Industrial Lands Strategy – Final Report

Vulcan Business Development Society

December 15, 2017

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Executive Summary

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The Vulcan area is a largely rural part of southern Alberta, located between Calgary and Lethbridge. The area contains a rural municipality (Vulcan County), the Town of Vulcan, and five smaller villages. The Vulcan Business Development Society (VBDS) was formed in 2005 to facilitate economic development in the region. With that goal in mind, VBDS, in partnership with the Town and County, has commissioned an Industrial Lands Study to explore options for the development of more shovel-ready land in and around the Town.

The consultant team led by MDB Insight Inc. who were joined by urbanMetrics Inc. and Watt Consulting Group, worked with representatives of VBDS, the Town and County between May and December 2017. The purpose of the project was to assess economic trends and general issues surrounding the existing industrial park, and three potential locations in and around the Town of Vulcan that could serve as alternatives for industrial development. The project has been composed of the following steps:

- Assessment of economic conditions for the Vulcan area
- Survey of industrial businesses within Vulcan
- Land demand analysis for Vulcan, with a forecasted land absorption rate for a 25-year horizon
- Traffic impact assessment study based on the expected increased demand over the 25-year horizon
- An assessment of the development attributes and challenges of three candidate locations, in addition to the existing Vulcan Business Park
- High-level analysis of the financial impacts of future industrial development
- Strategic Directions and Action Items that should be pursued by the two municipalities over the next five years (or longer).

Study Area

In addition to the existing industrial park located in Vulcan, VBDS staff and the consulting team identified three potential locations for a new business / industrial park, as shown on the following page. Two of these locations are within the existing Town boundary, while Location 3 is located in Vulcan County near the intersection of Highways 23 and 534, adjacent to the Town boundary.

Location of Existing and Potential New Business / Industrial Parks in Vulcan

Source: urbanMetrics inc. based on Google Maps.

Economic Outlook

Population growth within the Vulcan area has remained relatively stable, with greater growth occurring in the County. The Town's population is growing at a smaller pace, and population is declining within the surrounding small villages. Economically, agriculture remains a large driver within the County but recent renewable energy projects are adding to the area's economic diversity. Within the Town, the number of contributing employment sectors is much more varied with no one field dominating over the other.

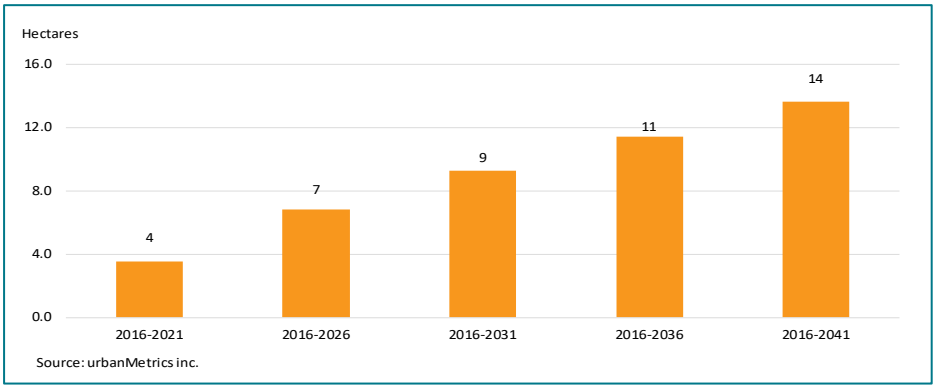
Business Survey

A web-based survey was sent to local businesses for feedback regarding the current business climate within Vulcan. The majority of respondents indicated that availability of serviced land, along with available buildings or land for rent were the most important issues. This indicates a need for continued efforts to develop a supply of industrial land in Vulcan.

Land Supply and Demand

The consultant team has established that there are approximately 5 hectares of vacant land within the Town, but the land is held in private hands. The consultant team has forecasted absorption of 14 net hectares[1] of industrial lands in Vulcan between 2016 and 2041. This includes a 25% contingency to provide flexibility in demand fluctuations that can occur over the 25-year period. To provide context, Calgary-area municipalities such as Okotoks, which has experienced strong population growth, has only absorbed about 1.9 hectares of industrial land per year (on average).

Forecast Industrial Land Absorption in Vulcan, 2016-2041



Traffic Impact Analysis

Watt Consulting Group undertook an assessment of traffic movements within key intersections related to the three potential locations for the industrial park, Watt concluded that, based upon projected population increases, the intersections would operate at the 'B' Level of Service, which translates into waits of approximately 20 seconds at signalized intersections. Furthermore:

- The results of the analysis indicate that no network improvements will be required if the proposed development is located at any of the analyzed locations.
- The intersection of Centre Street/1st Avenue, which provides access to Location 1 is located in proximity to an at-grade railroad crossing (offset approximately 60 m). This provides a relatively short distance for vehicle storage. Consequently, queues extending through the intersection may occur during a rail crossing event.
- From the overall network perspective, Location 3 provides for the preferred location as the traffic destined to the site will not have to cross residential or school zones. However, it should be noted that offset between the intersections of Pioneer Elevator access road or P&H access road with Highway 534 is approximately 50 meters.
- In the long term, it would be desirable to modify the alignment of Pioneer Elevator access road and/or P&H access road and combine the two existing Highway 534 intersections to improve the safety of the network operation in the area.

[1] Net hectare refers to the combined lot area within a subdivision, following the removal of roads, reserves and municipal rights-of-way

Financial Analysis of Development Costs

Based on research and analysis of the development financing and cost recovery options that are available to the municipal partners and the best practices being used in other municipalities, it is the consultant team's recommendation that initial infrastructure costs be financed through a combination of municipal debt and unrestricted reserves. The allocation of capital costs between debt and unrestricted reserves and the allocation between the municipalities will ultimately be up to the municipal partners.

For recovery of costs associated with these capital infrastructure projects, the consultant team recommends that the Town and County should recover the roads, water, wastewater and stormwater capital costs through an off-site levy based on land area. However, the extent to which these costs can be passed along to industrial land users will be limited based on off-site levies being charged by competitive local municipalities. When the municipal partners are calculating the off-site levies that the market will bear, it will be important to include both land costs and off-site levies in the calculation of 'total' land costs. As the Town has relatively inexpensive land costs, it may be possible to pass along a portion of the off-site levies to new industrial land users.

It will also be important for the Town to ensure it maintains a five-year supply of shovel-ready industrial lands available for development. Based on a forecast absorption rate of 0.75 net hectares per year, a five-year supply translates into approximately 4 hectares of shovel-ready industrial land. An industrial land inventory completed by the consultant team indicates the Town currently has 4.7 hectares of serviced industrial lands, which appears sufficient to accommodate five-years of growth. However, these lands are also held in private ownership. The Town should continue to monitor the supply of shovel-ready industrial lands and be prepared to move forward with servicing additional lands if the supply of available land is less than five years or appears to be not selling due to other issues.

Strategic Directions

Based on the evidence discussed, this strategy provides three strategic directions for the Partnership (or its successor) and the municipalities to undertake over the next five years. These directions will underpin how VBDS should incorporate additional economic development activities into the organization and includes different actions that can increase the areas investment readiness, and its ability to support reactive and proactive approaches to investment attraction.

The three strategic directions to guide the community in this pursuit are as follows:

Strategic Directions for Vulcan Industrial Land Strategy

Three Strategic Directions		
Ensure Sufficient Development Land for Traditional Industrial Uses	**Undertake Aftercare from Business Retention and Expansion Survey**	**Identify Future Development Land for Larger-Scale Industrial Uses**

Given fiscal restraint, limited funding resources, and competing priorities for core service delivery, these priority levels recommend a starting point, and may not indicate completion. It is recognized that some of the recommended initiatives may take longer than five years to complete, given the anticipated demands for shovel-ready industrial land.

Strategic Direction 1: Ensure Sufficient Land for Traditional Industrial Uses

At the present time, the Vulcan area has a small amount of developed land that could be used for industrial development. Increasing the supply of developed industrial land within Vulcan should be a very high priority for Town Council and Staff. As approximately half of the undeveloped lands in the existing industrial park have capital engineering estimates prepared, the development of Capital Project 'G' (construction of a portion of Jamison Road and 2nd Avenue NE) should be made a higher priority over the next budget cycle. Construction of these roads would allow for the development of 12 lots. The second priority would be to the development of Capital Project 'K', which would extend Jamison Road to Sinclair Road. Construction of the three interior roads in the northwest portion of the park would complete the development and would be undertaken as required by lot demand. Project 'K' would create 4 new lots.

Development of Location 1 would also complement the existing industrial park, but further engineering investigations would have to be undertaken to confirm soil conditions, more precisely pinpoint servicing and development cost estimates, and any issues connecting with the existing sanitary force main along 1 Avenue N.

Strategic Direction 2: Undertake Aftercare of Business Retention and Expansion Efforts

The survey that was commissioned as part of this project illuminated several key ideas relating to business retention and expansion activities that may be lacking sufficient attention in the region. Though anecdotal, the findings suggest critical follow-up may be required to gain a stronger grasp of business needs, expectations and future plans. There is a strong connection between business retention and expansion (BRE) and the ability to grow and fill employment lands. For one thing, existing businesses account for 80 to 90% of economic growth in a community[2]. If businesses are shrinking, closing or moving away, the needle is moving the opposite direction of where it should be going. BRE engagement and problem-solving will help to ensure businesses in the Vulcan area are poised for growth, rather than contraction or relocation. Also, by understanding the supply chain networks and critical needs of local businesses, opportunities may present themselves that will help build a case for attracting new investment into the area to fill identified gaps.

[2] Economic Developers Association of Canada (2015), *Practices, Principles and Planning: The Essentials of Economic Development*: pp. 68.

Strategic Direction 3: Identify Future Development Land for Larger-Scale Industrial Uses

While continued development of the existing industrial park should be a priority for Town Council, the lands identified as Location 3 should be viewed as a potential location for larger-scale industrial development. This is likely a longer-term strategic direction that Town and County staff should discuss and investigate further, with both the owner of the lands and also with the operators of the grain terminals. The municipalities will have to gain a better understanding of development costs and barriers, particularly with respect to sanitary servicing, and access requirements that Alberta Transportation may impose on further development of the lands. Much of this would be accomplished through the review of an Area Structure Plan, which should be developed with the above end-users in mind.

The municipalities should also be aware of any special water or servicing requirements that a larger agricultural facility would have so they can confirm to potential investors that the community has available servicing capacity for a larger processor or end-user.

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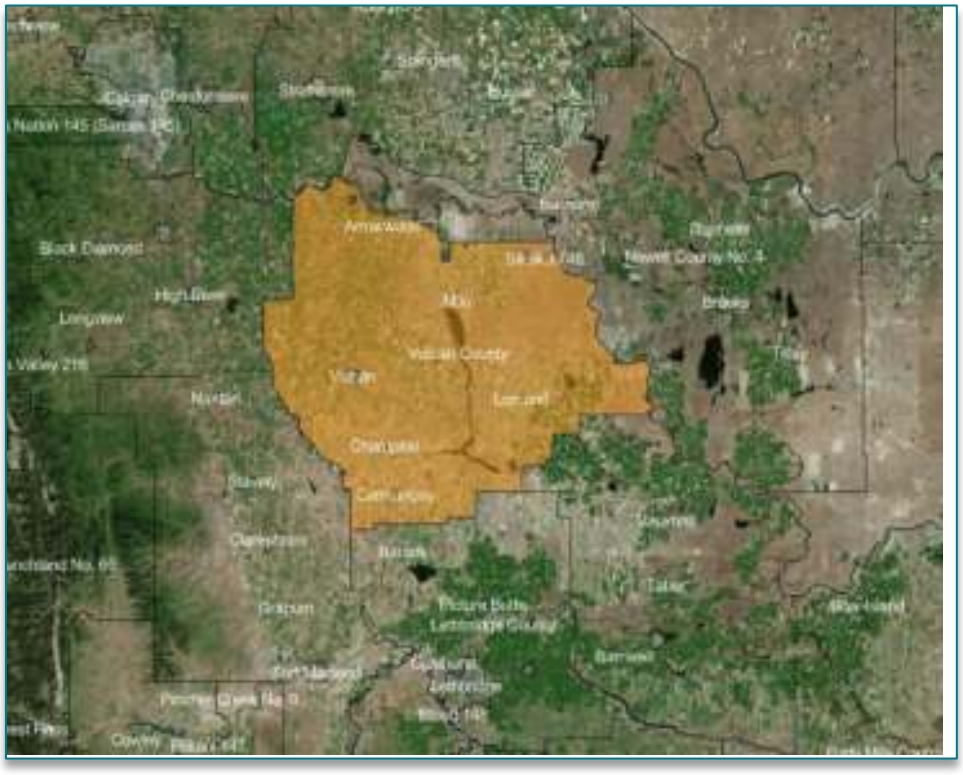
1. Introduction

The Vulcan area is a largely rural part of southern Alberta, located between Calgary and Lethbridge. The area contains a rural municipality (Vulcan County), the Town of Vulcan, and five smaller villages. The Vulcan Business Development Society (VBDS) was formed in 2005 to promote economic development within Vulcan County in Southern Alberta.

The location of Vulcan County and the Town of Vulcan is illustrated as the Study Area, in Figure 1 below. VBDS, in partnership with the Town and County, has commissioned an Industrial Lands Study to explore options for the development of more shovel-ready land in and around the Town.

Figure 1: Study Area Location



Source: urbanMetrics Inc. based on MapInfo.

While there are available industrial lands within the Vulcan area, many are spread out over the various municipalities within Vulcan County. The establishment of new 'shovel-ready' industrial lands in or adjacent to the Town of Vulcan aligns with the economic development focus of the VBDS, which is to promote business attraction and expansion and support for entrepreneurs and tourism development. At the same time, there may be some merits to having a supply of dry industrial land for some sectors that may not require the resources typically associated with serviced land. For example, some sectors do not require servicing to function, such as logistics and transport. Other industries may also require storage yards, of which there is little appropriately located land in or around Vulcan.

1.1 Project Methodology

The consultant team has been working with representatives of VBDS, the Town of Vulcan and Vulcan County between May and December 2017. The purpose of the project was to assess economic trends and general issues surrounding the existing Industrial Park, and three potential locations in and around the Town of Vulcan that could serve as an alternative for industrial development. The project has been composed of the following steps:

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1.2 Project Location

In addition to the existing industrial park located in Vulcan, VBDS staff and the consulting team identified three potential locations for a new business / industrial park, as shown in Figure 2. Two of these locations are within the existing Town boundary, while Location 3 is located in Vulcan County near the intersection of Highways 23 and 534, adjacent to the Town boundary.

Figure 2: Location of Existing and Potential New Business / Industrial Parks in Vulcan

Source: urbanMetrics inc. based on Google Maps.

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2. Environmental Scan

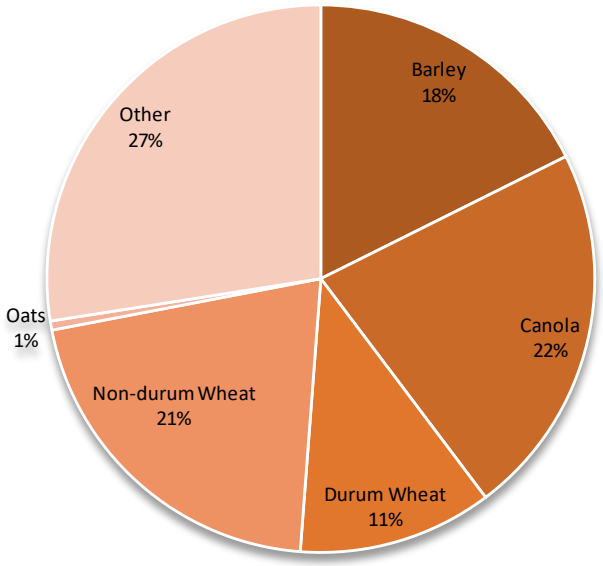
2.1 Regional Economic Outlook

While oil and gas will continue to be a mainstay of the provincial economy, exports in agricultural products and manufactured food and beverage products are becoming increasingly important. This shift in provincial exports has benefited Southern Alberta, which has relative strengths in agri-business. This focus on agri-business will be important in terms of demand for industrial lands in the Town and County of Vulcan and the surrounding municipalities which are part of the SouthGrow Regional Initiative.[3]

Over the ten-year period between 2007 and 2016, exports from the agricultural sector increased at an average annual rate of 3.6%, at a time when exports in other sectors declined by 0.4%. Exports of agricultural products are of particular importance to the County of Vulcan. In 2016, there were nearly 1.1 million acres of planted cropland in the County, which was the largest land area of any municipality in the province. The amount of planted cropland has been increasing in Vulcan County in recent years. Between 2011 and 2016, the number of acres of planted cropland grew at an annual average rate of 3.8%.

As shown in Figure 3, Vulcan County grows a diversity of crops. Therefore, the region is shielded by a downturn in any one crop price.

Figure 3: Vulcan County, Acres of Cropland, 2016



Source: Statistics Canada, Census of Agriculture, 2016.

[3] SouthGrow is an economic development alliance of 24 south central Alberta communities surrounding Lethbridge

In addition to strengths in crop farming, Vulcan also produces a significant share of Alberta's animal products. Based on the 2016 Agricultural Census, Vulcan is among the top 5 municipalities in the province in terms of numbers of pigs and cattle (although concentrated in a small number of operations.

Similar to grain exports, exports of cattle and pig products have improved in recent years. Exports of these agricultural products bode well for the Southern Alberta economy, particularly Vulcan; particularly if opportunities can be identified in spin-off, supply chain, or support industries.

In addition to agricultural exports, Southern Alberta continues to be a centre for agribusinesses related to farming, such as farm equipment distributors and finance. Food product manufacturing is also a staple in the southern Alberta economy, as both Cargill and JBS Food Canada have manufacturing facilities in southern Alberta (Aldersyde and Brooks, respectively).

There is a growing opportunity to leverage the area's proximity to high-value farmland to attract businesses engaged in value-added food and beverage manufacturing. Food and beverage manufacturing now represents about 22% of all manufacturing output in Alberta. The strength of the food and beverage manufacturing sector will likely continue to be supported by the relatively low Canadian dollar which will continue to drive exports. These factors are all positive in terms of demand for industrial lands.

2.2 Local Economic Context

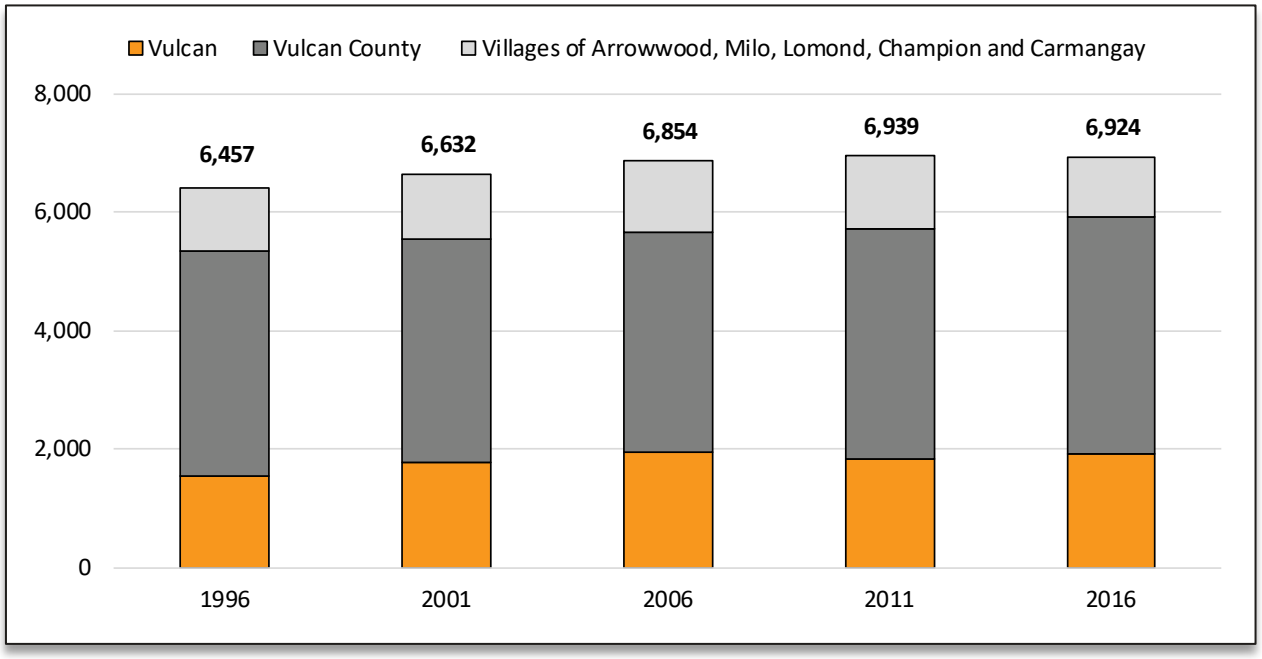
2.2.1 Population

As illustrated in Figure 4, the population in Study Area has generally been stable over the past two decades. The population has grown at an average annual rate of approximately 0.3% per year and added, on average, about 20 new residents per year. This is at a time when the Province has experienced phenomenal population growth of 2.1% per year, which was largely driven by high oil prices and significant investment in oil and gas infrastructure.

The majority of population growth that has occurred in the Study Area has taken place in the County of Vulcan, which added 380 new residents over a 20-year period. Over this period, the Town of Vulcan has also experienced population growth, but at a slower rate than the County. The five villages located within the geographical area of Vulcan County have seen their populations decline over the 20-year period as advances in farming techniques have resulted in less demand for agricultural labour.

Both the Town and County of Vulcan are located in Census Division No. 5, which extends northward through Wheatland County to Drumheller and Starland County. While the population of Division No. 5 has grown over the past 20 years, it has not kept pace with the overall provincial population growth rate. Overall, the share of the population in Alberta that resides in Division No. 5 has declined from 1.6% in 1996 to 1.4% in 2016. Based on population projections prepared by the Government of Alberta, this trend is anticipated to continue, with continued regional population growth around Edmonton and Calgary.

Figure 4: Historical Population, Study Area



Source: urbanMetrics, based on Census of Canada, 2001 through 2016.

Figure 5 provides a closer look at individual population changes across the study area, as well as in comparison to Division No. 5 and Alberta. There has been some population growth in Vulcan County between 2006 and 2016 (+7%). As well, the Town's population has been relatively stable, hovering around 1,900 residents. Between 2006 and 2016, Census Division No. 5 grew by 9%, likely owing mostly to growth in Strathmore.

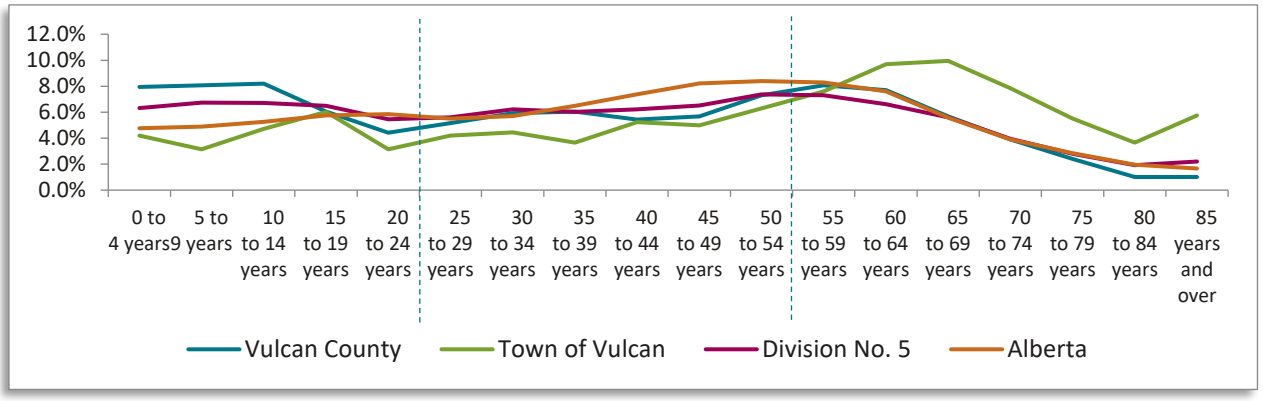
Figure 5: Population Growth for Vulcan County, Town of Vulcan, and Select Comparators

Geography	2006	2011	2016	% 2006-2016
Vulcan County	3,718	3,875	3,984	7%
Town of Vulcan	1,940	1,836	1,917	-1%
Census Division No. 5	51,104	53,263	55,708	9%
Alberta	3,290,350	3,645,257	4,067,175	24%

Source: Statistics Canada, Census Profiles 2016, 2011, 2016.

A key driver of most declines is the ageing populations in these areas. As demonstrated in Figure 6, Vulcan County has an above average proportion of its population that is 10 years or younger, indicating growth in families. By contrast, Town of Vulcan has a larger than average proportion of people aged 65 and over. This may be partially explained by residents choosing to retire away from 'the farm', and moving 'to town' and remaining in the area.

Figure 6: Population Distributions for Vulcan County, Town of Vulcan, and Select Comparators

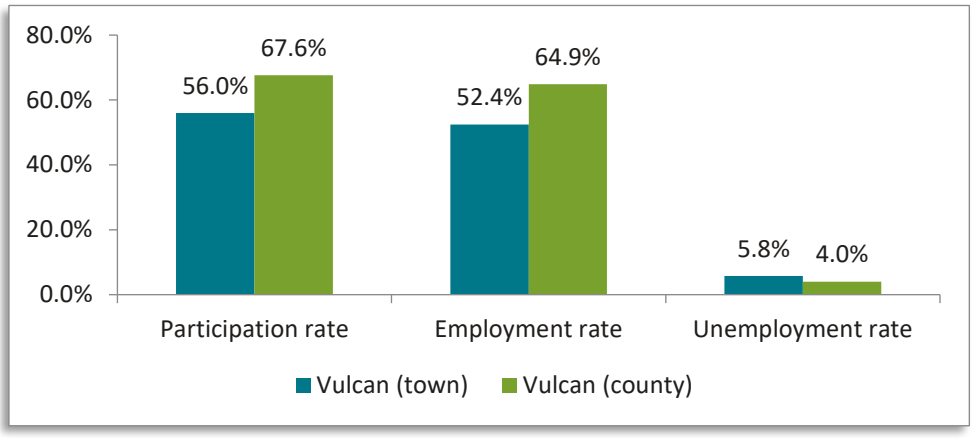


Source: Statistics Canada, Census Profiles, 2016

2.2.2 Workforce

The most recent Census data (2016) have been consulted regarding employment distributions. The Town of Vulcan had a total of 860 people in its labour force (aged 15 and over), of which 50 were unemployed, while 680 were not in the labour force. Figure 7 illustrates the participation, employment and unemployment rates for Town of Vulcan and Vulcan County. Town of Vulcan's participation rate was 56%. The result is a large proportion of the population that is not actively working or unemployed. A likely explanation for the outcome is the growing elderly segment of the population in the town. For Vulcan County, its labour force was 1,635, with a notably higher participation rate of 67.6%.

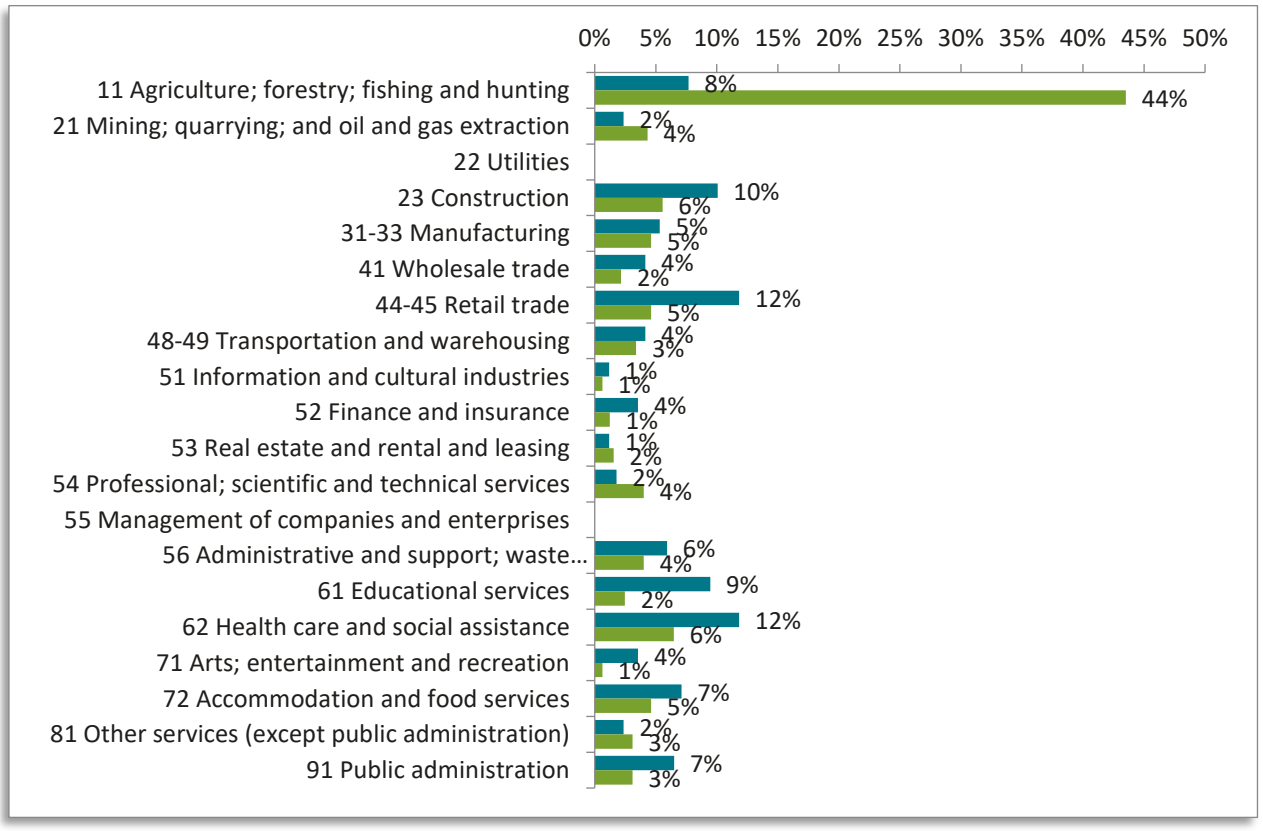
Figure 7: Participation, Employment and Unemployment Rates for Town of Vulcan and Vulcan County (2016)



Source: Statistics Canada, Census Profiles 2016.

Figure 8 shows the distribution of industries for Town of Vulcan and Vulcan County. Notably, the majority of people in the County work in agriculture (44%), followed by health care and social services (6%) and construction (6%). For the Town of Vulcan, strong employment sectors include retail (12%), health care and social services (12%), and construction (11%).

Figure 8: North American Industry Classification System (NAICS) Industry Distributions for Town of Vulcan and Vulcan County (2016)



Source: Statistics Canada, Census Profiles 2016.

2.3 Canadian Business Patterns Comparison

2.3.1 Location Quotient Analysis

Location quotient (LQ) is a ratio comparing the number of businesses in a defined area, to a larger area (e.g. Alberta). LQ analysis has been performed based on business distributions, rather than workforce distributions. This approach indicates which sectors are represented particularly well by local industry (> 1.25), lagging behind the province (< 0.75), or on par with the province (between 0.75 and 1.25). LQ data is derived from Canadian Business Patterns data, which is based on businesses that filed with the Canada Revenue Agency, as opposed to census data. This allows for annual comparisons between 2014 and 2016 at the census subdivision level so Vulcan County and Town of Vulcan can be compared to the province and other areas to assess growth and competitiveness.

The figure below demonstrates LQ results for Vulcan County and Town of Vulcan in comparison to two other nearby communities, Claresholm and Nanton for 2014 and 2016.

Vulcan County has seen growth in seven of its leading industries including utilities, retail trade, transportation & warehousing, information and cultural industries, administrative support and related services, health care and social services, and arts, entertainment and recreation. Meanwhile, it has seen slippage in a number of areas where it has traditionally maintained strength such as construction, manufacturing, wholesale trade, finance and insurance, and real estate and rental and leasing. Most of the areas where slippage has occurred remain in a position of economic strength; however, a notable exception is in the manufacturing sector, where the decline has gone from 1.87 to 1.22.

In contrast to Vulcan County, the Town of Vulcan had a net increase in the manufacturing sector from 0.65 to 1.56. Other areas that resulted in growth include retail trade, transportation and warehousing, information and cultural industries, education services, and arts, entertainment and recreation. Declines have been evident in utilities, construction, finance and insurance, real estate and rental and leasing, professional, scientific and technical services, management of companies and enterprises, healthcare and social assistance, and other services (except public administration).

The comparator communities of Claresholm and Nanton have generally seen considerable declines in most industries, with the exception of finance and insurance (which have seen growth). For most declines, industries that used to be considered competitive (i.e. with an LQ value of 1.25 or greater) constitute a shift from leading to lagging position.

In conclusion, while Vulcan County and Town of Vulcan have traded-off some declines for growth in new sectors, the opposite has been the case in comparator communities, which have mainly seen drastic reductions of competitiveness.

Figure 9: Location Quotient Analysis with Net Changes (2014-2016)

Industry	Vulcan County			Vulcan Town			Claresholm			Nanton		
	2014	2016	2014-2016	2014	2016	2014-2016	2014	2016	2014-2016	2014	2016	2014-2016
11 - Agriculture, forestry, fishing and hunting	0.65	1.01	0.4	1.06	0.94	-0.1	1.21	0.07	-1.1	0.79	0.14	-0.7
21 - Mining and oil and gas extraction	0.00	0.12	0.1	0.00	0.17	0.2	0.13	0.00	-0.1	0.00	0.00	0.0
22 - Utilities	1.42	4.14	2.7	3.95	1.43	-2.5	2.15	0.70	-1.4	3.34	1.16	-2.2
23 - Construction	3.88	1.81	-2.1	2.70	1.76	-0.9	1.07	0.17	-0.9	1.11	0.14	-1.0
31-33 - Manufacturing	1.87	1.22	-0.6	0.65	1.56	0.9	1.48	0.17	-1.3	1.59	0.17	-1.4
41 - Wholesale trade	6.29	2.76	-3.5	0.97	0.88	-0.1	4.03	0.23	-3.8	3.97	0.43	-3.5
44-45 - Retail trade	1.02	2.47	1.5	1.66	2.52	0.9	1.74	0.40	-1.3	0.95	0.59	-0.4
48-49 - Transportation and warehousing	0.51	3.92	3.4	1.43	2.86	1.4	0.13	0.03	-0.1	0.32	0.07	-0.2
51 - Information and cultural industries	1.96	4.40	2.4	1.09	2.89	1.8	0.94	0.45	-0.5	0.79	0.45	-0.3
52 - Finance and insurance	2.63	1.96	-0.7	1.22	0.90	-0.3	0.67	2.01	1.3	1.27	1.44	0.2
53 - Real estate and rental and leasing	9.40	5.08	-4.3	2.38	2.17	-0.2	2.28	0.60	-1.7	2.38	0.62	-1.8
54 - Professional, scientific and technical services	0.00	0.00	0.0	2.04	0.00	-2.0	0.00	0.02	0.0	0.16	0.05	-0.1
55 - Management of companies and enterprises	0.00	4.28	0.0	1.35	0.78	-0.6	0.81	0.20	-0.6	0.48	0.29	-0.2
56 - Administrative and support, waste management and remediation services	0.32	5.92	5.6	0.00	1.08	0.0	0.27	0.07	-0.2	0.00	0.03	0.0
61 - Educational services	0.00	24.84	0.0	1.13	3.62	2.5	2.28	0.18	-2.1	1.11	0.14	-1.0
62 - Health care and social assistance	1.21	6.02	4.8	1.68	0.63	-1.1	0.40	0.12	-0.3	0.95	0.14	-0.8
71 - Arts, entertainment and recreation	1.67	3.20	1.5	0.85	1.56	0.7	1.74	0.10	-1.6	1.75	0.16	-1.6
72 - Accommodation and food services	1.69	2.13	0.4	1.37	0.92	-0.5	3.49	0.50	-3.0	2.22	0.62	-1.6
81 - Other services (except public administration)	0.13	0.00	-0.1	0.37	0.00	-0.4	0.40	0.02	-0.4	0.32	0.00	-0.3
91 - Public administration	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0

Source: Statistics Canada, Canadian Business Patterns, December 2014, December 2016. Items highlighted in green represent areas of industry strength relative to provincial distributions, registered as anything above an LQ of 1.25. Items in blue indicate a net positive growth in LQ, while those in red represent a net decline.

2.4 Economic Cluster Analysis

This section presents a brief overview of market trends as they pertain to some key sectors identified in as previous priorities for the Vulcan region. Attention to them is considered important, as growth within them may signal the need for additional local considerations. These sectors are:

- Agriculture & Agrifood
- Clean Technology & Green Energy

Further analysis was also conducted of Vulcan County and Town of Vulcan's information technology and business support climate, and it was found that the sector generally has low representation. A deeper analysis of the cluster was therefore not pursued. Tourism is also a significant contributor to the economy but was not explored as it would not exercise demand on industrial land. Each of the above two is discussed in greater detail below.

2.4.1 Agriculture & Agrifood

The 2016 Census of Agriculture presents some insight into how agriculture has changed in Alberta since 2011. The figure below demonstrates changes in farm sizes and the number of farms for the Vulcan County region in comparison to other nearby counties in Census Division No. 5.

What the data show is that as of 2016, Vulcan County had six more farms than it had previously in 2011, totalling 598, but this may be due to the number of acreages or estate-residential properties, which increased in numbers between 2001 and 2016. Agriculture is alive and well in Vulcan County and other nearby Counties, offering an important opportunity for regional collaboration in the sector to accommodate or complement this growth with agriculture-related supply chain enterprises, including but not limited to wholesale trade, transportation and warehousing, and related manufacturing.

Figure 10: Farm Size (2011-2016)

North American Industry Classification System (NAICS)	Alberta			Division No. 5			Vulcan County		
	2011	2016	Change	2011	2016	Change	2011	2016	Change
Total number of farms	42,355	39,620	**-2,735**	2,326	2,365	**39**	592	598	**6**
Farms 10 to 69 acres	3,638	3,702	64	210	226	16	35	41	6
Farms 70 to 129 acres	3,030	2,824	-206	105	112	7	15	18	3
Farms 130 to 179 acres	6,581	6,045	-536	241	251	10	50	64	14
Farms 180 to 239 acres	1,336	1,289	-47	62	55	-7	9	9	0
Farms 240 to 399 acres	5,395	4,918	-477	211	214	3	57	46	-11
Farms 400 to 559 acres	3,653	3,257	-396	142	166	24	34	41	7
Farms 560 to 759 acres	3,258	2,947	-311	156	151	-5	31	31	0
Farms 760 to 1,119 acres	3,997	3,565	-432	215	211	-4	49	53	4
Farms 1,120 to 1,599 acres	3,335	3,012	-323	226	231	5	63	51	-12
Farms 1,600 to 2,239 acres	2,694	2,529	-165	251	223	-28	64	57	-7
Farms 2,240 to 2,879 acres	1,575	1,497	-78	132	134	2	47	41	-6
Farms 2,880 to 3,519 acres	1,025	1,027	2	101	97	-4	28	29	1
Farms 3,520 acres and over	2,838	3,008	170	274	294	20	110	117	7
North American Industry Classification System (NAICS)	Wheatland County			Starland County			Kneehill County		
	2011	2016	Change	2011	2016	Change	2011	2016	Change
Total number of farms	765	784	**19**	298	304	**6**	671	679	**8**
Farms 10 to 69 acres	102	91	-11	5	12	7	68	82	14
Farms 70 to 129 acres	56	57	1	4	10	6	30	27	-3
Farms 130 to 179 acres	73	86	13	35	32	-3	83	69	-14
Farms 180 to 239 acres	24	18	-6	2	6	4	27	22	-5
Farms 240 to 399 acres	67	78	11	17	26	9	70	64	-6
Farms 400 to 559 acres	42	54	12	21	14	-7	45	57	12
Farms 560 to 759 acres	55	42	-13	20	18	-2	50	60	10
Farms 760 to 1,119 acres	69	73	4	34	29	-5	63	56	-7
Farms 1,120 to 1,599 acres	62	69	7	39	44	5	62	67	5
Farms 1,600 to 2,239 acres	73	63	-10	39	33	-6	75	70	-5
Farms 2,240 to 2,879 acres	34	42	8	28	22	-6	23	29	6
Farms 2,880 to 3,519 acres	29	24	-5	14	14	0	30	30	0
Farms 3,520 acres and over	79	87	8	40	44	4	45	46	1

Source: Statistics Canada. Census of Agriculture, Table 004-0201. Top 25 percentile is in Green, and bottom 25 percentile is in Red. Note: Listed farms under 10 acres have been excluded as they would typically represent acreage residential development.

In regard to the type of farming, Figure 11 shows that some sectors, such as cattle ranching and farming, and oilseed and grain farming, are experiencing growth in Vulcan County, while others, such as other animal production, and greenhouse, nursery and floriculture production have experienced a decline. The decline in other animal production is indicative of a broader trend occurring across this part of the province, where nearly all counties have seen declines in the sector, indicating a reduction in the diversity of farm types overall.

Figure 11: Farms Classified by NAICS Code (2011-2016)

North American Industry Classification System (NAICS)	Alberta			Division No. 5			Vulcan County		
	2011	2016	Change	2011	2016	Change	2011	2016	Change
Total number of farms	43,234	40,638	-2,596	2,371	2,427	56	603	608	5
Cattle ranching and farming [1121]	12,507	12,693	186	492	543	51	107	128	21
Hog and pig farming [1122]	193	166	-27	11	22	11	3	3	0
Poultry and egg production [1123]	339	373	34	39	38	-1	1	0	-1
Sheep and goat farming [1124]	490	399	-91	29	22	-7	6	5	-1
Other animal production [1129]	6,374	5,101	-1,273	253	205	-48	61	48	-13
Oilseed and grain farming [1111]	12,692	13,451	759	1,221	1,319	98	355	367	12
Vegetable and melon farming [1112]	277	299	22	6	9	3	1	1	0
Fruit and tree nut farming [1113]	151	137	-14	9	5	-4	0	1	1
Greenhouse, nursery and floriculture production [1114]	826	605	-221	39	35	-4	5	3	-2
Other crop farming [1119]	9,385	7,414	-1,971	272	229	-43	64	52	-12
North American Industry Classification System (NAICS)	Wheatland County			Starland County			Kneehill County		
	2011	2016	Change	2011	2016	Change	2011	2016	Change
Total number of farms	782	810	28	300	309	9	686	700	14
Cattle ranching and farming [1121]	174	187	13	67	72	5	144	156	12
Hog and pig farming [1122]	2	4	2	0	3	3	6	12	6
Poultry and egg production [1123]	6	7	1	1	1	0	31	30	-1
Sheep and goat farming [1124]	8	10	2	5	2	-3	10	5	-5
Other animal production [1129]	105	76	-29	21	21	0	66	60	-6
Oilseed and grain farming [1111]	346	397	51	166	173	7	354	382	28
Vegetable and melon farming [1112]	4	4	0	1	2	1	0	2	2
Fruit and tree nut farming [1113]	6	2	-4	0	0	0	3	2	-1
Greenhouse, nursery and floriculture production [1114]	23	21	-2	0	1	1	11	10	-1
Other crop farming [1119]	108	102	-6	39	34	-5	61	41	-20

Source: Statistics Canada. Census of Agriculture, Table 004-0200. Top 25 percentile is in Green, and bottom 25 percentile are in Red.

Farm receipts are a strong indicator of market performance for the sector. As shown in Figure 18, across Division No. 5, the value of farm receipts has increased by nearly a billion dollars, with Vulcan County representing a net increase of nearly $330 Million.

Figure 12: Farm Receipt Values (2011-2016)

Geography	2011	2016	% Change
Census Division No. 5	1,445,369,338	2,234,061,094	55%
Vulcan County	534,826,356	864,818,487	62%

Source: Statistics Canada. Census of Agriculture, Table 004-0233.

By studying LQ, it is possible to determine the extent to which different components of the agrifood sub-sector more broadly are performing stronger or lagging behind the provincial distributions of the same sub-sectors. Figure 19 and Figure 20 present the number of enterprises, their proportions relative to all other businesses, and LQ values for Vulcan County and Town of Vulcan, respectively.

The data demonstrate that strength in the agrifood sector is predominantly driven by components of the agriculture sector and its support activities, rather than food, beverage and tobacco processing related business. Indeed, there are no food, beverage and tobacco manufacturers (NAICS 411) in the area, nor are there any wholesale distributors; demonstrating an important gap in the agrifood value chain.

Figure 13: Location Quotient Analysis (LQ) for Agrifood Sector in Vulcan County (2014-2016)

Industry (NAICS)	n		%		LQ	
	2014	2016	2014	2016	2014	2016
TOTAL AGRIFOOD	63	111	52%	63%	12.95	15.55
Farms (111 + 112)	55	104	45%	59%	15.45	20.00
Support Activities for Farms (115)	7	7	6%	4%	15.41	9.77
Food & Beverage Manufacturing (311 + 312)	0	0	0%	0%	0.00	0.00
Farm Product Wholesaler Distributors (411)	1	0	1%	0%	9.08	0.00
Food, Beverage and Tobacco Wholesaler-Distributors (413)	0	0	0%	0%	0.00	0.00

Source: Statistics Canada, Canadian Business Patterns, December 2014, December 2016.

Figure 14: Location Quotient Analysis (LQ) for Agrifood Sector in Town of Vulcan (2014-2016)

Industry (NAICS)	n		%		LQ	
	2014	2016	2014	2016	2014	2016
TOTAL AGRIFOOD	58	20	34%	15%	8.56	3.71
Farms (111 + 112)	50	12	29%	9%	10.08	3.06
Support Activities for Farms (115)	3	3	2%	2%	4.74	5.55
Food & Beverage Manufacturing (311 + 312)	0	0	0%	0%	0.00	0.00
Farm Product Wholesaler Distributors (411)	5	5	3%	4%	32.59	42.24
Food, Beverage and Tobacco Wholesaler-Distributors (413)	0	0	0%	0%	0.00	0.00

Source: Statistics Canada, Canadian Business Patterns, December 2014, December 2016.

Key Findings on Agriculture and Agrifood

Results of the above market analysis indicate that agriculture continues to be a strong and dominant industry in Vulcan County and across Division No. 5. All counties in the region have experienced growth in the number of farms and in farm receipt values. While the number of farms overall at the provincial level has experienced a decline, the number of farms in Vulcan and across Division No. 5 has increased, indicating a potential opportunity for further development across the broader value chain. At the same time, it is unclear whether Vulcan is bucking the trend entirely or if it is merely behind the curve on the provincial trend. Continued monitoring is essential. Meanwhile, the dominance of agriculture and related sub-sectors in the county and across the region is not demonstrated on the manufacturing or distribution side of the agrifood value chain, illustrating a critical gap in economic competitiveness. Given the number of primary inputs in Vulcan County and neighbouring counties, there may be opportunities for expanding into value-added agriculture via agrifood manufacturing or other agricultural product manufacturing.

2.4.2 Clean Technology & Green Energy

In 2014, Canada's Green Economy generated $5.8 billion in sustainable technologies and was projected to reach $2 trillion USD in global trade by 2020[4]. Despite these encouraging signs, investment in green technology in Canada has actually declined compared to other OECD countries, with $497 billion spent in 2015 being about 15% less than in 2014[5]. Policy decisions at Federal and Provincial levels are likely to constitute a shift in this negative trend, but their impacts have yet to be measured. On the other hand, global trends are also likely to affect the sector, with uncertainty over how the United States' withdraw from the Paris Climate Agreement and divestment in green technologies standing in contrast to other G20 climate and technology priorities[6]. These different considerations, i.e., provincial, national, and global trends, indicate that a period of uncertainty and volatility will likely continue to affect the cleantech sector, but there may be important opportunities for staking a claim in its future prosperity.

An LQ analysis of the clean technology and green energy sector in Vulcan County and Town of Vulcan has been conducted for 2014 and 2016. Many of the sub-sector NAICS codes represent sectors that include businesses that may or may not be directly associated with clean technology. Therefore, the analysis is primarily used to indicate areas where there is the potential for cleantech cluster elements and cannot replace verifying each business individually.

Figure 15 presents the LQ analysis for Vulcan County, where it is shown that the clean technology and green energy sector has shifted from a position of being on par with the province and to slightly below par since 2014. The addition of business in the energy efficiency development sub-sector is counteracted by slight declines in other existing sub-sectors. Biofuels are the strongest overall contributor to the county's clean technology and green energy sector potential. It should be noted however that just because a farm creates inputs that could be suitable for biofuels does not mean that those commodities are destined for biofuels production. Instead, the results should be interpreted as the potential to support or contribute to the green energy cluster.

Figure 15: Clean Technology and Green Energy for Vulcan County (2014-2016)

Industry (NAICS)	n		%		LQ	
	2014	2016	2014	2016	2014	2016
TOTAL CLEAN TECHNOLOGY AND GREEN ENERGY	15	17	12%	10%	0.94	0.74
BIOFUELS (1111+ 3241 + 3251)	7	9	6%	5%	13.82	13.19
CONSULTING & SUPPORT (5416 + 8133)	0	0	0%	0%	0.00	0.00
ENERGY EFFICIENCY – MANUFACTURING (3272 + 335 + 336)	0	0	0%	0%	0.00	0.00
ENERGY EFFICIENCY – DEVELOPMENT (5414 + 5417)	0	1	0%	1%	0.00	2.61
GREEN BUILDING - NEW CONSTRUCTION (2361 + 2362 + 5312 + 5413)	2	2	2%	1%	0.46	0.31
RENEWABLE ENERGY SYSTEMS – CONSTRUCTION (2371 + 2381 – 2383)	4	3	3%	2%	0.80	0.41
RENEWABLE ENERGY SYSTEMS – SUPPORT (5221 + 5239 + 5413)	2	2	2%	1%	0.46	0.33

Source: Statistics Canada, Canadian Business Patterns, December 2014, December 2016.

[4] Prosperity Institute, Canada's Green Economy and the World Factsheet, n/d.

[5] Clean Energy Canada, 2016, "Tracking the Energy Revolution – Canada 2016" June 16, 2016: http://cleanenergycanada.org/work/tracking-canada-2016/

[6] CBC News, 2017, "G20 leaders reaffirm support of Paris Climate change agreement without U.S.," Associated Press, July 8, 2017: http://www.cbc.ca/news/politics/g20-hamburg-1.4196158

For the Town of Vulcan, the clean technology and green energy sector has shifted from a position of comparative weakness (LQ 0.63) to one that is within the range of the provincial norm (0.87). Biofuels have experienced a sharp decline from LQ 7.09 to 1.94 with a corresponding decline of enterprises from five to one. Growth in the construction sector may be having a positive impact on green building construction as well if the new business growth is capable of meeting a local or regional demand. The sub-sector has shifted from a position of weakness (0.65) to one that is almost in a leadership position (LQ 1.23). As of 2016, the town's strongest sub-sector is in the recycling materials space, which has retained the number of businesses. Growth in LQ values between 2014 and 2016 (LQ 4.04 to 5.25) with the number of businesses remaining constant indicates that external shifts are what is driving growth in market strength locally.

At both county and town levels, there are several sub-sectors that do not have any activity; particularly in energy efficiency manufacturing, renewable energy generation, and renewable energy systems transmission. Given the policy preference to have nearly one-third of Alberta's energy generated from renewable sources by 2030, there may be an opportunity to carve out space in the market as these targets are operationalized. Local assets such as Vulcan Solar Park, a solar energy-themed public space, show the community as progressive and may serve as a collective symbol for future growth or excellence in the sector.

Figure 16: Clean Technology and Green Energy for Town of Vulcan (2014-2016)

Industry (NAICS)	n		%		LQ	
	2014	2016	2014	2016	2014	2016
TOTAL CLEAN TECHNOLOGY AND GREEN ENERGY	14	15	8%	11%	0.63	0.87
BIOFUELS (1111+ 3241 + 3251)	5	1	3%	1%	7.09	1.94
CONSULTING & SUPPORT (5416 + 8133)	0	0	0%	0%	0.00	0.00
ENERGY EFFICIENCY – MANUFACTURING (3272 + 335 + 336)	0	0	0%	0%	0.00	0.00
ENERGY EFFICIENCY – DEVELOPMENT (5414 + 5417)	0	0	0%	0%	0.00	0.00
GREEN BUILDING - NEW CONSTRUCTION (2361 + 2362 + 5312 + 5413)	4	6	2%	5%	0.65	1.23
RECYCLED MATERIALS (5621 + 5629)	2	2	1%	2%	4.04	5.25
RENEWABLE ENERGY – GENERATION (2211 + 2213 + 3211 + 3221 + 3359 + 5622)	0	0	0%	0%	0.00	0.00
RENEWABLE ENERGY SYSTEMS – CONSTRUCTION (2371 + 2381 – 2383)	1	3	1%	2%	0.14	0.54
RENEWABLE ENERGY SYSTEMS – SUPPORT (5221 + 5239 + 5413)	2	3	1%	2%	0.33	0.66
RENEWABLE ENERGY SYSTEMS – TRANSMISSION (221122)	0	0	0%	0%	0.00	0.00

Source: Statistics Canada, Canadian Business Patterns, December 2014, December 2016.

Qualitative Considerations for Clean Technology

Green building and new construction are likely to be impacted by a recent surge in solar and wind farm developments. In 2014, the 300-megawatt Blackspring Ridge wind farm project was completed. Construction saw a boom of over 350 jobs, with 20 permanent operations and maintenance jobs remaining after construction[7]. The project represents a $300 million investment, while Renewable Energy Credits (RECs) generated from the project are contracted to Pacific Gas and Electric under the 20-year purchase agreement.

Other projects in solar energy include the Vulcan Solar Project, which is currently in development. The project represents an investment of $155 million for 77 megawatts of electricity when phases 1 and 2 are complete[8]. While more than 100 jobs will be created during the construction of the project, employment, after it is complete, is to be less than 10 people for operations and maintenance[9].

These findings indicate solar, and wind projects could have a notable short-term impact on local employment and supply chain requirements during construction, but weaker long-term employment and supply chain needs.

Key Findings on Clean Technology and Renewable Energy

Considerations of clean technology and renewable energy continue to result in a period of uncertainty as provincial, federal and global policy shifts impact market stability. While Vulcan County is in a position that may indicate slippage in the sector, the Town of Vulcan is in a position that may affect growth and is transitioning to being on par with the province. Biofuels, recycled materials, and new building construction may constitute positive boons for the town or increased capacity to at least expand to including green technology options. There may also be opportunities to tap into renewable energy generation and transmission given provincial targets to obtain 30% renewable energy by 2030. Recent evidence of solar and wind farm development represents strong short-term labour force and supply chain impacts but are not likely to have strong impacts once operational. Unless manufacturing or professional-related services associated with the sector experience development in the Vulcan area, the sector is not expected to drive any significant demand for industrial land. Industrial land demand will most likely be required for affiliated supply chain industries and modest operation and maintenance workforce or storage needs.

[7] EDF Energies Nouvelles (2014) “Blackspring Ridge”: https://www.edf-en.ca/project/blackspring-ridge-wind/

[8] Government of Alberta (n/d) “Vulcan Solar Project”: http://www.majorprojects.alberta.ca/details/Vulcan-Solar-Project/2086

[9] EDF Energies Nouvelles (n/d) “Vulcan Solar Project”: https://www.edf-en.ca/project/vulcan-solar-project/

3

3. Supply and Demand Factors for Industrial Land

Three locations in and around the Town of Vulcan were identified by VBDS Staff and Partners. The three potential locations are shown in the Figure 2, in Section 1.

3.1 Land Needs and Absorption Forecast

urbanMetrics, with assistance from MDB Insight, submitted a report which details land supply and demand forecasts for Vulcan over a 25-year horizon. For urbanMetrics' Industrial Land Absorption Analysis please refer to Appendix A.

3.1.1 Industrial Land Supply

Based on the Vulcan Municipal Development Plan, there is currently 17.6 hectares of vacant industrial land in the municipality, representing an industrial land vacancy rate of approximately 50%. While the vacant industrial lands located in the northeast of the Town are available, the Town has had to prioritize infrastructure cost spending with other projects in the municipality.

The consultant team analysed the available air photos and GIS Mapping and have concluded; there are five vacant industrial parcels totalling 4.7 hectares in size located in the Town that is fully serviced. urbanMetrics was able to compare similar municipalities (Coaldale, Taber, Claresholm, and Picture Butte) to examine the following factors in relation to Vulcan:

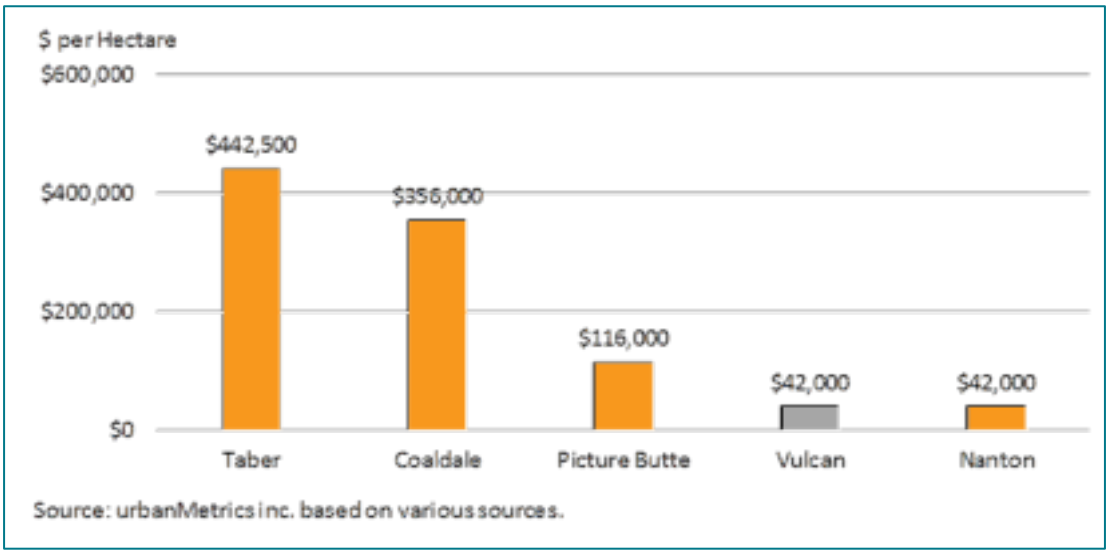
- Access to multimodal transportation
- Vacant land area
- Serviced land prices ($/ha)
- Off-site levies ($/ha)
- Non-residential tax rate (per $1000 property value)

The figure below illustrates the average price for vacant industrial lands in select municipalities based on available information. urbanMetrics was able to identify reliable vacant industrial land prices for five of the six communities profiled. The exception was Claresholm, where there was a limited supply of vacant and serviced industrial lands. As shown, Vulcan had the least expensive vacant industrial lands among the municipalities profiled.

In addition to land prices, off-site levies have an impact on industrial land absorption and the types of businesses that could ultimately locate in Vulcan. Research completed by urbanMetrics indicates that many of the smaller rural municipalities not to apply off-site levies, which is consistent with the current practice in Vulcan. Municipalities that typically apply off-site levies generally have a larger supply of industrial lands and access to major highways.

Should the Town decide to implement off-site levies for the proposed industrial park, it will be important to ensure that any off-site levy is competitive with municipalities in the surrounding region that have a large supply of industrial lands. This is discussed in greater detail further in this Section.

Figure 17: Industrial Land Prices (Select Municipalities)



3.1.2 Industrial Land Demand

urbanMetrics, through their analysis of available population data and forecasts, have prepared a land demand forecast for Vulcan, based on their assessment of similar municipalities in the region. A 25-year horizon was used, with the population projected to grow for all municipalities within the Vulcan County region from 6924 in 2016 to 8408 in 2041.

urbanMetrics have forecasted a similar growth in employment for the area, with the projection of 670 new jobs added overall in the next 25 years. Of those, 30% of the jobs are expected to be accommodated on industrial lands.

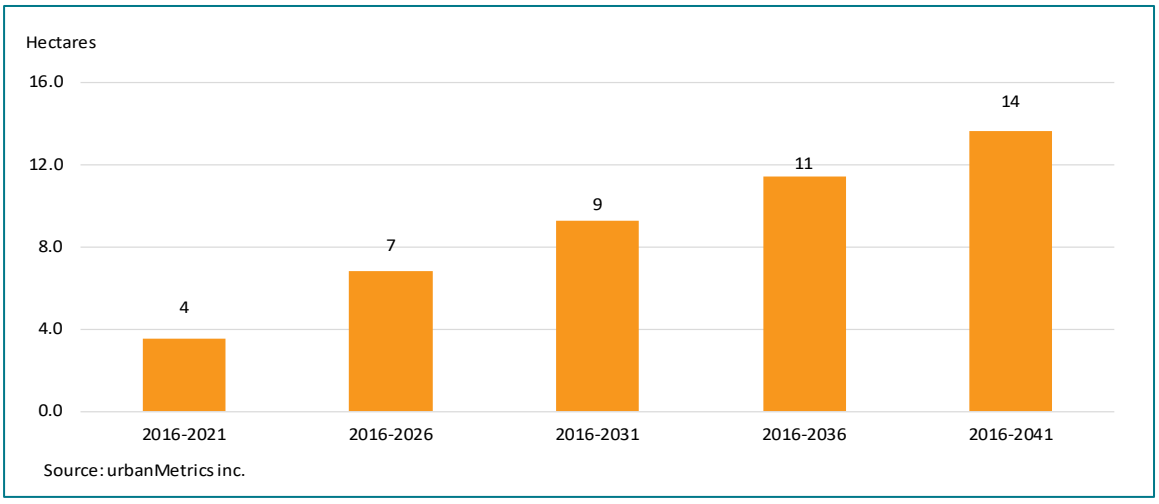
urbanMetrics were able to take this projection and convert to an expected amount of new floor space to be needed as a function of new workers (FSW) entering the economy. SW can vary significantly by industry. For example, in the manufacturing sector, FSW densities typically range between 1,000 and 2,000 square feet per employee. Within the wholesale trade and transportation and warehousing, FSW densities can be upwards of 2,000 square feet per employee. For population-related employment uses such as commercial and institutional, we have assumed a density of 400 square feet per employee.

In forecasting industrial land absorption in Vulcan, urbanMetrics made assumptions regarding FSW densities on industrial lands based on their experience in similar municipalities. These assumptions are also based on knowledge of the existing employment base and the types of employment that are expected to grow in Vulcan over the forecast period. In forecasting demand for industrial lands, FSW densities were held constant through the forecast period.

With the above in mind, urbanMetrics have forecasted absorption of 14 net hectares[10] of industrial lands in Vulcan between 2016 and 2041. This includes a 25% contingency to provide flexibility in demand fluctuations that can occur over the 25-year period. To provide context, Calgary-area municipalities such as Okotoks, which has experienced strong population growth has only absorbed about 1.9 hectares of industrial land per year (on average).

It is notable that the estimated absorption of 14 hectares of industrial land between 2016 and 2041 represents about 80% of the total supply of approximately 17.6 hectares of vacant industrial lands that are available in Vulcan. However, based on the inventory completed by MDB Insight, only 4.7 hectares of industrial lands are serviced and vacant. Therefore, additional serviced and vacant industrial lands are required in Vulcan to accommodate future growth.

Figure 18: Forecast Industrial Land Absorption in Vulcan, 2016-2041



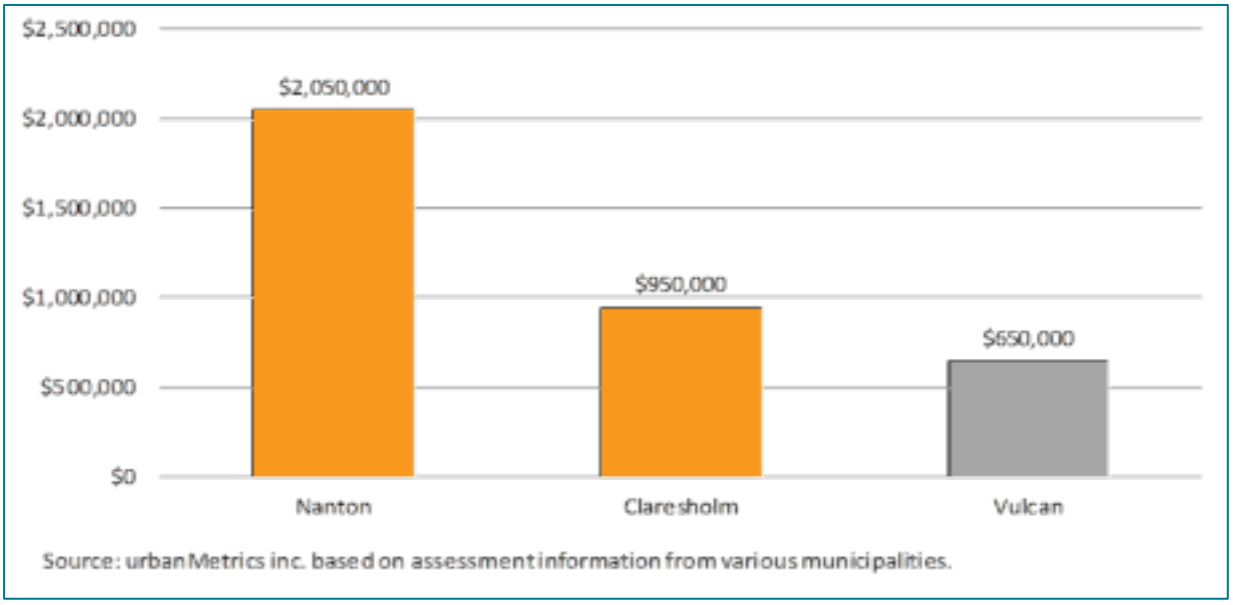
3.2 Land Assessment Values

urbanMetrics have estimated the potential tax revenue that can be generated from the further development of industrial lands in Vulcan. urbanMetrics examined the assessed value of occupied industrial lands in the municipality, in addition, to select municipalities profiled earlier in this report.

The figure below summarizes assessed value per hectare for occupied industrial lands in select municipalities surrounding Vulcan where assessment information is publicly available. As shown, assessed values range from a high of nearly $2 million per hectare in Nanton to a low of approximately $650,000 per hectare in Vulcan. While assessment information for Coaldale and Taber is not publicly available, based on industrial land prices summarized earlier in this report, it is likely that these assessed values are greater than the $2 million per hectare in Nanton. Therefore, in comparison to surrounding municipalities, Vulcan offers a significant value proposition.

[10] Net hectare refers to the combined lot area within a subdivision, following the removal of roads, reserves and municipal rights-of-way

Figure 19: Assessed Value per Hectare, Industrial Lands, Select Municipalities



Source: urbanMetrics inc. based on assessment information from various municipalities.

3.3 Traffic Impact Assessment

Watt Consulting has completed a traffic impact/ road network study for Vulcan, which included studying the three identified locations for future industrial development. The full traffic impact study is attached to this report as Appendix C.

The study scope included the following;

- Review of the existing traffic volumes, capacity and operational conditions at the key intersections in the study area.
- Forecast of traffic generated by the proposed business/industrial park.
- Evaluation of the impact of the traffic generated by the park on the adjacent network and identification of the required improvements.
- Identification of the best location for the park from a transportation perspective.
- Preparation of the report summarizing results and findings of the study.

Watt was able to use traffic counts collected by County of Vulcan Staff in June 2017; along with Alberta Transportation data for Highway 23 and 534. Historical traffic volumes were analyzed to determine the appropriate growth factor for future horizons. The growth of traffic experienced on Highway 23 was 0.68% to 0.8% while growth on Highway 534 was 1.6%. At the same time, population growth in the Town of Vulcan (as per the data obtained from Alberta Government's website) between 2001 and 2016 was 0.43%. Based on those trends, a growth factor of 1% per year was selected and used in the analysis.

Watt analysed potential impacts on several intersections related to the three potential locations, using both AM and PM peak projections. The analysis was performed to the horizon year of 2041, consistent with urbanMetrics' development projections.

Watt used the following Level of Service Criteria to classify future impacts on the studied intersections. This table is an industry standard and relevant to North American jurisdictions:

Figure 20: Level of Service Criteria

Level of Service (LOS)	Average Delay for UNSIGNALIZED Intersection Movements	Average Delay for SIGNALIZED Intersection Movements
A	0 – 10 seconds per vehicle	0 – 10 seconds per vehicle
B	> 10 – 15 seconds per vehicle	> 10 – 20 seconds per vehicle
C	> 15 – 25 seconds per vehicle	> 20 – 35 seconds per vehicle
D	> 25 – 35 seconds per vehicle	> 35 – 55 seconds per vehicle
E	> 35 – 50 seconds per vehicle	> 55 – 80 seconds per vehicle
F	> 50 seconds per vehicle	> 80 seconds per vehicle

Source: Watt Consulting Inc.

In analyzing traffic movements within key intersections related to the three potential locations for the industrial park, Watt concluded that, based upon projected population increases, the intersections would operate at the 'B' Level of Service, which translates into waits of approximately 20 seconds at signalized intersections.

For Location 1 (northwest of existing industrial area), the proposed access to the development would be via 1 Avenue. All traffic will make use of Centre Street/1 Avenue, Centre Street/Service Road and Centre Street/Highway 23 intersections to access the regional/provincial transportation network. Watt's analysis showed that all the studied intersections would be expected to operate at LOS C or better with a v/c ratio below 0.4 at the 2041 horizon year. No upgrades of the existing intersections would be required. However, the proximity of the at-grade railroad crossing to Intersection 7 (Centre Street/1st Avenue) may cause traffic queues to extend through the intersection during train crossing.

For Location 2, (next to the airport), Watt assumed that 90% of trips to and from the development would utilize Highway 532 to access Highway 23, while 10% of trips to and from the development would utilize Highway 534 west of the proposed development location. Results of the analysis showed that all the studied intersections would be expected to operate at LOS C or better with a v/c ratio below 0.4 at 2041 horizon year. No upgrades of the existing intersections would be required. However, it should be noted that the traffic destined to Location 2 would travel through the residential area and school zones along Highway 534.

For Location 3, Watt assumed that all traffic would use the 534/23 intersection. Results of the analysis show that all studied intersections operate at LOS C or better with a v/c ratio of less than 0.3. No upgrades of the existing intersections are required. However, it should be noted that the offset between the intersections of Pioneer Elevator access road or P&H access road with Highway 534 is approximately 50 meters. It would be desirable to modify the alignment of the Pioneer Elevator access road or P&H access road and combine the two existing Highway 534 intersections to improve the safety of network operation in the area.

Watt's conclusions from the Traffic Impact Assessment are as follows:

- The results of the analysis indicate that no network improvements will be required if the proposed development is located at any of the analyzed locations.
- The intersection of Centre Street/1st Avenue, which provides access to Location 1 is located in proximity to an at-grade railroad crossing (offset approximately 60 m). This provides a relatively short distance for vehicle storage. Consequently, queues extending through the intersection may occur during a rail crossing event.
- From the overall network perspective, Location 3 provides for the preferred location as the traffic destined to the site will not have to cross residential or school zones. However, it should be noted that offset between the intersections of Pioneer Elevator access road or P&H access road with Highway 534 is approximately 50 meters.
- In the long term, it would be desirable to modify the alignment of Pioneer Elevator access road and/or P&H access road and combine the two existing Highway 534 intersections to improve the safety of the network operation in the area.

3.4 Financial Analysis of Development Costs

Based, in part, on discussions and information provided by staff at the Town of Vulcan, and a high-level analysis completed by the consulting team, the capital infrastructure required to service the approximately 14.9 net hectares of vacant industrial land remaining in the existing industrial park has been estimated at approximately $5.9 million. A summary of the estimated capital costs to service vacant lands in the existing industrial park is summarized in Figure 21. urbanMetrics' entire Development Financing Review report can be found in Appendix B.

Figure 21: Capital Infrastructure Costs – Existing Business Park

Source: urbanMetrics and Google Maps

The consultant team has also prepared a high-level estimate of the capital infrastructure costs necessary to service the Location 1 lands, identified earlier in Figure 2. These capital investments have been estimated to provide general guidance to the municipal partners. Further study of these infrastructure costs is required by the municipality prior to advancing this option. For Location 1, the team assumed 470 lineal metres of internal roads, which could yield 24 industrial lots, with lot areas of 0.21 hectares. Based on an estimated servicing cost of $3,500 per lineal metre, which includes costs for roads, water, wastewater and stormwater, servicing these lands could require a capital investment of approximately $1.65 million.

For the purposes of this analysis, the consultant team has not prepared infrastructure cost estimates for Location 2 and Location 3. The airport lands, identified as Location 2, are currently not serviced. The Location 3 lands provide an opportunity to accommodate employment uses, such as an agriculture processing facility, but further engineering investigations will have to be undertaken to ensure that servicing costs are competitive and account for any engineering solution, such as a force-main or lift station.

Extending servicing to these lands could require significant infrastructure investments that will require further study by the municipalities' engineering consultants. Estimating the infrastructure investments necessary to service these lands should be addressed through an area structure plan (ASP) and a geotechnical report. It should also be noted that, unlike the existing Industrial Park, the Location 1 and 3 lands are owned by private landowners. This creates an opportunity to utilize additional forms of development financing, which are discussed below.

Based on the report prepared by Watt Consulting Group, the transportation network is not anticipated to require significant improvements to accommodate the planned industrial development in the existing industrial park or the three possible locations for a future industrial park.

3.4.1 Off-Site Levy Based on Average Day Flow Rate

An alternative approach to calculating off-site levies, which has been adopted by Rocky View County, is to apply the off-site levy for water and wastewater based on average daily flow rates. Under this approach, 'dry' industrial users that consume less water and wastewater would pay lower off-site levies. This could result in the industrial lands in Vulcan becoming more competitive in attracting industries, such as warehousing, logistics and some forms of manufacturing.

Rocky View County has been applying off-site levies based on average daily flow rates since 2013. Based on discussions with staff at Rocky View County, this approach to calculating the off-site levy has been well received by industrial developers. Rocky View County decided to use this 'demand based' approach to ensure that off-site levies more appropriately reflect actual water and wastewater usage.

3.4.2 Recommendations

Based on research and analysis of the development financing and cost recovery options that are available to the municipal partners and the best practices being used in other municipalities, it is urbanMetrics' recommendation that initial infrastructure costs be financed through a combination of municipal debt and unrestricted reserves. The allocation of capital costs between debt and unrestricted reserves and the allocation between the municipalities will ultimately be up to the municipal partners.

For recovery of costs associated with these capital infrastructure projects, the consultant team recommends that the Town and County should recover the roads, water, wastewater and stormwater capital costs through an off-site levy based on land area. However, the extent to which these costs can be passed along to industrial land users will be limited based on off-site levies being charged by competitive local municipalities. When the municipal partners are calculating the off-site levies that the market will bear, it will be important to include both land costs and off-site levies in the calculation of 'total' land costs. As the Town has relatively inexpensive land costs, it may be possible to pass along a portion of the off-site levies to new industrial land users.

It will also be important for the Town to ensure they maintain a five-year supply of shovel-ready industrial lands available for development. Based on a forecast absorption rate of 0.75 net hectares per year, a five-year supply translates into approximately 4 hectares of shovel-ready industrial land. An industrial land inventory completed by the consultant team indicates that the Town currently has 4.7 hectares of serviced industrial lands, which appears sufficient to accommodate five-years of growth. However, these lands are also held in private ownership. The Town should continue to monitor the supply of shovel-ready industrial lands and be prepared to move forward with servicing additional lands if the supply of available land is less than five years or appears to be not selling due to other issues.

4

4. SWOT and Value Proposition

4.1 Summary of Development Properties

Development in Vulcan is a relatively straightforward process. The planning and zoning analysis that was undertaken in the Phase 1 report indicates relatively few policy issues concerning the development of a new industrial park. The development of a new industrial park will likely require the preparation of an Area Structure Plan, to study the selected lands in more detail. This would include the following considerations, which would be done at a higher level of detail:

- Site characteristics
- Soil conditions
- Engineering design and servicing considerations
- Location and design of collector roads
- Proposed phasing of development

The passage of the Area Structure Plan would also require accompanying amendments to the appropriate Municipal Development Plan and eventually, the governing Land Use Bylaw. This would be done at the time of approval of the Area Structure Plan.

4.2 Servicing Considerations

As servicing within the existing industrial park has become an issue, the consultant team reviewed the locations of existing water and sanitary sewer infrastructure to generally determine if there could be challenges to providing services to the three locations. A discussion of each location follows:

Location 1

Location 1 has water and sanitary sewer present along both 1 Avenue N, and 2 Avenue N. A force main runs along 2 Avenue as shown in the figure below, and it is likely that any sanitary sewer would have to connect to the existing lift station given how the land slopes towards 1 Avenue.

Figure 22: Servicing Infrastructure near Location 1

Source: Town of Vulcan GIS Mapping

Location 2

Location 2 does not have water or sanitary sewer within its vicinity. The nearest water line is approximately 800 m to the south along Elizabeth Street, and sanitary sewer would likely have to be tied to the lift station located on Whispering Drive (near the Elizabeth Street and Centre Street intersection). The figure below shows the location of existing services in relation to Location 2. As services appear to be more readily available at Locations 1 and 3, the expected cost of extending services to Location 2 will likely make it a less affordable site for future industrial development.

Figure 23: Servicing Infrastructure near Location 2

Source: Town of Vulcan GIS Mapping

Location 3

Location 3 has water and sanitary sewer infrastructure available along Elizabeth Street (and likely along Range Road 244 within the County). If the entrance to the P&H Elevator is used as the potential entrance to the subdivision, services would have to be extended along Elizabeth Street (Highway 534), or along Range Road 244. This location should require further investigation from an engineering standpoint, as the lands slope from Range Road 244 towards Highway 23 (possibly requiring an engineering solution beyond a normal gravity fed sanitary sewer).

From Watt's analysis of the existing intersections, some cost will have to be factored in for the relocation of existing entrances to the elevators at the southeast corner of the subject lands.

Figure 24: Servicing Infrastructure near Location 3

Source: Town of Vulcan GIS Mapping

From the consultant's team's research, each potential location for industrial lands has assets and challenges. The figure below summarizes the positive attributes and challenges for each potential location.

Figure 25: Summary of Potential Location Attributes and Challenges

Attribute/Challenge	Location 1	Location 2	Location 3
Referenced within Municipal MDP	No	Yes, for aviation-related uses	No
Availability of Services	All services along 1st Avenue N	None in the vicinity. Will need to connect to services near Highway 534	Along Highway 534, topography may require a sanitary forcemain
Proximity to Rail	Nearby	No	Nearby
Proximity to Highways	Traffic must go through town to access	Yes – Highway 534	Yes – Highway 23 and 534
Potential Transportation Issues	Potential increased traffic through downtown	Potential increase in traffic on Highway 534	Existing entrances may need to be reconfigured with development
Best Uses for Investment Attraction and Development	General Industrial	Aviation-related uses	Larger footprint industrial including agricultural processing
Priority for Development	Medium to Long Term (when existing park is developed)	Long Term	Medium Term based upon opportunities for larger industrial uses

All proposed locations have value in being considered for longer-term development in and around Vulcan. In the short to medium term, continued development of the existing industrial area in the northeast part of the Town should still take precedence. Development conditions are known within the existing industrial park, and engineering cost estimates for partial development are in the Town's Five Year Capital Plan.

The following section will suggest action items on the addressing future development of industrial land in and around Vulcan.

4.3 SWOT Matrix

From the analysis and findings of the above project components, a complete Strengths, Weaknesses, Opportunities, and Threat (SWOT) Matrix may be considered. The following figure shows items captured within the SWOT:

Figure 26: SWOT Matrix

Strengths	Opportunities
▪ Population growth is relatively stable compared to other rural municipalities ▪ Vulcan County has a younger population than the surrounding area ▪ Agricultural sector remains strong within the County, and the number of farms continues to grow modestly ▪ A stable population means Vulcan is able to remain a local service centre for area residents	▪ Provincial economy is recovering from past years ▪ Potential opportunities continue in the area for additional solar and wind power generation ▪ Capacity exists to expand some existing businesses to include clean tech-related activities ▪ Town has an opportunity to examine the number of discretionary uses within an updated Land Use Bylaw (following passage of MDP)
Weaknesses	**Threats**
▪ Town is not located on a major highway or rail corridor ▪ Town of Vulcan has an ageing population ▪ Value Chain gap in food/beverage processing	▪ Lack of serviced industrial land within the Town ▪ Lack of commercial or industrial rental space within the Town ▪ Businesses may relocate to other communities where industrial land is more readily available

4.4 Value Proposition

In considering the three potential locations, there are a number of emerging and positive factors that add up to a value proposition for Vulcan, which could be used in the marketing of the existing industrial park. These factors include:

- Proximity of the existing industrial park, plus two potential location sites (Locations 1 and 3) to the CP Mainline running between Calgary and Lethbridge
- A road network that should be able to accommodate additional industrial lands generally.
- Proximity of all locations sites to the existing highway network
- Proximity to water and sanitary services for two of the potential location sites
- Lower assessed values of industrial lands when compared to similar communities within the region

5

5. Action and Implementation Plans

5.1 Strategic Directions

Based on the evidence presented above, this strategy provides three strategic directions for the Partnership (or its successor) and the municipalities to undertake over the next five years. These directions will underpin how VBDS should incorporate additional economic development activities into the organization and includes different actions that can increase the areas investment readiness, and its ability to support reactive and proactive approaches to investment attraction.

It requires the careful alignment of goals with municipal, agency, and private sector partners and a collaborative approach to the implementation of this plan. As described in detail in the report above, ensuring the right foundation is in place, and that the agents working on behalf of Vulcan and area have the capacity and resources to effectively create and respond to opportunities is essential to success.

The three strategic directions to guide the community in this pursuit are as follows:

Figure 27: Strategic Directions for Vulcan Industrial Land Strategy

Three Strategic Directions		
Ensure Sufficient Development Land for Traditional Industrial Uses	**Undertake Aftercare from Business Retention and Expansion Survey**	**Identify Future Development Land for Larger-Scale Industrial Uses**

Each strategic direction has an action plan with specific activities. The priority, partners, and resources for each recommended initiative are identified. The level of priority is based upon:

- Sense of urgency and level of immediacy indicated by consultations and research
- Level of economic development potential and gain for the Society's municipalities
- Feasibility and suitability based on local assets and SWOT analysis
- Resources required and value for output
- Logical sequence of actions

Priority levels are as follows:

- Highest = Immediate
- High = Within One Year
- Medium = Within 1-3 Years
- Low = 3- 5 Years, or longer based upon development demand

Given fiscal restraint, limited funding resources, and competing priorities for core service delivery, these priority levels recommend a starting point, and may not indicate completion. It is recognized that some of the recommended initiatives may take longer than five years to complete, given the anticipated demands for shovel-ready industrial land.

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5.1.1 Strategic Direction 1: Ensure Sufficient Land for Traditional Industrial Uses

At the present time, Vulcan has a small amount of developed land that could be used for industrial development. Increasing the supply of developed industrial land within Vulcan should be a very high priority for Town Council and Staff. As approximately half of the undeveloped lands in the existing industrial park have capital engineering estimates prepared, the development of Capital Project 'G' (construction of a portion of Jamison Road and 2nd Avenue NE) should be made a higher priority over the next budget cycle. Construction of these roads would allow for the development of 12 lots. The second priority would be to the development of Capital Project 'K', which would extend Jamison Road to Sinclair Road. Construction of the three interior roads in the northwest portion of the park would complete the development and would be undertaken as required by lot demand. Project 'K' would create 4 new lots.

Development of Location 1 would also complement the existing industrial park, but further engineering investigations would have to be undertaken to confirm soil conditions, more precisely pinpoint servicing and development cost estimates, and any issues connecting with the existing sanitary force main along 1 Avenue N.

5.1.2 Strategic Direction 2: Undertake Aftercare of Business Retention and Expansion Efforts

The survey that was commissioned as part of this project illuminated several key ideas relating to business retention and expansion activities that may be lacking sufficient attention in the region. Though anecdotal, the findings suggest critical follow-up may be required to gain a stronger grasp of business needs, expectations and future plans. There is a strong connection between business retention and expansion (BRE) and the ability to grow and fill employment lands. For one thing, existing businesses account for 80 to 90% of economic growth in a community[11]. If businesses are shrinking, closing, or moving away, the needle is moving the opposite direction of where it should be going. BRE engagement and problem-solving will help to ensure businesses in the Vulcan area are poised for growth, rather than contraction or relocation. Also, by understanding the supply chain networks and critical needs of local businesses, opportunities may present themselves that will help build a case for attracting new investment into the area to fill identified gaps.

The business survey found that several businesses were in a position to expand, but sufficient land or space was identified as a key barrier. The survey also found that businesses struggle with finding qualified labour and with the quality of the available workforce. Finally, the development and building permit process was of high importance and also had low satisfaction, making it a strong priority. These

[11] Economic Developers Association of Canada (2015), *Practices, Principles and Planning: The Essentials of Economic Development*: pp. 68.

findings highlight some areas that could be further explored through a deeper BRE effort. Ideally, finding solutions to these problems would result in growth opportunities for local businesses, as well as the potential to attract businesses which can add to local assessment and enhance local spending. Working closely with businesses through BRE efforts do not need to be a significant investment of time, but the efforts do generate results. At the very least, it sends the message that the Town and County care about local businesses and want to see them succeed.

The purpose of BRE is twofold: to identify red flag issues that mean businesses are at risk of closing, relocating, or downsizing, and to identify green flag issues that mean there is an opportunity for a business to expand or a hot lead on an opportunity for new investment attraction in the community.

A BRE effort requires three key teams:

- A **Leadership Team** to champion the program, communicate issues and maintain communication with visitation team
- A **Visitation Team or Random Sample Survey** to visit/call businesses, conduct confidential surveys, identify red-flag or green flag issues
- A **Response Team** to work to resolve issues, provide timely responses to red/green flag issues, and provide input into long-term issue resolution

The local economic development team, either VBDS or its successor, must be involved in each team, as well as in the day-to-day efforts to address red and green flags. The role is essential to ensuring that critical issues that are identified are acted on and that opportunities for good news in the community are not lost.

5.1.3 Strategic Direction 3: Identify Future Development Land for Larger-Scale Industrial Uses

While continued development of the existing industrial park should be a priority for Town Council, the lands identified as Location 3 should be viewed as a potential location for larger-scale industrial development. This is likely a longer-term strategic direction that Town and County staff should discuss and investigate further, with both the owner of the lands and also with the operators of the grain terminals. The municipalities will have to gain a better understanding of development costs and barriers, particularly with respect to sanitary servicing, and access requirements that Alberta Transportation may impose on further development of the lands. Much of this would be accomplished through the review of an Area Structure Plan, which should be developed with the above end-users in mind.

The municipalities should also be aware of any special water or servicing requirements that a larger agricultural facility would have so they can confirm to potential investors that the community has available servicing capacity for a larger processor or end-user.

5.2 Action Plans

Strategic Direction 1: Ensure Sufficient Land for Traditional Industrial Uses

Recommended Initiative	Partners	Priority & Resources
▪ Expand the existing industrial park with the construction of Capital Project 'G' (Jamison Road and 2nd Avenue NE extension)	Town Engineering Consultant	**HIGH PRIORITY** ▪ Capital funding as part of Town's annual budget
▪ Prepare marketing materials to advertise to the surrounding community and site selectors that developed lands are available within the Town	Town Staff Area Realtors SOUTHGROW resources	**HIGH PRIORITY** ▪ Capital funding as part of Town's annual budget
▪ Construct the remaining phases of existing Industrial Park to maintain a multi-year supply of developed industrial land	Town Engineering Consultant	**LOW TO MEDIUM PRIORITY** ▪ Capital funding as part of Town's annual budget
▪ Commission geotechnical and environmental studies of Location 1 lands to develop engineering cost estimates	Town Engineering Consultant Area Landowners	**LOW PRIORITY** ▪ Funding as part of Town's annual budget
▪ Redesignate Location 1 lands to 'future industrial' as part of a future update to the Town's Municipal Development Plan	ORRSC Area Landowners	**LOW PRIORITY** ▪ Public engagement plan through the MDP update

Strategic Direction 2: Undertake Aftercare from Business Retention and Expansion Efforts

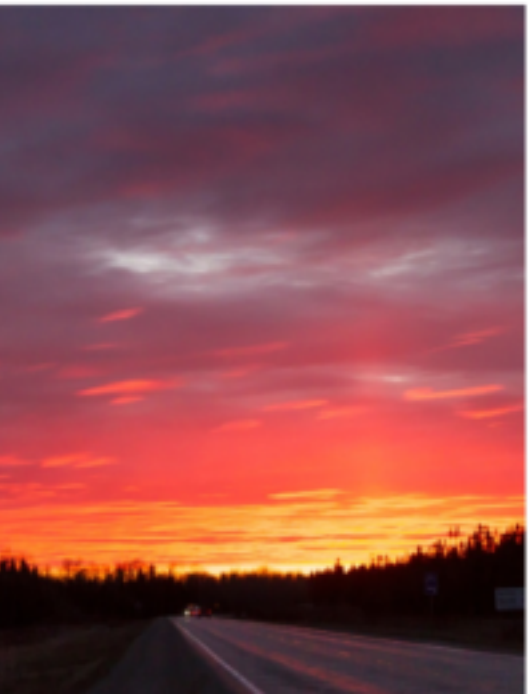
Recommended Initiative	Partners	Priority & Resources
▪ Initiate a formal annual business visitation program: ▪ Identify a small leadership team, visitation or survey team, and response team ▪ Identify the minimum number of businesses to be engaged per year (30 recommended) and a calendar for visits ▪ Undertake visitation surveys delivered by the visitation team ▪ Evaluate survey results and apply a triage logic (outlined below) to address issues raised ▪ Use business visitations as opportunities to understand supply chain gaps	Town and/or County staff and elected representatives	**HIGH PRIORITY** ▪ Municipal staff and council; volunteers from County, and Town ▪ Chamber of Commerce representatives
▪ Initiate a triage program for dealing with red flags (immediate challenges) and green flags (opportunities). The triage program should include: ▪ Identifying whether the challenge or opportunity isolated to one business or is more general ▪ Identifying the urgency of the challenge or opportunity ▪ Identify a primary solution with contingency in the event that the primary solution does not work out ▪ Contact and coordinate with necessary partners ▪ Address the solution appropriately ▪ Monitor the situation to see if solutions stick, require adjustment, or if a new solution is required	Town and/or County Staff Chamber of Commerce Members	**MEDIUM TO HIGH PRIORITY** ▪ An municipal staff person, as well as volunteers

Recommended Initiative	Partners	Priority & Resources
▪ Review Alberta Small Business Resources and/or Community Futures Highwood to identify grants, services, and loans that could be leveraged to support local small businesses and entrepreneurs ▪ Identify a point-person at Alberta Small Business Resources to make it easier for back and forth conversations ▪ Build a listing of resources categorized by resource type and application ▪ Conduct a semi-annual review of programs and update resources ▪ Connect local businesses or people interested in starting businesses toward resources	Community Futures Highwood Alberta Small Business Resources representatives	**MEDIUM PRIORITY** ▪ Staff person required to review resource listing quarterly
▪ Ensure that there continues to be appropriate opportunities and venues for business-to-business networking and support ▪ Initiate a task-force of local elected officials interested in working with the business community ▪ Set an annual meeting agenda to host a series of mixer events ▪ Host events regularly and promote them to the business community ▪ Identify business allies that are willing to help attract participation	Town and County Staff Local elected officials (Town and County)	**MEDIUM PRIORITY** ▪ A location is required (may be beneficial to rotate locations)

Recommended Initiative	Partners	Priority & Resources
▪ Initiate a workshop with area businesses to identify challenges and barriers associated with the development/building permit processes upon the next review of the Town Land Use Bylaw ▪ Ensure recent applicants are sincerely engaged in the process ▪ Try to have some businesses that have experience developing in multiple jurisdictions ▪ Consider using a third-party to facilitate the session	Town Staff Vulcan and District Chamber of Commerce ORRSC	**LOW TO MEDIUM PRIORITY** ▪ Location for workshop, with small budget for refreshments ▪ Possible stipend for third-party facilitator may be required
▪ Undertake a labour force skills gap analysis to identify critical labour force issues for employers. Use the opportunity to explore: ▪ Key jobs in high demand ▪ Key skills gaps in existing labour force ▪ Key markets and demographics for labour force attraction ▪ Key partners for improving the quality of labour force ▪ Action plan for improving skills and quantity of workers	Town and/or County Staff Local employers	**LOW PRIORITY** ▪ Dedicated staff or contracted person (about 14 days' time) ▪ Approximately $50K in project funding

Strategic Direction 3: Identify Future Development Land for Larger-Scale Industrial Uses

Recommended Initiative	Partners	Priority & Resources
▪ Discuss the feasibility of the development of a large-scale industrial park at Location 3	Area Landowners Grain Terminal Operators ORRSC County Staff	**MEDIUM TO HIGH PRIORITY** ▪ Internal Staff Resources
▪ Ensure any prepared Area Structure Plan accounts for servicing requirements of an agricultural processing-type facility	ORRSC County Engineering Consultant Alberta Transportation	**MEDIUM PRIORITY** ▪ Internal Staff Resources
▪ Review cost estimates for servicing requirements and connections to Town infrastructure	County Engineering Consultant Town Engineering Consultant	**MEDIUM PRIORITY** ▪ Internal Staff Resources ▪ Possible Joint Project between Town and County
▪ Revisit access issues and potential relocations as part of the review of an Area Structure Plan	Alberta Transportation Grain Terminal Operators	**MEDIUM PRIORITY** ▪ Internal Staff Resources




GREETINGS
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THIRD PLANET FROM THE SUN.
NORTH AMERICAN CONTINENT.
PROVINCE OF ALBERTA.
COUNTY OF VULCAN
LIVE LONG AND PROSPER
VULCAN ASSOC FOR SCIENCE & TREK
(V.A.S.T.)

Appendices

Appendix A: Industrial Land Absorption Analysis

PHASE 2 & 3 REPORT

Industrial Land Absorption Analysis

Vulcan, Alberta

Prepared for **Vulcan Business Development Society**

September 26, 2017

This document is available in alternative formats upon request by contacting:

info@urbanMetrics.ca
416-351-8585 (1-800-505-8755)

September 26, 2017

Harry Shnider, Senior Consultant
MDB Insight
909 17 Avenue SW, Suite 400
Calgary, AB T2T 0A4

Dear Mr. Shnider:

RE: Phase 2 & 3 Report – Industrial Land Absorption Analysis (Vulcan, Alberta)

urbanMetrics inc. is pleased to submit our Phase 2 & 3 Report, which forecasts potential absorption of industrial lands in the Town of Vulcan. This report also analyzes potential employment densities and assessment values that could be achieved in Vulcan. Densities and assessed values are important in understanding the number of jobs that can potentially be accommodated on industrial lands in Vulcan and the tax revenue that can be generated by these lands. The report also identifies variables that should be considered by the VBDS in determining the amount and location of a new industrial lands in Vulcan.

We appreciate the opportunity to conduct this assignment on your behalf and we look forward to discussing the results of our report with you.

Yours truly,

Craig Ferguson
Associate Partner
cferguson@urbanMetrics.ca

Contents

Figures

1.0 Introduction

MDB Insight, together with urbanMetrics inc., and Watt Consulting Group have been retained by the Vulcan Business Development Society (VBDS) to prepare an Industrial Land Strategy for the Region. The purpose of this strategy will be to determine the demand for new industrial lands in and around Vulcan and determine the ideal location for a new industrial park that is both convenient for businesses and cost effective to develop. The project includes an analysis of the market for industrial lands in the study area, planning requirements, transportation costs, and a strategy for development financing and revenue sharing.

1.1 Background

The purpose of this Phase 2 & 3 Report is to identify the potential demand for industrial lands in the VBDS. For the purpose of this analysis, we have focused the demand for industrial lands from manufacturing, wholesale trade and transportation and warehousing, as these are the types of employment uses that traditionally locate on the industrial lands. We have also analyzed the potential for industrial lands in Vulcan to accommodate employment uses related to the growing populations in the region. These types of businesses include retail, service commercial and institutional uses.

1.2 Objectives

This Phase 2 & 3 Report focuses on factors that are anticipated to impact demand for industrial lands in the Province and in the VBDS. This analysis includes:

- **Industrial Land Outlook** – We have identified characteristics of industrial land demand for firms engaged in manufacturing, wholesale trade, transportation and warehousing and alternative energy. Understanding these characteristics will be important in identifying future demand for industrial lands in Vulcan.
- **Industrial Land Supply** – We have examined the supply of industrial lands in select municipalities surrounding Vulcan, as these municipalities would likely compete with a new industrial park in Vulcan. For industries such as manufacturing, wholesale trade and transportation and warehousing, the location of industrial land relative the transportation infrastructure, as well as land prices, play an important role in locational decisions. We have assessed the competitiveness of the existing and potential new industrial lands in Vulcan relative to other industrial lands in surrounding municipalities.
- **Industrial Land Demand** – Building on the provincial and regional economic outlook in our Phase 1 report, we have forecasted population and employment growth for the municipalities within the VBDS. These forecasts take into consideration historic population and employment growth patterns, as well as emerging trends that are influencing population growth in rural

municipalities. Based on population forecasts prepared by the Province of Alberta, we have forecast demand for industrial lands in the VBDS.

- **Ideal Density and Assessment** – Based on a review of existing employment densities in Vulcan and the surround municipalities, we have identified the ideal employment density that will likely be accommodated in the proposed industrial park. Based on these ideal densities, we have identified the likely assessed value for industrial land parcels in the proposed industrial park and the potential associated tax revenue that could accrue to the municipal partners.
- **Locational Considerations** – Based on forecasted employment growth on industrial lands, we have identified variables that the VBDS should consider when making locational decisions for the new industrial park.

2.0 Industrial Land Outlook

The three sectors in the economy that have accounted for a significant share of demand for industrial lands are the manufacturing, wholesale trade and transportation and warehousing sectors. These sectors are commonly referred to as "export-based" industries as they are more dependent on external economic conditions and are less tied to population growth in the local area. These export-based industries place a greater emphasis on access to transportation, land prices and parcel sizes when determining where to locate. Therefore, if a municipality was considering a new industrial park to attract these types of uses, it is important to consider these variables.

The manufacturing sector continues to play an important role in the Alberta economy, accounting for 6% of gross domestic product in the province. While the prominence of manufacturing in the Alberta economy has subsided in recent years, it will continue to be a key driver of demand for industrial lands.

Alberta's manufacturing sector relies heavily on exports to the U.S. In 2016, 70% of Alberta's manufacturing exports went to the U.S. and manufacturing exports to the U.S. have trended higher over the past decade. While the strength of the U.S. economy could improve the outlook for Alberta's manufacturing sector, the ongoing NAFTA negotiations will create some uncertainty over the short-term.

Within the manufacturing sector, industries that have experienced strong growth in recent years include:

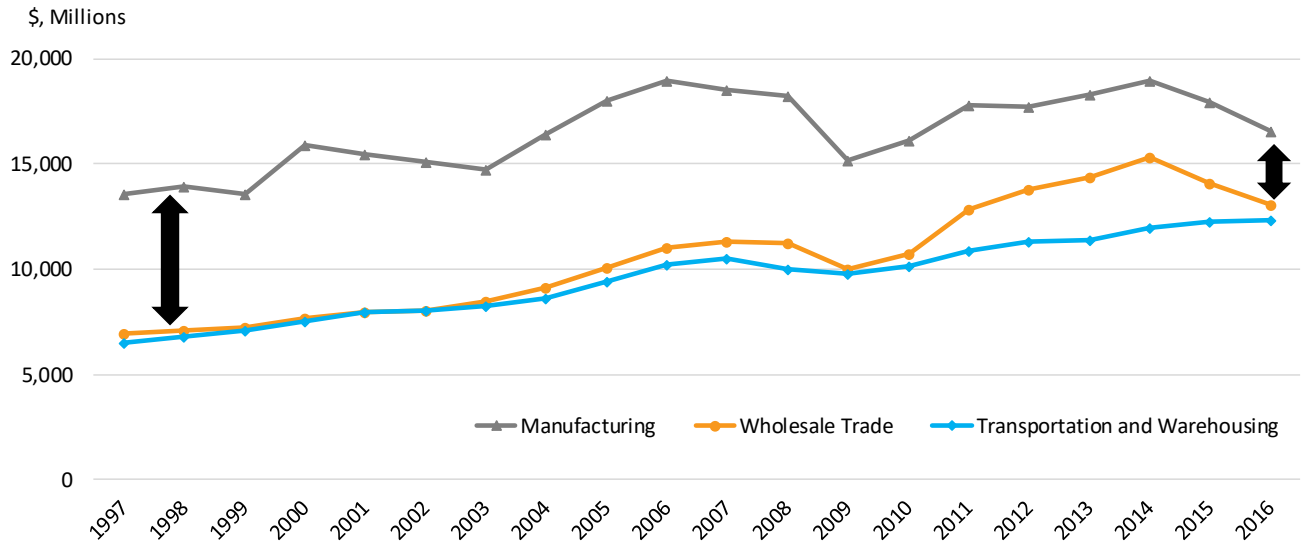
- Agri-Food
- Resin and Synthetic Rubber Manufacturing
- Animal Slaughtering and Processing
- Other Basic Organic Chemical Manufacturing
- Fertilizer Manufacturing

In addition to strong growth in these manufacturing sectors, there is also an opportunity for municipalities in the VBDS to further leverage their experience in clean, alternative energy sources as a driver of demand for industrial lands. This could include the manufacturing of biofuels produced from animal by-products, wind energy and solar energy.

While the manufacturing sector will continue to play an important role in the Alberta economy, the role of sectors such as wholesale trade and transportation and warehousing are becoming more significant and accounting for a growing share of demand for industrial lands. Based on the Alberta Treasury Board, investment in transportation and warehousing in Alberta almost doubled between 2012 and 2015 to reach $9.2 billion. It is also anticipated that the lower Canadian dollar could result in increased trade flows between Alberta and the U.S., which could spur additional investment in the industry.

Figure 2-1 illustrates the value of goods and services produced (output) in the manufacturing, wholesale trade and transportation and warehousing sectors. As shown, while there has been some growth in manufacturing output between 1997 and 2016, the value of goods produced in the wholesale trade and transportation and warehousing sectors have grown rapidly.

Figure 2-1: GDP for Manufacturing, Wholesale Trade and Transportation and Warehousing, Alberta



Source: urbanMetrics inc. based on data from Statistics Canada.

Needless to say, these changes in the provincial economy will have an impact on the demand for the type and location of employment lands across the Province and in Vulcan. The increased demand from businesses engaged in wholesale trade and transportation and warehousing will have an influence on the parcel size and building size desired by these new businesses, as well as the locational requirements and skills requirements of businesses competing in this "new economy". For example, businesses engaged in wholesale trade and transportation and warehousing tend to favour large warehouse facilities and therefore are attracted to large greenfield lands that are priced competitively.

Businesses engaged in wholesale trade and transportation and warehousing also tend to be concentrated close to multimodal transportation such as highway, rail and air transportation. As the employment land supply becomes more constrained in areas such as Calgary and land prices increase, there will inevitably be pressure to find less expensive land further away from these multimodal facilities. While Vulcan has access to the Canadian Pacific Railway (CPR) line, which could be attractive to some industrial land uses, Highway 23 does not offer the same access characteristics as Highway 2 and the Crowsnest Highway. This could make it difficult for Vulcan to attract logistics and

warehousing businesses. This is also evident from the limited number of these types of businesses that are currently located in Vulcan, as summarized in the Phase 1 report.

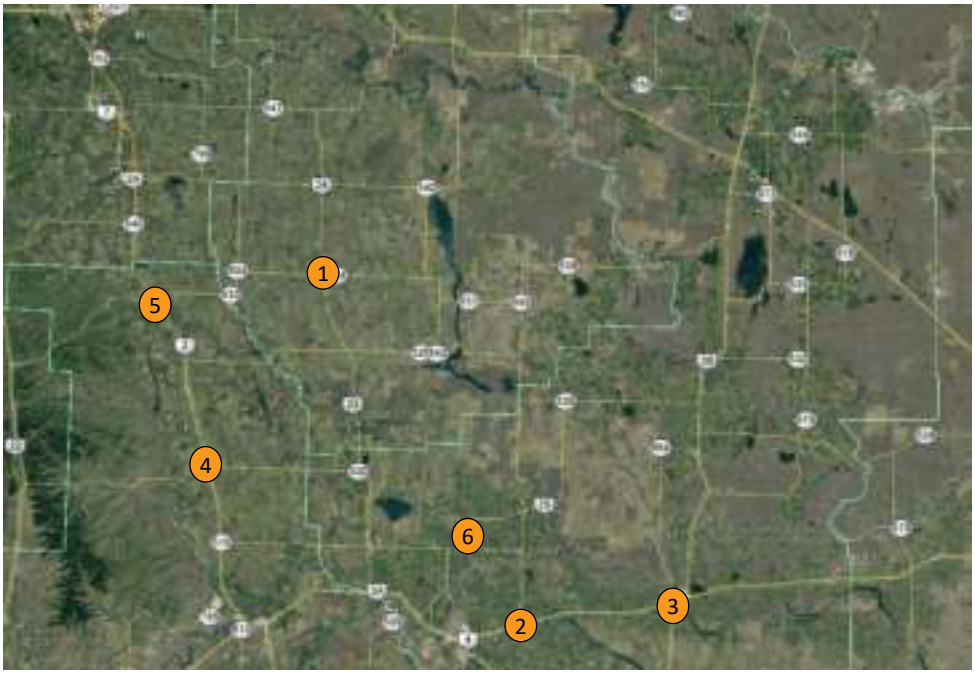
Employment growth in population-related industries such as the retail, service commercial and institutional sectors will also create demand for industrial lands. Most of these population-related jobs are likely to locate on commercial and institutional lands within the urban centre. However, a portion of the population-related job growth will also occur on industrial lands. These types of jobs typically include automotive maintenance, automobile and recreation vehicle dealers, contractor services and building and outdoor home supply stores. Vulcan's role as the commercial and social centre of the VBDS will likely increase demand for industrial lands to accommodate these population-related sectors. This is already evident in Vulcan, as the current industrial lands in the Town accommodate many of these uses.

3.0 Industrial Land Supply

In this section of the report, we summarize the supply of industrial lands for select municipalities and industrial parks located near Vulcan. The industrial parks that we have profiled are generally located in rural municipalities. Therefore, these industrial parks are likely to compete with industrial lands in Vulcan in attracting businesses. While there is a large supply of vacant industrial lands in municipalities such as Calgary, M.D. Foothills, High River and Lethbridge, these employment lands are unlikely to compete directly with a new industrial park in Vulcan. This is because industrial lands in these municipalities generally have better access to major transportation routes. These municipalities also have higher land costs and charge off-site levies. Therefore, industrial lands in these municipalities are likely to attract different users than businesses considering relocating or expanding to Vulcan.

The location of the various municipalities and industrial parks profiled in this section of the report are identified in Figure 3-1.

Figure 3-1: Location of Municipalities with Competitive Industrial Lands



Source: urbanMetrics inc. based on Google Earth

3.1 Town of Coaldale (Northeast Industrial Park)

Located approximately 10 kilometres east of Lethbridge, the Town of Coaldale is home to the North East Industrial Park. The Town has a total of approximately 32 hectares of vacant industrial lands available, most of which are located in the industrial park. In addition to these existing vacant industrial lands, the Town is also proposing to annex approximately 620 hectares of land to accommodate growth over the next 25 years. According to the Annexation Report, 83 hectares will be designated for industrial uses. Including these potential annexed lands, Coaldale would have a total vacant industrial land supply of 115 hectares.

Due to its proximity to Lethbridge, the Town of Coaldale has many positive locational characteristics. Coaldale is located at the intersection of two provincial highways, it is bisected by a major rail line and is located approximately 20 kilometres from the Lethbridge Regional Airport.

Serviced industrial land prices within the Northeast industrial park averaged approximately $356,000 per hectare. Coaldale also has off-site levies of $85,575 per hectare. This is competitive relative to Lethbridge, where off-site levies average $195,000 per hectare. However, many rural municipalities do not administer off-site levies. Therefore, companies seeking relatively inexpensive land may not consider Coaldale.

Figure 3-2: Coaldale Industrial Land Characteristics

		Relative to Vulcan
Access to Multimodal Transportation	Yes	+
Vacant Land Area (Ha)	116	+
Serviced Land Price ($/Ha)	$356,000	−
Off-Site Levies ($/Ha)	$85,575	−
Non-Residential Tax Rate (Per $1,000 property value)	$10.09	+

Legend

+ Indicates advantage relative to Vulcan

− Indicates disadvantage relative to Vulcan

3.2 Town of Taber (Eureka Industrial Park)

The Town of Taber is home to the Eureka Industrial Park, which is approximately 50 kilometres east of Lethbridge. The industrial park is currently in its second phase of development. Similar to Vulcan, the economic base of Taber consists of agri-business, agricultural services and oil and gas well servicing.

Based on estimates by urbanMetrics, Taber has approximately 165 hectares of vacant industrial lands. The Municipal Development Plan estimates that Taber has 15 to 20 years of industrial lands available to accommodate growth, which equates to industrial land absorption of approximately 10 hectares per year.

Taber shares many locational and transportation characteristics with Coaldale. It is located at the intersection of two Provincial highways, is bisected by a major rail line and has access to a regional airport.

While Taber has many positive locational characteristics, development costs in the municipality are generally higher than competitive municipalities. Industrial lands prices average $425,000 per hectare for interior parcels in the Eureka Industrial Park, while parcels with highway visibility average

$460,000 per hectare. Off-site levies, at approximately $113,000 per hectare, are also higher than competitive municipalities.

Figure 3-3: Taber Industrial Land Characteristics

		Relative to Vulcan
Access to Multimodal Transportation	Yes	
Vacant Land Area (Ha)	165	
Serviced Land Price ($/Ha)	$442,500	
Off-Site Levies ($/Ha)	$113,271	
Non-Residential Tax Rate (Per $1,000 property value)	$11.51	

3.3 Town of Claresholm

Claresholm is located one hour south of Calgary and along Highway 2, which is a major north-south trade route between Calgary and the U.S. The Town does not have a significant industrial park. Industrial development in Claresholm is generally separated into two nodes at the southeast and northwest of the Town. The southeast quadrant of the community is the original industrial area. The new industrial area is located in the northwestern area of the community. Claresholm has a very limited supply of vacant industrial lands. Therefore, the municipality is anticipating annexing lands in the southeast area of the community for future industrial uses.

The primary sectors in Claresholm include agriculture, tourism and manufacturing. In 2010 Claresholm completed a new water treatment plant that ultimately enticed food processor El Molino Foods to move its operations from Calgary and Abbotsford to the municipality.

The Town currently does not charge off-site levies. However, to facilitate development in the annexed lands, it is possible that off-site levies will be implemented to bring water, wastewater and transportation infrastructure to the area.

While Claresholm is currently not competitive with Vulcan, due to its lack of a significant industrial park with vacant lands, this could change after the annexation of lands in the southeast of the municipality, bordering Highway 2.

Figure 3-4: Claresholm Industrial Land Characteristics

		Relative to Vulcan
Access to Multimodal Transportation	No	
Vacant Land Area (Ha)	274	
Serviced Land Price ($/Ha)	n.a.	n.a.
Off-Site Levies ($/Ha)	$0	NEUTRAL
Non-Residential Tax Rate (Per $1,000 property value)	$12.03	

3.4 Town of Nanton

Similar to Vulcan, the local economy in Nanton is driven by agriculture, agricultural service industries and tourism. Lack of access to multimodal facilities has limited absorption of industrial lands in Nanton. Over a nearly 25-year span ending in 2008, only 6 industrial lots were created in the municipality.

Nanton has approximately 14.8 hectares vacant industrial land comprising a total of 18 lots. Only 14 of these vacant lots are serviced by sewer. High development costs have also likely limited industrial development activity in Nanton. Off-site levies and non-residential mill rates are higher than many of the rural municipalities profiled.

Figure 3-5: Nanton Industrial Land Characteristics

		Relative to Vulcan
Access to Multimodal Transportation	No	
Vacant Land Area (Ha)	15	
Serviced Land Price ($/Ha)	$42,000	NEUTRAL
Off-Site Levies ($/Ha)	$85,030	
Non-Residential Tax Rate (Per $1,000 property value)	$12.75	

3.5 Town of Picture Butte

While Picture Butte is only 12 kilometres from Lethbridge, it lacks direct access to the municipality due to the Old Man River. This has limited industrial growth in the municipality. Industrial activity in the Town is generally oriented towards the agricultural sector to serve the surrounding communities.

Existing industrial lands are generally located in the southeast of the Town, close to the former CPR line. There are currently 14 vacant industrial land parcels available for development, representing approximately 10 hectares of land. In comparison to Vulcan, the Town of Picture Butte lacks access to multimodal facilities.

Non-residential development in the Town is relatively affordable. Vacant industrial lots are priced at an average of $116,000 per hectare and there are no off-site levies in the Town. Mill rates are also the most affordable of the municipalities profiled at $8.65 per $1,000 of property value.

Figure 3-6: Picture Butte Industrial Land Characteristics

		Relative to Vulcan
Access to Multimodal Transportation	No	
Vacant Land Area (Ha)	10	
Serviced Land Price ($/Ha)	$116,000	
Off-Site Levies ($/Ha)	$0	NEUTRAL
Non-Residential Tax Rate (Per $1,000 property value)	$8.65	

3.6 Town of Vulcan

Like many of the municipalities profiled in this section of the report, industrial lands in the municipality generally serve agricultural businesses located in the surrounding area. Industrial development has remained in the northern parts of the Town, predominately north of the rail line. In 1985 the industrial park was developed and 45 lots were created. Many of these lots are still vacant and no new lots have been developed.

While Vulcan has access to both highways and rail, it is at a disadvantage relative to competitive municipalities located along Highway 2 and the Crowsnest Highway. This could limit the number of logistics and warehousing type businesses that would consider moving operations to Vulcan.

Based on the Vulcan Municipal Development Plan, there is currently 17.6 hectares of vacant industrial land in the municipality, representing an industrial land vacancy rate of approximately 50%. However, it is our understanding that while the vacant industrial lands located in the northeast of the Town are available, the high infrastructure costs necessary to service these lands makes their development unviable. Based on an inventory completed by MDB Insight, there are five vacant industrial parcels totaling 4.7 hectares in size located in the Town that are fully serviced. Due to the lack of vacant and serviced industrial lands, the Town is considering expanding the municipal boundary to develop a new industrial park to address future industrial demand.

Figure 3-7: Town of Vulcan Industrial Land Characteristics

		Relative to Competitive Municipalities
Access to Multimodal Transportation	Yes	−
Serviced Vacant Land Area (Ha)	5	−
Serviced Land Price ($/Ha)	$42,008	+
Off-Site Levies ($/Ha)	$0	+
Non-Residential Tax Rate (Per $1,000 property value)	$14.63	−

3.7 Summary

There is a large supply of vacant industrial land located in rural municipalities profiled in this section. In addition to vacant industrial land in the profiled municipalities, the supply of lands in more urban municipalities such as Calgary, Lethbridge, High River and Foothills is even larger.

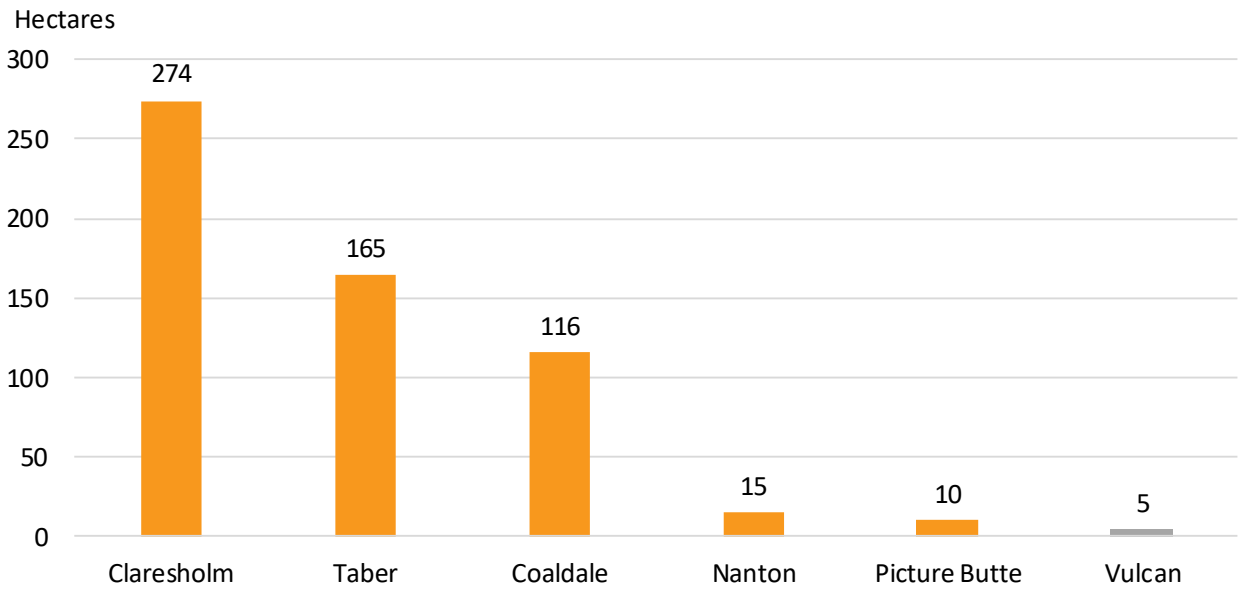
Each of these municipalities profiled in this section of the report offer differing value propositions that cater to specific industrial users. Particularly, location, access, servicing, land pricing and taxation all differentiate the municipal lands that are available. Additionally, some of these municipalities are actively planning to increase their supply of readily accessible industrial land in an attempt to attract new industrial users.

In terms of access to multimodal transportation, while Vulcan has access to these facilities, Highway 23 has less traffic volume than Highway 2 or the Crowsnest Highway (Highway 3) that serve many of the municipalities profiled. Therefore, it may be difficult to attract companies to Vulcan that rely heavily on ground transportation. One locational advantage that Vulcan has relative to the other municipalities is that it is served by the main CPR line between Calgary and Lethbridge.

Figure 3-8 summaries the amount of vacant industrial lands in the various municipalities profiled in this section. As shown, the approximately five hectares of available industrial lands in Vulcan is amongst the lowest. Therefore, a lack of suitable industrial lands could constrain growth in Vulcan if a large employer was looking to relocate to the municipality. It is important to note that this estimate

only includes industrial lands located in profiled municipalities. Therefore, the estimate understates the total supply of vacant industrial lands.

Figure 3-8: Vacant Industrial Land Supply (Select Municipalities)



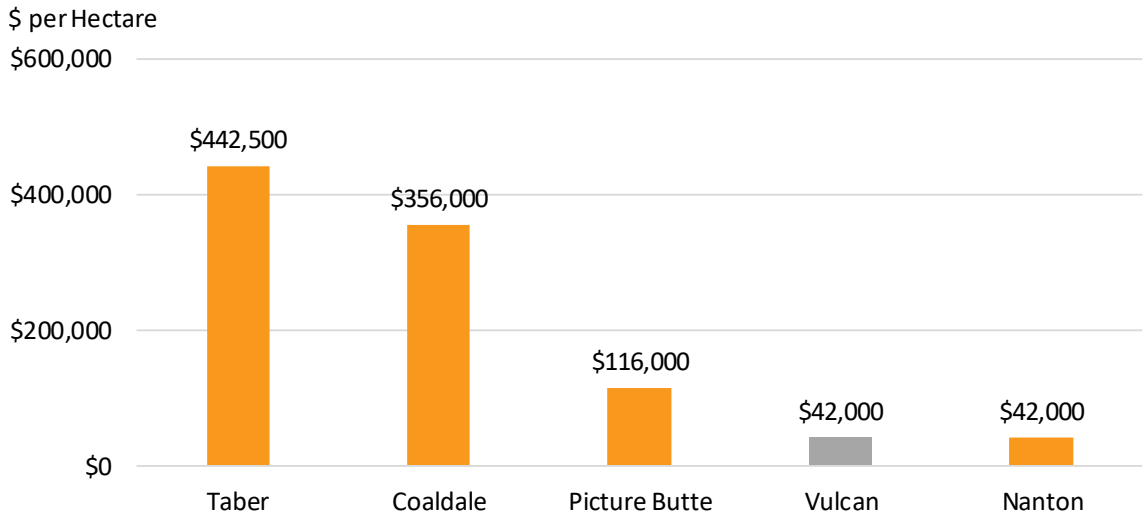
Source: urbanMetrics inc. based on various sources.

Figure 3-9 illustrates the average price for vacant industrial lands in select municipalities based on available information. urbanMetrics was able to identify reliable vacant industrial land prices for five of the six communities profiled. The exception was Claresholm, where there was a limited supply of vacant and serviced industrial lands. As shown in Figure 3-9, Vulcan had the least expensive vacant industrial lands among the municipalities profiled.

In addition to land prices, off-site levies will have an impact on industrial land absorption and the types of businesses that could ultimately locate in Vulcan. Research completed by urbanMetrics indicates that many of the smaller rural municipalities to not apply off-site levies, which is consistent with the current practice in Vulcan. The municipalities that do apply off-site levies typically have a large supply of industrial lands and access to major Highways.

If the Town decides to implement off-site levies for the proposed industrial park, it will be important to ensure that any off-site levy is competitive with municipalities in the surrounding region that have a large supply of industrial lands.

Figure 3-9: Industrial Land Prices (Select Municipalities)



Source: urbanMetrics inc. based on various sources.

Overall, based on our profile of select municipalities, it may be difficult for Vulcan to attract transportation and warehousing firms in comparison to other profiled municipalities, which have access to Highway 2 and the Crowsnest Highway. However, it is possible that access to the CPR mainline between Calgary and Lethbridge could appeal to some users. It is much more likely that industrial lands in Vulcan will appeal to firms engaged in wholesale trade for the agricultural sector or population-related businesses that are attracted by Vulcan's role as the commercial and social centre of the VBDS.

4.0 Industrial Land Demand

In determining the demand for industrial lands in Vulcan, it is important to differentiate between demand that is related to population growth, such as retail and institutional uses, and demand from export based industries that serve a broader geographic area. This includes manufacturing, logistics and wholesale trade.

Based on population forecasts prepared by the Province, the population in Census Division 5, which includes the municipalities in the VBDS, is anticipated to grow at an average annual rate of about 1.1% per year, which is lower than the provincial population growth rate of 1.7% per year. While continued population growth in the VBDS will ultimately result in absorption of industrial lands to accommodate a portion of employment growth, this absorption will be more muted than other areas of the province that are anticipated to experience stronger population growth.

While demand for industrial lands to serve manufacturing, wholesale trade and transportation and warehousing are also influenced by population growth in the local area, factors such as availability of land and location to a transportation network play a more important role in attracting new employers. As a result, industrial employment is not necessarily anticipated to increase in direct proportion to population growth. Therefore, for the purposes of this analysis we have reviewed the available supply of industrial lands in competitive municipalities that have similar geographic and land supply characteristics. While we anticipate province-wide demand for industrial lands to accommodate export-based industries, these types of firms are likely to locate in municipalities with access to major highways, such as Highway 2 and the Crowsnest Highway, or large intermodal facilities such as rail yards and international airports.

4.1 Population Growth Forecast

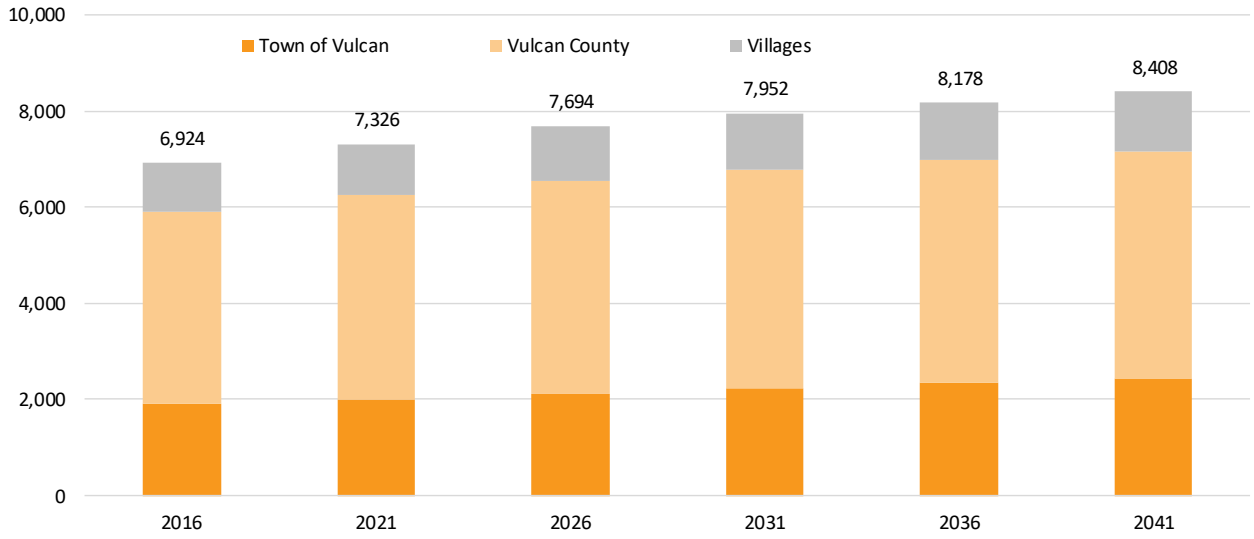
In preparing population forecasts for the municipalities within the VBDS, we have relied on forecasts available from the Province for Census Division 5, which includes the Town of Vulcan, Vulcan County and the constituent villages. As noted earlier, Census Division 5 is forecast to grow at an average annual rate of 1.1% over the 2015 to 2041 period, which is somewhat slower than the 1.3% average annual growth rate experienced over the 20-year period between 1996 and 2016.

As noted in the Town of Vulcan Municipal Development Plan[1], despite recent declines in the population of many rural municipalities, there has been a trend towards these municipalities starting to see increased levels of population. The trend towards renewed population growth has been attributed to a variety of factors including the retiring of the baby-boomer generation, telecommuting, people looking to get away from compact urban communities and the changing composition of the employment market.

[1] Town of Vulcan, Municipal Development Plan, Bylaw No. 00-1259, prepared by Oldman River Regional Services Commission.

It is notable that population growth in the VBDS will be dependent on many variables, some of which cannot be accurately projected. For example, the presence of a new industrial park in Vulcan could address pent up demand for industrial lands and attract new employers to the region. This in turn could result in stronger population growth than has been experienced in recent years. With this in mind, we have forecast population growth for the municipalities in the VBDS in Figure 4-1. As shown, we have forecast population growth of nearly 1,500 people in the VBDS between 2016 and 2041.

Figure 4-1: VBDS Population Growth Forecast, 2016 to 2041



Source: urbanMetrics Inc., based on Alberta Government's 2016-2041 Population Projections under a Medium Growth scenario.

4.2 Forecast Employment Growth on Industrial Lands

Based on population forecasts prepared in the previous section, we have forecast demand for industrial lands in Vulcan. Forecast population growth will bring with it jobs that will serve the growing population. This includes:

- Population-Related Employment - such as retail employment, finance, insurance and real estate (FIRE), information and cultural services, professional, scientific and technical services and other business services; and
- Institutional Employment – such as education, healthcare and local government.

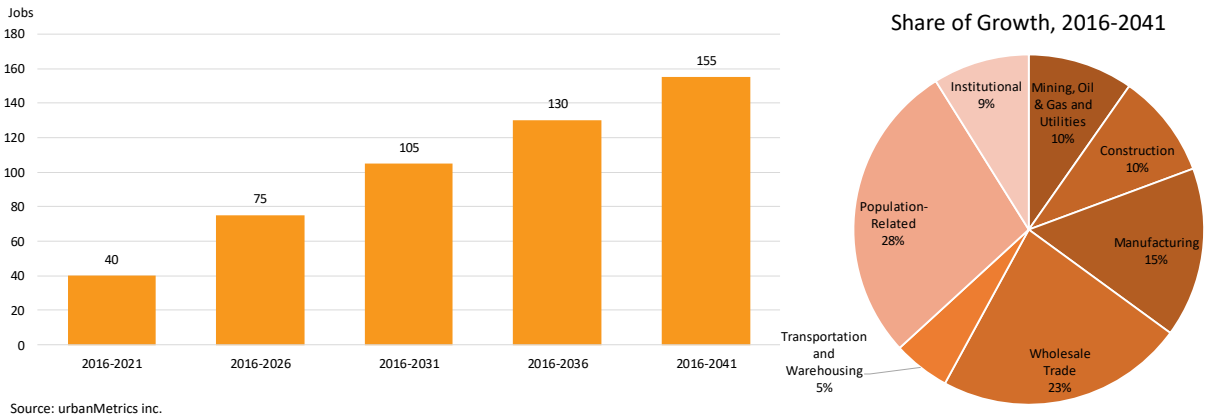
In additional to these population related and institutional jobs, there will also be jobs located on industrial lands, such as manufacturing, wholesale trade and transportation and warehousing. The location of these types of jobs are less dependent on population growth than population-related and institutional jobs.

In forecasting potential absorption of industrial lands in Vulcan, we have considered a number of factors, such as the supply of vacant industrial lands located in competitive municipalities, access to multimodal infrastructure, such as highways, rail lines and airports and the geographic location of Vulcan, between Calgary and Lethbridge.

In forecasting employment growth in manufacturing, wholesale trade and transportation and warehousing, we have examined export trends, recent trends in activity rates[2] and our anticipated change in activity rates in future years. The employment forecasts for manufacturing, wholesale trade and transportation and warehousing are summarized in Figure 4-2. The detailed forecasts are summarized in Appendix A.

Overall, our forecast identifies that Vulcan is anticipated to add approximately 670 jobs between 2016 and 2041, with 155 jobs expected to be accommodated on industrial lands. The right side of Figure 4-2 summarizes that nearly 30% of these new jobs on industrial lands will be population-related employment, followed by wholesale trade and manufacturing. It is expected that many of the wholesale trade jobs will be related to the agricultural sector, as Vulcan serves the surrounding farm community.

Figure 4-2: Forecast Employment Growth by Industry



Source: urbanMetrics inc.

[2] "Activity rates" are defined as the percentage of the population that is employed in a particular sector.

4.3 Industrial Densities

One of the key factors impacting forecast absorption of industrial lands are assumptions related to floor space per worker (FSW). This is the number of employees in an industrial building of a given size. As stated earlier in this analysis, due to increased automation, the number of employees required in a given industrial building has declined in recent decades.

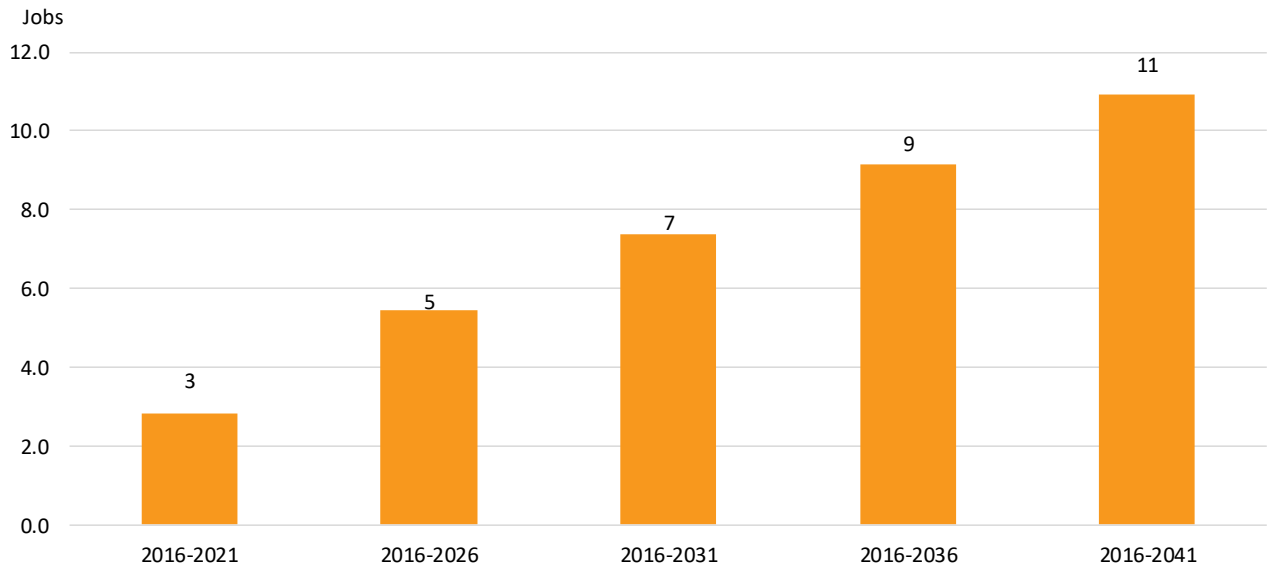
FSW can vary significantly by industry. For example, in the manufacturing sector, FSW densities typically range between 1,000 and 2,000 square feet per employee. Within the wholesale trade and transportation and warehousing, FSW densities can be upwards of 2,000 square feet per employee. For population-related employment uses such as commercial and institutional, we have assumed a density of 400 square feet per employee.

In forecasting industrial land absorption in Vulcan, we have made assumptions regarding FSW densities on industrial lands based on our experience in similar municipalities. These assumptions are also based on our knowledge of the existing employment base and the types of employment that are expected to grow in Vulcan over the forecast period. In forecasting demand for industrial lands, we have held these FSW densities constant through the forecast period.

4.4 Industrial Land Demand in Vulcan

Based on these employment forecasts and FSW densities, we have forecast absorption of industrial lands in Vulcan. As summarized in Figure 4-3, Vulcan is forecast to absorb 11 net hectares of industrial lands between 2016 and 2041. However, it is important to note that these forecasts are based on historical absorption of industrial lands in Vulcan. As noted earlier, a new industrial park in the region could address pent-up demand for industrial lands. Based on a survey conducted by MDB Insight of businesses currently operating in Vulcan, there are also some businesses that are considering expanding and require vacant industrial lands to grow their businesses. Therefore, it will be important that the new industrial park provide sufficient lands to accommodate both new and existing businesses.

Figure 4-3: Industrial Land Absorption, Vulcan, 2016 to 2041



Source: urbanMetrics inc.

4.5 Market Contingency

For long range forecasting purposes, our customary approach is to assign a market contingency for Employment lands in the order of 10 to 25%.

A market contingency is an adjustment factor that is applied as a planning safeguard, to ensure that a certain proportion of land should remain vacant – at all times - to provide the business and investment community with a healthy range of land development options at a variety of locations and price points to sustain on-going industrial development. Another practical benefit of using a market contingency adjustment is that it provides a certain degree of flexibility for a municipality, especially when confronted with unanticipated opportunities for economic development (i.e. a major new manufacturing plant or logistics facility that has above average land requirements). While the application of a market contingency is purely discretionary, we strongly suggest that municipalities maintain their vacant industrial land inventories at levels that are at least 10% above what is projected. For the purposes of this analysis, we have applied a market contingency factor of 25%. This market contingency factor is somewhat higher than what we typically use in our analysis. The higher market contingency factor is related to the potential for latent demand associated with new industrial lands in Vulcan “opening” up for development.

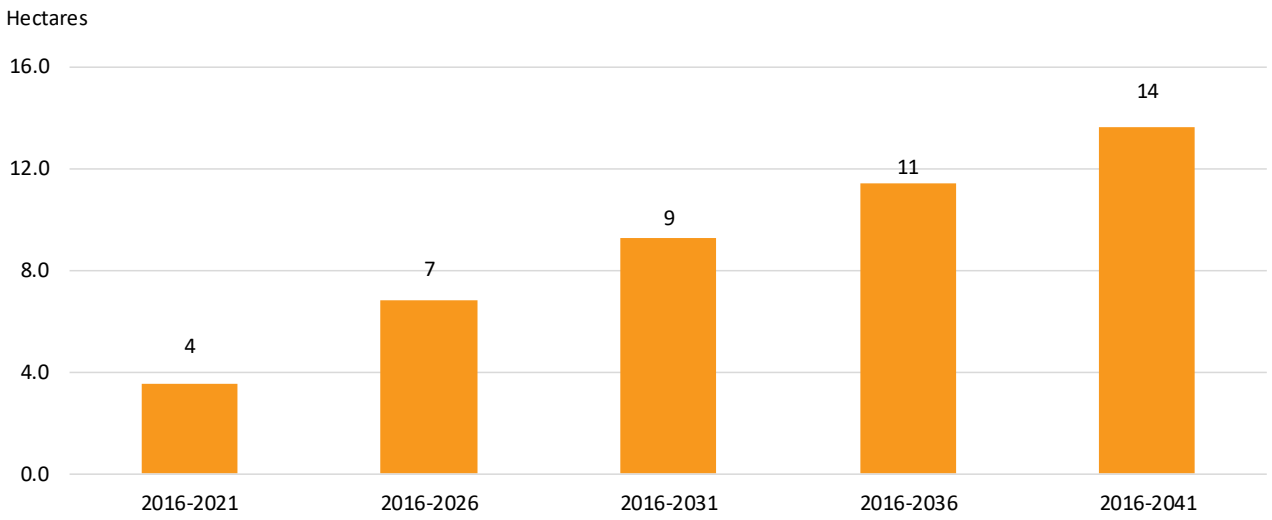
4.6 Demand for Employment Lands

After forecasting industrial land demand in Vulcan and assuming at 25% market contingency factor, we have forecast "total" industrial land demand.

As shown in Figure 4-4, we have forecast absorption of 14 hectares of industrial lands in Vulcan between 2016 and 2041. To provide context, municipalities such as Okotoks, which has experienced strong population growth has only absorbed about 1.9 hectares of industrial land per year.

It is notable that the estimated absorption of 14 hectares of industrial land between 2016 and 2041 represents about 80% of the total supply of approximately 17.6 hectares of vacant industrial lands that are available in Vulcan. However, based on the inventory completed by MDB Insight, only 4.7 hectares of industrial lands are serviced and vacant. Therefore, additional serviced and vacant industrial lands are required in Vulcan to accommodate future growth.

Figure 4-4: Forecast Industrial Land Absorption in Vulcan, 2016-2041



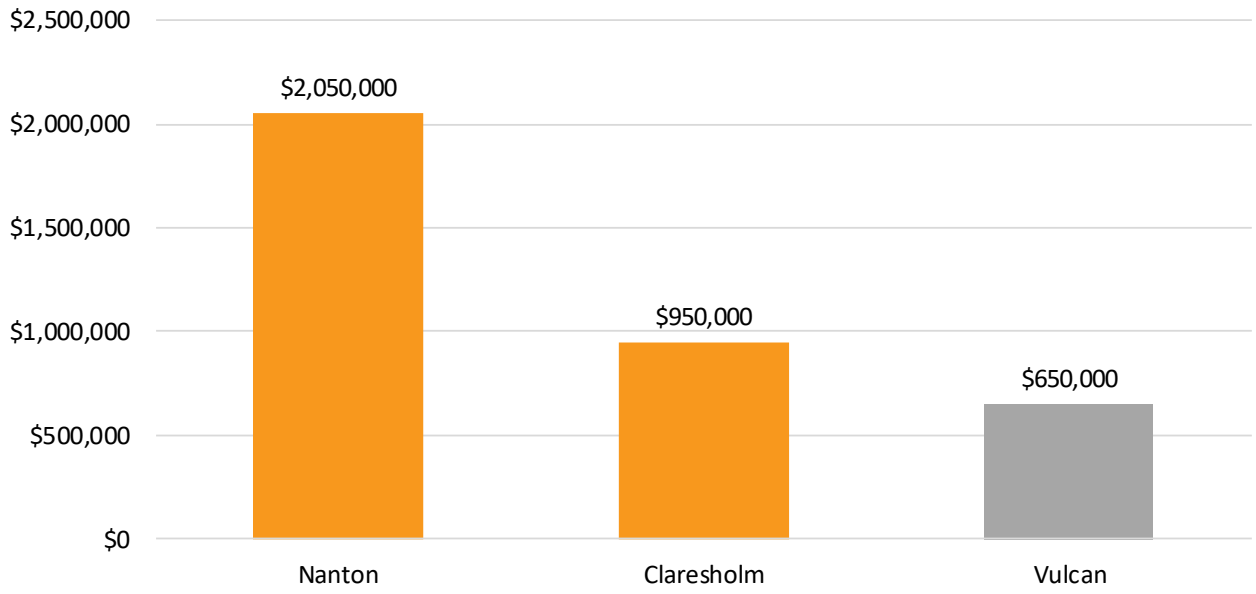
Source: urbanMetrics inc.

5.0 Industrial Land Assessment Values

To determine the potential tax revenue that can be generated from the development of a new industrial park in Vulcan, we have examined the assessed value of occupied industrial lands in the municipality, in addition to select municipalities profiled earlier in this report.

Figure 5-1 summarizes assessed value per hectare for occupied industrial lands in select municipalities surrounding Vulcan where assessment information is publicly available.[3] As shown, assessed values range from a high of nearly $2 million per hectare in Nanton to a low of approximately $650,000 per hectare in Vulcan. While assessment information for Coaldale and Taber is not publicly available, based on industrial land prices summarized earlier in this report, it is likely that these assessed values are greater than the $2 million per hectare in Nanton. Therefore, in comparison to surrounding municipalities, Vulcan offers a significant value proposition.

Figure 5-1: Assessed Value Per Hectare, Industrial Lands, Select Municipalities



Source: urbanMetrics inc. based on assessment information from various municipalities.

We have also summarized assessed values for the specific industry sectors identified by MDB Insight in the Phase 1 report. These sectors include:

- Agriculture and Agri-Food Manufacturing
- Clean Technology and Renewable Energy

The Phase 1 report identified that a large and growing number of farms in Vulcan County has resulted in a large amount of primary inputs into the agri-food sector. Therefore, there may be an opportunity

[3] This analysis includes industrial lands occupied

to expand into value-added agriculture via agri-food manufacturing and other agricultural product manufacturing. Therefore, as part of this analysis, we have identified firms engaged in agri-food manufacturing and related services in local municipalities. Based on this analysis, we have identified the average assessment value for these types of businesses.

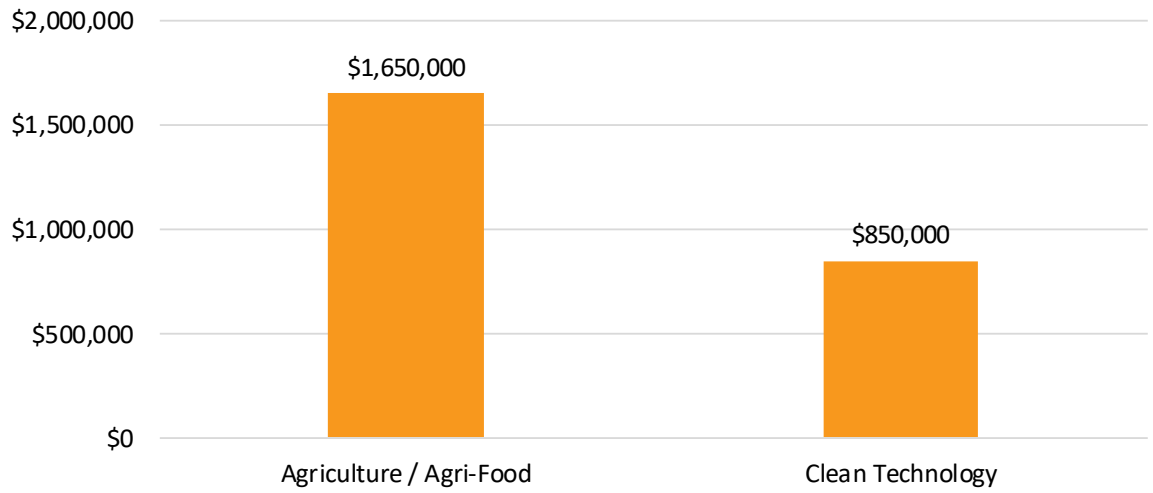
MDB Insight also identified that Vulcan is positioned to expand its footprint in Clean Technology and Renewable Energy, specifically related to biofuels, recycled materials and new building construction. While it is not expected that this industry will drive significant demand for industrial lands, it could be an area of growth.

The results of this sector analysis are summarized in Figure 5-2. The assessed values per hectare in Figure 5-2 include each of the municipalities identified in Figure 5-1 and are therefore intended to identify the order of magnitude in terms of the impact of attracting various types of businesses.

As shown, the assessed value per hectare for businesses engaged in Agriculture and Agri-food was higher than firms engaged in Clean Technology and Renewable Energy. However, it is important to note that the assessed value per hectare for these two industries is greater than the average assessed value for occupied industrial lands in Vulcan ($650,000 per hectare).

While Vulcan will not have direct control over the types of businesses that are attracted to the new industrial park, it will be important to take into consideration the assessed value per hectare in Figure 5-2 when targeting these various sectors.

Figure 5-2: Assessed Value Per Hectare, by Target Sector, Select Municipalities in the CRP



Source: urbanMetrics inc. based on assessment information from various sources.

Overall, based on our review of assessed value per hectare in the various municipalities, it is reasonable to assume that lands in the new industrial park can achieve an average assessed value of $1.2 million per hectare for occupied and serviced industrial lands. Based on this average assessed value and the current municipal tax rate, each absorbed hectare would generate approximately $17,500 per year in additional tax revenue per absorbed hectare.[4]

[4] Based on current mill rate of $14.63 per $1,000 in property value.

6.0 Locational Considerations

The location of an industrial park can have a profound impact on a municipality. While a new industrial park can spur employment growth, if not planned properly, it can also be a financial burden on a municipality.

The Town of Vulcan has not yet identified the preferred location for a new industrial park in the Town. Therefore, we have summarized variables that should be considered by the municipality in identifying a location for the new industrial park.

6.1 Infrastructure Costs

It is our understanding that the costs to service the existing industrial lands located in the northeast of the municipality have resulted in the lands being uneconomical to develop. Therefore, when identifying a location for the new industrial park, it will be important for the municipality to consider the costs necessary to extend services to the land (transportation, water and wastewater).

6.2 Transportation Access and Visibility

Depending on the type of businesses that are being targeted for the new industrial park, transportation access should be a consideration in the location of a new industrial park. As noted earlier in this report, it is unlikely that the new industrial park will accommodate a concentration of logistics and warehousing firms, as these types of businesses are more likely to locate in municipalities along Highway 2 or the Crowsnest Highway.

However, it will be important that the industrial park have direct access to either Highway 23 or County Road 534. This will be important, as businesses generally prefer not to transport materials through residential areas.

Also, since Vulcan has access to the CPR line, it will be important to locate the new industrial park in proximity to this line, as this may be a desirable amenity for some businesses.

6.3 Conflicting Land Uses

It will be important for the Town to consider the impact of a new industrial area on existing land uses in the Town. To mitigate potential noise disturbances and other factors such as smell and safe transportation/disposal of hazardous materials, a location should be chosen that does not border residential or institutional uses.

Locating a new industrial park near these types of land uses could limit the types of firms that may consider the lands.

Appendix A Detailed Employment Forecasts

Vulcan Business Development Society										
Activity Rate										
Period	Population	Agriculture	Mining, Oil & Gas and Utilities	Construction	Manufacturing	Wholesale Trade	Transportation and Warehousing	Population-Related	Institutional	Total Employment
2001	6,632	0.193	0.009	0.008	0.005	0.011	0.013	0.104	0.071	0.414
2006	6,854	0.209	0.009	0.007	0.005	0.020	0.011	0.088	0.093	0.442
2011	6,939	0.140	0.006	0.001	0.004	0.011	0.000	0.047	0.094	0.303
2016	6,924	0.231	0.010	0.010	0.002	0.024	0.005	0.072	0.092	0.446
2021	7,326	0.231	0.010	0.010	0.003	0.024	0.005	0.072	0.092	0.446
2026	7,694	0.231	0.010	0.010	0.003	0.024	0.005	0.072	0.092	0.446
2031	7,952	0.230	0.010	0.010	0.004	0.024	0.005	0.072	0.092	0.447
2036	8,178	0.230	0.010	0.010	0.004	0.024	0.005	0.072	0.092	0.447
2041	8,408	0.230	0.010	0.010	0.005	0.024	0.005	0.072	0.092	0.447
Employment										
Period	Population	Agriculture	Mining, Oil & Gas and Utilities	Construction	Manufacturing	Wholesale Trade	Transportation and Warehousing	Population-Related	Institutional	Total Employment
2001	6,632	1,280	60	50	35	75	85	690	470	2,745
2006	6,854	1,430	65	50	35	140	75	600	635	3,030
2011	6,939	970	40	10	25	75	0	325	655	2,100
2016	6,924	1,601	69	69	14	163	38	498	635	3,087
2021	7,326	1,692	73	73	18	173	40	527	672	3,268
2026	7,694	1,775	77	76	23	182	42	554	706	3,435
2031	7,952	1,833	80	79	28	188	43	572	729	3,551
2036	8,178	1,883	82	81	33	193	44	588	750	3,654
2041	8,408	1,934	84	83	38	198	46	605	771	3,759
Employment Growth										
2016-2021	402	91	4	4	4	9	2	29	37	181
2016-2026	770	174	8	8	9	18	4	55	71	347
2016-2031	1,028	232	10	10	14	24	6	74	94	464
2016-2036	1,254	282	13	12	19	30	7	90	115	567
2016-2041	1,484	333	15	15	24	35	8	107	136	672

Share of Growth on Industrial Lands									
Vulcan Business Development Society	0%	100%	100%	100%	100%	100%	40%	10%	
Employment Growth on Industrial Lands									
2016-2021	0	4	4	4	9	2	12	4	39
2016-2026	0	8	8	9	18	4	22	7	76
2016-2031	0	10	10	14	24	6	30	9	103
2016-2036	0	13	12	19	30	7	36	11	128
2016-2041	0	15	15	24	35	8	43	14	153
Floor Space Per Worker (sq.ft. per worker)									
Vulcan Business Development Society	0	400	400	2,000	2,000	2,000	400	400	
Floor Space (sq.ft.)									
2016-2021	0	1,611	1,597	8,952	18,970	4,355	4,629	1,475	41,589
2016-2026	0	3,086	3,060	18,505	36,349	8,345	8,870	2,826	81,041
2016-2031	0	4,116	4,081	28,010	48,481	11,131	11,831	3,770	111,420
2016-2036	0	5,022	4,980	37,782	59,157	13,582	14,436	4,600	139,559
2016-2041	0	5,942	5,892	48,037	69,991	16,069	17,079	5,442	168,453
Coverage									
Coverage	30%	30%	10%	30%	10%	10%	30%	30%	
Hectares of Industrial Lands									
2016-2021	0.0	0.0	0.1	0.3	1.8	0.4	0.1	0.0	2.8
2016-2026	0.0	0.1	0.3	0.6	3.4	0.8	0.3	0.1	5.5
2016-2031	0.0	0.1	0.4	0.9	4.5	1.0	0.4	0.1	7.4
2016-2036	0.0	0.2	0.5	1.2	5.5	1.3	0.4	0.1	9.1
2016-2041	0.0	0.2	0.5	1.5	6.5	1.5	0.5	0.2	10.9
Market Contingency Factor									
Market Contingency Factor	25%								
Total Absorption of Industrial Lands									
Hectares of Industrial Lands									
2016-2021	0.0	0.1	0.2	0.3	2.2	0.5	0.2	0.1	3.5
2016-2026	0.0	0.1	0.4	0.7	4.2	1.0	0.3	0.1	6.8
2016-2031	0.0	0.2	0.5	1.1	5.6	1.3	0.5	0.1	9.2
2016-2036	0.0	0.2	0.6	1.5	6.9	1.6	0.6	0.2	11.4
2016-2041	0.0	0.2	0.7	1.9	8.1	1.9	0.7	0.2	13.6

Appendix B: Development Financing Review

INDUSTRIAL LAND STRATEGY

Phase 4: Development Financing Review

Vulcan, Alberta

Prepared for **Vulcan Business Development Society**

November 30, 2017

This document is available in alternative formats upon request by contacting:

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416-351-8585 (1-800-505-8755)

November 30, 2017

Harry Shnider, Senior Consultant
MDB Insight
909 17 Avenue SW, Suite 400
Calgary, AB T2T 0A4

Dear Mr. Shnider:

RE: Industrial Land Strategy – Phase 4: Development Financing Review (Vulcan, Alberta)

urbanMetrics inc. is pleased to submit our Phase 4: Development Financing Report as part of the industrial lands study for the member municipalities of the Vulcan Business Development Society (VBDS). This report identifies development financing and cost recovery options that are available to the municipal partners in the VBDS to fund infrastructure improvements that are necessary to support employment growth.

We appreciate the opportunity to conduct this assignment on your behalf and we look forward to the opportunity to discuss the results of our report with you.

Yours truly,

Craig Ferguson
Associate Partner
cferguson@urbanMetrics.ca

Contents

Figures

1.0 Introduction

MDB Insight, together with urbanMetrics inc., and Watt Consulting Group (the "consulting team") have been retained by the Vulcan Business Development Society (VBDS) to prepare an Industrial Land Strategy for the Region. The purpose of this strategy will be to determine the demand for industrial lands in and around Vulcan, the types of businesses that could be attracted to the municipality and identify if additional industrial lands are required to accommodate employment growth.

This strategy will also benchmark the infrastructure costs necessary to service the existing industrial park in the Town of Vulcan, located north of Jamison Road between the CP rail line and Highway 23, against the infrastructure costs required to service the potential new industrial park locations that have been identified by VBDS staff and the consulting team.

1.1 Background

A survey conducted by MDB Insight identified there are existing employers located in the Town that are planning to expand their businesses and require additional space to accommodate their growing enterprises. While there are available industrial lands within Vulcan County, the Town of Vulcan and the four villages, many of these lands are not in ideal locations or require significant capital investments. Ensuring there is a sufficient supply of serviced (i.e. 'shovel ready') industrial lands aligns with the economic development focus of the VBDS, which is to promote business attraction and expansion and support for entrepreneurs and tourism development.

Our Phase 2 & 3 report identified demand for approximately 15 gross hectares of industrial lands over the 2016 to 2041 period to accommodate employment growth in Vulcan. Based on a land inventory completed by MDB Insight, the Town of Vulcan has at total of 17.6 hectares of industrial lands, of which approximately 15 hectares are located within the existing business park. While this appears to be sufficient to accommodate employment growth, it is notable that employment growth in the VBDS will be dependent on many variables, some of which cannot be accurately projected. For example, the presence of a new industrial park in Vulcan could address pent up demand for industrial lands and attract new employers to the region. This in turn could result in stronger employment growth than has been experienced in recent years.

Therefore, it is important for the VBDS to ensure that there are sufficient lands available to accommodate large industrial land users, which may be attracted to the Town's affordable land prices and access to the CP rail line. Ensuring there is an adequate supply of industrial lands to support growth may require the Town to identify a location for a new industrial park.

Based on industrial demand forecasts prepared by urbanMetrics in our Phase 2 and 3 Report, Watt Consulting Group subsequently prepared the *Town of Vulcan Industrial Land Strategy – Network Assessment* to identify the impact of the increase in industrial traffic on the transportation network. This report also examined the transportation improvements required to accommodate this planned development. In addition to the existing industrial park located in Vulcan, VBDS staff and the

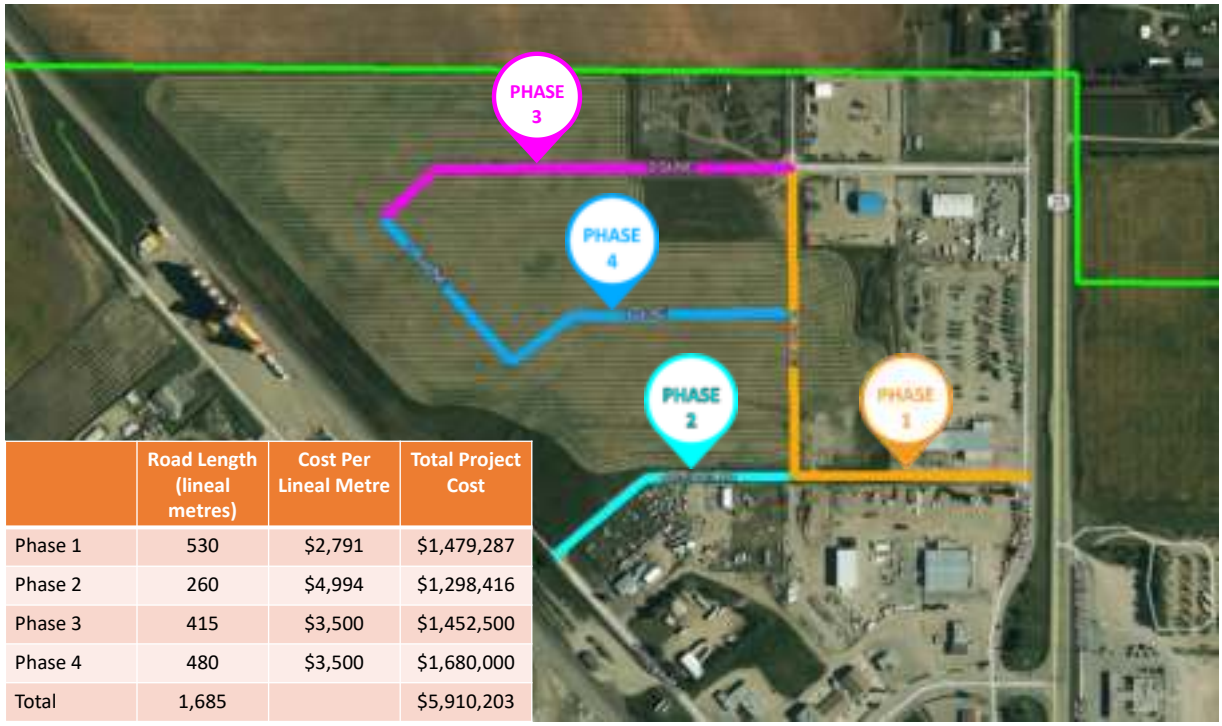
consulting team identified three potential locations for a new business / industrial park, as shown in Figure 1-1. Two of these locations are within the existing Town boundary, while Location 3 is located in Vulcan County and may require a municipal boundary adjustment.

Figure 1-1: Location of Existing and Potential New Business / Industrial Parks

Source: urbanMetrics inc. based on Google Maps.

Based, in part, on discussions and information provided by staff at the Town of Vulcan, and a high-level analysis completed by the consulting team, the capital infrastructure required to service the approximately 14.9 net hectares of vacant industrial land remaining in the existing industrial park has been estimated at approximately $5.9 million. A summary of the estimated capital costs to service vacant lands in the existing industrial park are summarized in Figure 1-2.

Figure 1-2: Capital Infrastructure Costs – Existing Business Park



	Road Length (lineal metres)	Cost Per Lineal Metre	Total Project Cost
Phase 1	530	$2,791	$1,479,287
Phase 2	260	$4,994	$1,298,416
Phase 3	415	$3,500	$1,452,500
Phase 4	480	$3,500	$1,680,000
Total	1,685		$5,910,203

The consulting team has also prepared a high-level estimate of the capital infrastructure costs necessary to service the Location 1 industrial lands, identified earlier in Figure 1-1. These capital investments have been estimated to provide general guidance to the municipal partners. Further study of these infrastructure costs is required by the municipality prior to advancing this option. In Location 1, we have assumed 470 lineal metres of internal roads, which could yield 24 industrial lots, with lot areas of 0.21 hectares. Based on an estimated servicing cost of $3,500 per lineal metre, which includes costs for roads, water, wastewater and stormwater, servicing these lands could require a capital investment of approximately $1.65 million.

For the purposes of this analysis, the consulting team has not prepared infrastructure cost estimates for Location 2 and Location 3. The airport lands, identified as Location 2 in Figure 1-1, are currently not serviced. Extending servicing to these lands could require significant infrastructure investments that requires further study by engineering staff at the Town. The Location 3 lands provide a longer-term opportunity to accommodate employment uses, such as an agriculture processing facility.

Estimating the infrastructure investments necessary to service these lands should be addressed through an area structure plan (ASP) and a geotechnical report. It should also be noted that, unlike the Existing Industrial Park, the Location 1 and 3 lands are owned by private landowners. This creates an opportunity to utilize additional forms of development financing, which will be discussed later in this report.

Based on the report prepared by Watt Consulting Group, the transportation network is not anticipated to require significant improvements to accommodate the planned industrial development in the existing industrial park or the three possible locations for a future industrial park.

1.2 Objectives

The purpose of this Phase 4 report is to identify and develop a financing strategy for the development of the existing and potential new industrial parks located in the Town of Vulcan. In preparing the development financing strategy, we have relied on the transportation analysis completed by Watt Consulting Group. This analysis also relies on water, wastewater and stormwater infrastructure costs identified by VBDS staff and estimated by the consulting team.

Based on these options we have benchmarked the infrastructure costs required to service vacant lands in the existing industrial park against a new industrial park in the Town. Based on this analysis, we have also recommended an approach to fund these capital infrastructure improvements that ensure that land prices in the industrial park is competitive with other local municipalities, while at the same time not putting unnecessary strain on municipal finances.

2.0 Development Financing and Cost Recovery Options

As the VBDS is well aware, the capital infrastructure required to service industrial lands can be costly. It is our understanding that the significant infrastructure costs necessary to service the existing industrial park located in the Town of Vulcan between the CPR line and Highway 23 have limited development in this area.

This section of the report examines the development financing options that are available to the Town and County. This section of the report then goes on to examine cost recovery options that are available to the municipal partners.

2.1 Development Financing Capacity

In this report, we have reviewed approaches available to the municipal partners to finance infrastructure improvements. These include:

- Issuing Municipal Debt;
- Utilizing Municipal Reserves;
- Full Cost Recovery User Charges; and,
- Font-end Financing Agreements.

Municipal Debt Capacity

Figure 2-1 identifies the remaining debt limit in the Town and County of Vulcan as of 2016. As shown, the remaining debt limit for the municipalities is approximately $31 million. As shown in the far right column in Figure 2-1, combined the municipalities have used approximately 16% of the municipal debt limit. This is in comparison to an average utilization rate of 15% across all Alberta municipalities with a population between 1,000 and 5,000 persons. While the Town and County are near the provincial average debt utilization, there may be an opportunity to take on additional municipal debt to fund infrastructure improvements in the existing or potential new industrial parks.

As shown in Figure 2-1, the County of Vulcan accounts for 88% of available debt capacity between the two municipalities. Therefore, the County may be required to carry much of the financial burden if municipal debt is used to fund future infrastructure improvements.

The ability to take on additional debt will ultimately be dependent on each municipal partner and their aversion to risk, as well as other projects that will require debt financing in the future. It is also important to recognize that the debt capacity is also a reflection of low interest rates. An increase in the cost of borrowing in the future would reduce these limits.

Figure 2-1: Municipal Debt Limit, 2016

	Population	Municipal Debt Limit	Total Debt Outstanding	Remaining Debt Limit	Share of Remaining Debt Limit	Outstanding Debt Limit as a Share of Total Debt Limit
Town of Vulcan	1,836	7,800,704	4,078,785	3,721,919	12%	52%
Vulcan County	3,893	29,564,939	2,042,229	27,522,710	88%	7%
Total	5,729	37,365,643	6,121,014	31,244,629	100%	16%

Source: urbanMetrics Inc., based on Alberta Municipal Affairs

Municipal Reserves

Figure 2-2 shows the restricted and unrestricted surplus balance for the municipal partners as of year end 2016. The restricted surplus represents those funds that have been earmarked for specific projects, whereas the unrestricted surplus represents the reserves the municipality has to fund unforeseen projects in the future. As of Year-End 2016 (as of the most current filing with Alberta Municipal Affairs), the Town and County had positive unrestricted surplus balances. In total, these unrestricted surpluses amount to approximately $2.0 million.

As noted earlier, providing capital infrastructure to the remaining lands in the existing industrial park is estimated at $5.9 million. Therefore, these unrestricted surpluses are not sufficient to cover the full extent of these capital improvements and additional funding will be required. However, unrestricted reserves could be used in conjunction with municipal debt to finance a portion of the costs. The costs to service the Location 1 lands, estimated at $1.65 million could potentially be funded through unrestricted reserves.

Figure 2-2: Restricted and Unrestricted Surpluses (Year End 2016)

	Accumulated Surplus (Year End 2016)	
	Restricted	Unrestricted
Town of Vulcan	$985,484	$816,927
Vulcan County	$30,392,556	$1,187,942
Total	$31,378,040	$2,004,869

SOURCE: urbanMetrics, based on Alberta Municipal Affairs.

Full-Cost Recovery User Charge

The application of a full-cost recovery user charge is a cost recovery method that is well suited for utility services such as water and wastewater treatment and collection. The Town of Vulcan, Vulcan

County and the villages of Carmangay and Champion are members of the Twin Valley Regional Water Commission (TVRWC), which is in charge of the provision of portable water to these communities.

Under the full-cost recovery user charge financing option, the TVRWC would incur the cost of servicing the existing or new industrial park. The capital costs and potential debt service charges would be recovered based on full-cost pricing, whereby user charges would cover operating costs as well as debt servicing costs related to the capital expenditures.

The application of this financing method could avoid high up-front costs, such as off-site levies, for new businesses locating along the industrial park. This could potentially make industrial lands in Vulcan a more attractive location for development in a regional context by lowering initial development costs.

Vulcan would not be alone in utilizing this approach to capital infrastructure financing. This methodology is used by hydroelectric and gas utilities. There are also examples of this financing method being used for water and wastewater infrastructure. For example, the City of Edmonton funds growth-related capital expenditures for water through user charges. Some joint economic development initiatives are also using this development financing and cost recovery option. The Alberta Capital Region Wastewater Commission and Capital Region Southwest Water Services Commission funds and operates the water and wastewater infrastructure for municipalities in the Leduc Nisku Economic Development Authority.

However, using this approach to finance water and wastewater infrastructure in Vulcan does present some challenges. Primarily, the municipalities would need to determine if the governance structure permits the TVRWC to incur debt to finance capital infrastructure projects. Secondly, the TVRWC is not responsible for wastewater treatment and collection. Therefore, the mandate of the TVEWC would need to be revised to include wastewater treatment and collection, or these infrastructure costs would need to be financed through alternative sources.

Overall, this approach would be subject to additional research by the municipal partners, which could delay the construction of the water and wastewater infrastructure to support industrial growth.

Front-End Financing Agreements

Front-end financing agreements are a method used by some municipalities to finance capital infrastructure improvements such as water, wastewater and transportation improvements. Landowners ‘front-ending’ infrastructure improvements would then be provided with off-site levy credits when they start to develop their lands.

As the Town of Vulcan owns the remaining lands in the existing industrial park, a front-end financing agreement is not an option that can be pursued. However, as the Location 1 and Location 3 lands are

owned by a private landowner, there may be an opportunity to explore the use of front-end financing agreements if these lands are developed to accommodate long-term employment growth.

Under this financing option, the landowner(s) in Location 1 and/or Location 3 would pay for the water, wastewater, stormwater and transportation costs necessary to service the lands. It is our understanding that there is one landowner in each of the Location 1 and Location 3 lands. Given the concentration of land ownership, it may be possible for the Town to enter into front-end financing agreements with the landowners.

While front-end financing agreements are sometimes used by developers for residential development, they are not typically used for non-residential development that is anticipated to have a long build-out period. Therefore, in our opinion, it is unlikely that a landowner will enter into a front-end financing agreement to service the Location 1 or Location 3 lands. If the Town were to rely on front-end financing agreements, it could result in significant delays in starting these projects that would be outside of the control of the Town and impact the supply of shovel-ready lands necessary to accommodate growth.

2.2 Cost Recovery Options

In this section, we have examined the principal methods of cost recovery (other than upper tier government funding), including Off-site Levies and the property tax base.

Off-Site Levies (Acreage Assessments)

Section 648 of the Municipal Government Act allows municipalities to enact bylaws for "Offsite Levies" to pay for roads and municipal utilities that are required outside of a particular development but that will directly or indirectly serve the development. These off-site levies may be imposed on the following forms of off-site infrastructure:

- **Water Services** - Facilities for water storage, transmission and treatment;
- **Wastewater Services** - Facilities for the treatment, movement and disposal of sanitary sewage;
- **Storm Water Management** - Storm sewage drainage facilities; and
- **Roads and Related Infrastructure** – New or expanded roads to accommodate development.

This form of development financing is used in many Alberta municipalities. These off-site levies are imposed as a condition in a Master Development Agreement. The off-site levies identify a rate per hectare as approved by Council. A limitation with off-site levies is that the municipalities must have

financial resources in place to fund the initial infrastructure prior to the absorption of employment lands in the potential industrial park. Under the off-site levy model, the municipalities may be collecting levies over many years while the business / industrial park is built-out.

The Town of Vulcan currently does not impose off-site levies on development within the municipality.

Residential and Non-Residential Tax Base

It is possible for the Town and County to fund the capital infrastructure requirements for the industrial park through the tax base. Under this scenario, the municipalities would fund the capital expenditures through municipal debt, then increase property tax rates to finance the debt.

Typically, the larger an assessment base, the more capacity a municipality has to absorb increased expenditures. While many other factors must be taken into consideration, a municipality with a large assessment base would be able to distribute the costs of a hypothetical sewer plant expansion over a larger tax base than a municipality with a lower assessment base, thus experiencing a lower tax increase per household or per square foot of non-residential space.

Another consideration, is the ratio of non-residential assessment to total assessment. Municipalities with a high non-residential assessment base relative to its total assessment, can absorb increased costs with lower tax increases on its residents. The assumption is that businesses are better able to absorb tax increases than residents.

Figure 2-3 summarizes the assessment bases of the Town and County compared to the Alberta average. As shown, each of the municipalities has a non-residential assessment share that is lower than the provincial average. Therefore, funding the capital infrastructure for the industrial park through the tax base will put added pressure on residents in the Town.

Figure 2-3: Comparison of Assessment Bases

	Non-Residential	Residential	Farmland	Railway	Total	Non-Residential as a % of Total
Town of Vulcan	34,688,571	164,704,205	111,460	83,240	199,587,476	17%
Vulcan County	71,838,068	419,265,358	203,644,720	4,904,540	699,652,686	10%
Total	**106,526,639**	**583,969,563**	**203,756,180**	**4,987,780**	**899,240,162**	**12%**
Alberta Average	**182,015,053,073**	**576,018,322,992**	**6,161,581,342**	**608,870,210**	**764,803,827,617**	**24%**

Source: urbanMetrics inc. based on Alberta Municipal Affairs.

It is also notable that the non-residential municipal tax rate of $14.75 per $1,000 of assessed value of higher than most local municipalities. Therefore, there is limited opportunity to increase the non-residential tax rate to finance capital infrastructure improvements in either the existing or potential new industrial parks.

Summary

Regardless of the option chosen by the municipalities to fund capital infrastructure in either the existing or new industrial park, it is likely they will have to front-end these costs to facilitate development on these lands. These front-ended infrastructure costs can then be recovered at a later date as development commences.

3.0 Development Financing and Cost Recovery Strategy

3.1 Development Financing Strategy

Based on our review of the development financing options that are available to the municipalities to provide roads, water, wastewater and stormwater capital infrastructure to the industrial lands, it is our opinion that using a combination of municipal debt and reserves to finance these projects is the most realistic option. Relying on full-cost recovery user charges, or front-end financing agreements are either not feasible or could result in significant delays in the construction of the capital infrastructure projects. By using municipal debt to finance these projects, the Town and County will have control over when these lands are serviced and when they can support growth.

In determining the cost recovery options available to the VBDS and its member municipalities, we have utilized water, wastewater, stormwater and transportation capital infrastructure costs provided by Town staff and estimated by the consulting team for the potential new industrial parks.

In our analysis, we have apportioned all of the capital infrastructure costs to support industrial growth on the nearly 15 vacant hectares that remain in the existing industrial park and the approximately 5 hectares that could potentially be developed in the Location 1 industrial park.

For the roads, water, wastewater and stormwater infrastructure required to service the existing and potential industrial parks, we have assumed that there will be no benefit to existing development. We have also assumed that the infrastructure will only benefit industrial development (i.e. 100% non-residential share). We are also not aware of any grants for these infrastructure costs. However, if grants were to be received, it would lower the costs allocated to the non-residential sector.

In this analysis, we have assumed that the Town and County issue a 20-year debenture to fund the construction costs associated with the roads, water, wastewater and stormwater infrastructure. We have also assumed that the debenture will carry a 2.992% interest rate, which is consistent with the prevailing interest rate based on the Alberta Capital Finance Authority in November 2017.

Based on these assumptions, the calculated financing charges to fund the $5.9 million debenture for the capital infrastructure costs for the existing industrial park is approximately $2.0 million for a total payment of nearly $7.9 million.

2.992%	Interest Rate Based on Alberta Capital Finance Authority
20	Amortization Period
1	Payments Per Year

$2,029,091	Interest Cost
$5,910,203	Principal
$7,939,294	Total Payment

Similarly, we have calculated the financing costs necessary to fund a 20-year debenture for the infrastructure costs in the Location 1 lands. As shown, the interest costs for this debenture are estimated at approximately $565,000 for a total payment of $2.21 million.

2.992%	Interest Rate Based on Alberta Capital Finance Authority
20	Amortization Period
1	Payments Per Year

$564,761	Interest Cost
$1,645,000	Principal
$2,209,761	Total Payment

As stated earlier in this report, the Town of Vulcan is currently utilizing a portion of its municipal debt limit that is greater than the Alberta average for similar sized municipalities. A shown in Figure 3-1, the Town of Vulcan is currently utilizing 52% of its debt limit, while the Alberta average for similar sized municipalities is 15%. If the municipal partners were to equally share the capital costs to service the remaining industrial park, it would result in the Town of Vulcan utilizing 90% of its debt limit and the County of Vulcan utilizing 17% of its debt limit. Similarly, if the municipalities were to pursue the Location 1 lands, the Town would utilize 63% of its outstanding debt limit, while the County would utilize 10%.

Figure 3-1: Municipal Debt Financing Option

	Town of Vulcan	County of Vulcan	Total
Municipal Debt Limit	7,800,704	29,564,939	37,365,643
Total Debt Outstanding	4,078,785	2,042,229	6,121,014
Remaining Debt Limit	3,721,919	27,522,710	31,244,629
Outstanding Debt as a Share of Total Limit	52%	7%	16%
Existing Industrial Park Infrastructure Costs			
Estimated Capital Infrastructure Costs[1]	2,955,102	2,955,102	5,910,203
Allocation of Infrastructure Costs	50%	50%	100%
Total New Debt Outstanding	7,033,887	4,997,331	12,031,217
Outstanding Debt as a Share of Total Limit	90%	17%	32%
Location 1 Lands Infrastructure Costs			
Estimated Capital Infrastructure Costs[1]	822,500	822,500	1,645,000
Allocation of Infrastructure Costs	50%	50%	100%
Total New Debt Outstanding	4,901,285	2,864,729	7,766,014
Outstanding Debt as a Share of Total Limit	63%	10%	21%

[1] Includes interest costs.

Source: urbanMetrics inc. based on information from the Alberta Ministry of Municipal Affairs.

Therefore, equally sharing the capital costs between the municipal partners or financing all costs through municipal debt may not be an option for the Town and County. Ultimately, how these costs are allocated will be up to the municipal partners.

3.2 Cost Recovery Strategy

If the municipalities in the VBDS decide to fund all or a portion of the capital infrastructure costs through municipal debt, they will need to recover these costs, with interest, from the future industrial land users. Based on our research, we have identified two ways in which these costs can be recovered. These approaches include off-site levies based on land area and off-site levy based on average day flow rate.

Off-Site Levy Based on Land Area

In our Phase 2/3 report, we identified the value of non-residential off-site levies implemented by various municipalities that have vacant industrial lands that would compete with the lands in Vulcan.

Based on interviews with key representative from municipalities and joint economic initiatives throughout Alberta, off-site levies are typically used to recover the costs of capital infrastructure. There are multiple approaches to calculating and applying off-site levies. The typical approach adopted by municipalities is to apply the off-site levy based on land area. Whereby, the municipality will determine an off-site levy per hectare.

In determining when off-site levy revenue will be received from industrial development in the existing and potential new future industrial parks, we have relied on industrial land absorption forecasts prepared in our Phase 2/3 Report. In that report, we forecast average industrial land absorption of between 0.5 and 1 hectare per year. For the purposes of calculating an off-site levy and its payback period, we have assumed average absorption of 0.75 hectares per year. This results in the 14.9 hectares being absorbed over a 20-year period.

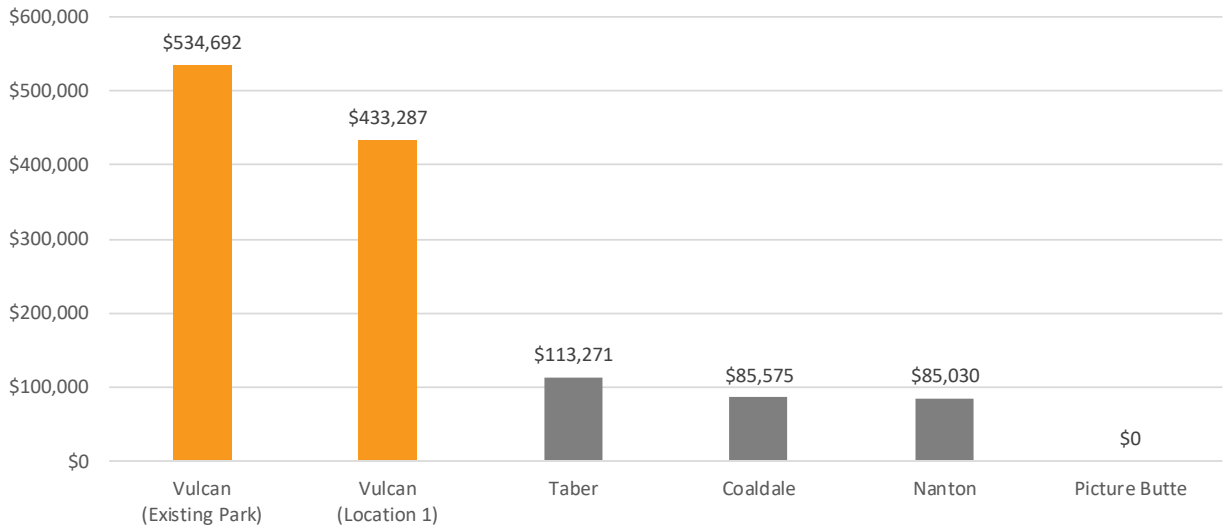
As shown in Figure 3-2, we have calculated an off-site levy of approximately 534,700 per hectare for lands in the existing business park. Similarly, the approximately 5.1 hectares of industrial land in the Location 1 lands would require an off-site levy of approximately $433,300 to recover capital infrastructure costs and interest payments.

Figure 3-2: Estimate Off-Site Levies

Project	Project Cost	Benefit to Existing	Net Project Cost	Non-Residential Share	Project Cost (Non-Residential Share)	Interest Payment	Total Payment	Off-Site Levy Per Ha
Existing Industrial Park	$5,910,203	$0	$5,910,203	100%	$5,910,203	$2,029,091	$7,939,294	$534,692
Location 1 Lands	$1,645,000	$0	$1,645,000	100%	$1,645,000	$564,761	$2,209,761	$433,287

Figure 3-3 summarizes industrial off-site levy rates per hectare in municipalities that have vacant industrial lands that would compete with vacant industrial lands in Vulcan. As shown, the calculated off-site levy per hectare for the existing industrial park and potential new industrial parks are significantly higher than the local municipalities. These high off-site levies could deter industrial development from locating in Vulcan.

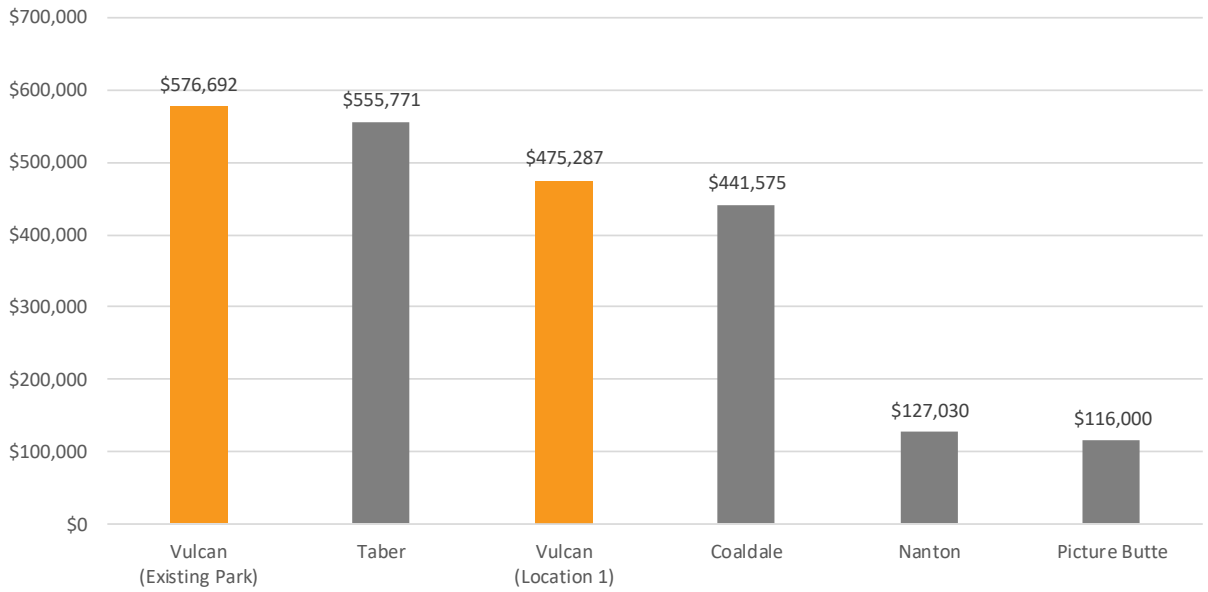
Figure 3-3: Comparison of Off-Site Levy Rate in Competitive Municipalities



However, it is important to note that off-site levies represent only a portion of the development costs for an industrial land user. A new business locating in a municipality must also purchase land, which can be a significant cost in some local municipalities. Figure 3-4, summarizes the 'total' purchase price for industrial land in the competitive municipalities, which includes the raw land cost and the off-site

levies. As shown, after incorporating land costs, the industrial lands in Vulcan become more competitive with lands in Taber and Coaldale. However, they are still significantly higher than lands located in Nanton and Picture Butte.

Figure 3-4: Comparison of Total Industrial Land Costs in Competitive Municipalities



As stated in our Phase 2/3 report, we have recommended an off-site levy for the industrial lands that are lower than municipalities located along major highways such as Highway 2A and the Crowsnest Highway. Therefore, high off-site levies calculated in Figure 3-2 could deter some potential businesses from locating in Vulcan.

Off-Site Levy Based on Average Day Flow Rate

An alternative approach to calculating off-site levies, which has been adopted by Rocky View County, is to apply the off-site levy for water and wastewater based on average day flow rates. Under this approach, 'dry' industrial users that consume less water and wastewater would pay lower off-site levies. This could result in the industrial lands in Vulcan becoming more competitive in attracting industries, such as warehousing, logistics and some forms of manufacturing.

Rocky View County has been applying off-site levies based on average day flow rates since 2013. Based on discussions with staff at Rocky View County, this approach to calculating the off-site levy has been well received by industrial developers. Rocky View County decided to use this 'demand based' approach to ensure that off-site levies more appropriately reflect actual water and wastewater usage.

It is the opinion of Rocky View County staff that basing off-site levies on average flow rate has helped attract 'dry' industrial users and encouraged users to be more innovative in their use of water and wastewater services. This approach could entice some industrial users to use water more efficiently to avoid high off-site levies. This approach could also entice some "dry" industrial users to locate in Vulcan to reduce off-site levies

Under this approach, off-site levies for transportation and stormwater management would still be applied on a cost per hectare basis.

To determine the amount of the levy to be paid by new industrial development in Vulcan, a new industrial user would be required to prepare a water and wastewater demand analysis to be submitted to the Town. Based on the demand analysis, the new industrial user would be required to pay an off-site levy based on the cubic metre of average daily flow.

One shortcoming of this approach is that it would require subsequent monitoring by the Town to ensure actual water and wastewater usage is consistent with anticipated demand. If an industrial user consumes more water and wastewater than calculated in their demand analysis, they would be assigned a penalty on their utility bill.

Another shortcoming of the average day flow methodology is that if the Town is successful in attracting 'dry' industrial users, it may not collect sufficient levies to pay for the capital infrastructure improvements. Therefore, any uncollected levies would be funded through the tax base and place a portion of the burden on residents.

If the Town decides to pursue the average day flow method, it would require further study to identify the water and wastewater capital infrastructure costs, as well as the current average water and wastewater flow rates in the Town.

4.0 Recommendations

The purpose of this Phase 4 report has been to identify and develop a financing and cost recovery strategy for the Town and County of Vulcan to service the existing and potential new industrial parks. In preparing this analysis, we have relied upon our Phase 2/3 report which estimated industrial land requirements and absorption over a 25-year forecast horizon.

This analysis also relies upon water, wastewater, stormwater and transportation capital infrastructure costs provided by Town staff and estimated by the consulting team. Based on these inputs, we have recommended a preferred development financing and cost recovery model that can be applied by the municipal partners to develop additional industrial lands to support growth.

4.1 Recommendation

Based on our research and analysis of the development financing and cost recovery options that are available to the municipal partners and the best practices being used in other municipalities, it is our recommendation that the Town and County fund the initial infrastructure costs through a combination of municipal debt and unrestricted reserves. The allocation of capital costs between debt and unrestricted reserves and the allocation between the municipalities will ultimately be up to the municipal partners.

To recover the costs associated with these capital infrastructure projects, it is our recommendation that the Town and County should recover the roads, water, wastewater and stormwater capital costs through an off-site levy based on land area. However, the extent to which these costs can be passed along to industrial land users will be limited based on off-site levies being charged by competitive local municipalities. When the municipal partners are calculating the off-site levies that the market will bare, it will be important to include both land costs and off-site levies in the calculation of 'total' land costs. As the Town has relatively inexpensive land costs, it may be possible to pass along a portion of the off-site levies to new industrial land users.

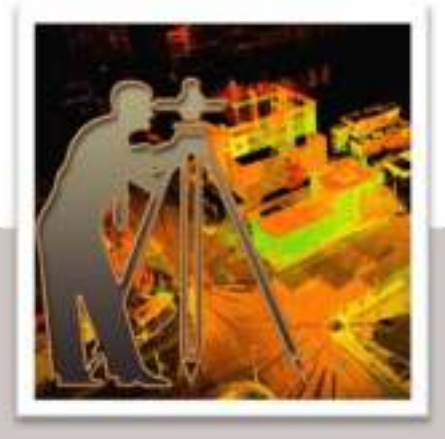
It will also be important for the Town to ensure they maintain a five-year supply of shovel ready industrial lands available for development. Based on a forecast absorption rate of 0.75 net hectares per year, a five-year supply translates into approximately 4 hectares of shovel ready industrial land. An industrial land inventory completed by MDB Insight indicates that the Town currently has 4.7 hectares of serviced industrial lands, which appears sufficient to accommodate five-years of growth. The Town should continue to monitor the supply of shovel-ready industrial lands and be prepared to move forward with servicing additional lands if the supply of available land is less than five-years.

Appendix C: Watt Transportation Study

WATT Consulting Group
Since 1983

TOWN OF VULCAN
INDUSTRIAL LAND STRATEGY
Network Assessment

October 27, 2017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TOWN OF VULCAN INDUSTRIAL LAND STRATEGY – NETWORK ASSESSMENT

Oct 27, 2017

PERMIT TO PRACTICE
WATT CONSULTING GROUP LTD.
Signature
Date Oct 27, 2017
PERMIT NUMBER: P 3818
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

Prepared for:	Vulcan Business Development Society
Prepared by:	**Watt Consulting Group**
Our File:	3443.T01
Date:	October 27, 2017

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APPENDICES

1.0 INTRODUCTION

The Vulcan Business Development Society (VBDS) is serving the Town of Vulcan, Vulcan County, and the Villages of Arrowwood, Champion, Lomond and Milo as an economic development services provider. It assists the existing businesses in the region as well as encourages new businesses to set up and grow within the regional boundaries. VBDS together with other stakeholders identified a need for serviced industrial lands within the region. The Town of Vulcan and Vulcan County expressed a desire to collaboratively develop a business/industrial park within the Town and/or County of Vulcan.

This report summarizes the results of the analysis of the possible park location and its impact on the transportation network as well as improvements required to accommodate this planned development.

1.1 STUDY OBJECTIVES

The study objective was to evaluate identified locations selected by the Town and/or County of Vulcan and select the best location for the business/industrial park.

1.2 STUDY SCOPE

The study scope included the following;

- Review of the existing traffic volumes, capacity and operational conditions at the key intersections in the study area.
- Forecast of traffic generated by the proposed business/industrial park.
- Evaluation of the impact of the traffic generated by the park on the adjacent network and identification of the required improvements.
- Identification of the best location for the park from a transportation perspective.
- Preparation of the report summarizing results and findings of the study.

2.0 ANALYSIS

Analysis was carried out using information pertaining to the planned land uses and provided by MDB Insight, corresponding traffic generation rates as per the ITE Traffic Generation Manual, traffic information provided by the Town and available on the Alberta Transportation site. The operational/capacity analysis was carried out for the following horizon years:

- 2021
- 2026
- 2031
- 2036
- 2041

2.1 ANALYSED LOCATIONS

Three possible locations for the proposed business/industrial park were analyzed as shown on **Figure 1**.

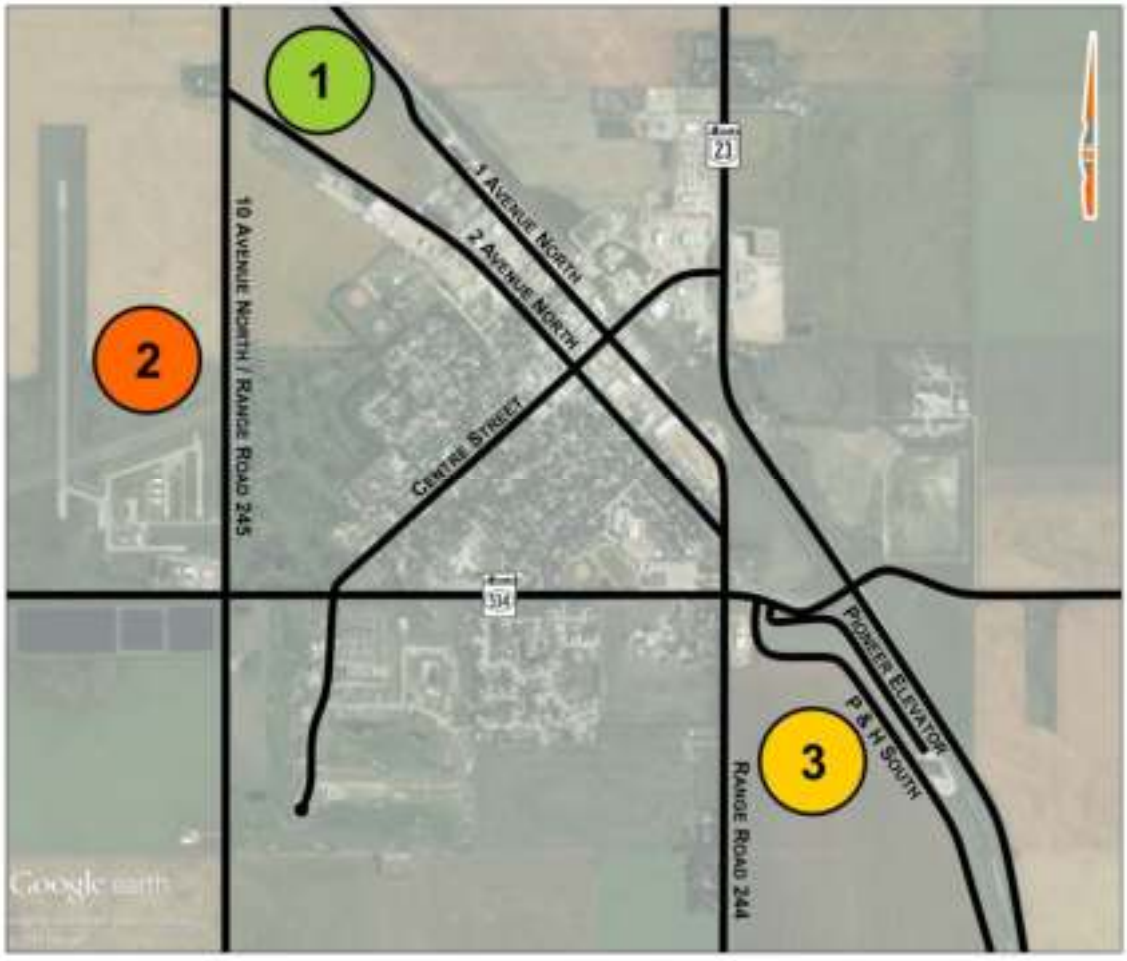


Figure 1: Possible Locations for Proposed Development

2.1.1 LOCATION #1

Site #1 is located between 1st and 2nd Avenues North just north of the industrial area. Its location is outside of the residential areas next to an industrial subdivision on the fringe of Town. It could have a direct access to the railway line and to 1st and 2nd Avenue N. It will be accessed via 1st Avenue through the Center Street/1st Avenue and Centre Street/Highway 23 intersections. This Site could be provided with feasible access to the railway line.

2.1.2 LOCATION #2

Location of Site #2 was identified in the area adjacent to airport lands west of 10th Avenue N. This Site is located outside of the residential areas next to the airport and golf course. Access to the Site will be provided off of 10 Avenue via Elisabeth Street intersection. The Site will have full accessibility to Highway 23 via Highway 534 (Elisabeth Street) and possible use of the airport as means of access.

2.1.3 LOCATION #3

Site #3 was identified south of Highway 534 between Highway 23 and 1st Avenue S. This Site is also located outside of the residential areas. It could have direct accesses off of RR 244 and P&H South Road off of Highway 534 (Elisabeth Street) and an easy access to Highway 23 via Highway 534. It is also located in proximity of and with feasible access to the railway line.

2.2 BACKGROUND CONDITIONS

Background traffic counts were provided by the Town. In addition, information pertaining to the turning movements at the intersections of Highway 23 and 534 were obtained from the Alberta Transportation website. The resulting turning movements at the key intersections used in the analysis are shown on **Figure 2**.

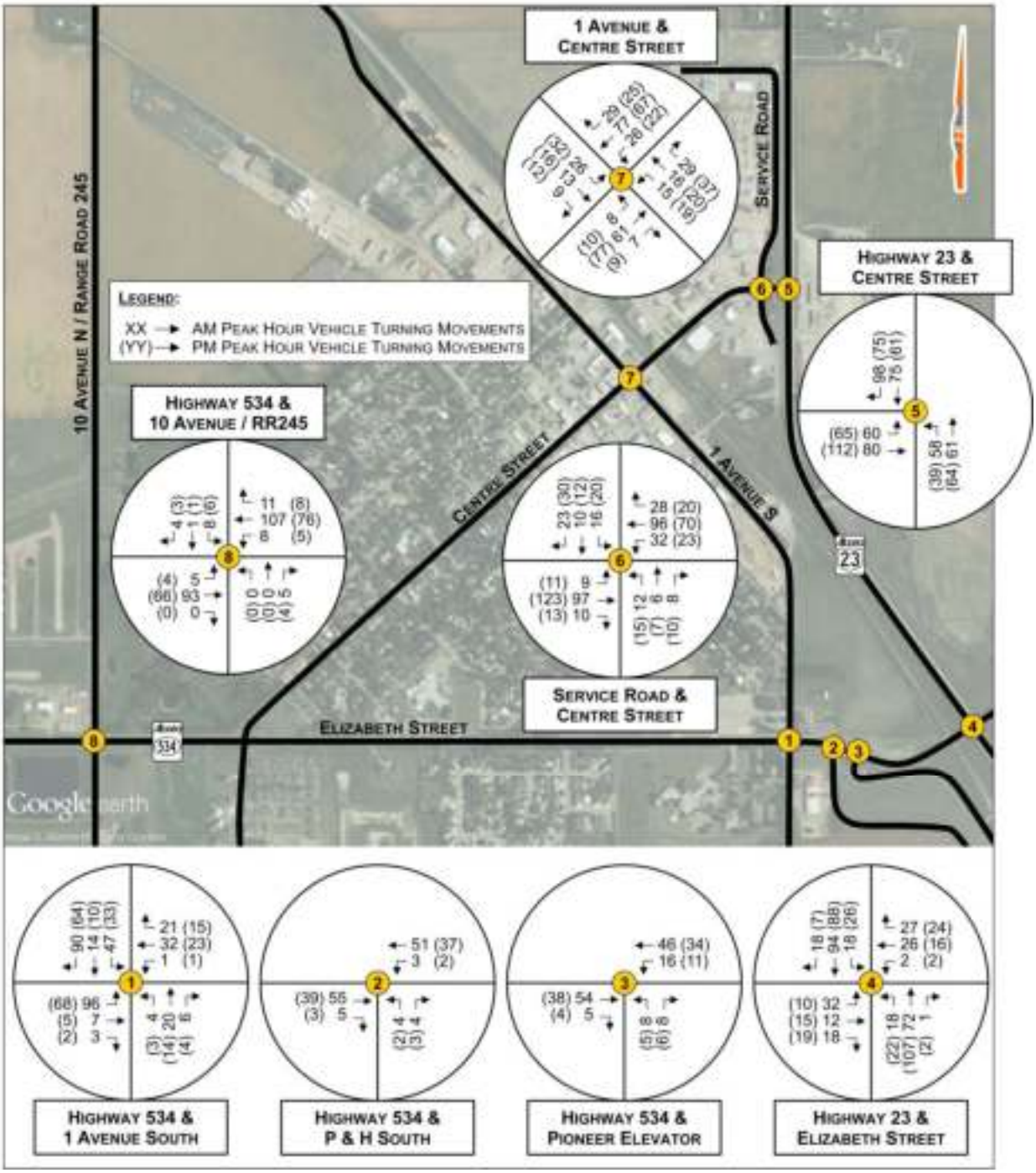


Figure 2: Existing Traffic volumes

2.2.1 GROWTH FACTOR

Traffic growth on Highway 23 and Highway 534 was estimated using data from Alberta Transportation. Historic traffic volumes were analyzed to determine the appropriate growth factor for future horizons. The growth of traffic experienced on Highway 23 was 0.68% to 0.8% while growth on Highway 534 was 1.6%. At the same time, population growth in the Town of Vulcan (as per the data obtained from Alberta Government's website) between 2001 and 2016 was 0.43%. Based on those trends, a growth factor of 1% per year was selected and used in the analysis. Graphs showing the analyzed Alberta Transportation volumes are shown in **Figure 3** to **Figure 5**.

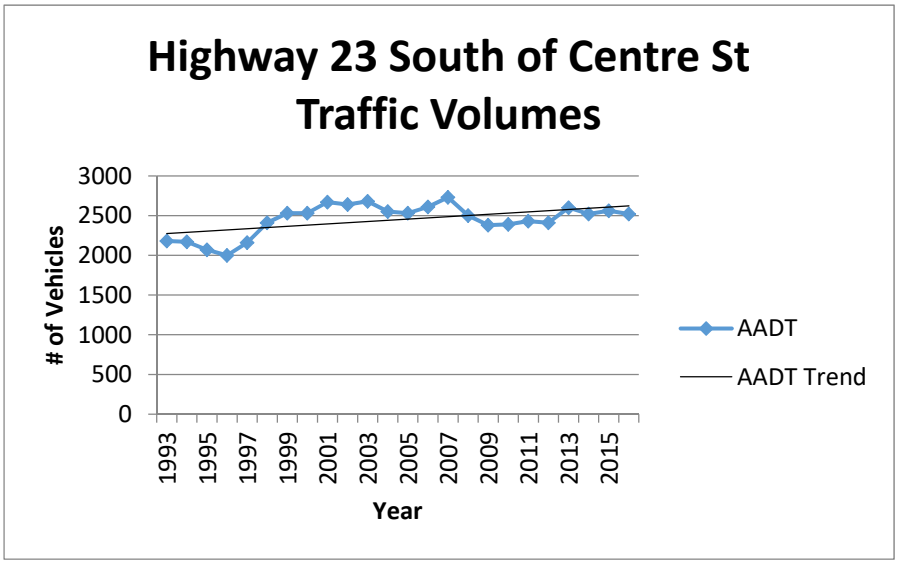


Figure 3: Highway 23 Traffic Volumes South of Centre St

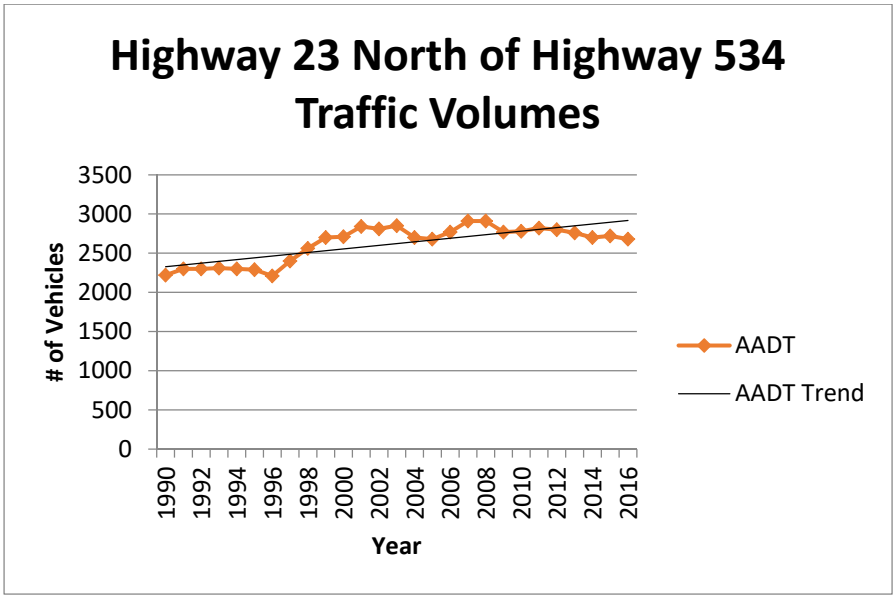


Figure 4: Highway 23 Traffic Volumes North of Highway 534

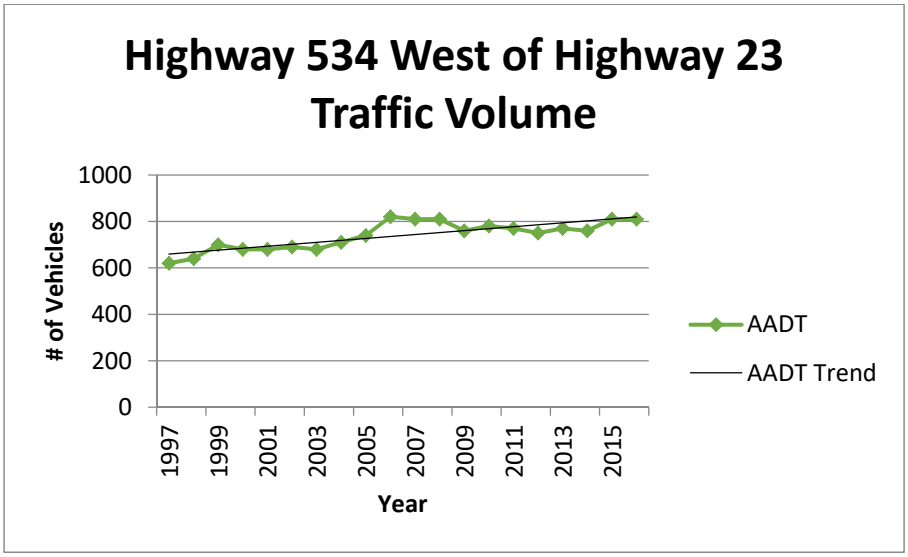


Figure 5: Highway 534 Traffic Volumes West of Highway 23

2.2.2 FUTURE TRAFFIC VOLUMES

Using an established growth factor for the area, the future traffic volumes for the analyzed horizons were estimated and are shown in **Figure 6** to **Figure 10**.

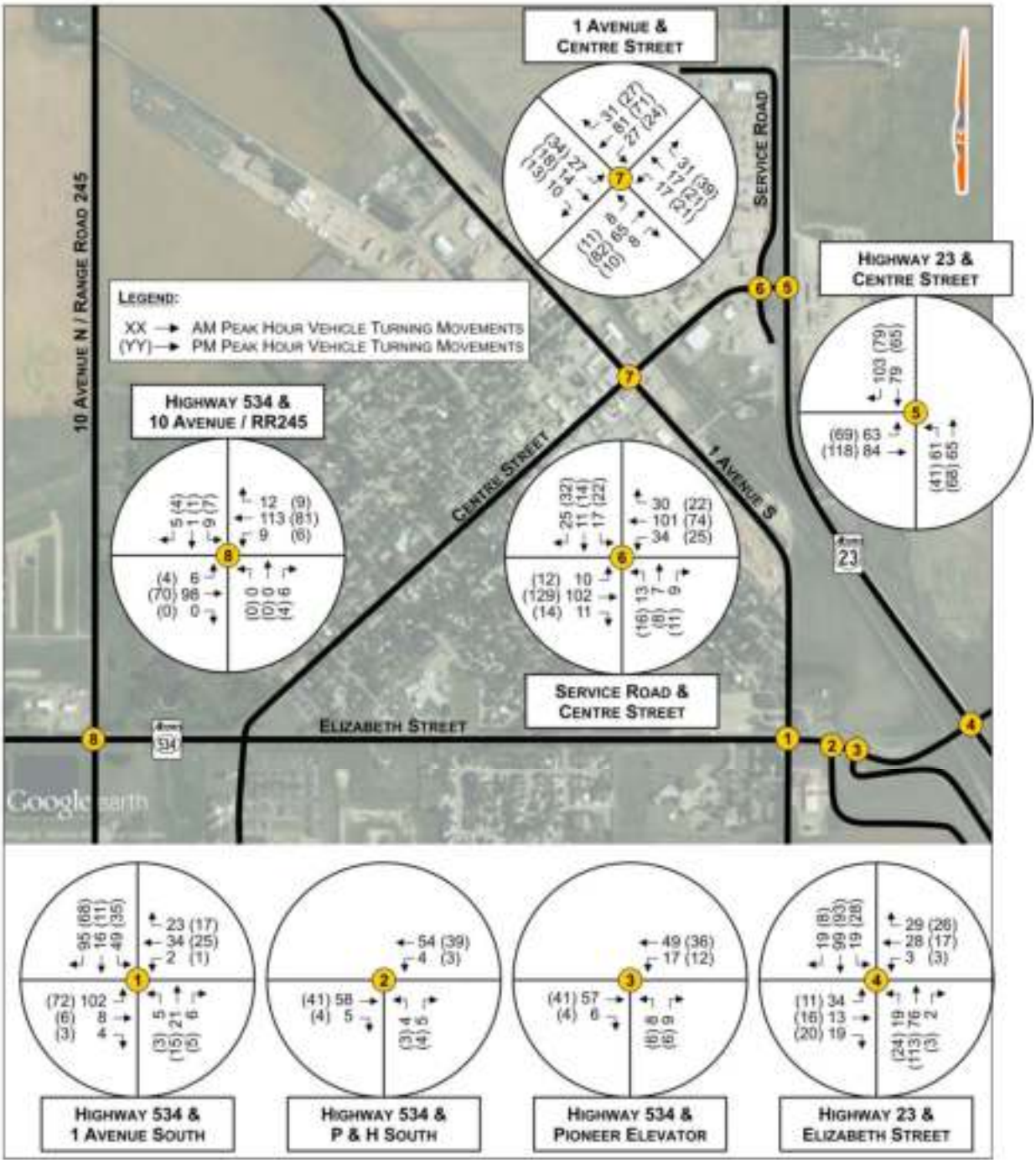


Figure 6: Background Traffic Volumes 2021 Horizon

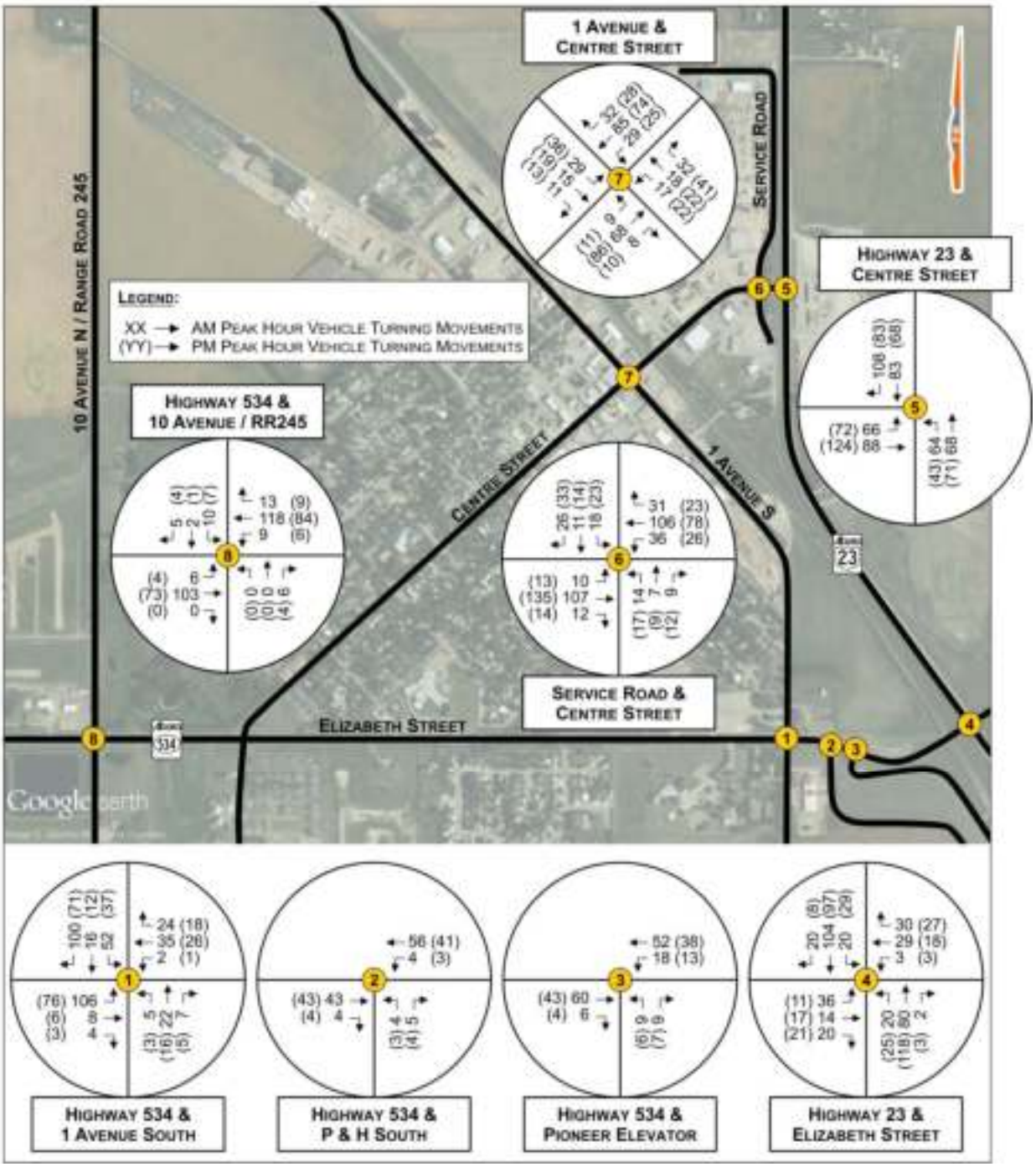


Figure 7: Background Traffic Volumes 2026 Horizon

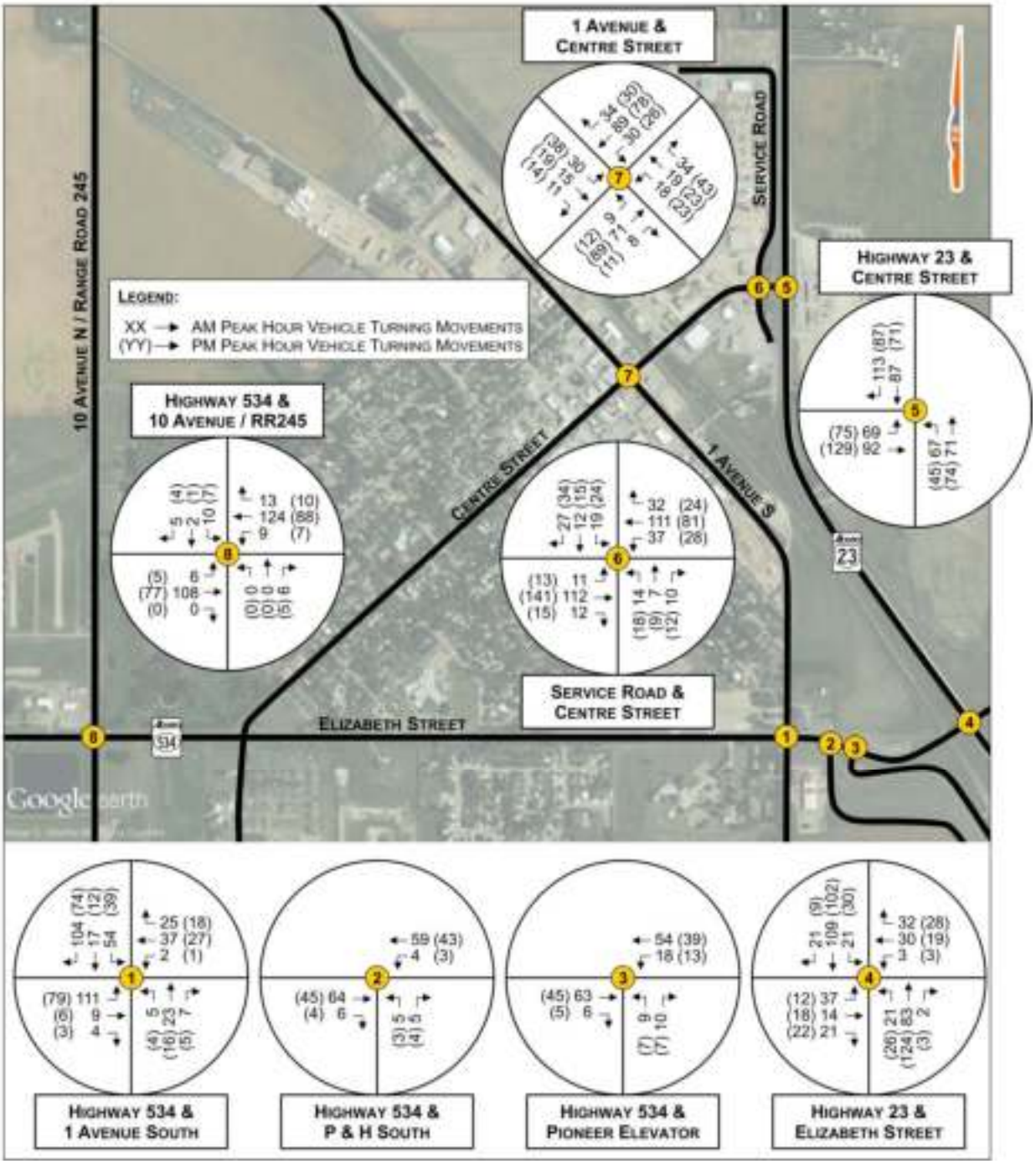


Figure 8: Background Traffic Volumes 2031 Horizon

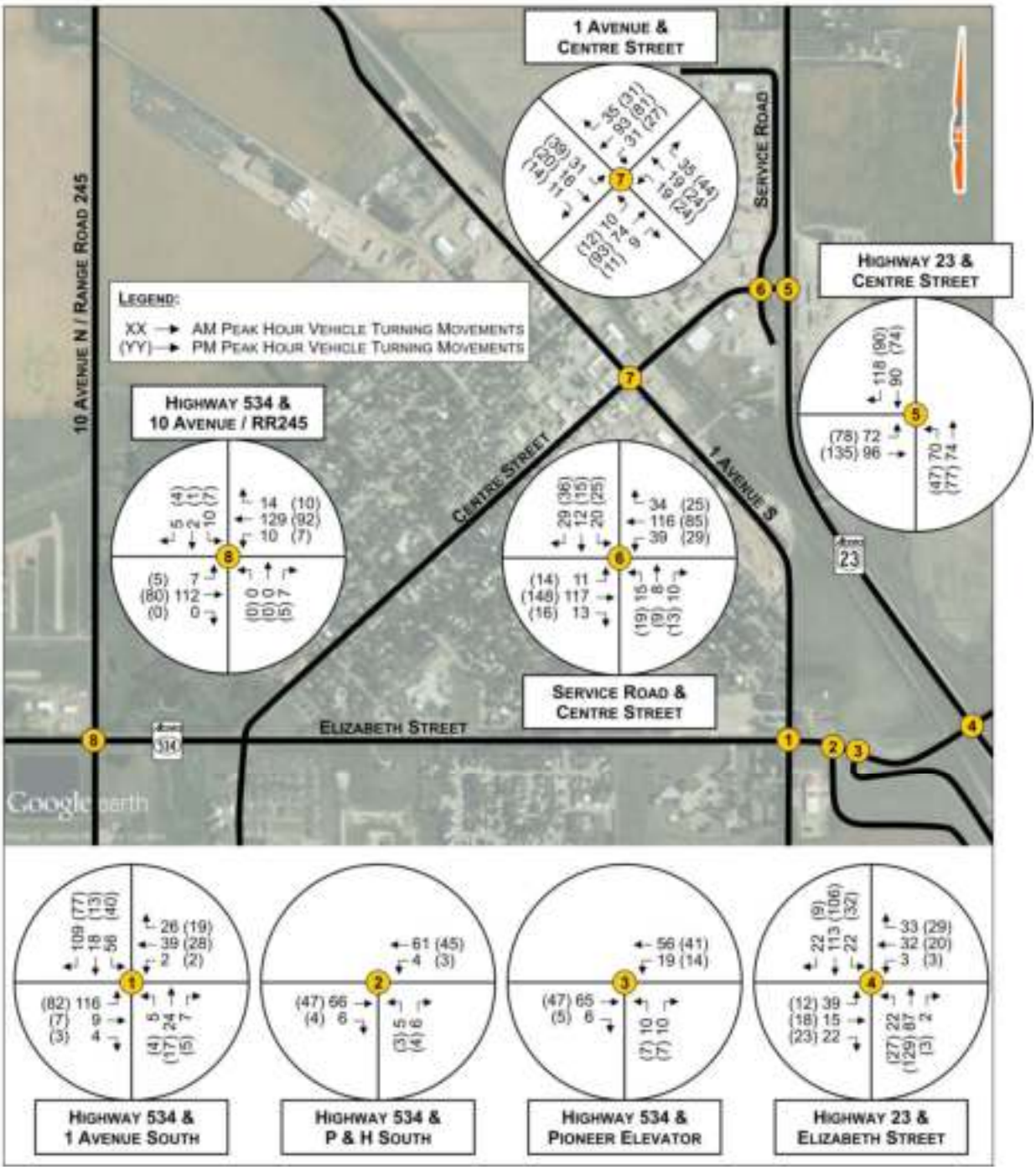


Figure 9: Background Traffic Volumes 2036 Horizon

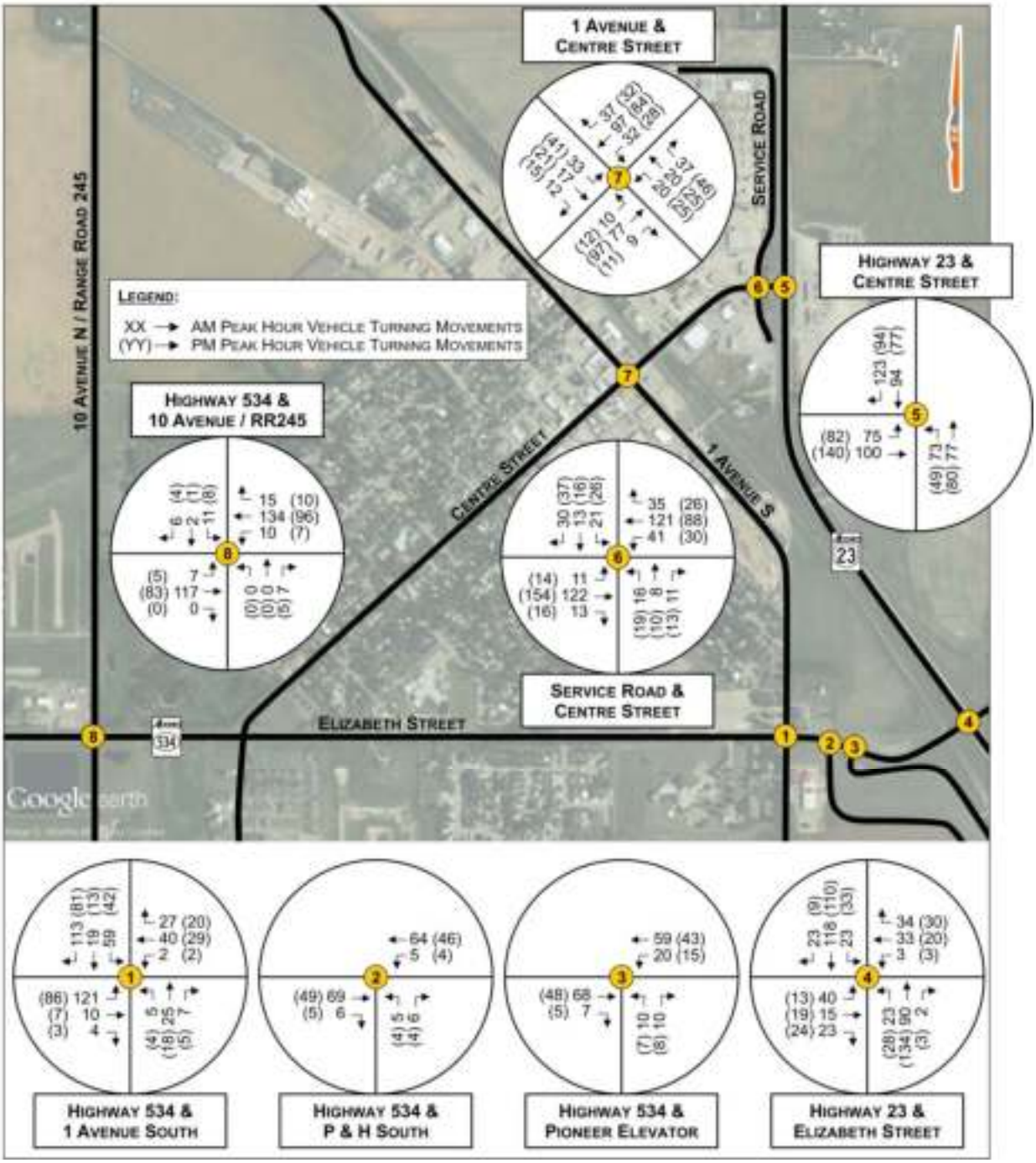


Figure 10: Background Traffic Volumes 2041 Horizon

2.2.3 BACKGROUND TRAFFIC CAPACITY AND OPERATIONAL CONDITIONS

Criteria

The operating conditions during the peak hours at the studied intersections were evaluated using the Synchro/SimTraffic 9.0, which is based on the methodology outlined in the U.S. Highway Capacity Manual[1]. For unsignalized intersections, the Level-of-Service (LOS) is based on the computed delays on each of the critical movements. LOS 'A' represents minimal delays for minor street traffic movements, and LOS 'F' represents a scenario with an insufficient number of gaps on the major street for minor street motorists to complete their movements without significant delays.

For signalized intersections, the methodology considers the intersection geometry, traffic volumes, the traffic signal phasing/timing plan and also pedestrian and cyclist volumes. The average delay for each lane group is calculated, as well as the delay for the overall intersection. The operating conditions can also be expressed in terms of volume-to-capacity (v/c) ratio. The City of Calgary considers a v/c ratio of 0.90 to be the threshold, beyond which geometric or signal timing improvements should be considered. The signalized and unsignalized LOS criteria as summarized in HCM are also shown in **Table 1**.

TABLE 1: LEVEL OF SERVICE CRITERIA

Level of Service (LOS)	Average Delay for UNSIGNALIZED Intersection Movements	Average Delay for SIGNALIZED Intersection Movements
A	0 – 10 seconds per vehicle	0 – 10 seconds per vehicle
B	> 10 – 15 seconds per vehicle	> 10 – 20 seconds per vehicle
C	> 15 – 25 seconds per vehicle	> 20 – 35 seconds per vehicle
D	> 25 – 35 seconds per vehicle	> 35 – 55 seconds per vehicle
E	> 35 – 50 seconds per vehicle	> 55 – 80 seconds per vehicle
F	> 50 seconds per vehicle	> 80 seconds per vehicle

For the purpose of this analysis, LOS C and v/c ratio of 0.9 were considered acceptable.

Table 2 to **Table 6** summarizes the results of the operational/capacity analysis for the analyzed horizon years.

[1] Transportation Research Board, National Research Council. Highway Capacity Manual 2000. Washington, D.C. 2000.

TABLE 2: 2021 HORIZON YEAR

INTERSECTION / MOVEMENT				AM PEAK HOUR				PM PEAK HOUR			
				v/c Ratio	LOS	Delay (s)	Queue (m)	v/c Ratio	LOS	Delay (s)	Queue (m)
1st Avenue / Centre Street (Stop-Controlled)	**7**	EB	Left/Through	0.03	A	0.8	0.1	0.03	A	0.8	0.2
			Through/Right	0.03	A	0.8	0.1	0.03	A	0.8	0.2
		WB	Left/Through	0.05	A	1.5	0.4	0.04	A	1.5	0.4
			Through/Right	0.05	A	1.5	0.4	0.04	A	1.5	0.4
		NB	Left/Through/Right	0.09	A	10.0	2.2	0.11	B	10.3	2.9
		SB	Left/Through/Right	0.08	B	10.8	2.0	0.11	B	11.1	2.9
Service Rd / Centre Street (Stop-Controlled)	**6**	EB	Left/Through	0.04	A	0.6	0.2	0.05	A	0.6	0.2
			Through/Right	0.04	A	0.0	0.2	0.05	A	0.6	0.2
		WB	Left/Through	0.05	A	0.6	0.6	0.04	A	1.6	0.4
			Through/Right	0.05	A	0.6	0.6	0.04	A	1.6	0.4
		NB	Left/Through/Right	0.05	B	10.7	1.2	0.06	B	10.8	1.4
		SB	Left/Through/Right	0.08	B	10.4	1.9	0.10	B	10.3	2.5
Highway 23 / Centre Street (Stop-Controlled)	**5**	EB	Left	0.10	B	11.0	2.6	0.10	B	10.5	2.6
			Right	0.09	A	9.1	2.3	0.13	A	9.2	3.4
		NB	Left	0.05	A	7.8	1.1	0.03	A	7.6	0.7
			Through	0.04	A	0.0	0.0	0.04	A	0.0	0.0
		SB	Through	0.05	A	0.0	0.0	0.04	A	0.0	0.0
			Right	0.07	A	0.0	0.0	0.05	A	0.0	0.0
Highway 23 / Highway 534 (Stop-Controlled)	**4**	EB	Left/Through/Right	0.08	B	10.8	1.9	0.08	B	10.8	1.9
		WB	Left/Through/Right	0.07	B	10.4	1.7	0.07	B	10.4	1.7
		NB	Left	0.02	A	7.5	0.4	0.02	A	7.5	0.4
			Through/Right	0.07	A	0.0	0.0	0.07	A	0.0	0.0
		SB	Left	0.02	A	7.5	0.5	0.02	A	7.5	0.5
			Through/Right	0.06	A	0.0	0.0	0.06	A	0.0	0.0
Highway 534 / P&H South (Stop-Controlled)	**3**	EB	Left/Through	0.04	A	0.0	0.0	0.03	A	0.0	0.0
		WB	Left/Through	0.01	A	0.1	0.3	0.02	A	1.2	0.2
			Through	0.02	A	1.3	0.3	0.02	A	1.2	0.2
		NB	Left/Right	0.02	A	9.0	0.5	0.01	A	8.9	0.3
Highway 23/ Grain elevator (Stop-Controlled)	**2**	EB	Through	0.04	A	0.00	0.0	0.03	A	0.0	0.0
			Right	0.00	A	0.00	0.0	0.00	A	0.0	0.0
		WB	Left/Through	0.00	A	0.0	0.1	0.00	A	0.0	0.0
			Through	0.02	A	0.4	0.1	0.02	A	0.4	0.0
		NB	Left/Right	0.01	A	8.9	0.2	0.01	A	8.7	0.2
Highway 23/ 1 Ave S (RR 244) (Stop-Controlled)	**1**	EB	Left/Through/Right	0.07	A	6.8	1.8	0.02	A	6.6	1.2
		WB	Left/Through/Right	0.00	A	0.2	0.0	0.00	A	0.2	0.0
		NB	Left/Through/Right	0.06	B	11.3	1.4	0.03	B	10.3	0.8
		SB	Left/Through/Right	0.22	B	10.9	6.4	0.14	A	9.9	3.8
Highway 23/ 10 Ave (RR 245) (Stop-Controlled)	**8**	EB	Left/Through/Right	0.00	A	0.5	0.1	0.00	A	0.4	0.1
		WB	Left/Through/Right	0.01	A	0.6	0.2	0.00	A	0.5	0.1
		NB	Left/Through/Right	0.01	A	8.8	0.2	0.00	A	8.7	0.1
		SB	Left/Through/Right	0.02	B	10.1	0.5	0.02	A	9.5	0.4

TABLE 3: 2026 HORIZON YEAR

INTERSECTION / MOVEMENT				AM PEAK HOUR				PM PEAK HOUR			
				v/c Ratio	LOS	Delay (s)	Queue (m)	v/c Ratio	LOS	Delay (s)	Queue (m)
1st Avenue / Centre Street (Stop-Controlled)	**7**	EB	Left/Through	0.03	A	0.8	0.2	0.03	A	0.8	0.2
			Through/Right	0.03	A	0.8	0.2	0.03	A	0.8	0.2
		WB	Left/Through	0.05	A	1.6	0.5	0.04	A	1.5	0.4
			Through/Right	0.05	A	1.6	0.5	0.04	A	1.5	0.4
		NB	Left/Through/Right	0.09	B	10.1	2.4	0.12	B	10.3	3.1
		SB	Left/Through/Right	0.09	B	11.0	2.3	0.11	B	11.3	2.9
Service Rd / Centre Street (Stop-Controlled)	**6**	EB	Left/Through	0.04	A	0.6	0.2	0.05	A	0.6	0.2
			Through/Right	0.04	A	0.6	0.2	0.05	A	0.6	0.2
		WB	Left/Through	0.05	A	1.6	0.6	0.04	A	1.6	0.5
			Through/Right	0.05	A	1.6	0.6	0.04	A	1.6	0.5
		NB	Left/Through/Right	0.05	B	10.9	1.2	0.06	B	11.0	1.5
		SB	Left/Through/Right	0.08	B	10.5	2.1	0.10	B	10.4	2.6
Highway 23 / Centre Street (Stop-Controlled)	**5**	EB	Left	0.11	B	11.2	2.8	0.11	B	10.6	2.8
			Right	0.10	A	9.1	2.5	0.14	A	9.2	3.6
		NB	Left	0.05	A	7.8	1.2	0.03	A	7.6	0.8
			Through	0.04	A	0.0	0.0	0.05	A	0.0	0.0
		SB	Through	0.05	A	0.0	0.0	0.04	A	0.0	0.0
			Right	0.07	A	0.0	0.0	0.05	A	0.0	0.0
Highway 23 / Highway 534 (Stop-Controlled)	**4**	EB	Left/Through/Right	0.12	B	11.5	3.1	0.08	B	11.0	2.0
		WB	Left/Through/Right	0.09	B	10.5	2.3	0.07	B	10.5	1.8
		NB	Left	0.02	A	7.5	0.4	0.02	A	7.5	0.4
			Through/Right	0.05	A	0.0	0.0	0.08	A	0.0	0.0
		SB	Left	0.01	A	7.4	0.3	0.02	A	7.5	0.5
			Through/Right	0.08	A	0.0	0.0	0.07	A	0.0	0.0
Highway 534 / P&H South (Stop-Controlled)	**3**	EB	Left/Through	0.04	A	0.0	0.0	0.03	A	0.0	0.0
		WB	Left/Through	0.01	A	1.3	0.3	0.02	A	1.2	0.2
			Through	0.02	A	1.3	0.3	0.02	A	1.2	0.2
		NB	Left/Right	0.02	A	9.1	0.5	0.02	A	8.9	0.4
Highway 23/ Grain elevator (Stop-Controlled)	**2**	EB	Through	0.03	A	0.00	0.0	0.03	A	0.0	0.0
			Right	0.00	A	0.00	0.0	0.00	A	0.0	0.0
		WB	Left/Through	0.00	A	0.0	0.1	0.02	A	0.4	0.0
			Through	0.02	A	0.4	0.1	0.02	A	0.4	0.0
		NB	Left/Right	0.01	A	8.8	0.2	0.01	A	8.7	0.2
Highway 23/ 1 Ave S (RR 244) (Stop-Controlled)	**1**	EB	Left/Through/Right	0.07	A	6.8	1.8	0.05	A	6.7	1.3
		WB	Left/Through/Right	0.00	A	0.2	0.0	0.00	A	0.2	0.0
		NB	Left/Through/Right	0.06	B	11.4	1.5	0.04	B	10.5	0.9
		SB	Left/Through/Right	0.24	B	11.1	7.0	0.15	A	10.0	4.1
Highway 23/ 10 Ave (RR 245) (Stop-Controlled)	**8**	EB	Left/Through/Right	0.00	A	0.5	0.1	0.00	A	0.4	0.1
		WB	Left/Through/Right	0.01	A	0.5	0.2	0.00	A	0.5	0.1
		NB	Left/Through/Right	0.01	A	8.9	0.2	0.00	A	8.7	0.1
		SB	Left/Through/Right	0.03	B	10.2	0.6	0.02	A	9.6	0.4

TABLE 4: 2031 HORIZON YEAR

INTERSECTION / MOVEMENT				AM PEAK HOUR				PM PEAK HOUR			
				v/c Ratio	LOS	Delay (s)	Queue (m)	v/c Ratio	LOS	Delay (s)	Queue (m)
1st Avenue / Centre Street (Stop-Controlled)	**7**	EB	Left/Through	0.03	A	0.8	0.2	0.04	A	0.8	0.2
			Through/Right	0.03	A	0.8	0.2	0.04	A	0.8	0.2
		WB	Left/Through	0.05	A	1.6	0.5	0.40	A	1.5	0.4
			Through/Right	0.05	A	1.6	0.5	0.04	A	1.5	0.4
		NB	Left/Through/Right	0.10	B	10.2	2.6	0.13	B	10.5	3.3
		SB	Left/Through/Right	0.09	B	11.2	2.6	0.12	B	11.4	3.1
Service Rd / Centre Street (Stop-Controlled)	**6**	EB	Left/Through	0.04	A	0.6	0.2	0.05	A	0.6	0.2
			Through/Right	0.04	A	0.6	0.2	0.05	A	0.6	0.2
		WB	Left/Through	0.06	A	1.6	0.6	0.04	A	1.6	0.5
			Through/Right	0.06	A	1.6	0.6	0.04	A	1.6	0.5
		NB	Left/Through/Right	0.05	B	11.0	1.3	0.07	B	11.2	1.7
		SB	Left/Through/Right	0.09	B	10.7	2.3	0.11	B	11.2	2.8
Highway 23 / Centre Street (Stop-Controlled)	**5**	EB	Left	0.12	B	11.4	3.0	0.12	B	10.7	3.0
			Right	0.08	A	9.1	2.0	0.14	A	9.3	3.8
		NB	Left	0.05	A	7.8	1.3	0.03	A	7.7	0.8
			Through	0.05	A	0.0	0.0	0.05	A	0.0	0.0
		SB	Through	0.06	A	0.0	0.0	0.05	A	0.0	0.0
			Right	0.07	A	0.0	0.0	0.06	A	0.0	0.0
Highway 23 / Highway 534 (Stop-Controlled)	**4**	EB	Left/Through/Right	0.13	B	11.6	3.3	0.09	B	11.2	2.2
		WB	Left/Through/Right	0.10	B	10.6	2.5	0.08	B	10.7	1.9
		NB	Left	0.02	A	7.5	0.4	0.02	A	7.5	0.4
			Through/Right	0.05	A	0.0	0.0	0.08	A	0.0	0.0
		SB	Left	0.02	A	7.4	0.4	0.02	A	7.5	0.5
			Through/Right	0.08	A	0.0	0.0	0.07	A	0.0	0.0
Highway 534 / P&H South (Stop-Controlled)	**3**	EB	Left/Through	0.04	A	0.0	0.0	0.03	A	0.0	0.0
		WB	Left/Through	0.02	A	1.3	0.3	0.02	A	1.2	0.2
			Through	0.02	A	1.3	0.3	0.02	A	1.2	0.2
		NB	Left/Right	0.02	A	9.1	0.5	0.02	A	8.9	0.4
Highway 23/ Grain elevator (Stop-Controlled)	**2**	EB	Through	0.04	A	0.00	0.0	0.03	A	0.0	0.0
			Right	0.00	A	0.00	0.0	0.00	A	0.0	0.0
		WB	Left/Through	0.03	A	0.4	0.1	0.02	A	0.4	0.0
			Through	0.03	A	0.4	0.1	0.02	A	0.4	0.0
		NB	Left/Right	0.01	A	8.9	0.2	0.01	A	8.8	0.2
Highway 23/ 1 Ave S (RR 244) (Stop-Controlled)	**1**	EB	Left/Through/Right	0.08	A	6.8	1.9	0.06	A	6.7	1.3
		WB	Left/Through/Right	0.00	A	0.2	0.0	0.00	A	0.1	0.0
		NB	Left/Through/Right	0.06	B	11.6	1.6	0.04	B	10.6	0.9
		SB	Left/Through/Right	0.25	B	11.3	7.5	0.16	B	10.1	4.3
Highway 23/ 10 Ave (RR 245) (Stop-Controlled)	**8**	EB	Left/Through/Right	0.00	A	0.5	0.1	0.00	A	0.4	0.1
		WB	Left/Through/Right	0.01	A	0.5	0.2	0.01	A	0.6	0.1
		NB	Left/Through/Right	0.01	A	8.9	0.2	0.01	A	8.7	0.1
		SB	Left/Through/Right	0.03	B	10.3	0.6	0.02	A	9.7	0.4

TABLE 5: 2036 HORIZON YEAR

INTERSECTION / MOVEMENT				AM PEAK HOUR				PM PEAK HOUR			
				v/c Ratio	LOS	Delay (s)	Queue (m)	v/c Ratio	LOS	Delay (s)	Queue (m)
1st Avenue / Centre Street (Stop-Controlled)	**7**	EB	Left/Through	0.03	A	0.8	0.2	0.04	A	0.8	0.2
			Through/Right	0.03	A	0.8	0.2	0.04	A	0.8	0.2
		WB	Left/Through	0.05	A	1.6	0.5	0.05	A	1.5	0.5
			Through/Right	0.05	A	1.6	0.5	0.05	A	1.5	0.5
		NB	Left/Through/Right	0.11	B	10.3	2.7	0.13	B	10.6	3.5
		SB	Left/Through/Right	0.10	B	11.3	2.5	0.13	B	11.6	3.3
Service Rd / Centre Street (Stop-Controlled)	**6**	EB	Left/Through	0.05	A	0.6	0.2	0.06	A	0.6	0.2
			Through/Right	0.05	A	0.6	0.2	0.06	A	0.6	0.2
		WB	Left/Through	0.06	A	1.6	0.7	0.04	A	1.6	0.5
			Through/Right	0.06	A	1.6	0.7	0.04	A	1.6	0.5
		NB	Left/Through/Right	0.06	B	11.2	1.4	0.07	B	11.3	1.8
		SB	Left/Through/Right	0.10	B	10.8	2.4	0.11	B	10.7	2.9
Highway 23 / Centre Street (Stop-Controlled)	**5**	EB	Left	0.12	B	11.6	3.2	0.12	B	10.9	3.2
			Right	0.11	A	9.2	2.8	0.15	A	9.3	4.0
		NB	Left	0.06	A	7.8	1.4	0.04	A	7.7	0.9
			Through	0.05	A	0.0	0.0	0.05	A	0.0	0.0
		SB	Through	0.06	A	0.0	0.0	0.05	A	0.0	0.0
			Right	0.08	A	0.0	0.0	0.06	A	0.0	0.0
Highway 23 / Highway 534 (Stop-Controlled)	**4**	EB	Left/Through/Right	0.14	B	11.9	3.5	0.09	B	11.3	2.3
		WB	Left/Through/Right	0.10	B	10.7	2.7	0.08	B	10.8	2.1
		NB	Left	0.02	A	7.6	0.4	0.02	A	7.5	0.5
			Through/Right	0.06	A	0.0	0.0	0.08	A	0.0	0.0
		SB	Left	0.02	A	7.4	0.4	0.02	A	7.6	0.6
			Through/Right	0.09	A	0.0	0.0	0.07	A	0.0	0.0
Highway 534 / P&H South (Stop-Controlled)	**3**	EB	Left/Through	0.05	A	0.0	0.0	0.03	A	0.0	0.0
		WB	Left/Through	0.02	A	1.3	0.3	0.02	A	1.2	0.2
			Through	0.02	A	1.3	0.3	0.02	A	1.2	0.2
		NB	Left/Right	0.02	A	9.2	0.6	0.02	A	8.9	0.4
Highway 23/ Grain elevator (Stop-Controlled)	**2**	EB	Through	0.04	A	0.00	0.0	0.03	A	0.0	0.0
			Right	0.00	A	0.00	0.0	0.00	A	0.0	0.0
		WB	Left/Through	0.03	A	0.4	0.1	0.02	A	0.4	0.0
			Through	0.03	A	0.4	0.1	0.02	A	0.4	0.0
		NB	Left/Right	0.01	A	8.9	0.3	0.01	A	8.8	0.2
Highway 23/ 1 Ave S (RR 244) (Stop-Controlled)	**1**	EB	Left/Through/Right	0.08	A	6.9	2.0	0.06	A	6.7	1.4
		WB	Left/Through/Right	0.00	A	0.2	0.0	0.00	A	0.3	0.0
		NB	Left/Through/Right	0.07	B	11.7	1.7	0.04	B	10.7	1.0
		SB	Left/Through/Right	0.27	B	11.5	8.1	0.17	B	10.2	4.6
Highway 23/ 10 Ave (RR 245) (Stop-Controlled)	**8**	EB	Left/Through/Right	0.01	A	0.5	0.1	0.00	A	0.4	0.1
		WB	Left/Through/Right	0.01	A	0.6	0.2	0.01	A	0.5	0.1
		NB	Left/Through/Right	0.01	A	8.9	0.2	0.01	A	8.7	0.1
		SB	Left/Through/Right	0.03	B	10.4	0.6	0.02	A	9.7	0.4

TABLE 6: 2041 HORIZON YEAR

INTERSECTION / MOVEMENT				AM PEAK HOUR				PM PEAK HOUR			
				v/c Ratio	LOS	Delay (s)	Queue (m)	v/c Ratio	LOS	Delay (s)	Queue (m)
1st Avenue / Centre Street (Stop-Controlled)	**7**	EB	Left/Through	0.03	A	0.8	0.2	0.04	A	0.8	0.2
			Through/Right	0.03	A	0.8	0.2	0.04	A	0.8	0.2
		WB	Left/Through	0.05	A	1.5	0.5	0.05	A	1.5	0.5
			Through/Right	0.05	A	1.5	0.5	0.05	A	1.5	0.5
		NB	Left/Through/Right	0.11	B	10.4	2.9	0.14	B	10.7	3.7
		SB	Left/Through/Right	0.11	B	11.5	2.7	0.14	B	11.8	3.6
Service Rd / Centre Street (Stop-Controlled)	**6**	EB	Left/Through	0.05	A	0.6	0.2	0.06	A	0.6	0.2
			Through/Right	0.05	A	0.6	0.2	0.06	A	0.6	0.2
		WB	Left/Through	0.06	A	1.6	0.7	0.04	A	1.6	0.6
			Through/Right	0.06	A	1.6	0.7	0.04	A	1.6	0.6
		NB	Left/Through/Right	0.06	B	11.3	1.5	0.08	B	11.5	1.9
		SB	Left/Through/Right	0.10	B	10.9	2.6	0.12	B	10.8	3.1
Highway 23 / Centre Street (Stop-Controlled)	**5**	EB	Left	0.13	B	11.8	3.5	0.13	B	11.0	3.4
			Right	0.11	A	9.3	2.9	0.16	A	9.4	4.2
		NB	Left	0.06	A	7.9	1.4	0.04	A	7.7	0.9
			Through	0.05	A	0.0	0.0	0.05	A	0.0	0.0
		SB	Through	0.06	A	0.0	0.0	0.05	A	0.0	0.0
			Right	0.08	A	0.0	0.0	0.06	A	0.0	0.0
Highway 23 / Highway 534 (Stop-Controlled)	**4**	EB	Left/Through/Right	0.14	B	12.1	3.7	0.10	B	11.5	2.5
		WB	Left/Through/Right	0.11	B	10.8	2.8	0.09	B	10.9	2.1
		NB	Left	0.02	A	7.6	0.4	0.02	A	7.5	0.5
			Through/Right	0.06	A	0.0	0.0	0.09	A	0.0	0.0
		SB	Left	0.02	A	7.5	0.4	0.03	A	7.6	0.6
			Through/Right	0.09	A	0.0	0.0	0.08	A	0.0	0.0
Highway 534 / P&H South (Stop-Controlled)	**3**	EB	Left/Through	0.05	A	0.0	0.0	0.03	A	0.0	0.0
		WB	Left/Through	0.03	A	1.3	0.3	0.02	A	1.3	0.2
			Through	0.03	A	1.3	0.3	0.02	A	1.3	0.4
		NB	Left/Right	0.02	A	9.2	0.6	0.02	A	8.9	0.4
Highway 23/ Grain elevator (Stop-Controlled)	**2**	EB	Through	0.04	A	0.00	0.0	0.03	A	0.0	0.0
			Right	0.00	A	0.00	0.0	0.00	A	0.0	0.0
		WB	Left/Through	0.03	A	0.4	0.1	0.02	A	0.5	0.1
			Through	0.03	A	0.4	0.1	0.02	A	0.5	0.1
		NB	Left/Right	0.01	A	9.0	0.3	0.01	A	8.8	0.2
Highway 23/ 1 Ave S (RR 244) (Stop-Controlled)	**1**	EB	Left/Through/Right	0.09	A	6.9	2.2	0.06	A	6.7	1.5
		WB	Left/Through/Right	0.00	A	0.2	0.0	0.00	A	0.3	0.0
		NB	Left/Through/Right	0.07	B	12.0	1.8	0.05	B	10.9	1.1
		SB	Left/Through/Right	0.28	B	11.8	8.8	0.18	B	10.3	5.0
Highway 23/ 10 Ave (RR 245) (Stop-Controlled)	**8**	EB	Left/Through/Right	0.01	A	0.5	0.1	0.00	A	0.4	0.1
		WB	Left/Through/Right	0.01	A	0.5	0.2	0.01	A	0.5	0.1
		NB	Left/Through/Right	0.01	A	8.9	0.2	0.01	A	8.7	0.1
		SB	Left/Through/Right	0.03	B	10.4	0.7	0.02	A	9.8	0.4

Results of the analysis indicate that all analyzed intersections should operate at an acceptable LOS B or better past the 2041 horizon year.

2.3 POST DEVELOPMENT CONDITIONS

2.3.1 LAND USE

Information pertaining to the land use concept which was used in the analysis was provided by MDB Insight and is included in **Appendix A**. It includes assumptions pertaining to different percentages for activity rates, employment scenarios, employment growth, floor space per worker, coverage and size of industrial lands.

The summary of the land use intensity for specific horizon years used in the analysis is included in **Table 6**.

TABLE 6 ANALYZED LAND USE SCENARIOS

Analysis Horizon	Floor Space (sq ft)
2016-2021	42,175
2016-2026	82,272
2016-2031	113,328
2016-2036	142,176
2016-2041	171,816

2.3.2 TRAFFIC GENERATION

Based on the land use scenario selected, vehicle trips were generated using the rates provided in the Trip Generation Manual[2]. Five year analysis horizons were evaluated up to a full build-out expected for the twenty-five horizon year.

Trip generation Rates for Light Industrial (ITE 110) developments are as follows:

- AM peak hour: 0.92 vehicles / 1000 square feet (88% inbound / 12% outbound)
- PM peak hour: 0.97 vehicles / 1000 square feet (12% inbound / 88% outbound)

Table 7 shows the trips generated by horizon year for the proposed development for the AM and PM peak hours.

TABLE 7: TRIP GENERATION

Horizon Year	GFA	Unit	TRIPS GENERATED - AM PEAK HOUR			TRIPS GENERATED - PM PEAK HOUR		
			TOTAL	IB	OB	TOTAL	IB	OB
2021	42,175	sq ft	39	34	5	41	5	36
2026	82,272	sq ft	76	67	9	80	10	70
2031	113,328	sq ft	104	92	13	110	13	97
2036	142,176	sq ft	131	115	16	138	17	121
2041	171,816	sq ft	158	139	19	167	20	147

[2] Institute of Transportation Engineers. Trip Generation Manual 9th Edition. Washington, D.C. 2012.

At full build-out in 2041, the expected traffic generated by the proposed development is expected to reach 158 trips per hour (vph) during the AM peak and 167 trips per hour during the PM peak. These volumes are low as compared with the theoretical lane capacity of 1800 to 1900 vph. Consequently, subsequent sections of this report provide details on the full build-out of the proposed development (2041 horizon year) while results of the interim analyzed horizon years are included in **Appendix B**.

2.3.3 LOCATION 1

The proposed location of Site #1 is shown on **Figure 1**. The proposed access to the development is via 1 Avenue. All traffic will make use of Centre Street/1 Avenue, Centre Street/Service Road and Centre Street/Highway 23 intersections to access the regional/provincial transportation network.

Distribution of site generated traffic at this intersection is based on current traffic patterns. **Figure 11** shows the post development traffic volumes.

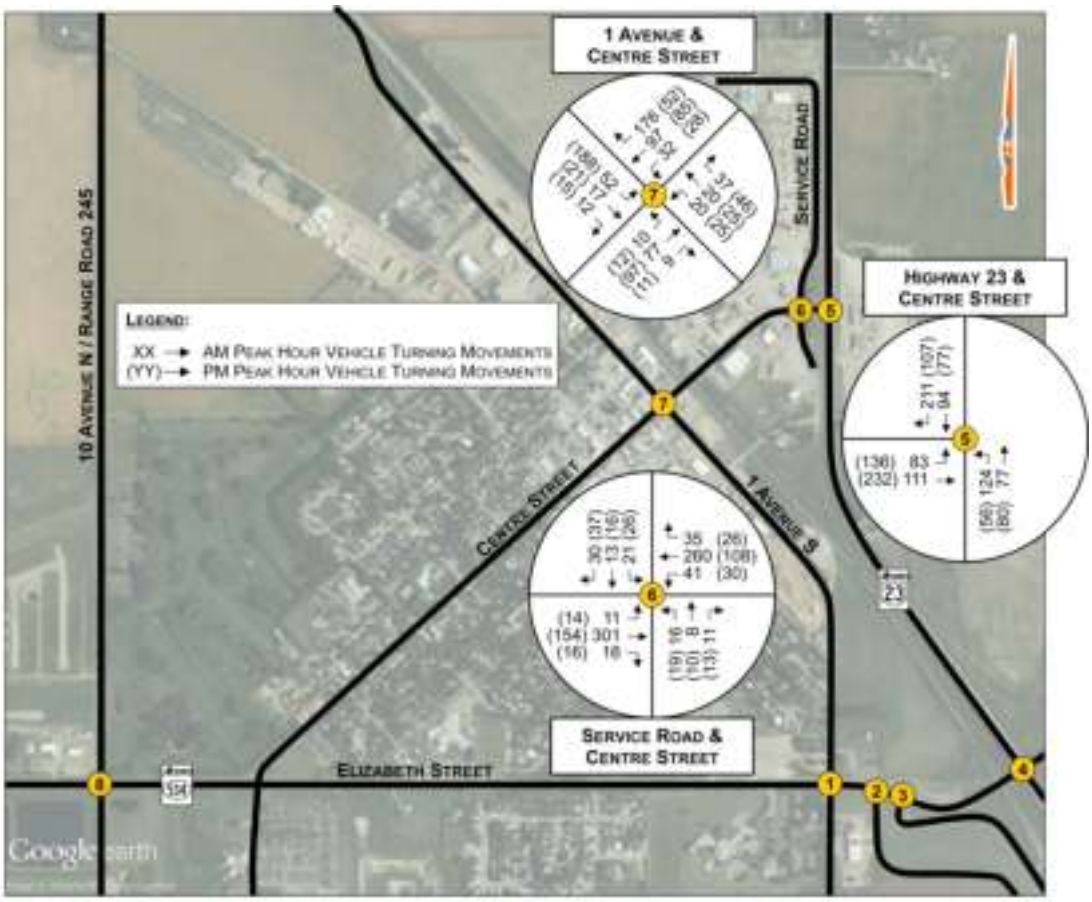


Figure 11: Location 1 - 2041 Post Development Volumes

Table 8 shows the summarized results of the operational/capacity analysis.

TABLE 8: LOCATION 1 - 2041 POST DEVELOPMENT CONDITIONS

INTERSECTION / MOVEMENT				AM PEAK HOUR				PM PEAK HOUR			
				v/c Ratio	LOS	Delay (s)	Queue (m)	v/c Ratio	LOS	Delay (s)	Queue (m)
1st Avenue / Centre Street (Stop-Controlled)	7	EB	Left/Through	0.03	A	0.8	0.2	0.04	A	0.8	0.2
			Through/Right	0.03	A	0.8	0.2	0.04	A	0.8	0.2
		WB	Left/Through	0.14	A	1.5	0.5	0.06	A	1.5	0.5
			Through/Right	0.14	A	1.5	0.5	0.06	A	1.5	0.5
		NB	Left/Through/Right	0.12	B	10.9	3.1	0.14	B	10.9	3.7
		SB	Left/Through/Right	0.16	B	13.0	4.4	0.43	C	16.2	16.1
Service Rd / Centre Street (Stop-Controlled)	6	EB	Left/Through	0.05	A	0.6	0.2	0.10	A	0.4	0.2
			Through/Right	0.05	A	0.6	0.2	0.10	A	0.4	0.2
		WB	Left/Through	0.11	A	1.0	0.8	0.05	A	1.5	0.6
			Through/Right	0.11	A	1.0	0.8	0.05	A	1.5	0.6
		NB	Left/Through/Right	0.07	B	12.5	1.8	0.10	B	13.6	2.4
		SB	Left/Through/Right	0.13	B	12.5	3.3	0.14	B	12.0	3.6
Highway 23 / Centre Street (Stop-Controlled)	5	EB	Left	0.18	B	13.8	4.9	0.22	B	11.9	6.4
			Right	0.13	A	9.3	3.3	0.26	A	10.0	7.9
		NB	Left	0.11	A	8.3	2.8	0.04	A	7.7	1.1
			Through	0.05	A	0.0	0.0	0.05	A	0.0	0.0
		SB	Through	0.06	A	0.0	0.0	0.05	A	0.0	0.0
			Right	0.13	A	0.0	0.0	0.07	A	0.0	0.0

Results of the analysis show that all the studied intersections are expected to operate at LOS C or better with a v/c ratio below 0.4 at the 2041 horizon year. No upgrades of the existing intersections are required. However, the proximity of the at-grade railroad crossing to Intersection 7 (Centre Street/1st Avenue) may cause traffic queues to extend through the intersection during train crossing.

2.3.4 LOCATION 2

The proposed Site #2 is situated west of 10 Avenue adjacent to the airport lands. Proposed access to the development is from 10 Avenue. As such, all vehicle traffic to and from the proposed development is expected to utilize the 10 Avenue/Highway 534 (Elisabeth Street) intersection.

For the analysis, it was assumed that 90% of trips to and from the development would utilize Highway 532 to access Highway 23, while 10% of trips to and from the development would utilize Highway 534 west of the proposed development location. **Figure 12** shows the post development traffic volumes.

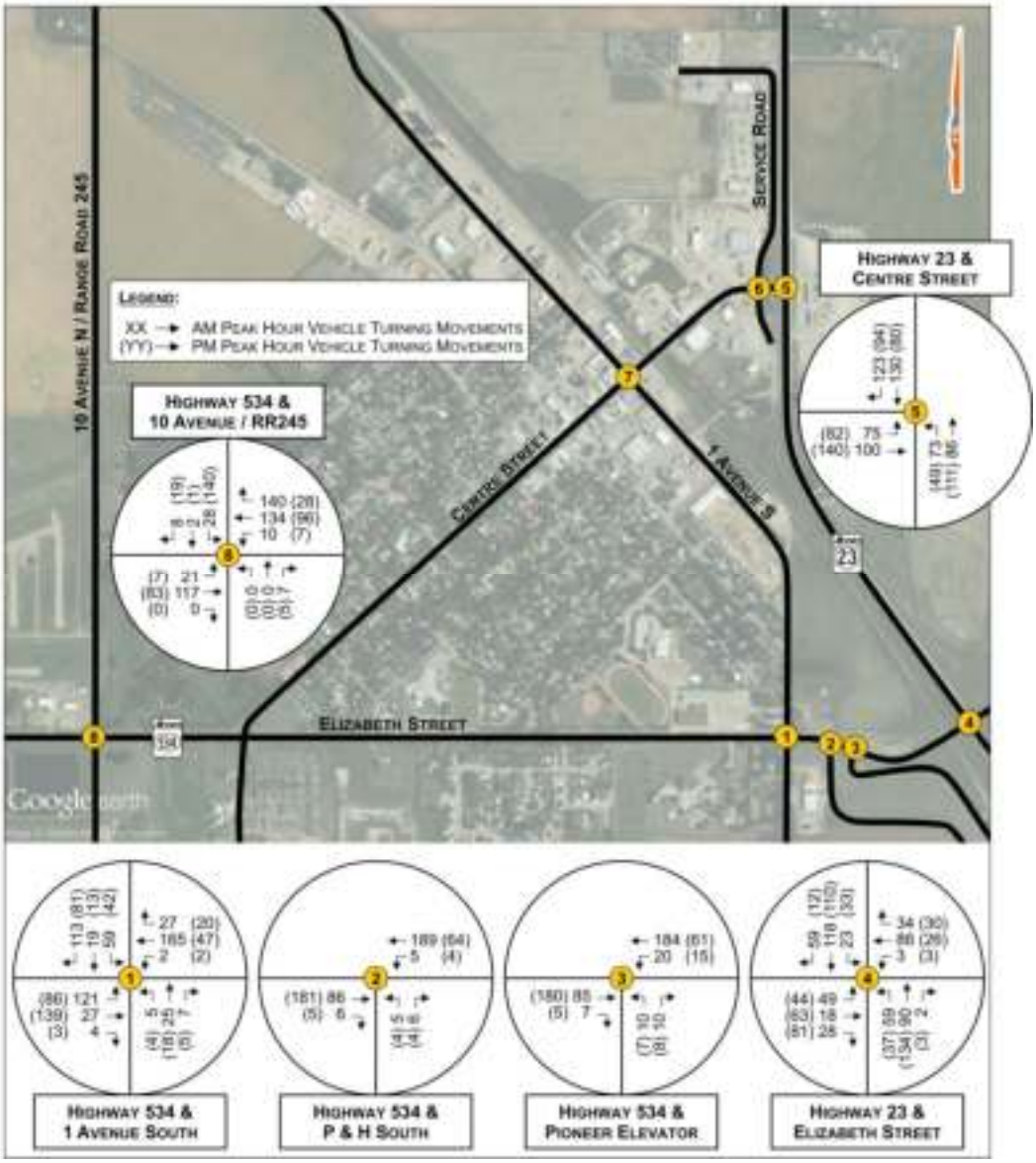


Figure 12: Location 2 - Post Development Volumes

Table 9 shows the summarized results of the operational/capacity analysis.

TABLE 9: LOCATION 2 – 2041 POST DEVELOPMENT CONDITIONS

INTERSECTION / MOVEMENT				AM PEAK HOUR				PM PEAK HOUR			
				v/c Ratio	LOS	Delay (s)	Queue (m)	v/c Ratio	LOS	Delay (s)	Queue (m)
Hwy 534 / 10th Ave (Stop-Controlled)	**8**	EB	Left / Through / Right	0.02	A	7.9	0.0	0.01	A	7.5	0.0
		WB	Left / Through / Right	0.01	A	7.5	0.0	0.01	A	7.4	0.0
		NB	Left / Through / Right	0.01	A	9.7	0.0	0.01	A	9.2	0.0
		SB	Left / Through / Right	0.07	B	11.7	0.2	0.23	B	11.4	0.9
Hwy 534 / 1st Ave (Stop-Controlled)	**1**	EB	Left / Through / Right	0.10	A	7.9	0.3	0.06	A	7.5	0.2
		WB	Left / Through / Right	0.00	A	7.3	0.0	0.00	A	7.5	0.0
		NB	Left / Through / Right	0.09	B	13.5	0.3	0.05	B	12.1	0.2
		SB	Left / Through / Right	0.34	B	14.0	1.5	0.20	B	11.2	0.7
Hwy 534 / P&H South (Stop-Controlled)	**2**	EB	Through	0.00	A	0.0	0.0	0.00	A	0.0	0.0
			Right	0.00	A	0.0	0.0	0.00	A	0.0	0.0
		WB	Left / Through	0.00	A	7.5	0.0	0.00	A	7.7	0.0
			Through	0.00	A	0.0	0.0	0.00	A	0.0	0.0
		NB	Left / Right	0.01	A	9.3	0.0	0.01	A	9.7	0.0
Hwy 534 / Pioneer Elevator (Stop-Controlled)	**3**	EB	Through / Right	0.00	A	0.0	0.0	0.00	A	0.0	0.0
		WB	Left / Through	0.02	A	7.5	0.0	0.01	A	7.8	0.0
		NB	Left / Right	0.03	A	9.6	0.1	0.02	A	9.9	0.1
Hwy 534 / Hwy 23 (Stop-Controlled)	**4**	EB	Left / Through / Right	0.23	C	15.4	0.9	0.35	B	14.5	1.5
		WB	Left / Through / Right	0.27	C	15.1	1.1	0.10	B	11.7	0.3
		NB	Left	0.05	A	7.8	0.1	0.03	A	7.6	0.1
			Through / Right	0.00	A	0.0	0.0	0.00	A	0.0	0.0
		SB	Left	0.02	A	7.7	0.1	0.03	A	7.8	0.1
			Through / Right	0.00	A	0.0	0.0	0.00	A	0.0	0.0
Hwy 23 / Centre St (Stop-Controlled)	**5**	EB	Left	0.14	B	12.3	0.5	0.19	B	14.8	0.7
			Right	0.12	A	9.7	0.4	0.20	B	11.0	0.7
		NB	Left	0.06	A	7.7	0.2	0.04	A	7.8	0.1
			Through	0.00	A	0.0	0.0	0.00	A	0.0	0.0
		SB	Through	0.00	A	0.0	0.0	0.00	A	0.0	0.0
			Right	0.00	A	0.0	0.0	0.00	A	0.0	0.0

Results of the analysis show that all the studied intersections are expected to operate at LOS C or better with a v/c ratio below 0.4 at 2041 horizon year. No upgrades of the existing intersections are required. However it should be noted that the traffic destined to Site #2 would travel through the residential area and school zones along Highway 534.

2.3.5 LOCATION 3

The proposed Site #3 is situated south of Highway 534 between Highway 23 and 1st Avenue. Proposed access to the development is from an existing roadway that currently services the local RCMP office, the Viterra South Elevator, and the Richardson Pioneer South Elevator.

It was assumed for the purpose of this analysis that all traffic to and from the proposed development will utilise the Highway 534 / Highway 23 intersection. Distribution of site generated traffic at this intersection is based on current traffic patterns provided by AT data. **Figure 13** shows the post development traffic volumes.

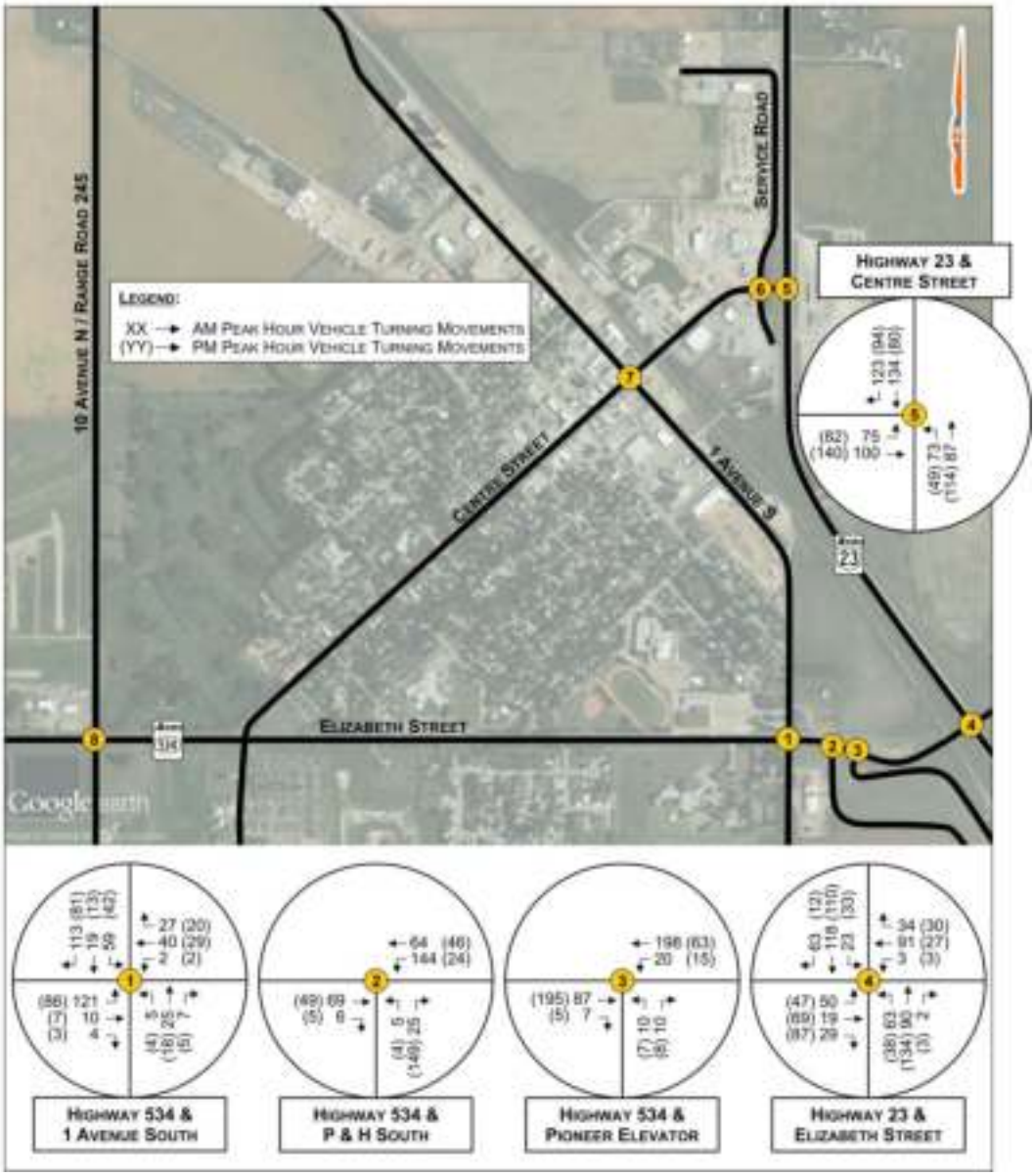


Figure 13: Location 3 - Post Development Volumes

Table 10 shows the summarized results of the operational/capacity analysis.

TABLE 10: LOCATION 3 – 2041 POST DEVELOPMENT CONDITIONS

INTERSECTION / MOVEMENT				AM PEAK HOUR				PM PEAK HOUR			
				v/c Ratio	LOS	Delay (s)	Queue (m)	v/c Ratio	LOS	Delay (s)	Queue (m)
Hwy 534 / 1st Ave (Stop-Controlled)	**1**	EB	Left / Through / Right	0.09	A	7.6	0.3	0.06	A	7.6	0.2
		WB	Left / Through / Right	0.00	A	7.3	0.0	0.00	A	7.3	0.0
		NB	Left / Through / Right	0.07	B	11.8	0.2	0.05	B	10.9	0.1
		SB	Left / Through / Right	0.27	B	11.6	1.1	0.18	B	10.5	0.7
Hwy 534 / P&H South (Stop-Controlled)	**2**	EB	Through	0.00	A	0.0	0.0	0.00	A	0.0	0.0
			Right	0.00	A	0.0	0.0	0.00	A	0.0	0.0
		WB	Left / Through	0.10	A	7.7	0.3	0.02	A	7.4	0.1
			Through	0.10	A	0.0	0.0	0.00	A	0.0	0.0
		NB	Left / Right	0.04	A	9.3	0.1	0.17	A	9.4	0.6
Hwy 534 / Pioneer Elevator (Stop-Controlled)	**3**	EB	Through / Right	0.00	A	0.0	0.0	0.00	A	0.0	0.0
		WB	Left / Through	0.02	A	7.5	0.0	0.01	A	7.8	0.0
		NB	Left / Right	0.03	A	9.4	0.1	0.02	A	10.0	0.1
Hwy 534 / Hwy 23 (Stop-Controlled)	**4**	EB	Left / Through / Right	0.27	C	15.9	0.9	0.37	B	15.0	1.7
		WB	Left / Through / Right	0.29	C	15.6	1.2	0.11	B	11.8	0.4
		NB	Left	0.05	A	7.9	0.2	0.03	A	7.6	0.1
			Through / Right	0.00	A	0.0	0.0	0.00	A	0.0	0.0
		SB	Left	0.02	A	7.7	0.1	0.03	A	7.8	0.1
			Through / Right	0.00	A	0.0	0.0	0.00	A	0.0	0.0
Hwy 23 / Centre St (Stop-Controlled)	**5**	EB	Left	0.14	B	12.3	0.5	0.19	B	14.8	0.7
			Right	0.12	A	9.8	0.4	0.20	B	11.0	0.7
		NB	Left	0.06	A	7.7	0.2	0.04	A	7.8	0.1
			Through	0.00	A	0.0	0.0	0.00	A	0.0	0.0
		SB	Through	0.00	A	0.0	0.0	0.00	A	0.0	0.0
			Right	0.00	A	0.0	0.0	0.00	A	0.0	0.0

Results of the analysis show that all studied intersections operate at LOS C or better with a v/c ratio of less than 0.3. No upgrades of the existing intersections are required. However, it should be noted that the offset between the intersections of Pioneer Elevator access road or P&H access road with Highway 534 is approximately 50 meters. It would be desirable to modify the alignment of the Pioneer Elevator access road or P&H access road and combine the two existing Highway 534 intersections to improve safety of network operation in the area.

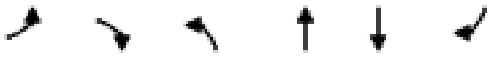
3.0 CONCLUSIONS AND RECOMMENDATIONS

- The results of the analysis indicate that no network improvements will be required if the proposed development is located at any of the analyzed locations.
- The intersection of Centre Street/1st Avenue, which provides access to Site #1 is located in proximity to an at-grade railroad crossing (offset approximately 60 m). This provides a relatively short distance for vehicle storage. Consequently, queues extending through the intersection may occur during a rail crossing event.
- From the overall network perspective, Site #3 provides for the best location as the traffic destined to the site will not have to cross residential or school zones. However, it should be noted that offset between the intersections of Pioneer Elevator access road or P&H access road with Highway 534 is approximately 50 meters.
  In the long term, it would be desirable to modify the alignment of Pioneer Elevator access road and/or P&H access road and combine the two existing Highway 534 intersections to improve safety of the network operation in the area.

APPENDIX A: LAND USE CONCEPT

Vulcan Business Development Society										
Activity Rate										
Period	Population	Agriculture	Mining, Oil & Gas and Utilities	Construction	Manufacturing	Wholesale Trade	Transportation and Warehousing	Population-Related	Institutional	Total Employment
2001	6,631	0.193	0.009	0.008	0.005	0.011	0.013	0.104	0.071	0.414
2006	6,854	0.209	0.009	0.007	0.005	0.010	0.011	0.088	0.093	0.442
2011	6,939	0.146	0.006	0.001	0.004	0.011	0.000	0.047	0.094	0.303
2016	6,924	0.231	0.010	0.010	0.002	0.024	0.005	0.071	0.093	0.446
2021	7,926	0.231	0.010	0.011	0.003	0.024	0.005	0.070	0.092	0.445
2026	7,694	0.231	0.010	0.012	0.003	0.024	0.005	0.068	0.092	0.444
2031	7,912	0.230	0.010	0.013	0.004	0.024	0.005	0.066	0.092	0.444
2036	8,178	0.230	0.010	0.014	0.004	0.024	0.005	0.064	0.092	0.443
2041	8,408	0.230	0.010	0.015	0.005	0.024	0.005	0.062	0.092	0.442
Employment										
Period	Population	Agriculture	Mining, Oil & Gas and Utilities	Construction	Manufacturing	Wholesale Trade	Transportation and Warehousing	Population-Related	Institutional	Total Employment
2001	6,631	1,280	60	50	35	75	85	690	470	2,745
2006	6,854	1,434	65	50	35	140	75	600	635	3,030
2011	6,939	970	40	10	25	75	0	325	655	2,100
2016	6,924	1,601	69	69	14	163	38	498	695	3,087
2021	7,926	1,692	73	80	18	173	40	512	672	3,261
2026	7,694	1,775	77	92	23	182	42	523	706	3,419
2031	7,912	1,833	80	103	28	188	43	526	729	3,528
2036	8,178	1,883	82	114	33	193	44	529	750	3,622
2041	8,408	1,934	84	126	38	198	46	531	771	3,717
Employment Growth										
2016-2021	402	91	-4	11	4	9	2	14	37	174
2016-2026	770	174	8	23	9	18	4	25	71	332
2016-2031	1,028	232	11	34	14	24	6	26	94	440
2016-2036	1,254	282	13	45	19	30	7	25	115	535
2016-2041	1,484	333	15	57	24	35	8	23	136	630
Share of Growth on Industrial Lands										
Vulcan Business Development Society		0%	100%	100%	100%	100%	100%	40%	10%	
Employment Growth on Industrial Lands										
2016-2021		0	4	11	4	9	2	6	4	41
2016-2026		0	8	23	9	18	4	10	7	79
2016-2031		0	10	34	14	24	6	10	9	108
2016-2036		0	13	45	19	30	7	10	11	134
2016-2041		0	15	57	24	35	8	9	14	161
Floor Space Per Worker (sq.ft. per worker)										
Vulcan Business Development Society		0	400	400	2,000	2,000	2,000	400	400	
Floor Space (sq.ft.)										
2016-2021		0	1,611	4,527 -	8,951	18,970	4,355	2,285	1,475	42,175
2016-2026		0	3,086	9,216	18,505	36,549	8,345	3,946	2,826	82,272
2016-2031		0	4,116	13,623	28,010	48,481	11,131	4,197	3,770	113,338
2016-2036		0	5,022	18,005	37,782	59,157	13,582	3,968	4,600	142,176
2016-2041		0	5,942	22,707	48,037	69,991	16,069	3,627	5,442	171,816
Coverage										
Coverage		10%	30%	10%	30%	10%	10%	30%	30%	
Hectares of Industrial Lands										
2016-2021		0.0	0.0	0.4	0.3	1.8	0.4	0.1	0.0	3.0
2016-2026		0.0	0.1	0.9	0.6	3.4	0.8	0.1	0.1	5.9
2016-2031		0.0	0.1	1.3	0.9	4.5	1.0	0.1	0.1	8.0
2016-2036		0.0	0.2	1.7	1.2	5.5	1.3	0.1	0.1	10.0
2016-2041		0.0	0.2	2.1	1.5	6.5	1.5	0.1	0.2	12.1

APPENDIX B: POST DEVELOPMENT CONDITIONS



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	87	74	65	79	125
Future Volume (Veh/h)	65	87	74	65	79	125
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	95	80	71	86	136
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	317	86	222			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	317	86	222			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	90	94			
cM capacity (veh/h)	636	973	1347			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	71	95	80	71	86	136
Volume Left	71	0	80	0	0	0
Volume Right	0	95	0	0	0	136
cSH	636	973	1347	1700	1700	1700
Volume to Capacity	0.11	0.10	0.06	0.04	0.05	0.08
Queue Length 95th (m)	2.9	2.5	1.4	0.0	0.0	0.0
Control Delay (s)	11.4	9.1	7.8	0.0	0.0	0.0
Lane LOS	B	A	A			
Approach Delay (s)	10.1		4.2		0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	21.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	107	11	34	135	30	13	7	9	17	11	25
Future Volume (Veh/h)	10	107	11	34	135	30	13	7	9	17	11	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	11	116	12	37	147	33	14	8	10	18	12	27
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	180			128			324	398	64	332	388	90
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	180			128			324	398	64	332	388	90
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			98	98	99	97	98	97
cM capacity (veh/h)	1393			1456			563	520	987	570	528	950

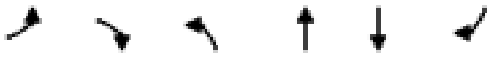
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	69	70	110	106	32	57
Volume Left	11	0	37	0	14	18
Volume Right	0	12	0	33	10	27
cSH	1393	1700	1456	1700	635	689
Volume to Capacity	0.01	0.04	0.03	0.06	0.05	0.08
Queue Length 95th (m)	0.2	0.0	0.6	0.0	1.2	2.0
Control Delay (s)	1.3	0.0	2.7	0.0	11.0	10.7
Lane LOS	A		A		B	B
Approach Delay (s)	0.6		1.4		11.0	10.7
Approach LOS					B	B

Intersection Summary				
Average Delay	3.0			
Intersection Capacity Utilization	21.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	65	8	27	81	65	17	17	31	32	14	10
Future Volume (Veh/h)	8	65	8	27	81	65	17	17	31	32	14	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	9	71	9	29	88	71	18	18	34	35	15	11
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	159			80			214	310	40	278	280	80
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	159			80			214	310	40	278	280	80
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			97	97	97	94	98	99
cM capacity (veh/h)	1418			1516			689	588	1022	604	612	965

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	44	44	73	115	70	61
Volume Left	9	0	29	0	18	35
Volume Right	0	9	0	71	34	11
cSH	1418	1700	1516	1700	778	650
Volume to Capacity	0.01	0.03	0.02	0.07	0.09	0.09
Queue Length 95th (m)	0.1	0.0	0.4	0.0	2.2	2.4
Control Delay (s)	1.6	0.0	3.0	0.0	10.1	11.1
Lane LOS	A		A		B	B
Approach Delay (s)	0.8		1.2		10.1	11.1
Approach LOS					B	B

Intersection Summary				
Average Delay	4.1			
Intersection Capacity Utilization	21.3%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	81	140	43	67	64	81
Future Volume (Veh/h)	81	140	43	67	64	81
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	88	152	47	73	70	88
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	237	70	158			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	237	70	158			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	85	97			
cM capacity (veh/h)	726	993	1422			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	88	152	47	73	70	88
Volume Left	88	0	47	0	0	0
Volume Right	0	152	0	0	0	88
cSH	726	993	1422	1700	1700	1700
Volume to Capacity	0.12	0.15	0.03	0.04	0.04	0.05
Queue Length 95th (m)	3.1	4.1	0.8	0.0	0.0	0.0
Control Delay (s)	10.6	9.3	7.6	0.0	0.0	0.0
Lane LOS	B	A	A			
Approach Delay (s)	9.8		3.0		0.0	
Approach LOS	A					

Intersection Summary				
Average Delay	5.2			
Intersection Capacity Utilization	20.2%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	164	14	25	79	22	16	8	11	22	13	31
Future Volume (Veh/h)	12	164	14	25	79	22	16	8	11	22	13	31
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	13	178	15	27	86	24	17	9	12	24	14	34
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	110			193			350	376	96	284	371	55
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	110			193			350	376	96	284	371	55
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			97	98	99	96	97	97
cM capacity (veh/h)	1478			1378			538	539	941	617	542	1000

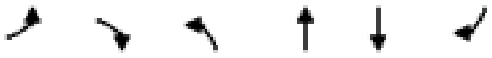
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	102	104	70	67	38	72
Volume Left	13	0	27	0	17	24
Volume Right	0	15	0	24	12	34
cSH	1478	1700	1378	1700	622	729
Volume to Capacity	0.01	0.06	0.02	0.04	0.06	0.10
Queue Length 95th (m)	0.2	0.0	0.5	0.0	1.5	2.5
Control Delay (s)	1.0	0.0	3.1	0.0	11.2	10.5
Lane LOS	A		A		B	B
Approach Delay (s)	0.5		1.6		11.2	10.5
Approach LOS					B	B

Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	23.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	81	10	24	70	32	21	21	39	70	18	12
Future Volume (Veh/h)	10	81	10	24	70	32	21	21	39	70	18	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	11	88	11	26	76	35	23	23	42	76	20	13
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	111			99			228	278	50	265	266	56
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	111			99			228	278	50	265	266	56
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			97	96	96	88	97	99
cM capacity (veh/h)	1477			1492			668	613	1008	609	622	999

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	55	55	64	73	88	109
Volume Left	11	0	26	0	23	76
Volume Right	0	11	0	35	42	13
cSH	1477	1700	1492	1700	775	641
Volume to Capacity	0.01	0.03	0.02	0.04	0.11	0.17
Queue Length 95th (m)	0.2	0.0	0.4	0.0	2.9	4.6
Control Delay (s)	1.5	0.0	3.1	0.0	10.2	11.8
Lane LOS	A		A		B	B
Approach Delay (s)	0.8		1.5		10.2	11.8
Approach LOS					B	B

Intersection Summary				
Average Delay	5.6			
Intersection Capacity Utilization	26.9%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	70	93	89	68	83	150
Future Volume (Veh/h)	70	93	89	68	83	150
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	101	97	74	90	163
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	358	90	253			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	358	90	253			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	90	93			
cM capacity (veh/h)	593	968	1312			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	76	101	97	74	90	163
Volume Left	76	0	97	0	0	0
Volume Right	0	101	0	0	0	163
cSH	593	968	1312	1700	1700	1700
Volume to Capacity	0.13	0.10	0.07	0.04	0.05	0.10
Queue Length 95th (m)	3.3	2.6	1.8	0.0	0.0	0.0
Control Delay (s)	12.0	9.2	8.0	0.0	0.0	0.0
Lane LOS	B	A	A			
Approach Delay (s)	10.4		4.5		0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	22.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	116	12	36	173	31	14	7	9	18	11	26
Future Volume (Veh/h)	10	116	12	36	173	31	14	7	9	18	11	26
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	11	126	13	39	188	34	15	8	10	20	12	28
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	222			139			360	454	70	382	444	111
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	222			139			360	454	70	382	444	111
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			97	98	99	96	98	97
cM capacity (veh/h)	1344			1442			528	483	979	524	489	921

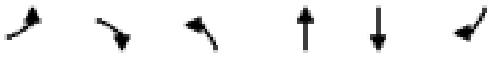
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	74	76	133	128	33	60
Volume Left	11	0	39	0	15	20
Volume Right	0	13	0	34	10	28
cSH	1344	1700	1442	1700	598	644
Volume to Capacity	0.01	0.04	0.03	0.08	0.06	0.09
Queue Length 95th (m)	0.2	0.0	0.6	0.0	1.3	2.3
Control Delay (s)	1.2	0.0	2.4	0.0	11.4	11.2
Lane LOS	A		A		B	B
Approach Delay (s)	0.6		1.2		11.4	11.2
Approach LOS					B	B

Intersection Summary				
Average Delay	2.9			
Intersection Capacity Utilization	24.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	68	8	29	85	99	17	18	32	38	15	11
Future Volume (Veh/h)	9	68	8	29	85	99	17	18	32	38	15	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	10	74	9	32	92	108	18	20	35	41	16	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	200			83			228	362	42	312	313	100
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	200			83			228	362	42	312	313	100
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			97	96	97	93	97	99
cM capacity (veh/h)	1370			1512			669	548	1020	567	584	936

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	47	46	78	154	73	69
Volume Left	10	0	32	0	18	41
Volume Right	0	9	0	108	35	12
cSH	1370	1700	1512	1700	747	613
Volume to Capacity	0.01	0.03	0.02	0.09	0.10	0.11
Queue Length 95th (m)	0.2	0.0	0.5	0.0	2.5	2.9
Control Delay (s)	1.7	0.0	3.1	0.0	10.3	11.6
Lane LOS	A		A		B	B
Approach Delay (s)	0.8		1.1		10.3	11.6
Approach LOS					B	B

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	23.8%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	98	168	46	71	68	89
Future Volume (Veh/h)	98	168	46	71	68	89
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	107	183	50	77	74	97
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	251	74	171			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	251	74	171			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	81	96			
cM capacity (veh/h)	711	988	1406			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	107	183	50	77	74	97
Volume Left	107	0	50	0	0	0
Volume Right	0	183	0	0	0	97
cSH	711	988	1406	1700	1700	1700
Volume to Capacity	0.15	0.19	0.04	0.05	0.04	0.06
Queue Length 95th (m)	4.0	5.2	0.8	0.0	0.0	0.0
Control Delay (s)	11.0	9.5	7.7	0.0	0.0	0.0
Lane LOS	B	A	A			
Approach Delay (s)	10.0		3.0		0.0	
Approach LOS	B					

Intersection Summary				
Average Delay	5.6			
Intersection Capacity Utilization	21.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	205	14	26	88	23	17	9	12	23	14	33
Future Volume (Veh/h)	13	205	14	26	88	23	17	9	12	23	14	33
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	14	223	15	28	96	25	18	10	13	25	15	36
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	121			238			406	436	119	322	430	60
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	121			238			406	436	119	322	430	60
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			96	98	99	96	97	96
cM capacity (veh/h)	1464			1326			487	497	910	576	500	992

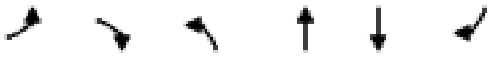
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	126	126	76	73	41	76
Volume Left	14	0	28	0	18	25
Volume Right	0	15	0	25	13	36
cSH	1464	1700	1326	1700	575	693
Volume to Capacity	0.01	0.07	0.02	0.04	0.07	0.11
Queue Length 95th (m)	0.2	0.0	0.5	0.0	1.7	2.8
Control Delay (s)	0.9	0.0	3.0	0.0	11.7	10.8
Lane LOS	A		A		B	B
Approach Delay (s)	0.4		1.5		11.7	10.8
Approach LOS					B	B

Intersection Summary				
Average Delay	3.2			
Intersection Capacity Utilization	25.1%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	86	10	25	74	38	22	22	41	106	19	13
Future Volume (Veh/h)	11	86	10	25	74	38	22	22	41	106	19	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	12	93	11	27	80	41	24	24	45	115	21	14
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	121			104			241	298	52	282	282	60
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	121			104			241	298	52	282	282	60
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			96	96	96	80	97	99
cM capacity (veh/h)	1464			1485			652	597	1005	588	609	992

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	58	58	67	81	93	150
Volume Left	12	0	27	0	24	115
Volume Right	0	11	0	41	45	14
cSH	1464	1700	1485	1700	763	615
Volume to Capacity	0.01	0.03	0.02	0.05	0.12	0.24
Queue Length 95th (m)	0.2	0.0	0.4	0.0	3.1	7.2
Control Delay (s)	1.6	0.0	3.1	0.0	10.4	12.7
Lane LOS	A		A		B	B
Approach Delay (s)	0.8		1.4		10.4	12.7
Approach LOS					B	B

Intersection Summary				
Average Delay	6.3			
Intersection Capacity Utilization	29.0%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	74	99	101	71	87	171
Future Volume (Veh/h)	74	99	101	71	87	171
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	80	108	110	77	95	186
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	392	95	281			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	392	95	281			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	89	91			
cM capacity (veh/h)	560	962	1282			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	80	108	110	77	95	186
Volume Left	80	0	110	0	0	0
Volume Right	0	108	0	0	0	186
cSH	560	962	1282	1700	1700	1700
Volume to Capacity	0.14	0.11	0.09	0.05	0.06	0.11
Queue Length 95th (m)	3.8	2.9	2.1	0.0	0.0	0.0
Control Delay (s)	12.5	9.2	8.1	0.0	0.0	0.0
Lane LOS	B	A	A			
Approach Delay (s)	10.6		4.7		0.0	
Approach LOS	B					

Intersection Summary				
Average Delay	4.4			
Intersection Capacity Utilization	23.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	125	12	37	203	32	14	7	10	19	12	27
Future Volume (Veh/h)	11	125	12	37	203	32	14	7	10	19	12	27
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	12	136	13	40	221	35	15	8	11	21	13	29
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	256			149			392	502	74	426	492	128
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	256			149			392	502	74	426	492	128
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			97	98	99	96	97	97
cM capacity (veh/h)	1306			1430			498	452	972	486	459	898

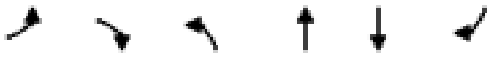
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	80	81	150	146	34	63
Volume Left	12	0	40	0	15	21
Volume Right	0	13	0	35	11	29
cSH	1306	1700	1430	1700	575	607
Volume to Capacity	0.01	0.05	0.03	0.09	0.06	0.10
Queue Length 95th (m)	0.2	0.0	0.7	0.0	1.4	2.6
Control Delay (s)	1.2	0.0	2.2	0.0	11.7	11.6
Lane LOS	A		A		B	B
Approach Delay (s)	0.6		1.1		11.7	11.6
Approach LOS					B	B

Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	25.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	71	8	30	89	126	18	19	34	43	15	11
Future Volume (Veh/h)	9	71	8	30	89	126	18	19	34	43	15	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	10	77	9	33	97	137	20	21	37	47	16	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	234			86			236	402	43	338	338	117
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	234			86			236	402	43	338	338	117
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			97	96	96	91	97	99
cM capacity (veh/h)	1331			1508			660	520	1018	541	565	913

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	48	48	82	186	78	75
Volume Left	10	0	33	0	20	47
Volume Right	0	9	0	137	37	12
cSH	1331	1700	1508	1700	729	584
Volume to Capacity	0.01	0.03	0.02	0.11	0.11	0.13
Queue Length 95th (m)	0.2	0.0	0.5	0.0	2.7	3.3
Control Delay (s)	1.6	0.0	3.1	0.0	10.5	12.1
Lane LOS	A		A		B	B
Approach Delay (s)	0.8		1.0		10.5	12.1
Approach LOS					B	B

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	25.7%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	111	190	49	74	71	96
Future Volume (Veh/h)	111	190	49	74	71	96
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	121	207	53	80	77	104
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	263	77	181			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	263	77	181			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	83	79	96			
cM capacity (veh/h)	698	984	1394			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	121	207	53	80	77	104
Volume Left	121	0	53	0	0	0
Volume Right	0	207	0	0	0	104
cSH	698	984	1394	1700	1700	1700
Volume to Capacity	0.17	0.21	0.04	0.05	0.05	0.06
Queue Length 95th (m)	4.7	6.0	0.9	0.0	0.0	0.0
Control Delay (s)	11.2	9.6	7.7	0.0	0.0	0.0
Lane LOS	B	A	A			
Approach Delay (s)	10.2		3.1		0.0	
Approach LOS	B					

Intersection Summary				
Average Delay	5.9			
Intersection Capacity Utilization	22.2%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	238	15	28	94	24	18	9	12	24	15	34
Future Volume (Veh/h)	13	238	15	28	94	24	18	9	12	24	15	34
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	14	259	16	30	102	26	20	10	13	26	16	37
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	128			275			451	483	138	350	478	64
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	128			275			451	483	138	350	478	64
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			96	98	99	95	97	96
cM capacity (veh/h)	1456			1285			450	466	886	548	469	987

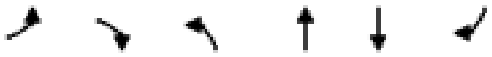
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	144	146	81	77	43	79
Volume Left	14	0	30	0	20	26
Volume Right	0	16	0	26	13	37
cSH	1456	1700	1285	1700	533	664
Volume to Capacity	0.01	0.09	0.02	0.05	0.08	0.12
Queue Length 95th (m)	0.2	0.0	0.5	0.0	2.0	3.1
Control Delay (s)	0.8	0.0	3.0	0.0	12.3	11.2
Lane LOS	A		A		B	B
Approach Delay (s)	0.4		1.6		12.3	11.2
Approach LOS					B	B

Intersection Summary				
Average Delay	3.1			
Intersection Capacity Utilization	26.4%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	89	11	26	78	43	23	23	43	135	19	14
Future Volume (Veh/h)	12	89	11	26	78	43	23	23	43	135	19	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	13	97	12	28	85	47	25	25	47	147	21	15
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	132			109			253	317	54	298	300	66
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	132			109			253	317	54	298	300	66
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			96	96	95	74	96	98
cM capacity (veh/h)	1451			1479			637	581	1001	569	595	984

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	62	60	70	90	97	183
Volume Left	13	0	28	0	25	147
Volume Right	0	12	0	47	47	15
cSH	1451	1700	1479	1700	751	593
Volume to Capacity	0.01	0.04	0.02	0.05	0.13	0.31
Queue Length 95th (m)	0.2	0.0	0.4	0.0	3.4	9.9
Control Delay (s)	1.6	0.0	3.1	0.0	10.5	13.8
Lane LOS	A		A		B	B
Approach Delay (s)	0.8		1.3		10.5	13.8
Approach LOS					B	B

Intersection Summary				
Average Delay	6.9			
Intersection Capacity Utilization	33.6%	ICU Level of Service		A
Analysis Period (min)	15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	123	211	53	77	74	101
Future Volume (vph)	123	211	53	77	74	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	20.0			20.0
Storage Lanes	1	1	1			1
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1789	1601	1789	1883	1883	1601
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1789	1601	1789	1883	1883	1601
Link Speed (k/h)	50			50	50	
Link Distance (m)	64.5			241.0	163.6	
Travel Time (s)	4.6			17.4	11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	134	229	58	84	80	110
Shared Lane Traffic (%)						
Lane Group Flow (vph)	134	229	58	84	80	110
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

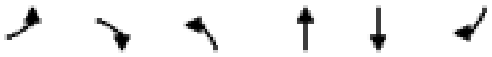
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	23.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	269	16	29	102	25	19	9	13	25	15	36
Future Volume (vph)	14	269	16	29	102	25	19	9	13	25	15	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.976			0.958			0.936	
Flt Protected		0.998			0.991			0.977			0.984	
Satd. Flow (prot)	0	3543	0	0	3461	0	0	1763	0	0	1735	0
Flt Permitted		0.998			0.991			0.977			0.984	
Satd. Flow (perm)	0	3543	0	0	3461	0	0	1763	0	0	1735	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		376.4			64.5			210.4			84.2	
Travel Time (s)		27.1			4.6			15.1			6.1	
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)	15	292	17	32	111	27	21	10	14	27	16	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	324	0	0	170	0	0	45	0	0	82	0
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(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 27.8%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	93	11	27	81	48	24	24	44	160	20	14
Future Volume (vph)	12	93	11	27	81	48	24	24	44	160	20	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.986			0.954			0.935			0.990	
Flt Protected		0.995			0.991			0.987			0.960	
Satd. Flow (prot)	0	3511	0	0	3383	0	0	1738	0	0	1790	0
Flt Permitted		0.995			0.991			0.987			0.960	
Satd. Flow (perm)	0	3511	0	0	3383	0	0	1738	0	0	1790	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.8			376.4			196.9			144.1	
Travel Time (s)		10.4			27.1			14.2			10.4	
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)	13	101	12	29	88	52	26	26	48	174	22	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	126	0	0	169	0	0	100	0	0	211	0
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(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

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



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	79	105	113	74	90	191
Future Volume (Veh/h)	79	105	113	74	90	191
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	86	114	123	80	98	208
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	424	98	306			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	424	98	306			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	84	88	90			
cM capacity (veh/h)	529	958	1255			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	86	114	123	80	98	208
Volume Left	86	0	123	0	0	0
Volume Right	0	114	0	0	0	208
cSH	529	958	1255	1700	1700	1700
Volume to Capacity	0.16	0.12	0.10	0.05	0.06	0.12
Queue Length 95th (m)	4.4	3.1	2.5	0.0	0.0	0.0
Control Delay (s)	13.1	9.3	8.2	0.0	0.0	0.0
Lane LOS	B	A	A			
Approach Delay (s)	10.9		5.0		0.0	
Approach LOS	B					

Intersection Summary				
Average Delay	4.5			
Intersection Capacity Utilization	24.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	133	13	39	231	34	15	8	10	20	12	29
Future Volume (Veh/h)	11	133	13	39	231	34	15	8	10	20	12	29
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	12	145	14	42	251	37	16	9	11	22	13	32
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	288			159			424	548	80	466	536	144
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	288			159			424	548	80	466	536	144
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			97	98	99	95	97	96
cM capacity (veh/h)	1271			1418			470	425	965	453	432	877

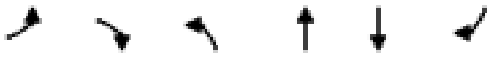
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	84	86	168	162	36	67
Volume Left	12	0	42	0	16	22
Volume Right	0	14	0	37	11	32
cSH	1271	1700	1418	1700	540	582
Volume to Capacity	0.01	0.05	0.03	0.10	0.07	0.12
Queue Length 95th (m)	0.2	0.0	0.7	0.0	1.6	2.9
Control Delay (s)	1.2	0.0	2.1	0.0	12.1	12.0
Lane LOS	A		A		B	B
Approach Delay (s)	0.6		1.1		12.1	12.0
Approach LOS					B	B

Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	27.1%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	74	9	31	93	150	19	19	35	47	16	11
Future Volume (Veh/h)	10	74	9	31	93	150	19	19	35	47	16	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	11	80	10	34	101	163	21	21	38	51	17	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	264			90			246	439	45	361	362	132
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	264			90			246	439	45	361	362	132
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			97	96	96	90	97	99
cM capacity (veh/h)	1297			1503			646	495	1015	518	546	893

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	51	50	84	214	80	80
Volume Left	11	0	34	0	21	51
Volume Right	0	10	0	163	38	12
cSH	1297	1700	1503	1700	712	560
Volume to Capacity	0.01	0.03	0.02	0.13	0.11	0.14
Queue Length 95th (m)	0.2	0.0	0.5	0.0	2.9	3.8
Control Delay (s)	1.7	0.0	3.1	0.0	10.7	12.5
Lane LOS	A		A		B	B
Approach Delay (s)	0.9		0.9		10.7	12.5
Approach LOS					B	B

Intersection Summary				
Average Delay	3.9			
Intersection Capacity Utilization	27.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	83	111	124	77	94	211
Future Volume (Veh/h)	83	111	124	77	94	211
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	90	121	135	84	102	229
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	456	102	331			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	456	102	331			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	82	87	89			
cM capacity (veh/h)	501	953	1228			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	90	121	135	84	102	229
Volume Left	90	0	135	0	0	0
Volume Right	0	121	0	0	0	229
cSH	501	953	1228	1700	1700	1700
Volume to Capacity	0.18	0.13	0.11	0.05	0.06	0.13
Queue Length 95th (m)	4.9	3.3	2.8	0.0	0.0	0.0
Control Delay (s)	13.8	9.3	8.3	0.0	0.0	0.0
Lane LOS	B	A	A			
Approach Delay (s)	11.2		5.1		0.0	
Approach LOS	B					

Intersection Summary				
Average Delay	4.6			
Intersection Capacity Utilization	26.6%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	141	13	41	260	35	16	8	11	21	13	30
Future Volume (Veh/h)	11	141	13	41	260	35	16	8	11	21	13	30
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	12	153	14	45	283	38	17	9	12	23	14	33
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	321			167			456	595	84	509	583	160
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	321			167			456	595	84	509	583	160
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			96	98	99	95	97	96
cM capacity (veh/h)	1236			1408			443	399	959	420	405	856

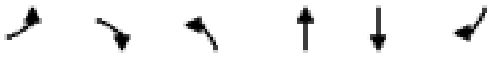
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	88	90	186	180	38	70
Volume Left	12	0	45	0	17	23
Volume Right	0	14	0	38	12	33
cSH	1236	1700	1408	1700	517	548
Volume to Capacity	0.01	0.05	0.03	0.11	0.07	0.13
Queue Length 95th (m)	0.2	0.0	0.8	0.0	1.8	3.3
Control Delay (s)	1.1	0.0	2.0	0.0	12.5	12.5
Lane LOS	A		A		B	B
Approach Delay (s)	0.6		1.0		12.5	12.5
Approach LOS					B	B

Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	28.4%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	77	9	32	97	176	20	20	37	52	17	12
Future Volume (Veh/h)	10	77	9	32	97	176	20	20	37	52	17	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	11	84	10	35	105	191	22	22	40	57	18	13
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	296			94			256	477	47	386	386	148
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	296			94			256	477	47	386	386	148
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			97	95	96	88	97	99
cM capacity (veh/h)	1262			1498			634	470	1012	495	529	872

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	53	52	88	244	84	88
Volume Left	11	0	35	0	22	57
Volume Right	0	10	0	191	40	13
cSH	1262	1700	1498	1700	694	536
Volume to Capacity	0.01	0.03	0.02	0.14	0.12	0.16
Queue Length 95th (m)	0.2	0.0	0.5	0.0	3.1	4.4
Control Delay (s)	1.7	0.0	3.1	0.0	10.9	13.0
Lane LOS	A		A		B	B
Approach Delay (s)	0.9		0.8		10.9	13.0
Approach LOS					B	B

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	29.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	136	232	56	80	77	107
Future Volume (Veh/h)	136	232	56	80	77	107
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	148	252	61	87	84	116
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	293	84	200			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	293	84	200			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	78	74	96			
cM capacity (veh/h)	667	975	1372			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	148	252	61	87	84	116
Volume Left	148	0	61	0	0	0
Volume Right	0	252	0	0	0	116
cSH	667	975	1372	1700	1700	1700
Volume to Capacity	0.22	0.26	0.04	0.05	0.05	0.07
Queue Length 95th (m)	6.4	7.9	1.1	0.0	0.0	0.0
Control Delay (s)	11.9	10.0	7.7	0.0	0.0	0.0
Lane LOS	B	A	A			
Approach Delay (s)	10.7		3.2		0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	6.4		
Intersection Capacity Utilization	25.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	301	16	30	108	26	19	10	13	26	16	37
Future Volume (Veh/h)	14	301	16	30	108	26	19	10	13	26	16	37
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	15	317	17	32	114	27	20	11	14	27	17	39
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	141			334			524	560	167	400	556	70
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	141			334			524	560	167	400	556	70
tC, single (s)	4.3			4.3			7.7	6.7	7.1	7.7	6.7	7.1
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	99			97			95	97	98	94	96	96
cM capacity (veh/h)	1383			1166			378	403	823	482	405	952

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	174	176	89	84	45	83
Volume Left	15	0	32	0	20	27
Volume Right	0	17	0	27	14	39
cSH	1383	1700	1166	1700	463	598
Volume to Capacity	0.01	0.10	0.03	0.05	0.10	0.14
Queue Length 95th (m)	0.2	0.0	0.6	0.0	2.4	3.6
Control Delay (s)	0.7	0.0	3.1	0.0	13.6	12.0
Lane LOS	A		A		B	B
Approach Delay (s)	0.4		1.6		13.6	12.0
Approach LOS					B	B

Intersection Summary				
Average Delay	3.1			
Intersection Capacity Utilization	29.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	97	11	28	85	52	25	25	46	188	21	15
Future Volume (Veh/h)	12	97	11	28	85	52	25	25	46	188	21	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	13	102	12	29	89	55	26	26	48	198	22	16
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	144			114			264	336	57	312	314	72
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	144			114			264	336	57	312	314	72
tC, single (s)	4.3			4.3			7.7	6.7	7.1	7.7	6.7	7.1
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	99			98			96	95	95	63	96	98
cM capacity (veh/h)	1379			1416			604	549	972	534	565	950

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	64	63	74	100	100	236
Volume Left	13	0	29	0	26	198
Volume Right	0	12	0	55	48	16
cSH	1379	1700	1416	1700	715	554
Volume to Capacity	0.01	0.04	0.02	0.06	0.14	0.43
Queue Length 95th (m)	0.2	0.0	0.5	0.0	3.7	16.1
Control Delay (s)	1.6	0.0	3.1	0.0	10.9	16.2
Lane LOS	A		A		B	C
Approach Delay (s)	0.8		1.3		10.9	16.2
Approach LOS					B	C

Intersection Summary				
Average Delay	8.3			
Intersection Capacity Utilization	37.9%	ICU Level of Service		A
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	98	1	9	113	43	1	1	6	14	1	6
Future Vol, veh/h	10	98	1	9	113	43	1	1	6	14	1	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	11	104	1	10	120	46	1	1	6	15	1	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	166	0	0	105	0	0	292	311	105	292	289	143
Stage 1	-	-	-	-	-	-	126	126	-	162	162	-
Stage 2	-	-	-	-	-	-	166	185	-	130	127	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1394	-	-	1468	-	-	660	604	949	660	621	905
Stage 1	-	-	-	-	-	-	878	792	-	840	764	-
Stage 2	-	-	-	-	-	-	836	747	-	874	791	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1394	-	-	1468	-	-	647	594	949	647	611	905
Mov Cap-2 Maneuver	-	-	-	-	-	-	647	594	-	647	611	-
Stage 1	-	-	-	-	-	-	871	786	-	833	758	-
Stage 2	-	-	-	-	-	-	822	741	-	860	785	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.4	9.3	10.3
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	838	1394	-	-	1468	-	-	702
HCM Lane V/C Ratio	0.01	0.008	-	-	0.007	-	-	0.032
HCM Control Delay (s)	9.3	7.6	0	-	7.5	0	-	10.3
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	7.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	102	13	4	2	65	23	5	21	6	49	16	95
Future Vol, veh/h	102	13	4	2	65	23	5	21	6	49	16	95
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	109	14	4	2	69	24	5	22	6	52	17	101

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	94	0	0	18	0	0	378	331	16	333	321	81
Stage 1	-	-	-	-	-	-	233	233	-	86	86	-
Stage 2	-	-	-	-	-	-	145	98	-	247	235	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1481	-	-	1579	-	-	580	588	1063	620	596	979
Stage 1	-	-	-	-	-	-	770	712	-	922	824	-
Stage 2	-	-	-	-	-	-	858	814	-	757	710	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1481	-	-	1579	-	-	479	544	1063	563	551	979
Mov Cap-2 Maneuver	-	-	-	-	-	-	479	544	-	563	551	-
Stage 1	-	-	-	-	-	-	713	659	-	854	823	-
Stage 2	-	-	-	-	-	-	753	813	-	673	657	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.5	0.2	11.5	11.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	585	1481	-	-	1579	-	-	751
HCM Lane V/C Ratio	0.058	0.073	-	-	0.001	-	-	0.227
HCM Control Delay (s)	11.5	7.6	0	-	7.3	0	-	11.2
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0.2	-	-	0	-	-	0.9

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	63	5	4	85	4	5
Future Vol, veh/h	63	5	4	85	4	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	67	5	4	90	4	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	67	0	121	67
Stage 1	-	-	-	-	67	-
Stage 2	-	-	-	-	54	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1481	-	847	972
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	941	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1481	-	844	972
Mov Cap-2 Maneuver	-	-	-	-	844	-
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	938	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	911	-	-	1481	-
HCM Lane V/C Ratio	0.011	-	-	0.003	-
HCM Control Delay (s)	9	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	62	6	17	80	8	9
Future Vol, veh/h	62	6	17	80	8	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	66	6	18	85	9	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	72	0	148	69
Stage 1	-	-	-	-	69	-
Stage 2	-	-	-	-	79	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1474	-	816	970
Stage 1	-	-	-	-	932	-
Stage 2	-	-	-	-	914	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1474	-	805	970
Mov Cap-2 Maneuver	-	-	-	-	805	-
Stage 1	-	-	-	-	932	-
Stage 2	-	-	-	-	902	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	885	-	-	1474	-
HCM Lane V/C Ratio	0.02	-	-	0.012	-
HCM Control Delay (s)	9.2	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	5.2

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	28	76	2	19	99	28	36	14	20	3	41	29
Future Vol, veh/h	28	76	2	19	99	28	36	14	20	3	41	29
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	11	26	50	28	21	11	13	42	6	2	42	30
Mvmt Flow	30	81	2	20	105	30	38	15	21	3	44	31

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	138	0	0	83	0	0	343	307	123	320	320	82
Stage 1	-	-	-	-	-	-	164	164	-	141	141	-
Stage 2	-	-	-	-	-	-	179	143	-	179	179	-
Critical Hdwy	4.21	-	-	4.38	-	-	7.23	6.92	6.26	7.12	6.92	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Follow-up Hdwy	2.299	-	-	2.452	-	-	3.617	4.378	3.354	3.518	4.378	3.57
Pot Cap-1 Maneuver	1392	-	-	1365	-	-	591	546	917	633	537	905
Stage 1	-	-	-	-	-	-	813	693	-	862	710	-
Stage 2	-	-	-	-	-	-	798	708	-	823	682	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1392	-	-	1365	-	-	518	525	914	588	516	905
Mov Cap-2 Maneuver	-	-	-	-	-	-	518	525	-	588	516	-
Stage 1	-	-	-	-	-	-	793	681	-	843	695	-
Stage 2	-	-	-	-	-	-	707	693	-	775	670	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	2	1	11.9	11.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	593	1392	-	-	1365	-	-	626
HCM Lane V/C Ratio	0.126	0.021	-	-	0.015	-	-	0.124
HCM Control Delay (s)	11.9	7.6	-	-	7.7	-	-	11.6
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.4

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	63	84	61	67	88	103
Future Vol, veh/h	63	84	61	67	88	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	7	18	7	31	28	15
Mvmt Flow	67	89	65	71	94	110

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	295	94	94	0	-	0
Stage 1	94	-	-	-	-	-
Stage 2	201	-	-	-	-	-
Critical Hdwy	6.47	6.38	4.17	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.462	2.263	-	-	-
Pot Cap-1 Maneuver	686	921	1469	-	-	-
Stage 1	917	-	-	-	-	-
Stage 2	821	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	656	921	1469	-	-	-
Mov Cap-2 Maneuver	656	-	-	-	-	-
Stage 1	917	-	-	-	-	-
Stage 2	785	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.1	3.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1469	-	656	921	-	-
HCM Lane V/C Ratio	0.044	-	0.102	0.097	-	-
HCM Control Delay (s)	7.6	-	11.1	9.3	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	0.3	-	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	70	1	6	81	14	1	1	4	39	1	8
Future Vol, veh/h	5	70	1	6	81	14	1	1	4	39	1	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	5	74	1	6	85	15	1	1	4	41	1	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	100	0	0	75	0	0	195	198	74	192	190	93
Stage 1	-	-	-	-	-	-	85	85	-	105	105	-
Stage 2	-	-	-	-	-	-	110	113	-	87	85	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1474	-	-	1505	-	-	764	698	988	768	705	964
Stage 1	-	-	-	-	-	-	923	824	-	901	808	-
Stage 2	-	-	-	-	-	-	895	802	-	921	824	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1474	-	-	1505	-	-	752	692	988	759	699	964
Mov Cap-2 Maneuver	-	-	-	-	-	-	752	692	-	759	699	-
Stage 1	-	-	-	-	-	-	919	821	-	897	805	-
Stage 2	-	-	-	-	-	-	882	799	-	912	821	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.4	9.1	9.9
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	879	1474	-	-	1505	-	-	785
HCM Lane V/C Ratio	0.007	0.004	-	-	0.004	-	-	0.064
HCM Control Delay (s)	9.1	7.5	0	-	7.4	0	-	9.9
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	72	38	3	1	29	17	3	15	5	35	11	68
Future Vol, veh/h	72	38	3	1	29	17	3	15	5	35	11	68
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	76	40	3	1	31	18	3	16	5	37	12	72

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	48	0	0	43	0	0	276	244	42	246	237	39
Stage 1	-	-	-	-	-	-	193	193	-	42	42	-
Stage 2	-	-	-	-	-	-	83	51	-	204	195	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1540	-	-	1547	-	-	676	658	1029	708	664	1033
Stage 1	-	-	-	-	-	-	809	741	-	972	860	-
Stage 2	-	-	-	-	-	-	925	852	-	798	739	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1540	-	-	1547	-	-	596	624	1029	663	630	1033
Mov Cap-2 Maneuver	-	-	-	-	-	-	596	624	-	663	630	-
Stage 1	-	-	-	-	-	-	768	703	-	922	859	-
Stage 2	-	-	-	-	-	-	848	851	-	737	701	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	4.8	0.2	10.5	10
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	678	1540	-	-	1547	-	-	838
HCM Lane V/C Ratio	0.036	0.049	-	-	0.001	-	-	0.143
HCM Control Delay (s)	10.5	7.5	0	-	7.3	0	-	10
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0	-	-	0.5

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	73	4	3	43	3	4
Future Vol, veh/h	73	4	3	43	3	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	77	4	3	45	3	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	77	0	106	77
Stage 1	-	-	-	-	77	-
Stage 2	-	-	-	-	29	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1468	-	865	960
Stage 1	-	-	-	-	924	-
Stage 2	-	-	-	-	968	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1468	-	863	960
Mov Cap-2 Maneuver	-	-	-	-	863	-
Stage 1	-	-	-	-	924	-
Stage 2	-	-	-	-	966	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	916	-	-	1468	-
HCM Lane V/C Ratio	0.008	-	-	0.002	-
HCM Control Delay (s)	9	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	72	4	12	40	6	6
Future Vol, veh/h	72	4	12	40	6	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	76	4	13	42	6	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	80	0	124	78
Stage 1	-	-	-	-	78	-
Stage 2	-	-	-	-	46	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1464	-	844	958
Stage 1	-	-	-	-	923	-
Stage 2	-	-	-	-	950	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1464	-	836	958
Mov Cap-2 Maneuver	-	-	-	-	836	-
Stage 1	-	-	-	-	923	-
Stage 2	-	-	-	-	941	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	893	-	-	1464	-
HCM Lane V/C Ratio	0.014	-	-	0.009	-
HCM Control Delay (s)	9.1	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	4.6

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	25	112	3	28	92	9	19	27	34	3	19	25
Future Vol, veh/h	25	112	3	28	92	9	19	27	34	3	19	25
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	9	21	2	19	17	2	10	40	5	2	19	29
Mvmt Flow	26	118	3	29	97	9	20	28	36	3	20	26

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	109	0	0	121	0	0	359	338	105	365	340	119
Stage 1	-	-	-	-	-	-	164	164	-	172	172	-
Stage 2	-	-	-	-	-	-	195	174	-	193	168	-
Critical Hdwy	4.19	-	-	4.29	-	-	7.2	6.9	6.25	7.12	6.69	6.49
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Follow-up Hdwy	2.281	-	-	2.371	-	-	3.59	4.36	3.345	3.518	4.171	3.561
Pot Cap-1 Maneuver	1439	-	-	1368	-	-	582	526	941	591	555	865
Stage 1	-	-	-	-	-	-	820	696	-	830	725	-
Stage 2	-	-	-	-	-	-	789	689	-	809	728	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1439	-	-	1368	-	-	530	504	938	528	532	865
Mov Cap-2 Maneuver	-	-	-	-	-	-	530	504	-	528	532	-
Stage 1	-	-	-	-	-	-	803	679	-	815	712	-
Stage 2	-	-	-	-	-	-	730	677	-	730	711	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	1.3	1.7	11.5	10.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	637	1439	-	-	1368	-	-	669
HCM Lane V/C Ratio	0.132	0.018	-	-	0.022	-	-	0.074
HCM Control Delay (s)	11.5	7.5	-	-	7.7	-	-	10.8
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0.1	-	-	0.2

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	68	117	41	75	65	78
Future Vol, veh/h	68	117	41	75	65	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	0	0	0	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	12	10	13	30	31	13
Mvmt Flow	72	123	43	79	68	82

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	233	-	68	0	-	0
Stage 1	68	-	-	-	-	-
Stage 2	165	-	-	-	-	-
Critical Hdwy	7.22	-	4.23	-	-	-
Critical Hdwy Stg 1	6.22	-	-	-	-	-
Critical Hdwy Stg 2	6.22	-	-	-	-	-
Follow-up Hdwy	3.608	-	2.317	-	-	-
Pot Cap-1 Maneuver	701	0	1466	-	-	-
Stage 1	918	0	-	-	-	-
Stage 2	814	0	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	685	-	1466	-	-	-
Mov Cap-2 Maneuver	685	-	-	-	-	-
Stage 1	891	-	-	-	-	-
Stage 2	790	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.9	2.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1466	-	685	-	-	-
HCM Lane V/C Ratio	0.029	-	0.104	-	-	-
HCM Control Delay (s)	7.5	-	10.9	0	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	103	1	9	118	73	1	1	6	18	2	6
Future Vol, veh/h	13	103	1	9	118	73	1	1	6	18	2	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	14	110	1	10	126	78	1	1	6	19	2	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	203	0	0	111	0	0	326	360	110	325	322	164
Stage 1	-	-	-	-	-	-	138	138	-	184	184	-
Stage 2	-	-	-	-	-	-	188	222	-	141	138	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1351	-	-	1460	-	-	627	567	943	628	595	881
Stage 1	-	-	-	-	-	-	865	782	-	818	747	-
Stage 2	-	-	-	-	-	-	814	720	-	862	782	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1351	-	-	1460	-	-	612	556	943	614	584	881
Mov Cap-2 Maneuver	-	-	-	-	-	-	612	556	-	614	584	-
Stage 1	-	-	-	-	-	-	855	773	-	809	741	-
Stage 2	-	-	-	-	-	-	799	714	-	846	773	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.3	9.5	10.7
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	817	1351	-	-	1460	-	-	657
HCM Lane V/C Ratio	0.01	0.01	-	-	0.007	-	-	0.042
HCM Control Delay (s)	9.5	7.7	0	-	7.5	0	-	10.7
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	106	16	4	2	95	24	5	22	7	52	16	100
Future Vol, veh/h	106	16	4	2	95	24	5	22	7	52	16	100
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	113	17	4	2	101	26	5	23	7	55	17	106

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	127	0	0	21	0	0	425	376	19	378	365	114
Stage 1	-	-	-	-	-	-	245	245	-	118	118	-
Stage 2	-	-	-	-	-	-	180	131	-	260	247	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1441	-	-	1575	-	-	540	555	1059	580	563	939
Stage 1	-	-	-	-	-	-	759	703	-	887	798	-
Stage 2	-	-	-	-	-	-	822	788	-	745	702	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1441	-	-	1575	-	-	438	511	1059	522	518	939
Mov Cap-2 Maneuver	-	-	-	-	-	-	438	511	-	522	518	-
Stage 1	-	-	-	-	-	-	699	647	-	817	797	-
Stage 2	-	-	-	-	-	-	713	787	-	657	647	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.5	0.1	11.9	11.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	557	1441	-	-	1575	-	-	709
HCM Lane V/C Ratio	0.065	0.078	-	-	0.001	-	-	0.252
HCM Control Delay (s)	11.9	7.7	0	-	7.3	0	-	11.8
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0.3	-	-	0	-	-	1

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	66	5	4	116	4	5
Future Vol, veh/h	66	5	4	116	4	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	70	5	4	123	4	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	70	0	140	70
Stage 1	-	-	-	-	70	-
Stage 2	-	-	-	-	70	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1477	-	825	968
Stage 1	-	-	-	-	931	-
Stage 2	-	-	-	-	924	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1477	-	823	968
Mov Cap-2 Maneuver	-	-	-	-	823	-
Stage 1	-	-	-	-	931	-
Stage 2	-	-	-	-	921	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	898	-	-	1477	-
HCM Lane V/C Ratio	0.011	-	-	0.003	-
HCM Control Delay (s)	9.1	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	68	6	18	112	9	9
Future Vol, veh/h	68	6	18	112	9	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	72	6	19	119	10	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	79	0	174	76
Stage 1	-	-	-	-	76	-
Stage 2	-	-	-	-	98	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1465	-	787	961
Stage 1	-	-	-	-	925	-
Stage 2	-	-	-	-	894	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1465	-	776	961
Mov Cap-2 Maneuver	-	-	-	-	776	-
Stage 1	-	-	-	-	925	-
Stage 2	-	-	-	-	881	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	859	-	-	1465	-
HCM Lane V/C Ratio	0.022	-	-	0.013	-
HCM Control Delay (s)	9.3	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	5.7

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	37	80	2	20	104	37	40	16	22	3	54	30
Future Vol, veh/h	37	80	2	20	104	37	40	16	22	3	54	30
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	11	26	50	28	21	11	13	42	6	2	42	30
Mvmt Flow	39	85	2	21	111	39	43	17	23	3	57	32

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	153	0	0	87	0	0	386	342	133	358	361	86
Stage 1	-	-	-	-	-	-	176	176	-	165	165	-
Stage 2	-	-	-	-	-	-	210	166	-	193	196	-
Critical Hdwy	4.21	-	-	4.38	-	-	7.23	6.92	6.26	7.12	6.92	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Follow-up Hdwy	2.299	-	-	2.452	-	-	3.617	4.378	3.354	3.518	4.378	3.57
Pot Cap-1 Maneuver	1374	-	-	1360	-	-	553	521	906	597	508	901
Stage 1	-	-	-	-	-	-	801	684	-	837	692	-
Stage 2	-	-	-	-	-	-	768	691	-	809	670	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1374	-	-	1360	-	-	468	497	903	548	485	901
Mov Cap-2 Maneuver	-	-	-	-	-	-	468	497	-	548	485	-
Stage 1	-	-	-	-	-	-	776	672	-	813	672	-
Stage 2	-	-	-	-	-	-	658	671	-	756	658	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	2.4	1	12.7	12.4
HCM LOS			B	B

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	549	1374	-	-	1360	-	-	580
HCM Lane V/C Ratio	0.151	0.029	-	-	0.016	-	-	0.16
HCM Control Delay (s)	12.7	7.7	-	-	7.7	-	-	12.4
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	66	88	61	73	102	108
Future Vol, veh/h	66	88	61	73	102	108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	7	18	7	31	28	15
Mvmt Flow	70	94	65	78	109	115

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	316	109	109	0	-	0
Stage 1	109	-	-	-	-	-
Stage 2	207	-	-	-	-	-
Critical Hdwy	6.47	6.38	4.17	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.462	2.263	-	-	-
Pot Cap-1 Maneuver	667	903	1451	-	-	-
Stage 1	903	-	-	-	-	-
Stage 2	816	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	637	903	1451	-	-	-
Mov Cap-2 Maneuver	637	-	-	-	-	-
Stage 1	903	-	-	-	-	-
Stage 2	779	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.3	3.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1451	-	637	903	-	-
HCM Lane V/C Ratio	0.045	-	0.11	0.104	-	-
HCM Control Delay (s)	7.6	-	11.4	9.4	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	0.3	-	-

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	73	1	6	84	18	1	1	4	70	1	11
Future Vol, veh/h	5	73	1	6	84	18	1	1	4	70	1	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	5	77	1	6	88	19	1	1	4	74	1	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	107	0	0	78	0	0	205	208	77	202	199	98
Stage 1	-	-	-	-	-	-	88	88	-	111	111	-
Stage 2	-	-	-	-	-	-	117	120	-	91	88	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1465	-	-	1502	-	-	753	689	984	756	697	958
Stage 1	-	-	-	-	-	-	920	822	-	894	804	-
Stage 2	-	-	-	-	-	-	888	796	-	916	822	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1465	-	-	1502	-	-	739	683	984	747	691	958
Mov Cap-2 Maneuver	-	-	-	-	-	-	739	683	-	747	691	-
Stage 1	-	-	-	-	-	-	916	819	-	890	801	-
Stage 2	-	-	-	-	-	-	873	793	-	907	819	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.4	9.2	10.3
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	872	1465	-	-	1502	-	-	769
HCM Lane V/C Ratio	0.007	0.004	-	-	0.004	-	-	0.112
HCM Control Delay (s)	9.2	7.5	0	-	7.4	0	-	10.3
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.4

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	76	69	3	1	35	18	3	16	5	37	12	71
Future Vol, veh/h	76	69	3	1	35	18	3	16	5	37	12	71
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	80	73	3	1	37	19	3	17	5	39	13	75

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	56	0	0	76	0	0	326	292	74	293	284	46
Stage 1	-	-	-	-	-	-	234	234	-	48	48	-
Stage 2	-	-	-	-	-	-	92	58	-	245	236	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1530	-	-	1504	-	-	627	619	988	659	625	1023
Stage 1	-	-	-	-	-	-	769	711	-	965	855	-
Stage 2	-	-	-	-	-	-	915	847	-	759	710	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1530	-	-	1504	-	-	547	584	988	614	590	1023
Mov Cap-2 Maneuver	-	-	-	-	-	-	547	584	-	614	590	-
Stage 1	-	-	-	-	-	-	727	672	-	912	854	-
Stage 2	-	-	-	-	-	-	835	846	-	696	671	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.8	0.1	10.9	10.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	633	1530	-	-	1504	-	-	800
HCM Lane V/C Ratio	0.04	0.052	-	-	0.001	-	-	0.158
HCM Control Delay (s)	10.9	7.5	0	-	7.4	0	-	10.3
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	106	4	3	50	3	4
Future Vol, veh/h	106	4	3	50	3	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	112	4	3	53	3	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	112	0	145	112
Stage 1	-	-	-	-	112	-
Stage 2	-	-	-	-	33	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1424	-	820	917
Stage 1	-	-	-	-	891	-
Stage 2	-	-	-	-	964	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1424	-	818	917
Mov Cap-2 Maneuver	-	-	-	-	818	-
Stage 1	-	-	-	-	891	-
Stage 2	-	-	-	-	962	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	872	-	-	1424	-
HCM Lane V/C Ratio	0.008	-	-	0.002	-
HCM Control Delay (s)	9.2	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	106	4	13	47	6	7
Future Vol, veh/h	106	4	13	47	6	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	112	4	14	49	6	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	116	0	166	114
Stage 1	-	-	-	-	114	-
Stage 2	-	-	-	-	52	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1419	-	796	915
Stage 1	-	-	-	-	889	-
Stage 2	-	-	-	-	943	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1419	-	788	915
Mov Cap-2 Maneuver	-	-	-	-	788	-
Stage 1	-	-	-	-	889	-
Stage 2	-	-	-	-	934	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	852	-	-	1419	-
HCM Lane V/C Ratio	0.016	-	-	0.01	-
HCM Control Delay (s)	9.3	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	5.3

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	29	118	3	29	97	9	26	38	48	3	21	27
Future Vol, veh/h	29	118	3	29	97	9	26	38	48	3	21	27
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	9	21	2	19	17	2	10	40	5	2	19	29
Mvmt Flow	31	124	3	31	102	9	27	40	51	3	22	28

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	115	0	0	127	0	0	383	359	110	400	363	126
Stage 1	-	-	-	-	-	-	171	171	-	187	187	-
Stage 2	-	-	-	-	-	-	212	188	-	213	176	-
Critical Hdwy	4.19	-	-	4.29	-	-	7.2	6.9	6.25	7.12	6.69	6.49
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Follow-up Hdwy	2.281	-	-	2.371	-	-	3.59	4.36	3.345	3.518	4.171	3.561
Pot Cap-1 Maneuver	1431	-	-	1360	-	-	561	512	935	560	539	857
Stage 1	-	-	-	-	-	-	812	691	-	815	714	-
Stage 2	-	-	-	-	-	-	772	678	-	789	722	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1431	-	-	1360	-	-	506	488	932	480	514	857
Mov Cap-2 Maneuver	-	-	-	-	-	-	506	488	-	480	514	-
Stage 1	-	-	-	-	-	-	792	673	-	797	699	-
Stage 2	-	-	-	-	-	-	707	663	-	686	704	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	1.5	1.7	12.2	11
HCM LOS			B	B

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	620	1431	-	-	1360	-	-	649
HCM Lane V/C Ratio	0.19	0.021	-	-	0.022	-	-	0.083
HCM Control Delay (s)	12.2	7.6	-	-	7.7	-	-	11
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.7	0.1	-	-	0.1	-	-	0.3

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	72	124	43	87	69	83
Future Vol, veh/h	72	124	43	87	69	83
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	12	10	13	30	31	13
Mvmt Flow	76	131	45	92	73	87

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	255	73	73	0	-	0
Stage 1	73	-	-	-	-	-
Stage 2	182	-	-	-	-	-
Critical Hdwy	6.52	6.3	4.23	-	-	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.39	2.317	-	-	-
Pot Cap-1 Maneuver	712	967	1460	-	-	-
Stage 1	925	-	-	-	-	-
Stage 2	826	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	690	967	1460	-	-	-
Mov Cap-2 Maneuver	690	-	-	-	-	-
Stage 1	925	-	-	-	-	-
Stage 2	801	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.9	2.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1460	-	690	967	-	-
HCM Lane V/C Ratio	0.031	-	0.11	0.135	-	-
HCM Control Delay (s)	7.5	-	10.9	9.3	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	0.5	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	108	1	9	124	96	1	1	6	21	2	6
Future Vol, veh/h	15	108	1	9	124	96	1	1	6	21	2	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	16	115	1	10	132	102	1	1	6	22	2	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	234	0	0	116	0	0	353	400	115	353	350	183
Stage 1	-	-	-	-	-	-	147	147	-	202	202	-
Stage 2	-	-	-	-	-	-	206	253	-	151	148	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1316	-	-	1454	-	-	602	538	937	602	574	859
Stage 1	-	-	-	-	-	-	856	775	-	800	734	-
Stage 2	-	-	-	-	-	-	796	698	-	851	775	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1316	-	-	1454	-	-	586	527	937	587	562	859
Mov Cap-2 Maneuver	-	-	-	-	-	-	586	527	-	587	562	-
Stage 1	-	-	-	-	-	-	845	765	-	790	728	-
Stage 2	-	-	-	-	-	-	781	692	-	833	765	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.3	9.6	11
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	799	1316	-	-	1454	-	-	626
HCM Lane V/C Ratio	0.011	0.012	-	-	0.007	-	-	0.049
HCM Control Delay (s)	9.6	7.8	0	-	7.5	0	-	11
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	7.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	111	20	4	2	120	25	5	23	7	54	17	104
Future Vol, veh/h	111	20	4	2	120	25	5	23	7	54	17	104
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	118	21	4	2	128	27	5	24	7	57	18	111

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	154	0	0	26	0	0	470	419	23	421	407	141
Stage 1	-	-	-	-	-	-	260	260	-	145	145	-
Stage 2	-	-	-	-	-	-	210	159	-	276	262	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1408	-	-	1569	-	-	504	525	1054	543	533	907
Stage 1	-	-	-	-	-	-	745	693	-	858	777	-
Stage 2	-	-	-	-	-	-	792	766	-	730	691	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1408	-	-	1569	-	-	402	480	1054	484	487	907
Mov Cap-2 Maneuver	-	-	-	-	-	-	402	480	-	484	487	-
Stage 1	-	-	-	-	-	-	682	634	-	785	776	-
Stage 2	-	-	-	-	-	-	679	765	-	638	632	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.4	0.1	12.4	12.4
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	522	1408	-	-	1569	-	-	670
HCM Lane V/C Ratio	0.071	0.084	-	-	0.001	-	-	0.278
HCM Control Delay (s)	12.4	7.8	0	-	7.3	0	-	12.4
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0.3	-	-	0	-	-	1.1

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	69	5	4	142	5	5
Future Vol, veh/h	69	5	4	142	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	73	5	4	151	5	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	73	0	157	73
Stage 1	-	-	-	-	73	-
Stage 2	-	-	-	-	84	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1473	-	806	965
Stage 1	-	-	-	-	928	-
Stage 2	-	-	-	-	909	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1473	-	804	965
Mov Cap-2 Maneuver	-	-	-	-	804	-
Stage 1	-	-	-	-	928	-
Stage 2	-	-	-	-	906	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	877	-	-	1473	-
HCM Lane V/C Ratio	0.012	-	-	0.003	-
HCM Control Delay (s)	9.2	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	74	6	18	137	9	10
Future Vol, veh/h	74	6	18	137	9	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	79	6	19	146	10	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	85	0	193	82
Stage 1	-	-	-	-	82	-
Stage 2	-	-	-	-	111	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1458	-	767	954
Stage 1	-	-	-	-	919	-
Stage 2	-	-	-	-	881	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1458	-	756	954
Mov Cap-2 Maneuver	-	-	-	-	756	-
Stage 1	-	-	-	-	919	-
Stage 2	-	-	-	-	869	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	849	-	-	1458	-
HCM Lane V/C Ratio	0.024	-	-	0.013	-
HCM Control Delay (s)	9.3	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	6

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	45	83	2	21	109	45	43	16	24	3	65	32
Future Vol, veh/h	45	83	2	21	109	45	43	16	24	3	65	32
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	11	26	50	28	21	11	13	42	6	2	42	30
Mvmt Flow	48	88	2	22	116	48	46	17	26	3	69	34

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	167	0	0	90	0	0	425	374	143	391	397	89
Stage 1	-	-	-	-	-	-	188	188	-	185	185	-
Stage 2	-	-	-	-	-	-	237	186	-	206	212	-
Critical Hdwy	4.21	-	-	4.38	-	-	7.23	6.92	6.26	7.12	6.92	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Follow-up Hdwy	2.299	-	-	2.452	-	-	3.617	4.378	3.354	3.518	4.378	3.57
Pot Cap-1 Maneuver	1358	-	-	1357	-	-	521	499	894	568	483	897
Stage 1	-	-	-	-	-	-	789	675	-	817	677	-
Stage 2	-	-	-	-	-	-	742	677	-	796	658	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1358	-	-	1357	-	-	425	472	892	516	457	897
Mov Cap-2 Maneuver	-	-	-	-	-	-	425	472	-	516	457	-
Stage 1	-	-	-	-	-	-	759	662	-	788	653	-
Stage 2	-	-	-	-	-	-	616	653	-	741	646	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	2.7	0.9	13.5	13.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	512	1358	-	-	1357	-	-	544
HCM Lane V/C Ratio	0.172	0.035	-	-	0.016	-	-	0.196
HCM Control Delay (s)	13.5	7.7	-	-	7.7	-	-	13.2
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0.1	-	-	0.7

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	69	92	67	77	111	113
Future Vol, veh/h	69	92	67	77	111	113
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	7	18	7	31	28	15
Mvmt Flow	73	98	71	82	118	120

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	342	118	118	0	-	0
Stage 1	118	-	-	-	-	-
Stage 2	224	-	-	-	-	-
Critical Hdwy	6.47	6.38	4.17	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.462	2.263	-	-	-
Pot Cap-1 Maneuver	644	892	1440	-	-	-
Stage 1	895	-	-	-	-	-
Stage 2	802	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	612	892	1440	-	-	-
Mov Cap-2 Maneuver	612	-	-	-	-	-
Stage 1	895	-	-	-	-	-
Stage 2	762	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.4	3.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1440	-	612	892	-	-
HCM Lane V/C Ratio	0.049	-	0.12	0.11	-	-
HCM Control Delay (s)	7.6	-	11.7	9.5	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.4	0.4	-	-

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	77	1	7	88	22	1	1	5	94	1	14
Future Vol, veh/h	6	77	1	7	88	22	1	1	5	94	1	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	6	81	1	7	93	23	1	1	5	99	1	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	116	0	0	82	0	0	221	225	82	216	214	104
Stage 1	-	-	-	-	-	-	94	94	-	119	119	-
Stage 2	-	-	-	-	-	-	127	131	-	97	95	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1454	-	-	1497	-	-	735	674	978	740	684	951
Stage 1	-	-	-	-	-	-	913	817	-	885	797	-
Stage 2	-	-	-	-	-	-	877	788	-	910	816	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1454	-	-	1497	-	-	718	668	978	730	678	951
Mov Cap-2 Maneuver	-	-	-	-	-	-	718	668	-	730	678	-
Stage 1	-	-	-	-	-	-	909	814	-	881	793	-
Stage 2	-	-	-	-	-	-	858	784	-	900	813	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.4	9.1	10.6
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	875	1454	-	-	1497	-	-	752
HCM Lane V/C Ratio	0.008	0.004	-	-	0.005	-	-	0.153
HCM Control Delay (s)	9.1	7.5	0	-	7.4	0	-	10.6
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.5

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	79	93	3	1	39	18	4	16	5	39	12	74
Future Vol, veh/h	79	93	3	1	39	18	4	16	5	39	12	74
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	83	98	3	1	41	19	4	17	5	41	13	78

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	60	0	0	101	0	0	364	328	99	330	320	51
Stage 1	-	-	-	-	-	-	266	266	-	53	53	-
Stage 2	-	-	-	-	-	-	98	62	-	277	267	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1525	-	-	1473	-	-	592	591	957	623	597	1017
Stage 1	-	-	-	-	-	-	739	689	-	960	851	-
Stage 2	-	-	-	-	-	-	908	843	-	729	688	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1525	-	-	1473	-	-	513	556	957	578	562	1017
Mov Cap-2 Maneuver	-	-	-	-	-	-	513	556	-	578	562	-
Stage 1	-	-	-	-	-	-	696	649	-	904	850	-
Stage 2	-	-	-	-	-	-	825	842	-	665	648	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.4	0.1	11.3	10.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	598	1525	-	-	1473	-	-	774
HCM Lane V/C Ratio	0.044	0.055	-	-	0.001	-	-	0.17
HCM Control Delay (s)	11.3	7.5	0	-	7.4	0	-	10.6
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	132	4	3	55	3	4
Future Vol, veh/h	132	4	3	55	3	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	139	4	3	58	3	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	139	0	174	139
Stage 1	-	-	-	-	139	-
Stage 2	-	-	-	-	35	-
Critical Hdwy	-	-	4.25	-	7.45	6.35
Critical Hdwy Stg 1	-	-	-	-	6.25	-
Critical Hdwy Stg 2	-	-	-	-	6.65	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1391	-	761	885
Stage 1	-	-	-	-	843	-
Stage 2	-	-	-	-	955	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1391	-	760	885
Mov Cap-2 Maneuver	-	-	-	-	760	-
Stage 1	-	-	-	-	843	-
Stage 2	-	-	-	-	953	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	827	-	-	1391	-
HCM Lane V/C Ratio	0.009	-	-	0.002	-
HCM Control Delay (s)	9.4	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	132	5	13	51	7	7
Future Vol, veh/h	132	5	13	51	7	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	139	5	14	54	7	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	144	0	196	142
Stage 1	-	-	-	-	142	-
Stage 2	-	-	-	-	54	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1385	-	764	882
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	941	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1385	-	756	882
Mov Cap-2 Maneuver	-	-	-	-	756	-
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	932	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	814	-	-	1385	-
HCM Lane V/C Ratio	0.018	-	-	0.01	-
HCM Control Delay (s)	9.5	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	5.8

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	32	124	3	30	102	11	32	47	60	3	23	28
Future Vol, veh/h	32	124	3	30	102	11	32	47	60	3	23	28
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	9	21	2	19	17	2	10	40	5	2	19	29
Mvmt Flow	34	131	3	32	107	12	34	49	63	3	24	29

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	122	0	0	134	0	0	405	380	116	432	384	132
Stage 1	-	-	-	-	-	-	179	179	-	199	199	-
Stage 2	-	-	-	-	-	-	226	201	-	233	185	-
Critical Hdwy	4.19	-	-	4.29	-	-	7.2	6.9	6.25	7.12	6.69	6.49
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Follow-up Hdwy	2.281	-	-	2.371	-	-	3.59	4.36	3.345	3.518	4.171	3.561
Pot Cap-1 Maneuver	1423	-	-	1352	-	-	542	497	928	534	524	850
Stage 1	-	-	-	-	-	-	804	685	-	803	706	-
Stage 2	-	-	-	-	-	-	759	669	-	770	716	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1423	-	-	1352	-	-	484	472	925	441	498	850
Mov Cap-2 Maneuver	-	-	-	-	-	-	484	472	-	441	498	-
Stage 1	-	-	-	-	-	-	783	667	-	784	689	-
Stage 2	-	-	-	-	-	-	690	653	-	648	697	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	1.5	1.6	12.9	11.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	603	1423	-	-	1352	-	-	628
HCM Lane V/C Ratio	0.243	0.024	-	-	0.023	-	-	0.091
HCM Control Delay (s)	12.9	7.6	-	-	7.7	-	-	11.3
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.9	0.1	-	-	0.1	-	-	0.3

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	75	129	45	94	73	87
Future Vol, veh/h	75	129	45	94	73	87
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	12	10	13	30	31	13
Mvmt Flow	79	136	47	99	77	92

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	271	77	77	0	-	0
Stage 1	77	-	-	-	-	-
Stage 2	194	-	-	-	-	-
Critical Hdwy	6.52	6.3	4.23	-	-	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.39	2.317	-	-	-
Pot Cap-1 Maneuver	697	962	1455	-	-	-
Stage 1	921	-	-	-	-	-
Stage 2	815	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	674	962	1455	-	-	-
Mov Cap-2 Maneuver	674	-	-	-	-	-
Stage 1	921	-	-	-	-	-
Stage 2	789	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10	2.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1455	-	674	962	-	-
HCM Lane V/C Ratio	0.033	-	0.117	0.141	-	-
HCM Control Delay (s)	7.6	-	11	9.4	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	0.5	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	112	1	10	129	118	1	1	7	24	2	7
Future Vol, veh/h	19	112	1	10	129	118	1	1	7	24	2	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	20	119	1	11	137	126	1	1	7	26	2	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	263	0	0	120	0	0	386	444	120	385	382	200
Stage 1	-	-	-	-	-	-	160	160	-	221	221	-
Stage 2	-	-	-	-	-	-	226	284	-	164	161	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1284	-	-	1449	-	-	573	508	931	573	551	841
Stage 1	-	-	-	-	-	-	842	766	-	781	720	-
Stage 2	-	-	-	-	-	-	777	676	-	838	765	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1284	-	-	1449	-	-	555	495	931	556	537	841
Mov Cap-2 Maneuver	-	-	-	-	-	-	555	495	-	556	537	-
Stage 1	-	-	-	-	-	-	828	753	-	768	714	-
Stage 2	-	-	-	-	-	-	761	670	-	816	752	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0.3	9.6	11.4
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	794	1284	-	-	1449	-	-	598
HCM Lane V/C Ratio	0.012	0.016	-	-	0.007	-	-	0.059
HCM Control Delay (s)	9.6	7.8	0	-	7.5	0	-	11.4
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	7.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	116	23	4	2	143	26	5	24	7	56	18	109
Future Vol, veh/h	116	23	4	2	143	26	5	24	7	56	18	109
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	123	24	4	2	152	28	5	26	7	60	19	116

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	180	0	0	29	0	0	511	457	27	460	446	166
Stage 1	-	-	-	-	-	-	273	273	-	170	170	-
Stage 2	-	-	-	-	-	-	238	184	-	290	276	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1378	-	-	1565	-	-	473	500	1048	512	507	878
Stage 1	-	-	-	-	-	-	733	684	-	832	758	-
Stage 2	-	-	-	-	-	-	765	747	-	718	682	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1378	-	-	1565	-	-	370	454	1048	453	460	878
Mov Cap-2 Maneuver	-	-	-	-	-	-	370	454	-	453	460	-
Stage 1	-	-	-	-	-	-	666	622	-	756	757	-
Stage 2	-	-	-	-	-	-	647	746	-	621	620	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.4	0.1	12.9	13.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	493	1378	-	-	1565	-	-	638
HCM Lane V/C Ratio	0.078	0.09	-	-	0.001	-	-	0.305
HCM Control Delay (s)	12.9	7.9	0	-	7.3	0	-	13.1
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0.3	-	-	0	-	-	1.3

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	72	5	4	165	5	6
Future Vol, veh/h	72	5	4	165	5	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	77	5	4	176	5	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	77	0	173	77
Stage 1	-	-	-	-	77	-
Stage 2	-	-	-	-	96	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1468	-	788	960
Stage 1	-	-	-	-	924	-
Stage 2	-	-	-	-	896	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1468	-	786	960
Mov Cap-2 Maneuver	-	-	-	-	786	-
Stage 1	-	-	-	-	924	-
Stage 2	-	-	-	-	893	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	872	-	-	1468	-
HCM Lane V/C Ratio	0.013	-	-	0.003	-
HCM Control Delay (s)	9.2	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	79	6	19	160	10	10
Future Vol, veh/h	79	6	19	160	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	84	6	20	170	11	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	90	0	213	87
Stage 1	-	-	-	-	87	-
Stage 2	-	-	-	-	126	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1451	-	746	947
Stage 1	-	-	-	-	914	-
Stage 2	-	-	-	-	865	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1451	-	735	947
Mov Cap-2 Maneuver	-	-	-	-	735	-
Stage 1	-	-	-	-	914	-
Stage 2	-	-	-	-	852	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	828	-	-	1451	-
HCM Lane V/C Ratio	0.026	-	-	0.014	-
HCM Control Delay (s)	9.5	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	6.5

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	52	87	2	22	113	52	46	18	27	3	76	33
Future Vol, veh/h	52	87	2	22	113	52	46	18	27	3	76	33
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	11	26	50	28	21	11	13	42	6	2	42	30
Mvmt Flow	55	93	2	23	120	55	49	19	29	3	81	35

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	179	0	0	95	0	0	460	403	151	423	429	94
Stage 1	-	-	-	-	-	-	198	198	-	204	204	-
Stage 2	-	-	-	-	-	-	262	205	-	219	225	-
Critical Hdwy	4.21	-	-	4.38	-	-	7.23	6.92	6.26	7.12	6.92	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Follow-up Hdwy	2.299	-	-	2.452	-	-	3.617	4.378	3.354	3.518	4.378	3.57
Pot Cap-1 Maneuver	1344	-	-	1351	-	-	493	479	885	541	463	891
Stage 1	-	-	-	-	-	-	779	668	-	798	664	-
Stage 2	-	-	-	-	-	-	719	663	-	783	649	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1344	-	-	1351	-	-	388	450	883	484	435	891
Mov Cap-2 Maneuver	-	-	-	-	-	-	388	450	-	484	435	-
Stage 1	-	-	-	-	-	-	745	655	-	765	637	-
Stage 2	-	-	-	-	-	-	578	636	-	723	636	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	2.9	0.9	14.4	14.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	481	1344	-	-	1351	-	-	514
HCM Lane V/C Ratio	0.201	0.041	-	-	0.017	-	-	0.232
HCM Control Delay (s)	14.4	7.8	-	-	7.7	-	-	14.1
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.7	0.1	-	-	0.1	-	-	0.9

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	72	96	70	81	120	118
Future Vol, veh/h	72	96	70	81	120	118
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	7	18	7	31	28	15
Mvmt Flow	77	102	74	86	128	126

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	363	128	128	0	-	0
Stage 1	128	-	-	-	-	-
Stage 2	235	-	-	-	-	-
Critical Hdwy	6.47	6.38	4.17	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.462	2.263	-	-	-
Pot Cap-1 Maneuver	626	881	1428	-	-	-
Stage 1	886	-	-	-	-	-
Stage 2	792	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	594	881	1428	-	-	-
Mov Cap-2 Maneuver	594	-	-	-	-	-
Stage 1	886	-	-	-	-	-
Stage 2	751	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	3.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1428	-	594	881	-	-
HCM Lane V/C Ratio	0.052	-	0.129	0.116	-	-
HCM Control Delay (s)	7.7	-	12	9.6	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.4	0.4	-	-

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	80	1	7	92	25	1	1	5	116	1	16
Future Vol, veh/h	7	80	1	7	92	25	1	1	5	116	1	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	7	84	1	7	97	26	1	1	5	122	1	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	123	0	0	85	0	0	233	237	85	228	225	110
Stage 1	-	-	-	-	-	-	99	99	-	125	125	-
Stage 2	-	-	-	-	-	-	134	138	-	103	100	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1446	-	-	1493	-	-	722	664	974	727	674	943
Stage 1	-	-	-	-	-	-	907	813	-	879	792	-
Stage 2	-	-	-	-	-	-	869	782	-	903	812	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1446	-	-	1493	-	-	703	657	974	717	667	943
Mov Cap-2 Maneuver	-	-	-	-	-	-	703	657	-	717	667	-
Stage 1	-	-	-	-	-	-	902	809	-	875	788	-
Stage 2	-	-	-	-	-	-	848	778	-	892	808	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.4	9.2	11
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	867	1446	-	-	1493	-	-	738
HCM Lane V/C Ratio	0.008	0.005	-	-	0.005	-	-	0.19
HCM Control Delay (s)	9.2	7.5	0	-	7.4	0	-	11
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.7

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	82	116	3	2	43	19	4	17	5	40	13	77
Future Vol, veh/h	82	116	3	2	43	19	4	17	5	40	13	77
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	86	122	3	2	45	20	4	18	5	42	14	81

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	65	0	0	125	0	0	403	365	124	367	357	55
Stage 1	-	-	-	-	-	-	296	296	-	59	59	-
Stage 2	-	-	-	-	-	-	107	69	-	308	298	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1518	-	-	1443	-	-	558	563	927	589	569	1012
Stage 1	-	-	-	-	-	-	712	668	-	953	846	-
Stage 2	-	-	-	-	-	-	898	837	-	702	667	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1518	-	-	1443	-	-	480	528	927	544	534	1012
Mov Cap-2 Maneuver	-	-	-	-	-	-	480	528	-	544	534	-
Stage 1	-	-	-	-	-	-	669	627	-	895	845	-
Stage 2	-	-	-	-	-	-	812	836	-	637	626	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.1	0.2	11.7	10.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	566	1518	-	-	1443	-	-	747
HCM Lane V/C Ratio	0.048	0.057	-	-	0.001	-	-	0.183
HCM Control Delay (s)	11.7	7.5	0	-	7.5	0	-	10.9
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0.2	-	-	0	-	-	0.7

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	156	4	3	60	3	4
Future Vol, veh/h	156	4	3	60	3	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	164	4	3	63	3	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	164	0	202	164
Stage 1	-	-	-	-	164	-
Stage 2	-	-	-	-	38	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1361	-	757	857
Stage 1	-	-	-	-	843	-
Stage 2	-	-	-	-	958	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1361	-	755	857
Mov Cap-2 Maneuver	-	-	-	-	755	-
Stage 1	-	-	-	-	843	-
Stage 2	-	-	-	-	956	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	810	-	-	1361	-
HCM Lane V/C Ratio	0.009	-	-	0.002	-
HCM Control Delay (s)	9.5	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	156	5	14	56	7	7
Future Vol, veh/h	156	5	14	56	7	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	164	5	15	59	7	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	169	0	226	167
Stage 1	-	-	-	-	167	-
Stage 2	-	-	-	-	59	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1355	-	732	854
Stage 1	-	-	-	-	840	-
Stage 2	-	-	-	-	935	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1355	-	724	854
Mov Cap-2 Maneuver	-	-	-	-	724	-
Stage 1	-	-	-	-	840	-
Stage 2	-	-	-	-	925	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	784	-	-	1355	-
HCM Lane V/C Ratio	0.019	-	-	0.011	-
HCM Control Delay (s)	9.7	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	6.3

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	34	129	3	32	106	11	37	54	70	3	25	29
Future Vol, veh/h	34	129	3	32	106	11	37	54	70	3	25	29
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	9	21	2	19	17	2	10	40	5	2	19	29
Mvmt Flow	36	136	3	34	112	12	39	57	74	3	26	31

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	126	0	0	139	0	0	425	399	120	459	403	137
Stage 1	-	-	-	-	-	-	188	188	-	209	209	-
Stage 2	-	-	-	-	-	-	237	211	-	250	194	-
Critical Hdwy	4.19	-	-	4.29	-	-	7.2	6.9	6.25	7.12	6.69	6.49
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Follow-up Hdwy	2.281	-	-	2.371	-	-	3.59	4.36	3.345	3.518	4.171	3.561
Pot Cap-1 Maneuver	1418	-	-	1346	-	-	526	485	923	512	511	844
Stage 1	-	-	-	-	-	-	796	678	-	793	698	-
Stage 2	-	-	-	-	-	-	749	662	-	754	709	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1418	-	-	1346	-	-	466	459	920	410	484	844
Mov Cap-2 Maneuver	-	-	-	-	-	-	466	459	-	410	484	-
Stage 1	-	-	-	-	-	-	774	659	-	773	680	-
Stage 2	-	-	-	-	-	-	676	645	-	618	689	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	1.6	1.7	13.6	11.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	589	1418	-	-	1346	-	-	611
HCM Lane V/C Ratio	0.288	0.025	-	-	0.025	-	-	0.098
HCM Control Delay (s)	13.6	7.6	-	-	7.7	-	-	11.5
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1.2	0.1	-	-	0.1	-	-	0.3

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	78	135	47	102	76	90
Future Vol, veh/h	78	135	47	102	76	90
Conflicting Peds, #/hr	0	0	105	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	12	10	13	30	31	13
Mvmt Flow	82	142	49	107	80	95

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	391	185	185	0	-	0
Stage 1	185	-	-	-	-	-
Stage 2	206	-	-	-	-	-
Critical Hdwy	6.52	6.3	4.23	-	-	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.39	2.317	-	-	-
Pot Cap-1 Maneuver	594	837	1326	-	-	-
Stage 1	823	-	-	-	-	-
Stage 2	805	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	466	756	1326	-	-	-
Mov Cap-2 Maneuver	466	-	-	-	-	-
Stage 1	743	-	-	-	-	-
Stage 2	700	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.2	2.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1326	-	466	756	-	-
HCM Lane V/C Ratio	0.037	-	0.176	0.188	-	-
HCM Control Delay (s)	7.8	-	14.4	10.9	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	0.7	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	21	117	1	10	134	140	1	1	7	28	2	8
Future Vol, veh/h	21	117	1	10	134	140	1	1	7	28	2	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	22	124	1	11	143	149	1	1	7	30	2	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	291	0	0	126	0	0	414	483	125	412	408	217
Stage 1	-	-	-	-	-	-	170	170	-	238	238	-
Stage 2	-	-	-	-	-	-	244	313	-	174	170	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1254	-	-	1442	-	-	549	483	926	550	533	823
Stage 1	-	-	-	-	-	-	832	758	-	765	708	-
Stage 2	-	-	-	-	-	-	760	657	-	828	758	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1254	-	-	1442	-	-	530	470	926	533	518	823
Mov Cap-2 Maneuver	-	-	-	-	-	-	530	470	-	533	518	-
Stage 1	-	-	-	-	-	-	816	744	-	750	702	-
Stage 2	-	-	-	-	-	-	743	651	-	805	744	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	0.3	9.7	11.7
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	778	1254	-	-	1442	-	-	575
HCM Lane V/C Ratio	0.012	0.018	-	-	0.007	-	-	0.07
HCM Control Delay (s)	9.7	7.9	0	-	7.5	0	-	11.7
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	121	27	4	2	165	27	5	25	7	59	19	113
Future Vol, veh/h	121	27	4	2	165	27	5	25	7	59	19	113
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	129	29	4	2	176	29	5	27	7	63	20	120

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	204	0	0	33	0	0	552	497	31	499	484	190
Stage 1	-	-	-	-	-	-	288	288	-	194	194	-
Stage 2	-	-	-	-	-	-	264	209	-	305	290	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1350	-	-	1560	-	-	444	475	1043	482	483	852
Stage 1	-	-	-	-	-	-	720	674	-	808	740	-
Stage 2	-	-	-	-	-	-	741	729	-	705	672	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1350	-	-	1560	-	-	340	428	1043	422	436	852
Mov Cap-2 Maneuver	-	-	-	-	-	-	340	428	-	422	436	-
Stage 1	-	-	-	-	-	-	650	609	-	730	739	-
Stage 2	-	-	-	-	-	-	618	728	-	604	607	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.3	0.1	13.5	14
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	463	1350	-	-	1560	-	-	604
HCM Lane V/C Ratio	0.085	0.095	-	-	0.001	-	-	0.336
HCM Control Delay (s)	13.5	7.9	0	-	7.3	0	-	14
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0.3	-	-	0	-	-	1.5

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	86	6	5	189	5	6
Future Vol, veh/h	86	6	5	189	5	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	91	6	5	201	5	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	91	0	202	91
Stage 1	-	-	-	-	91	-
Stage 2	-	-	-	-	111	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1450	-	757	942
Stage 1	-	-	-	-	910	-
Stage 2	-	-	-	-	881	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1450	-	754	942
Mov Cap-2 Maneuver	-	-	-	-	754	-
Stage 1	-	-	-	-	910	-
Stage 2	-	-	-	-	877	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	846	-	-	1450	-
HCM Lane V/C Ratio	0.014	-	-	0.004	-
HCM Control Delay (s)	9.3	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	85	7	20	184	10	10
Future Vol, veh/h	85	7	20	184	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	90	7	21	196	11	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	98	0	234	94
Stage 1	-	-	-	-	94	-
Stage 2	-	-	-	-	140	-
Critical Hdwy	-	-	4.25	-	7.45	6.35
Critical Hdwy Stg 1	-	-	-	-	6.25	-
Critical Hdwy Stg 2	-	-	-	-	6.65	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1441	-	692	939
Stage 1	-	-	-	-	891	-
Stage 2	-	-	-	-	829	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1441	-	684	939
Mov Cap-2 Maneuver	-	-	-	-	684	-
Stage 1	-	-	-	-	891	-
Stage 2	-	-	-	-	816	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	791	-	-	1441	-
HCM Lane V/C Ratio	0.027	-	-	0.015	-
HCM Control Delay (s)	9.7	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	7

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	59	90	2	23	118	59	49	18	28	3	86	34
Future Vol, veh/h	59	90	2	23	118	59	49	18	28	3	86	34
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	11	26	50	28	21	11	13	42	6	2	42	30
Mvmt Flow	63	96	2	24	126	63	52	19	30	3	91	36

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	191	0	0	98	0	0	495	432	160	452	462	97
Stage 1	-	-	-	-	-	-	209	209	-	222	222	-
Stage 2	-	-	-	-	-	-	286	223	-	230	240	-
Critical Hdwy	4.21	-	-	4.38	-	-	7.23	6.92	6.26	7.12	6.92	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Follow-up Hdwy	2.299	-	-	2.452	-	-	3.617	4.378	3.354	3.518	4.378	3.57
Pot Cap-1 Maneuver	1330	-	-	1347	-	-	467	461	875	518	442	888
Stage 1	-	-	-	-	-	-	769	660	-	780	651	-
Stage 2	-	-	-	-	-	-	698	651	-	773	639	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1330	-	-	1347	-	-	353	430	873	460	412	888
Mov Cap-2 Maneuver	-	-	-	-	-	-	353	430	-	460	412	-
Stage 1	-	-	-	-	-	-	731	646	-	743	620	-
Stage 2	-	-	-	-	-	-	544	620	-	712	626	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	3.1	0.9	15.4	15.1
HCM LOS			C	C

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	447	1330	-	-	1347	-	-	485
HCM Lane V/C Ratio	0.226	0.047	-	-	0.018	-	-	0.27
HCM Control Delay (s)	15.4	7.8	-	-	7.7	-	-	15.1
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.9	0.1	-	-	0.1	-	-	1.1

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	75	100	73	86	130	123
Future Vol, veh/h	75	100	73	86	130	123
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	7	18	7	31	28	15
Mvmt Flow	80	106	78	91	138	131

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	385	138	138	0	-	0
Stage 1	138	-	-	-	-	-
Stage 2	247	-	-	-	-	-
Critical Hdwy	6.47	6.38	4.17	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.462	2.263	-	-	-
Pot Cap-1 Maneuver	608	869	1415	-	-	-
Stage 1	876	-	-	-	-	-
Stage 2	783	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	574	869	1415	-	-	-
Mov Cap-2 Maneuver	574	-	-	-	-	-
Stage 1	876	-	-	-	-	-
Stage 2	740	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	3.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1415	-	574	869	-	-
HCM Lane V/C Ratio	0.055	-	0.139	0.122	-	-
HCM Control Delay (s)	7.7	-	12.3	9.7	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.5	0.4	-	-

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	83	1	7	96	28	1	1	5	140	1	19
Future Vol, veh/h	7	83	1	7	96	28	1	1	5	140	1	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	7	87	1	7	101	29	1	1	5	147	1	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	131	0	0	88	0	0	244	248	88	237	234	116
Stage 1	-	-	-	-	-	-	103	103	-	131	131	-
Stage 2	-	-	-	-	-	-	141	145	-	106	103	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1436	-	-	1489	-	-	710	655	970	717	666	936
Stage 1	-	-	-	-	-	-	903	810	-	873	788	-
Stage 2	-	-	-	-	-	-	862	777	-	900	810	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1436	-	-	1489	-	-	689	648	970	707	659	936
Mov Cap-2 Maneuver	-	-	-	-	-	-	689	648	-	707	659	-
Stage 1	-	-	-	-	-	-	898	806	-	869	784	-
Stage 2	-	-	-	-	-	-	838	773	-	889	806	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.4	9.2	11.4
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	859	1436	-	-	1489	-	-	728
HCM Lane V/C Ratio	0.009	0.005	-	-	0.005	-	-	0.231
HCM Control Delay (s)	9.2	7.5	0	-	7.4	0	-	11.4
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.9

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	86	139	3	2	47	20	4	18	5	42	13	81
Future Vol, veh/h	86	139	3	2	47	20	4	18	5	42	13	81
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	91	146	3	2	49	21	4	19	5	44	14	85

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	71	0	0	149	0	0	443	404	148	405	395	60
Stage 1	-	-	-	-	-	-	329	329	-	64	64	-
Stage 2	-	-	-	-	-	-	114	75	-	341	331	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1510	-	-	1414	-	-	525	536	899	556	542	1005
Stage 1	-	-	-	-	-	-	684	646	-	947	842	-
Stage 2	-	-	-	-	-	-	891	833	-	674	645	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1510	-	-	1414	-	-	447	500	899	509	506	1005
Mov Cap-2 Maneuver	-	-	-	-	-	-	447	500	-	509	506	-
Stage 1	-	-	-	-	-	-	639	603	-	884	841	-
Stage 2	-	-	-	-	-	-	801	832	-	606	602	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.8	0.2	12.1	11.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	535	1510	-	-	1414	-	-	720
HCM Lane V/C Ratio	0.053	0.06	-	-	0.001	-	-	0.199
HCM Control Delay (s)	12.1	7.5	0	-	7.5	0	-	11.2
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0.2	-	-	0	-	-	0.7

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	181	5	4	64	4	4
Future Vol, veh/h	181	5	4	64	4	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	191	5	4	67	4	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	191	0	233	191
Stage 1	-	-	-	-	191	-
Stage 2	-	-	-	-	42	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1330	-	725	827
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	954	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1330	-	723	827
Mov Cap-2 Maneuver	-	-	-	-	723	-
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	951	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	772	-	-	1330	-
HCM Lane V/C Ratio	0.011	-	-	0.003	-
HCM Control Delay (s)	9.7	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	180	5	15	61	7	8
Future Vol, veh/h	180	5	15	61	7	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	189	5	16	64	7	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	195	0	256	192
Stage 1	-	-	-	-	192	-
Stage 2	-	-	-	-	64	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1325	-	702	826
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	930	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1325	-	693	826
Mov Cap-2 Maneuver	-	-	-	-	693	-
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	918	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	758	-	-	1325	-
HCM Lane V/C Ratio	0.021	-	-	0.012	-
HCM Control Delay (s)	9.9	-	-	7.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	6.9

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	37	134	3	33	110	12	44	63	81	3	26	30
Future Vol, veh/h	37	134	3	33	110	12	44	63	81	3	26	30
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	9	21	2	19	17	2	10	40	5	2	19	29
Mvmt Flow	39	141	3	35	116	13	46	66	85	3	27	32

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	131	0	0	144	0	0	445	417	125	488	422	143
Stage 1	-	-	-	-	-	-	195	195	-	221	221	-
Stage 2	-	-	-	-	-	-	250	222	-	267	201	-
Critical Hdwy	4.19	-	-	4.29	-	-	7.2	6.9	6.25	7.12	6.69	6.49
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Follow-up Hdwy	2.281	-	-	2.371	-	-	3.59	4.36	3.345	3.518	4.171	3.561
Pot Cap-1 Maneuver	1412	-	-	1341	-	-	510	473	918	490	498	838
Stage 1	-	-	-	-	-	-	789	673	-	781	690	-
Stage 2	-	-	-	-	-	-	737	654	-	738	704	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1412	-	-	1341	-	-	449	447	915	378	470	838
Mov Cap-2 Maneuver	-	-	-	-	-	-	449	447	-	378	470	-
Stage 1	-	-	-	-	-	-	765	654	-	759	671	-
Stage 2	-	-	-	-	-	-	662	636	-	586	684	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	1.6	1.7	14.5	11.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	574	1412	-	-	1341	-	-	596
HCM Lane V/C Ratio	0.345	0.028	-	-	0.026	-	-	0.104
HCM Control Delay (s)	14.5	7.6	-	-	7.8	-	-	11.7
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1.5	0.1	-	-	0.1	-	-	0.3

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	82	140	49	111	80	94
Future Vol, veh/h	82	140	49	111	80	94
Conflicting Peds, #/hr	0	0	105	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	12	10	13	30	31	13
Mvmt Flow	86	147	52	117	84	99

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	409	189	189	0	-	0
Stage 1	189	-	-	-	-	-
Stage 2	220	-	-	-	-	-
Critical Hdwy	6.52	6.3	4.23	-	-	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.39	2.317	-	-	-
Pot Cap-1 Maneuver	580	833	1322	-	-	-
Stage 1	820	-	-	-	-	-
Stage 2	793	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	454	752	1322	-	-	-
Mov Cap-2 Maneuver	454	-	-	-	-	-
Stage 1	740	-	-	-	-	-
Stage 2	688	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.4	2.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1322	-	454	752	-	-
HCM Lane V/C Ratio	0.039	-	0.19	0.196	-	-
HCM Control Delay (s)	7.8	-	14.8	11	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	0.7	-	-

Intersection	
Int Delay, s/veh	7.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	102	8	4	2	34	23	5	21	6	49	16	95
Future Vol, veh/h	102	8	4	2	34	23	5	21	6	49	16	95
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	109	9	4	2	36	24	5	22	6	52	17	101

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	61	0	0	13	0	0	340	293	11	295	283	48
Stage 1	-	-	-	-	-	-	228	228	-	53	53	-
Stage 2	-	-	-	-	-	-	112	65	-	242	230	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1523	-	-	1586	-	-	614	618	1070	657	626	1021
Stage 1	-	-	-	-	-	-	775	715	-	960	851	-
Stage 2	-	-	-	-	-	-	893	841	-	762	714	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1523	-	-	1586	-	-	511	573	1070	599	580	1021
Mov Cap-2 Maneuver	-	-	-	-	-	-	511	573	-	599	580	-
Stage 1	-	-	-	-	-	-	719	664	-	891	850	-
Stage 2	-	-	-	-	-	-	788	840	-	679	663	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.8	0.2	11.2	10.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	615	1523	-	-	1586	-	-	790
HCM Lane V/C Ratio	0.055	0.071	-	-	0.001	-	-	0.215
HCM Control Delay (s)	11.2	7.5	0	-	7.3	0	-	10.8
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0.2	-	-	0	-	-	0.8

Intersection	
Int Delay, s/veh	2.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	58	5	38	54	4	10
Future Vol, veh/h	58	5	38	54	4	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	62	5	40	57	4	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	62	0	172	62
Stage 1	-	-	-	-	62	-
Stage 2	-	-	-	-	110	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1487	-	789	979
Stage 1	-	-	-	-	939	-
Stage 2	-	-	-	-	882	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1487	-	767	979
Mov Cap-2 Maneuver	-	-	-	-	767	-
Stage 1	-	-	-	-	939	-
Stage 2	-	-	-	-	857	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.1	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	907	-	-	1487	-
HCM Lane V/C Ratio	0.016	-	-	0.027	-
HCM Control Delay (s)	9	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	62	6	17	83	8	9
Future Vol, veh/h	62	6	17	83	8	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	66	6	18	88	9	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	72	0	149	69
Stage 1	-	-	-	-	69	-
Stage 2	-	-	-	-	80	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1474	-	815	970
Stage 1	-	-	-	-	932	-
Stage 2	-	-	-	-	913	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1474	-	804	970
Mov Cap-2 Maneuver	-	-	-	-	804	-
Stage 1	-	-	-	-	932	-
Stage 2	-	-	-	-	901	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	884	-	-	1474	-
HCM Lane V/C Ratio	0.02	-	-	0.012	-
HCM Control Delay (s)	9.2	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	5.2

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	29	76	2	19	99	27	36	14	20	3	42	29
Future Vol, veh/h	29	76	2	19	99	27	36	14	20	3	42	29
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	11	26	50	28	21	11	13	42	6	2	42	30
Mvmt Flow	31	81	2	20	105	29	38	15	21	3	45	31

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	137	0	0	83	0	0	344	308	123	322	321	82
Stage 1	-	-	-	-	-	-	163	163	-	144	144	-
Stage 2	-	-	-	-	-	-	181	145	-	178	177	-
Critical Hdwy	4.21	-	-	4.38	-	-	7.23	6.92	6.26	7.12	6.92	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Follow-up Hdwy	2.299	-	-	2.452	-	-	3.617	4.378	3.354	3.518	4.378	3.57
Pot Cap-1 Maneuver	1393	-	-	1365	-	-	590	545	917	631	536	905
Stage 1	-	-	-	-	-	-	814	693	-	859	707	-
Stage 2	-	-	-	-	-	-	796	707	-	824	683	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1393	-	-	1365	-	-	516	524	914	586	515	905
Mov Cap-2 Maneuver	-	-	-	-	-	-	516	524	-	586	515	-
Stage 1	-	-	-	-	-	-	794	681	-	840	691	-
Stage 2	-	-	-	-	-	-	703	691	-	776	671	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	2.1	1	12	11.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	591	1393	-	-	1365	-	-	623
HCM Lane V/C Ratio	0.126	0.022	-	-	0.015	-	-	0.126
HCM Control Delay (s)	12	7.6	-	-	7.7	-	-	11.6
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.4

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	63	84	61	67	89	103
Future Vol, veh/h	63	84	61	67	89	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	7	18	7	31	28	15
Mvmt Flow	67	89	65	71	95	110

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	296	95	95	0	-	0
Stage 1	95	-	-	-	-	-
Stage 2	201	-	-	-	-	-
Critical Hdwy	6.47	6.38	4.17	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.462	2.263	-	-	-
Pot Cap-1 Maneuver	685	919	1468	-	-	-
Stage 1	916	-	-	-	-	-
Stage 2	821	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	655	919	1468	-	-	-
Mov Cap-2 Maneuver	655	-	-	-	-	-
Stage 1	916	-	-	-	-	-
Stage 2	785	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.1	3.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1468	-	655	919	-	-
HCM Lane V/C Ratio	0.044	-	0.102	0.097	-	-
HCM Control Delay (s)	7.6	-	11.1	9.3	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	0.3	-	-

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	72	6	3	1	25	17	3	15	5	35	11	68
Future Vol, veh/h	72	6	3	1	25	17	3	15	5	35	11	68
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	76	6	3	1	26	18	3	16	5	37	12	72

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	44	0	0	9	0	0	238	205	8	207	198	35
Stage 1	-	-	-	-	-	-	159	159	-	37	37	-
Stage 2	-	-	-	-	-	-	79	46	-	170	161	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1545	-	-	1591	-	-	716	691	1074	751	698	1038
Stage 1	-	-	-	-	-	-	843	766	-	978	864	-
Stage 2	-	-	-	-	-	-	930	857	-	832	765	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1545	-	-	1591	-	-	633	656	1074	706	663	1038
Mov Cap-2 Maneuver	-	-	-	-	-	-	633	656	-	706	663	-
Stage 1	-	-	-	-	-	-	802	728	-	930	863	-
Stage 2	-	-	-	-	-	-	853	856	-	770	728	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.6	0.2	10.2	9.8
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	713	1545	-	-	1591	-	-	866
HCM Lane V/C Ratio	0.034	0.049	-	-	0.001	-	-	0.139
HCM Control Delay (s)	10.2	7.5	0	-	7.3	0	-	9.8
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0	-	-	0.5

Intersection	
Int Delay, s/veh	3.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	41	4	8	39	3	40
Future Vol, veh/h	41	4	8	39	3	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	43	4	8	41	3	42

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	43	0	80	43
Stage 1	-	-	-	-	43	-
Stage 2	-	-	-	-	37	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1512	-	897	1003
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	959	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1512	-	893	1003
Mov Cap-2 Maneuver	-	-	-	-	893	-
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	954	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	994	-	-	1512	-
HCM Lane V/C Ratio	0.046	-	-	0.006	-
HCM Control Delay (s)	8.8	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	76	4	12	41	6	6
Future Vol, veh/h	76	4	12	41	6	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	80	4	13	43	6	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	84	0	129	82
Stage 1	-	-	-	-	82	-
Stage 2	-	-	-	-	47	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1459	-	838	954
Stage 1	-	-	-	-	919	-
Stage 2	-	-	-	-	948	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1459	-	830	954
Mov Cap-2 Maneuver	-	-	-	-	830	-
Stage 1	-	-	-	-	919	-
Stage 2	-	-	-	-	939	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	888	-	-	1459	-
HCM Lane V/C Ratio	0.014	-	-	0.009	-
HCM Control Delay (s)	9.1	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	4.7

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	25	112	3	28	92	9	19	28	35	3	19	25
Future Vol, veh/h	25	112	3	28	92	9	19	28	35	3	19	25
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	9	21	2	19	17	2	10	40	5	2	19	29
Mvmt Flow	26	118	3	29	97	9	20	29	37	3	20	26

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	109	0	0	121	0	0	359	338	105	366	340	119
Stage 1	-	-	-	-	-	-	164	164	-	172	172	-
Stage 2	-	-	-	-	-	-	195	174	-	194	168	-
Critical Hdwy	4.19	-	-	4.29	-	-	7.2	6.9	6.25	7.12	6.69	6.49
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Follow-up Hdwy	2.281	-	-	2.371	-	-	3.59	4.36	3.345	3.518	4.171	3.561
Pot Cap-1 Maneuver	1439	-	-	1368	-	-	582	526	941	590	555	865
Stage 1	-	-	-	-	-	-	820	696	-	830	725	-
Stage 2	-	-	-	-	-	-	789	689	-	808	728	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1439	-	-	1368	-	-	530	504	938	526	532	865
Mov Cap-2 Maneuver	-	-	-	-	-	-	530	504	-	526	532	-
Stage 1	-	-	-	-	-	-	803	679	-	815	712	-
Stage 2	-	-	-	-	-	-	730	677	-	727	711	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	1.3	1.7	11.5	10.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	637	1439	-	-	1368	-	-	668
HCM Lane V/C Ratio	0.136	0.018	-	-	0.022	-	-	0.074
HCM Control Delay (s)	11.5	7.5	-	-	7.7	-	-	10.8
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0.1	-	-	0.2

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	68	117	41	75	65	78
Future Vol, veh/h	68	117	41	75	65	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	0	0	0	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	12	10	13	30	31	13
Mvmt Flow	72	123	43	79	68	82

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	233	-	68	0	-	0
Stage 1	68	-	-	-	-	-
Stage 2	165	-	-	-	-	-
Critical Hdwy	6.52	-	4.23	-	-	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	-	2.317	-	-	-
Pot Cap-1 Maneuver	734	0	1466	-	-	-
Stage 1	930	0	-	-	-	-
Stage 2	841	0	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	712	-	1466	-	-	-
Mov Cap-2 Maneuver	712	-	-	-	-	-
Stage 1	930	-	-	-	-	-
Stage 2	816	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	2.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1466	-	712	-	-	-
HCM Lane V/C Ratio	0.029	-	0.101	-	-	-
HCM Control Delay (s)	7.5	-	10.6	0	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-	-

Intersection	
Int Delay, s/veh	8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	106	8	4	2	35	24	5	22	7	52	16	100
Future Vol, veh/h	106	8	4	2	35	24	5	22	7	52	16	100
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	113	9	4	2	37	26	5	23	7	55	17	106

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	63	0	0	13	0	0	352	303	11	306	292	50
Stage 1	-	-	-	-	-	-	236	236	-	54	54	-
Stage 2	-	-	-	-	-	-	116	67	-	252	238	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1521	-	-	1586	-	-	603	610	1070	646	619	1018
Stage 1	-	-	-	-	-	-	767	710	-	958	850	-
Stage 2	-	-	-	-	-	-	889	839	-	752	708	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1521	-	-	1586	-	-	497	564	1070	585	572	1018
Mov Cap-2 Maneuver	-	-	-	-	-	-	497	564	-	585	572	-
Stage 1	-	-	-	-	-	-	709	657	-	886	849	-
Stage 2	-	-	-	-	-	-	779	838	-	666	655	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.8	0.2	11.3	11
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	611	1521	-	-	1586	-	-	781
HCM Lane V/C Ratio	0.059	0.074	-	-	0.001	-	-	0.229
HCM Control Delay (s)	11.3	7.6	0	-	7.3	0	-	11
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0.2	-	-	0	-	-	0.9

Intersection	
Int Delay, s/veh	3.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	58	5	71	56	4	14
Future Vol, veh/h	58	5	71	56	4	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	62	5	76	60	4	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	62	0	243	62
Stage 1	-	-	-	-	62	-
Stage 2	-	-	-	-	181	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1487	-	715	979
Stage 1	-	-	-	-	939	-
Stage 2	-	-	-	-	812	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1487	-	677	979
Mov Cap-2 Maneuver	-	-	-	-	677	-
Stage 1	-	-	-	-	939	-
Stage 2	-	-	-	-	769	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.3	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	891	-	-	1487	-
HCM Lane V/C Ratio	0.021	-	-	0.051	-
HCM Control Delay (s)	9.1	-	-	7.5	0.1
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.2	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	69	6	18	119	9	9
Future Vol, veh/h	69	6	18	119	9	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	73	6	19	127	10	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	80	0	179	77
Stage 1	-	-	-	-	77	-
Stage 2	-	-	-	-	102	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1464	-	782	960
Stage 1	-	-	-	-	924	-
Stage 2	-	-	-	-	890	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1464	-	771	960
Mov Cap-2 Maneuver	-	-	-	-	771	-
Stage 1	-	-	-	-	924	-
Stage 2	-	-	-	-	878	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	855	-	-	1464	-
HCM Lane V/C Ratio	0.022	-	-	0.013	-
HCM Control Delay (s)	9.3	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	5.7

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	39	80	2	20	104	39	41	16	23	3	57	30
Future Vol, veh/h	39	80	2	20	104	39	41	16	23	3	57	30
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	11	26	50	28	21	11	13	42	6	2	42	30
Mvmt Flow	41	85	2	21	111	41	44	17	24	3	61	32

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	155	0	0	87	0	0	392	347	134	364	367	86
Stage 1	-	-	-	-	-	-	177	177	-	169	169	-
Stage 2	-	-	-	-	-	-	215	170	-	195	198	-
Critical Hdwy	4.21	-	-	4.38	-	-	7.23	6.92	6.26	7.12	6.92	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Follow-up Hdwy	2.299	-	-	2.452	-	-	3.617	4.378	3.354	3.518	4.378	3.57
Pot Cap-1 Maneuver	1372	-	-	1360	-	-	548	517	904	592	503	901
Stage 1	-	-	-	-	-	-	800	683	-	833	689	-
Stage 2	-	-	-	-	-	-	763	688	-	807	668	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1372	-	-	1360	-	-	460	492	901	542	479	901
Mov Cap-2 Maneuver	-	-	-	-	-	-	460	492	-	542	479	-
Stage 1	-	-	-	-	-	-	774	671	-	808	668	-
Stage 2	-	-	-	-	-	-	649	667	-	753	656	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	2.5	0.9	12.8	12.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	544	1372	-	-	1360	-	-	570
HCM Lane V/C Ratio	0.156	0.03	-	-	0.016	-	-	0.168
HCM Control Delay (s)	12.8	7.7	-	-	7.7	-	-	12.6
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	66	88	61	73	102	108
Future Vol, veh/h	66	88	61	73	102	108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	7	18	7	31	28	15
Mvmt Flow	70	94	65	78	109	115

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	316	109	109	0	-	0
Stage 1	109	-	-	-	-	-
Stage 2	207	-	-	-	-	-
Critical Hdwy	6.47	6.38	4.17	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.462	2.263	-	-	-
Pot Cap-1 Maneuver	667	903	1451	-	-	-
Stage 1	903	-	-	-	-	-
Stage 2	816	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	637	903	1451	-	-	-
Mov Cap-2 Maneuver	637	-	-	-	-	-
Stage 1	903	-	-	-	-	-
Stage 2	779	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.3	3.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1451	-	637	903	-	-
HCM Lane V/C Ratio	0.045	-	0.11	0.104	-	-
HCM Control Delay (s)	7.6	-	11.4	9.4	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	0.3	-	-

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	76	6	3	1	26	18	3	16	5	37	12	71
Future Vol, veh/h	76	6	3	1	26	18	3	16	5	37	12	71
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	80	6	3	1	27	19	3	17	5	39	13	75

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	46	0	0	9	0	0	251	216	8	218	208	37
Stage 1	-	-	-	-	-	-	168	168	-	39	39	-
Stage 2	-	-	-	-	-	-	83	48	-	179	169	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1543	-	-	1591	-	-	702	682	1074	738	689	1035
Stage 1	-	-	-	-	-	-	834	759	-	976	862	-
Stage 2	-	-	-	-	-	-	925	855	-	823	759	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1543	-	-	1591	-	-	616	646	1074	691	653	1035
Mov Cap-2 Maneuver	-	-	-	-	-	-	616	646	-	691	653	-
Stage 1	-	-	-	-	-	-	791	720	-	925	861	-
Stage 2	-	-	-	-	-	-	845	854	-	758	720	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.7	0.2	10.3	9.9
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	700	1543	-	-	1591	-	-	854
HCM Lane V/C Ratio	0.036	0.052	-	-	0.001	-	-	0.148
HCM Control Delay (s)	10.3	7.5	0	-	7.3	0	-	9.9
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0	-	-	0.5

Intersection	
Int Delay, s/veh	4.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	43	4	13	41	3	74
Future Vol, veh/h	43	4	13	41	3	74
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	45	4	14	43	3	78

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	45	0	94	45
Stage 1	-	-	-	-	45	-
Stage 2	-	-	-	-	49	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1509	-	880	1000
Stage 1	-	-	-	-	955	-
Stage 2	-	-	-	-	946	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1509	-	871	1000
Mov Cap-2 Maneuver	-	-	-	-	871	-
Stage 1	-	-	-	-	955	-
Stage 2	-	-	-	-	937	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.8	8.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	994	-	-	1509	-
HCM Lane V/C Ratio	0.082	-	-	0.009	-
HCM Control Delay (s)	8.9	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	113	4	13	48	6	7
Future Vol, veh/h	113	4	13	48	6	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	119	4	14	51	6	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	123	0	174	121
Stage 1	-	-	-	-	121	-
Stage 2	-	-	-	-	53	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1410	-	787	906
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	942	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1410	-	779	906
Mov Cap-2 Maneuver	-	-	-	-	779	-
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	933	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	843	-	-	1410	-
HCM Lane V/C Ratio	0.016	-	-	0.01	-
HCM Control Delay (s)	9.3	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	5.4

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	30	118	3	29	97	10	27	41	51	3	21	27
Future Vol, veh/h	30	118	3	29	97	10	27	41	51	3	21	27
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	9	21	2	19	17	2	10	40	5	2	19	29
Mvmt Flow	32	124	3	31	102	11	28	43	54	3	22	28

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	116	0	0	127	0	0	385	362	110	406	366	126
Stage 1	-	-	-	-	-	-	171	171	-	189	189	-
Stage 2	-	-	-	-	-	-	214	191	-	217	177	-
Critical Hdwy	4.19	-	-	4.29	-	-	7.2	6.9	6.25	7.12	6.69	6.49
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Follow-up Hdwy	2.281	-	-	2.371	-	-	3.59	4.36	3.345	3.518	4.171	3.561
Pot Cap-1 Maneuver	1430	-	-	1360	-	-	559	510	935	555	536	857
Stage 1	-	-	-	-	-	-	812	691	-	813	713	-
Stage 2	-	-	-	-	-	-	770	676	-	785	722	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1430	-	-	1360	-	-	504	486	932	471	511	857
Mov Cap-2 Maneuver	-	-	-	-	-	-	504	486	-	471	511	-
Stage 1	-	-	-	-	-	-	792	673	-	795	697	-
Stage 2	-	-	-	-	-	-	705	661	-	677	704	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	1.5	1.6	12.3	11.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	618	1430	-	-	1360	-	-	646
HCM Lane V/C Ratio	0.203	0.022	-	-	0.022	-	-	0.083
HCM Control Delay (s)	12.3	7.6	-	-	7.7	-	-	11.1
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.8	0.1	-	-	0.1	-	-	0.3

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	72	124	43	87	71	83
Future Vol, veh/h	72	124	43	87	71	83
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	12	10	13	30	31	13
Mvmt Flow	76	131	45	92	75	87

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	257	75	75	0	-	0
Stage 1	75	-	-	-	-	-
Stage 2	182	-	-	-	-	-
Critical Hdwy	6.52	6.3	4.23	-	-	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.39	2.317	-	-	-
Pot Cap-1 Maneuver	711	965	1457	-	-	-
Stage 1	923	-	-	-	-	-
Stage 2	826	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	689	965	1457	-	-	-
Mov Cap-2 Maneuver	689	-	-	-	-	-
Stage 1	923	-	-	-	-	-
Stage 2	800	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.9	2.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1457	-	689	965	-	-
HCM Lane V/C Ratio	0.031	-	0.11	0.135	-	-
HCM Control Delay (s)	7.5	-	10.9	9.3	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	0.5	-	-

Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	111	9	4	2	37	25	5	23	7	54	17	104
Future Vol, veh/h	111	9	4	2	37	25	5	23	7	54	17	104
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	118	10	4	2	39	27	5	24	7	57	18	111

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	66	0	0	14	0	0	369	318	12	321	307	53
Stage 1	-	-	-	-	-	-	248	248	-	57	57	-
Stage 2	-	-	-	-	-	-	121	70	-	264	250	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1517	-	-	1585	-	-	588	598	1069	632	607	1014
Stage 1	-	-	-	-	-	-	756	701	-	955	847	-
Stage 2	-	-	-	-	-	-	883	837	-	741	700	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1517	-	-	1585	-	-	480	551	1069	570	559	1014
Mov Cap-2 Maneuver	-	-	-	-	-	-	480	551	-	570	559	-
Stage 1	-	-	-	-	-	-	697	646	-	881	846	-
Stage 2	-	-	-	-	-	-	769	836	-	653	645	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.8	0.2	11.4	11.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	596	1517	-	-	1585	-	-	769
HCM Lane V/C Ratio	0.062	0.078	-	-	0.001	-	-	0.242
HCM Control Delay (s)	11.4	7.6	0	-	7.3	0	-	11.2
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0.3	-	-	0	-	-	0.9

Intersection	
Int Delay, s/veh	3.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	58	5	96	59	5	18
Future Vol, veh/h	58	5	96	59	5	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	62	5	102	63	5	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	62	0	298	62
Stage 1	-	-	-	-	62	-
Stage 2	-	-	-	-	236	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1487	-	662	979
Stage 1	-	-	-	-	939	-
Stage 2	-	-	-	-	761	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1487	-	615	979
Mov Cap-2 Maneuver	-	-	-	-	615	-
Stage 1	-	-	-	-	939	-
Stage 2	-	-	-	-	707	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.7	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	867	-	-	1487	-
HCM Lane V/C Ratio	0.028	-	-	0.069	-
HCM Control Delay (s)	9.3	-	-	7.6	0.1
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.2	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	76	6	18	146	9	10
Future Vol, veh/h	76	6	18	146	9	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	81	6	19	155	10	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	87	0	200	84
Stage 1	-	-	-	-	84	-
Stage 2	-	-	-	-	116	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1455	-	759	951
Stage 1	-	-	-	-	917	-
Stage 2	-	-	-	-	875	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1455	-	748	951
Mov Cap-2 Maneuver	-	-	-	-	748	-
Stage 1	-	-	-	-	917	-
Stage 2	-	-	-	-	863	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	843	-	-	1455	-
HCM Lane V/C Ratio	0.024	-	-	0.013	-
HCM Control Delay (s)	9.4	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	6.2

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	48	83	2	21	109	48	44	16	25	3	69	32
Future Vol, veh/h	48	83	2	21	109	48	44	16	25	3	69	32
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	11	26	50	28	21	11	13	42	6	2	42	30
Mvmt Flow	51	88	2	22	116	51	47	17	27	3	73	34

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	170	0	0	90	0	0	434	382	144	399	406	89
Stage 1	-	-	-	-	-	-	189	189	-	191	191	-
Stage 2	-	-	-	-	-	-	245	193	-	208	215	-
Critical Hdwy	4.21	-	-	4.38	-	-	7.23	6.92	6.26	7.12	6.92	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Follow-up Hdwy	2.299	-	-	2.452	-	-	3.617	4.378	3.354	3.518	4.378	3.57
Pot Cap-1 Maneuver	1355	-	-	1357	-	-	514	493	893	561	477	897
Stage 1	-	-	-	-	-	-	788	675	-	811	673	-
Stage 2	-	-	-	-	-	-	735	672	-	794	656	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1355	-	-	1357	-	-	414	465	891	508	450	897
Mov Cap-2 Maneuver	-	-	-	-	-	-	414	465	-	508	450	-
Stage 1	-	-	-	-	-	-	756	662	-	780	648	-
Stage 2	-	-	-	-	-	-	603	647	-	738	644	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	2.8	0.9	13.7	13.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	504	1355	-	-	1357	-	-	534
HCM Lane V/C Ratio	0.179	0.038	-	-	0.016	-	-	0.207
HCM Control Delay (s)	13.7	7.8	-	-	7.7	-	-	13.5
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0.1	-	-	0.8

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	69	92	67	78	114	113
Future Vol, veh/h	69	92	67	78	114	113
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	7	18	7	31	28	15
Mvmt Flow	73	98	71	83	121	120

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	347	121	121	0	-	0
Stage 1	121	-	-	-	-	-
Stage 2	226	-	-	-	-	-
Critical Hdwy	7.17	6.38	4.17	-	-	-
Critical Hdwy Stg 1	6.17	-	-	-	-	-
Critical Hdwy Stg 2	6.17	-	-	-	-	-
Follow-up Hdwy	3.563	3.462	2.263	-	-	-
Pot Cap-1 Maneuver	598	889	1436	-	-	-
Stage 1	871	-	-	-	-	-
Stage 2	765	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	575	889	1436	-	-	-
Mov Cap-2 Maneuver	575	-	-	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	727	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.7	3.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1436	-	575	889	-	-
HCM Lane V/C Ratio	0.05	-	0.128	0.11	-	-
HCM Control Delay (s)	7.6	-	12.2	9.6	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.4	0.4	-	-

Intersection	
Int Delay, s/veh	7.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	79	6	3	1	27	18	4	16	5	39	12	74
Future Vol, veh/h	79	6	3	1	27	18	4	16	5	39	12	74
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	83	6	3	1	28	19	4	17	5	41	13	78

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	47	0	0	9	0	0	259	223	8	225	216	38
Stage 1	-	-	-	-	-	-	174	174	-	40	40	-
Stage 2	-	-	-	-	-	-	85	49	-	185	176	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1541	-	-	1591	-	-	694	676	1074	730	682	1034
Stage 1	-	-	-	-	-	-	828	755	-	975	862	-
Stage 2	-	-	-	-	-	-	923	854	-	817	753	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1541	-	-	1591	-	-	606	639	1074	682	645	1034
Mov Cap-2 Maneuver	-	-	-	-	-	-	606	639	-	682	645	-
Stage 1	-	-	-	-	-	-	783	714	-	922	861	-
Stage 2	-	-	-	-	-	-	840	853	-	751	712	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.7	0.2	10.4	10
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	689	1541	-	-	1591	-	-	848
HCM Lane V/C Ratio	0.038	0.054	-	-	0.001	-	-	0.155
HCM Control Delay (s)	10.4	7.5	0	-	7.3	0	-	10
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0	-	-	0.5

Intersection	
Int Delay, s/veh	5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	45	4	16	43	3	101
Future Vol, veh/h	45	4	16	43	3	101
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	47	4	17	45	3	106

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	47	0	103	47
Stage 1	-	-	-	-	47	-
Stage 2	-	-	-	-	56	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1506	-	869	998
Stage 1	-	-	-	-	953	-
Stage 2	-	-	-	-	939	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1506	-	859	998
Mov Cap-2 Maneuver	-	-	-	-	859	-
Stage 1	-	-	-	-	953	-
Stage 2	-	-	-	-	928	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	993	-	-	1506	-
HCM Lane V/C Ratio	0.11	-	-	0.011	-
HCM Control Delay (s)	9.1	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	142	5	13	52	7	7
Future Vol, veh/h	142	5	13	52	7	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	149	5	14	55	7	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	155	0	207	152
Stage 1	-	-	-	-	152	-
Stage 2	-	-	-	-	55	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1372	-	752	871
Stage 1	-	-	-	-	854	-
Stage 2	-	-	-	-	940	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1372	-	744	871
Mov Cap-2 Maneuver	-	-	-	-	744	-
Stage 1	-	-	-	-	854	-
Stage 2	-	-	-	-	930	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	803	-	-	1372	-
HCM Lane V/C Ratio	0.018	-	-	0.01	-
HCM Control Delay (s)	9.6	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	6

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	32	124	3	30	102	11	34	51	64	3	24	28
Future Vol, veh/h	32	124	3	30	102	11	34	51	64	3	24	28
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	9	21	2	19	17	2	10	40	5	2	19	29
Mvmt Flow	34	131	3	32	107	12	36	54	67	3	25	29

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	122	0	0	134	0	0	406	380	116	436	384	132
Stage 1	-	-	-	-	-	-	179	179	-	199	199	-
Stage 2	-	-	-	-	-	-	227	201	-	237	185	-
Critical Hdwy	4.19	-	-	4.29	-	-	7.2	6.9	6.25	7.12	6.69	6.49
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Follow-up Hdwy	2.281	-	-	2.371	-	-	3.59	4.36	3.345	3.518	4.171	3.561
Pot Cap-1 Maneuver	1423	-	-	1352	-	-	541	497	928	531	524	850
Stage 1	-	-	-	-	-	-	804	685	-	803	706	-
Stage 2	-	-	-	-	-	-	758	669	-	766	716	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1423	-	-	1352	-	-	483	472	925	434	498	850
Mov Cap-2 Maneuver	-	-	-	-	-	-	483	472	-	434	498	-
Stage 1	-	-	-	-	-	-	783	667	-	784	689	-
Stage 2	-	-	-	-	-	-	688	653	-	638	697	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	1.5	1.6	13.1	11.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	602	1423	-	-	1352	-	-	625
HCM Lane V/C Ratio	0.261	0.024	-	-	0.023	-	-	0.093
HCM Control Delay (s)	13.1	7.6	-	-	7.7	-	-	11.3
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1	0.1	-	-	0.1	-	-	0.3

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	75	129	45	96	73	87
Future Vol, veh/h	75	129	45	96	73	87
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	12	10	13	30	31	13
Mvmt Flow	79	136	47	101	77	92

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	273	77	77	0	-	0
Stage 1	77	-	-	-	-	-
Stage 2	196	-	-	-	-	-
Critical Hdwy	6.52	6.3	4.23	-	-	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.39	2.317	-	-	-
Pot Cap-1 Maneuver	696	962	1455	-	-	-
Stage 1	921	-	-	-	-	-
Stage 2	814	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	674	962	1455	-	-	-
Mov Cap-2 Maneuver	674	-	-	-	-	-
Stage 1	921	-	-	-	-	-
Stage 2	788	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10	2.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1455	-	674	962	-	-
HCM Lane V/C Ratio	0.033	-	0.117	0.141	-	-
HCM Control Delay (s)	7.6	-	11	9.4	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	0.5	-	-

Intersection	
Int Delay, s/veh	8.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	116	9	4	2	39	26	5	24	7	56	18	109
Future Vol, veh/h	116	9	4	2	39	26	5	24	7	56	18	109
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	123	10	4	2	41	28	5	26	7	60	19	116

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	69	0	0	14	0	0	386	332	12	335	321	55
Stage 1	-	-	-	-	-	-	259	259	-	60	60	-
Stage 2	-	-	-	-	-	-	127	73	-	275	261	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1513	-	-	1585	-	-	573	588	1069	619	596	1012
Stage 1	-	-	-	-	-	-	746	694	-	951	845	-
Stage 2	-	-	-	-	-	-	877	834	-	731	692	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1513	-	-	1585	-	-	463	539	1069	555	547	1012
Mov Cap-2 Maneuver	-	-	-	-	-	-	463	539	-	555	547	-
Stage 1	-	-	-	-	-	-	685	637	-	873	844	-
Stage 2	-	-	-	-	-	-	758	833	-	640	635	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.8	0.2	11.6	11.4
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	582	1513	-	-	1585	-	-	758
HCM Lane V/C Ratio	0.066	0.082	-	-	0.001	-	-	0.257
HCM Control Delay (s)	11.6	7.6	0	-	7.3	0	-	11.4
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0.3	-	-	0	-	-	1

Intersection	
Int Delay, s/veh	4.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	58	5	119	61	5	22
Future Vol, veh/h	58	5	119	61	5	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	62	5	127	65	5	23

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	62	0	348	62
Stage 1	-	-	-	-	62	-
Stage 2	-	-	-	-	286	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1487	-	617	979
Stage 1	-	-	-	-	939	-
Stage 2	-	-	-	-	718	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1487	-	562	979
Mov Cap-2 Maneuver	-	-	-	-	562	-
Stage 1	-	-	-	-	939	-
Stage 2	-	-	-	-	654	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.1	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	861	-	-	1487	-
HCM Lane V/C Ratio	0.033	-	-	0.085	-
HCM Control Delay (s)	9.3	-	-	7.6	0.1
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.3	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	81	6	19	171	10	10
Future Vol, veh/h	81	6	19	171	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	86	6	20	182	11	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	93	0	220	89
Stage 1	-	-	-	-	89	-
Stage 2	-	-	-	-	131	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1448	-	738	945
Stage 1	-	-	-	-	912	-
Stage 2	-	-	-	-	860	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1448	-	727	945
Mov Cap-2 Maneuver	-	-	-	-	727	-
Stage 1	-	-	-	-	912	-
Stage 2	-	-	-	-	847	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	822	-	-	1448	-
HCM Lane V/C Ratio	0.026	-	-	0.014	-
HCM Control Delay (s)	9.5	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	6.7

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	55	87	2	22	113	55	47	18	27	3	80	33
Future Vol, veh/h	55	87	2	22	113	55	47	18	27	3	80	33
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	11	26	50	28	21	11	13	42	6	2	42	30
Mvmt Flow	59	93	2	23	120	59	50	19	29	3	85	35

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	182	0	0	95	0	0	470	411	152	431	440	94
Stage 1	-	-	-	-	-	-	199	199	-	211	211	-
Stage 2	-	-	-	-	-	-	271	212	-	220	229	-
Critical Hdwy	4.21	-	-	4.38	-	-	7.23	6.92	6.26	7.12	6.92	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Follow-up Hdwy	2.299	-	-	2.452	-	-	3.617	4.378	3.354	3.518	4.378	3.57
Pot Cap-1 Maneuver	1341	-	-	1351	-	-	486	474	884	535	456	891
Stage 1	-	-	-	-	-	-	778	667	-	791	659	-
Stage 2	-	-	-	-	-	-	711	658	-	782	646	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1341	-	-	1351	-	-	377	444	882	478	427	891
Mov Cap-2 Maneuver	-	-	-	-	-	-	377	444	-	478	427	-
Stage 1	-	-	-	-	-	-	742	654	-	756	630	-
Stage 2	-	-	-	-	-	-	565	629	-	722	633	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	3	0.9	14.7	14.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	470	1341	-	-	1351	-	-	503
HCM Lane V/C Ratio	0.208	0.044	-	-	0.017	-	-	0.245
HCM Control Delay (s)	14.7	7.8	-	-	7.7	-	-	14.5
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.8	0.1	-	-	0.1	-	-	1

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	72	96	70	82	123	118
Future Vol, veh/h	72	96	70	82	123	118
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	7	18	7	31	28	15
Mvmt Flow	77	102	74	87	131	126

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	367	131	131	0	-	0
Stage 1	131	-	-	-	-	-
Stage 2	236	-	-	-	-	-
Critical Hdwy	6.47	6.38	4.17	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.462	2.263	-	-	-
Pot Cap-1 Maneuver	623	877	1424	-	-	-
Stage 1	883	-	-	-	-	-
Stage 2	792	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	591	877	1424	-	-	-
Mov Cap-2 Maneuver	591	-	-	-	-	-
Stage 1	883	-	-	-	-	-
Stage 2	751	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	3.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1424	-	591	877	-	-
HCM Lane V/C Ratio	0.052	-	0.13	0.116	-	-
HCM Control Delay (s)	7.7	-	12	9.6	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.4	0.4	-	-

Intersection	
Int Delay, s/veh	7.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	82	7	3	2	28	19	4	17	5	40	13	77
Future Vol, veh/h	82	7	3	2	28	19	4	17	5	40	13	77
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	86	7	3	2	29	20	4	18	5	42	14	81

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	49	0	0	11	0	0	273	236	9	237	227	39
Stage 1	-	-	-	-	-	-	182	182	-	44	44	-
Stage 2	-	-	-	-	-	-	91	54	-	193	183	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1539	-	-	1589	-	-	679	665	1073	717	672	1033
Stage 1	-	-	-	-	-	-	820	749	-	970	858	-
Stage 2	-	-	-	-	-	-	916	850	-	809	748	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1539	-	-	1589	-	-	589	627	1073	668	634	1033
Mov Cap-2 Maneuver	-	-	-	-	-	-	589	627	-	668	634	-
Stage 1	-	-	-	-	-	-	774	707	-	916	857	-
Stage 2	-	-	-	-	-	-	830	849	-	741	706	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.7	0.3	10.6	10.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	674	1539	-	-	1589	-	-	839
HCM Lane V/C Ratio	0.041	0.056	-	-	0.001	-	-	0.163
HCM Control Delay (s)	10.6	7.5	0	-	7.3	0	-	10.1
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	5.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	47	4	20	45	3	125
Future Vol, veh/h	47	4	20	45	3	125
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	49	4	21	47	3	132

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	49	0	115	49
Stage 1	-	-	-	-	49	-
Stage 2	-	-	-	-	66	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1504	-	854	995
Stage 1	-	-	-	-	951	-
Stage 2	-	-	-	-	928	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1504	-	842	995
Mov Cap-2 Maneuver	-	-	-	-	842	-
Stage 1	-	-	-	-	951	-
Stage 2	-	-	-	-	915	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.3	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	991	-	-	1504	-
HCM Lane V/C Ratio	0.136	-	-	0.014	-
HCM Control Delay (s)	9.2	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	168	5	14	58	7	7
Future Vol, veh/h	168	5	14	58	7	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	177	5	15	61	7	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	182	0	239	179
Stage 1	-	-	-	-	179	-
Stage 2	-	-	-	-	60	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1340	-	719	840
Stage 1	-	-	-	-	830	-
Stage 2	-	-	-	-	934	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1340	-	710	840
Mov Cap-2 Maneuver	-	-	-	-	710	-
Stage 1	-	-	-	-	830	-
Stage 2	-	-	-	-	923	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	770	-	-	1340	-
HCM Lane V/C Ratio	0.019	-	-	0.011	-
HCM Control Delay (s)	9.8	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	6.6

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	35	129	3	32	106	12	40	59	75	3	26	29
Future Vol, veh/h	35	129	3	32	106	12	40	59	75	3	26	29
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	9	21	2	19	17	2	10	40	5	2	19	29
Mvmt Flow	37	136	3	34	112	13	42	62	79	3	27	31

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	127	0	0	139	0	0	428	401	121	467	406	137
Stage 1	-	-	-	-	-	-	188	188	-	211	211	-
Stage 2	-	-	-	-	-	-	240	213	-	256	195	-
Critical Hdwy	4.19	-	-	4.29	-	-	7.2	6.9	6.25	7.12	6.69	6.49
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Follow-up Hdwy	2.281	-	-	2.371	-	-	3.59	4.36	3.345	3.518	4.171	3.561
Pot Cap-1 Maneuver	1417	-	-	1346	-	-	523	483	922	506	509	844
Stage 1	-	-	-	-	-	-	796	678	-	791	697	-
Stage 2	-	-	-	-	-	-	746	661	-	749	709	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1417	-	-	1346	-	-	462	457	919	399	482	844
Mov Cap-2 Maneuver	-	-	-	-	-	-	462	457	-	399	482	-
Stage 1	-	-	-	-	-	-	773	659	-	770	679	-
Stage 2	-	-	-	-	-	-	672	644	-	604	689	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	1.6	1.7	13.9	11.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	585	1417	-	-	1346	-	-	605
HCM Lane V/C Ratio	0.313	0.026	-	-	0.025	-	-	0.101
HCM Control Delay (s)	13.9	7.6	-	-	7.7	-	-	11.6
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1.3	0.1	-	-	0.1	-	-	0.3

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	78	135	47	105	77	90
Future Vol, veh/h	78	135	47	105	77	90
Conflicting Peds, #/hr	0	0	105	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	12	10	13	30	31	13
Mvmt Flow	82	142	49	111	81	95

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	395	186	186	0	-	0
Stage 1	186	-	-	-	-	-
Stage 2	209	-	-	-	-	-
Critical Hdwy	6.52	6.3	4.23	-	-	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.39	2.317	-	-	-
Pot Cap-1 Maneuver	591	836	1325	-	-	-
Stage 1	822	-	-	-	-	-
Stage 2	803	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	464	755	1325	-	-	-
Mov Cap-2 Maneuver	464	-	-	-	-	-
Stage 1	742	-	-	-	-	-
Stage 2	698	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.2	2.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1325	-	464	755	-	-
HCM Lane V/C Ratio	0.037	-	0.177	0.188	-	-
HCM Control Delay (s)	7.8	-	14.4	10.9	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	0.7	-	-

Intersection	
Int Delay, s/veh	8.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	121	10	4	2	40	27	5	25	7	59	19	113
Future Vol, veh/h	121	10	4	2	40	27	5	25	7	59	19	113
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	129	11	4	2	43	29	5	27	7	63	20	120

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	71	0	0	15	0	0	401	346	13	348	333	57
Stage 1	-	-	-	-	-	-	270	270	-	61	61	-
Stage 2	-	-	-	-	-	-	131	76	-	287	272	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1510	-	-	1583	-	-	560	577	1067	607	587	1009
Stage 1	-	-	-	-	-	-	736	686	-	950	844	-
Stage 2	-	-	-	-	-	-	873	832	-	720	685	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1510	-	-	1583	-	-	447	527	1067	541	536	1009
Mov Cap-2 Maneuver	-	-	-	-	-	-	447	527	-	541	536	-
Stage 1	-	-	-	-	-	-	673	627	-	868	843	-
Stage 2	-	-	-	-	-	-	750	831	-	626	626	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.8	0.2	11.8	11.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	568	1510	-	-	1583	-	-	745
HCM Lane V/C Ratio	0.069	0.085	-	-	0.001	-	-	0.273
HCM Control Delay (s)	11.8	7.6	0	-	7.3	0	-	11.6
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0.3	-	-	0	-	-	1.1

Intersection	
Int Delay, s/veh	4.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	69	6	144	64	5	25
Future Vol, veh/h	69	6	144	64	5	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	73	6	153	68	5	27

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	73	0	413	73
Stage 1	-	-	-	-	73	-
Stage 2	-	-	-	-	340	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1473	-	563	965
Stage 1	-	-	-	-	928	-
Stage 2	-	-	-	-	673	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1473	-	502	965
Mov Cap-2 Maneuver	-	-	-	-	502	-
Stage 1	-	-	-	-	928	-
Stage 2	-	-	-	-	600	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.4	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	836	-	-	1473	-
HCM Lane V/C Ratio	0.038	-	-	0.104	-
HCM Control Delay (s)	9.5	-	-	7.7	0.1
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.3	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	87	7	20	198	10	10
Future Vol, veh/h	87	7	20	198	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	93	7	21	211	11	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	100	0	244	96
Stage 1	-	-	-	-	96	-
Stage 2	-	-	-	-	148	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1439	-	714	936
Stage 1	-	-	-	-	906	-
Stage 2	-	-	-	-	843	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1439	-	702	936
Mov Cap-2 Maneuver	-	-	-	-	702	-
Stage 1	-	-	-	-	906	-
Stage 2	-	-	-	-	829	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	802	-	-	1439	-
HCM Lane V/C Ratio	0.027	-	-	0.015	-
HCM Control Delay (s)	9.6	-	-	7.5	0.1
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	7.2

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	63	90	2	23	118	63	50	19	29	3	91	34
Future Vol, veh/h	63	90	2	23	118	63	50	19	29	3	91	34
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	11	26	50	28	21	11	13	42	6	2	42	30
Mvmt Flow	67	96	2	24	126	67	53	20	31	3	97	36

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	196	0	0	98	0	0	508	443	162	465	475	97
Stage 1	-	-	-	-	-	-	211	211	-	231	231	-
Stage 2	-	-	-	-	-	-	297	232	-	234	244	-
Critical Hdwy	4.21	-	-	4.38	-	-	7.23	6.92	6.26	7.12	6.92	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.23	5.92	-	6.12	5.92	-
Follow-up Hdwy	2.299	-	-	2.452	-	-	3.617	4.378	3.354	3.518	4.378	3.57
Pot Cap-1 Maneuver	1325	-	-	1347	-	-	458	454	872	508	434	888
Stage 1	-	-	-	-	-	-	767	659	-	772	645	-
Stage 2	-	-	-	-	-	-	689	644	-	769	636	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1325	-	-	1347	-	-	340	422	870	448	404	888
Mov Cap-2 Maneuver	-	-	-	-	-	-	340	422	-	448	404	-
Stage 1	-	-	-	-	-	-	726	645	-	733	612	-
Stage 2	-	-	-	-	-	-	528	611	-	706	623	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	3.2	0.9	15.9	15.6
HCM LOS			C	C

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	435	1325	-	-	1347	-	-	474
HCM Lane V/C Ratio	0.24	0.051	-	-	0.018	-	-	0.287
HCM Control Delay (s)	15.9	7.9	-	-	7.7	-	-	15.6
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.9	0.2	-	-	0.1	-	-	1.2

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	75	100	73	87	134	123
Future Vol, veh/h	75	100	73	87	134	123
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	7	18	7	31	28	15
Mvmt Flow	80	106	78	93	143	131

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	391	143	143	0	-	0
Stage 1	143	-	-	-	-	-
Stage 2	248	-	-	-	-	-
Critical Hdwy	6.47	6.38	4.17	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.462	2.263	-	-	-
Pot Cap-1 Maneuver	603	864	1409	-	-	-
Stage 1	872	-	-	-	-	-
Stage 2	782	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	570	864	1409	-	-	-
Mov Cap-2 Maneuver	570	-	-	-	-	-
Stage 1	872	-	-	-	-	-
Stage 2	739	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.9	3.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1409	-	570	864	-	-
HCM Lane V/C Ratio	0.055	-	0.14	0.123	-	-
HCM Control Delay (s)	7.7	-	12.3	9.8	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.5	0.4	-	-

Intersection	
Int Delay, s/veh	7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	86	7	3	2	59	20	4	18	5	42	13	81
Future Vol, veh/h	86	7	3	2	59	20	4	18	5	42	13	81
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	5	5	5	2	2	2	2	2	2
Mvmt Flow	91	7	3	2	62	21	4	19	5	44	14	85

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	83	0	0	11	0	0	316	277	9	279	269	73
Stage 1	-	-	-	-	-	-	190	190	-	77	77	-
Stage 2	-	-	-	-	-	-	126	87	-	202	192	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1495	-	-	1589	-	-	637	631	1073	673	637	989
Stage 1	-	-	-	-	-	-	812	743	-	932	831	-
Stage 2	-	-	-	-	-	-	878	823	-	800	742	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1495	-	-	1589	-	-	545	592	1073	623	598	989
Mov Cap-2 Maneuver	-	-	-	-	-	-	545	592	-	623	598	-
Stage 1	-	-	-	-	-	-	762	698	-	875	830	-
Stage 2	-	-	-	-	-	-	788	822	-	727	697	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.8	0.2	10.9	10.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	637	1495	-	-	1589	-	-	795
HCM Lane V/C Ratio	0.045	0.061	-	-	0.001	-	-	0.18
HCM Control Delay (s)	10.9	7.6	0	-	7.3	0	-	10.5
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0	-	-	0.7

Intersection	
Int Delay, s/veh	5.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	49	5	24	46	4	151
Future Vol, veh/h	49	5	24	46	4	151
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	52	5	25	48	4	159

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	52	0	127	52
Stage 1	-	-	-	-	52	-
Stage 2	-	-	-	-	75	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1500	-	840	991
Stage 1	-	-	-	-	948	-
Stage 2	-	-	-	-	918	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1500	-	826	991
Mov Cap-2 Maneuver	-	-	-	-	826	-
Stage 1	-	-	-	-	948	-
Stage 2	-	-	-	-	902	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	986	-	-	1500	-
HCM Lane V/C Ratio	0.165	-	-	0.017	-
HCM Control Delay (s)	9.4	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	195	5	15	63	7	8
Future Vol, veh/h	195	5	15	63	7	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	205	5	16	66	7	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	211	0	273	208
Stage 1	-	-	-	-	208	-
Stage 2	-	-	-	-	65	-
Critical Hdwy	-	-	4.25	-	6.75	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.95	-
Follow-up Hdwy	-	-	2.295	-	3.595	3.395
Pot Cap-1 Maneuver	-	-	1307	-	686	809
Stage 1	-	-	-	-	805	-
Stage 2	-	-	-	-	929	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1307	-	677	809
Mov Cap-2 Maneuver	-	-	-	-	677	-
Stage 1	-	-	-	-	805	-
Stage 2	-	-	-	-	917	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	10
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	742	-	-	1307	-
HCM Lane V/C Ratio	0.021	-	-	0.012	-
HCM Control Delay (s)	10	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	7.3

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	38	134	3	33	110	12	47	69	87	3	27	30
Future Vol, veh/h	38	134	3	33	110	12	47	69	87	3	27	30
Conflicting Peds, #/hr	3	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	1250	-	-	1250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	9	21	2	19	17	2	10	40	5	2	19	29
Mvmt Flow	40	141	3	35	116	13	49	73	92	3	28	32

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	131	0	0	144	0	0	448	419	125	497	424	143
Stage 1	-	-	-	-	-	-	195	195	-	223	223	-
Stage 2	-	-	-	-	-	-	253	224	-	274	201	-
Critical Hdwy	4.19	-	-	4.29	-	-	7.2	6.9	6.25	7.12	6.69	6.49
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	5.9	-	6.12	5.69	-
Follow-up Hdwy	2.281	-	-	2.371	-	-	3.59	4.36	3.345	3.518	4.171	3.561
Pot Cap-1 Maneuver	1412	-	-	1341	-	-	508	472	918	483	497	838
Stage 1	-	-	-	-	-	-	789	673	-	780	688	-
Stage 2	-	-	-	-	-	-	734	653	-	732	704	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1412	-	-	1341	-	-	446	445	915	365	469	838
Mov Cap-2 Maneuver	-	-	-	-	-	-	446	445	-	365	469	-
Stage 1	-	-	-	-	-	-	765	654	-	758	669	-
Stage 2	-	-	-	-	-	-	657	635	-	570	684	-

Approach	NB	SB	NE	SW
HCM Control Delay, s	1.7	1.7	15	11.8
HCM LOS			C	B

Minor Lane/Major Mvmt	NELn1	NBL	NBT	NBR	SBL	SBT	SBR	SWLn1
Capacity (veh/h)	571	1412	-	-	1341	-	-	591
HCM Lane V/C Ratio	0.374	0.028	-	-	0.026	-	-	0.107
HCM Control Delay (s)	15	7.6	-	-	7.8	-	-	11.8
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1.7	0.1	-	-	0.1	-	-	0.4

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	82	140	49	114	80	94
Future Vol, veh/h	82	140	49	114	80	94
Conflicting Peds, #/hr	0	0	105	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	1150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	12	10	13	30	31	13
Mvmt Flow	86	147	52	120	84	99

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	412	189	189	0	-	0
Stage 1	189	-	-	-	-	-
Stage 2	223	-	-	-	-	-
Critical Hdwy	6.52	6.3	4.23	-	-	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.39	2.317	-	-	-
Pot Cap-1 Maneuver	578	833	1322	-	-	-
Stage 1	820	-	-	-	-	-
Stage 2	791	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	453	752	1322	-	-	-
Mov Cap-2 Maneuver	453	-	-	-	-	-
Stage 1	740	-	-	-	-	-
Stage 2	686	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.4	2.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1322	-	453	752	-	-
HCM Lane V/C Ratio	0.039	-	0.191	0.196	-	-
HCM Control Delay (s)	7.8	-	14.8	11	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	0.7	-	-