MORRISON HERSHFIELD

Teston Road Area Transportation Improvements Individual Environmental Assessment

Transportation System Technical Report # 1

Presented to:

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1. INTRODUCTION

1.1 Study Overview

In 2020 the Regional Municipality of York (York Region) retained Morrison Hershfield (MH) to conduct an Individual Environmental Assessment (IEA) Study for transportation improvements in the Teston Road area. MH will examine alternative solutions that will improve transportation throughout the study area through a comprehensive IEA process.

The road network in northern Vaughan has a number of 'missing links'. The most notable of these is Teston Road between Keele Street and Dufferin Street. York Region has previously tried to secure approval to construct this link. Though York Region presented strong transportation arguments for this link in the previous (2003) Municipal Class Environmental Assessment (EA), and the current and updated Transportation Master Plan (2009 and 2016), given the sensitive land uses in the area, obtaining project approval has been extremely challenging. Consequently, the Ministry of the Environment, Conservation and Parks (MECP) required that the transportation problems and opportunities in the area be examined through an IEA Study to determine the most appropriate solution to address future transportation requirements in the area.

In 2016 York Region initiated the IEA process and completed the Teston Road Area Transportation IEA Terms of Reference (ToR) in 2018. Consultation with interested and/or affected parties is an essential part of this planning process and provides a mechanism for the proponent (York Region) to identify and respond to issues before decisions are made and documentation is filed with the MECP.

1.2 Study Area

The study area for this project was determined during the ToR stage completed in 2018. The study area is bounded by Kirby Road to the north, Bathurst Street to the east, Major Mackenzie Drive West to the south, and Highway 400 to the west.

The IEA study area is situated within the City of Vaughan. The City of Vaughan is one of nine local municipalities within York Region, with local government organized in a two-tier structure.

For the purposes of the traffic analysis, the study area is extended to include Yonge Street, Pine Valley Drive, King Vaughan Road and Rutherford Road. The IEA and Traffic Analysis study areas are outlined in **Figure 1**.

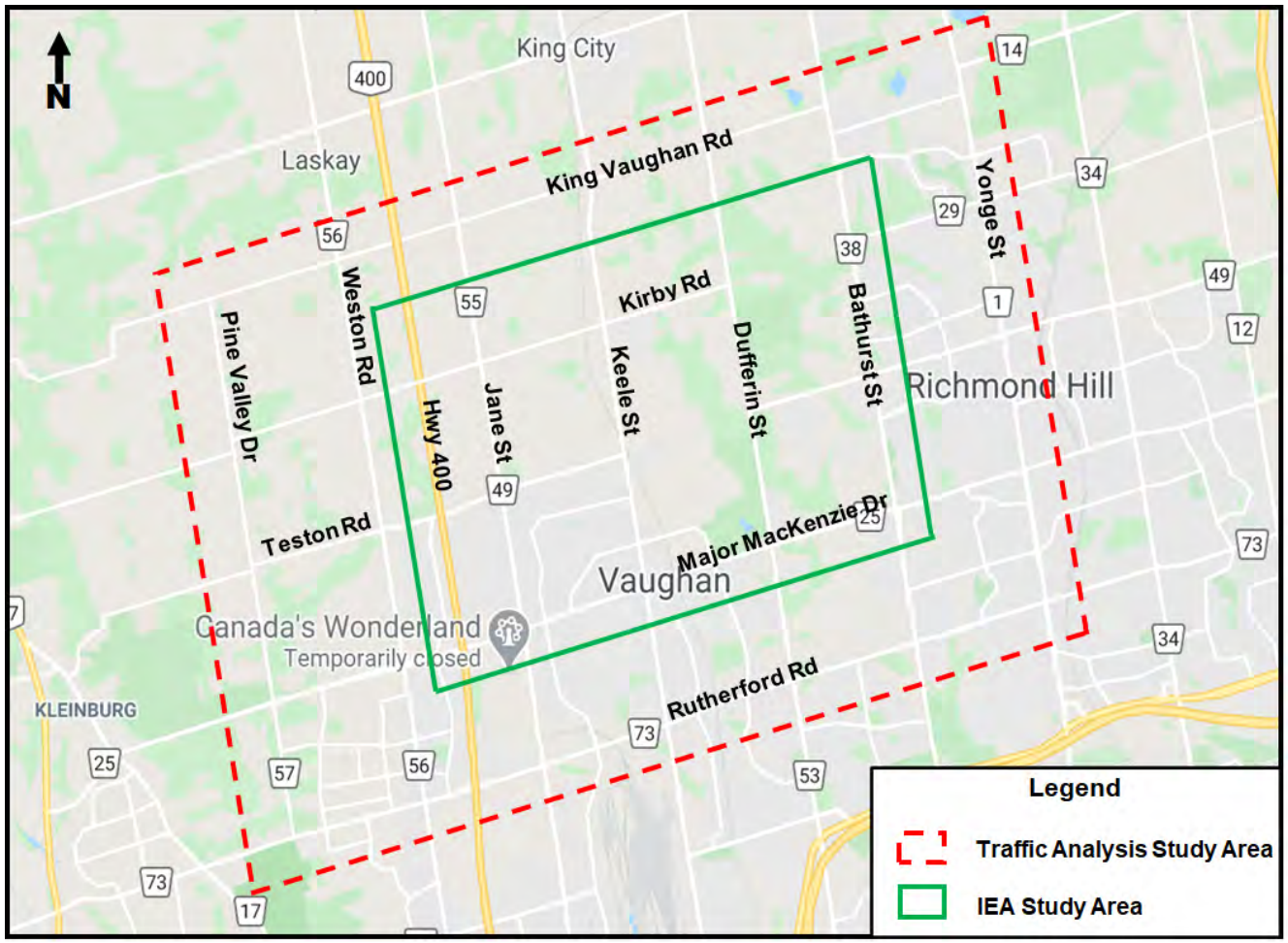


Figure 1: Study Area

1.3 Background

According to the Statistic Canada's population census from 2016, York Region has a population of 1.14 million residents and is anticipated to grow to 1.5 million residents by 2031 (the time or planning horizon for the Official Plan). York Region is currently undertaking the Municipal Comprehensive Review process to review the Region's population and employment forecasts, land budget and Regional Official Plan policies. Through this review process York Region is forecast to reach 2.02 million residents and 990 thousand jobs by 2051. Along with this growth comes the need for additional infrastructure to meet the demands of the growing communities, including the City of Vaughan.

The City of Vaughan is forecast to experience significant population and employment growth by 2031. With a population of more than 330,000 residents, Provincial and Regional forecasts predict Vaughan will reach a population of 416,600 people and 266,100 jobs by 2031. As such, Vaughan will require a significant investment in infrastructure to support this growth.

Although improvements to Teston Road have been identified in the Region's TMP (2016) and various other studies, the IEA is not starting off with a 'predetermined outcome'. The problem and opportunity components of this task will be based on the Transportation Analysis outlined in this report.

1.4 Purpose of Transportation System Technical Report #1

This Report documents regional and municipal planning context, existing transportation facilities and their conditions, existing and future operational performance analysis, a 5-year collision history review and any existing road deficiencies which could affect and have an influence on this study.

The information presented within this Transportation System Technical Report will be used during subsequent stages of this study to support the generation and evaluation of the appropriate alternative solutions as well as the evaluation of those alternatives.

2. REGIONAL AND MUNICIPAL PLANNING CONTEXT

In addition to provincial policies, various municipal policy documents exist and will be taken into consideration in relation to this Project. At the municipal level, Official Plans provide the context and boundaries within which a municipality operates with regards to land use, development and growth. The *Planning Act* requires that an Official Plan conforms to, or does not conflict with provincial plans, has regard for matters of provincial interest, and "shall be consistent with" policy statements issued under the Act. Municipalities must incorporate provincial policy initiatives into their Official Plans and other planning policy documents. Relevant municipal planning policies and how they affect land uses within the study area are presented below for York Region and the City of Vaughan.

2.1 York Region Plans/Policies

2.1.1 York Region Official Plan

The Modified 2010 York Region Official Plan – 2019 Office Consolidation (2019) describes how the Region plans to accommodate future growth and development while meeting the needs of existing residents and businesses in the Region. It provides directions and policies that outline how the community is designed, serviced and supported; and, guides economic, environmental and community building decisions to manage growth (York Region Official Plan – 2019 Office Consolidation, 2019).

The Plan includes policies to help co-ordinate and provide the framework for the nine local municipalities within York Region to undertake more detailed planning. The Region is responsible for regulating land use and establishing policies for physical, economic and social development within its jurisdiction. However, this responsibility is conducted within a provincial framework. Accordingly, during the planning horizon of its Plan, the Province and the Region will work together to ensure successful implementation of the governing Provincial Plans and legislation. Thus, all planning decisions under the York Region Official Plan shall conform with provincial plans such as the Oak Ridges Moraine Conservation Plan (ORMCP), Growth Plan (A Place to Grow, 2020), and Greenbelt Plan and be consistent with the Provincial Policy Statement (PPS).

According to the Statistic Canada's population census from 2016, York Region has a population of 1.14 million residents and is anticipated to grow to 1.5 million residents by 2031 (the time or planning horizon for the Official Plan). Along with this growth comes the need to add infrastructure to meet the demands of the growing communities, including the City of Vaughan.

York Region is currently undertaking the Municipal Comprehensive Review process to review the Region's population and employment forecasts, land budget and Regional Official Plan policies. Through this Review process York Region is forecast to reach 2.02 million residents and 990 thousand jobs by 2051.

The decisions documented within the Official Plan will act as a base scenario for the IEA study and it is assumed that all improvements identified within the Official Plan for the study area will be approved and built. The extension of Teston Road between Keele Street and Dufferin Street, while included in the Official Plan, will be considered as just one alternative through the IEA study.

Section 7.2 of the Official Plan documents York Region's policies for the provision of infrastructure and servicing for the movement of people and goods through transit, active transportation and streets. The objectives that dictate the policies as well as the most relevant policies for this study are included in **Table 1.**

Table 1: Official Plan Objectives for the Movement of People and Goods

OBJECTIVE FOR EACH TRANSPORTATION MODE	RELEVANT POLICIES
Active Transportation Objective: To create an active transportation system and programs that encourage walking, cycling and the use of public transit.	• Implement the cycling network. • Apply the planning and design guidelines for these facilities in the implementation of the network. • To develop an integrated Regional cycling network connecting people to places of recreation, services and employment and transit.
Transit Objective: To provide transit service that is convenient and accessible to all residents and workers of York Region.	• To develop transit corridors and related infrastructure necessary to establish the York Region Transit and Viva network. • To provide preferential treatment for transit vehicles on designated Regional streets, including the construction of high-occupancy vehicle lanes, dedicated transit lanes, transit signal priority and other transit priority measures within the right-of-way. • To achieve higher transit usage by supporting improvements in service, convenient access and good urban design • To manage the movement of traffic in the Regional Rapid Transit Corridors to improve the safety and efficiency of all movements including that of pedestrians, cyclists and transit vehicles
Streets Objectives: To ensure streets support all modes of transportation including walking, cycling, transit, automobile use, and the efficient movement of goods. To plan and protect future urban and rural streets to accommodate transportation demands	• That an Individual Environmental Assessment will be undertaken for the unopened road allowance of Teston Road between Dufferin Street and Keele Street which will include a comprehensive network analysis and environmental impact assessment to determine a preferred transportation strategy in the corridor. • To improve the street network as identified in the Official Plan, including the completion of the necessary Environmental Assessments. • Corridors are to accommodate all modes of transportation including walking, cycling, transit, automobile use and the movement of goods, as well as public and private utilities. • To investigate establishing a continuous alternative east-west corridor(s) in the central part of the Region.

OBJECTIVE FOR EACH TRANSPORTATION MODE	RELEVANT POLICIES
	• That within the Oak Ridges Moraine, all improvements to the Regional Transit and Street Networks shall conform with the policies of the Oak Ridges Moraine Conservation Plan
Goods Movement Objective: To promote a linked and efficient network for goods movement that supports economic vitality and minimizes conflicts with sensitive land uses.	• To promote an interconnected goods movement network that links local municipalities and surrounding areas, utilizing Provincial highways, Regional streets and rail corridors. • To support the optimization of the existing transportation network for goods movement, through methods such as access management and intelligent transportation systems.

2.1.2 York Region Transportation Master Plan

The York Region Transportation Master Plan (TMP 2016) builds upon the direction given in the Official Plan but focusses on the transportation network and the various modes of transportation provided or planned throughout York Region. The TMP sets five objectives for planning and implementing the transportation network. The objectives focus on transit, active transportation, the road network, and employment areas. **Table 2** identifies the various objectives and the initiatives within those objectives that apply to the Teston Road Area Transportation Improvements Project.

Table 2: TMP Objectives and Major Applicable Initiatives

OBJECTIVE	MAJOR INITIATIVES
Objective 1: Create a world class transit system	• Improve transit frequency and coverage.
Objective 2: Develop a road network fit for the future	• Build missing links and new roads • Utilize technology to improve efficiency of the road network • Expand high occupancy vehicle/transit network • Develop the finer grid road network • Build context sensitive multi-modal corridors • Incorporate flexibility in corridors • Maximize the person carrying capacity through corridor evolution
Objective 3: Integrate active transportation in urban areas	• Accelerate active transportation infrastructure that connects communities to transit spines, major destinations and Regional Centres • Support the last mile • Complete gaps in sidewalks
Objective 4: Maximize the potential of employment areas	• Improve connectivity to 400-series highways
Objective 5: Make the last mile work	• Provide safe and convenient walking/cycling opportunities to mobility hubs

Section 9.3.5 of the TMP addresses the need to complete several missing links within the Regional road network, including Teston Road between Keele Street and Dufferin Street. The TMP ensures that any future crossing of natural heritage systems in the Teston Road area, would be subject to an environmental assessment that demonstrates the need and justification for the project through an analysis of alternative solutions and consideration of potential environmental effects. The completion of missing links is also supported by active transportation policies throughout the TMP as these would provide additional connections for active transportation users.

The TMP also identifies existing and future road network conditions, transit network and pedestrian and cyclist facilities. These conditions will play a crucial role in identifying the problems and opportunities, generating reasonable alternatives, and comparatively evaluating those alternatives during the IEA study.

2.1.3 York Region Pedestrian and Cycling Planning & Design Guidelines

Building upon York Region's original Pedestrian & Cycling Master Plan, the latest Pedestrian and Cycling Planning & Design Guidelines (PCPDG, 2018) provide designers with a design reference to support the development of active transportation facilities from the Region's perspective. The guideline, in addition to the Region's Designing Great Streets, reflects the Region's vision to develop high quality active transportation facilities to balance the needs of all road users (comfort, safety and efficiency). The guideline highlights the importance of implementing consistent facility types and design treatments which are in accordance with the Region's planning and design initiatives to further increase active mode shares. The PCPDG expands on the objectives of the TMP that pertain to pedestrians and cyclists, such as Objective 3 as shown in **Table 2.**

The PCPDG will be examined for opportunities to provide active transportation facilities within the study area.

2.1.4 York Region Designing Great Streets: Building Roads that Build Community - Design Guideline

The Designing Great Streets (DGS, 2019) design guideline is an update to York Region's roadway design process using a context sensitive approach, which emphasizes greater mobility for all road users while supporting the development of adjacent land uses. The latest guideline contains six roadway typologies (City Centre Street, Avenue, Main Street, Connector, Rural Road and Rural Hamlet Road) that the Region has developed to reflect their road network aspirations. Additionally, the guideline includes design best practices for cross sectional elements and intersection design, with a nine-step decision-making process to guide the development of roadway corridors (retrofit, reconstruction or new construction). The concerted effort between the various features of the latest design guideline supports the Region's vision of creating vibrant streets for York Region that provide a range of safe and reliable transportation options, while being sensitive to adjacent land uses and needs of the community."

The DGS will be reviewed for opportunities to incorporate the Region's recommended road typologies and design best practices.

2.1.5 Other Pertinent Regional Policies

There are several important Regional policies that will play a role in the evaluation of alternatives and/or the development of the Preliminary Design. These policies include, but are not limited to:

- **Vision 2051 (n.d.):** Vision 2051 is a policy document providing long-term strategies for York Region. Vision 2051 includes eight goal areas ranging from being a place where people can thrive to creating a resilient natural environment and agricultural system. There are several goals within Vision 2051 that support the creation of new infrastructure to support growing communities and increasing connectivity, which is the aim of the IEA study.
- **Sustainability Strategy (2007):** The strategy is a framework for growth management decision making that integrates the economy, environment, and community. The strategy is intended to ensure that each decision made by York Region produces value and a net gain within the economy, environment, and the community.
- **Regional Streetscape Policy (n.d):** The streetscape policy provides an approach to ensure a unified vision for the design of regional streets and the policy will be used during the generation of alternatives to determine appropriate roadway corridor widths. Moreover, the specific roadway design details will be addressed during the Preliminary Design stage of the IEA process.
- **Standard Operating Procedures for Traffic Noise Mitigation (2010):** A noise assessment will be completed to assist in the evaluation of the alternative methods. The guidelines in this standard operating procedure will be followed and provide the framework to complete the noise assessment.

2.2 City of Vaughan Plans/Policies

2.2.1 City of Vaughan Official Plan

The study area lies within the City of Vaughan, which is a municipality in York Region. Centrally located within the Greater Golden Horseshoe (GGH) area, the City enjoys strong rail and road transportation links to its neighbouring municipalities and others across the GGH and beyond. The City is also home to the headwaters of both the Humber and Don Rivers, with their significant valley systems being a prominent feature on the landscape.

Similar to York Region, Vaughan is forecast to experience significant population and employment growth by 2031. With a population of more than 330,000 residents, Provincial and Regional forecasts predict Vaughan will reach a population of 416,600 people and 266,100 jobs by 2031. As such, Vaughan will require significant investment in the infrastructure necessary to support this growth.

The City of Vaughan Official Plan 2010 (June 2019 Office Consolidation) is part of an overall Growth Management Strategy, initiated by City Council that is intended to shape the future of the City and guide its continued transformation into a vibrant, beautiful and sustainable City. The Official Plan – A Plan for Transformation, was prepared as part of a comprehensive three-year exercise, involving several concurrent studies and Master Plans to address the City's long-term planning requirements to the year 2031. The June 2019 Office Consolidation of the Vaughan Official Plan 2010 was updated to include Local Planning Appeal Tribunal (LPAT) decisions and City Council approved Official Plan Amendments as of May 29, 2019. In addition to consolidating all former land use policy into one document, the June 2019 Office Consolidation brings the City into conformity with recent Provincial and Regional land use policy direction.

Where the York Region Official Plan sets priorities at the regional level, the City of Vaughan's Official Plan provides the structure for planning decisions made within the City and at the local level. This includes land use planning and the local road network. The study area features a number of different land uses which are described in **Table 3**.

The City's Official Plan also discusses the importance of a safe and efficient street network that accommodates transit, active transportation and other vehicles. The City's local network is dependent on the planning and implementation of the provincial and regional road networks.

During the IEA study, potential impacts to mapped land uses will be examined during the evaluation of alternatives. Where applicable, sensitive land uses will be avoided, and pertinent mitigation measures explored and prescribed during the Preliminary Design phase, to minimize potential impacts to land uses and features that cannot be avoided.

Table 3: City of Vaughan Land Use Descriptions and Areas

LAND USE	DESCRIPTION FROM THE OFFICIAL PLAN	LOCATIONS WITHIN THE STUDY AREA
Natural Areas and Countryside	Natural Areas and Countryside generally follow the valleys of the Humber and Don River systems and their associated tablelands but also feature areas of agricultural lands in the north parts of Vaughan.	• Similar to areas identified as Natural Core or Countryside Areas in the ORMCP. • The areas east of Dufferin Street and North of Teston Road. • Throughout the study area generally following watercourses such as the east and west branches of the Don River.
Employment Area	Employment Areas are intended for the use of economic activities that require separation from other uses in order to achieve their maximum potential. Employment areas offer areas for economic activity related to	• On the east side of the GO Barrie Line, north and south of Teston Road abutting the former landfills. • Between Jane Street and Highway 400, north of Teston Road.

LAND USE	DESCRIPTION FROM THE OFFICIAL PLAN	LOCATIONS WITHIN THE STUDY AREA
	industrial, manufacturing, warehousing and some offices.	
Primary Intensification Corridor	Intensification corridors link various centres and are linear places of activity in their own right. They may accommodate mixed-use intensification or employment intensification.	• Along Major Mackenzie Drive West.
Local Centres	Local centres act as the focus for communities, are lower in scale and offer a more limited range of uses.	• Surrounding the intersection of Major Mackenzie Drive West and Keele Street and encompasses much of Historic Maple Village.
Primary Centres	Primary Centres accommodate a wide range of uses and will have tall buildings, as well as lower ones, to facilitate an appropriate transition to neighbouring areas.	• North of Major Mackenzie Drive West, west of Jane Street and east of Highway 400, includes the Mackenzie Vaughan Hospital (currently under construction).
Community Areas	Characterized by predominately Low-Rise Residential housing stock, with local amenities including local retail, community facilities, schools and parks, and they provide access to the City's natural heritage and open spaces.	• The remainder of the study area not identified above. • A new community area is planned for the block bound by Kirby Road, Keele Street, Teston Road, and Jane Street.

2.2.2 City of Vaughan Transportation Master Plan

Similar to York Region's TMP, the City's TMP (2012) builds upon the direction given in the Official Plan but focusses on the transportation network and the various modes of transportation provided or planned throughout the City of Vaughan. The City's TMP focusses on solutions to several transportation issues including: affordability of supplying sufficient capacity for rapid growth; the dependency on the automobile; heavy orientation for travel to the City of Toronto; providing more efficient movement of goods; the threat of air quality posed by the rise in auto and truck travel; and if development density is high enough to support efficient public transit. The TMP attempts to address these issues through the planning of the City's road network, active transportation and transit initiatives.

The future conditions provided within the TMP will be incorporated into the IEA study as part of the generation and evaluation of alternatives. In this regard, every effort will be made to conform to the City's TMP during the IEA study.

2.2.3 City of Vaughan Pedestrian and Bicycle Master Plan (2020 to 2023 Updates)

The City of Vaughan Pedestrian and Bicycle Master Plan (PBMP) reflects the direction from the City's Official Plan and Transportation Master Plan with a

dedicated focus towards pedestrian and cycling infrastructure. Originally completed in 2012, the City of Vaughan commenced an update to the Pedestrian and Bicycle Master Plan in 2017 to guide the planning, design, construction, and maintenance of pedestrian and cycling infrastructure. The key areas of opportunity identified in the update include safety for all ages and abilities, supporting pedestrian and cycling infrastructure, addressing gaps and connectivity, and creating awareness and culture. The process of the following IEA study shall address and support the key opportunity areas identified within the PBMP updates completed in 2020, 2022 and 2023.

As shown in **Figure 2**, the City of Vaughan's Priority Cycling and Multi-use Recreational Trail Network (February 2022 update) includes:

- Existing multi-use recreational trail connections to the Teston Road corridor:
    - from the north at 45 m and 850 m east of Rodinea Road
    - from the south at 175 m east of Dufferin Street at the existing entrance to the Maple Nature Reserve
- A primary network (Vaughan Super Trail) south side multi-use recreational trail connection to Teston Road at 850 m east of Rodinea Road (shown as short term and medium term implementation)
- Secondary multi-use recreational trail network crossings of or connections to the proposed Teston Road corridor (all shown as long term implementation):
    - in the vicinity of the GO Rail corridor (extending to the north and south)
    - along the Don River East Branch Tributary (extending to the north and south)
    - at Via Romano Boulevard (connection to the north)
    - 340 m east of Via Romano Boulevard (extending to the north and south)

As shown in **Figure 3**, the City of Vaughan's 2051 Active Transportation Network (April 2023) also includes:

- Planned regional cycling routes along Teston Road from west of Keele Street to Bathurst Street, as well as along Keele Street, Dufferin Street and Bathurst Street to the north and south of Teston Road.
- Planned local cycling routes on several roadways intersecting Teston Road including: a new roadway accessing Block 27 about 175 m west of Keele Street, Rodinea Road, Lady Fenyrose Avenue, Via Romano Boulevard (as above) and Torah Gate.

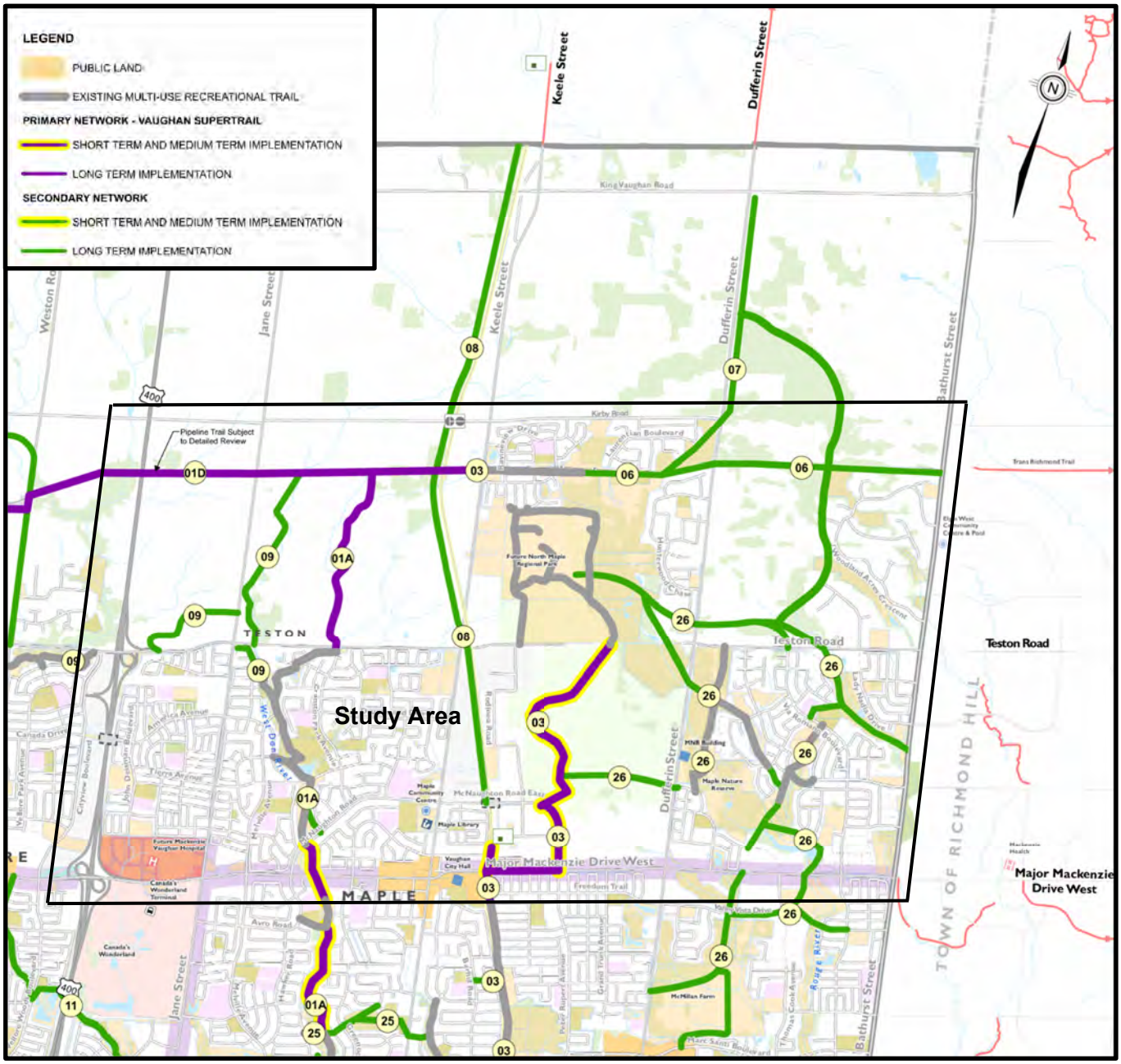


Figure 2: Multi-Use Recreational Trail Network Implementation Plan (City of Vaughan Pedestrian and Bicycle Master Plan, Feb 2022)

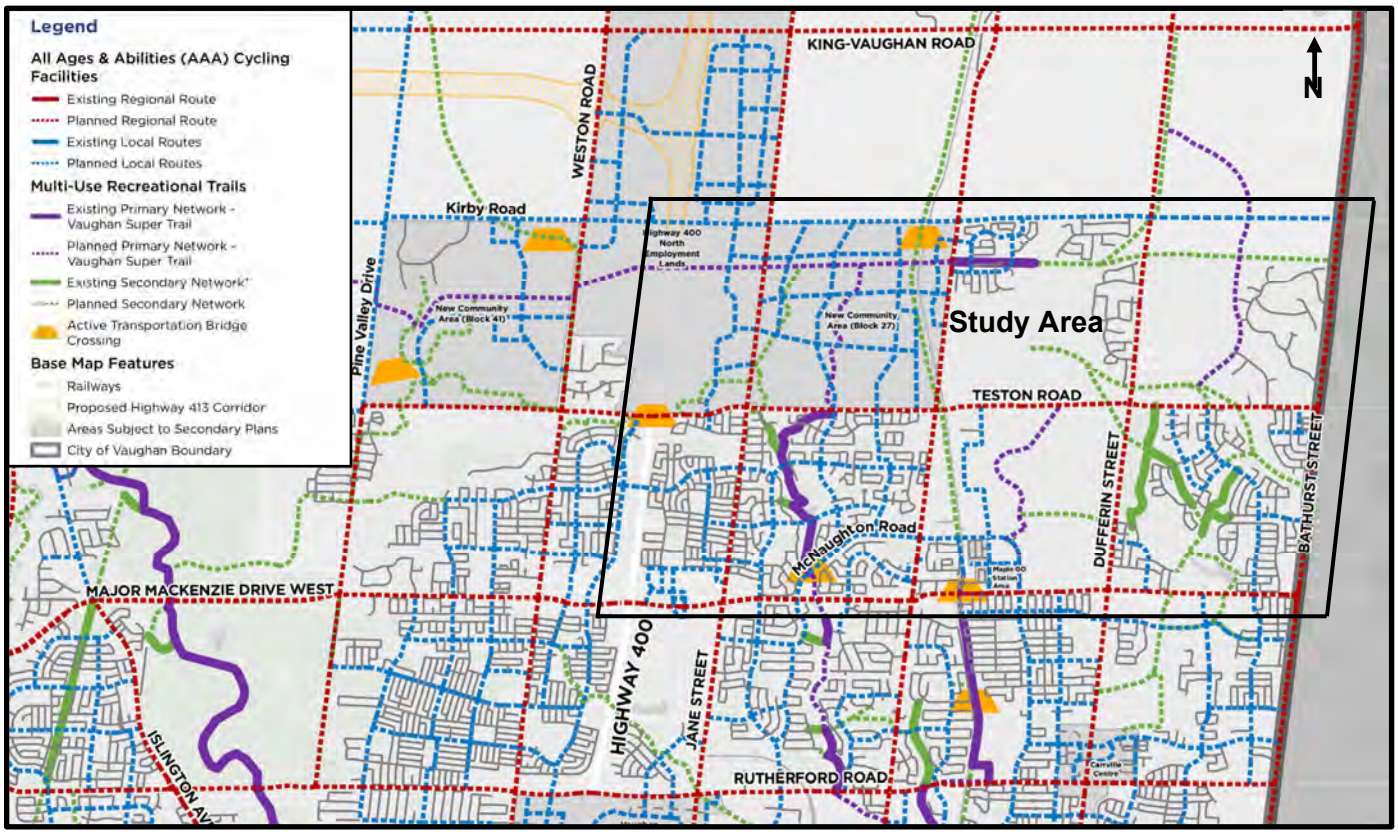


Figure 3: 2051 Active Transportation Network (City of Vaughan, April 2023)

2.2.4 North Vaughan and New Communities Transportation Master Plan

The North Vaughan and New Communities Transportation Master Plan (NVNCTMP) is a long-range plan that recommends policies, programs and the infrastructure required to meeting the existing and future mobility needs for the North Vaughan area (City of Vaughan, 2019a). The area covered by the NVNCTMP is shown in **Figure 4**. The Teston Road IEA study area has been added to the map.

The TMP recommended both the Transportation network layout and Active Transportation networks for the area.

The study was conducted in parallel with Secondary Plan studies for both Block 27 and Block 41 (see **Figure 4)** that are reviewing the transportation network and land uses within each block.

A portion of the NVNCTMP study area and all of Block 27 falls within the Teston Road Area Improvements study area. The decisions made within these studies will be further examined and integrated into the Teston Road Area study as required.

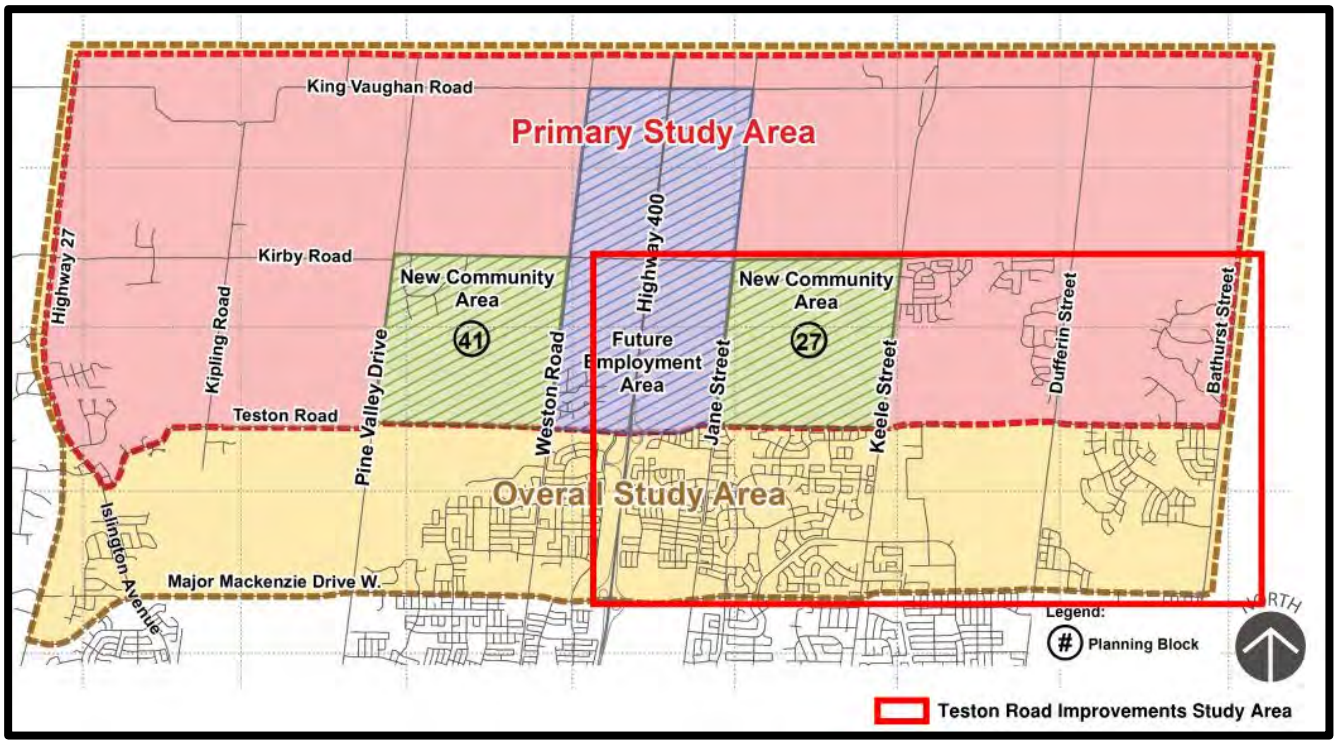


Figure 4: North Vaughan and New Communities TMP Study Area (City of Vaughan, 2019)

2.3 Other Relevant Plans/Policies

2.3.1 Metrolinx 2041 Regional Transportation Plan (2018)

The 2041 Regional Transportation Plan (RTP) represents Metrolinx's dedication to developing a complete multi-modal transportation system that connects the greater Toronto and Hamilton area. The groundwork of the RTP plan is in support of the planning policies of the Growth Plan for the Greater Golden Horseshoe to provide safe, convenient and reliable connections. The goals of the RTP are to provide strong multi-modal connections to transit, address a complete trip and to support the development of sustainable and healthy communities. To achieve the vision and goals of the RTP, Metrolinx's primary strategies include expanding the transit network to serve a greater proportion of the region, optimizing the transportation system to support transit use and integrating transit in the planning of transportation systems and land use.

2.3.2 Provincial Policy Statement (2020)

The PPS is a policy planning document prepared in accordance with the Planning Act, providing underlying direction for land use planning and developments within Ontario. The policies of the PPS are aimed at protecting provincial interests to ensure efficient land use planning and enhancing the quality of life for Ontarians addressing a breadth of matters related to community development, resource management, and public health and safety. The PPS supports the development of a

reliable, cost effective multi-modal transportation systems that promotes the use of a mix of active transportation modes and transit to facilitate the safe movement of people. In addition, the policies are in support of improving connections between various transportation modes and expanding the greater transportation network beyond regional boundaries. Teston Road is a key east-west corridor through the City of Vaughan that has the potential to serve as an important multi-modal transportation corridor to support the City's future growth and development outlook.

2.3.3 A Place to Grow (2020)

Building upon the PPS, the Growth Plan for the Greater Golden Horseshoe (GPGGH) is a regional specific land use planning policy for the Greater Golden Horseshoe in conjunction with other plans, such as the Oak Ridges Moraine Conservation Plan and Niagara Escarpment Plan, which focus on establishing a framework for developing a thriving economy, clean and healthy environment, and social equity. The vision of the GPGGH is to support the development of complete communities which include access to affordable transit and active transportation facilities, employment zones, and a range of housing options. These policies support the development of active transportation and transit supportive networks to offer residents with a balance of transportation choices by providing continuous links and multi-modal connections which align with the York Region's proposed plans for Teston Road.

2.3.4 Nearby Ongoing/Approved EAs

There are several ongoing EAs within and in proximity to the study area. Though these EAs involve assessments of planned improvements identified within the Official Plans of either York Region or the City of Vaughan for the most part, it is recognized that they may affect the future conditions within the study area.

The IEA study will ensure the recommendations for these EAs are incorporated should they be available. Otherwise, reasonable assumptions will be made based on available information. A preliminary list of other EAs within and in proximity to the study area includes:

- York Region's EA for Teston Road - Pine Valley Drive to Weston Road (approved November 2016 – construction anticipated in 2021).
- York Region's EA for Major Mackenzie Drive – McNaughton Road/Avro Road to Keele Street (approved December 2018 – construction anticipated in 2024).
- City of Vaughan's EA for the Kirby Road Widening between Jane Street and Dufferin Street and the Grade Separation of the Barrie GO Line at Kirby Road (ongoing).
- City of Vaughan's EA for Kirby Road Extension between Bathurst Street and Dufferin Street (approved October 2019 – construction anticipated in 2022).
- City of Vaughan's EA for North Maple Community Bridge (approved December 2013).

- Ministry of Transportation's (MTO) EA for the GTA West Corridor (expected to be complete by the end of 2022).
- Metrolinx Barrie Rail Corridor Expansion Project, Transit Project Assessment Process, Environmental Project Report (approved August 2017).
- Metrolinx Transportation and Traffic Impact Analysis for Kirby GO Station (approved August 2018).

Additional information on any anticipated EAs within the study area will be requested from York Region and the City of Vaughan, and the list updated as the IEA study progresses.

3. EXISTING CONDITIONS

3.1 Road Network

As mentioned in **Section 1.2**, the IEA study area is bounded by Kirby Road to the north, Bathurst Street to the east, Major Mackenzie Drive West to the south, and Highway 400 to the west. This section provides a glimpse of traffic characteristics at each of the north/south and east/west arterial roads within the study area.

3.1.1 Teston Road (York Region Road 49)

Teston Road (York Region Road 49) is an east-west arterial road with a 4-lane cross section (between Highway 400 and Keele Street) and 2-lanes (from Keele Street to Rodinea Road and from Dufferin Street to Bathurst Street) and a posted speed limit of 60 km/h. The posted speed limit is reduced to 50 km/h, east of Bathurst Street. There is a discontinuity along Teston Road between Keele Street and Dufferin Street.

The land uses abutting the Teston Road corridor between Highway 400 and the eastern boundary for the City of Vaughan (Bathurst Street) includes a mix of open space, agricultural, residential, and commercial / industrial. Portions of the open space and agricultural land near Teston Road are part of the Oak Ridges Moraine and Greenbelt natural heritages systems. The land east of Keele Street adjacent to Teston Road includes environmentally significant areas and areas of natural and scientific interest subject to the policies of the Oak Ridges Moraine Conservation Plan. Other Greenbelt areas would be subject to the policies of the Greenbelt Plan. The majority of the residential land use abutting Teston Road is comprised of low-rise residential and mixed-use properties with new community areas planned for the land on the north side of Teston Road bounded by Jane Street and Keele Street subject to the New Communities Secondary Plan. The commercial and industrial lands along Teston Road are concentrated on the east of Keele Street, adjacent to the existing Go Transit rail line, comprised of general and prestige employment areas. The missing segment of Teston Road between Keele Street and Dufferin Street currently provides access to landfill sites formerly used by the City of Toronto and regional municipalities of York and Durham.

With regards to the existing road geometrics, the existing Teston Road horizontal alignment from west to east begins with a reverse curve with approximate radii of 350m to 475m between Highway 400 and Jane Street. It is then on a tangent between Jane Street and Keele Street. East of Keele Street, the alignment crosses the Barrie GO Line rail at-grade with an approximate 375m radius reverse curve which terminates as a tangent at Rodinea Road. Between Dufferin Street and Bathurst Street, a 400m reverse curve is present at the Dufferin Street intersection with the remaining segment being on a tangent until Bathurst Street. The existing profile follows a rolling topography with approximate grades ranging from 0.30% and 12.50% (which exceeds the Region's maximum desirable vertical grade of 8%) with crest curve K values ranging from 1 to 21 (which certain areas do not meet the minimum 17 K_{crest} value for a 70 km/h Design Speed) and sag curve K values

ranging from 1 to 7 which do not meet the minimum 10 K_{sag} value for a 70 km/h Design Speed).

As shown in **Table 4**, the Annual Average Daily Traffic (AADT) volume in this section of Teston Road (between Highway 400 and Bathurst Street) was in the range of 2,222 to 16,285 veh/day. The field measured 85th percentile speed was in the order of 72-83 km/h. The typical vehicle carrying capacity of a single arterial traffic lane on Teston Road is in the order of 800 to 900 veh/h.

Table 4: Traffic Characteristics along Teston Road

Location Description	AADT (vpd)	85th Percentile Speed (kph)
Hwy 400 to Jane St	5,309 (2019)	83
Jane St to Keele St	6,476 (2018)	75
Keele St to Rodinea Rd	2,222 (2019)	72
Dufferin St to Bathurst St	16,285 (2018)	74

3.1.2 Kirby Road (City of Vaughan)

Kirby Road (from Highway 400 to Dufferin Street) is an east-west minor arterial road with a 2-lane cross-section and a posted speed limit of 60 km/h. There is a discontinuity along Kirby Road between Dufferin Street and Bathurst Street. Currently, there is minimal development along the westerly section of Kirby Road between Keele Street and Jane Street. The easterly section from Jane Street to Dufferin Street includes substantial residential development to the south.

With regards to the existing road geometrics, the existing horizontal alignment from east to west is generally tangent with an offset intersection at Jane Street and an approximate 1,250m radius reverse curve to the east of the Keele Street intersection. The existing profile follows a rolling topography with approximate grades ranging from 0.30% and 11.50% (which exceeds the Region's maximum desirable vertical grade of 8%) with crest curve K values ranging from 4 to 28 (which does not meet the minimum 26 K_{crest} value for an 80 km/h Design Speed) and sag curve K values ranging from 2 to 15 (which does not meet the minimum 12 K_{sag} value for a 80 km/h Design Speed).

As shown in **Table 5**, the 2016 two-way AADT volume in this section of Kirby Road (between Highway 400 and Jane Street) was 2,878 veh/day. The typical vehicle carrying capacity of a single lane on Kirby Road is approximately 700 veh/h.

Table 5: Traffic Characteristics along Kirby Road

Location Description	AADT (vpd)
Hwy 400 to Jane St	2,878 (2016)
Jane St to Keele St	3,787 (2011)

3.1.3 Major Mackenzie Drive (York Regional Road 25)

Major Mackenzie Drive (York Regional Road 25) is an east-west arterial road with an interchange at Highway 400. Currently, Major Mackenzie Drive has a 4-lane cross-section and a posted speed limit of 60 km/h and is identified in the York Region TMP as a future Rapid Transit corridor. Currently, Major Mackenzie Drive is fully urbanized and generally surrounded by residential and commercial lands on both sides between Highway 400 and Bathurst Street.

With regards to the existing road geometrics, the existing horizontal alignment from east to west begins with a reverse curve with approximate radii of 1250m between Highway 400 to the east of Jane Street. It is then tangent between Jane Street and Keele Street where a tight 175m reverse curve shifts the road to the north. The alignment then generally follows a tangent until the west of Dufferin Street where a 1350m curve shifts the road to the south. The road continues on a tangent until ending in a 1250m curve at the Bathurst Street intersection. The existing profile follows a rolling topography with approximate grades ranging from 0.30% and 10.50% (which exceeds the Region's maximum desirable vertical grade of 8%) with crest curve K values ranging from 1 to 16 (which does not meet the minimum 26 K_{crest} value for an 80 km/h Design Speed) and sag curve K values ranging from 1 to 14 (which does not meet the minimum 12 K_{sag} value for a 80 km/h Design Speed).

As shown in **Table 6**, the AADT volume in this section of Major Mackenzie Drive (between Highway 400 and Bathurst Street) was in the range of 34,336 to 63,533 veh/day. The field measured 85th percentile speed was in the order of 62-86 km/h. The typical vehicle carrying capacity of a single arterial traffic lane on Major Mackenzie Drive is in the order of 800 to 900 veh/h.

Table 6: Traffic Characteristics along Major Mackenzie Drive

Location Description	AADT (vpd)	85th Percentile Speed (kph)
Hwy 400 to Jane St	63,533 (2019)	70
Jane St to Keele St	58,053 (2018)	70
Keele St and Dufferin St	34,336 (2019)	62
Dufferin St to Bathurst St	35,176 (2018)	86

3.1.4 Bathurst Street (York Regional Road 38)

Bathurst Street (York Regional Road 38) is a north-south major urban arterial road with a 4-lane cross section and a posted speed limit of 60 km/h. Currently, Bathurst Street is fully urbanized and generally surrounded by residential and natural heritage lands on both sides between Major Mackenzie Drive and Kirby Road.

With regards to the existing road geometrics, the existing horizontal alignment from south to north is generally tangent throughout from Major Mackenzie Drive to Kirby Road. The existing profile follows a rolling topography with approximate grades ranging from 0.30% and 8% with crest curve K values ranging from 1 to 15 (which does not meet the minimum 26 K_{crest} value for an 80 km/h Design Speed) and sag

curve K values ranging from 1 to 27 (which does not meet the minimum 12 K_{sag} value for a 80 km/h Design Speed).

As shown in **Table 7**, the AADT in this section of Bathurst Street (between Rutherford Road and King Vaughan Road) was in the range of 24,518 to 38,877 veh/day. The field measured 85th percentile speed was 74 km/h. The typical vehicle carrying capacity of a single arterial traffic lane on Bathurst Street is in the order of 900 to 1,200 veh/h.

Table 7: Traffic Characteristics along Bathurst Street

Location Description	AADT (vpd)	85th Percentile Speed (kph)
Rutherford Rd IC to Major Mackenzie Dr	37,672 (2019)	74
Major Mackenzie Dr to Mill St/Queen Filomena Ave	38,877 (2018)	74
Oxford St/Lady Dolores Ave and Elgin Mills Rd/Teston Rd	34,478 (2019)	74
Teston Rd to Kirby Road	33,838 (2018)	74
Kirby Road to King Vaughan Rd	24,518 (2019)	n/a

3.1.5 Dufferin Street (York Regional Road 53)

Dufferin Street (York Regional Road 53) is a north-south minor arterial road with a 2-lane cross section and a posted speed limit of 60 km/h. Currently, Dufferin Street is generally surrounded by residential and natural heritage lands including golf courses on both sides between Major Mackenzie Drive and Kirby Road.

With regards to the existing road geometrics, the existing horizontal alignment from south to north is generally tangent throughout from Major Mackenzie Drive to Kirby Road. The existing profile follows a rolling topography with approximate grades ranging from 0.30% and 12.50% (which exceeds the Region's maximum desirable vertical grade of 8%) with crest curve K values ranging from 1 to 15 (which does not meet the minimum 26 K_{crest} value for an 80 km/h Design Speed) and sag curve K values ranging from 1 to 18 (which does not meet the minimum 12 K_{sag} value for a 80 km/h Design Speed).

As shown in **Table 8**, the AADT in this section of Dufferin Street (between Rutherford Road and King Vaughan Road) was in the range of 9,491 to 29,671 veh/day. The field measured 85th percentile speed was in the order of 79-94 km/h. The typical vehicle carrying capacity of a single arterial traffic lane on Dufferin Street is in the order of 900 to 1,000 veh/h.

Table 8: Traffic Characteristics along Dufferin Street

Location Description	AADT (vpd)	85th Percentile Speed (kph)
Rutherford Rd IC to Major Mackenzie Dr	29,671 (2019)	79
Major Mackenzie Dr to Teston Rd	18,553 (2018)	79
Hunterwood Chase to Beakes Cres	14,430 (2019)	84

Location Description	AADT (vpd)	85th Percentile Speed (kph)
Athabasca Dr and Kirby Rd	12,051 (2018)	84
Kirby Rd to King Vaughan Rd	9,491 (2019)	94

3.1.6 Keele Street (York Regional Road 6)

Keele Street (York Regional Road 6) is a north-south urban arterial road with a 4-lane cross section and a posted speed limit of 50 km/h. Currently, Keele Street is generally surrounded by residential and agricultural lands as well as industrial lands to the north-east and south-east of the Teston Road intersection.

With regards to the existing road geometrics, the existing horizontal alignment from south to north is generally tangent throughout from Major Mackenzie Drive to Kirby Road. The existing profile follows a rolling topography with approximate grades ranging from 0.30% and 7.10% with crest curve K values ranging from 1 to 24 (which certain areas do not meet the minimum 17 K_{crest} value for a 70 km/h Design Speed) and sag curve K values ranging from 1 to 24 which do not meet the minimum 10 K_{sag} value for a 70 km/h Design Speed).

As shown in **Table 9**, the AADT in this section of Keele Street (between Rutherford Road and King Vaughan Road) was in the range of 14,032 to 21,957 veh/day. The field measured 85th percentile speed was in the order of 69-80 km/h. The typical vehicle carrying capacity of a single arterial traffic lane on Keele Street is in the order of 800 to 1,000 veh/h.

Table 9: Traffic Characteristics along Keele Street

Location Description	AADT (vpd)	85th Percentile Speed (kph)
Dina Rd and Cromwell Rd/Fieldgate Dr	19,151 (2018)	69
Naylon St and Church St. Mid-Block Pedestrian Crossing	20,095 (2018)	80
Major Mackenzie Dr W and Railway St/Killian Rd	21,957 (2019)	80
Maple Health Centre and Drummond Dr	19,357 (2018)	76
Teston Rd to Kirby Rd	15,234 (2019)	78
Kirby Rd to King Vaughan Rd	14,032 (2018)	78

3.1.7 Jane Street (York Regional Road 55)

Jane Street (York Regional Road 55) is a north-south urban arterial road with a 4-lane cross section and a posted speed limit of 60 km/h. Currently, Jane Street is generally surrounded by residential and commercial lands between Major Mackenzie Drive and Teston Road and undeveloped agricultural lands between Teston Road and Kirby Road.

With regards to the existing road geometrics, the existing horizontal alignment from south to north is generally tangent throughout from Major Mackenzie Drive to Kirby

Road. The existing profile is fairly flat and follows a rolling topography with approximate grades ranging from 0.30% and 3.90% with crest curve K values ranging from 1 to 37 (which does not meet the minimum 26 K_{crest} value for an 80 km/h Design Speed) and sag curve K values ranging from 1 to 25 (which does not meet the minimum 12 K_{sag} value for a 80 km/h Design Speed).

As shown in **Table 10**, the AADT in this section of Jane Street (between Rutherford Road and King Vaughan Road) was in the range of 6,837 to 36,093 veh/day. The field measured 85th percentile speed was in the order of 73-97 km/h. The typical vehicle carrying capacity of a single arterial traffic lane on Jane Street is in the order of 900 to 1,000 veh/h.

Table 10: Traffic Characteristics along Jane Street

Location Description	AADT (vpd)	85th Percentile Speed (kph)
Rutherford Rd and Auto Vaughan Dr	27,619 (2019)	84
Avro Rd and Major Mackenzie Dr W	27,493 (2018)	80
Major Mackenzie Dr and Roseheath Dr/Grand Valley Blvd	36,093 (2019)	80
Ahmadiyya Ave and Teston Rd	12,374 (2018)	73
Teston Rd and Kirby Rd	6,837 (2019)	98
Kirby Rd and King Vaughan Rd	6,888 (2018)	97

3.1.8 Highway 400

Highway 400 is a Controlled Access Highway under the jurisdiction of MTO, which traverses through the study area in a north/south direction. Highway 400 is considered regionally and provincially significant, serving as an important link between the GGH area and Simcoe County to the north. It also connects Highway 401 in southern Ontario to central and northern Ontario/western Canada via Highway 69 and Highway 11, respectively. Highway 400 has a 6-lane cross section and includes two interchanges within the study area at Major Mackenzie Drive West and Teston Road.

Table 11 illustrates pertinent traffic information along Highway 400 which provides a glimpse of traffic characteristics at each section. Summer traffic (2016 SADT) was approximately 22% higher than the two-way Annual Average Daily Traffic (2016 AADT) volume in this section of Highway 400. In the Pattern Type column: “CTR” refers to “Commuter Tourist Recreation”.

Table 11: Traffic Characteristics along Highway 400

Location Description	Pattern Type	2016 AADT	2016 SADT
Rutherford Rd IC to Major Mackenzie Dr IC	CTR	158,900	193,800
Major Mackenzie Dr IC to Teston Rd IC	CTR	132,400	161,500
Teston Rd IC to York Rd 11 IC	CTR	119,200	145,400

3.2 Existing Signalized Intersections

As shown in **Figure 5**, there are currently 18 key signalized intersections within the study area summarized below:

- Kirby Road and Jane Street Intersection;
- Kirby Road and Keele Street Intersection;
- Kirby Road and Dufferin Street Intersection;
- Kirby Road and Bathurst Street Intersection;
- Teston Road and Cityview Boulevard Intersection;
- Teston Road and Highway 400 S-E/W Ramp Terminal;
- Teston Road and Jane Street Intersection;
- Teston Road and Cranston Park Avenue Intersection;
- Teston Road and Keele Street Intersection;
- Teston Road and Dufferin Street Intersection;
- Teston Road and Via Romano Boulevard;
- Teston Road and Bathurst Street Intersection;
- Major Mackenzie Drive and Highway 400 N-E/W Ramp Terminal;
- Major Mackenzie Drive and Highway 400 S-E/W Ramp Terminal;
- Major Mackenzie Drive and Jane Street Intersection;
- Major Mackenzie Drive and Keele Street Intersection;
- Major Mackenzie Drive and Dufferin Street Intersection; and
- Major Mackenzie Drive and Bathurst Street Intersection.

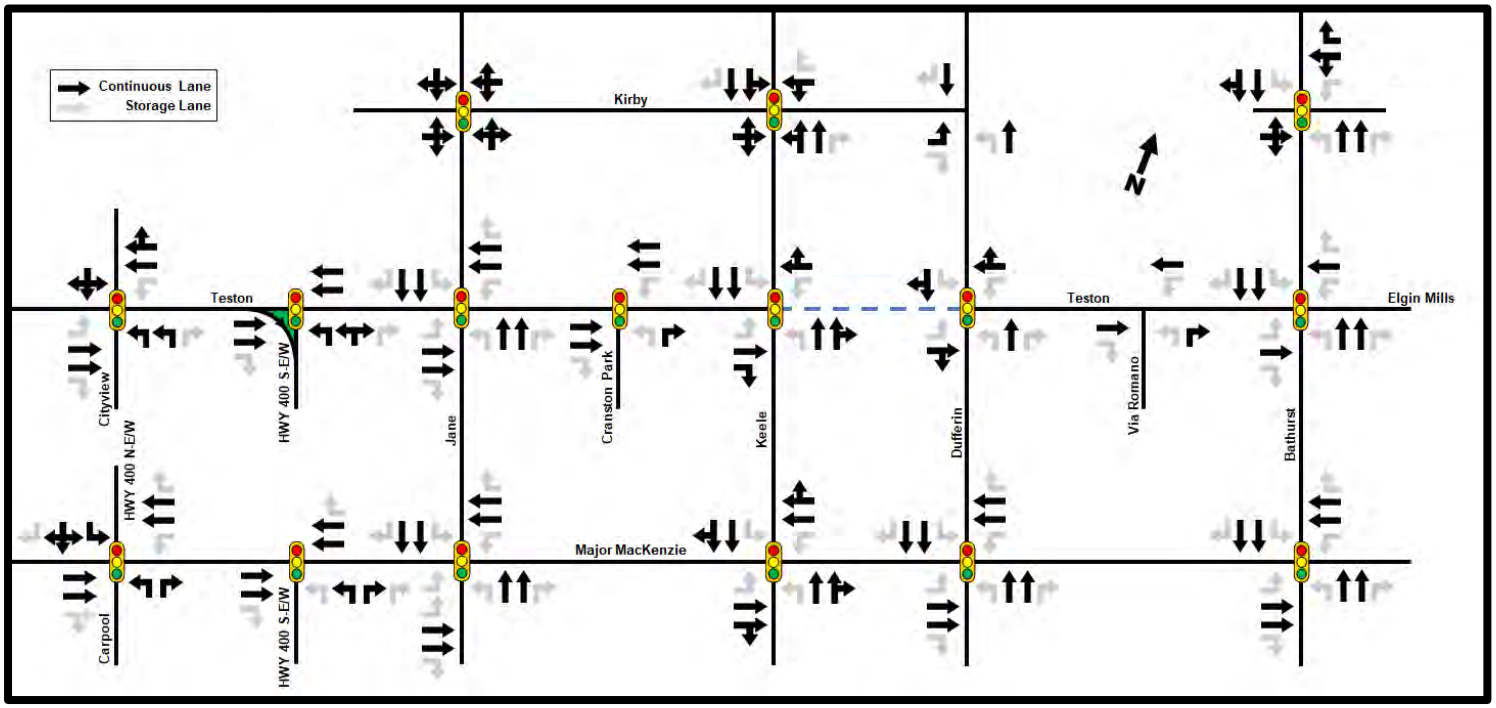


Figure 5: Existing Intersections within Traffic Analysis Study Area

3.3 Transit

Figure 6 illustrates existing York Region transit network. The existing GO, Viva, and YRT network within the study area is described below.

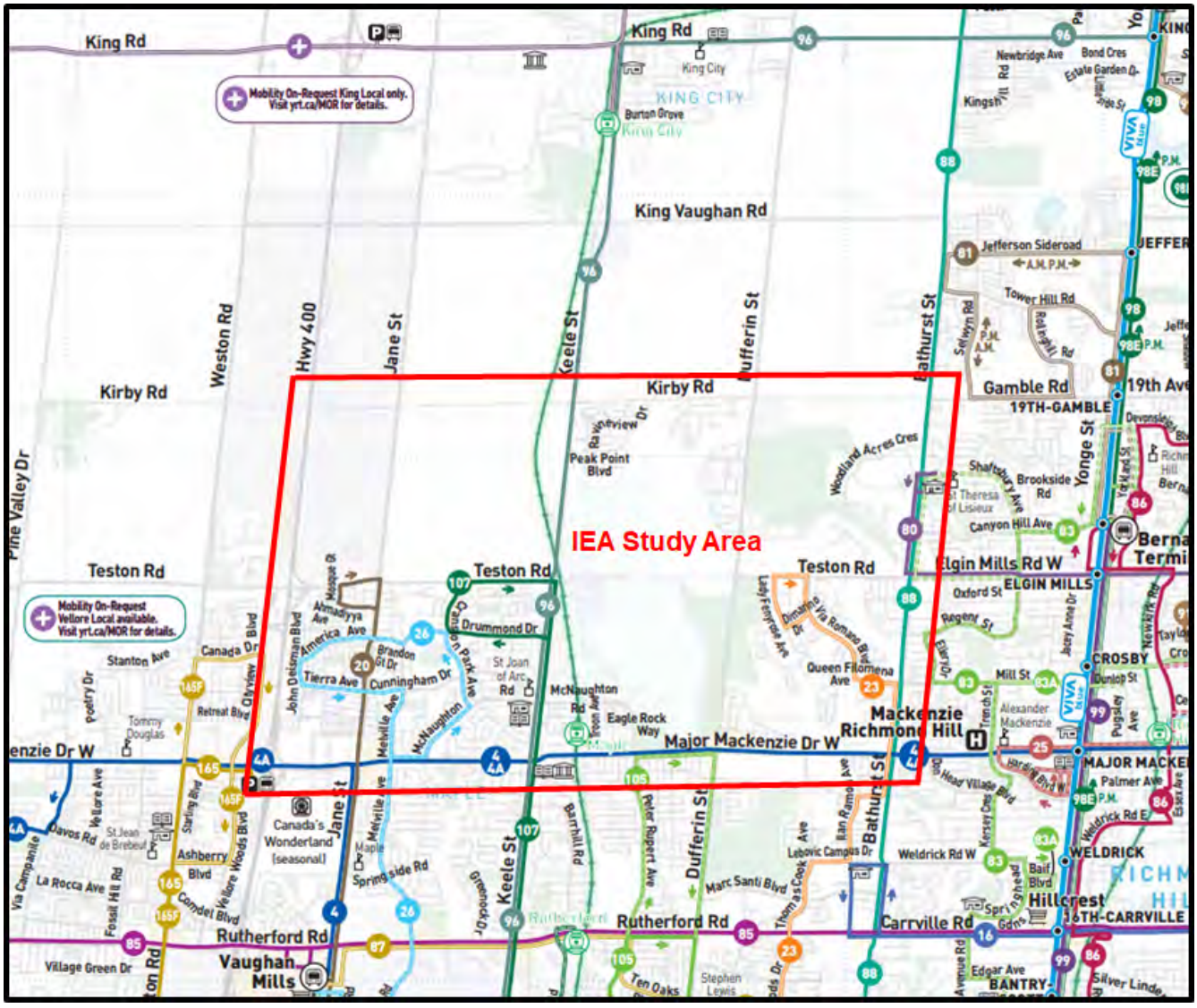


Figure 6: Existing York Region Transit Network (June 2020)

3.3.1 GO Transit

The Barrie GO rail corridor is one of the seven train lines of the GO Transit system in the Greater Toronto Area. It extends from Union Station in Toronto in a generally northward direction to Barrie, and includes ten stations along its 101.4 km route. Within the study area the GO Barrie rail corridor services the City of Vaughan with stops at King City, Maple (just north of Major MacKenzie Drive) and Rutherford (Refer to **Figure 6**).

King City GO Station is situated south of the intersection of Keele Street and King Vaughan Road. The existing 12-car accessible platform, station building and parking lot are located along the west side of the rail corridor. The existing parking lot includes accessible parking and can accommodate 468 vehicles. There is currently no Passenger Pick-up and Drop-off (PPUDO) facility at this location, and the bus access is adjacent to the station's main parking lot on Keele Street. The existing King City GO Station has one mainline track that is accessed from the east side platform.

Maple GO Station is situated east of the intersection of Keele Street and Major Mackenzie Drive. The existing 12-car accessible platform, station building and parking lot are located along the east side of the rail corridor. The existing parking lot can accommodate 1,239 vehicles and includes a PPUDO area as well as a bus loop and accessible parking. The existing Maple GO Station has one mainline track that is accessible from the east side platform.

Rutherford GO Station is situated east of the Rutherford Road and Keele Street intersection. The existing 12-car accessible platform, station building and parking lot are located along the west side of the rail corridor. The existing parking lot can accommodate 978 vehicles and includes a PPUDO area as well as a bus loop and accessible parking. The existing Rutherford GO Station has one mainline track that is accessible from the west side platform.

The current train departure schedule from King City, Maple and Rutherford stations is shown in **Table 12**.

Table 12: GO Train Departure Times (Monday to Friday)

King City		Maple		Rutherford	
AM Trains (SB)	**PM Trains (NB)**	**AM Trains (SB)**	**PM Trains (NB)**	**AM Trains (SB)**	**PM Trains (NB)**
5:52 AM	5:19 PM	5:59 AM	5:11 PM	6:03 AM	5:07 PM
6:37 AM	5:49 PM	6:44 AM	5:41 PM	6:48 AM	5:37 PM
7:22 AM	6:34 PM	7:29 AM	6:26 PM	7:33 AM	6:22 PM
8:07 AM	7:34 PM	8:14 AM	7:26 PM	8:18 AM	7:22 PM
9:07 AM	8:34 PM	9:14 AM	8:26 PM	9:18 AM	8:22 PM

The Barrie GO corridor, which sees more than 9,000 passenger trips each day, is preparing for future expansion. For expanded service, all existing platforms will be maintained and improvements will include an additional side platform and second track at all three above mentioned stations.

Based on the Barrie Rail Corridor Expansion Project, Transit Project Assessment Process, Environmental Project Report (approved in August 2017), Metrolinx announced five new GO Stations for the Barrie rail corridor in June 2016. These stations were endorsed by each municipality and received Municipal Council resolution approvals in November 2016. The new GO Stations include:

- Spadina (at Front Street) in the City of Toronto;
- Bloor-Davenport (Bloor Street near Lansdowne Avenue) in the City of Toronto;

- Kirby (near Keele Street) in the City of Vaughan;
- Mulock (near Bayview Avenue) in the Town of Newmarket; and
- Innisfil (at 6th Line) in the Town of Innisfil.

Kirby GO Station will be located south of Kirby Road approximately 300 metres west of Keele Street, with access from both sides of the Barrie GO rail corridor in the City of Vaughan. The Kirby GO Station will provide a stop between the Maple GO Station and the King City GO Station. Based on the Kirby GO Station Transpiration and Traffic Impact Analysis (completed in 2018), proposed components of the Kirby GO Station are:

- Three station access structures including a main station building to the east of the rail corridor and secondary station entrances east and west of the rail corridor;
- Two side platforms;
- Three rail tracks through the station, including a centre express track and two gauntlet tracks;
- Two pedestrian tunnels providing access across the corridor;
- Three bicycle parking areas;
- A bus loop;
- A passenger PPUDO area;
- A 1,000-space surface parking lot;
- Three non-signalized vehicular access points (two off of Keele Street and one off of Kirby Road). The north Keele Street access point will include dedicated bus lanes, vehicular lanes and pedestrian and cyclist access; and
- Multi-Use Path (MUP) connection to the planned TransCanada MUP trail south of the station.

3.3.2 VIVA Service

The following Viva Bus Service currently operates within the Traffic Analysis Study Area:

- Viva Blue runs along Yonge Street between Finch Go Bus Terminal and Newmarket Terminal, further described in **Table 13**.

Table 13: Existing VIVA Service within the Traffic Study Area

Route No.	Service Corridor	Service Direction	From	To	Service Type	Peak/Off-Peak Frequency
Viva Blue	Yonge Street	North-South	Finch Go Bus Terminal	Newmarket Terminal	Arterial	Finch Go Bus Terminal to Newmarket Terminal: 15/20 minutes

3.3.3 York Region Transit (YRT) Service

Table 14 presents the existing and future transit routes within the study areas. The transit data provided below reflects October 2019 conditions, pre-COVID-19 pandemic.

Overall, there are 17 transit routes within the study area. Viva Blue, which operates within dedicated transit lanes along the Yonge Street BRT corridor, provides the shortest headway and most frequent service. There is a total average of 50,314 passenger boardings during a typical weekday for all routes shown below. Approximately 9% of all passengers are using Route 20 along Jane Street and 8% are using Route 4/4A along Major Mackenzie Drive. The predominant route is the Viva Blue along Yonge Street with 33% of all passenger-boardings on it.

Table 14: Existing and Future Transit Routes (October 2019)

Route	2019 Average Weekday Daily Passenger Boarding	Existing (October 2019)		Future Planned (2041)	
		Weekday Headway		Weekday Headway	
		Peak	Off Peak	Peak	Off Peak
4/4A - Major Mackenzie	4,120	14	19	14	15
16 - 16th Avenue	1,645	30	30	15	15
20 - Jane	4,632	12	19	12	15
23 - Thornhill Woods	610	33	60	20	-
26 - Maple	1,311	16-20	46	16-20	46
80 - Elgin Mills	515	29	50	15	15
81 - Inspiration	193	29	-	29	-
83/83A - Trench	1,045	35	37	20	20
85/85C - Rutherford	3,486	15	30	15	15
88 - Bathurst	4,064	15	15	12	12
96 - Keele-Yonge	2,413	25-32	33	15	15
98 - Yonge	768	38	52	15	15
99 - Yonge	1,798^	32	51	15	15
105 - Dufferin	2,467	16	28	15	15
107 - Keele	2,720^	19	41	15	15
165/165F - Weston	2,111	15-19	44	15	15
Viva blue	16,416	8	9	4	4

** Note: Ridership data based on the entire length of the route.*

^ Note: Ridership data includes associated branch routes (i.e. Route 98/99 - Yonge (Late Night) & Route 107B - Keele).

The existing and proposed transit routes along all major arterial roads within the study area is described below:

3.3.3.1 Teston Road (York Region Road 49)

Based on York Region Transit (YRT) Map (Refer to **Figure 6**), YRT local Route is only available on Teston Road in four short sections at Jane Street (Route 20), Keele Street (Route 107), Thornhill Woods (Route 23) and Elgin Mills (Route 80).

Figure 7 illustrates the proposed transit network in the 2016 TMP for the year 2041. Teston Road will be served by frequent transit service.

3.3.3.2 Kirby Road (City of Vaughan)

Currently transit is available on Kirby Road in a short section at Keele Street (Route 96) and along Bathurst Street (Route 88). Based on Figure 6, Kirby Road will be served by frequent transit service.

The GO Transit rail corridor crosses through Kirby Road west of Keele Street, with King City Station being the closest terminal. The City of Vaughan is supporting Metrolinx's GO Expansion program along the Barrie GO Rail Corridor to increase train frequency to provide all-day, two-way services and the future Kirby GO Station at Kirby Road/Keele Street.

3.3.3.3 Major Mackenzie Drive (York Regional Road 25)

Major Mackenzie Drive within the study area is primarily serviced along the whole corridor by YRT local Route 4/4A beginning at the Vaughan Mills Terminal. Short segments of other YRT routes travel along Major Mackenzie Drive including, Route 26 (Melville Avenue to McNaughton Road) and Route 105 (Peter Rupert Avenue to Dufferin Street).

The GO Transit rail corridor crosses through Major Mackenzie Drive east of Keele Street, with Maple Station being the closest terminal. The forthcoming plan for Major Mackenzie Drive is to provide VIVA curbside service until around 2026 before being transformed to a dedicated rapidway beyond 2027.

3.3.3.4 Bathurst Street (York Regional Road 38)

Bathurst Street is primarily serviced by YRT local Route 88 which travels between GO Transit's Finch terminal and Seneca College's King Campus. Other transit routes that intersect along short segments of Bathurst Street include Route 23 (Queen Filomena Avenue to Valley Vista Drive), and Route 80 and 83 (Elgin Mills Road to Shaftsbury Avenue).

Based on **Figure 5**, Bathurst Street will be served by frequent transit service.

3.3.3.5 Dufferin Street (York Regional Road 53)

There are no transit routes which travel along Dufferin Street within the study area between Major Mackenzie Drive and Kirby Road. Based on **Figure 5**, Dufferin Street will be served by frequent transit service.

3.3.3.6 Keele Street (York Regional Road 6)

Keele Street is primarily serviced by YRT local Route 96 which travels between TTC's Pioneer Village Station, Go Transit's King City Station,

and YRT's Newmarket terminal. Other transit routes that travel along Keele Street include YRT's local Route 107 which primarily travels along Keele Street, originating from TTC's Pioneer Village Station and loops through the residential community in the southwest corner of the Teston Road intersection. Based on **Figure 7**, Keele Street will be served by frequent transit service.

3.3.3.7 Jane Street (York Regional Road 55)

Transit on Keele Street is limited to YRT Route 20 which travels between TTC's Pioneer Village Station to the south and loops through the residential community in the southwest corner of the Teston Road intersection. Based on **Figure 7**, Jane Street will be served by frequent transit service.

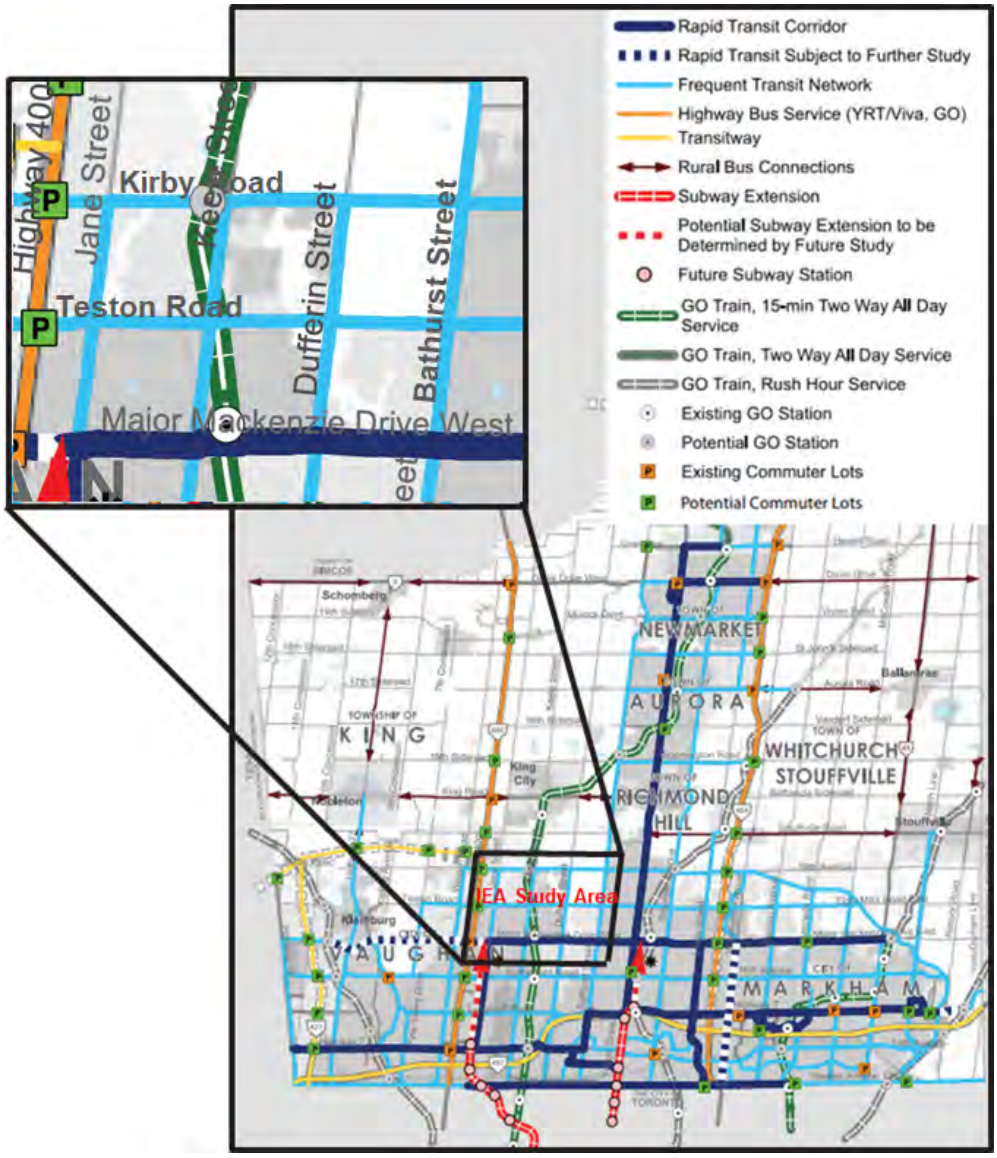


Figure 7: York Region Recommended Transit Network for 2041 (2016 TMP)

3.4 Modal Share by Ward / Zone

3.4.1 2016 Transportation Tomorrow Survey

As shown in **Figure 8**, the Traffic Analysis study area is within Wards 1, 3 and 4 of City of Vaughan.

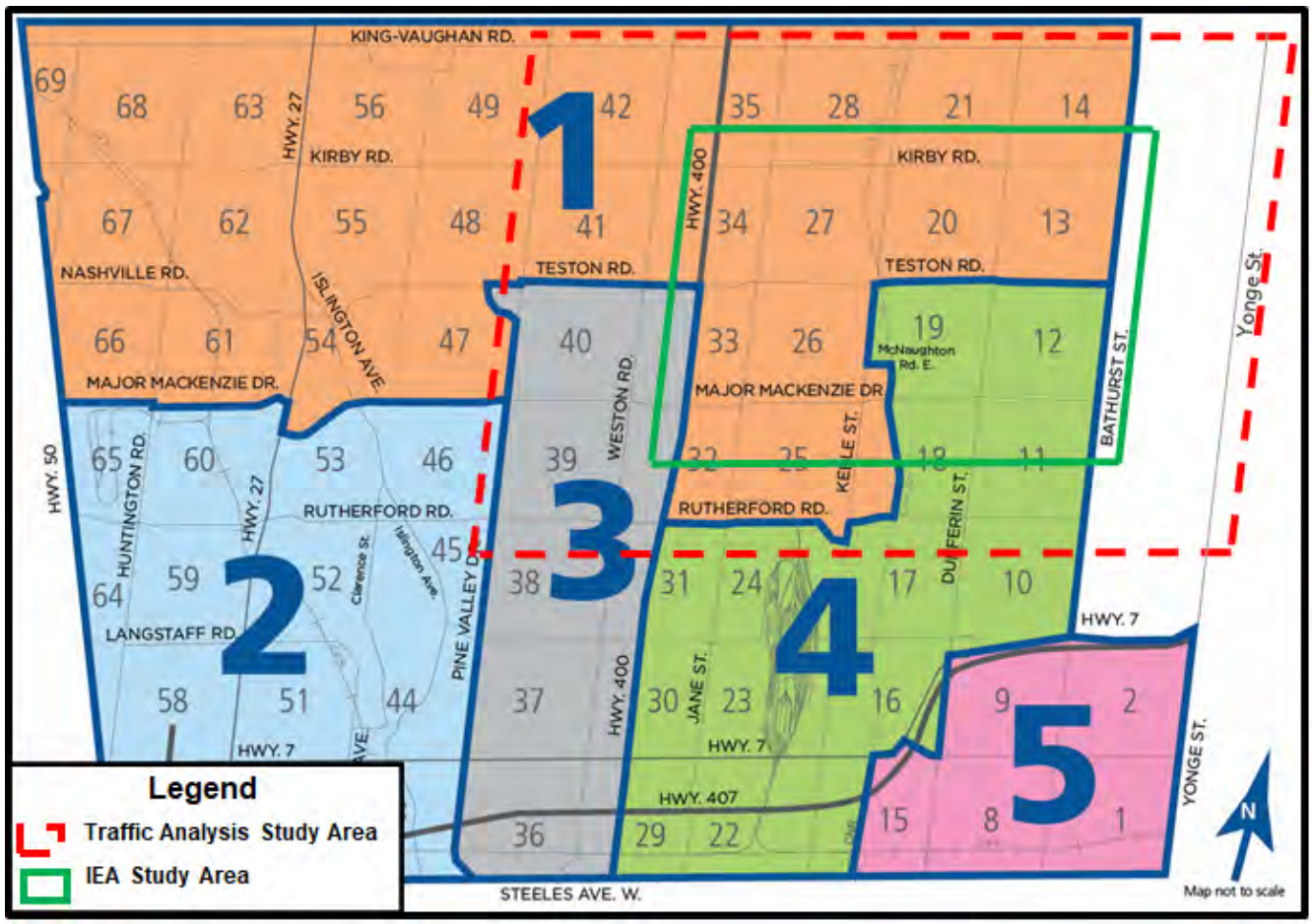


Figure 8: City of Vaughan Ward Area Map

To better identify the opportunities for modal shift, mode share data from the 2016 Transportation Tomorrow Survey (TTS) was extracted for trips made by residents of City of Vaughan within Wards 1, 3 and 4 (Refer to **Appendix A**).

As shown in **Table 15** the current combined Transit and GO Train ridership during the AM peak period is in the order of ten (10) percent of all trips (97,400) made by residents of City of Vaughan within Wards 1, 3 and 4.

Six (6) percent of trips are walking and/or cycle trips. Also, thirteen (13) percent of trips are made by passengers in vehicles driven by someone else.

Table 15: Trips Made by Residents of City of Vaughan (6:00 – 9:00 AM)

Trips	% 24 hr	Mode of Travel					
		Driver	Pass	Transit	GO Train	Walk & Cycle	Other
Ward 1							
34,900	27.0%	66%	13%	4%	4%	5%	8%
Ward 3							
32,700	28.2%	69%	13%	6%	2%	7%	2%
Ward 4							
29,800	29.2%	65%	12%	8%	5%	7%	3%
Total							
97,400	-	67%	13%	6%	4%	6%	5%

As shown in **Table 16**, mode share data from the 2016 TTS was extracted for trips made by residents of the TTS area to City of Vaughan (Wards 1, 3 and 4). It is evident that approximately four (4) percent of all trips (112,300) by residents of the TTS area are using Transit and GO Train during the AM peak period to get into City of Vaughan (Wards 1, 3 and 4).

Five (5) percent of trips are walking and/or cycle trips. Also, eleven (11) percent of trips are made by passengers in vehicles driven by someone else.

Table 16: Trips Made to City of Vaughan by Residents of the TTS Area (6:00 – 9:00 AM)

Trips	% 24 hr	Mode of Travel					
		Driver	Pass	Transit	GO Train	Walk & Cycle	Other
Ward 1							
17,200	18.60%	67%	17%	2%	1%	9%	4%
Ward 3							
33,100	26.10%	74%	12%	3%	1%	7%	3%
Ward 4							
62,000	35.50%	83%	9%	4%	1%	3%	1%
Total							
112,300	-	78%	11%	3%	1%	5%	2%

3.4.2 York Region Travel Demand Forecasting Models (EMME)

The Region's current 2016 Travel Demand Forecasting Model (TDFM) is an a.m. peak period model, predicting both auto and transit demands between 6:00 a.m. and 8:59 a.m. This 3-hour a.m. peak period is considered to be most representative of morning peak period travel and has been adopted as a GTA standard for travel demand forecasting[1]. The Region's current 2016 TDFM was calibrated at the Regional screenline level using data from the 2011 TTS.

[1] For auto trips, conversion factors are required to transform the a.m. peak period demand to the a.m. peak hour demand for assignment purpose.

The 2031 and 2041 road networks were developed based on the 2006 network with the addition of road widenings and extensions across the Greater Toronto and Hamilton Area (GTHA) that have been committed to by both the provincial and municipal governments to address transportation needs and support future growth in the study area.

For the purpose of this study, York Region provided Subarea EMME Models for years 2016, 2031 and 2041. As mentioned in **Section 1.2**, the limits of subarea models were extended to include Yonge Street, Pine Valley Drive, King Vaughan Road and Rutherford Road (Refer to **Figure 1**).

Table 17 illustrates the 3-hour a.m. peak period demand for all internal traffic zones within 2016, 2031 and 2041Subarea Models (EMME).

For the origin trips produced within the subarea model, auto trips and transit trips are expected to increase by approximately 53% and 99%, respectively, from 2016 to 2041. Transit mode share is projected to increase from 11% to 14% over this period.

For the destination trips produced within the subarea model, auto trips and transit trips are expected to increase by approximately 75% and 126%, respectively from 2016 to 2041. Transit mode share is projected to remain at 4% over this period.

Table 17: AM 3-hour Peak Period Travel Demand Forecasts for Study Area

Trips	Year	2016		2031		2041	
	Mode	Auto	Transit	Auto	Transit	Auto	Transit
Origins	Total	75,843	9,492	97,316	16,135	115,649	18,853
	Transit Mode Share		11%		14%		14%
Destinations	Total	43,227	1,591	62,551	2,950	79,596	3,591
	Transit Mode Share		4%		5%		4%

Figures 9 and **10** illustrate the origin and destination trips at the traffic zone level from the York Region TDFM for the years 2016 and 2041, respectively, during the AM peak hour. Green bars depict the trip production; red bars depict trip attractions. As shown in both figures, the majority of trips originate from east and south of the study area.



Figure 9: Origin and Destination Trips at Traffic Zone Level (2016 Subarea EMME Model)

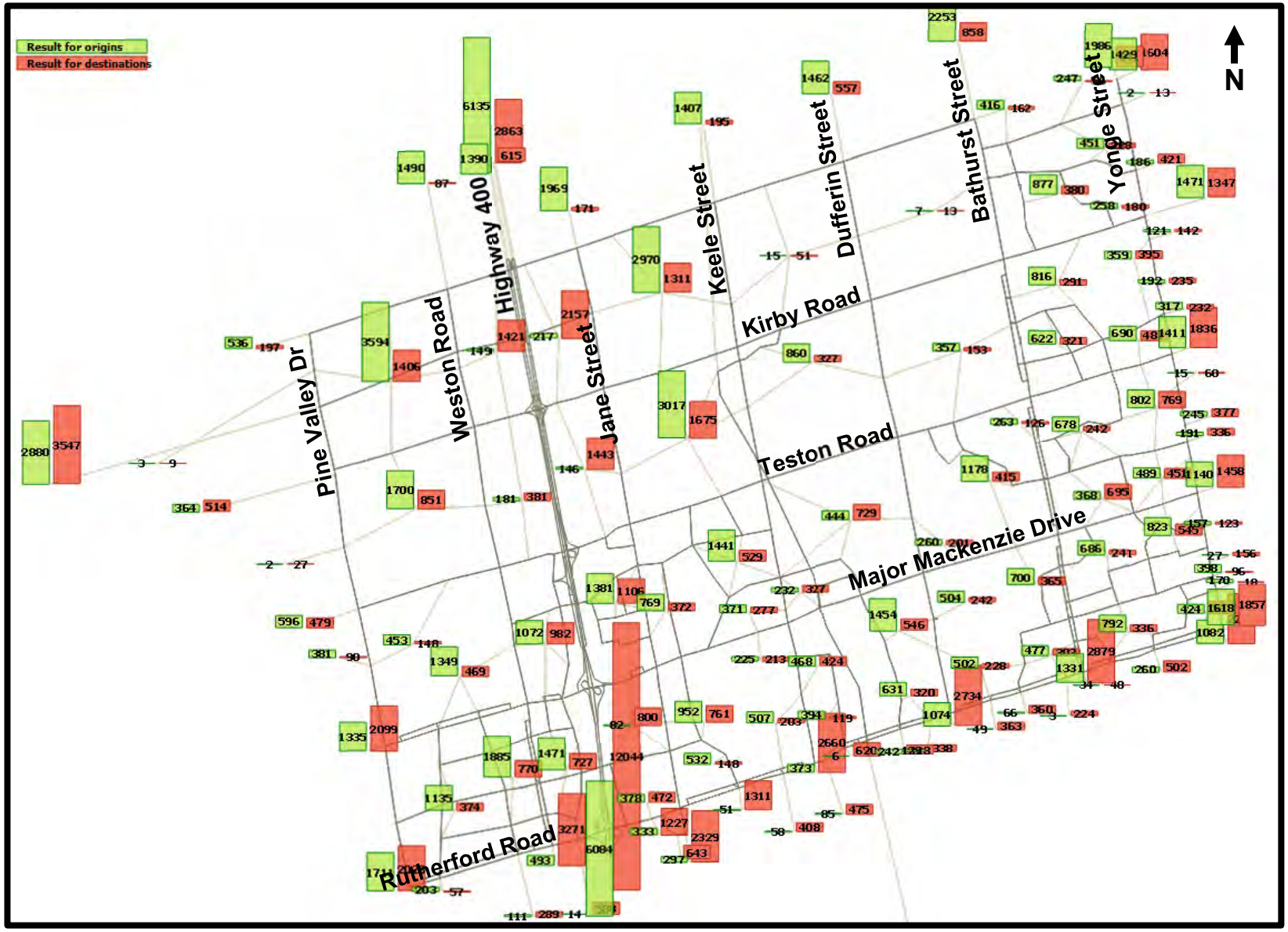


Figure 10: Origin and Destination Trips at Traffic Zone Level (2041 Subarea EMME Model)

3.5 Goods Movement

Based on York Region proposed strategic good movement network, Highway 400 and Kirby Road are designated as highway and primary arterial corridors to accommodate goods movement demands, respectively. However, Teston Road, Major Mackenzie Drive, Jane Street, Keele Street, Dufferin Street and Bathurst Street are identified as secondary arterial good movement corridors (Refer to **Figure 11)**.

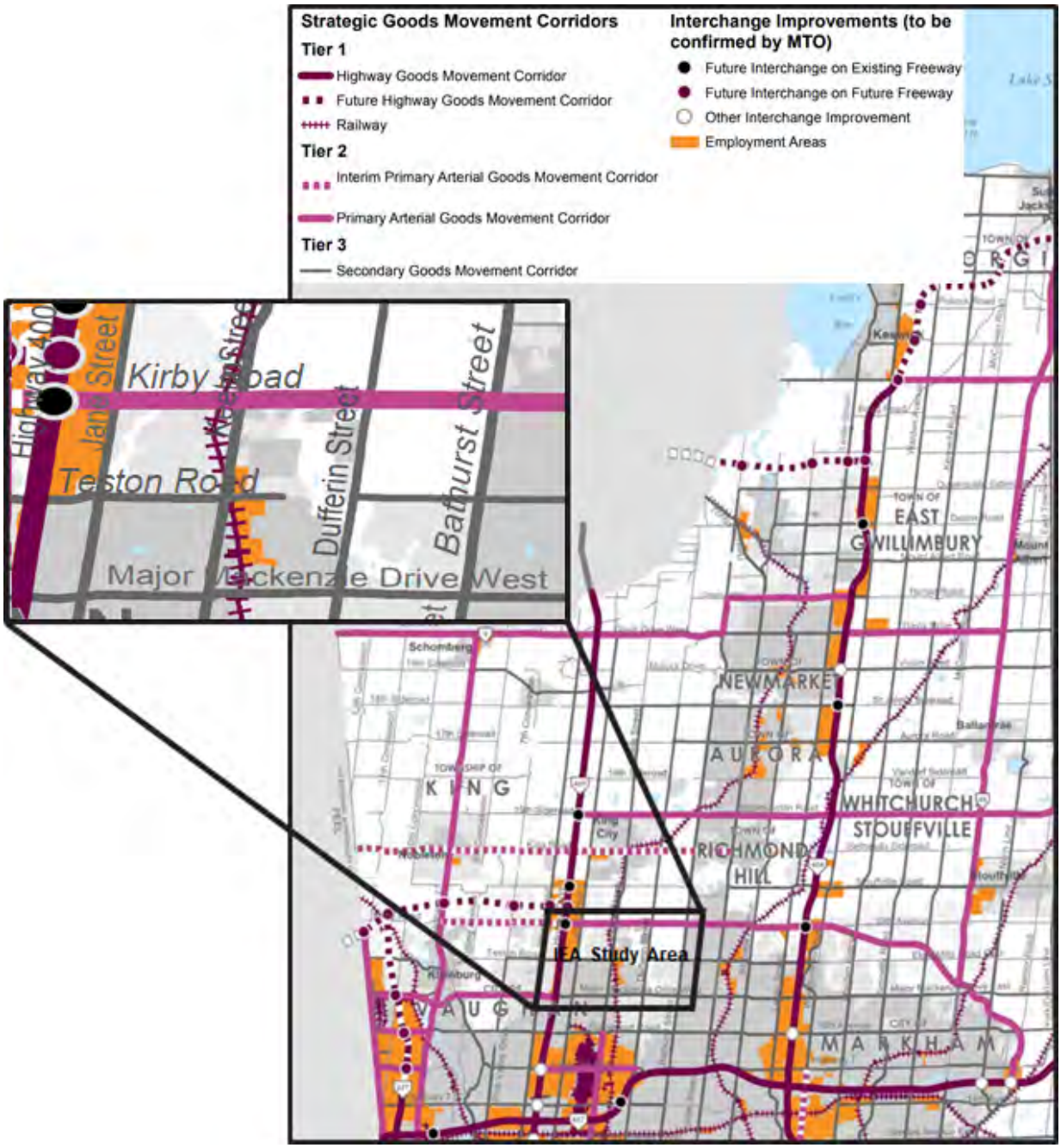


Figure 11: York Region Proposed Strategic Good Movement Network for 2041 (2016 TMP)

3.6 Active Transportation

3.6.1 Teston Road (York Region Road 49)

Teston Road is currently urban 4-lane roadway with curbs between Highway 400 and Keele Street. Pedestrian facilities are only provided on the south side of Teston Road with a 1.5m concrete sidewalk with a landscaping boulevard west of Jane Street and a 3.0m multi-use pathway with a grassed boulevard east of Jane Street to Keele Street. Between Keele Street and Rodinea Drive, Teston Road has a rural cross-section with wide shoulders and barely defined ditches. Between Dufferin Street and Bathurst Street, Teston Road typically has a rural 3-lane cross-section with paved shoulders which are designated as dedicated cycling facilities in York Region's TMP. A sidewalk is present along the south side of Teston Road from Torah Gate to Bathurst Street.

Figure 12 illustrates the proposed cycling network in 2016 TMP for the year 2041. Separated cycling facilities are proposed along Teston Road between Weston Road and Jane Street and between Keele Street and Dufferin Street.

A detailed breakdown for the evaluation of the active transportation facilities on Teston Road is provided in **Section 3.10**.

3.6.2 Kirby Road (City of Vaughan)

The road cross-section is currently rural without any cycling facilities along Kirby Road. Narrow shoulders offer limited space for users and disabled vehicles. A concrete sidewalk, path, trail (Multi Use Path) of approximately 2.0 meters in width is available on the south side beyond the ditch from Keele Street to Dufferin Street. Utility poles and some vegetation are located relatively close to the edge of pavement. There is also a gated at-grade crossing of the Barrie GO Rail line approximately 300 m west of Keele Street.

Exclusive bike lanes are available on both sides of the roadway on Kirby Road.

As shown in **Figure 12** Kirby Road (between Highway 27 and Dufferin Street) will be a component of the overall bicycle network for York Region.

3.6.3 Major Mackenzie Drive (York Regional Road 25)

The road is currently urban with curbs without any cycling facilities along Major Mackenzie Drive between Highway 400 and Peter Rupert Avenue. The road becomes a rural cross-section with shoulders between Peter Rupert Avenue and Bathurst Street. A concrete sidewalk is present on both the north and south side from Highway 400 to Dufferin Street. The north sidewalk continues until Sir Benson Drive. The sidewalks resume from the west of Ilan Ramon Boulevard to Bathurst Street.

As shown in **Figure 12** separate facilities will be provided along Major Mackenzie Drive from west of Highway 27 to Woodbine Avenue to protect cyclists from vehicular traffic.

3.6.4 Bathurst Street (York Regional Road 38)

The road is currently urban with curbs without any bicycle facilities along Bathurst Street between Major Mackenzie Drive and the north of Teston Road. At this point, the road becomes semi-urban with shoulder on the west side and curb and boulevard on the east side. Bathurst Street becomes fully rural at the intersection of Shaftsbury Avenue. A concrete sidewalk is present on the east side from Major Mackenzie Drive to Mill Street at which point a sidewalk on both sides is present until Teston Road. The eastern sidewalk continues until it terminates at Shaftsbury Avenue.

As shown in **Figure 12** separate facilities will be provided along Bathurst Street between Steeles Avenue and Kirby Road to protect cyclists from vehicular traffic.

3.6.5 Dufferin Street (York Regional Road 53)

The road is currently rural with wide paved shoulders which double as bicycle facilities along Dufferin Street between Major Mackenzie Drive and Kirby Road. A concrete sidewalk is only present on the east side for the segment between Major Mackenzie Drive and Eagles Landing Road. There are no plans to improve bicycle facilities along Dufferin Street within the study area by 2041.

3.6.6 Keele Street (York Regional Road 6)

The road is generally urban with sidewalks on both sides from Major Mackenzie Drive to McNaughton Road. The west side sidewalk continues to Teston Road. Keele Street then becomes a rural road with gravel shoulders to the north of Teston Road beyond the Barrie GO Line grade separation structure. Dedicated on-street bike lanes are present on Keele Street between Masters Avenue to the north of McNaughton Road.

As shown in **Figure 12,** dedicated facilities will be provided along Keele Street between Rutherford Road and Kirby Road to protect cyclists from vehicular traffic.

3.6.7 Jane Street (York Regional Road 55)

The road is fully urban with sidewalks on both sides from Major Mackenzie Drive to Teston Road. The east sidewalk continues for approximately 500m north of Teston Road where it terminates. North of Teston Road, Jane Street then becomes a rural road with gravel shoulders until Kirby Road.

As shown in **Figure 12** separate facilities will be provided along Jane Street from Major Mackenzie Drive to Teston Road to protect cyclists from vehicular traffic.

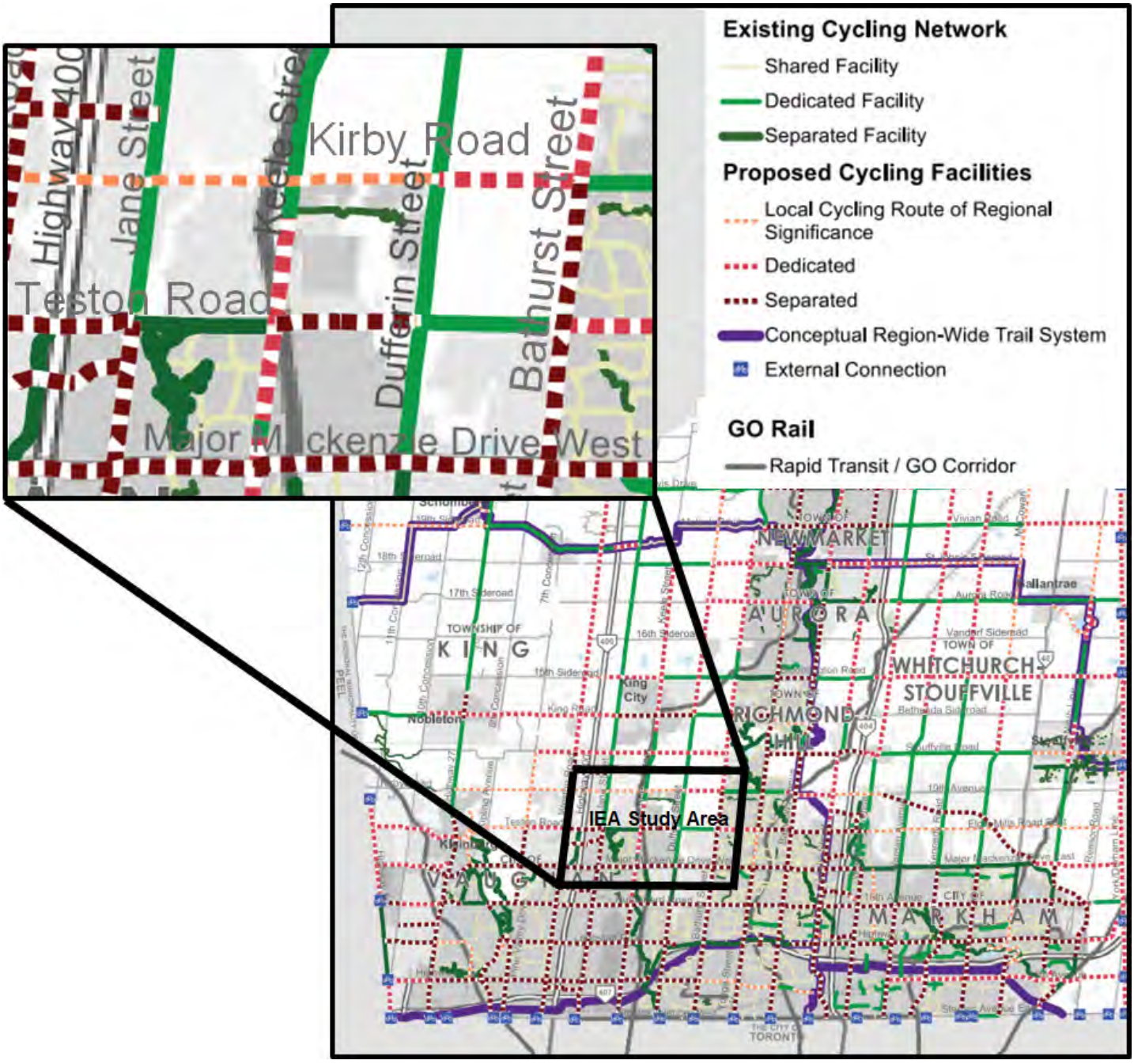


Figure 12: York Region Recommended Cycling Network for 2041 (2016 TMP)

3.7 Existing Traffic Data

A variety of traffic data was obtained from York Region in order to complete the traffic analysis provided herein. Detailed copies of the traffic data are provided in **Appendix B**.

- **Traffic Volume Information System (TVIS-2010 to 2019) Data:** The TVIS data spreadsheet included historical AADT for all midblock segments within the Traffic Analysis Study Area.
- **Advance Traffic Management Systems (ATMS) Data**: Automatic Traffic Recorder (ATR) Counts for all midblock segments from the designated ATMS traffic counting stations.
- **Turning Movement Counts (TMC)**: The most recent TMCs at all ramp terminals/intersections along Teston Road between Highway 400 and Bathurst Street.
- **Signal Timing Plans**: The most recent signal timing plans at all ramp terminals/intersections along Teston Road between Highway 400 and Bathurst Street.
- **2018 - 2019 Speed Data**: The most recent field measured speed data for all arterial roads within the study area.
- **2015 – 2019 Automatic Identification System (AIS):** The collision summary at all intersections and midblocks within the Traffic Analysis Study Area.
- **2016, 2031 and 2041 Subarea EMME Models**: 2016, 2031 and 2041 (with and without GTA West) subarea Travel Demand Forecasting models (EMME).

3.8 Existing Traffic Volumes

The most recent turning movement count (2011 - 2019) volumes at all ramp terminals/intersections along Teston Road between Highway 400 and Bathurst Street were balanced and used for turning distributions.

The development of existing volumes for the year 2020 included a review of travel demand forecasts from the EMME sub-area models provided by York Region. The EMME model data provided was for the 2016 year and 2041 base year and includes various stages of planned development (i.e. new roadways, trip generators, etc.) within a 25-year window. Based on the review of the travel demand forecasts, an annual growth rate of 1% was selected for the development of the 2020 volume condition (i.e. existing conditions). The morning peak hour traffic volumes for this horizon year are illustrated in **Figure 13**.

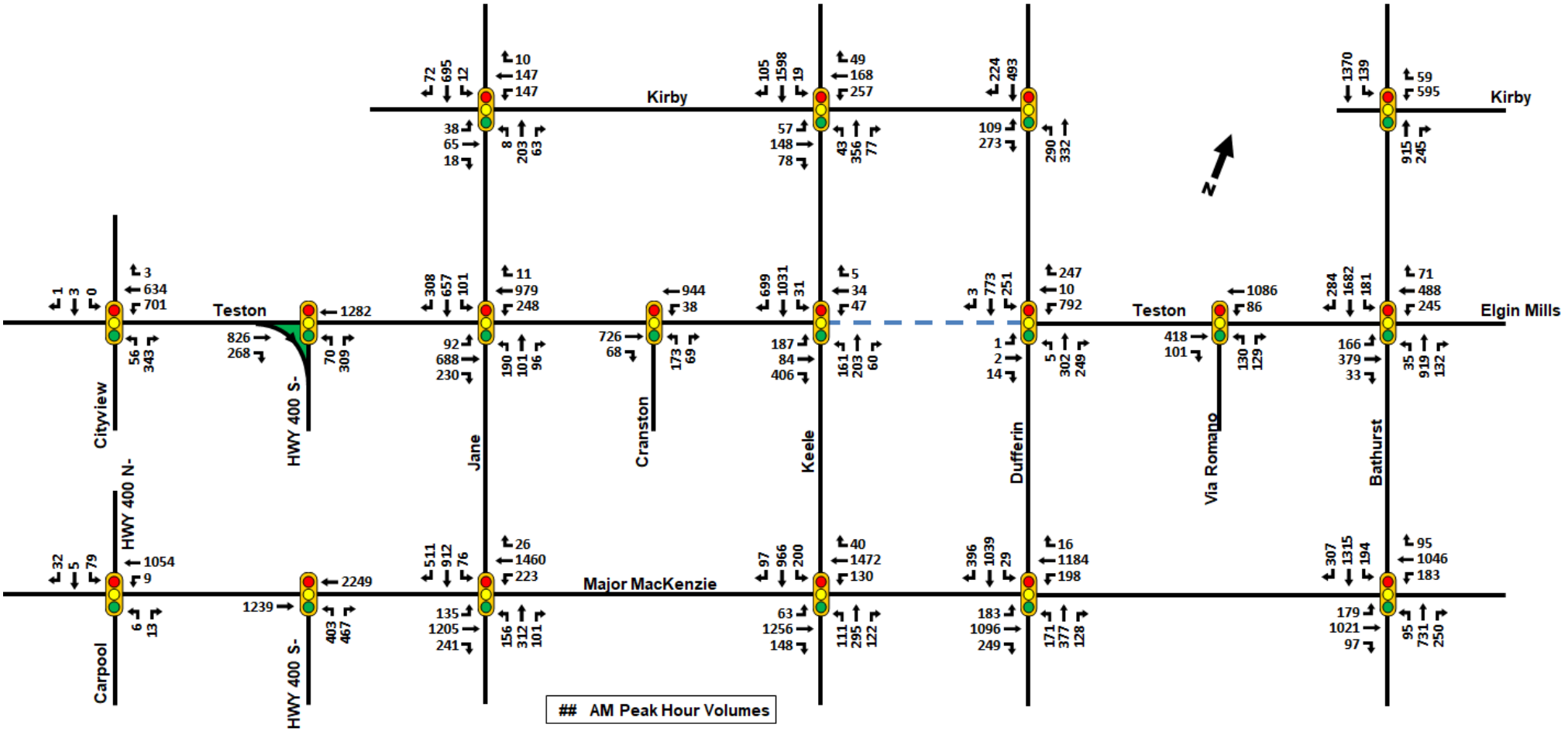


Figure 13: Existing Traffic Volumes (2020)

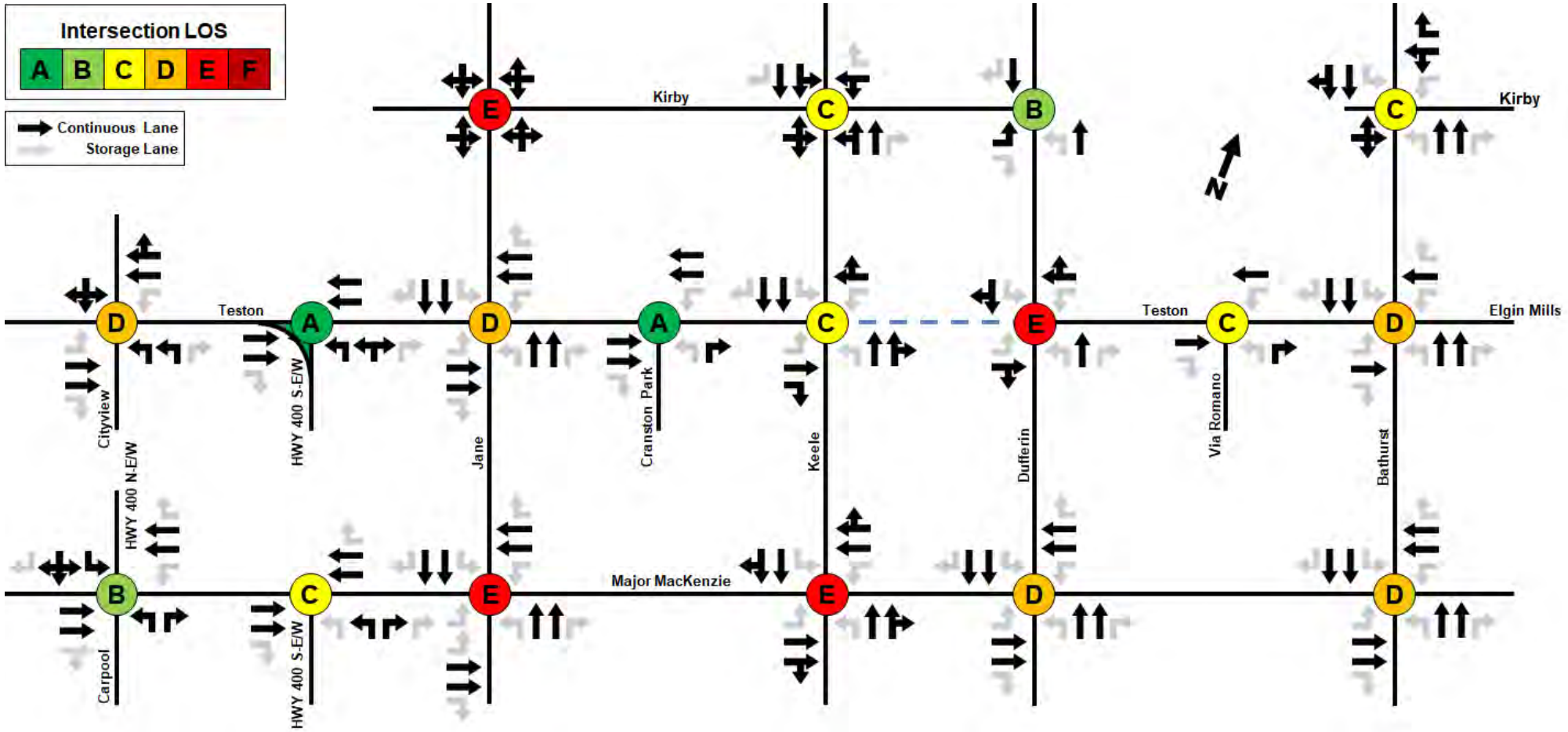


Figure 14: Existing Intersection Operational Performance (2020)

3.9 Existing Intersection Operational Performance Analysis (2020)

An evaluation of the performance of the signalized intersections within the study area was completed using Synchro 10 for the existing conditions (2020) during the morning peak hour.

The following assumptions are based on City of Vaughan Transportation Impact Study Guidelines (2018) and were used within the analysis:

- Saturation flow rate – 1,900 vphpl;
- Peak Hour Factor (PHF) – 0.97 (based on a review of traffic counts). A PHF of 1.00 was applied at movements exceeding capacity;
- Lost time: 5.0 seconds for main phases and 1.0 seconds for advance phases;
- Growth Rate – 1% per year; and
- Percent Commercial Vehicles obtained from traffic data provided (per movement).

The summary of the traffic assessment is shown in **Table 18**. Detailed Synchro reports are provided in **Appendix C**. As shown in **Table 18** below, the existing condition includes several turning movements operating at, or slightly above, capacity along with congested and failing conditions (LOS E and F) as a result of delays experienced during the AM peak hour within the study area. Intersection performance within the study area was noted to be at a LOS E or better based on overall delay (see **Figure 14**).

Table 18: Intersection Performance – Existing Conditions (2020) – AM Peak Hour

Intersections	Movements	Delay (s)	LOS	v/c Ratio	95th Queue (m)
Teston / Cityview	EBL	0	A	0.00	0
	EBT	44	D	0.64	210
	EBR	41	D	0.45	90
	WBL	**80**	**E**	**1.01**	260
	WBTR	4	A	0.25	44
	NBL	**66**	**E**	**0.25**	17
	NBR	**67**	**E**	**0.25**	34
	SBLTR	**72**	**E**	**0.05**	5
	Overall	**46**	**D**	**0.75**	**-**
Teston / Highway 400	EBT	8	A	0.39	37
	EBR	1	A	0.18	0
	WBT	10	A	0.60	69
	NBLR	25	C	0.19	15
	NBR	25	C	0.18	19
	Overall	**10**	**A**	**0.51**	**-**
Teston / Jane	EBL	33	C	0.45	24
	EBT	44	D	0.67	114
	EBR	36	D	0.16	20
	WBL	33	C	0.69	59
	WBT	42	D	0.79	152
	WBR	28	C	0.01	0
	NBL	25	C	0.55	52
	NBT	20	B	0.07	15
	NBR	20	B	0.06	11
	SBL	29	C	0.21	37

Intersections	Movements	Delay (s)	LOS	v/c Ratio	95th Queue (m)
	SBT	33	C	0.48	104
	SBR	31	C	0.33	57
	Overall	**36**	**D**	**0.62**	**-**
	EBT	6	A	0.30	36
	EBR	4	A	0.05	4
	WBL	5	A	0.08	6
Teston / Cranston	WBT	6	A	0.39	49
	NBL	38	D	0.56	49
	NBR	33	C	0.05	11
	Overall	**9**	**A**	**0.42**	**-**
	EBL	36	D	0.38	61
	EBT	42	D	0.18	35
	EBR	49	D	0.46	67
	WBL	39	D	0.17	19
	WBTR	46	D	0.10	19
Teston / Keele	NBL	23	C	0.58	31
	NBTR	15	B	0.14	22
	SBL	22	C	0.06	12
	SBT	32	C	0.63	152
	SBR	30	C	0.50	47
	Overall	**32**	**C**	**0.55**	**-**
	EBL	39	D	0.00	1
	EBTR	44	D	0.01	7
	WBL	**85**	**F**	**1.06**	311
	WBTR	26	C	0.19	20
	NBL	33	C	0.09	4
Teston / Dufferin	NBT	38	D	0.49	93
	NBR	12	B	0.18	9
	SBL	34	C	0.64	62
	SBTR	**72**	**E**	**1.00**	301
	Overall	**57**	**E**	**0.99**	**-**
	EBT	7	A	0.39	36
	EBR	5	A	0.07	4
	WBL	6	A	0.16	9
Teston / Via Romano	WBT	35	C	0.99	189
	NBL	19	B	0.36	23
	NBR	18	B	0.08	10
	Overall	**23**	**C**	**0.82**	**-**
	EBL	**101**	**F**	**0.97**	81
	EBT	**62**	**E**	**0.81**	156
	EBR	42	D	0.03	0
	WBL	**146**	**F**	**1.13**	105
	WBT	**101**	**F**	**1.02**	221
	WBR	42	D	0.05	8
Teston / Bathurst	**NBL**	**95**	**F**	**0.73**	32
	NBT	26	C	0.53	116
	NBR	19	B	0.09	11
	SBL	19	B	0.56	34
	SBT	28	C	0.82	238
	SBR	15	B	0.22	23
	Overall	**46**	**D**	**0.89**	**-**
	EBTR	14	B	0.74	238
Major MacKenzie / Highway 400 West Ramp	WBL	11	B	0.11	2
	WBT	7	A	0.42	82
	NBL	**69**	**E**	**0.16**	7

Intersections	Movements	Delay (s)	LOS	v/c Ratio	95th Queue (m)
	NBR	**67**	**E**	**0.01**	0
	SBL	**69**	**E**	**0.37**	27
	SBLTR	**69**	**E**	**0.38**	27
	SBR	**65**	**E**	**0.03**	0
	Overall	**13**	**B**	**0.67**	-
	EBT	9	A	0.50	114
Major MacKenzie / Highway 400 East Ramp	WBT	14	B	0.90	431
	NBL	**65**	**E**	**0.69**	77
	NBR	**69**	**E**	**0.76**	78
	Overall	**23**	**C**	**0.88**	-
	EBL	**69**	**E**	**0.48**	34
	EBT	50	D	0.82	204
	EBR	**70**	**E**	**0.18**	35
	WBL	**70**	**E**	**0.87**	94
	WBT	47	D	0.90	262
	WBR	24	C	0.04	11
Major MacKenzie / Jane	**NBL**	**62**	**E**	**0.81**	73
	NBT	45	D	0.33	57
	NBR	42	D	0.07	10
	SBL	35	C	0.21	27
	SBT	**72**	**E**	**0.93**	193
	SBR	**84**	**F**	**0.94**	199
	Overall	**58**	**E**	**0.90**	-
	EBL	37	D	0.42	20
	EBTR	**60**	**E**	**0.96**	285
	WBL	51	D	0.69	49
	WBTR	**61**	**E**	**0.97**	320
Major MacKenzie / Keele	NBL	52	D	0.69	49
	NBTR	48	D	0.43	74
	SBL	32	C	0.47	60
	SBTR	**62**	**E**	**0.91**	207
	Overall	**57**	**E**	**0.90**	-
	EBL	**93**	**F**	**0.97**	86
	EBT	46	D	0.85	181
	EBR	31	C	0.27	40
	WBL	**72**	**E**	**0.90**	86
	WBT	47	D	0.88	199
	WBR	26	C	0.01	0
Major MacKenzie / Dufferin	**NBL**	**65**	**E**	**0.87**	72
	NBT	29	C	0.28	52
	NBR	27	C	0.09	13
	SBL	24	C	0.07	10
	SBT	44	D	0.82	164
	SBR	36	D	0.53	88
	Overall	**46**	**D**	**0.88**	-
	EBL	**70**	**E**	**0.88**	81
	EBT	**60**	**E**	**0.92**	191
	EBR	1	A	0.06	0
	WBL	**65**	**E**	**0.87**	80
Major MacKenzie / Bathurst	**WBT**	**61**	**E**	**0.93**	196
	WBR	33	C	0.07	14
	NBL	31	C	0.51	28
	NBT	31	C	0.52	97
	NBR	27	C	0.21	25
	SBL	24	C	0.57	42

Intersections	Movements	Delay (s)	LOS	v/c Ratio	95th Queue (m)
	SBT	46	D	0.90	210
	SBR	28	C	0.30	42
	Overall	**46**	**D**	**0.86**	**-**
	EBLTR	**111**	**F**	**0.90**	72
	WBLTR	**93**	**F**	**0.99**	148
Kirby / Jane	NBLTR	25	C	0.37	70
	SBLTR	53	D	0.94	279
	Overall	**61**	**E**	**0.95**	**-**
	EBLTR	29	C	0.57	78
	WBLT	**62**	**E**	**0.94**	158
	WBR	22	C	0.03	8
	NBLT	18	B	0.39	41
Kirby / Keele	NBR	14	B	0.05	7
	SBLT	36	D	0.93	234
	SBR	15	B	0.07	8
	Overall	**35**	**C**	**0.93**	**-**
	EBL	52	D	0.51	43
	EBR	48	D	0.18	24
	NBL	6	A	0.44	38
Kirby / Dufferin	NBT	4	A	0.23	29
	SBT	5	A	0.34	47
	SBR	4	A	0.14	5
	Overall	**14**	**B**	**0.46**	**-**
	EBLTR	0	A	0.00	0
	WBL	30	C	0.50	84
	WBLT	30	C	0.50	84
	WBR	24	C	0.04	2
	NBL	0	A	0.00	0
Kirby / Bathurst	NBT	25	C	0.58	101
	NBR	20	B	0.23	29
	SBL	16	B	0.44	23
	SBTR	22	C	0.72	145
	Overall	**24**	**C**	**0.67**	**-**

Note: LOS is based on average vehicle delays

3.10 Active Transportation Facility Assessment on Teston Road

The evaluation of the active transportation facilities for Teston Road was performed using the York Region's Transportation Mobility Plan Guidelines (November 2016). Although the Transportation Mobility Plan Guidelines are directed towards development applications, the evaluation process would be similar for assessing the performance and quality for all road users including pedestrians, cyclists, transit users and vehicles. For this assessment, the evaluation of the active transportation facilities was performed at each major intersection crossing of Teston Road and the roadway segments in-between. Please refer to **Appendix D** for a more detailed breakdown for the evaluation of the active transportation facilities on Teston Road.

A description of the active transportation facility assessment is described below for each mode.

- **Automobile LOS:** The automobile LOS is evaluated based on the intersection delays and capacity outputs from **Section 3.9**. The automobile

LOS was determined for each approach based on assigning a letter designation ranging from 'A' to 'F', representing the traffic conditions from free flow to congested. The target automobile LOS for York Region is LOS 'D' or better for both intersection delay and capacity.

- **Transit LOS:** The transit LOS is evaluated based on the transit headway and the performance of the transit vehicles at the intersection approach. The evaluation assesses the transit vehicles ability to navigate and interact with other vehicles along the roadway corridor and the quality of service that is provided to transit users. The target transit LOS for York Region is LOS 'C' or better for transit headway and LOS 'D' or better for transit intersection performance.

- **Pedestrian LOS:** The pedestrian LOS is evaluated based on the presence of pedestrian facilities at the intersection or roadway segments. The assessment evaluates the pedestrian facility based on the type of facility, sidewalk and buffer width, presence of a crosswalk and pedestrian signal heads to provide a safe and comfortable experience. The target pedestrian LOS for York Region is LOS 'C' or better, which indicates the presence of at least a 1.5m sidewalk with no buffer, crosswalk, and pedestrian signal head.

- **Bicycle LOS:** The bicycle LOS is evaluated based on providing a facility that all bicyclists feel comfortable and safe. The assessment evaluates the bicycle facility based on the type of facility (i.e. separated, dedicated, or shared), facility width, presence of a buffer, and bicycle treatments at the intersection (bike box, signal heads, etc.). The target bicycle LOS for York Region is LOS 'C' or better, which indicates a dedicated bicycle facility that is less than 1.8m with no buffer and bicycle treatments.

3.10.1 Teston Road and Jane Street

A summary of the Multimodal Level of Service (MMLOS) results for the signalized intersection at Teston Road and Jane Street is shown below in **Table 19**. The MMLOS summary table identifies the LOS for each respective transportation mode by approach and identifies the approach(es) which do not meet the LOS targets established by York Region for each approach.

Table 19: MMLOS Intersection Summary at Teston Road and Jane Street

Level of Service Summary		Intersection Approach [1]			
		Jane Street		Teston Road	
		NB	SB	EB	WB
Automobile	Level of Service	C	C	D	D
	(Delay in seconds)	*(25)*	*(33)*	*(44)*	*(42)*
	Critical Movement	NBL	SBT	EBT	WBT
	[v/c ratio]	*[0.55]*	*[0.48]*	*[0.67]*	*[0.79]*
Transit	Transit Headway	N/A	N/A	C	N/A
	Intersection Approach	N/A	N/A	D	N/A
Pedestrian	Intersection	B	F	B	F
Bicycle	Intersection	F	D	F	F

[1] All modes evaluated in direction of travel for each intersection approach.

Automobile LOS – The intersection of Teston Road and Jane Street operates acceptably in the morning peak hour with a LOS ‘D’ as shown in **Section 3.9**. Based on the four approaches to the intersection, all achieve the target LOS ‘D’. The configuration of the existing intersection includes an auxiliary left and right turn lane at each approach. Additionally, the current signal timing for the intersection includes protected-permitted left turn movements from all approaches with the exception of the southbound direction.

Transit LOS – Apart from the south leg of Jane Street, Teston Road and Jane Street are not classified as part of York Region’s Frequent Transit Network per York Regions TMP Map 12. At the intersection of Teston Road and Jane Street, the local community in the southwest corner of the intersection is serviced by YRT Local Route #20 which operates in a mixed traffic lane. YRT Route #20 runs north-south along Jane Street between Teston Road and TTC’s Subway Line 1 Pioneer Village station providing intermediate connections to YRT’s SmartVMC bus terminal and TTC’s Highway 407 subway station. YRT’s SmartVMC bus terminal provides transfers to Viva and Brampton Zum transit services that use the Highway 7 rapidway. At the intersection, the only current transit movement for Route #20 is the eastbound right turn as the route returns south towards the start at Pioneer Village, which meets the minimum LOS targets of ‘C’ and ‘D’, respectively, for transit headway and performance (delay & v/c ratio).

Pedestrian LOS – Along Teston Road in the eastbound direction and along Jane Street in the northbound direction, pedestrian facilities are provided resulting in a LOS ‘B’. The sidewalk on the eastbound approach is 1.5m wide with a 1.0m grassed boulevard. For the northbound approach, a 1.5m wide sidewalk is buffered by the travelled lanes by a 1.0m wide grassed boulevard, which is mirrored on the west side. Both these sidewalks connect to a 3.0m multi-use pathway on the south side of Teston Road between Jane Street to Keele Street. In the southbound and westbound directions, the pedestrian LOS is failing since no facilities are provided in the primary direction of travel. At the intersection, pedestrian signal heads and painted crosswalks are provided on all approaches to indicate when it is safe to cross. Furthermore, a short-depressed sidewalk section is provided, at a minimum, on all intersection curb returns to allow pedestrians to provide refuge beyond the roadway. The pedestrian realm in the southeast and southwest corners of the intersection have enhanced facilities with additional landscaping, benches, and bike racks. Furthermore, the establishment of sidewalks current at the intersections and on the approaches is based on the presence of nearby residential and commercial developments. The gaps in the existing pedestrian network, notably along both edges of the northwest quadrant, abut undeveloped agricultural farmland.

Bicycle LOS – Bicycle facilities are only provided on the southbound approach to the intersection of Teston Road and Jane Street in the form of a narrow (<1.5m) dedicated bike lane resulting in a LOS ‘D’. The remainder of the approaches do not have a cycling facility resulting in a failing LOS ‘F’. The lack of cycling cross-rides at the intersection, in addition to the absence or narrow width of the existing cycling facilities, does not encourage the average

recreational cyclist from using this intersection as part of their cycling route. This intersection represents the southern end of the cycling network on Jane Street extending from Davis Drive West to the north as shown in York Regions TMP Map 10, providing only a connection to the multi-use pathway on Teston Road east of Jane Street towards Keele Street.

3.10.2 Teston Road between Jane Street to Keele Street

A summary of the MMLOS results for the segment of Teston Road between Jane Street and Keele Street is shown below in **Table 20**. The MMLOS summary table identifies the LOS for each respective transportation mode by segment and identifies the approach(es) which do not meet the LOS targets established by York Region for each approach.

Table 20: MMLOS Segment Summary between Jane Street to Keele Street

Level of Service Summary		Mid Block Segment Teston Road	
		EB	WB
Automobile	Level of Service *(Delay in seconds)* [1] [2] Critical Movement *[v/c ratio]* [1] [2]	D *(49)* EBR *[0.46]*	D *(42)* WBT *[0.79]*
Transit	Transit Headway	N/A	N/A
	Intersection Approach	N/A	N/A
Pedestrian	Segment	A	F
Bicycle	Segment	A	F

[1] EB segment delay and v/c ratio are for the EB approach to Keele Street.
[2] WB segment delay and v/c ratio are for the WB approach to Jane Street.

Automobile LOS – The mid-block segment of Teston Road between Jane Street to Keele Street has a five-lane cross section with the fifth lane being a two-way left-turn lane (TWLTL), providing access to properties fronting onto Teston Road, reducing delays caused by left turning vehicles. The LOS in both directions during the AM peak hour currently operates at an appropriate LOS 'D' or better with additional capacity available for the critical movements. The LOS for the eastbound direction is based on the eastbound approach to Keele Street while the westbound direction is based on the westbound approach to Jane Street.

Transit LOS – Teston Road between Jane Street to Keele Street is not designated as a transit corridor per York Regions TMP Map 12. The sole transit route using this corridor is YRT Local Route #107 which uses the section between Cranston Park Avenue to Keele Street and operates in mixed traffic. The transit route serves the communities on the south side of Teston Road which represents the northernmost residential community between Jane Street to Keele Street. Since there are no continuous transit routes along this section of Teston Road, the transit LOS targets are not achieved.

Pedestrian LOS – The roadway segment along Teston Road between Jane Street and Keele Street includes a 3.0m separated multi-use pathway

separated from the travelled lanes by a grassed boulevard with no pedestrian facilities on the north side. The pedestrian LOS along this segment is LOS 'A' in the eastbound direction but LOS 'F' in the westbound direction. However, the multi-use pathway on the south side of Teston Road can currently serve the pedestrian needs in both directions along the corridor as majority of the pathway users are presumed to live in the abutting communities primarily located on the south side of the corridor while the north side mainly consists of undeveloped agricultural farmland. Access to the multi-use pathway on the south side of the corridor is provided by the network of trails and sidewalks in the residential community to the south and at the mid-block intersections.

Bicycle LOS – Similar to the pedestrian LOS, the bicycle LOS in the eastbound direction is LOS 'A' with a failing LOS 'F' in the opposing westbound direction. The separated multi-use pathway on the south side of Teston Road in the corridor serves cyclists needs in both directions complementing the side where most residents live, providing a comfortable facility for users of all ages and experiences.

3.10.3 Teston Road and Keele Street

A summary of the MMLOS results for the signalized intersection at Teston Road and Jane Street is shown below in **Table 21**. The MMLOS summary table identifies the LOS for each respective transportation mode by approach and identifies the approach(es) which do not meet the LOS targets established by York Region for each approach.

Table 21: MMLOS Intersection Summary at Teston Road and Keele Street

Level of Service Summary		Intersection Approach [1]			
		Keele Street		Teston Road	
		NB	SB	EB	WB
Automobile	Level of Service *(Delay in seconds)* Critical Movement *[v/c ratio]*	C *(23)* NBL *[0.58]*	C *(32)* SBT *[0.63]*	D *(49)* EBR *[0.46]*	D *(46)* WBTR *[0.10]*
Transit	Transit Headway Intersection Approach	E / F B	E / F C	D D	N/A N/A
Pedestrian	Intersection	F	F	A	F
Bicycle	Intersection	F	F	A	F

[1] All modes evaluated in direction of travel for each intersection approach.

Automobile LOS – The intersection of Teston Road and Keele Street operates acceptably in the morning peak hour with a LOS 'C', as shown in **Section 3.9**. Based on the four approaches to the intersection, all achieve the target LOS 'D'. The configuration of the current intersection includes an auxiliary left turn lane on all approaches with the north and west approach having an additional dedicated right turn lane. The current signal timing plan for the intersection includes protected-permitted left turn movements for all approaches except the southbound left which operates with a permitted left turn movement.

Transit LOS – Transit at the intersection of Teston Road and Keele Street is provided by YRT Local Route #96 & #107. YRT Route #96 travels in the north-south direction along Keele Street while YRT Route #107 performs an eastbound right turn at the intersection, both operating in mixed traffic. Based on York Region's TMP Map 12, only the south section of Jane Street is considered part of the Frequent Transit Network. Normally, YRT Route #107 travels along Keele Street between Teston Road and TTC's Subway Line 1 Pioneer Village station. However, exclusively during the weekday, YRT Route #107B services the Rutherford GO transit station. YRT Route #96 similarly begins at Pioneer Village travelling between the YRT's Newmarket Terminal servicing GO Transit's King City transit station along the way. At the intersection, the transit headway is 19 minutes for Route #107 and ranges between 25 - 32 minutes for Route #96, during the weekday peak hour, resulting in LOS that exceeds the target LOS 'C'. However, the transit performance at the intersection for the critical movements for each route meet the minimum target LOS 'D'.

Pedestrian LOS – Pedestrian facilities are limited at the intersection of Teston Road and Keele Street with a LOS 'F' for all approaches except the eastbound approach with a LOS 'A'. In the eastbound direction, the multi-use pathway along the south side of Teston Road from Jane Street connects into the intersection at Keele. In this southwest corner, there is a large refuge area for pedestrians indicating the Village of Maple. Along the section of Keele Street south of Teston Road, a 1.5m wide sidewalk extends south on the west side of the road. In the northwest and southwest corner of the intersection, only a short section of sidewalk is provided for a connection to the nearby bus stop pad. In the northeast corner of the intersection, only a depressed / mountable curb is provided without a sidewalk. On all approaches, depressed curbs, painted crosswalks and pedestrian crossing signal heads are provided. Therefore, based on the conditions described above, there are many existing gaps in the pedestrian network at this intersection.

Bicycle LOS – The bicycle LOS at all approaches for the intersection of Teston Road and Keele Street are LOS 'F' except for the eastbound approach. In the eastbound direction, the multi-use pathway provides a cycling connection to the intersection resulting in a bicycle LOS 'A' for the approach. The remainder of the approaches lack any form of a cycling facility towards the intersection, resulting in a LOS 'F'. Based on York Region's TMP Map 4 - Existing Cycling Network, there are existing bicycle facilities on Keele Street, albeit discontinuous on both approaches to Teston Road. However, in the Region's proposed 10 year (TMP Map 10), they have identified a dedicated cycling facility connecting the cycling facilities on Keele as well as a separate facility from Keele extending towards Dufferin Street.

3.10.4 Teston Road and Dufferin Street

A summary of the MMLOS results for the signalized intersection at Teston Road and Jane Street is shown below in **Table 22**. The MMLOS summary table identifies the LOS for each respective transportation mode by approach

and identifies the approach(es) which do not meet the LOS targets established by York Region for each approach.

Table 22: MMLOS Intersection Summary at Teston Road and Dufferin Street

Level of Service Summary		Intersection Approach [1]			
		Dufferin Street		Teston Road	
		NB	SB	EB	WB
Automobile	Level of Service *(Delay in seconds)* Critical Movement *[v/c ratio]*	D *(38)* NBT *[0.49]*	E *(72)* SBT *[1.00]*	D *(44)* EBTR *[0.01]*	F *(85)* WBL *[1.06]*
Transit	Transit Headway Intersection Approach	N/A N/A	N/A N/A	N/A N/A	N/A N/A
Pedestrian	Intersection	F	F	B	F
Bicycle	Intersection	B	B	F	D

[1] All modes evaluated in direction of travel for each intersection approach.

Automobile LOS – The overall intersection LOS for the intersection of Teston Road and Dufferin Street operates with a LOS 'E' during the morning peak hour, as summarized in **Section 3.9**. The southbound and westbound approaches currently fail to meet the target LOS 'D'. For the northbound and eastbound approaches, the LOS targets are achieved. The configuration of the intersection at Teston Road and Dufferin Street includes a dedicated left turn auxiliary lane and a through-right lane on three of the four approaches with the northbound approach having a dedicated lane for each left, through and right movement. Based on the current signal timing plan, the northbound left turn is the only movement with a permitted phasing with the remainder of the left turns protected-permitted.

Transit LOS – No transit facilities are present at the intersection of Teston Road and Dufferin Street and as a result cannot be evaluated.

Pedestrian LOS – Pedestrian facilities are limited at the intersection of Teston Road and Dufferin Street with a LOS 'F' for all approaches except the eastbound approach which has a 1.5m sidewalk with a grassed buffer approaching the intersection. The eastbound approach has a LOS 'B'. Based on York Region's TMP Map 5, the section west of the intersection has been identified as a potential active transportation link. At the intersection, pedestrian signal heads and painted crosswalks are present on all corners and approaches. At each corner, a section of sidewalk is provided with depressed curbs and tactile walking surface indicators at the crosswalk locations. In the immediate vicinity of the intersection, sidewalks are not provided since majority of the land in the northeast, southeast and southwest corner are either agricultural farmland or undisturbed woodland. The gaps in the pedestrian network are notable with the development of residential subdivisions beyond the intersection in the northwest and southeast quadrants. Additional pedestrian facilities on the approaches to the intersection can serve to connect the off-road trail networks in each community.

Bicycle LOS – Cycling facilities are provided on three of the approaches (northbound, southbound, and westbound) to the intersection at Teston Road and Dufferin Street in the form on on-street paved shoulder bike lanes. The existing bike lanes on the approach legs are approximately 1.5 – 2.0m wide. In both directions on Dufferin Street, the bicycle LOS is 'B'. On Teston Road, the LOS in the eastbound direction is 'F' due to the lack of bicycle facilities, while the LOS in the westbound direction is 'D' with a 1.5m paved shoulder bike lane.

3.10.5 Teston Road between Dufferin Street to Bathurst Street

A summary of the MMLOS results for the segment of Teston Road between Dufferin Street and Bathurst Street is shown below in **Table 23**. The MMLOS summary table identifies the LOS for each respective transportation mode by segment and identifies the approach(es) which do not meet the LOS targets established by York Region for each approach.

Table 23: MMLOS Segment Summary between Dufferin Street to Bathurst Street

Level of Service Summary		Mid Block Segment	
		Teston Road	
		EB	WB
Automobile	Level of Service *(Delay in seconds)* [1] [2]	F *(101)*	F *(85)*
	Critical Movement *[v/c ratio]* [1] [2]	EBL *[0.97]*	WBL *[1.06]*
Transit	Transit Headway	N/A	N/A
	Intersection Approach	N/A	N/A
Pedestrian	Segment	F	F
Bicycle	Segment	D	D

[1] EB segment delay and v/c ratio are for the EB approach to Bathurst Street.
[2] WB segment delay and v/c ratio are for the WB approach to Dufferin Street.

Automobile LOS – The mid-block segment of Teston Road between Dufferin Street and Bathurst Street has a three-lane cross section with the third lane being a two-way left turn lane (TWLTL), providing access to residential properties and side streets, reducing the delays caused by left turning vehicles with the single lane in the eastbound and westbound directions. The LOS in both directions is LOS 'F' based on the delays and v/c ratios approaching each of the respective intersections. The LOS for the eastbound direction is based on the eastbound approach to Bathurst Street while the westbound direction is based on the westbound approach to Dufferin Street.

Transit LOS – Teston Road between Jane Street to Keele Street is not designated as a transit corridor per York Region's TMP Map 12. The sole transit route using this corridor is YRT Local Rush Hour Only Route #23 which uses the section between Lady Fenyrose Avenue to Via Romano Boulevard and operates in mixed traffic. The transit route serves the communities on the south side of Teston Road, providing transit services to the schools and shopping malls between Go Transit's Finch terminal and Teston Road. The transit connection at Go Transit's Finch terminal also provides access to the TTC's Finch subway station and line. Since there are

no continuous transit routes along this section of Teston Road, the transit LOS targets are not achieved.

Pedestrian LOS – The majority of Teston Road between Dufferin Street and Bathurst Street does not have any pedestrian facilities except for a section east of Torah Gate adjacent to the Forest View Park subdivision. The pedestrian facility between Torah Gate and Bathurst Street is a 1.5m wide sidewalk with a varying grassed boulevard approximately 6.5m wide which connects to a sidewalk that runs parallel to Teston Road in the Forest View Park subdivision. Since there is no continuous pedestrian facility along this section of Teston Road, the pedestrian LOS targets are not achieved.

Bicycle LOS – Cycling facilities are present in both directions along the whole section of Teston Road between Dufferin Street and Bathurst Street in the form of dedicated paved shoulder bike lanes. The width of the shoulder bike lanes is approximately 1.5m along this segment with no buffer to the travelled lanes resulting in a LOS 'D'. The cycling facilities provide a continuous connection between Dufferin Street and Bathurst Street, albeit there are no cycling facilities at Bathurst Street per York Region's TMP Map 4.

3.10.6 Teston Road and Bathurst Street

A summary of the MMLOS results for the signalized intersection at Teston Road and Jane Street is shown below in **Table 24**. The MMLOS summary table identifies the LOS for each respective transportation mode by approach and identifies the approach(es) which do not meet the LOS targets established by York Region for each approach.

Table 24: MMLOS Intersection Summary at Teston Rd / Elgin Mills Rd and Bathurst St

Level of Service Summary		Intersection Approach [1]			
		Bathurst Street		Teston Road	
		NB	SB	EB	WB
Automobile	Level of Service *(Delay in seconds)*	F *(95)*	C *(28)*	F *(101)*	F *(146)*
	Critical Movement *[v/c ratio]*	NBL *[0.73]*	SBT *[0.82]*	EBL *[0.97]*	WBL *[1.13]*
Transit	Transit Headway	C	E	N/A	F
	Intersection Approach	C	C	N/A	D
Pedestrian	Intersection	B	B	B	B
Bicycle	Intersection	F	F	F	F

[1] All modes evaluated in direction of travel for each intersection approach.

Automobile LOS – The intersection of Teston Road and Bathurst Street operates acceptably in the morning peak hour with a LOS 'D' as shown in **Section 3.9**. However, only the southbound approach meets the automobile LOS target of 'D'. The remaining three legs of the intersection all experience long delays greater than the 80 second with the accompanying critical movements operating at LOS 'F'. The configuration of the existing intersection includes a dedicated right and left turn lane in addition to the through lanes.

Transit LOS – Although Dufferin Street is not part of the York Region's Frequent Transit Network per York Regions TMP Map 12, the section of Bathurst Street north and south of Teston Road is. The intersection of Teston Road is serviced by 3 of York Region Transit's local routes including Route #80, 83 and 88. All of these transit routes operate in mixed traffic. YRT Route #80 runs along Elgin Mills Road West between the Elgin West Community Center and Woodbine Avenue to the east. YRT Route #83 which uses the intersection at Teston Road and Bathurst Street is a Limited Service weekday route which runs between YRT's Bernard and Richmond Hill terminals while passing by the Mackenzie Richmond Hill hospital. YRT Route #88 is a local route which runs primarily along Bathurst Street between Go Transit's Finch terminal and Seneca College's King Campus, with stops at YRT's Promenade bus terminal. From the current transit data, the transit LOS target is only met for the northbound approach. However, in terms of transit performance, the LOS target of 'D' is achieved by all approaches.

Pedestrian LOS – At the intersection of Teston Road and Bathurst Street, the pedestrian LOS target is achieved for all approaches. On all of the approaches, the pedestrian facilities include a minimum of a 1.5m concrete sidewalk separated by a grassed boulevard approximately 2.0m wide which narrows approaching the intersection. Furthermore, all intersection approaches include a painted crosswalk with pedestrian signal heads on each corner. Additionally, the sidewalks are depressed at all curb returns ensuring accessibility to the pedestrian facilities for all users.

Bicycle LOS – Contrary to the pedestrian facilities being provided on all approaches to the intersection of Teston Road and Bathurst Street, there are however no cycling facilities resulting in a LOS 'F'. The shoulder bike lanes that are present on Teston Avenue from Dufferin Street do not continue to the intersection. In the area around the intersection per York Region's TMP Map 4, there are limited and discontinuous cycling facilities providing not much desire for bicyclists to use this intersection as part of their bike route.

3.11 Collisions Review

General historical collision records from AIS were obtained from York Region for all arterial roads within the study area for a 5-year period between 2015 to 2019. The collision history database provides the detail of collisions reported within the project limits, including details such as the time and location, classification, environment (weather and light condition), as well as other related information to describe the collision event.

3.11.1 Teston Road (York Region Road 49)

There was a total of 300 collisions on Teston Road between Cityview Boulevard and Bathurst Street for the 5-year period. **Figure 15** illustrates the number of collisions by each year. The average number of collisions per year are 60, with the least recorded in 2017 (42 collisions) and the most recorded in 2015 (71 collisions). Furthermore, most of the collisions (29%) occurred during the autumn season (September, October, and November)

while the least number of collisions (23%) occurred during the spring season (March, April, and May), as depicted in **Figure 16**.

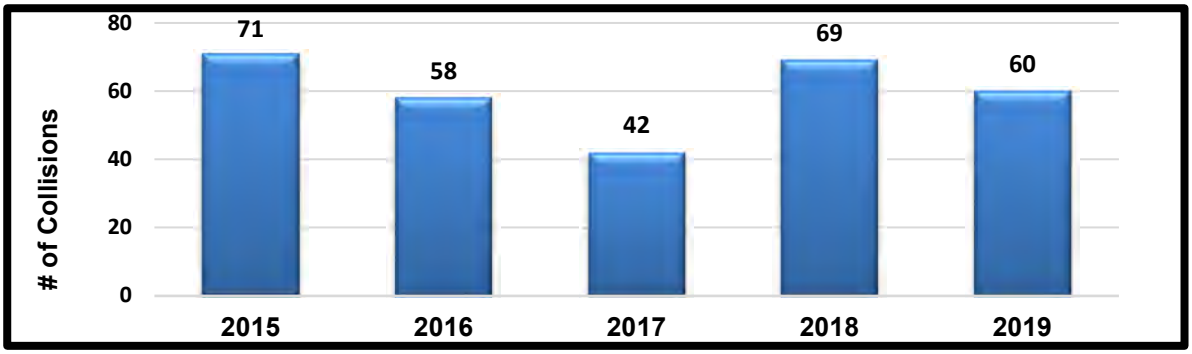


Figure 15: Total Number of Collisions Reported along Teston Road

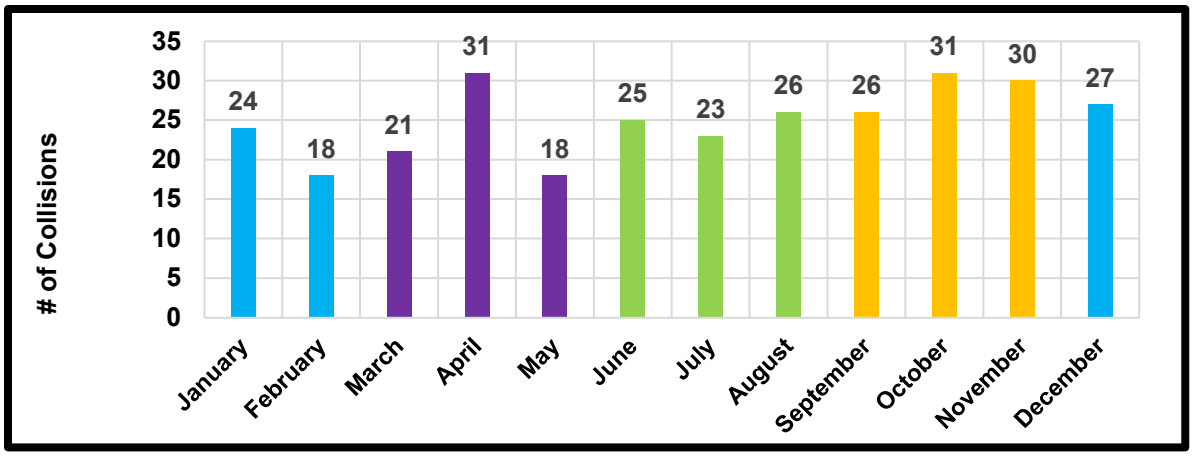


Figure 16: Total Number of Collisions along Teston Road by Month

No fatal collisions were reported during the 5-year analysis period with the majority classified as property damage only (71%). The remainder of the collisions were classified as non-fatal injury with 2 non-reportable as illustrated in **Figure 17**. None of the reported collisions involved pedestrians, although 3 collisions involved cyclists. A brief summary of the collisions involving the cyclists are included below in **Table 25**.

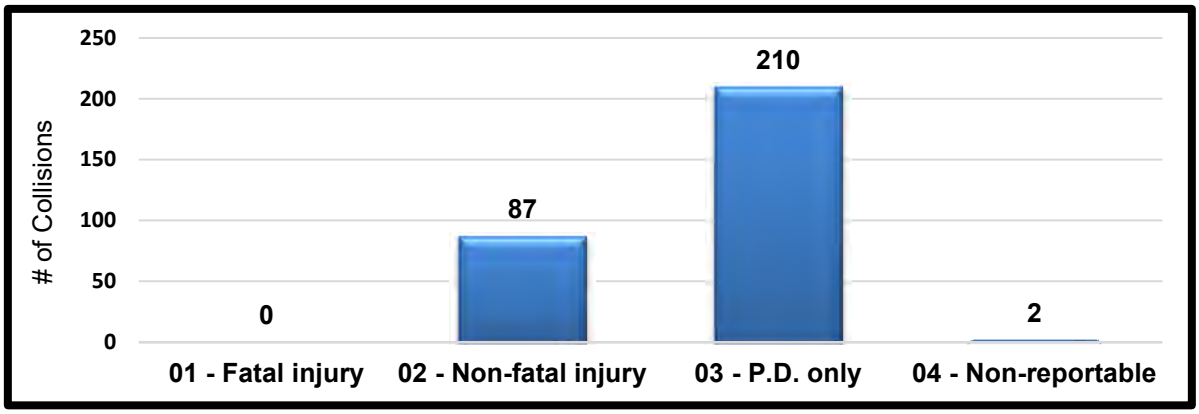


Figure 17: Number of Collisions on Teston Road based on Collision Type

Table 25: Summary of Collisions along Teston Road involving Cyclists

Date	Location	Vehicle Type	Vehicle Maneuver	Classification of Collision	Environmental Condition	Surface Condition	Light Condition	Driver Condition / Action
10/15/2015 Thursday	Keele Street & Teston Road	Dump Truck	Turning left	Injury	Clear	Dry	Daylight	Normal / Improper passing
6/7/2018 Thursday	Keele Street & Teston Road	Passenger Car	Turning right	PDO	Clear	Dry	Daylight	Normal / Driving properly
9/20/2016 Tuesday	Teston Road & Exit 37	Passenger Car	Turning right	Injury	Clear	Dry	Daylight	Normal / Failed to yield right-of-way

The review of the collision history indicated majority of the collisions occurred at intersections (89%) while the remainder occurred mid-block between intersections or at residential driveways off Teston Road. One collision was recorded at the railway crossing on Teston Road east of Keele Street while another collision was unclassified (i.e. others).

The intersection that recorded the most collisions during the analysis period was at Bathurst Street and Elgin Mills Road West/Teston Road with 79 collisions. The mid-block segment which recorded the most collisions was along Teston Road between Torah Gate and Bathurst Street with 8 collisions.

A review of the collision impact type indicated that rear end collisions were the most common, representing 44% of all collisions. The subsequent most common impact types are turning (22%), sideswipe (13%), and angle (12%). **Figure 18** illustrates the proportion of each impact type relative to the collisions within the study area on Teston Road.

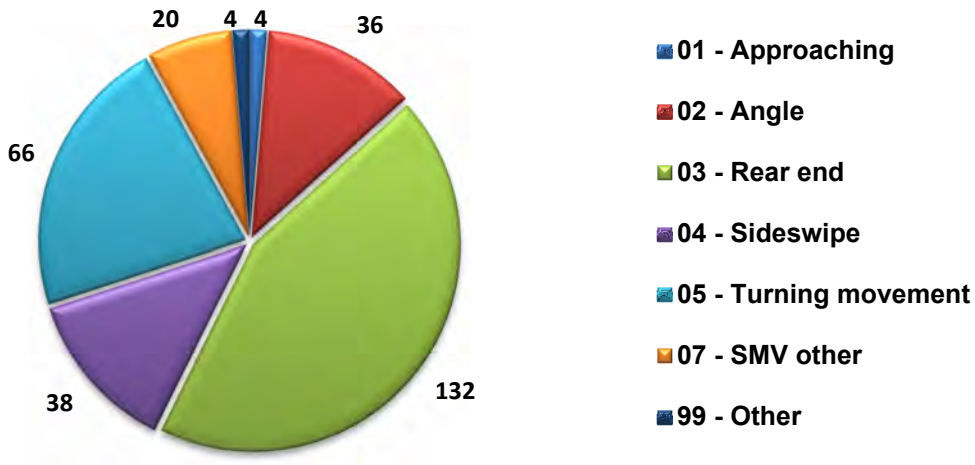


Figure 18: Number of Collisions on Teston Road based on Impact Type

Many of the collisions (82%) occurred when the road had clear weather conditions. Of the remaining collisions, the weather conditions included rain (13%), snow (4%), strong wind, fog / mist, and others. Additionally, the bulk of the collisions also occurred when the roadway surface was dry (73%). The remaining proportion of collisions occurred when there was some form of precipitation on the roadway surface such as rain, snow, or ice. The proportion of each weather condition is shown in **Figure 19,** and the proportion of each surface condition is shown in **Figure 20**.

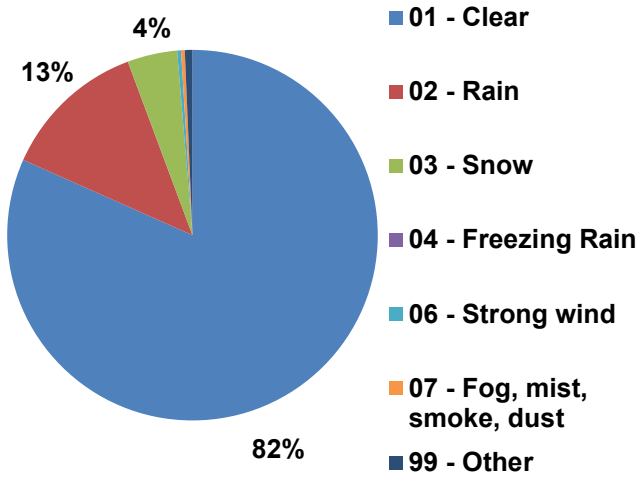


Figure 19: Number of Collisions on Teston Road based on Environmental Conditions

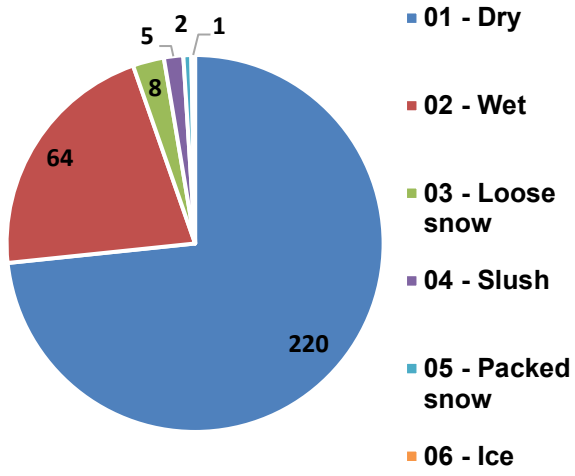


Figure 20: Number of Collisions on Teston Road based on Surface Condition

Furthermore, 70% of the collisions occurred during daylight conditions as shown in **Figure 21**. The remaining collisions either occurred during the night (21%), dawn (4%) or dusk (5%).

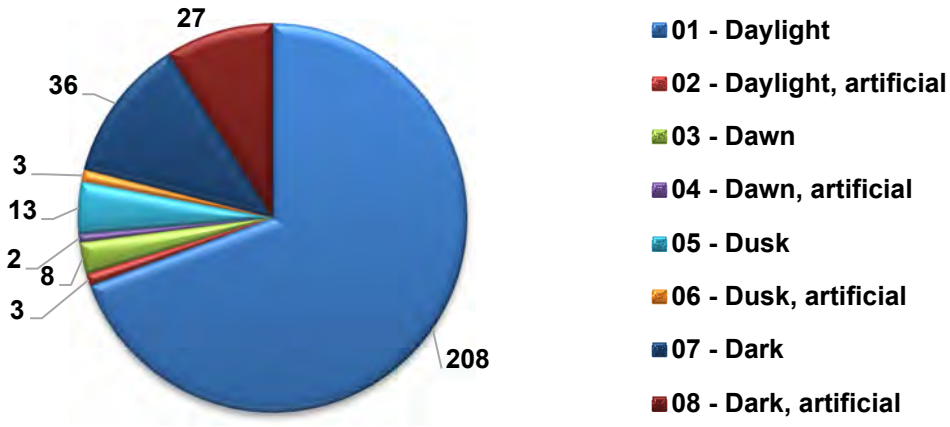


Figure 21: Number of Collisions on Teston Road based on Light Conditions

In assessing the condition of the drivers involved in the collision, most of the drivers were reported to be normal (63%) and uninhibited. Another 21% of the drivers were reported to be inattentive, suggesting they were not monitoring the roadway conditions prior to the collision. Three of the reported drivers should not have been driving as they were reported to have been drinking with one over the legal limit. Two other drivers were reported to be fatigued while the remaining drivers' condition were not reported or indicated as others. **Figure 22** illustrates the proportion of collisions by the primary driver's condition.

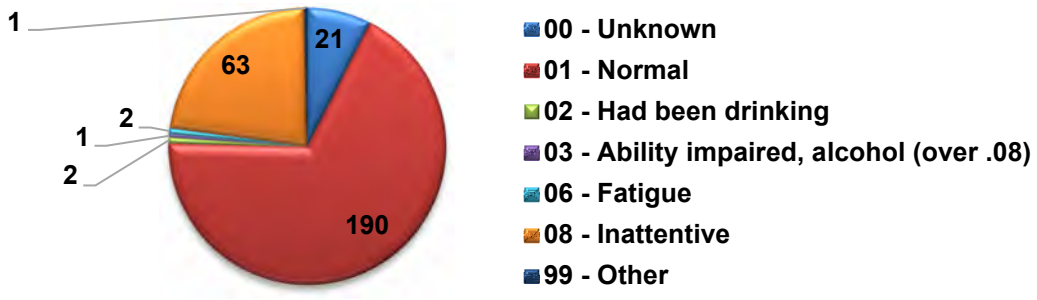


Figure 22: Number of Collisions on Teston Road based on Primary Driver Condition

The most prevalent primary event for the collisions reported was between two motor vehicles at 92%. Additionally, 81% of all collisions were the result of the primary drivers' actions. The leading cause of the collisions includes following too close to the vehicle ahead (27%), improper turn (14%), or failing to yield the right-of-way (13%). A distribution of each driver action resulting in the collision is shown in **Figure 23**. 9% of the reported collisions revealed the primary driver was driving appropriately, implying the collision was the result of the secondary vehicle / driver.

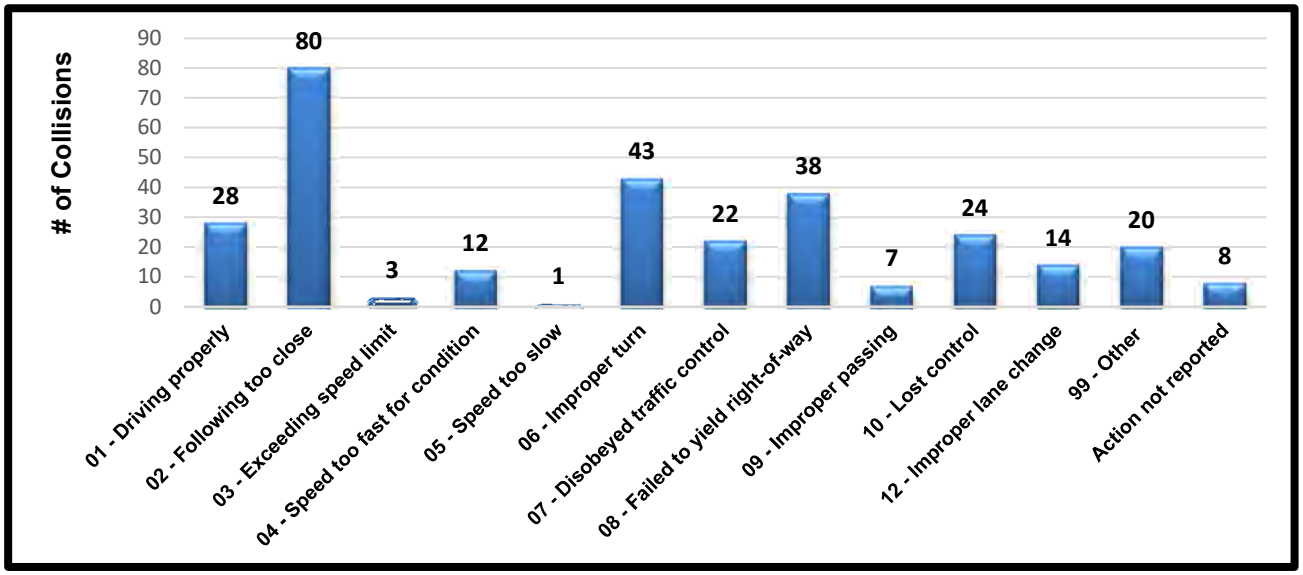


Figure 23: Number of Collisions on Teston Road based on Primary Driver Action

As shown in **Table 26**, the collision rates along Teston Road were calculated based on the number of collisions recorded per million vehicle kilometers (MVK). The collision rate equation is shown below:

$$\text{Site Specific Collision Rate} = \frac{\text{No. of Collisions} \times 10^6}{\text{AADT} \times \text{Segment Length} \times \text{No. of Years} \times 365 \text{ days/year}}$$

The AADT volume at Teston Road (from Highway 400 to Bathurst Street) was in the range of 2,222 vpd to 16,285 veh/day. Based on these volumes, the 66 midblock collisions along Teston Road would correlate to an average collision rate in the order of 0.55 to 2.47 collisions per Million Vehicle Kilometers (MVKM).

Table 26: Collision Rates along Teston Road

Location Description	Segment Length (km)	AADT (vpd)	Number of collisions (2015 2019)	Collision Rate (MVK)
Hwy 400 to Jane St	1.0	5,309 (2019)	15	1.55
Jane St to Keele St	2.0	6,476 (2018)	13	0.55
Keele St to Rodinea Rd	0.5	2,222 (2019)	5	2.47
Dufferin St to Bathurst St	2.0	16,285 (2018)	33	0.56

For the comparison of the collisions on each arterial road, York Region's collision rate is based on the number of collisions for each 100,000 population. Population statistics are not available along the study area arterial roadways, so comparisons for this metric cannot be made. However, collision rates based on million vehicle kilometers travelled have been provided.

3.11.2 Kirby Road (City of Vaughan)

Along the section of Kirby Road between Highway 400 to Dufferin Street, 73 collisions were reported between 2015 and 2019. Majority of the collisions were reported at or related to intersections as there was limited information provided for the mid-block segments along the corridor. No fatal collisions were reported in the corridor with most collisions resulting in property damage only (64%). Many of the collisions were between two motor vehicles (90%) with no collisions reported involving pedestrians or cyclists. The most common impact types included rear end and turning movements which accounted for approximately 36% each. 65% of all collisions also occurred when the conditions were dry and clear during the day. The midblock collision summary along Kirby Road is not available.

3.11.3 Major Mackenzie Drive (York Regional Road 25)

A review of the historical collision record for Major Mackenzie Drive between the limits of Highway 400 to Bathurst Street between 2015 and 2019

resulted in 1,066 individual entries. More than half of the collisions occurred during clear, daylight conditions when the roadway was dry. 75% of the collisions recorded were related to intersections along Major Mackenzie Drive. The most common impact type reported was rear-end collisions (48%) which related to 34% of drivers following too closely. The ensuing order for the impact type were turning movements (20%), sideswipes (13%) and angle (11%). Majority of the collisions (91%) involved passenger vehicles with 25 collisions involving pedestrians and 14 involving cyclists. A summary of all collisions involving pedestrians and cyclists are included in **Appendix E**. Most of the collisions reported were classified as either non-fatal (26%) or property damage only (73%) with two collisions classified as fatal. The fatal collisions are summarized in **Table 27** below.

Table 27: Summary of Fatal Collisions along Major Mackenzie Drive

Date	Location	Vehicle Maneuver [1]	Vehicle Maneuver [1]	Classification of Collision	Environmental Condition	Surface Condition	Light Condition	Driver Condition / Action [1]
09/10/2018 Monday	Major Mackenzie Drive West & Dufferin Street	Passenger Car (Passenger Car)	U-Turn (Going Ahead)	Fatal	Fog, Mist, Smoke, Dust	Wet	Dark, Artificial	Normal / Other (Normal / Driving Properly)
08/10/2018 Friday	Major Mackenzie Drive West b/w Exit 35 & Jane Street	Motorcycle (Passenger Car)	Going Ahead (Turning Left)	Fatal	Clear	Dry	Dark	Normal / Exceeding Speed Limit (Normal / Driving Properly)

[1] Details of the collision is reported for both vehicles: Vehicle 1 (Vehicle 2)

As shown in **Table 28**, the AADT volume at Major Mackenzie Drive (from Highway 400 to Bathurst Street) was in the range of 34,336 vpd to 63,533 veh/day. Based on these volumes, the 591 midblock collisions along Major Mackenzie Drive would correlate to an average collision rate in the order of 0.50 to 1.40 collisions per MVKM.

Table 28: Collision Rates along Major Mackenzie Drive

Location Description	Segment Length (km)	AADT (vpd)	Number of collisions (2015 2019)	Collision Rate (MVK)
Hwy 400 to Jane St	1.0	63,533 (2019)	67	0.58
Jane St to Keele St	2.0	58,053 (2018)	297	1.40
Keele St to Dufferin Street	2.1	34,336 (2019)	163	1.24
Dufferin St to Bathurst St	2.0	35,176 (2018)	64	0.50

3.11.4 Bathurst Street (York Regional Road 38)

Collision data for Bathurst Street between Kirby Road and Major Mackenzie Drive West obtained from the Regional Municipality of York reported 200

collisions between 2015 and 2019. The majority (75%) of the collisions reported occurred at intersections compared to other locations (e.g. mid-block, driveway). The primary cause of collisions reported was the vehicles were following too close (23%) resulting in primarily rear end impacts (41%). No fatal collisions were reported with the majority resulting in property damage only (70%). Half of the collisions occurred when the environmental conditions were dry and clear during the day. Four collisions involved pedestrians and one included a cyclist (Refer to **Appendix E**).

As shown in **Table 29**, the AADT volume at Bathurst Street (between Kirby Road and Major Mackenzie Drive West) was in the range of 33,838 vpd to 38,877 veh/day. Based on these volumes, the 70 midblock collisions along Bathurst Street would correlate to an average collision rate in the order of 0.16 to 0.64 collisions per MVKM.

Table 29: Collision Rates along Bathurst Street

Location Description	Segment Length (km)	AADT (vpd)	Number of collisions (2015 2019)	Collision Rate (MVK)
Major Mackenzie Dr to Mill St/Queen Filomena Ave	0.8	38,877 (2018)	9	0.16
Oxford St/Lady Dolores Ave and Elgin Mills Rd/Teston Rd	0.3	34,478 (2019)	12	0.64
Teston Rd to Kirby Road	2.0	33,838 (2018)	49	0.40

3.11.5 Dufferin Street (York Regional Road 53)

Between 2015 and 2019, 78 collisions were reported along Dufferin Street between Kirby Road and Major Mackenzie Drive. Mid-block collisions accounted for approximately 60% of the total number of reported collisions. Majority of the collisions (74%) reported resulted in property damage only with only 1 reported as fatal. The details for the fatal collision are summarized in **Table 30** below. 41% of the collisions were reported during the day when the weather was clear, and the roadway surface was dry. The surface condition for most of the collisions was dry (77%). Most of the collisions involved passenger vehicles (88%) with one fatal collision involving a cyclist as described in **Table 30**. The most common impact type reported are rear-end collisions.

Table 30: Summary of Fatal Collisions along Dufferin Street

Date	Location	Vehicle Maneuver [1]	Vehicle Maneuver [1]	Classification of Collision	Environmental Condition	Surface Condition	Light Condition	Driver Condition / Action [1]
08/01/2015 Saturday	Dufferin Street btwn Sir Benson Drive & Teston Road	Passenger Car (Cyclist)	Going Ahead (Going Ahead)	Fatal	Clear	Dry	Dark	Normal / Driving Properly (Impaired – Drugs / Failed to Yield Right-of-Way)

[1] Details of the collision is reported for both vehicles: Vehicle 1 (Vehicle 2)

As shown in **Table 31**, the AADT volume at Dufferin Street (between Kirby Road and Major Mackenzie Drive) was in the range of 12,051 vpd to 18,553 veh/day. Based on these volumes, the 48 midblock collisions along Dufferin Street would correlate to an average collision rate in the order of 0.13 to 0.62 collisions per MVKM.

Table 31: Collision Rates along Dufferin Street

Location Description	Segment Length (km)	AADT (vpd)	Number of collisions (2015 2019)	Collision Rate (MVK)
Major Mackenzie Dr to Teston Rd	2.0	18,553 (2018)	42	0.62
Hunterwood Chase to Beakes Cres	0.6	14,430 (2019)	2	0.13
Athabasca Dr and Kirby Rd	0.7	12,051 (2018)	4	0.26

3.11.6 Keele Street (York Regional Road 6)

297 collisions were reported along Keele Street between Kirby Road and Major Mackenzie Drive between 2015 and 2019. Approximately 80% of the collisions occurred at the intersections within the limits. Most of the collisions (70%) resulted in property damage only while the remainder were non-fatal. No fatal collisions were reported. The most common impact type reported was rear end collisions accounting for 40% of all reported collisions. Many of the collisions involved another motor vehicle (86%), with six involving pedestrians and 5 involving cyclists (Refer to **Appendix E**). Additionally, 60% of the collisions occurred during clear daylight conditions when the road was dry.

As shown in **Table 32**, the AADT volume at Keele Street (between Kirby Road and Major Mackenzie Drive) was in the range of 15,234 vpd to 21,957 veh/day. Based on these volumes, the 57 midblock collisions along Keele Street would correlate to an average collision rate in the order of 0.42 to 0.85 collisions per MVKM.

Table 32: Collision Rates along Keele Street

Location Description	Segment Length (km)	AADT (vpd)	Number of collisions (2015 2019)	Collision Rate (MVK)
Major Mackenzie Dr W and Railway St/Killian Rd	0.2	21,957 (2019)	4	0.50
Maple Health Centre and Drummond Dr	0.4	19,357 (2018)	6	0.42
Teston Rd to Kirby Rd	2.0	15,234 (2019)	47	0.85

3.11.7 Jane Street (York Regional Road 55)

Along the section of Jane Street between Kirby Road and Major Mackenzie Drive, 135 collisions were reported during a 5-year period between 2015 and 2019. 70% of the reported collisions were located at intersections along Jane Street. No fatalities were reported with most collisions resulting in property damage only (67%). Most of the collisions (57%) occurred when the conditions were dry and clear during the day. The most common impact types included rear end (31%), angle (19%), Single Motor Vehicle (19%), and turning movement (18%). Many of the collisions involved another motor vehicle (86%), with 14 involving pedestrians and 5 involving cyclists (Refer to **Appendix E**).

As shown in **Table 33**, the AADT volume at Jane Street (between Kirby Road and Major Mackenzie Drive) was in the range of 12,374 vpd to 36,093 veh/day. Based on these volumes, the 44 midblock collisions along Jane Street would correlate to an average collision rate in the order of 0.15 to 0.84 collisions per MVKM.

Table 33: Collision Rates along Jane Street

Location Description	Segment Length (km)	AADT (vpd)	Number of collisions (2015 2019)	Collision Rate (MVK)
Major Mackenzie Dr and Roseheath Dr/Grand Valley Blvd	0.45	36,093 (2019)	12	0.40
Ahmadiyya Ave and Teston Rd	0.3	12,374 (2018)	1	0.15
Teston Rd and Kirby Rd	2.0	6,837 (2019)	21	0.84

4. FUTURE CONDITIONS

4.1 City of Vaughan Active (Proposed) Land Use Developments

The City of Vaughan maintains a geospatial database, referred to as PLANit, which identifies current active development proposals within the City's jurisdiction. The PLANit database includes planned subdivisions, zoning by-law changes, official plan amendments, site plan and condominium applications. A summary of active proposals, in addition to other planned developments, which may contribute to increased traffic within the study area are discussed below.

4.1.1 North Maple Regional Park

The North Maple Regional Park (NMRP) sits south of Kirby Road between Keele Street and Dufferin Street on the former Avondale Compost lands. It is currently roughly 81 hectares of parklands with walking trails, soccer fields as well as washrooms and other amenities. Phase 1 of the park (81 hectares) was opened in 2019.

The City of Vaughan has plans to increase the size of the park through a phased planning approach. The expected final size of the park will be roughly 365 hectares and will cover the land of the former Vaughan Landfill and the former Keele Valley Landfill. The plan also includes integration with a Teston Road missing link between Keele Street and Dufferin Street.

The NMRP will include a portion of the proposed Vaughan Super Trail which will create a 100km city-wide trail system.

4.1.2 Maple Go Station Improvements

Maple GO Station is a train and bus station on GO Transit's Barrie line, located in Maple, Ontario. Metrolinx has been committed to improving the Maple GO Station while maintaining the heritage aspects of the station. Since 2012, improvements at Maple GO Station have included the expansion of the existing parking facilities, a pedestrian walkway from Eagle Rock Way, and two pedestrian tunnels. The future improvements planned specifically at this station include a new second track and platform for increased service, further expansion of the current parking facilities, an upgraded bus loop and a PPUDO area. Furthermore, future plans for the area separate from the improvements at the station include grade separating the existing rail crossing at McNaughton Road to improve traffic and safety at the junction.

4.1.3 Cortelluci Vaughan Hospital

The Cortelluci Vaughan Hospital, slated to open in 2020, will be the first smart hospital in Canada, expanding the health care services and capacity to the surrounding communities. The construction of the 1.2 million square foot facility hospital, costing $1.6 billion, located in the northwest corner of Jane

Street and Major Mackenzie Drive, will include a wealth of facilities including a 37,000 square foot state of the art emergency department, 12,000 square foot pharmacy, 350 beds with capacity to expand to 550 beds, specialized ambulatory clinics and 21 critical care beds. The location of the hospital near Highway 400 and nearby Highway 407 and Highway 401 provides convenient access for the greater community.

4.1.4 Block 27

Block 27 is a proposed plan to redevelop approximately 400 hectares of mainly undeveloped land on the north side of Teston Road between Jane Street and Keele Street up to Kirby Road. The area includes part of the West Don River, Greenbelt and an east-west section of the TransCanada Pipeline. In 2018, the City of Vaughan approved a secondary plan for the area to guide the development of the lands to focus on transit-oriented development which supports a compact, vibrant, and inclusive community. The proposed community is planned to include a mix of commercial, residential and community facilities with a potential GO station along the existing railway corridor in the northeast quadrant of the lands near the intersection of Kirby Road and Keele Street.

4.1.5 Part of Lot 28, Concession 5

A proposed warehouse and distribution development centre have been proposed along Janes Street midway between Teston Road and Kirby Road. The development is planned within the Highway 400 North Employment Area and will have a total gross floor area of 70,308 m2 when the site is fully developed.

The Highway 400 North Employment area is a largely undeveloped section of land on both sides of the regional Highway 400 corridor area surrounding the Highway 400 corridor between Teston Road and King Vaughan Road. The portion overlapping the IEA study area bounded by Highway 400, Teston Road, Jane Street and Kirby Road has been approved by the City of Vaughan to support a mix of prestige, general employment and mixed-use developments.

4.1.6 11333 Dufferin Street

Located in the south-east quadrant of Dufferin Street and Kirby Road, the proposed development is comprised of a residential subdivision consisting of 526 lots for detached dwellings, a park, stormwater management, natural areas and municipal roads. The site is currently zoned as Future Urban Area Zone, as such there is a zoning amendment application in progress to change the zoning to allow single family detached dwellings, park lands and open space.

4.1.7 981 Teston Road

Located along Teston Road midway between Bathurst Street and Dufferin Street, the proposed development is comprised of a residential subdivision consisting of 49 single detached dwellings, natural area, stormwater management, and municipal roads. The site is currently zoned Agricultural Zone, as such a zoning amendment will be required.

4.1.8 1600 Teston Road

A planning application has been submitted to construct a new subdivision at 1600 Teston Road. The planned subdivision located on the north side of Teston Road, west of the intersection with Dufferin Street, is planned to include 96 low-rise residential subdivision properties. The new subdivision will access Teston Road via the existing unopened road allowance west of Teston Road between Keele Street and Dufferin Street.

4.1.9 2975, 2985 and 2993 Teston Road

An application for an 11-story residential apartment complex has been submitted in the southeast corner of Jane Street and Teston Road. The proposed development shall include 176 residential units and 205 parking spaces, with a full movement driveway access to Teston Road and a right-in right-out access to Jane Street.

4.1.10 Developments on Rodinea Road

Planning applications have been submitted for three properties along Rodinea Road. These applications include construction of two new two-story accessory office spaces and an addition to an existing building. The two new proposed office spaces are at 200 and 290 Rodinea Road with a total gross floor area of 1236m2 and 1257m2, respectively. The proposed addition at 311 Rodinea Road is a 346m2 addition to the existing industrial building.

4.2 Future Road Network

4.2.1 The City of Vaughan and York Region's Road Improvements

Figure 24 illustrates the proposed road network in York Region's 2016 TMP for the year 2041.

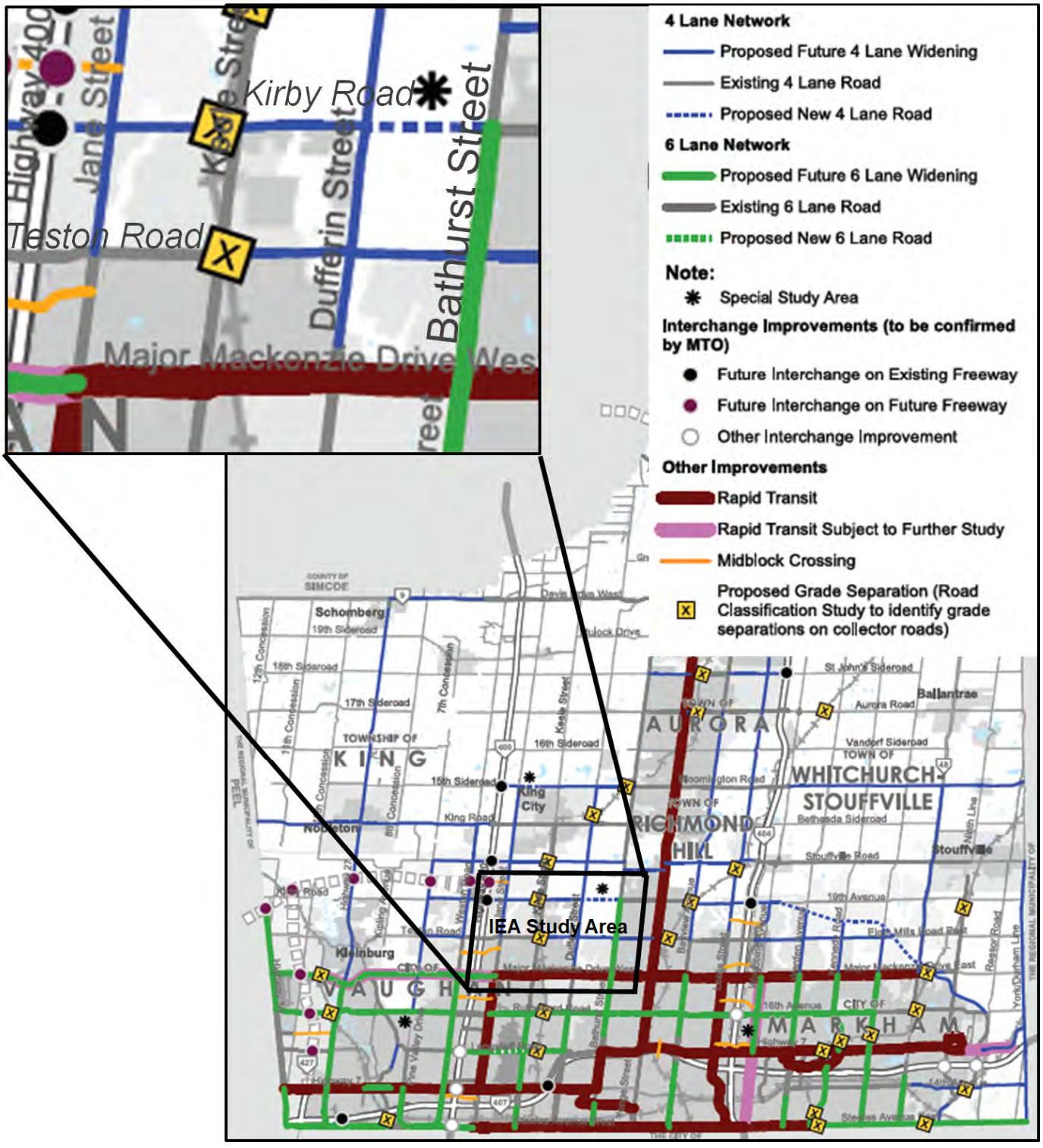


Figure 24: York Region Recommended Road Network for 2041 (2016 TMP)

The City of Vaughan and York Region have both identified the following planned improvements and additions to the transportation system:

4.2.1.1 Teston Road (York Region Road 49)

York Region's TMP includes widening of the existing Teston Road to four lanes between Pine Valley Drive and Weston Road and from Dufferin Street to Yonge Street. In addition, it is recommended to extend Teston Road between Keele Street and Dufferin Street as a four-lane roadway to accommodate additional traffic from anticipated developments.

4.2.1.2 Kirby Road (City of Vaughan)

York Region's TMP includes widening of Kirby Road between Pine Valley Drive and Dufferin Street from two to four lanes and the extension of Kirby Road between Dufferin Street and Bathurst Street as a four-lane roadway including a potential Kirby Road interchange with Highway 400.

4.2.1.3 Major Mackenzie Drive (York Regional Road 25)

The York Region's TMP includes the widening of Major Mackenzie Drive between Highway 50 and Jane Street from four to six lanes. Based on the York Region's TMP, there will be a dedicated transit rapidway on Major Mackenzie Drive (occurring 2027-2031).

4.2.1.4 Bathurst Street (York Regional Road 38)

The York Region's TMP includes widening of Bathurst Street between Highway 7 and Kirby Road from four to six lanes.

4.2.1.5 Dufferin Street (York Regional Road 53)

The York Region's TMP includes widening of Dufferin Street between Major Mackenzie Drive and 15th Sideroad (Y.R. 40), located north of Kirby Road, from two to four lanes.

4.2.1.6 Keele Street (York Regional Road 6)

There are no identified recommended improvements along Keele Street in the York Region TMP.

4.2.1.7 Jane Street (York Regional Road 55)

York Region's TMP includes widening Jane Street between Teston Road and 15th Sideroad (Y.R. 40) from two to four lanes.

4.2.2 Other Road Improvements

4.2.2.1 Highway 400

Currently there is ongoing construction on Highway 400 (between Major Mackenzie Drive north to King Road) to widen Highway 400 from six to eight lanes.

4.2.2.2 Canada Drive-America Avenue Bridge

The City of Vaughan's Official Plan identifies the need to establish a primary road connection over Highway 400 between Major Mackenzie Drive and Teston Road in Block 33. This road connection is not only a key component of the area multi-modal transportation system (accommodating vehicles, cyclists and pedestrians) but also a means of providing the residents in the communities on either side of Highway 400 with better access to community services, reduced travel times and improved emergency response services. Subsequently, the location of the mid-block connection between Canada Drive and America Avenue was identified through the development planning process for Block 33. The preferred design includes a 2-lane roadway, sidewalks and bicycle lanes on a mostly straight alignment slightly shifted to the south side of the right of way and intersections at Cityview Boulevard/Canada Drive (requiring re-grading) and John Deisman Boulevard/ America Avenue.

4.2.2.3 GTA West Highway Corridor

MTO is in the process of confirming the Preferred Route for a new 400-series highway and transit corridor across York, Peel and Halton regions to make commuting and travel easier in the Greater Toronto Area.

The GTA West corridor will include a four-to-six lane 400-series highway, separate infrastructure dedicated for transit and passenger stations, as well as intelligent transportation features and truck parking. The EA for the GTA West Corridor is expected to be completed by the end of 2022. **Figure 25** illustrates the GTA West route planning study area.



Figure 25: GTA West Route Planning Study Area

4.2.2.4 Highway 427 Expansion and Extension

The MTO and Infrastructure Ontario (IO) have signed a $616 million fixed-price contract for the Link 427 consortium to design, build, finance and maintain the expansion project.

The expansion project includes an extension of the highway corridor by 6.6 km from Highway 7 to Major Mackenzie Drive, widening of the existing highway to 8 lanes between Finch Avenue and Highway 7, and new interchanges at Langstaff Road, Rutherford Road and Major Mackenzie Drive. The extension project will include 8 lanes between Highway 7 and Rutherford Drive and 6 lanes from Rutherford to Major Mackenzie Drive. The project which began in August 2017 is expected to be completed in 2021, with Link 427 providing ongoing highway maintenance for the next 30 years. Refer to **Figure 26** illustrating the improvements for Highway 427.

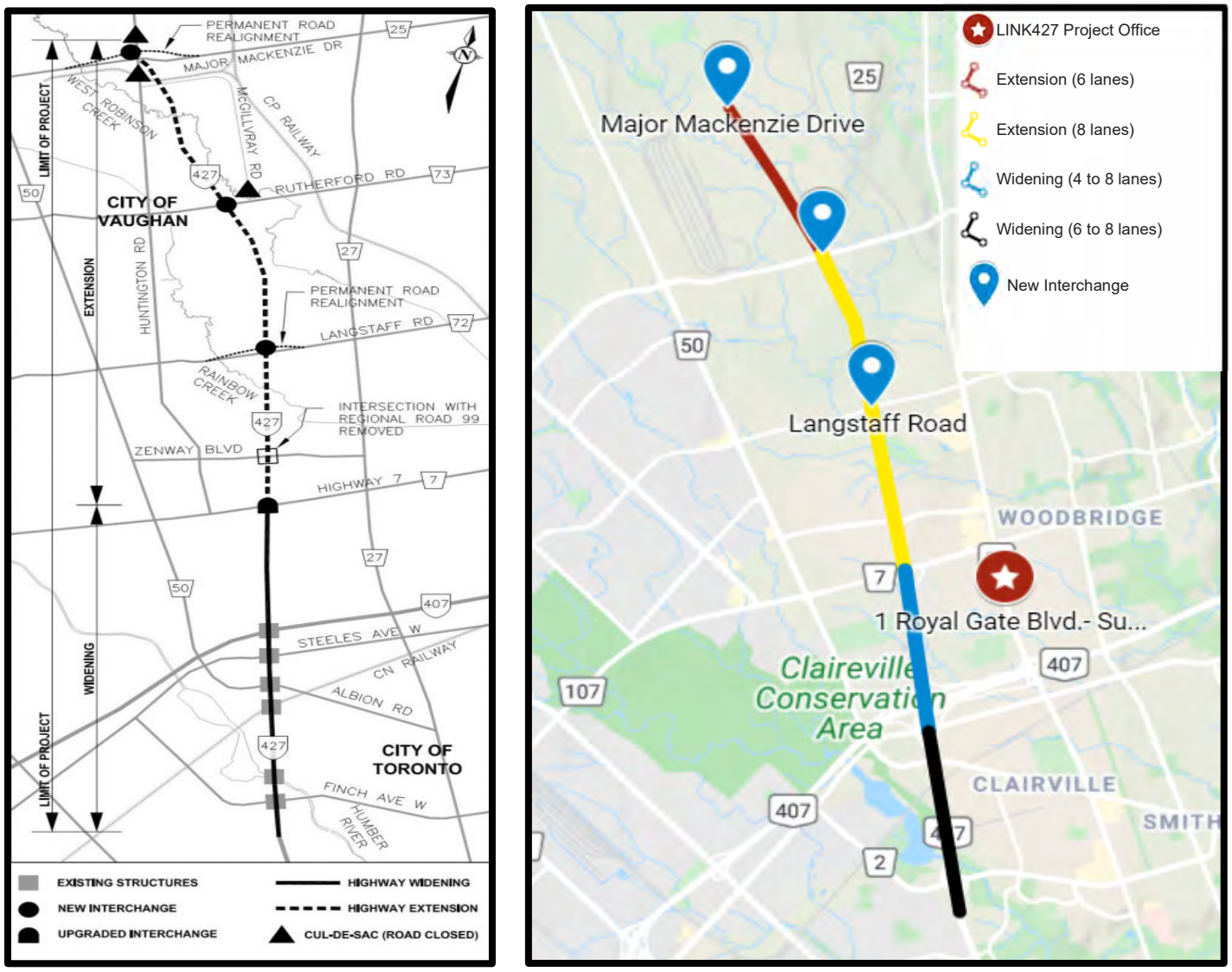


Figure 26: Highway 427 Expansion and Extension

5. MODEL REVIEW

York Region provided Travel Demand Forecasting Subarea Models (EMME) for years 2016, 2031 and 2041 (with and without GTA West) during the AM peak hour of a typical day. As mentioned in **Section 1.2**, the limits of the subarea models were extended to include Yonge Street, Pine Valley Drive, King Vaughan Road and Rutherford Road (Refer to **Figure 1**).

5.1 2016 Subarea EMME Model

The Region's current 2016 EMME model was calibrated at the Regional screenline level using data from the 2011 TTS. However, the calibrated Region's model is not sufficient for any subarea studies. Therefore, the 2016 subarea model was calibrated based on the provided traffic counts.

5.1.1 Calibrating 2016 EMME Subarea Model

Calibration is a process of comparing the model to the field data to test the accuracy of simulated data. The measures of effectiveness (MOE) that were used for the purpose of calibration comparisons between the simulated runs and the existing conditions included hourly traffic volumes for all arterial roads within the study area. The model was considered calibrated when hourly traffic volumes satisfied the criteria provided in **Table 34**.

Table 34: EMME Model Calibration Criteria

Criteria	Measure	Greater Than	Less Than	Calibration Target
Traffic Volume	Hourly Link Volumes	-	700 veh/h	Within 100 veh/h
		700 veh/h	2700 veh/h	Within 15%
		2700 veh/h	-	Within 400 veh/h
		GEH	Statistics	Less Than 5.00
	Total Link Volume		-	Within 5%
		GEH	Statistics	Less Than 4.00

The GEH Statistic is a formula used in traffic modelling to compare two sets of traffic volumes. The formula for the "GEH Statistic" is:

$$GEH = \sqrt{\frac{2(M-C)^2}{M+C}}$$

Where M is the hourly traffic volume from the traffic model and C is the real-world hourly traffic count.

Table 35 2016 AM Peak Hour Traffic Volume Calibration

Arterial Road	Segment	Bidirectional Model Volume	Bidirectional Observed Volume	Difference (%)	Difference (veh/h)	GEH Statistics
Kirby Rd	Hwy 400 to Jane St	363	347	5%	16	0.85
	Jane St to Keele St	601	576	4%	25	1.03

Teston Rd	Hwy 400 to Jane St	2,189	2,390	-8%	-201	4.20
	Jane St to Keele St	1,849	1,765	5%	84	1.98
	Dufferin St to Bathurst St	908	838	8%	70	2.37
Major Mackenzie Dr	Hwy 400 to Jane St	3,265	3,831	-15%	**-566**	**9.50**
	Jane St to Keele St	2,940	3,294	-11%	-354	**6.34**
	Keele St to Dufferin St	2,390	2,616	-9%	-226	4.52
	Dufferin St to Bathurst St	2,686	2,699	0%	-13	0.25
Bathurst St	Rutherford Rd to Major Mackenzie Dr	2,804	2,902	-3%	-98	1.83
	Major Mackenzie Dr to Mill St/Queen Filomena Ave	2,874	3,237	-11%	-363	**6.57**
	Oxford St/Lady Dolores Ave to Teston Rd	2,648	2,747	-4%	-99	1.91
	Teston Rd to Kirby Rd	2,873	2,843	1%	30	0.56
	Kirby Rd to King Vaughan Rd	2,569	2,298	12%	271	**5.49**
Dufferin St	Rutherford Rd to Major Mackenzie Dr	2,247	2,330	-4%	-83	1.74
	Major Mackenzie Dr to Teston Rd	1,351	1,517	-11%	-166	4.38
	Teston Rd to Kirby Rd	1,312	1,344	-2%	-32	0.88
	Kirby Rd to King Vaughan Rd	987	1,000	-1%	-13	0.41
Keele St	Dina Rd to Cromwell Rd/Fieldgate Dr	2,137	1,883	13%	254	**5.67**
	Naylon St to Church St. Mid-Block Pedestrian Crossing	2,138	2,197	-3%	-59	1.27
	Major Mackenzie Dr to Railway St/Killian Rd	1,998	1,970	1%	28	0.63
	Maple Health Centre to Drummond Dr	1,630	1,715	-5%	-85	2.08
	Teston Rd to Kirby Rd	1,734	1,858	-7%	-124	2.93
	Kirby Rd to King Vaughan Rd	1,691	1,712	-1%	-21	0.51
Jane St	Rutherford Rd to Auto Vaughan Dr	2,507	2,195	14%	312	**6.43**
	Avro Rd to Major Mackenzie Dr	2,225	2,207	1%	18	0.38
	Major Mackenzie Dr to Roseheath Dr/Grand Valley Blvd	2,593	2,587	0%	6	0.12
	Ahmadiyya Ave to Teston Rd	1,171	1,199	-2%	-28	0.81
	Teston Rd to Kirby Rd	1,162	1,053	10%	109	3.28
	Kirby Rd to King Vaughan Rd	1,030	1,010	2%	20	0.63
	Total	58,842	60,160	-2%	-1,318	**5.40**

As shown above, the hourly traffic volumes reported from the model correspond strongly with the observed volumes. As a result of the analysis provided, the EMME model is considered to be accurately calibrated to the observed hourly traffic volumes along all arterial roads, representing the year 2016 within the study area. The results of the calibration indicate that the 2016 model is appropriate to use as a basis for developing future traffic volume projections.

5.1.2 2016 Link Analysis

The existing roadways in the study area range from multi-lane arterial roadways (e.g. Major Mackenzie Drive) to single lane facilities (e.g. Gamble Road). Each facility has a finite capacity - the number of vehicles that can be serviced in a lane in a given hour.

Based on York Region Travel Demand Forecasting Model Update Report (2014), lane capacities in the EMME models were reviewed and adjustments were made based on a set of rules, including road classifications, posted speed limit, number of signalized intersections and geometric aspects (Refer to **Table 36**). MH has reviewed and confirmed the lane capacity in the model based on available turning movement counts.

Table 36: Lane Capacities in the EMME Models

Road Classification	Posted Speed (km/hr)	Capacity (Veh/Ln/hr)
Centroid Connectors	40	9999
Local Roads	40	400 - 500
Local Roads	50	700 - 800
Arterial Roads	60	700 - 1000
Arterial Roads	70	900 - 1200
Arterial Roads	80	1000
Highway 400	110	1800
Highway 400 Ramps	50 - 70	1400

The 2016 traffic volumes reported from the model during the morning peak hour are then applied to this capacity of the roadway and the quality of performance is determined. Roadway performance is typically expressed in terms of the Volume to Capacity (V/C) ratio, whereby a V/C ratio that exceeds 0.90 is typically considered “congested condition” and improvements are generally warranted (see **Table 37**).

Table 37: Link Volume to Capacity Ratio and Operating Condition for Arterial Roads

Volume to Capacity Ratio	LOS	Operating Condition
Less than 0.60	A	Free-flow Conditions
0.61 to 0.70	B	Reasonably Unimpeded Operations
0.71 to 0.80	C	Stable Operations
0.81 to 0.90	D	Approaching Unstable Operations
0.91 to 1.00	E	Congested Conditions
Greater Than 1.00	F	Very Congested Conditions

Figure 27 illustrates the 2016 V/C ratios for each key roadway. The figure indicates that numerous locations exhibit over-capacity conditions.

The analysis results indicate that under 2016 AM conditions Kirby Road, Teston Road and Major Mackenzie Drive are operating at free flow conditions in the eastbound direction, while congested conditions exist in the westbound direction due to the predominant westbound traffic during the morning peak hour.

All north-south arterial roads are operating at free flow conditions in the northbound direction, while the majority of southbound movements experience very congested conditions particularly south of Teston Road due to the predominant southbound traffic during the morning peak hour.

A similar reversed traffic pattern is expected during the afternoon peak hour, with predominantly eastbound and northbound directions of traffic flow.

A snapshot of the 2016 EMME subarea network is included in **Appendix F**.

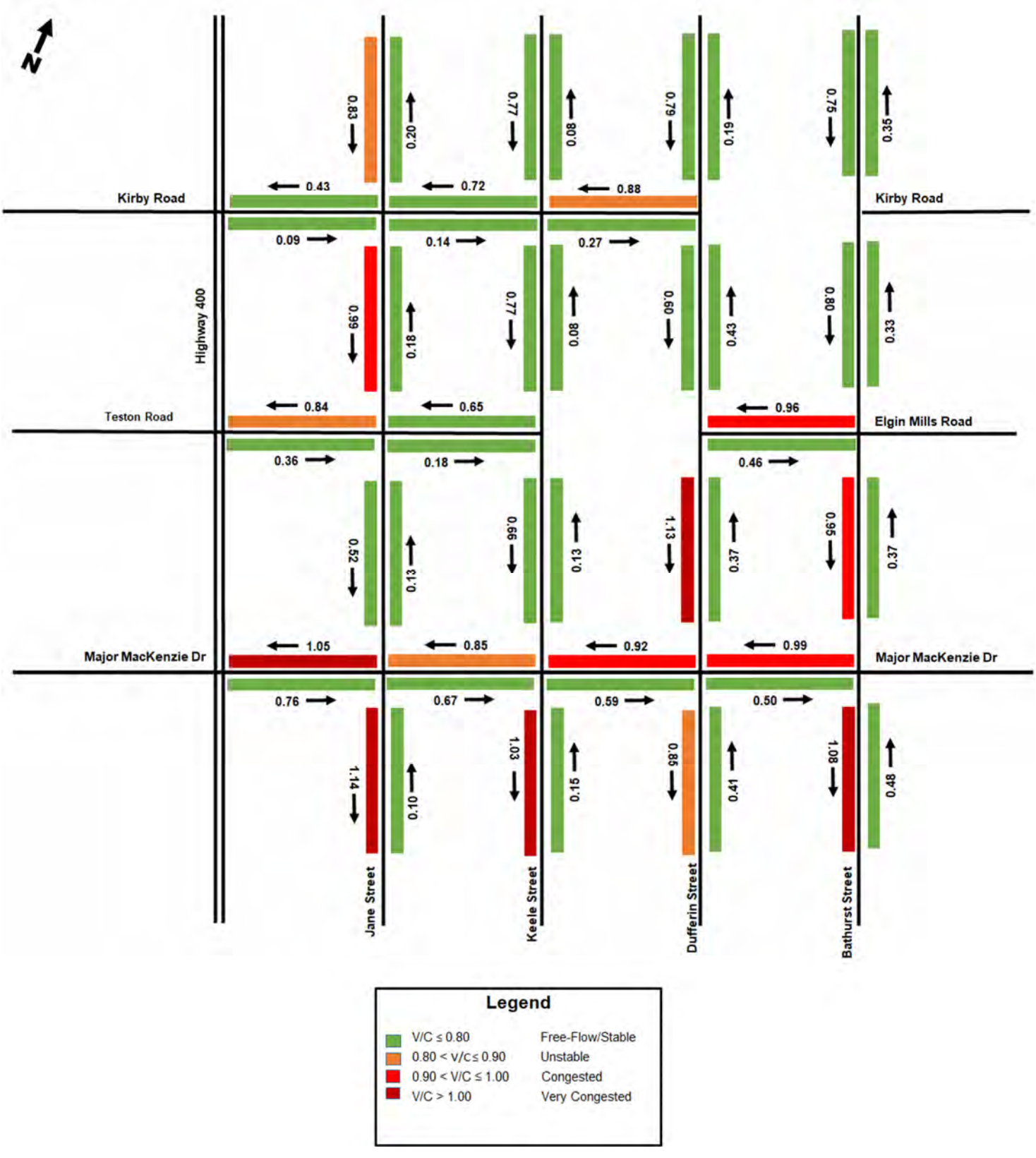


Figure 27: 2016 Link Analysis - AM Peak Hour

5.1.3 2016 Screenline Analysis

The travel demands were developed at strategic screenlines or an imaginary boundary which extends across a series of roadways and typically located where travel constraints exist such as rivers, rail corridors, and greenspaces. The 2016 peak direction (westbound and southbound) travel demands at five screenlines were then compared with the available capacity and the travel deficiency or surplus was derived. **Figure 28** illustrates the location of these five screenlines.

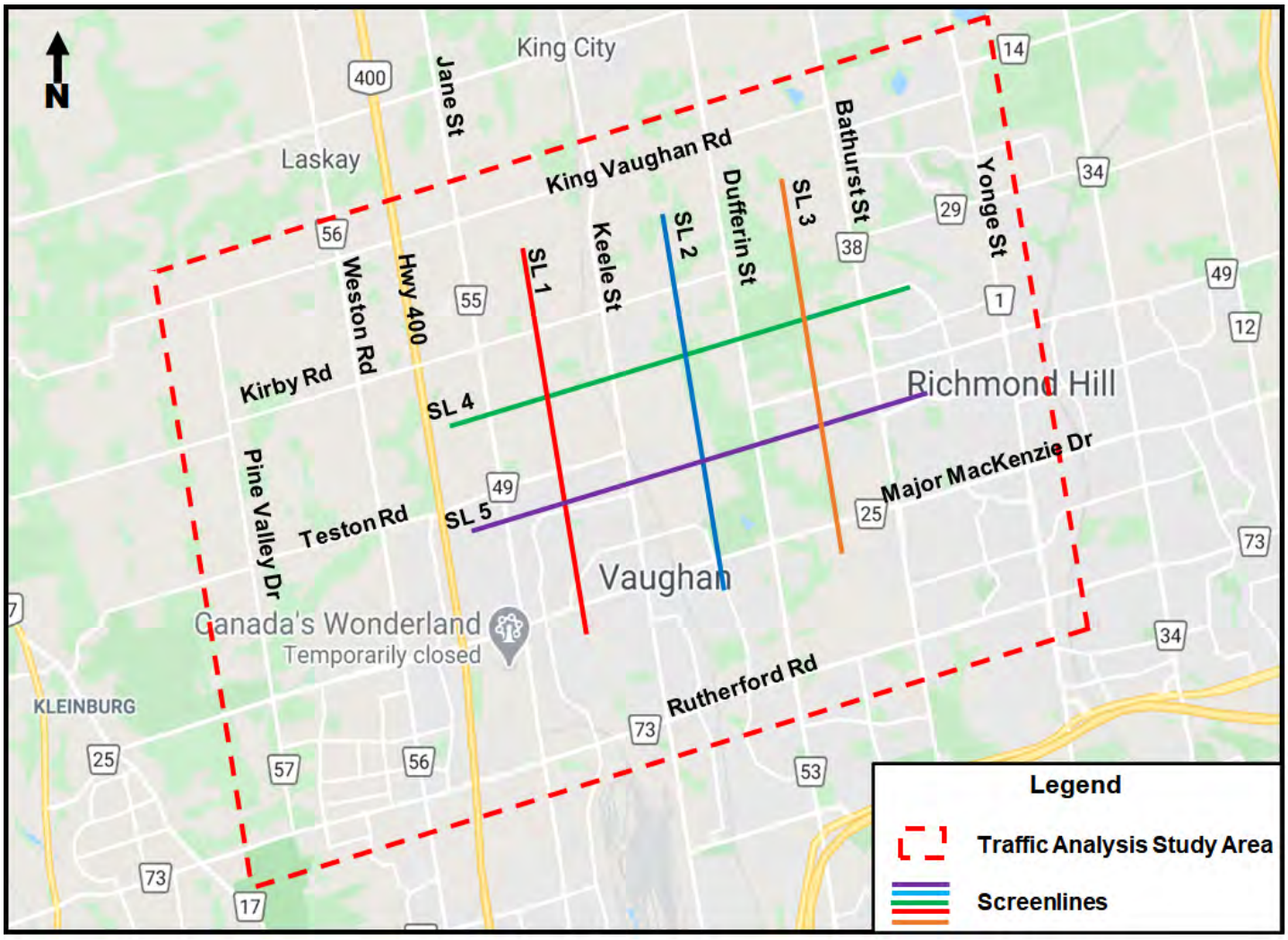


Figure 28: Study Area Screenlines

Table 38 summarizes 2016 AM peak hour volumes and the V/C ratio for each key roadway at the five screenlines in the study area. **Table 38** indicates that the overall V/C for Screenlines SL2 and SL3 exhibit values of 0.91 and 0.98, respectively, suggesting that the demand exceeds the available capacity. It is evident that without the Kirby Road and Teston Road connections Major Mackenzie Drive experiences delay and congestion.

Table 38: AM Peak Hour / Peak Direction Assigned Volumes and V/C (2016 EMME Model)

Section	Volume	# Lanes (Per Direction)	Lane Capacity (Per Direction)	Total Capacity (Per Direction)	V/C
Screenline 1					
Major Mackenzie Dr	1,362	2	800	1,600	0.85
Teston Rd	1,175	2	900	1,800	0.65
Kirby Rd	504	1	700	700	0.72
Screenline Total	3,041	5		4,100	0.74
Screenline 2					
Major Mackenzie Dr	1,651	2	900	1,800	0.92
Kirby Rd	619	1	700	700	0.88
Screenline Total	2,270	3		2,500	0.91
Screenline 3					
Major Mackenzie Dr	1,780	2	900	1,800	0.99
Teston Rd	768	1	800	800	0.96
Screenline Total	2,548	3		2600	0.98
Screenline 4					
Jane St	986	1	1000	1000	0.99
Keele St	1,548	2	1000	2000	0.77
Dufferin St	598	1	1000	1000	0.60
Bathurst St	1,931	2	1200	2400	0.80
Screenline Total	5,063	6		6,400	0.79
Screenline 5					
Jane St	939	2	900	1800	0.52
Keele St	1,051	2	800	1600	0.66
Dufferin St	1,018	1	900	900	1.13
Bathurst St	1,903	2	1000	2000	0.95
Screenline Total	4,911	7		6,300	0.78

The corresponding 2016 projected am peak hour transit demand (i.e. transit person trips) at each screenline developed in the EMME model is summarized in **Table 39**.

The 3-hour transit trips (between 6:00 a.m. and 8:59 a.m.) were factored by 2.0 to establish average am peak hour transit passenger trips. This factor was estimated based on the assumption that 50% of the a.m. peak period of transit demand takes place during the a.m. peak hour.

In general terms, transit trips are higher at the eastern and southern limits of the study area where the various transit facilities converge.

Table 39: AM Peak Hour / Peak Direction Transit Person Trips (2016 EMME Model)

Section	1 hour Auto trips	1 hour Passenger Car Equivalent[1]	3 hour Transit Passenger Trips	1 hour Transit Passenger Trips	1 hour Total Passenger Trips	Transit Mode Share
Screenline 1						
Major Mackenzie Dr	1,362	1,580	130	65	1,645	4%
Teston Rd	1,175	1,363	0	0	1,363	0%
Kirby Rd	504	585	0	0	585	0%
Screenline Total	3,041	3,528	130	65	3,593	2%
Screenline 2 (WB)						
Major Mackenzie Dr	1,651	1,915	169	85	2,000	4%
Kirby Rd	619	718	0	0	718	0%
Screenline Total	2,270	2,633	169	85	2,718	3%
Screenline 3 (WB)						
Major Mackenzie Dr	1,780	2,065	183	92	2,156	4%
Teston Rd	768	891	0	0	891	0%
Screenline Total	2,548	2,956	183	92	3,047	3%
Screenline 4 (SB)						
Jane St	986	1,144	1	1	1,144	0%
Keele St	1,548	1,796	59	30	1,825	2%
Dufferin St	598	694	0	0	694	0%
Bathurst St	1,931	2,240	455	228	2,467	9%
Screenline Total	5,063	5,873	515	258	6,131	4%
Screenline 5 (SB)						
Jane St	939	1,089	0	0	1,089	0%
Keele St	1,051	1,219	49	25	1,244	2%
Dufferin St	1,018	1,181	0	0	1,181	0%
Bathurst St	1,903	2,207	372	186	2,393	8%
Screenline Total	4,911	5,697	421	211	5,907	4%

Note: Based on 2011 TTS, the passenger-car equivalent is 1.16. persons/car

5.2 2031 Subarea EMME Model

The Region's 2031 EMME model includes all planned/proposed network improvements identified in the York Region's 2020 10-year Capital Program:

- Dufferin Street widened between Major Mackenzie Drive and Teston Road from two to four lanes;
- Bathurst Street widened between Highway 7 and Major Mackenzie Drive from four to six lanes;
- Major Mackenzie Drive widened between Highway 50 and Jane Street from four to six lanes.
- Teston Road widened between Pine Valley Drive and Weston Road from two to four lanes;
- Teston Road widened between Bathurst Street and Yonge Street from two to four lanes; and

- Highway 400 widened between Major Mackenzie Drive to King Road from six to eight lanes.

The GTA West freeway, Kirby Road and Teston Road extensions are not part of the roadway network in this horizon year.

Figure 29 illustrates the 2031 V/C ratios for each key roadway. The figure indicates that virtually all westbound and southbound movements along arterial roads are functioning with a V/C ratio that exceeds 0.90 suggesting that the demand well exceeds the proposed capacity. A snapshot of the 2031 EMME subarea network is included in **Appendix G**.

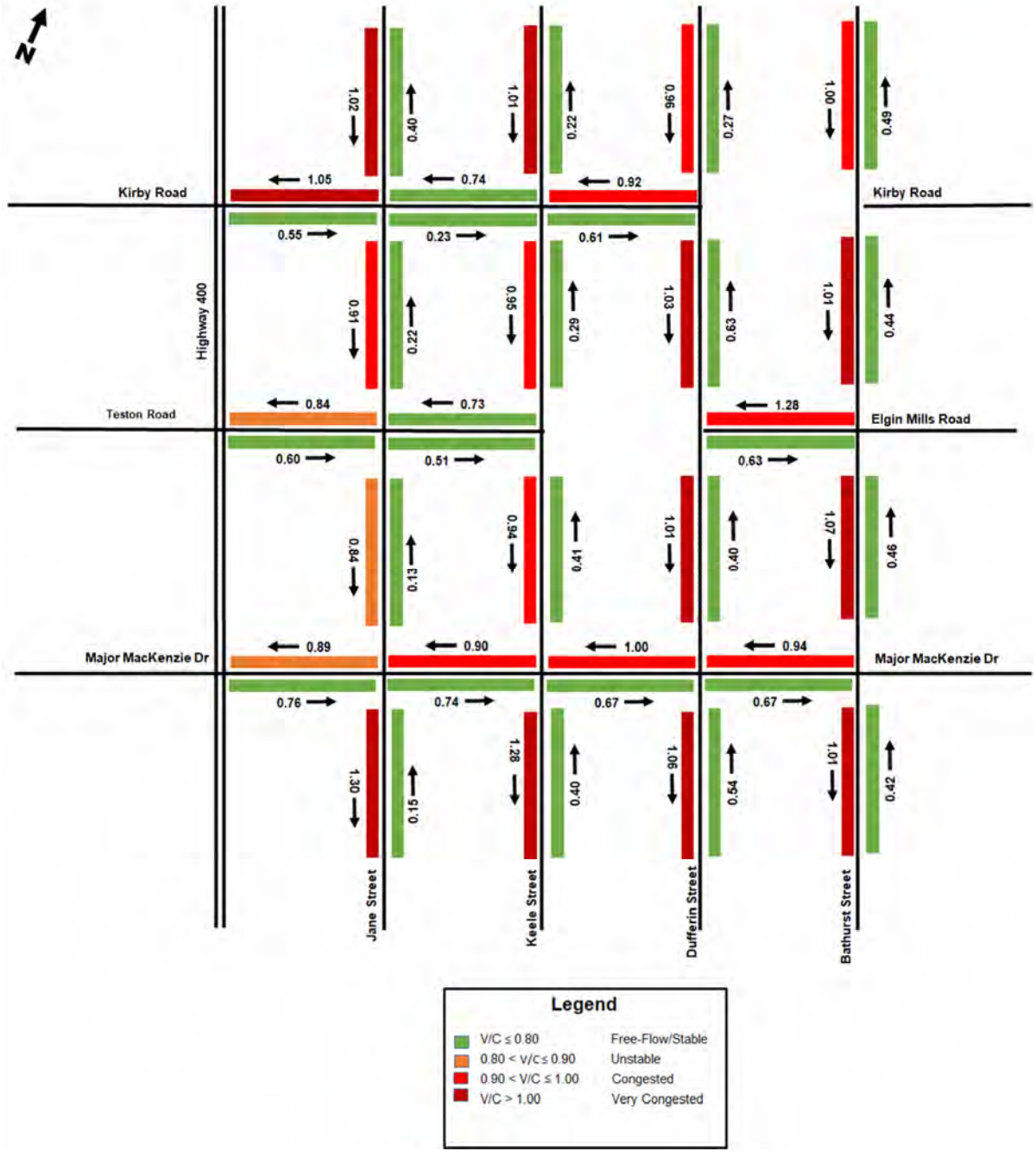


Figure 29: 2031 Link Analysis - AM Peak Hour

Table 40 illustrates the V/C ratio for each key roadway at the five screenlines in the study area for the year 2031. **Table 40** indicates that virtually all major arterial roads crossing Screenlines SL2, SL3, SL4 and SL5 function with a V/C ratio that exceeds 0.90 (i.e. volume exceeds capacity).

Table 40: AM Peak Hour / Peak Direction Assigned Volumes and V/C (2031 EMME Model)

Section	Volume	# Lanes (Per Direction)	Lane Capacity (Per Direction)	Total Capacity (Per Direction)	V/C
Screenline 1					
Major Mackenzie Dr	1,439	2	800	1,600	0.90
Teston Rd	1,321	2	900	1,800	0.73
Kirby Rd	521	1	700	700	0.74
Screenline Total	3,281	5		4,100	0.80
Screenline 2					
Major Mackenzie Dr	1,801	2	900	1,800	1.00
Kirby Rd	646	1	700	700	0.92
Screenline Total	2,447	3		2,500	0.98
Screenline 3					
Major Mackenzie Dr	1,699	2	900	1,800	0.94
Teston Rd	1,026	1	800	800	1.28
Screenline Total	2,725	3		2,600	1.05
Screenline 4					
Jane St	912	1	1000	1,000	0.91
Keele St	1,710	2	900	1,800	0.95
Dufferin St	1,032	1	1000	1,000	1.03
Bathurst St	2,422	2	1200	2,400	1.01
Screenline Total	6,076	6		6,200	0.98
Screenline 5					
Jane St	1,507	2	900	1,800	0.84
Keele St	1,510	2	800	1,600	0.94
Dufferin St	1,816	2	900	1,800	1.01
Bathurst St	2,142	2	1000	2,000	1.07
Screenline Total	6,975	8		7,200	0.97

The corresponding 2031 projected am peak hour transit demand (i.e. transit person trips) at each screenline developed in the EMME model is summarized in **Table 41**.

It is evident that by 2031 the transit trips are expected to increase significantly along Major Mackenzie Drive, Jane Street and Keele Street.

Table 41: AM Peak Hour / Peak Direction Transit Person Trips (2031 EMME Model)

Section	1 hour Auto trips	1 hour Passenger Car Equivalent[1]	3 hour Transit Passenger Trips	1 hour Transit Passenger Trips	1 hour Total Passenger Trips	Transit Mode Share
Screenline 1						
Major Mackenzie Dr	1,439	1,669	1,073	537	2,206	24%
Teston Rd	1,321	1,532	42	21	1,553	1%
Kirby Rd	521	604	19	10	614	2%
Screenline Total	3,281	3,806	1,134	567	4,373	13%
Screenline 2 (WB)						
Major Mackenzie Dr	1,801	2,089	966	483	2,572	19%
Kirby Rd	646	749	0	0	749	0%
Screenline Total	2,447	2,839	966	483	3,322	15%
Screenline 3 (WB)						
Major Mackenzie Dr	1,699	1,971	870	435	2,406	18%
Teston Rd	1,026	1,190	0	0	1,190	0%
Screenline Total	2725	3,161	870	435	3,596	12%
Screenline 4 (SB)						
Jane St	912	1,058	85	43	1,100	4%
Keele St	1,710	1,984	492	246	2,230	11%
Dufferin St	1,032	1,197	22	11	1,208	1%
Bathurst St	2,422	2,810	668	334	3,144	11%
Screenline Total	6,076	7,048	1,267	634	7,682	8%
Screenline 5 (SB)						
Jane St	1,507	1,748	35	18	1,766	1%
Keele St	1,510	1,752	122	61	1,813	3%
Dufferin St	1,816	2,107	0	0	2,107	0%
Bathurst St	2,142	2,485	673	337	2,821	12%
Screenline Total	6,975	8,091	830	415	8,506	5%

Note: Based on 2011 TTS, the passenger-car equivalent is 1.16. persons/car

5.2.1 2031 EMME Network with 2041 Demand

A link analysis was conducted for the year 2041 using York Region's 2041 projected travel demand (Origin-Destination Matrix) and 2031 planned/proposed network improvements identified in the York Region's 2020 10-year Capital Program.

As shown in **Figure 30**, it can be observed that virtually all the V/C ratio in the westbound and southbound directions would exceed the threshold limit of 1.00 by 2041. The analysis results suggest that network improvements would be required to accommodate future travel needs for the 2041 horizon year.

A snapshot of the 2031 EMME subarea network with 2041 travel demand is included in **Appendix H**.

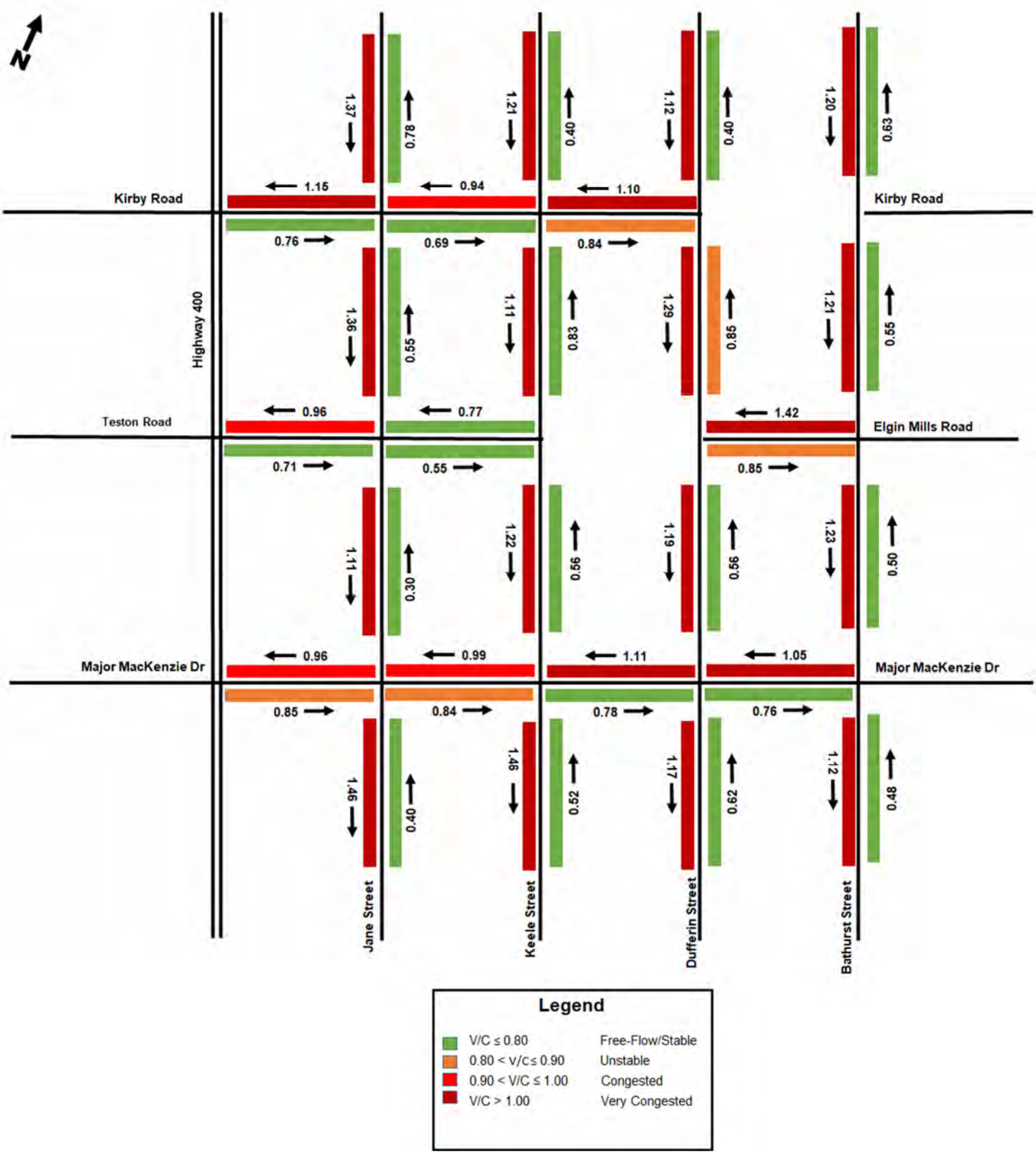


Figure 30: 2041 Link Analysis with 2031 Road Improvements – AM Peak Hour

Table 42 indicates that all major arterial roads crossing Screenlines SL2, SL3, SL4 and SL5 are functioning with a V/C ratio that exceeds 1.00 (i.e. volume exceeds capacity). The analysis results suggest that 2031 network cannot accommodate future travel needs for the 2041 horizon year and network improvements would be required.

Table 42: AM Peak Hour / Peak Direction Assigned Volumes and V/C (2031 EMME Model with 2041 Demand)

Section	Volume	# Lanes (Per Direction)	Lane Capacity (Per Direction)	Total Capacity (Per Direction)	V/C
Screenline 1					
Major Mackenzie Dr	1,590	2	800	1,600	0.99
Teston Rd	1,381	2	900	1,800	0.77
Kirby Rd	659	1	700	700	0.94
Screenline Total	3,630	5		4100	0.89
Screenline 2					
Major Mackenzie Dr	2,006	2	900	1,800	1.11
Kirby Rd	773	1	700	700	1.10
Screenline Total	2,779	3		2,500	1.11
Screenline 3					
Major Mackenzie Dr	1,882	2	900	1,800	1.05
Teston Rd	1,135	1	800	800	1.42
Screenline Total	3,017	3		2,600	1.16
Screenline 4					
Jane St	1,362	1	1,000	1,000	1.36
Keele St	1,993	2	900	1,800	1.11
Dufferin St	1,293	1	1,000	1,000	1.29
Bathurst St	2,905	2	1,200	2,400	1.21
Screenline Total	7,553	6		6,200	1.22
Screenline 5					
Jane St	1,994	2	900	1,800	1.11
Keele St	1,948	2	800	1,600	1.22
Dufferin St	2,150	2	900	1,800	1.19
Bathurst St	2,451	2	1000	2,000	1.23
Screenline Total	8,543	8		7,200	1.19

5.3 2041 Subarea EMME Model

In addition to the planned/propose network improvements up to 2031 described previously, the Region's 2041 EMME model includes all additional planned/proposed network improvements identified in the York Region's 2016 TMP for the year 2041 (i.e. base case) condition:

- Jane Street widened between Teston Road and 15th Sideroad (Y.R. 40) from two to four lanes;
- Dufferin Street widened between Teston Road and 15th Sideroad (Y.R. 40) from two to four lanes;
- Bathurst Street widened between Major Mackenzie Drive and Kirby Road from four to six lanes;

- Kirby Road widened between Pine Valley Drive and Dufferin Street from two to four lanes;

- Kirby Road extended between Dufferin Street and Bathurst Street as a four-lane roadway. The City of Vaughan's EA for the Kirby Road Extension between Dufferin Street and Bathurst Street used the capacity of 900 veh/Lane/hr along Kirby Road in their modelling. As such, the capacity along Kirby Road was increased from 700 to 900 veh/Lane/hr for the year 2041 when the 4-lane widening is in place; and

- New Kirby Road / Highway 400 interchange at Highway 400.

- Teston Road widened between Dufferin Street and Bathurst Street from two to four lanes and the associated capacity was increased from 800 to 900 veh/Lane/hr for the year 2041 when the 4-lane widening is in place; and

- Teston Road was extended between Keele Street and Dufferin Street as a four-lane roadway. **Teston Road extension will be excluded from the 2041 network while evaluating various future alternatives.**

- A new mid-block connection across Highway 400 (Canada Drive-America Avenue Bridge). The new bridge includes a 2-lane roadway, sidewalks and bicycle lanes on a mostly straight alignment slightly shifted to the south side of the right of way and intersections at Cityview Boulevard/Canada Drive (requiring re-grading) and John Deisman Boulevard/ America Avenue.

5.3.1 Select Link Analysis for 2041 Network with and without GTA West

In August 2020 MTO confirmed the preferred route for the GTA West Multimodal Transportation Corridor (see **Figure 25**). However, as the project likely isn't funded yet by MTO further analysis was undertaken for the horizon year 2041 with and without the proposed GTA West freeway as part of the roadway network. A select link analysis was conducted for both options in order to identify the origins and destinations of forecast vehicles using Teston Road in the 2041 model during the AM peak hour.

5.3.1.1 2041 Model without GTA West

As mentioned above, the dominant traffic volumes during the morning peak hour are in the westbound and southbound directions. **Figure 31** illustrates that by 2041 without the GTA West freeway, the AM peak hour traffic volume in the westbound direction along Teston Road (between Keele Street and Dufferin Street) is in excess of 1,518 veh/h. The typical vehicle carrying capacity of a single lane on Teston Road is approximately 900 veh/h.

The 2041 forecast without GTA West indicates that projected vehicle flows along Teston Road are still significant and this section of Teston Road may require two lanes in each direction to

serve the forecast demand. Note that further analysis of this and other alternatives will be undertaken.

A snapshot of 2041 EMME subarea network without GTA West is included in **Appendix I**.

Figure 32 illustrates the 2041 V/C ratios without GTA West freeway for each key roadway. The figure indicates that virtually all southbound movements along arterial roads exhibit over-capacity conditions.

Table 43 illustrates the V/C ratio for each key roadway at the five screenlines in the study area for the year 2041 without the GTA West freeway. The overall V/C for Screenlines SL1 to SL4 exhibits values of 0.90 or less. However, Screenline SL5 is over-capacity (i.e V/C of 1.11) suggesting that all southbound traffic flow south of Teston Road are expected to be very congested by the year 2041.

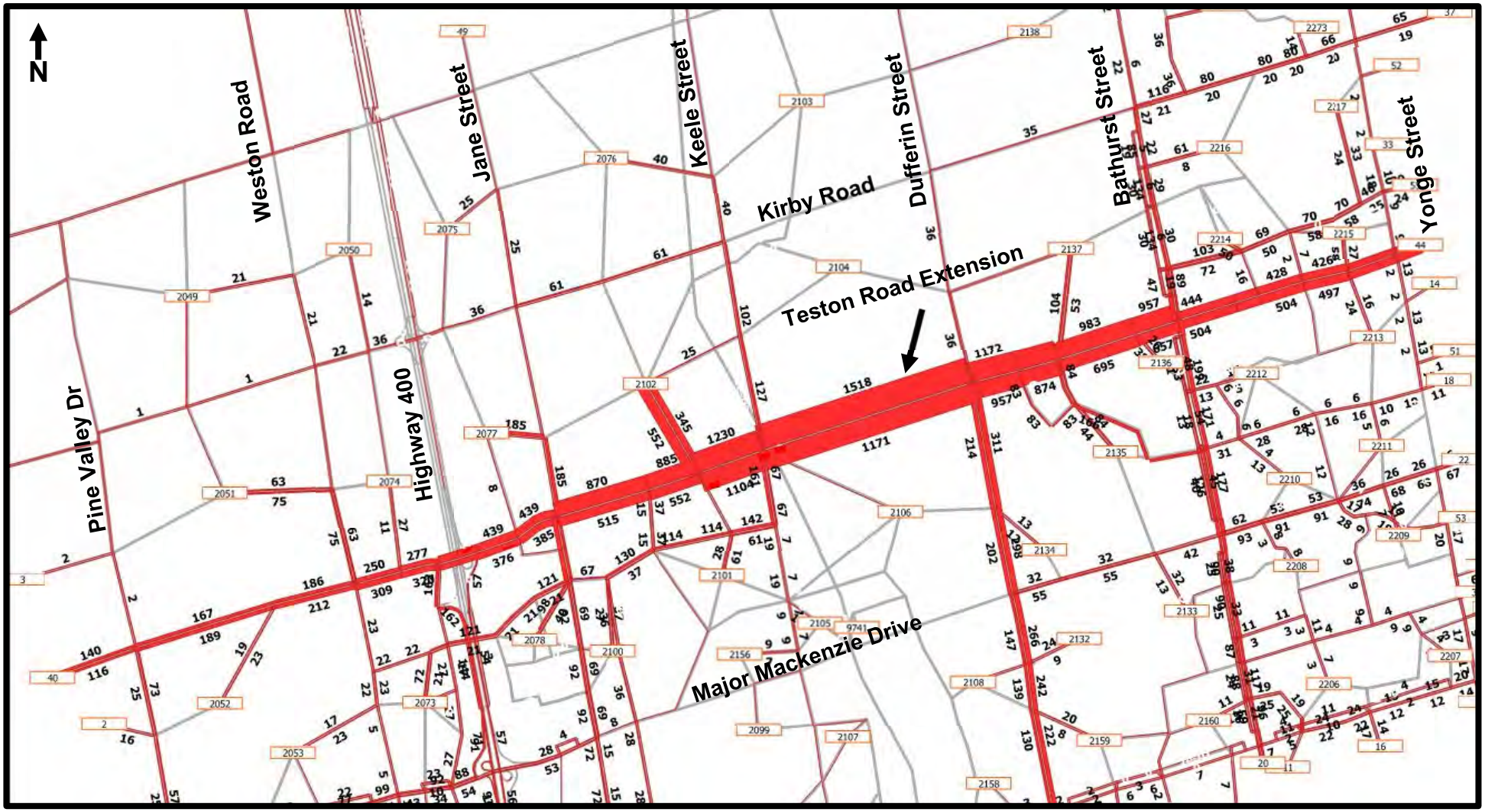


Figure 31: Select Link Analysis for Teston Road without GTA West - AM Peak Hour

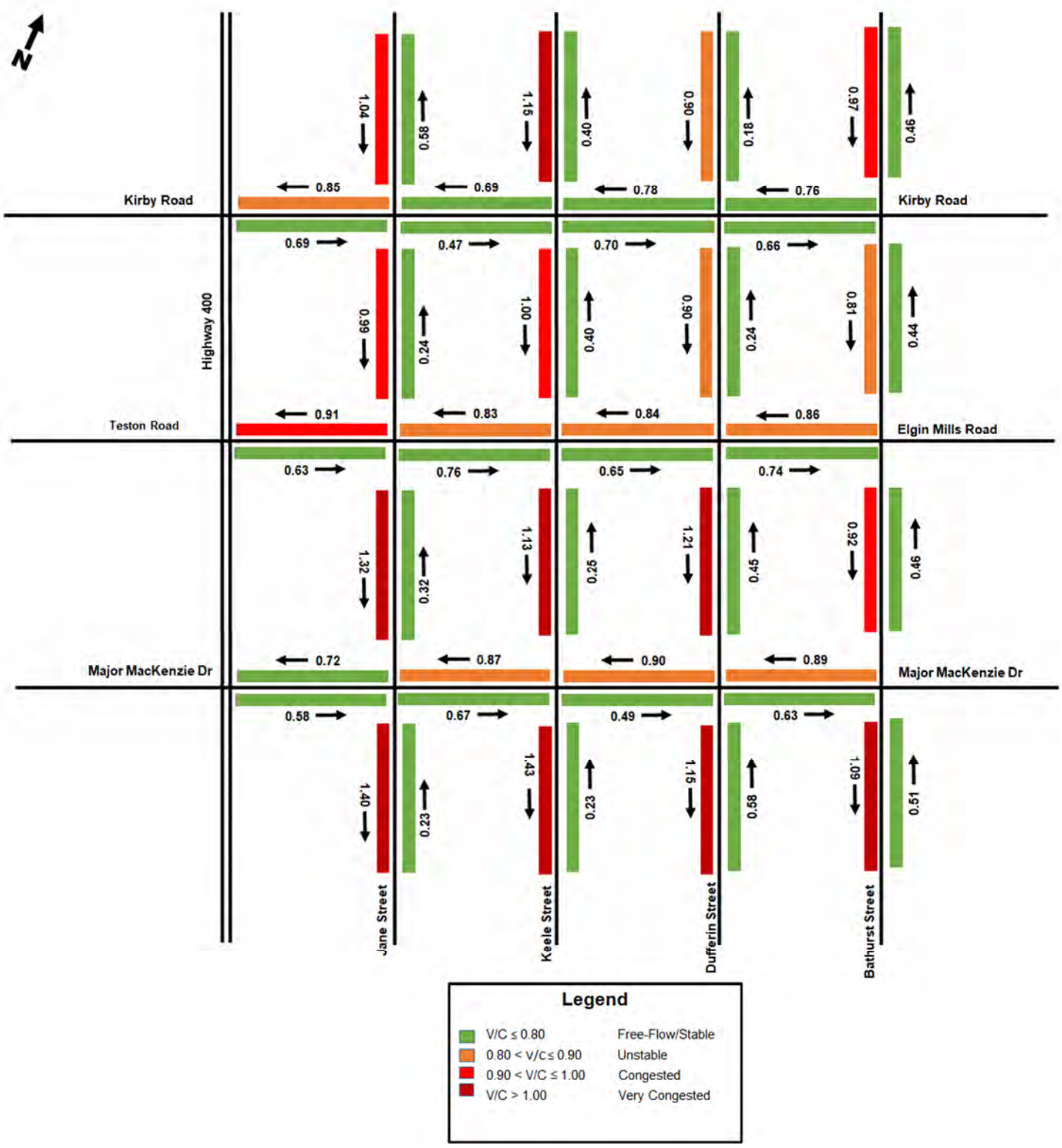


Figure 32: 2041 Link Analysis without GTA West - AM Peak Hour

Table 43: AM Peak Hour / Peak Direction Assigned Volumes and V/C (2041 EMME Model without GTA West)

Section	Volume	# Lanes (Per Direction)	Lane Capacity (Per Direction)	Total Capacity (Per Direction)	V/C
Screenline 1					
Major Mackenzie Dr	1,385	2	800	1,600	0.87
Teston Rd	1,500	2	900	1,800	0.83
Kirby Rd	1,237	2	900	1,800	0.69
Screenline Total	4,122	6		5,200	0.79
Screenline 2					
Major Mackenzie Dr	1,628	2	900	1,800	0.90
Teston Rd	1,518	2	900	1,800	0.84
Kirby Rd	1,411	2	900	1,800	0.78
Screenline Total	4,557	6		5,400	0.84
Screenline 3					
Major Mackenzie Dr	1,610	2	900	1,800	0.89
Teston Rd	1,555	2	900	1,800	0.86
Kirby Rd	1,369	2	900	1,800	0.76
Screenline Total	4,534	6		5,400	0.84
Screenline 4					
Jane St	1,988	2	1000	2000	0.99
Keele St	1,798	2	900	1800	1.00
Dufferin St	1,792	2	1000	2000	0.90
Bathurst St	2,905	3	1200	3600	0.81
Screenline Total	8,483	9		9,400	0.90
Screenline 5					
Jane St	2,376	2	900	1800	1.32
Keele St	1,806	2	800	1600	1.13
Dufferin St	2,183	2	900	1800	1.21
Bathurst St	2,747	3	1000	3000	0.92
Screenline Total	9,112	9		8,200	1.11

5.3.1.2 2041 Model with GTA West

Figure 33 illustrates that by 2041 with the GTA West freeway, the AM peak hour traffic volume in the westbound direction along Teston Road (between Keele Street and Dufferin Street) is in excess of 1,630 veh/h (only approximately 7% in excess of the volume without GTA West). The 2041 forecast with GTA West indicates that this section of Teston Road may require two lanes in each direction to serve the forecast demand. Note that further analysis of this and other alternatives will be undertaken.

A snapshot of 2041 EMME subarea network with GTA West is included in **Appendix J**.

Figure 34 illustrates the 2041 V/C ratios with GTA West freeway for each key roadway. The figure indicates that virtually all southbound movements along arterial roads exhibit over-capacity conditions, particularly south of Teston Road (although on

average approximately 5% better than without GTA West). However, all westbound movements along Kirby Road, Teston Road and Major Mackenzie Drive are functioning with a V/C ratio of 0.90 and less (although on average approximately 5% worse than without GTA West).

Table 44 illustrates the V/C ratio for each key roadway at the five screenlines in the study area for the year 2041 with the GTA West freeway. The overall V/C for Screenlines SL1 to SL4 exhibits values of 0.89 or less suggesting that the proposed capacity would accommodate future demand. However, Screenlines SL5 is over-capacity (i.e V/C of 1.06) suggesting that all southbound traffic flows south of Teston Road are expected to be very congested by the year 2041.

The corresponding 2041 projected am peak hour transit demand (i.e. transit person trips) at each screenline developed in the EMME model is summarized in **Table 45**. The summary of results indicates that by 2041 the transit trips are expected to increase significantly along all arterial roads, particularly along Major Mackenzie Drive (i.e. 623 westbound 2041 AM peak hour transit passenger trips and 25% Transit Mode Share between Dufferin and Keele). At SL2 westbound 2041 AM peak hour transit passenger trips are projected to increase from 85 trips and 3% Transit Mode Share in 2016 to 717 trips and 11% Transit Mode Share by 2041.

It is evident that by 2041 with the GTA West freeway in place and with the Kirby Road and Teston Road extensions available the area roads examined prove to be capable of accommodating primary peak hour peak direction demand flows.

Study area travel demand is higher in the scenario “with GTA West” in comparison to “without GTA West” and therefore, further scenario analysis including the GTA West corridor for this IEA is considered to be the most conservative approach. Based on the above assessment of the GTA West corridor, the 2041 option **without** GTA West freeway will be excluded from further traffic analysis.

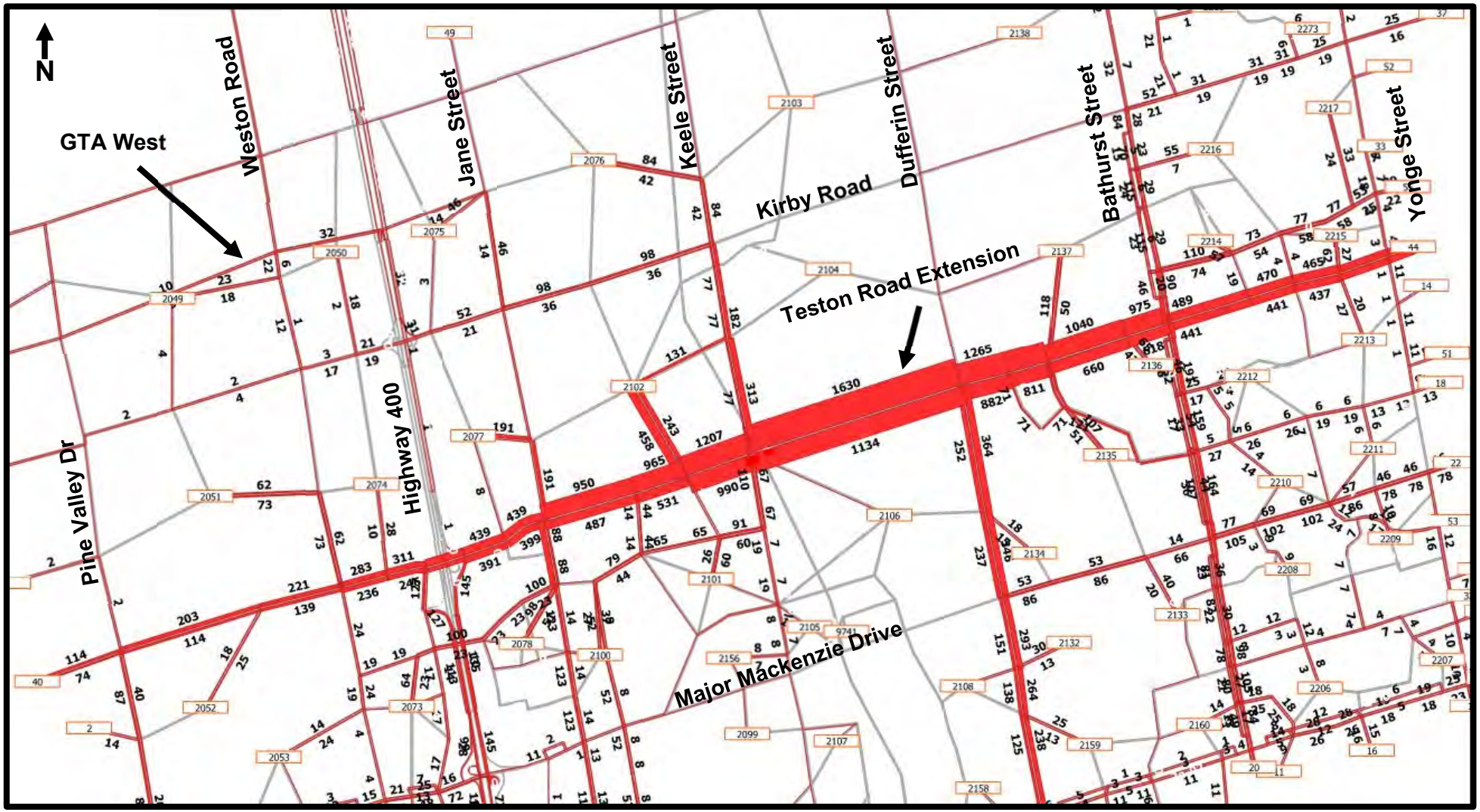


Figure 33: Select Link Analysis for Teston Road with GTA West - AM Peak Hour

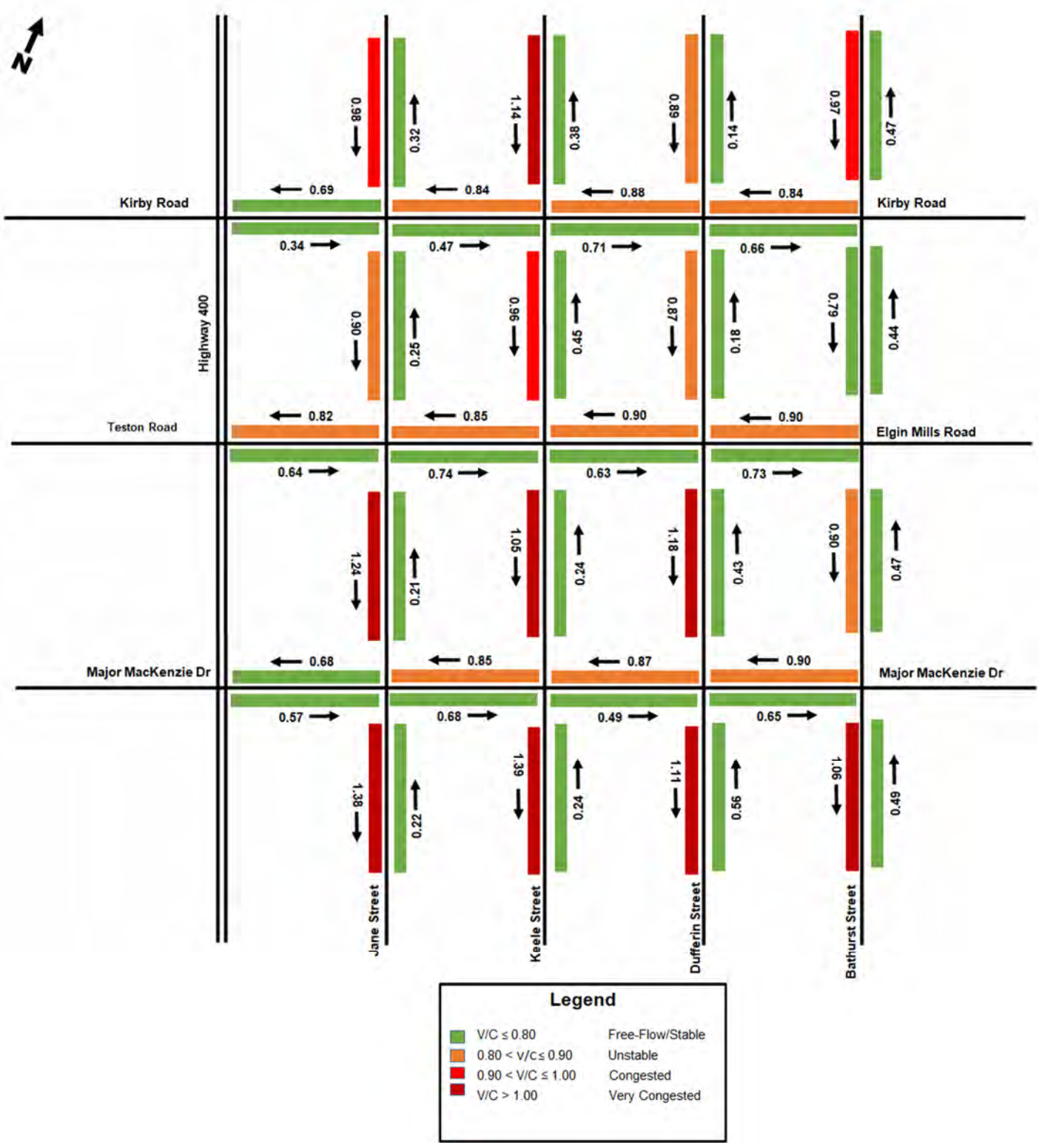


Figure 34: 2041 Link Analysis with GTA West - AM Peak Hour

Table 44: AM Peak Hour / Peak Direction Assigned Volumes and V/C (2041 EMME Model with GTA West)

Section	Volume	# Lanes (Per Direction)	Lane Capacity (Per Direction)	Total Capacity (Per Direction)	V/C
Screenline 1					
Major Mackenzie Dr	1,355	2	800	1,600	0.85
Teston Rd	1,522	2	900	1,800	0.85
Kirby Rd	1,503	2	900	1,800	0.84
Screenline Total	4,380	6		5,200	0.84
Screenline 2					
Major Mackenzie Dr	1,568	2	900	1,800	0.87
Teston Rd	1,637	2	900	1,800	0.91
Kirby Rd	1,585	2	900	1,800	0.88
Screenline Total	4,790	6		5,400	0.89
Screenline 3					
Major Mackenzie Dr	1,616	2	900	1,800	0.90
Teston Rd	1,611	2	900	1,800	0.90
Kirby Rd	1,518	2	900	1,800	0.84
Screenline Total	4,745	6		5,400	0.88
Screenline 4					
Jane St	1,805	2	1,000	2,000	0.90
Keele St	1,723	2	900	1,800	0.96
Dufferin St	1,747	2	1,000	20,00	0.87
Bathurst St	2,840	3	1,200	3,600	0.79
Screenline Total	8,115	9		9,400	0.86
Screenline 5					
Jane St	2,224	2	900	1,800	1.24
Keele St	1,675	2	800	1,600	1.05
Dufferin St	2,132	2	900	1,800	1.18
Bathurst St	2,698	3	1,000	3,000	0.90
Screenline Total	8,729	9		8,200	1.06

Table 45: AM Peak Hour / Peak Direction Transit Person Trips (2041 EMME Model with GTA West)

Section	1 hour Auto trips	1 hour Passenger Car Equivalent[1]	3 hour Transit Passenger Trips	1 hour Transit Passenger Trips	1 hour Total Passenger Trips	Transit Mode Share
Screenline 1						
Major Mackenzie Dr	1,355	1,572	1,220	610	2,182	28%
Teston Rd	1,522	1,766	140	70	1,836	4%
Kirby Rd	1,503	1,743	186	93	1,836	5%
Screenline Total	4,380	5,081	1,546	773	5,854	13%
Screenline 2 (WB)						
Major Mackenzie Dr	1,568	1,819	1,245	623	2,441	25%
Teston Rd	1,637	1,899	54	27	1,926	1%
Kirby Rd	1,585	1,839	135	68	1,906	4%
Screenline Total	4,790	5,556	1,434	717	6,273	11%
Screenline 3 (WB)						
Major Mackenzie Dr	1,616	1,875	1,144	572	2,447	23%
Teston Rd	1,611	1,869	55	28	1,896	1%
Kirby Rd	1,518	1,761	134	67	1,828	4%
Screenline Total	4,745	5,504	1,333	667	6,171	11%
Screenline 4 (SB)						
Jane St	1,805	2,094	218	109	2,203	5%
Keele St	1,723	1,999	298	149	2,148	7%
Dufferin St	1,747	2,027	9	5	2,031	0%
Bathurst St	2,840	3,294	578	289	3,583	8%
Screenline Total	8,115	9,413	1,103	552	9,965	6%
Screenline 5 (SB)						
Jane St	2,224	2,580	253	127	2,706	5%
Keele St	1,675	1,943	592	296	2,239	13%
Dufferin St	2,132	2,473	35	18	2,491	1%
Bathurst St	2,698	3,130	606	303	3,433	9%
Screenline Total	8,729	10,126	1,486	743	10,869	7%

Note: Based on 2011 TTS, the passenger-car equivalent is 1.16. persons/car

6. NOTHING OPTION

The Do-Nothing Option includes York Region's 2041 EMME model with all planned/ proposed network improvements identified in the York Region's 2016 TMP (e.g., GTA West) with the exception of the Teston Road extension between Keele Street and Dufferin Street.

A snapshot of the 2041 EMME subarea network for the Do-Nothing Option is included in **Appendix K**.

6.1 Link Analysis for Do-Nothing Option

A link analysis was conducted for the Do-Nothing Option using the 2041 traffic volumes reported from the model during the morning peak hour. **Figure 35** illustrates the 2041 V/C ratios for each key roadway. The figure indicates that virtually all westbound movements on parallel arterial roads north and south of Teston Road and all southbound movements along north-south arterial roads are expected to exceed capacity.

It is very evident that the traffic flow in order to complete their direction of travel causes increased vehicle movements on adjacent arterial roads (e.g. Keele Street) and creates a barrier to people from other subdivisions (e.g. Drummond Drive) to access these already congested roadways.

Figure 36 shows the change in Assigned Traffic Volumes in the EMME model comparing the 2041 with Teston Road Extension and 2041 Do-Nothing scenarios. **Figure 36** illustrates that by 2041 with the Teston Road Extension, the AM peak hour traffic volume in the westbound direction along Teston Road (between Keele Street and Dufferin Street) is in excess of 1,630 veh/h. If this project segment were not available this projected significant traffic flow would have to find alternate routes. The forecasted volumes indicate that the equivalent of two lanes of traffic capacity in each direction of travel would have to be found in one or more adjacent roadway corridors or be accommodated through some other mode of travel (i.e. transit) or other alternative solution.

In addition, the discontinuity on Teston Road between Keele Street and Dufferin Street results in longer trip distances which may increase greenhouse gas emissions and potentially have negative impacts on climate change.

Table 46 illustrates the V/C ratio for each key roadway at the five screenlines in the study area for the 2041 Do-Nothing Option. The overall V/C for Screenlines SL1, SL3 and SL4 exhibits values of 0.90 or less. However, Screenlines SL2 and SL5 exhibit values of 1.15 and 1.05, respectively, suggesting that the demand well exceeds the available capacity. Note that the above V/C for SL2 does not account for trips diverted to King Vaughan Road or to Rutherford Road in **Figure 36**.

Table 47 illustrates the AM peak hour / peak direction transit person trips for the Do-Nothing Option.

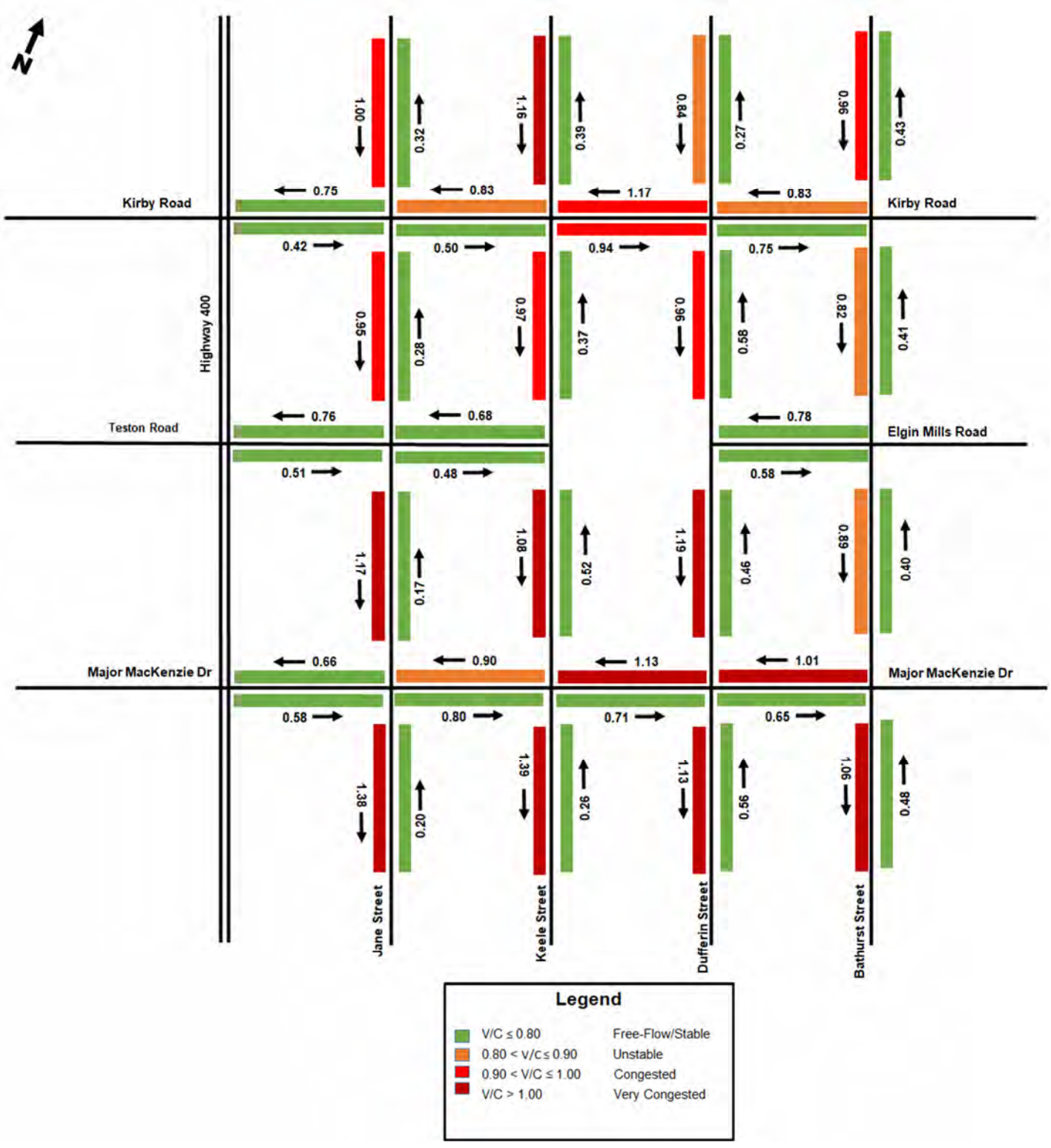


Figure 35: 2041 Link Analysis for Do-Nothing Option - AM Peak Hour

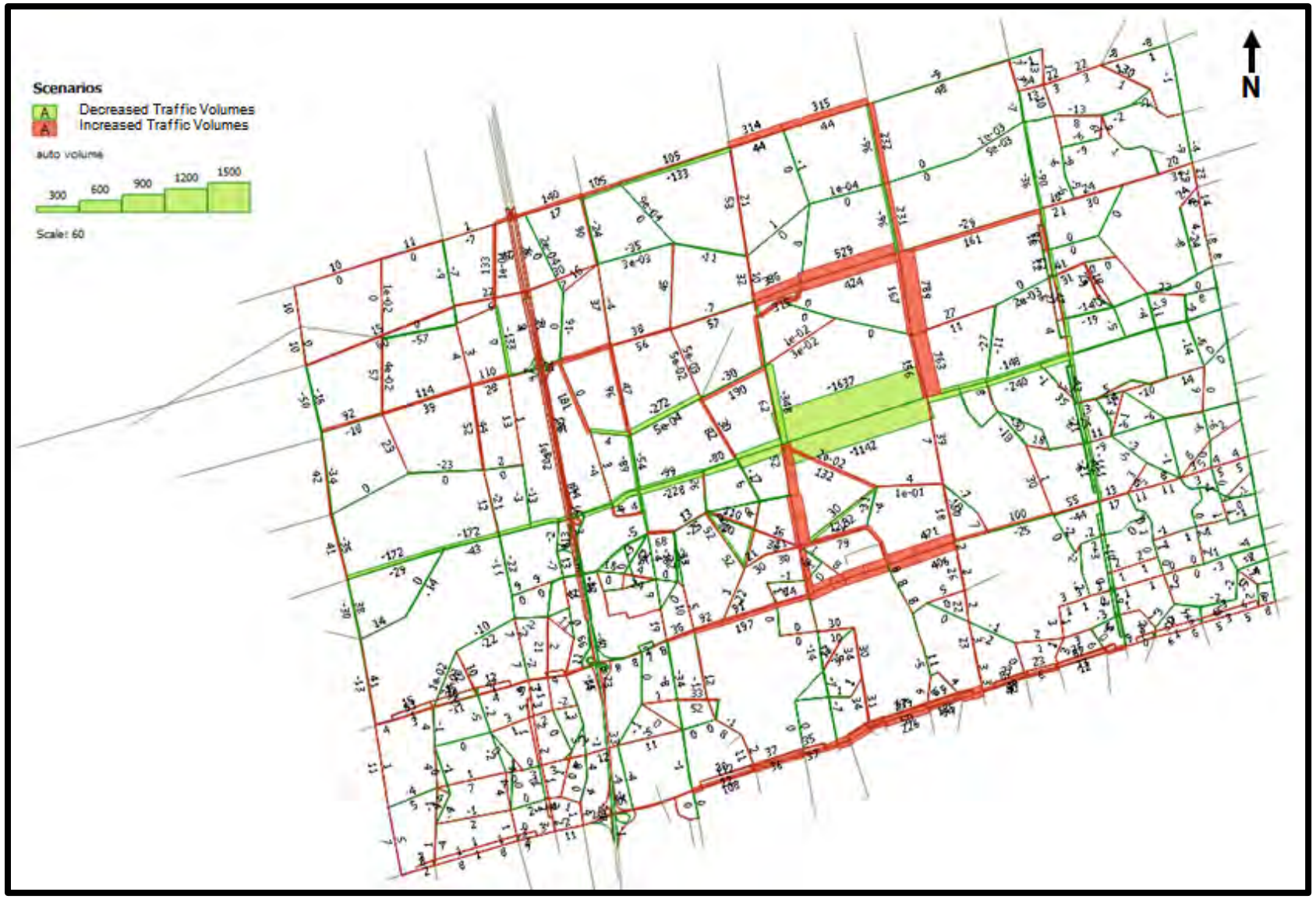


Figure 36: 2041 Do-Nothing Option vs. 2041 with Teston Road Extension (Assigned Traffic Volumes)

Table 46: AM Peak Hour / Peak Direction Assigned Volumes and V/C (2041 EMME Model for Do-Nothing Option)

Section	Volume	# Lanes (Per Direction)	Lane Capacity (Per Direction)	Total Capacity (Per Direction)	V/C
Screenline 1					
Major Mackenzie Dr	1,439	2	800	1,600	0.90
Teston Rd	1,217	2	900	1,800	0.68
Kirby Rd	1,497	2	900	1,800	0.83
Screenline Total	4,153	6		5,200	0.80
Screenline 2					
Major Mackenzie Dr	2,039	2	900	1,800	1.13
Kirby Rd	2,114	2	900	1,800	1.17
Screenline Total	4,153	4		3,600	1.15
Screenline 3					
Major Mackenzie Dr	1,823	2	900	1,800	1.01
Teston Rd	1,406	2	900	1,800	0.78
Kirby Rd	1,489	2	900	1,800	0.83
Screenline Total	4,718	6		5,400	0.87
Screenline 4					
Jane St	1,901	2	1,000	2,000	0.95
Keele St	1,748	2	900	1,800	0.97
Dufferin St	1,914	2	1,000	2,000	0.96
Bathurst St	2,942	3	1,200	3,600	0.82
Screenline Total	8,505	9		9,400	0.90
Screenline 5					
Jane St	2,112	2	900	1,800	1.17
Keele St	1,728	2	800	1,600	1.08
Dufferin St	2,139	2	900	1,800	1.19
Bathurst St	2,657	3	1,000	3,000	0.89
Screenline Total	8,636	9		8,200	1.05

Table 47: AM Peak Hour / Peak Direction Transit Person Trip (2041 EMME Model for Do-Nothing Option)

Section	1 hour Auto trips	1 hour Passenger Car Equivalent	3 hour Transit Passenger Trips	1 hour Transit Passenger Trips	1 hour Total Passenger Trips	Transit Mode Share
Screenline 1						
Major Mackenzie Dr	1,439	1,669	1,229	615	2,284	27%
Teston Rd	1,217	1,412	129	65	1,476	4%
Kirby Rd	1,497	1,737	189	95	1,831	5%
Screenline Total	4,153	4,817	1,547	774	5,591	14%
Screenline 2 (WB)						
Major Mackenzie Dr	2,039	2,365	1,256	628	2,993	21%
Kirby Rd	2,114	2,452	174	87	2,539	3%
Screenline Total	4,153	4,817	1,430	715	5,532	13%
Screenline 3 (WB)						
Major Mackenzie Dr	1,823	2,115	1,153	577	2,691	21%
Teston Rd	1,406	1,631	36	18	1,649	1%
Kirby Rd	1,489	1,727	137	69	1,796	4%
Screenline Total	4,718	5,473	1,326	663	6,136	11%
Screenline 4 (SB)						
Jane St	1,901	2,205	211	106	2,311	5%
Keele St	1,748	2,028	240	120	2,148	6%
Dufferin St	1,914	2,220	103	52	2,272	2%
Bathurst St	2,942	3,413	577	289	3,701	8%
Screenline Total	8,505	9,866	1,131	566	10,431	5%
Screenline 5 (SB)						
Jane St	2,112	2,450	254	127	2,577	5%
Keele St	1,728	2,004	615	308	2,312	13%
Dufferin St	2,139	2,481	45	23	2,504	1%
Bathurst St	2,657	3,082	598	299	3,381	9%
Screenline Total	8,636	10,018	1,512	756	10,774	7%

Note: Based on 2011 TTS, the passenger-car equivalent is 1.16. persons/car

6.2 Projected Intersection Traffic Volumes (2041)

Projected turning movement volumes were developed for the 2041 Do-Nothing Option based on the EMME model projections above. As previously mentioned, this scenario included all network modifications (i.e. road widenings) along study area roadways. **Figure 37** illustrates the projected AM peak hour turning movement volumes for the 2041 Do-Nothing scenario.

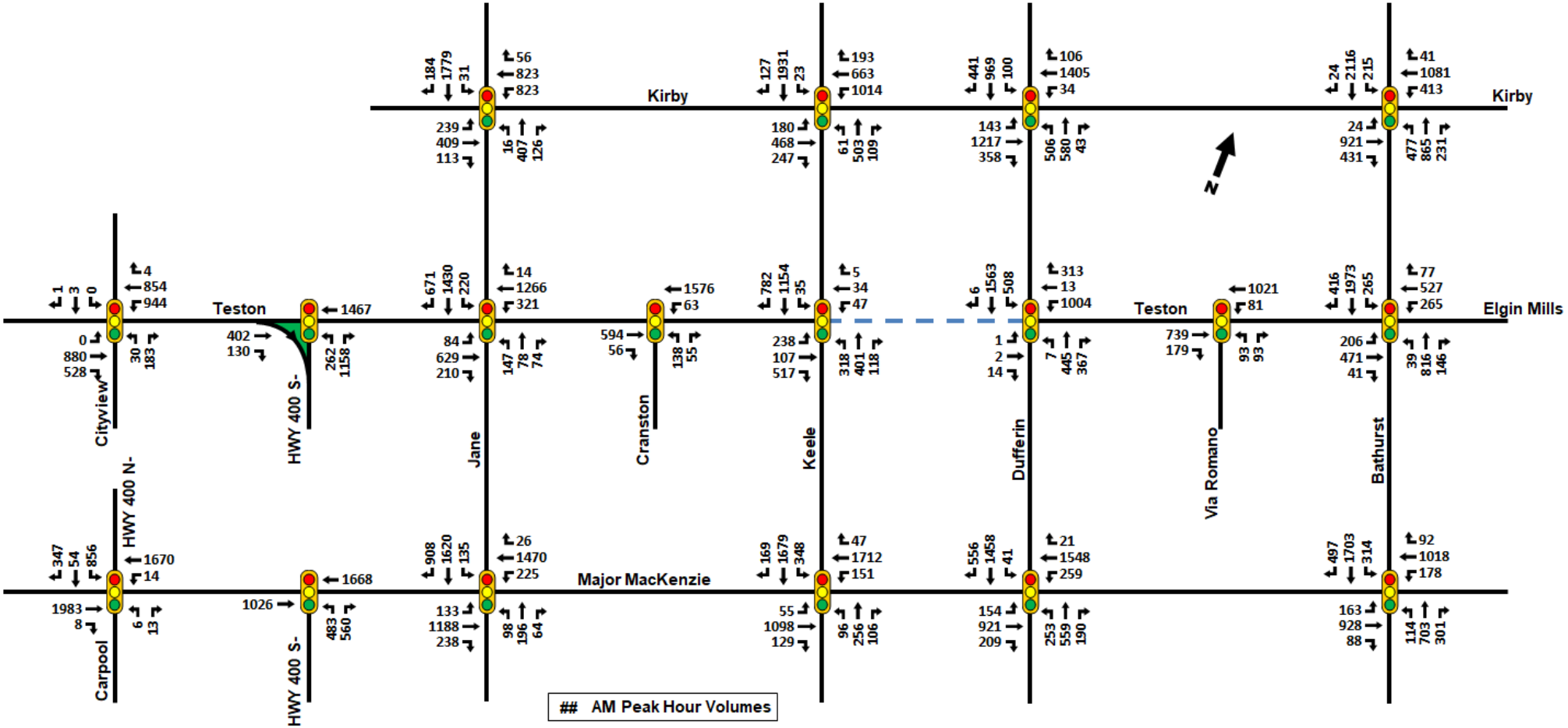
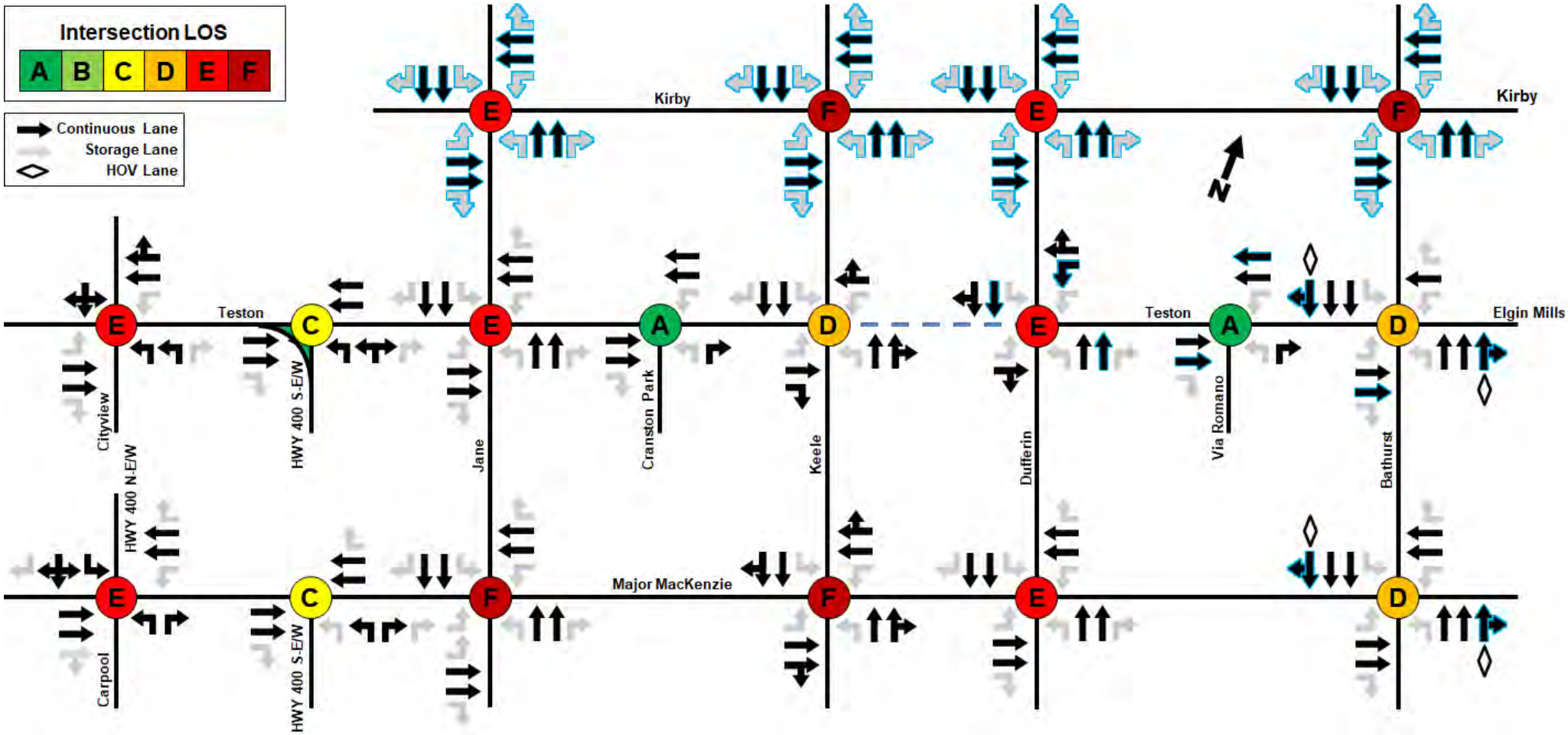


Figure 37: Projected Traffic Volumes (2041)



Lane arrows outlined in blue are new lanes from background study area road widenings.

Figure 38: Future Intersection Operational Performance (2041)

6.3 Projected Intersection Operational Performance Analysis (2041)

Traffic analysis was completed for the 2041 Do-Nothing scenario to provide an assessment of the projected traffic volume condition at study area intersections. This analysis included all network modifications (i.e. road widenings) anticipated for build-out by 2041. **Figure 38** and **Table 48** display the results of this analysis. Detailed Synchro reports are provided in **Appendix L**.

Table 48: Intersection Performance – Projected Conditions (2041) – AM Peak Hour

Intersections	Movements	Delay (s)	LOS	v/c Ratio	95th Queue (m)
	EBL	0	A	0.00	0
	EBT	**65**	**E**	**0.96**	174
	EBR	42	D	0.52	65
	WBL	**138**	**F**	**1.21**	393
Teston / Cityview	WBTR	5	A	0.35	52
	NBL	52	D	0.12	9
	NBR	52	D	0.13	22
	SBLTR	**57**	**E**	**0.04**	4
	Overall	**65**	**E**	**0.94**	-
	EBT	10	A	0.21	28
	EBR	1	A	0.09	0
Teston / Highway 400	WBT	17	B	0.77	144
	NBLR	27	C	0.62	54
	NBR	34	C	0.75	90
	Overall	**21**	**C**	**0.76**	-
	EBL	40	D	0.50	25
	EBT	47	D	0.64	107
	EBR	41	D	0.28	42
	WBL	49	D	0.86	100
	WBT	**68**	**E**	**0.99**	238
	WBR	30	C	0.01	0
Teston / Jane	**NBL**	**70**	**E**	**0.85**	65
	NBT	20	B	0.05	11
	NBR	20	B	0.05	4
	SBL	33	C	0.42	69
	SBT	**63**	**E**	**0.99**	270
	SBR	**60**	**E**	**0.91**	237
	Overall	**57**	**E**	**0.95**	-
	EBT	5	A	0.24	26
	EBR	4	A	0.04	3
	WBL	4	A	0.11	8
Teston / Cranston	WBT	8	A	0.63	97
	NBL	38	D	0.50	40
	NBR	34	C	0.04	10
	Overall	**9**	**A**	**0.61**	-
	EBL	24	C	0.44	53
	EBT	30	C	0.21	32
	EBR	37	D	0.55	67
	WBL	23	C	0.14	13
Teston / Keele	WBTR	29	C	0.08	14
	NBL	**88**	**F**	**1.01**	109
	NBTR	17	B	0.33	42
	SBL	26	C	0.12	13

Intersections	Movements	Delay (s)	LOS	v/c Ratio	95th Queue (m)
	SBT	**56**	**E**	**0.97**	176
	SBR	35	C	0.59	60
	Overall	**42**	**D**	**0.77**	**-**
	EBL	42	D	0.00	1
	EBTR	47	D	0.03	8
	WBL	**113**	**F**	**1.09**	205
	WBT	26	C	0.24	22
	NBL	51	D	0.14	7
Teston / Dufferin	NBT	55	D	0.60	81
	NBR	21	C	0.26	14
	SBL	**97**	**F**	**1.08**	181
	SBTR	**80**	**E**	**1.05**	296
	Overall	**77**	**E**	**0.88**	**-**
	EBT	5	A	0.34	25
	EBR	4	A	0.13	5
	WBL	5	A	0.19	9
Teston / Via Romano	WBT	6	A	0.45	38
	NBL	21	C	0.33	18
	NBR	20	B	0.06	9
	Overall	**6**	**A**	**0.43**	**-**
	EBL	**107**	**F**	**1.02**	95
	EBT	44	D	0.50	77
	EBR	38	D	0.03	0
	WBL	47	D	0.79	77
	WBT	**97**	**F**	**1.03**	223
	WBR	38	D	0.06	8
Teston / Bathurst	**NBL**	**115**	**F**	**0.82**	34
	NBT	28	C	0.52	104
	NBR	22	C	0.10	12
	SBL	31	C	0.78	55
	SBT	51	D	1.00	339
	SBR	19	B	0.35	43
	Overall	**49**	**D**	**1.01**	**-**
	EBTR	47	D	0.92	233
	WBL	30	C	0.15	5
	WBT	**65**	**E**	**1.02**	316
Major MacKenzie / Highway 400 West Ramp	**NBL**	**70**	**E**	**0.16**	7
	NBR	**67**	**E**	**0.01**	0
	SBL	**62**	**E**	**0.88**	236
	SBLTR	**69**	**E**	**0.92**	247
	SBR	47	D	0.67	116
	Overall	**56**	**E**	**0.95**	**-**
	EBT	9	A	0.42	92
Major MacKenzie / Highway 400 East Ramp	WBT	9	A	0.68	77
	NBL	**65**	**E**	**0.75**	91
	NBR	**65**	**E**	**0.74**	82
	Overall	**24**	**C**	**0.71**	**-**
	EBL	**81**	**F**	**0.59**	34
	EBT	**68**	**E**	**0.98**	243
Major MacKenzie / Jane	EBR	38	D	0.32	57
	WBL	**154**	**F**	**1.13**	120
	WBT	**113**	**F**	**1.11**	323
	WBR	33	C	0.06	13

Intersections	Movements	Delay (s)	LOS	v/c Ratio	95th Queue (m)
	NBL	47	D	0.66	39
	NBT	29	C	0.14	29
	NBR	27	C	0.05	4
	SBL	24	C	0.24	36
	SBT	**89**	**F**	**1.07**	340
	SBR	**163**	**F**	**1.23**	404
	Overall	**96**	**F**	**1.14**	-
	EBL	39	D	0.41	18
	EBTR	**58**	**E**	**0.92**	244
	WBL	**93**	**F**	**0.92**	78
	WBTR	**153**	**F**	**1.22**	410
Major MacKenzie / Keele	NBL	50	D	0.65	38
	NBTR	45	D	0.34	60
	SBL	31	C	0.65	95
	SBTR	**191**	**F**	**1.31**	437
	Overall	**126**	**F**	**1.20**	-
	EBL	**76**	**E**	**0.90**	68
	EBT	44	D	0.75	145
	EBR	33	C	0.23	34
	WBL	**58**	**E**	**0.88**	93
	WBT	**87**	**F**	**1.07**	290
	WBR	26	C	0.01	0
Major MacKenzie / Dufferin	**NBL**	**246**	**F**	**1.39**	131
	NBT	33	C	0.43	80
	NBR	29	C	0.13	16
	SBL	24	C	0.12	13
	SBT	**101**	**F**	**1.10**	284
	SBR	53	D	0.85	188
	Overall	**76**	**E**	**1.08**	-
	EBL	**94**	**F**	**0.97**	76
	EBT	**66**	**E**	**0.94**	177
	EBR	1	A	0.06	0
	WBL	**105**	**F**	**1.01**	83
	WBT	**73**	**E**	**0.98**	193
	WBR	36	D	0.06	7
Major MacKenzie / Bathurst	NBL	39	D	0.64	39
	NBT	32	C	0.51	99
	NBR	29	C	0.31	47
	SBL	23	C	0.69	61
	SBT	54	D	0.98	295
	SBR	27	C	0.55	101
	Overall	**52**	**D**	**0.94**	-
	EBL	54	D	0.85	65
	EBT	**88**	**F**	**1.00**	73
	EBR	40	D	0.07	9
	WBL	**210**	**F**	**1.39**	265
	WBT	38	D	0.80	100
Kirby / Jane	WBR	26	C	0.04	2
	NBL	18	B	0.26	8
	NBT	16	B	0.26	34
	NBR	16	B	0.18	24
	SBL	15	B	0.07	8
	SBT	**65**	**E**	**1.06**	242

Intersections	Movements	Delay (s)	LOS	v/c Ratio	95th Queue (m)
	SBR	16	B	0.24	34
	Overall	**77**	**E**	**1.14**	**-**
	EBL	**186**	**F**	**1.18**	110
	EBT	53	D	0.61	83
	EBR	**57**	**E**	**0.64**	81
	WBL	**384**	**F**	**1.76**	474
	WBT	25	C	0.39	78
	WBR	22	C	0.13	13
Kirby / Keele	**NBL**	**323**	**F**	**1.42**	42
	NBT	26	C	0.33	61
	NBR	23	C	0.07	11
	SBL	23	C	0.09	10
	SBT	**130**	**F**	**1.19**	391
	SBR	24	C	0.14	24
	Overall	**139**	**F**	**1.43**	**-**
	EBL	45	D	0.75	52
	EBT	34	C	0.78	170
	EBR	25	C	0.36	52
	WBL	51	D	0.59	25
	WBT	**95**	**F**	**1.09**	255
	WBR	29	C	0.07	12
Kirby / Dufferin	**NBL**	**143**	**F**	**1.18**	204
	NBT	22	C	0.34	62
	NBR	20	B	0.03	4
	SBL	52	D	0.51	42
	SBT	**78**	**E**	**1.01**	177
	SBR	**63**	**E**	**0.84**	143
	Overall	**65**	**E**	**1.03**	**-**
	EBL	52	D	0.44	18
	EBT	**105**	**F**	**1.07**	190
	EBR	**63**	**E**	**0.81**	133
	WBL	**408**	**F**	**1.78**	219
	WBT	50	D	0.86	175
	WBR	31	C	0.03	4
Kirby / Bathurst	**NBL**	**429**	**F**	**1.81**	250
	NBT	27	C	0.51	105
	NBR	21	C	0.14	14
	SBL	19	B	0.55	37
	SBT	**166**	**F**	**1.27**	429
	SBR	21	C	0.01	0
	Overall	**137**	**F**	**1.30**	**-**

Note: LOS is based on vehicle delays

As a result of the analysis shown above, it is evident that the projected traffic volumes cannot be accommodated within the background 2041 Do-Nothing scenario. Numerous failing (i.e. LOS F) turning movements were reported along with some locations reporting failing conditions for the whole intersection. The following **Table 49** provides a summary of intersections reporting the highest impacts to traffic operations within the study area.

Table 49: Critical Intersection Summary – 2041 Do-Nothing Scenario

Intersections	Movements	Delay (s)	LOS	v/c Ratio	95th Queue (m)
Teston / Keele	NBL	88	F	1.01	109
	SBT	56	E	0.97	176
	Overall	42	D	0.77	-
Teston / Dufferin	WBL	113	F	1.09	205
	SBL	97	F	1.08	181
	SBTR	80	E	1.05	296
	Overall	77	E	0.88	-
Major MacKenzie / Keele	EBTR	58	E	0.92	244
	WBL	93	F	0.92	78
	WBTR	153	F	1.22	410
	SBTR	191	F	1.31	437
	Overall	126	F	1.20	-
Major MacKenzie / Dufferin	EBL	76	E	0.90	68
	WBL	58	E	0.88	93
	WBT	87	F	1.07	290
	NBL	246	F	1.39	131
	SBT	101	F	1.10	284
	Overall	76	E	1.08	-
Kirby / Keele	EBL	186	F	1.18	110
	EBR	57	E	0.64	81
	WBL	384	F	1.76	474
	NBL	323	F	1.42	42
	SBT	130	F	1.19	391
	Overall	139	F	1.43	-
Kirby / Dufferin	WBT	95	F	1.09	255
	NBL	143	F	1.18	204
	SBT	78	E	1.01	177
	SBR	63	E	0.84	143
	Overall	65	E	1.03	-

To improve network performance issues identified from the 2041 Do-Nothing scenario, localized intersection improvements using Transportation System Management (TSM) techniques should be considered (e.g. traffic signal improvements, channelization, etc.). Additionally, Transportation Demand Management (TDM) and Smart Commute strategies (e.g. parking fees, carpool priority, discounted transit passes, bike racks, etc.) promote and increase walking, cycling and transit use should be evaluated to estimate potential mode shift for the study area. In combination with traditional solutions such as building new roadways and widening existing roadways, these techniques and strategies will be included as possible solutions developed for the Alternatives to the Undertaking.

7. PROBLEMS / OPPORTUNITIES

Defining problems and opportunities is a key step that sets the stage for the range and types of alternatives to be considered and provides a baseline for the transportation evaluation criteria (or factors) to be used to select among alternatives. The following transportation problems/opportunities have been identified in the area:

- Future land-use will change surrounding Teston Road from primarily rural to residential and mixed use will considerably increase future travel demand within the Study Area. The screenline analysis indicates that AM peak hour travel demand along arterial roads is projected to increase from 2016 to 2041 on average by 66% (SL 1, 2 and 3) and 72% (SL 4 and 5), respectively, in the westbound and southbound directions under the Do-Nothing scenario (i.e. 2041 TMP Network excluding a Teston Road Extension between Keele and Dufferin), with even higher increases under the 2041 TMP Network scenario (including GTA West).

- The estimated 2041 AM peak hour traffic volumes in the westbound direction between Keele Street and Dufferin Street exceed available capacity under the Do-Nothing scenario. The estimated 2041 AM peak hour traffic volumes in the southbound direction between Kirby Road and Major MacKenzie Drive generally exceed available capacity under the Do-Nothing scenario.

- The discontinuity on Teston Road between Keele Street and Dufferin Street is a barrier to local and regional east/west trips and adds traffic load to parallel east/west alternatives routes such as the already congested Major Mackenzie Drive and Kirby Road. AM peak hour over-capacity conditions are noted for Teston Road, Kirby Road and Major MacKenzie Drive at the Keele Street and Dufferin Streets intersections for movements.

- There is limited east-west accessibility along the Teston Road corridor to access existing and planned Highway 400 interchanges (i.e. Teston Road Interchange, Major Mackenzie Drive Interchange and Kirby Road Interchange). Current levels of congestion and out-of-way travel faced by commuters would be exacerbated by increasing traffic demands. While it is anticipated that links within the vicinity of Highway 400 would have greater capacity due to proposed future widenings, east of this facility, the same capacity is not provided which produces bottlenecks at major intersections.

- The discontinuity on Teston Road between Keele Street and Dufferin Street is a barrier to residents from better access to amenities (e.g. schools, parks, recreational facilities, emergency services and other public services, etc.).

- The discontinuity on Teston Road between Keele Street and Dufferin Street results in longer trip distances which may increase greenhouse gas emissions and have negative impacts on climate change.

- The area of Teston Road between Keele Street and Dufferin Street is identified in York Region's TMP as having a separated cycling facility by 2041. The current network requires significant out-of-way travel by cyclists and pedestrians, channeling additional cycling and pedestrian traffic to Keele Street or Dufferin Street to use Kirby Road or Major Mackenzie Drive to cross this barrier.

- Westbound AM peak hour transit ridership and Transit Mode Share are both projected to increase significantly within the study area between 2016 and 2041 (e.g. at SL2 transit ridership to increase by 741% and Transit Modal Share from 3% to 13% for the Do Nothing Scenario). While the above is a very significant increase the opportunity may exist to further increase transit ridership and Transit Mode Share within the study area.

- Teston Road between Keele Street and Dufferin Street is identified in York Region's 2016 TMP to be served by frequent transit service by the year 2041. Currently, transit is only available on Teston Road in four short sections at Jane Street (Route 20), Keele Street (Route 107), Thornhill Woods (Route 23) and Elgin Mills (Route 80). The discontinuity on Teston Road between Keele Street and Dufferin Street is a barrier to increased transit service and ridership along this corridor.

- Based on the discussion with the Deputy Fire Chief, City of Vaughan Fire and Rescue Service, there is a need for another fire station on the west side of the study area. The location of the station depends on the findings of the IEA.

8. REFERENCES

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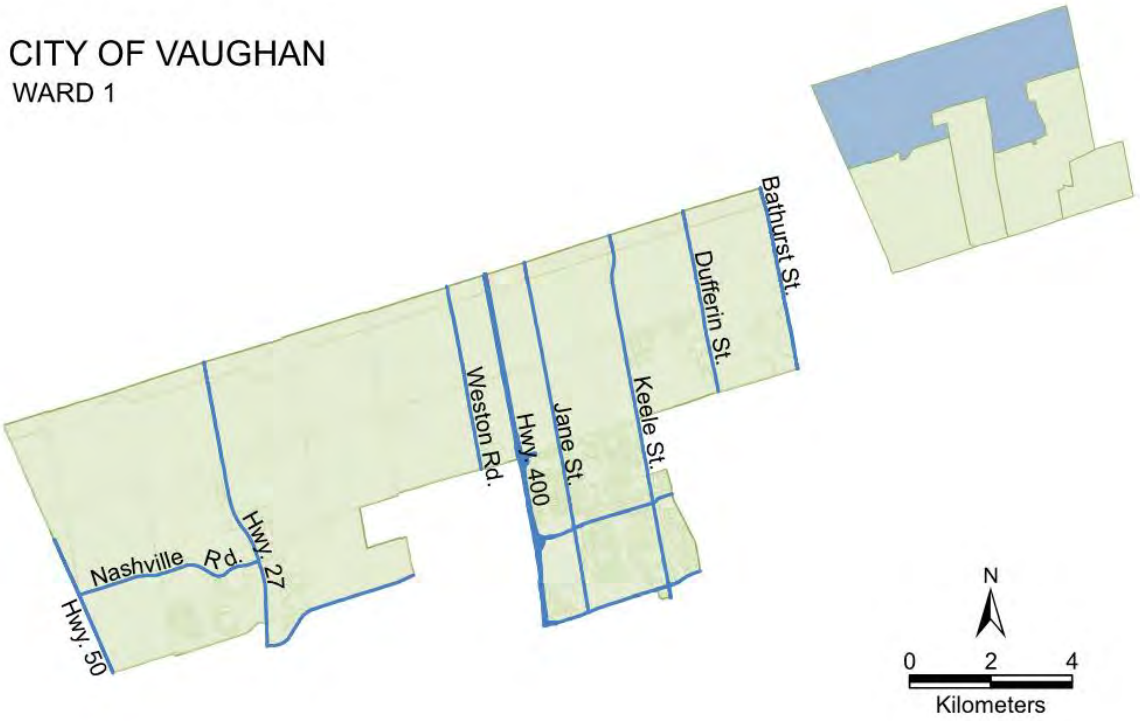
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Appendix A: 2016 Transportation Tomorrow Survey (TTS) for City of Vaughan



WARD 1

HOUSEHOLD CHARACTERISTICS

Households	Dwelling Type			Household Size					Number of Available Vehicles					Household Averages				
	House	Townhouse	Apartment	1	2	3	4	5+	0	1	2	3	4+	Persons	Workers	Drivers	Vehicles	Trips/Day
20,400	74%	12%	13%	11%	21%	19%	28%	20%	4%	22%	49%	17%	8%	3.3	2.0	2.3	2.0	6.3

POPULATION CHARACTERISTICS

Population	Age							Daily Trips per Person (age 11+)	Daily Work Trips per Worker	Population	Employment Type			Student	Licensed	Transit Pass
	0-10	11-15	16-25	26-45	46-64	65+	Median				Full Time	Part Time	At Home			
										Male						
										33,600	49%	7%	4%	25%	73%	10%
										Female						
68,300	13%	7%	16%	26%	28%	10%	37.7	2.2	0.74	34,700	38%	11%	3%	25%	66%	13%

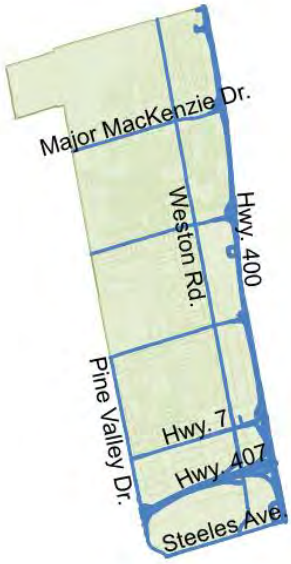
TRIPS MADE BY RESIDENTS OF CITY OF VAUGHAN WARD 1

Time Period	Trips	% 24hr	Trip Purpose				Mode of Travel						Median Trip Length (km)			
			HB-W	HB-S	HB-D	N-HB	Driver	Pass.	Transit	GO Train	Walk & Cycle	Other	Driver	Pass.	Transit	GO Train
6-9 AM	34,900	27%	50%	21%	20%	9%	66%	13%	4%	4%	5%	8%	9.9	2.7	21.6	25.4
24 Hrs	129,300		38%	13%	35%	13%	71%	14%	5%	2%	4%	5%	8.4	4.7	13.3	25.4

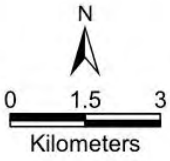
TRIPS MADE TO CITY OF VAUGHAN WARD 1 BY RESIDENTS OF THE TTS AREA

Time Period	Trips	% 24 hr	Trip Purpose				Mode of Travel						Median Trip Length (km)			
			Work	School	Home	Other	Driver	Pass.	Transit	GO Train	Walk & Cycle	Other	Driver	Pass.	Transit	GO Train
6-9 AM	17,200	18.6%	40%	24%	10%	26%	67%	17%	2%	*	9%	4%	6.8	2.0	6.8	*
24 Hrs	92,400		12%	5%	60%	23%	71%	16%	3%	2%	5%	4%	8.0	3.8	11.0	25.4

CITY OF VAUGHAN
WARD 3







WARD 3

HOUSEHOLD CHARACTERISTICS

Households	Dwelling Type			Household Size					Number of Available Vehicles					Household Averages				
	House	Townhouse	Apartment	1	2	3	4	5+	0	1	2	3	4+	Persons	Workers	Drivers	Vehicles	Trips/Day
18,100	86%	13%	2%	7%	23%	19%	30%	21%	0%	22%	55%	14%	8%	3.4	1.9	2.4	2.1	6.4

POPULATION CHARACTERISTICS

Population	Age							Daily Trips per Person (age 11+)	Daily Work Trips per Worker	Population	Employment Type			Student	Licensed	Transit Pass
	0-10	11-15	16-25	26-45	46-64	65+	Median				Full Time	Part Time	At Home			
										Male						
										30,400	47%	5%	4%	26%	70%	8%
										Female						
61,800	15%	7%	12%	28%	26%	12%	39.1	2.2	0.79	31,400	37%	10%	3%	25%	66%	11%

TRIPS MADE BY RESIDENTS OF CITY OF VAUGHAN WARD 3

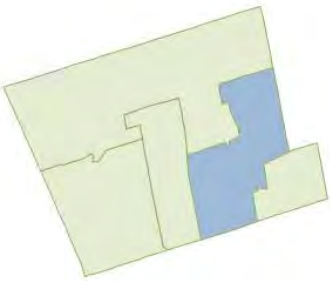
Time Period	Trips	% 24hr	Trip Purpose				Mode of Travel						Median Trip Length (km)			
			HB-W	HB-S	HB-D	N-HB	Driver	Pass.	Transit	GO Train	Walk & Cycle	Other	Driver	Pass.	Transit	GO Train
6-9 AM	32,700	28.2%	47%	20%	22%	11%	69%	13%	6%	2%	7%	2%	8.5	3.4	20.2	25.2
24 Hrs	115,900		39%	13%	35%	13%	73%	14%	5%	1%	6%	2%	6.9	3.9	19.3	25.2

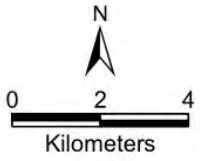
TRIPS MADE TO CITY OF VAUGHAN WARD 3 BY RESIDENTS OF THE TTS AREA

Time Period	Trips	% 24 hr	Trip Purpose				Mode of Travel						Median Trip Length (km)			
			Work	School	Home	Other	Driver	Pass.	Transit	GO Train	Walk & Cycle	Other	Driver	Pass.	Transit	GO Train
6-9 AM	33,100	26.1%	58%	15%	5%	22%	74%	12%	3%	*	7%	3%	8.9	2.8	5.5	*
24 Hrs	127,000		25%	4%	39%	31%	75%	14%	4%	1%	5%	1%	6.8	4.2	11.3	25.2

CITY OF VAUGHAN
WARD 4







WARD 4

HOUSEHOLD CHARACTERISTICS

Households	Dwelling Type			Household Size					Number of Available Vehicles					Household Averages				
	House	Townhouse	Apartment	1	2	3	4	5+	0	1	2	3	4+	Persons	Workers	Drivers	Vehicles	Trips/Day
15,700	78%	16%	6%	9%	19%	22%	30%	20%	2%	23%	62%	10%	3%	3.4	2.0	2.2	1.9	6.5

POPULATION CHARACTERISTICS

Population	Age							Daily Trips per Person (age 11+)	Daily Work Trips per Worker	Population	Employment Type			Student	Licensed	Transit Pass
	0-10	11-15	16-25	26-45	46-64	65+	Median				Full Time	Part Time	At Home			
										Male						
										26,100	48%	5%	5%	28%	66%	14%
										Female						
53,400	19%	8%	10%	32%	24%	8%	36.6	2.4	0.77	27,300	37%	7%	5%	26%	61%	15%

TRIPS MADE BY RESIDENTS OF CITY OF VAUGHAN WARD 4

Time Period	Trips	% 24hr	Trip Purpose				Mode of Travel						Median Trip Length (km)			
			HB-W	HB-S	HB-D	N-HB	Driver	Pass.	Transit	GO Train	Walk & Cycle	Other	Driver	Pass.	Transit	GO Train
6-9 AM	29,800	29.2%	47%	18%	24%	11%	65%	12%	8%	5%	7%	3%	8.2	3.6	19.6	23.6
24 Hrs	101,900		36%	13%	36%	15%	70%	13%	7%	3%	5%	2%	7.0	4.6	19.1	23.6

TRIPS MADE TO CITY OF VAUGHAN WARD 4 BY RESIDENTS OF THE TTS AREA

Time Period	Trips	% 24 hr	Trip Purpose				Mode of Travel						Median Trip Length (km)			
			Work	School	Home	Other	Driver	Pass.	Transit	GO Train	Walk & Cycle	Other	Driver	Pass.	Transit	GO Train
6-9 AM	62,000	35.5%	79%	5%	3%	13%	83%	9%	4%	*	3%	1%	12.7	6.7	8.8	*
24 Hrs	174,700		45%	2%	25%	28%	78%	12%	5%	1%	3%	1%	9.5	6.2	10.2	23.5

Appendix B: Existing Traffic Data

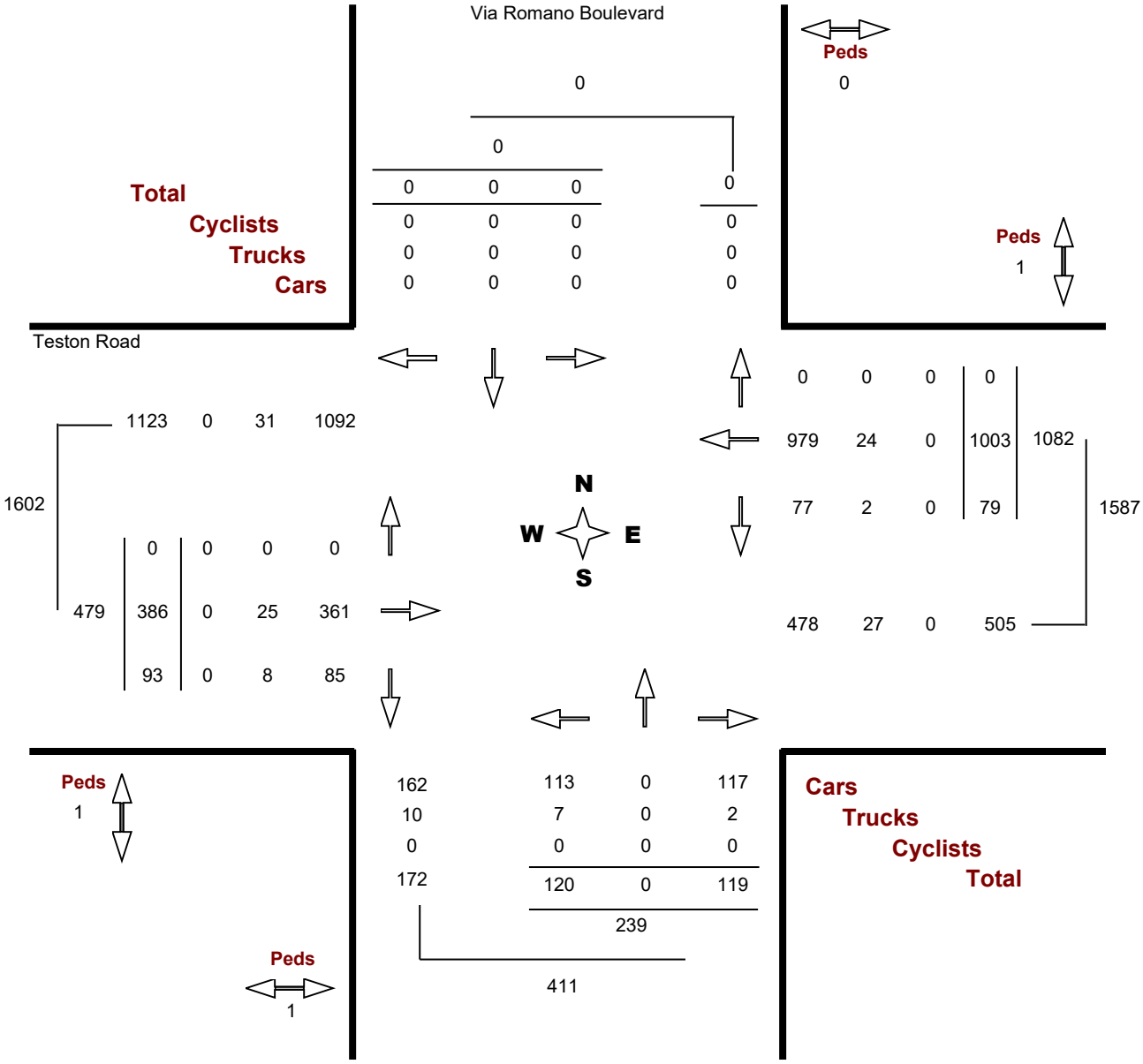
AADT Midblocks Report

Description	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Bathurst Street btwn Elgin Mills Road West/Teston Road & Woodland Acres Crescent	28361		29911		31666		32811		33838	
Bathurst Street btwn Gamble Road & Hearthside Avenue	21108		22217		23516	23357		25552		24518
Bathurst Street btwn Major Mackenzie Drive West & Mill Street/Queen Filomena Avenue				39375			40474		38877	
Bathurst Street btwn McCallum Drive/Valley Vista Drive & Major Mackenzie Drive West	34204		34548		36622	36051		38887		37672
Bathurst Street btwn Oxford Street/Lady Dolores Avenue & Elgin Mills Road West/Teston Road	31031		31298		33121	33002		35610		34478
Carrville Road btwn Bathurst Street & Okanagan Drive	26971		27523		29099	29305		32260		29939
Carrville Road btwn Plaisance Road & Carville Avenue @ Hillcrest Mall	25445		26162		27710		25456		27735	
Dufferin Street btwn Athabasca Drive & Kirby Road	10774		10859		11472		11568		12051	
Dufferin Street btwn District Avenue/Marc Santi Boulevard & Maurier Boulevard	19075		19850		20934	21012		34909		29671
Dufferin Street btwn Hunterwood Chase & Beakes Crescent	12513		12894		11435	11659		15193		14430
Dufferin Street btwn Kirby Road & King Vaughan Road	8821		9055		9543	9759		11841		9491
Dufferin Street btwn Sir Benson Drive & Teston Road				22945			43297	29572	18553	
Elgin Mills Road West btwn Bathurst Street & Hiram Road		16783		18696		17819		19528		18703
Elgin Mills Road West btwn Creekview Avenue & Yonge Street	19635		20695		21882		21777		22228	
Jane Street btwn Ahmadiyya Avenue & Teston Road	10330		11084		11707		11760		12374	
Jane Street btwn Avro Road & Major Mackenzie Drive West	24226		24881		26270		25892		27493	
Jane Street btwn Kirby Road & King Vaughan Road		5321		5561			6601		6888	
Jane Street btwn Major Mackenzie Drive West & Roseheath Drive/Grand Valley Boulevard				37466		37173		37798		36093
Jane Street btwn Rutherford Road & Auto Vaughan Drive	24932		25395		26781	26320		28838		27619
Jane Street btwn Teston Road & Kirby Road	6278		6111		6439	6542		7205		6837
Keele Street btwn Dina Road & Cromwell Road/Fieldgate Drive								19151		
Keele Street btwn Keele Street @ Maple Health Centre & Drummond Drive	16086		17094		18100		18227		19357	
Keele Street btwn Kirby Road & Maloy Street		8243		8820			13577		14032	
Keele Street btwn Major Mackenzie Drive West & Railway Street/Killian Road	19681		19617		20746	20649		23042		21957
Keele Street btwn Naylon Street & Church St. Mid Block Pedestrian Crossing		18025		18884			19259		20095	
Keele Street btwn Teston Road & Peak Point Boulevard				13107		13524		15115		15234
King Vaughan Rd btwn Highway 400 & Jane Street							3142		322	
King Vaughan Road btwn Bathurst Street & Dufferin Street									8856	
King Vaughan Road btwn Dufferin Street & Keele Street									8791	
King Vaughan Road btwn Highway 400 & Weston Road									577	
King Vaughan Road btwn Jane Street & Stallions Court									5035	
King Vaughan Road btwn Keele Street & Stallions Court									5042	
King Vaughan Road btwn Pine Valley Drive & Weston Road									1248	
Kirby Rd S btwn Highway 400 & Jane St							2878			
Kirby Rd S btwn Jane St & Keele St		3787								
Major Mackenzie Drive West btwn Atkinson Street & Yonge Street				27887		27238		30646		28438
Major Mackenzie Drive West btwn Exit 35 & Jane Street				54409		54452	47736	62966	63409	63533
Major Mackenzie Drive West btwn Fortinos / Longos Entrance & Melville Avenue		22047		42471			51879		58053	
Major Mackenzie Drive West btwn Ilan Ramon Boulevard & Bathurst Street							37082			
Major Mackenzie Drive West btwn Jutland Street & Weston Road										34703
Major Mackenzie Drive West btwn Keele Street & Richmond Street	30402		31222		32936	32899		37279		34336
Major Mackenzie Drive West btwn Pine Valley Drive & Woodend Place	17389		17821	20260	18798	18703		21067		21257
Major Mackenzie Drive West btwn Sir Benson Drive & Thomas Cook Avenue	31675		31522		32620		31350		35176	
Major Mackenzie Drive West btwn Vellore Woods Boulevard/Cityview Boulevard & Exit 35/GO Carpool Lot - Hwy 400 & Major Mackenzie Drive West	34293		35916		37815	37370	36307	42569	39755	43802
Pine Valley Drive btwn Major Mackenzie Drive West & Teston Road	1932		2051		2169		2181		2287	
Pine Valley Drive btwn Rutherford Road & Davos Road		1538		1619		1658		1792		1713
Rutherford Road btwn Exit 33 & Sweetriver Boulevard		60948				57961	54017	65129	61385	61554
Rutherford Road btwn Fossil Hill Road & Rutherford Road @ Rutherford Road Plaza		40807		43928		42023		42465		45837
Rutherford Road btwn Ilan Ramon Boulevard & Bathurst Street							28791			
Rutherford Road btwn Jacob Keffer Parkway & Barrhill Road/Westburne Drive	41805		42292		44596	44439		39229		37892
Rutherford Road btwn Jane Street & Rutherford Road @ Southwest Yard										47554
Rutherford Road btwn Julliard Drive & Jane Street				57205		57589		64858		60253
Rutherford Road btwn Melville Avenue/Creditstone Road & Rotational Dr.										53283
Rutherford Road btwn Sherwood Park Drive & Wedgewood Place	47668		46421		48847		45938		51149	
Rutherford Road btwn Thornhill Woods Drive/Thomas Cook Avenue & Ilan Ramon Boulevard			27563		29037		26951		29998	
Rutherford Road btwn Weston Road & Vellore Woods Boulevard	46097		48036		50600	49636	47008	57405	52863	52312
Teston Road btwn Exit 37 & Mosque Gate		3598	4716			4866	24804	5669	5221	5309
Teston Road btwn Jane Street & Cranston Park Avenue	5320	6790	5818		6157		6164		6476	
Teston Road btwn Keele Street & Rodinea Road	1919		1904		2033	2125		2351		2222
Teston Road btwn Pine Valley Drive & Weston Road				3627			3583		4027	
Teston Road btwn Quail Run Boulevard & Torah Gate				13838			15430		16285	
Teston Road btwn Weston Road & Cityview Boulevard	3225		2843		3022	3038	3473	3499	3190	3247
Weston Road btwn Kirby Road & King Vaughan Road				4020			6513		6720	
Weston Road btwn Major Mackenzie Drive West & Retreat Boulevard/Chatfield Drive	8082		8823		9318		9348		15122	
Weston Road btwn Maria Antonia Road/Hawstone Road & Major Mackenzie Drive West	16177		16991		17925		17647		18826	
Weston Road btwn Mattucci Court & Kirby Road				6223		6448		7024		6748
Yonge Street btwn Baif Boulevard/Observatory Lane & Weldrick Road West/Weldrick Road East	34732	37507	38317	41100	40467		43692		39959	
Yonge Street btwn Hopkins Street/Elmwood Avenue & Major Mackenzie Drive West/Major Mackenzie Drive East	29468		30573	33249	32362	31439	35587	35936	32751	33026
Yonge Street btwn Jefferson Sideroad & Stouffville Road		23326		24869		23817	23644	25983		24816
Yonge Street btwn Leonard Street & Private Entrance - LBS Development	40349	45360	41771	45629	44102	43226	43243	47116		45204

Turning Movements Diagram
Peak Hour Report: AM Period

Location..... Teston Road & Via Romano Boulevard
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 4C3E19E1
Count Date. Wednesday, 03 October, 2012
Count Period. 07:00 AM — 09:00 AM
Peak Hour.... 07:30 AM — 08:30 AM

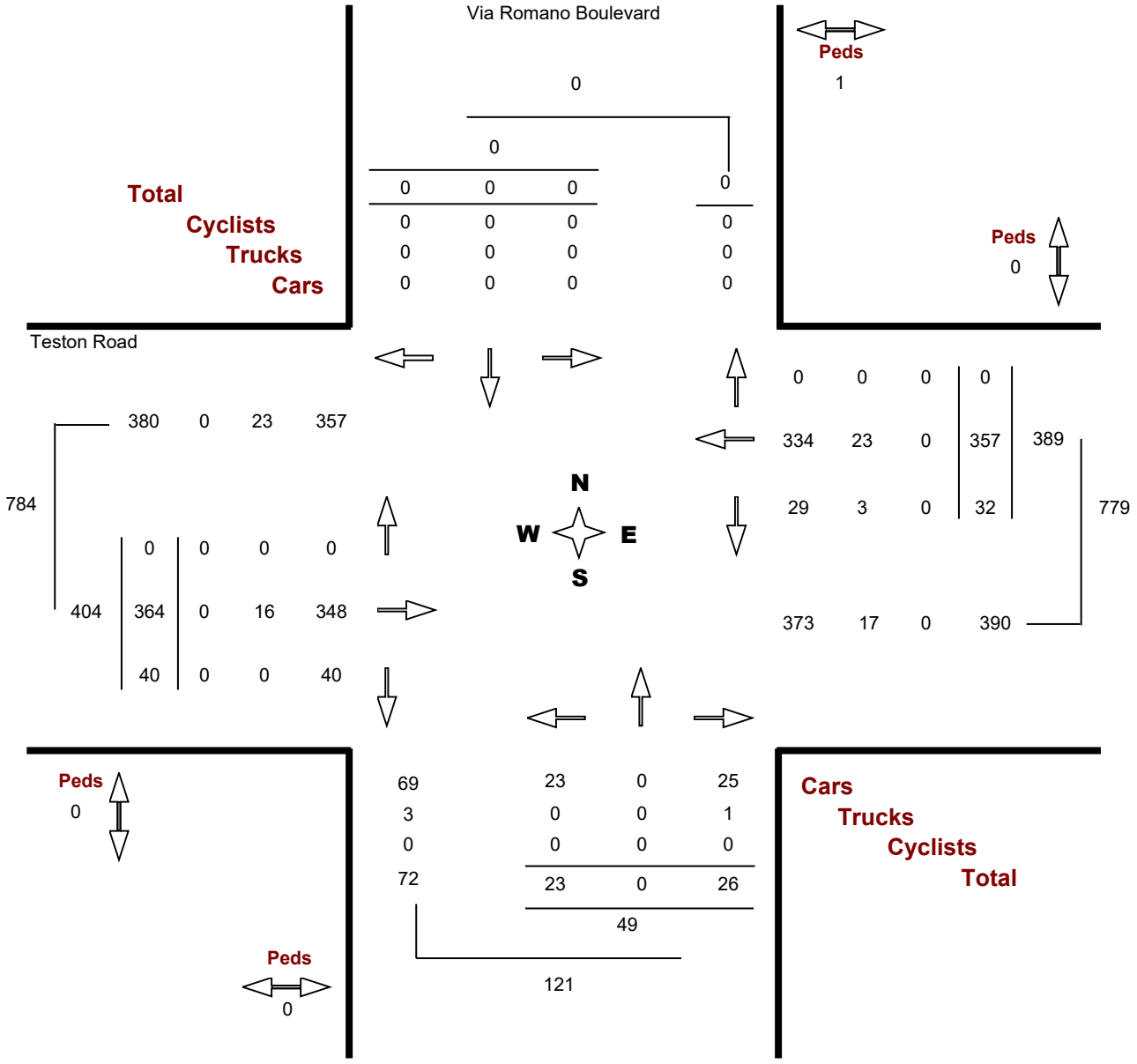


Notes:

Turning Movements Diagram
Peak Hour Report: MD Period

Location..... Teston Road & Via Romano Boulevard
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 4C3E19E1
Count Date. Wednesday, 03 October, 2012
Count Period. 11:00 AM — 02:00 PM
Peak Hour.... 01:00 PM — 02:00 PM

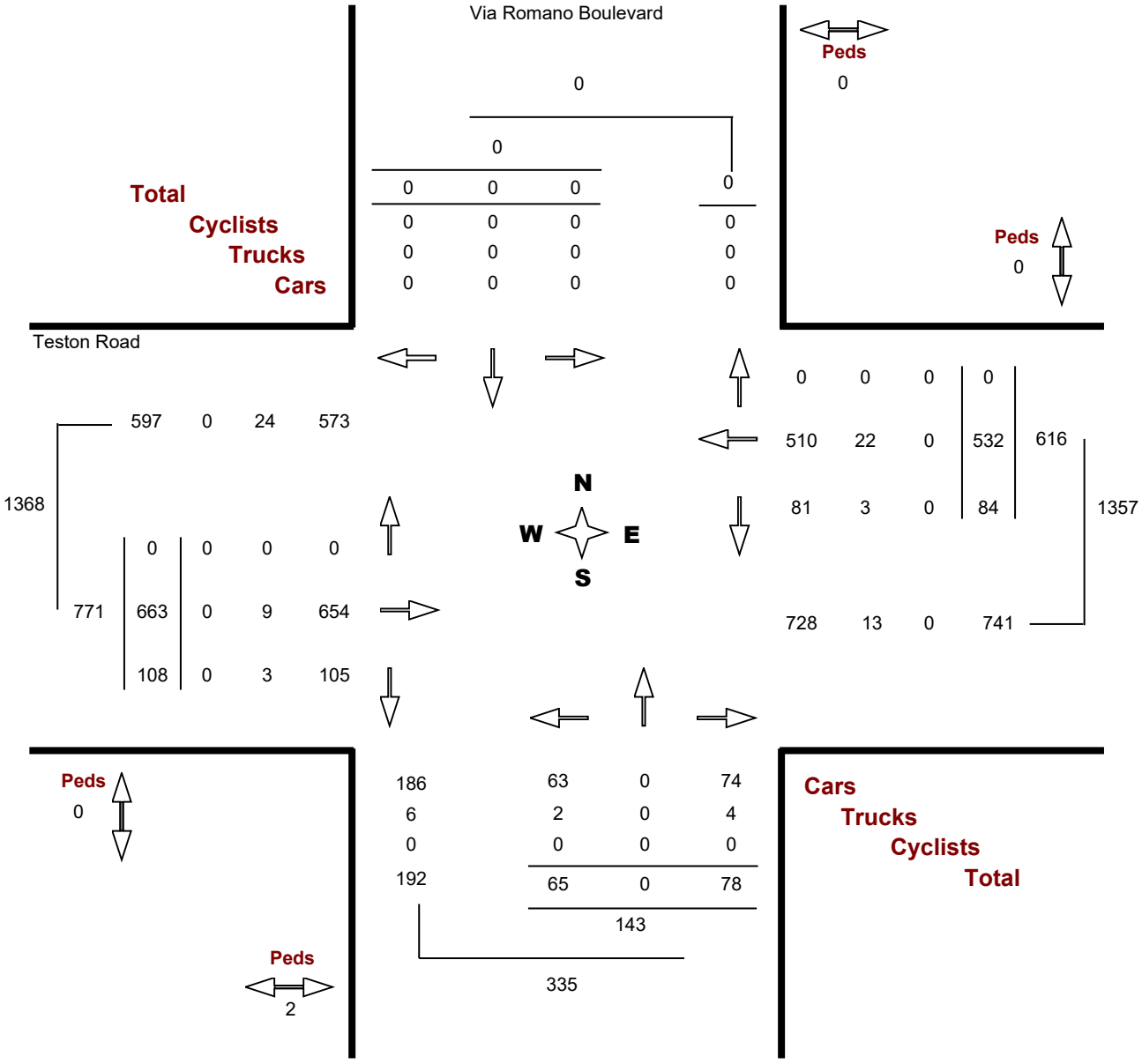


Notes:

Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Teston Road & Via Romano Boulevard
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

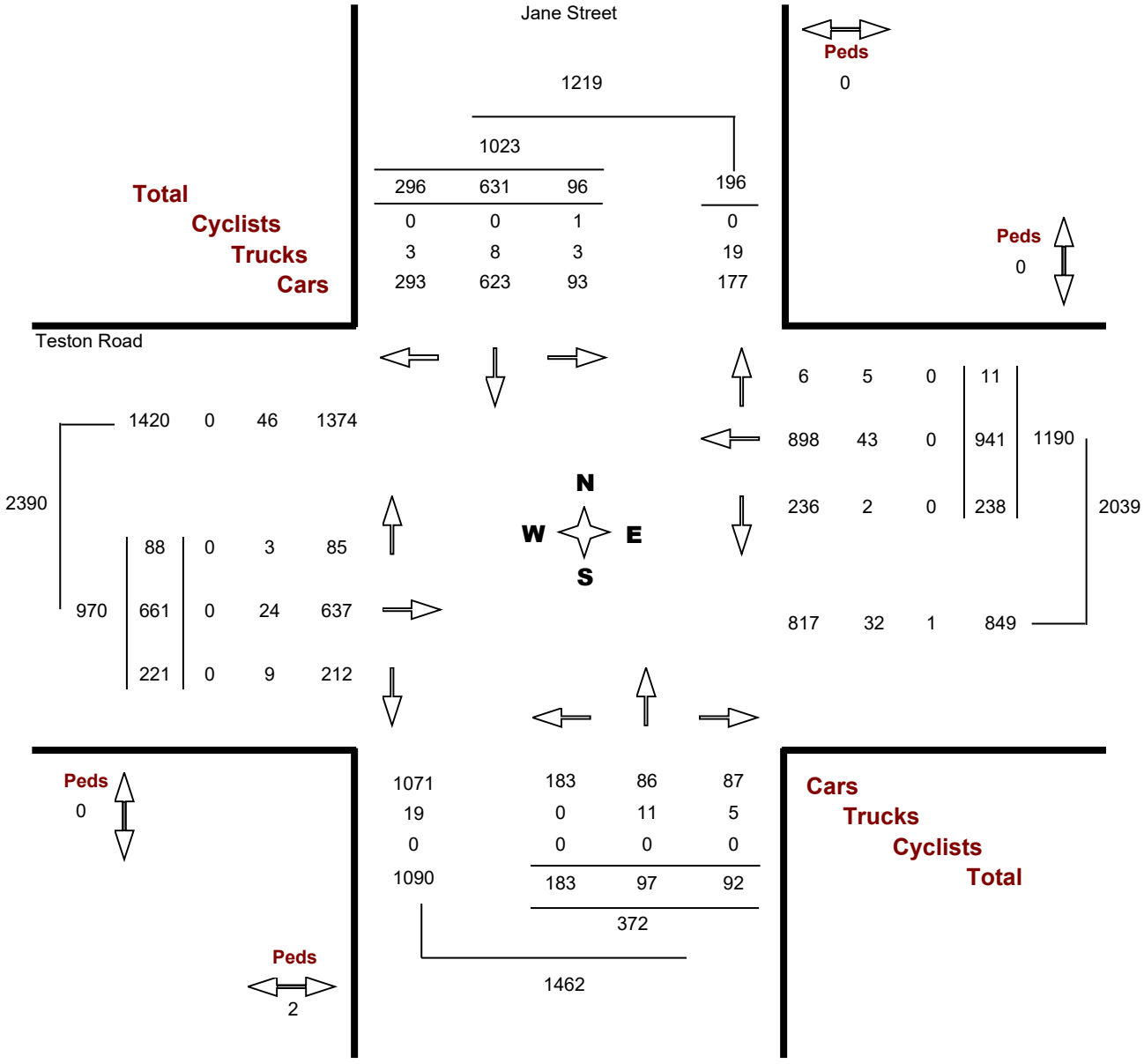
GeoID..... 4C3E19E1
Count Date. Wednesday, 03 October, 2012
Count Period. 03:00 PM — 06:00 PM
Peak Hour.... 05:00 PM — 06:00 PM



Notes:

Turning Movements Diagram
Peak Hour Report: AM Period

Location..... Teston Road & Jane Street
GeoID..... EC354822
Municipality. Vaughan
Count Date. Wednesday, 07 December, 2016
Traffic Cont. Traffic signal
Count Period. 07:00 AM — 09:00 AM
Major Dir..... None
Peak Hour.... 07:30 AM — 08:30 AM

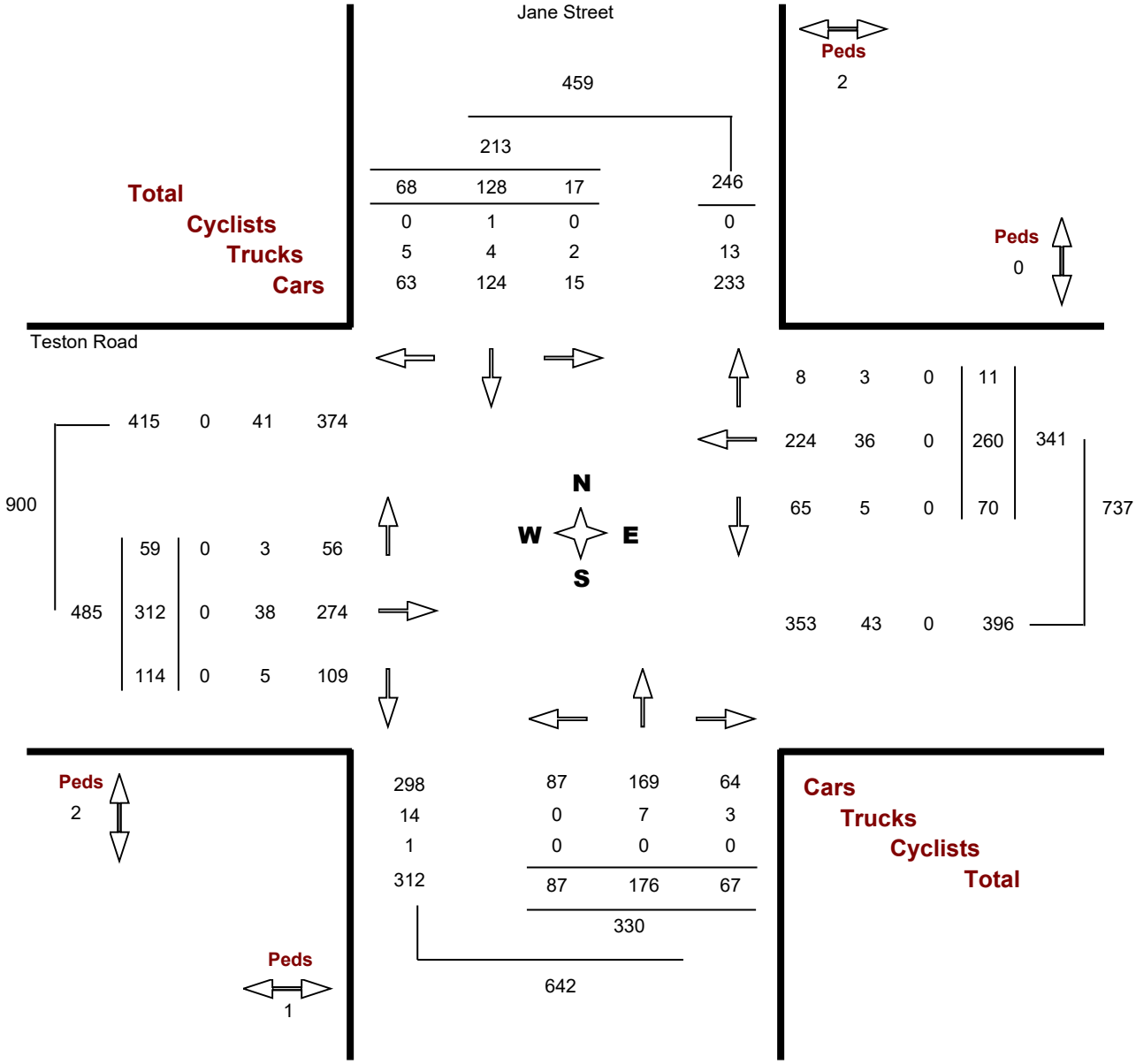


Notes:

Turning Movements Diagram
Peak Hour Report: MD Period

Location..... Teston Road & Jane Street
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... EC354822
Count Date. Wednesday, 07 December, 2016
Count Period. 11:00 AM — 02:00 PM
Peak Hour.... 01:00 PM — 02:00 PM

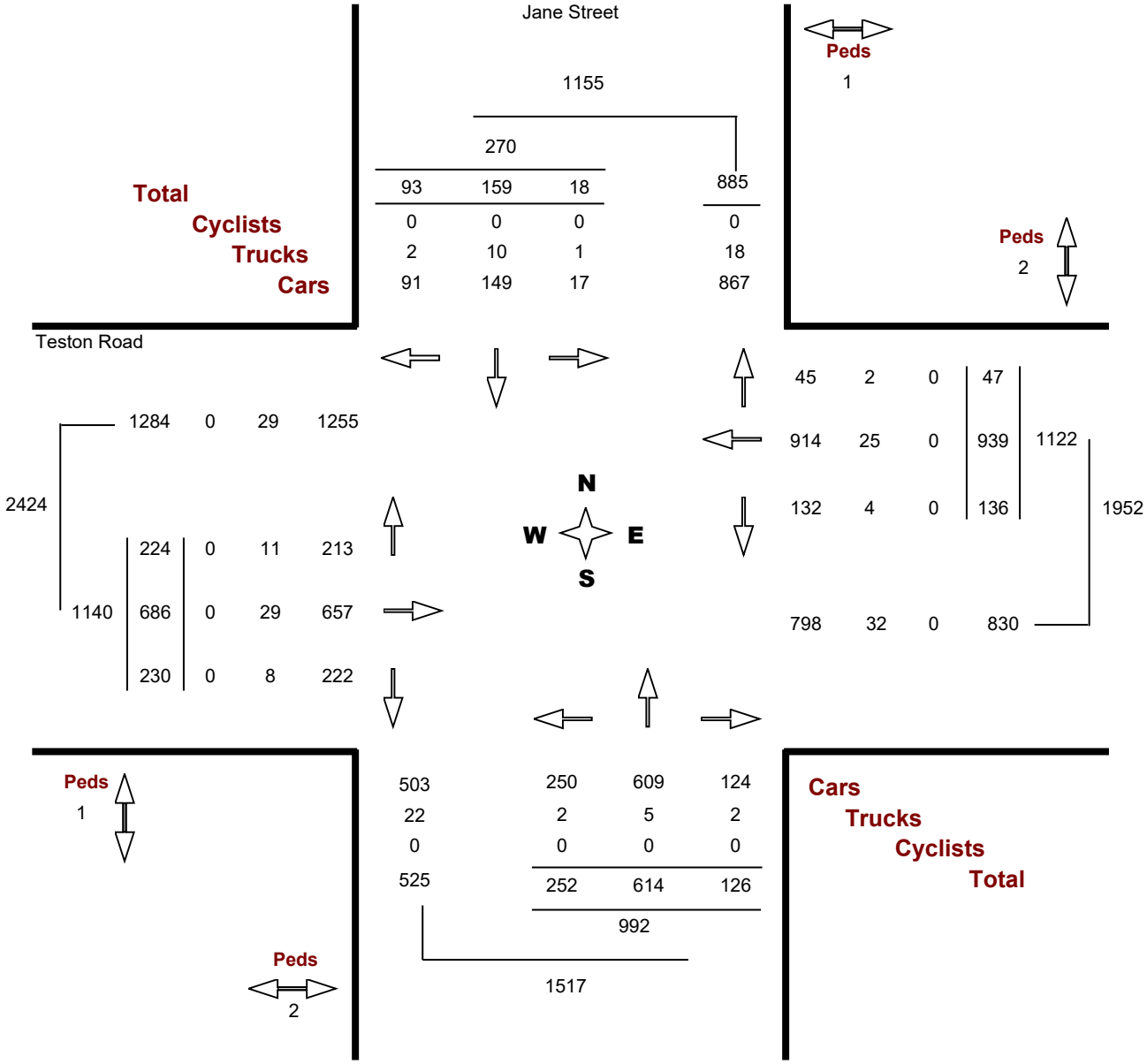


Notes:

Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Teston Road & Jane Street
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... EC354822
Count Date. Wednesday, 07 December, 2016
Count Period. 03:00 PM — 06:00 PM
Peak Hour.... 04:30 PM — 05:30 PM

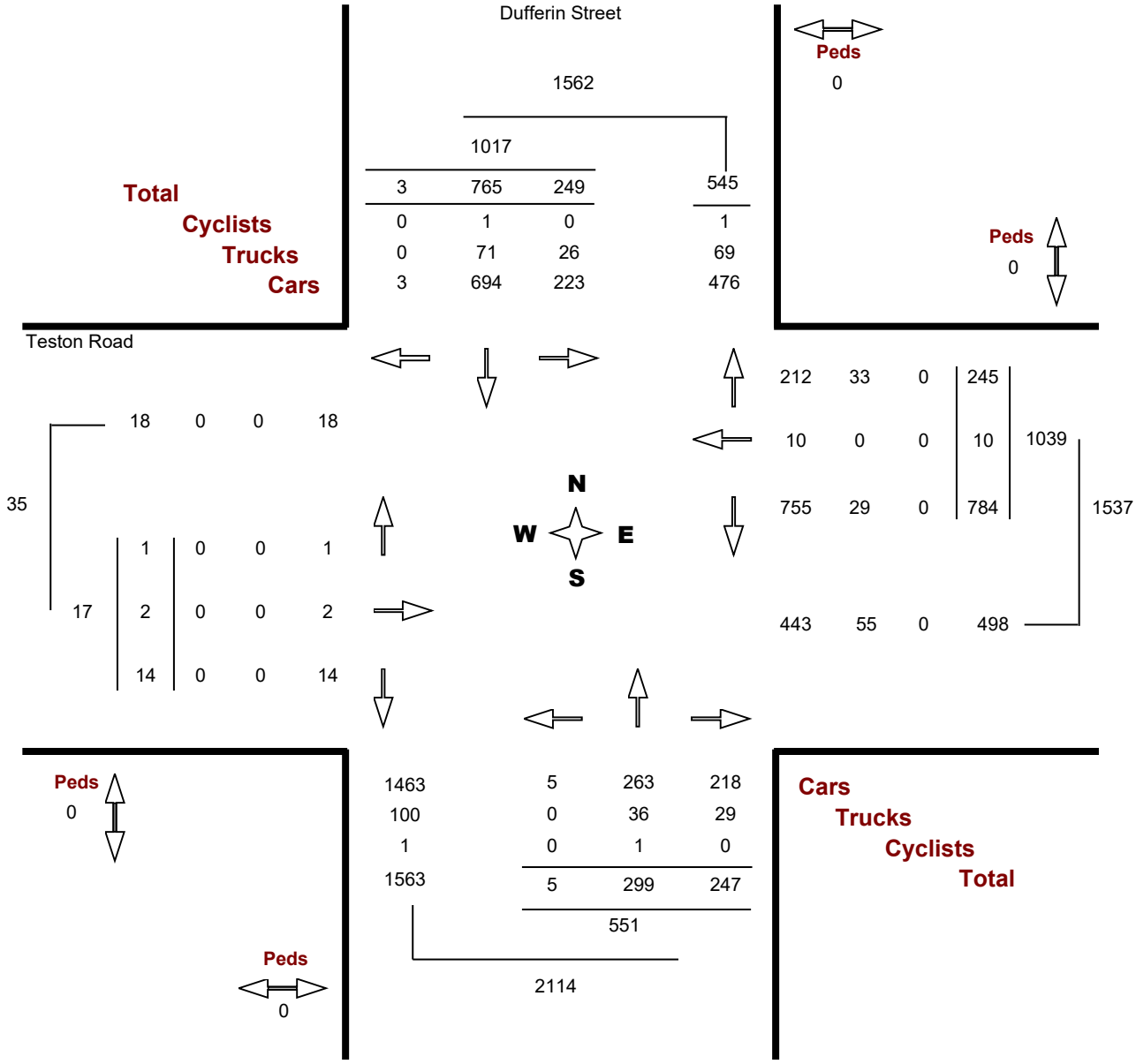


Notes:

Turning Movements Diagram
Peak Hour Report: AM Period

Location..... Teston Road & Dufferin Street
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 9661E84C
Count Date. Tuesday, 25 June, 2019
Count Period. 07:00 AM — 09:00 AM
Peak Hour.... 07:45 AM — 08:45 AM

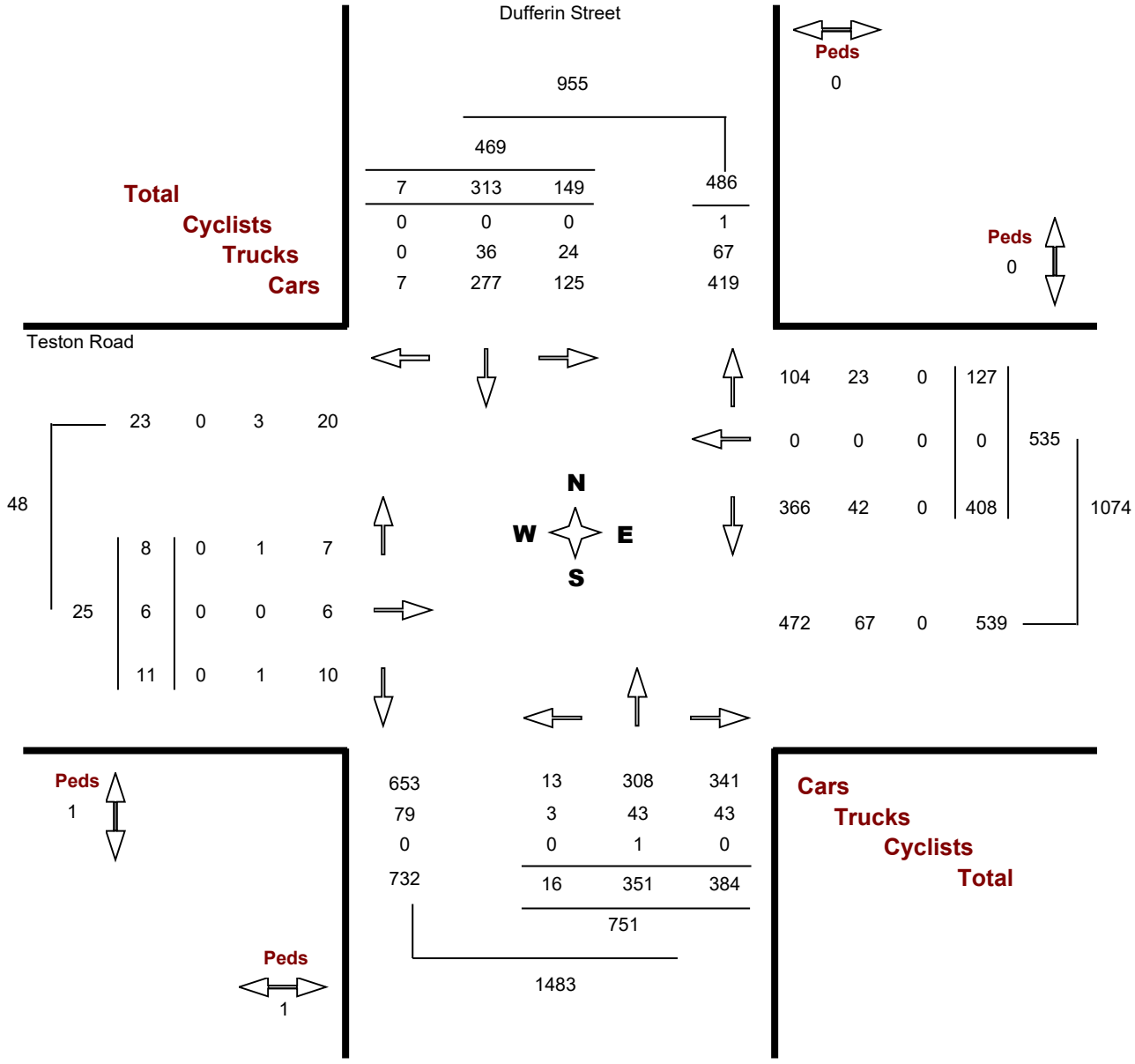


Notes:

Turning Movements Diagram
Peak Hour Report: MD Period

Location..... Teston Road & Dufferin Street
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 9661E84C
Count Date. Tuesday, 25 June, 2019
Count Period. 11:00 AM — 02:00 PM
Peak Hour.... 01:00 PM — 02:00 PM

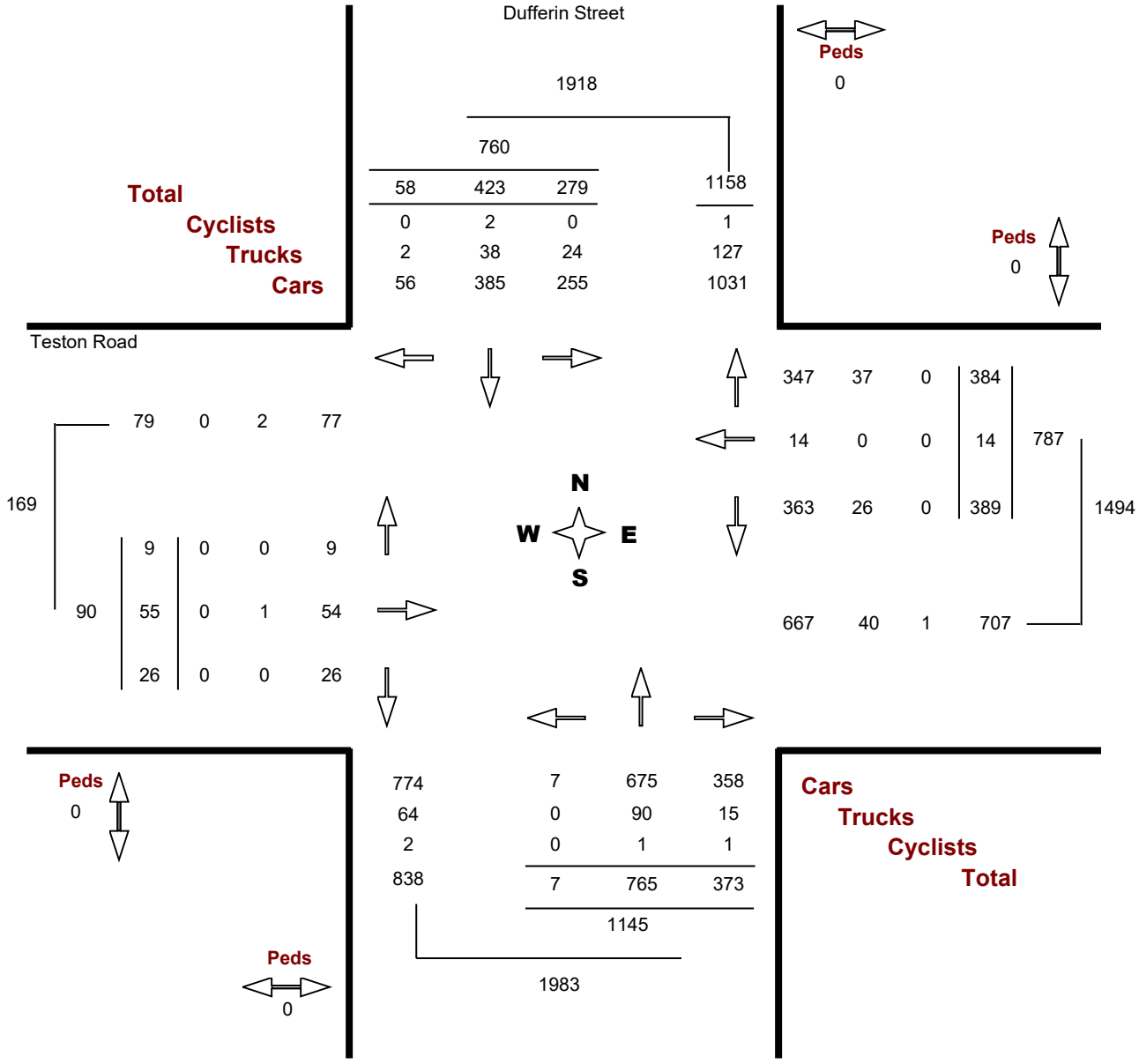


Notes:

Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Teston Road & Dufferin Street
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 9661E84C
Count Date. Tuesday, 25 June, 2019
Count Period. 03:00 PM — 06:00 PM
Peak Hour.... 04:45 PM — 05:45 PM

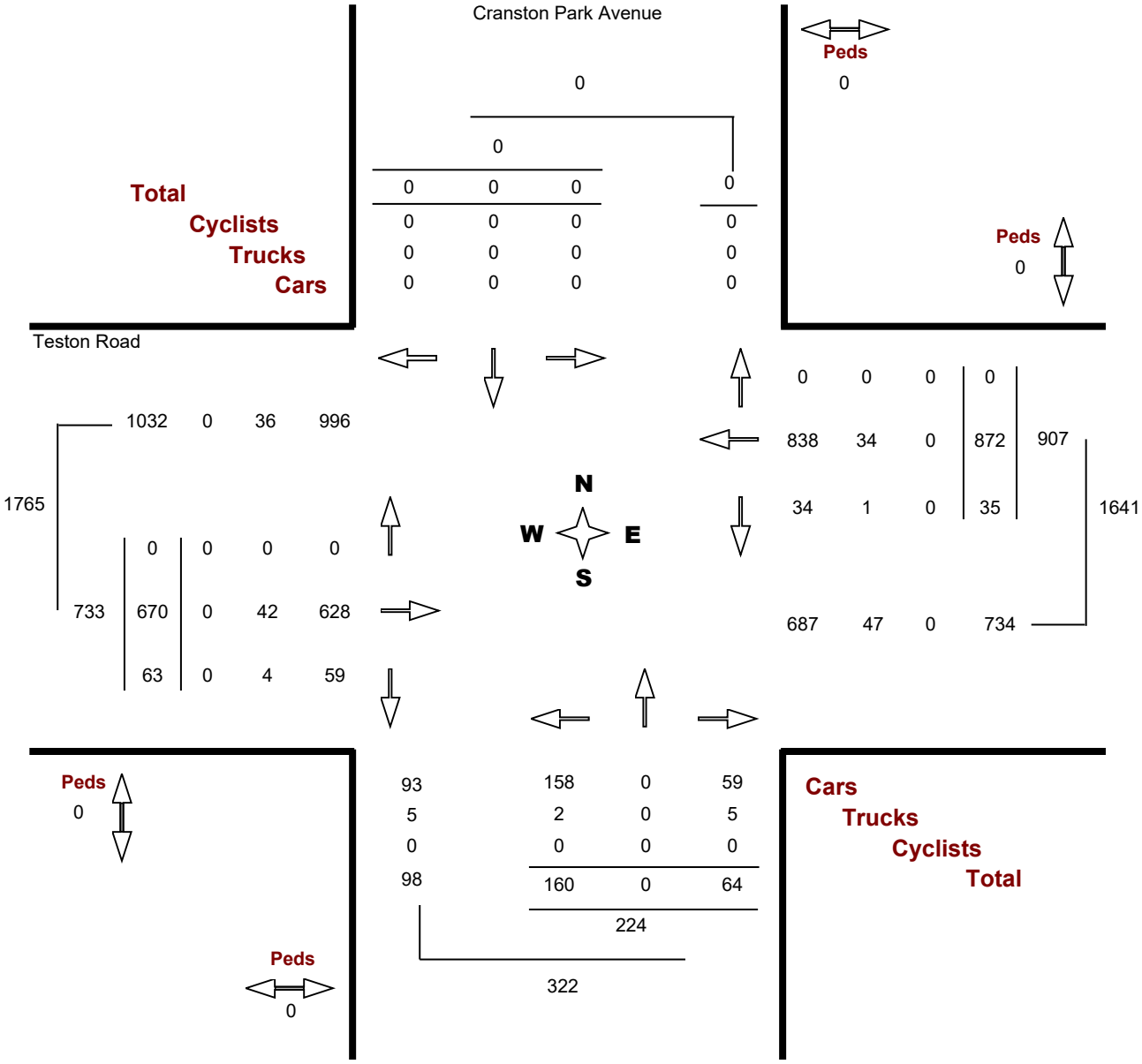


Notes:

Turning Movements Diagram
Peak Hour Report: AM Period

Location..... Teston Road & Cranston Park Avenue
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... A5E0C75C
Count Date. Tuesday, 16 October, 2012
Count Period. 07:00 AM — 09:00 AM
Peak Hour.... 07:30 AM — 08:30 AM

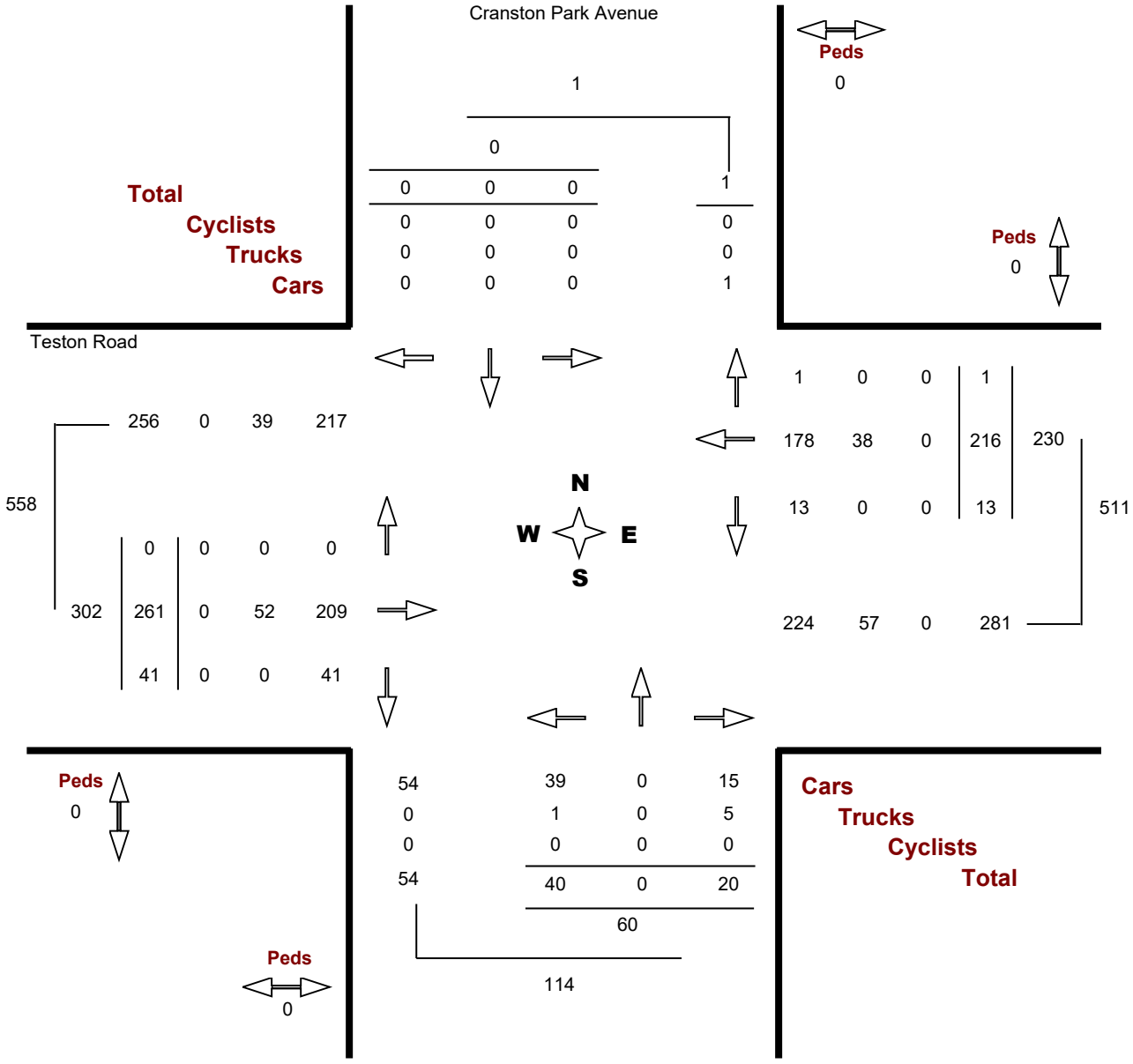


Notes:

Turning Movements Diagram
Peak Hour Report: MD Period

Location..... Teston Road & Cranston Park Avenue
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... A5E0C75C
Count Date. Tuesday, 16 October, 2012
Count Period. 11:00 AM — 02:00 PM
Peak Hour.... 01:00 PM — 02:00 PM

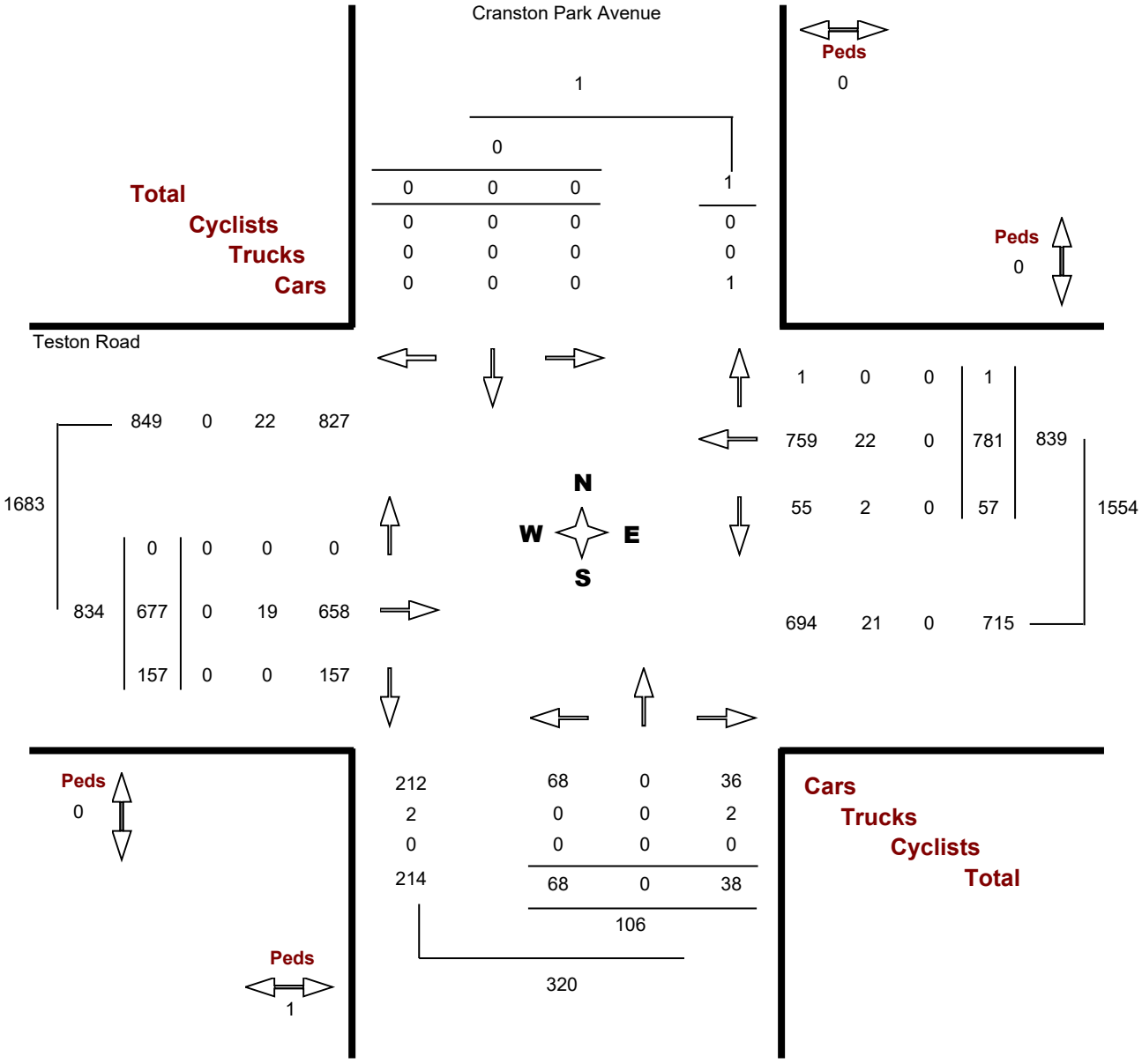


Notes:

Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Teston Road & Cranston Park Avenue
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... A5E0C75C
Count Date. Tuesday, 16 October, 2012
Count Period. 03:00 PM — 06:00 PM
Peak Hour.... 05:00 PM — 06:00 PM

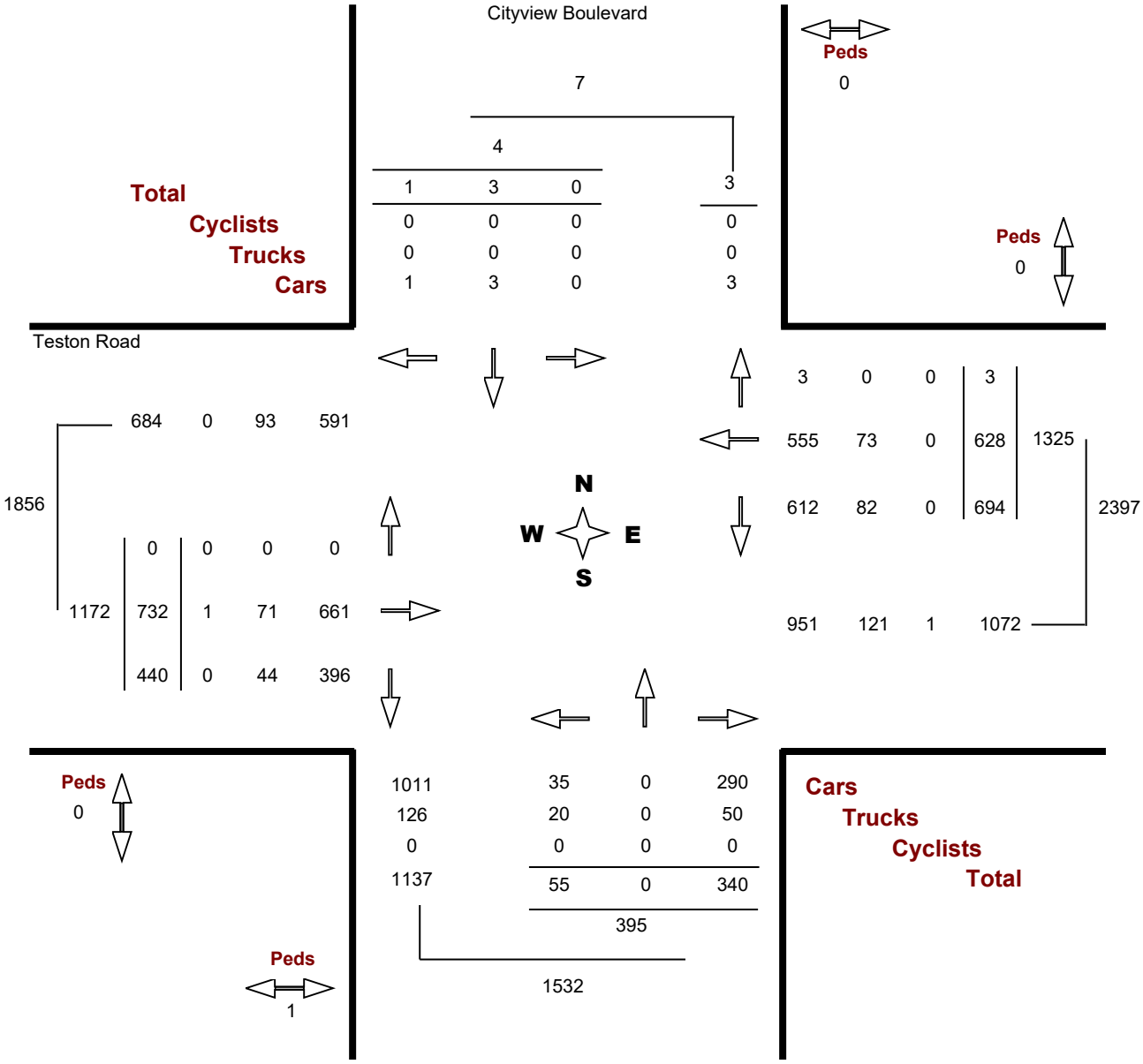


Notes:

Turning Movements Diagram
Peak Hour Report: AM Period

Location..... Teston Road & Cityview Boulevard
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 531ECD19
Count Date. Tuesday, 22 October, 2019
Count Period. 07:00 AM — 09:00 AM
Peak Hour.... 07:30 AM — 08:30 AM

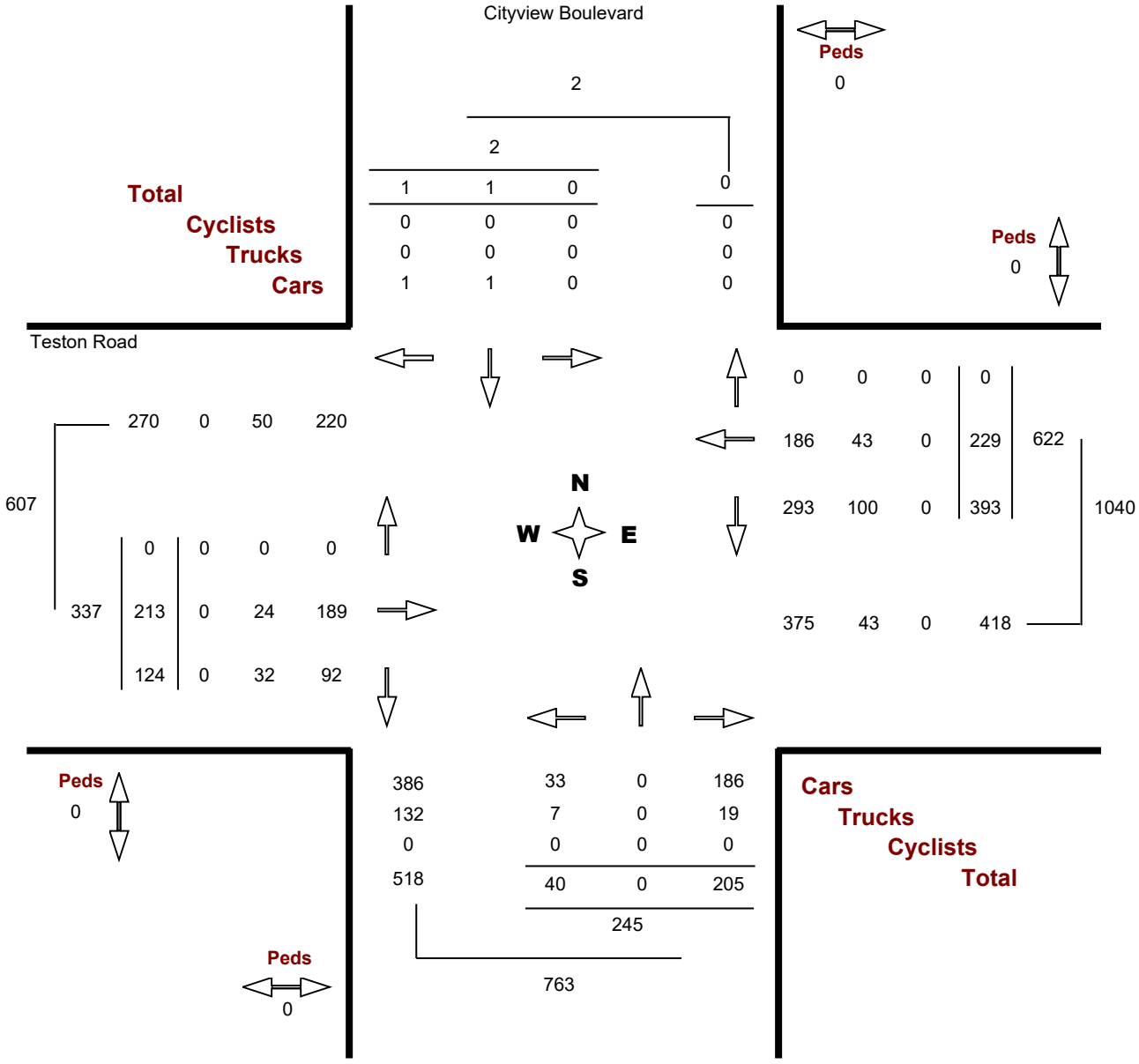


Notes:

Turning Movements Diagram
Peak Hour Report: MD Period

Location..... Teston Road & Cityview Boulevard
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 531ECD19
Count Date. Tuesday, 22 October, 2019
Count Period. 11:00 AM — 02:00 PM
Peak Hour.... 11:30 AM — 12:30 PM

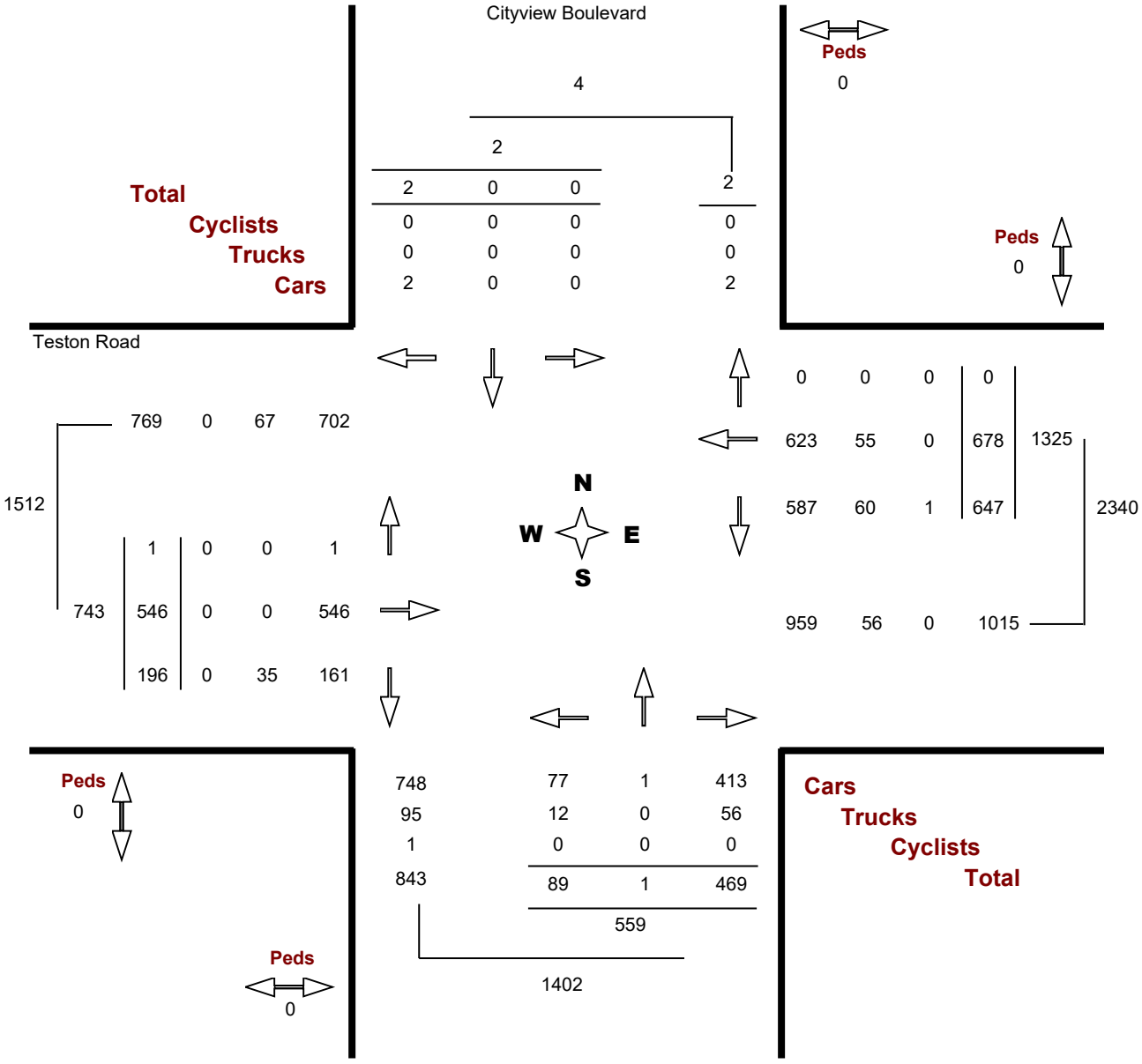


Notes:

Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Teston Road & Cityview Boulevard
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 531ECD19
Count Date. Tuesday, 22 October, 2019
Count Period. 03:00 PM — 06:00 PM
Peak Hour.... 05:00 PM — 06:00 PM

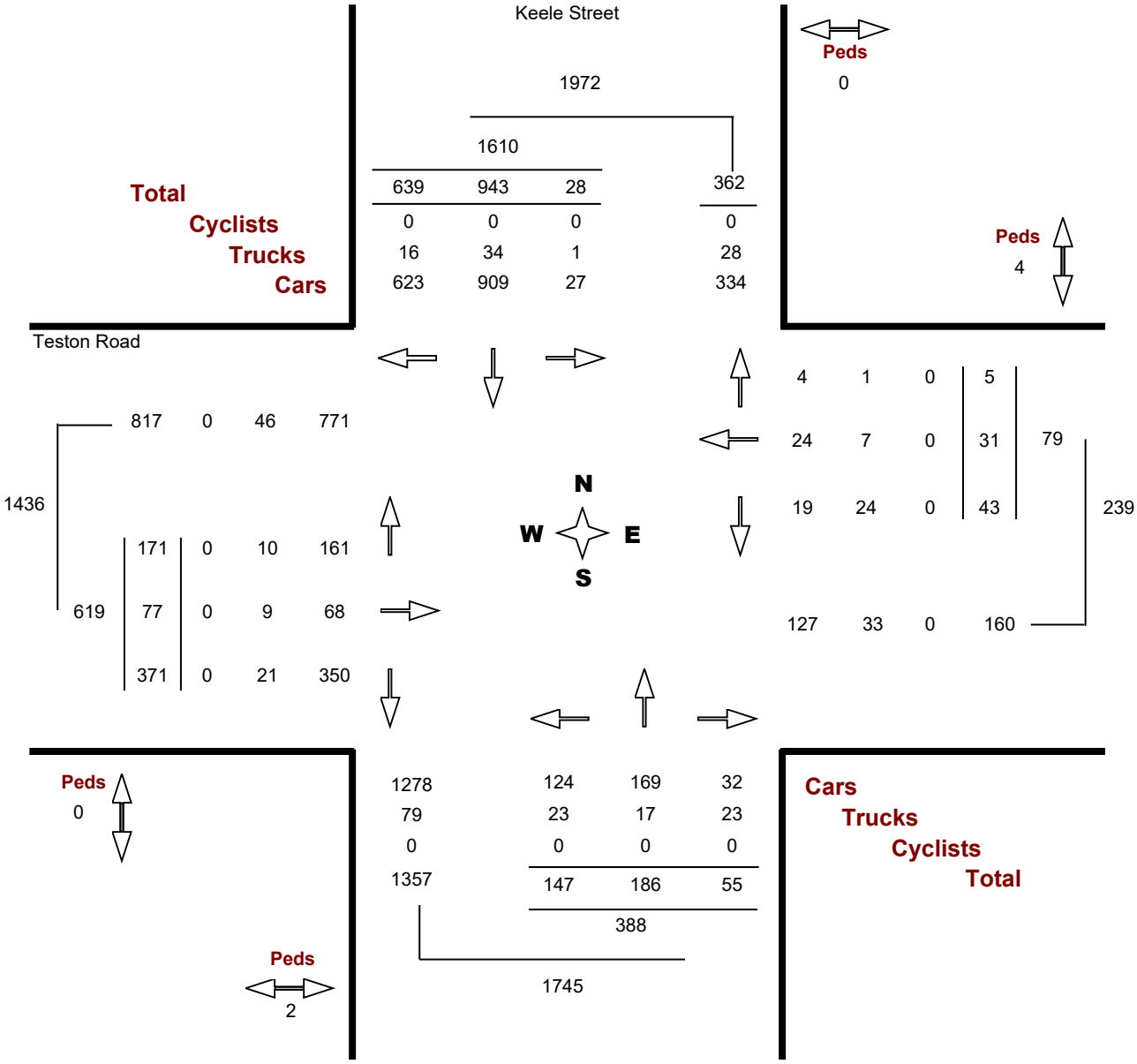


Notes:

Turning Movements Diagram
Peak Hour Report: AM Period

Location..... Keele Street & Teston Road
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... C8F21BE9
Count Date. Tuesday, 14 June, 2011
Count Period. 07:00 AM — 09:00 AM
Peak Hour.... 07:30 AM — 08:30 AM

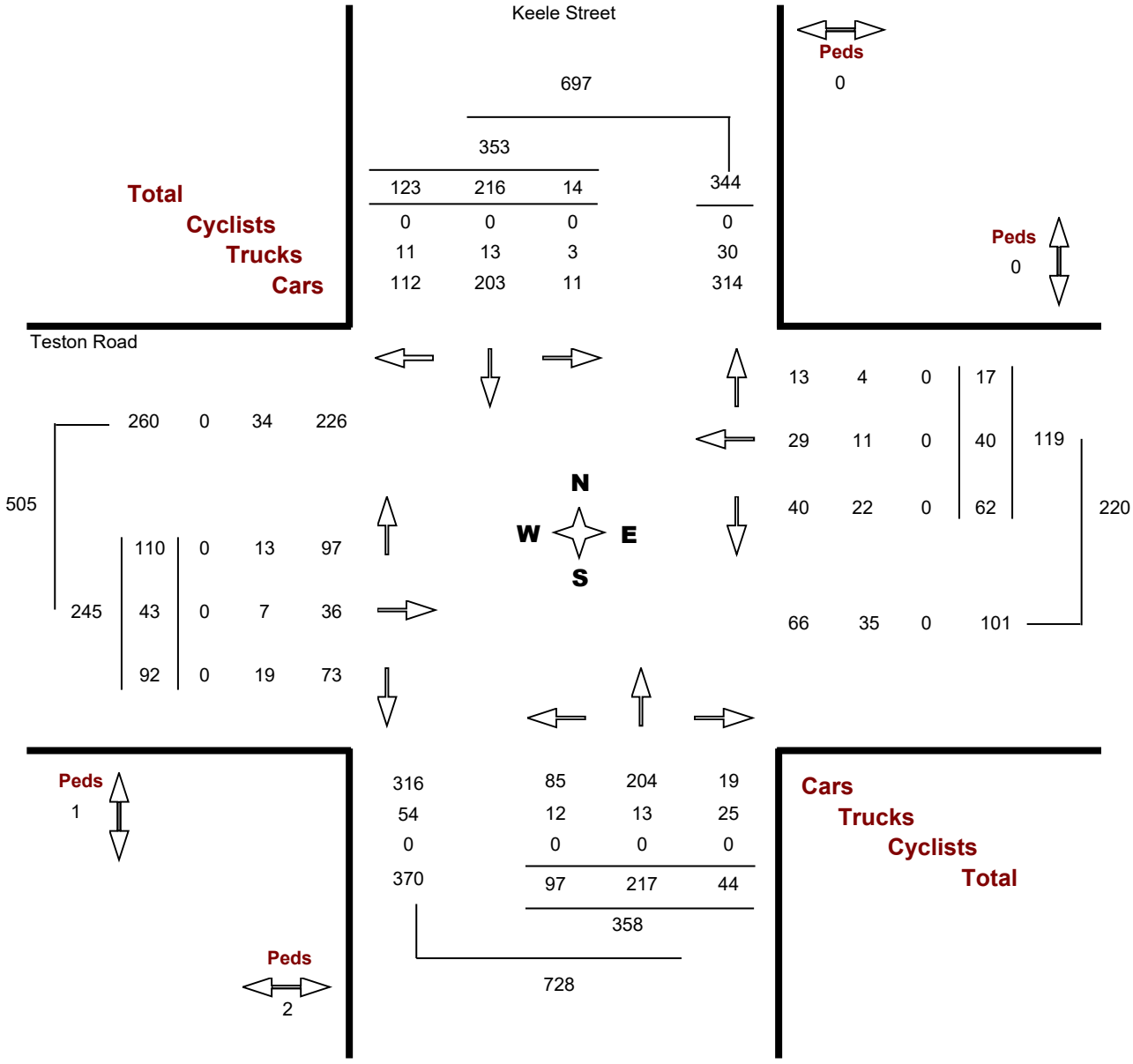


Notes:

Turning Movements Diagram
Peak Hour Report: MD Period

Location..... Keele Street & Teston Road
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... C8F21BE9
Count Date. Tuesday, 14 June, 2011
Count Period. 11:00 AM — 02:00 PM
Peak Hour.... 12:00 PM — 01:00 PM

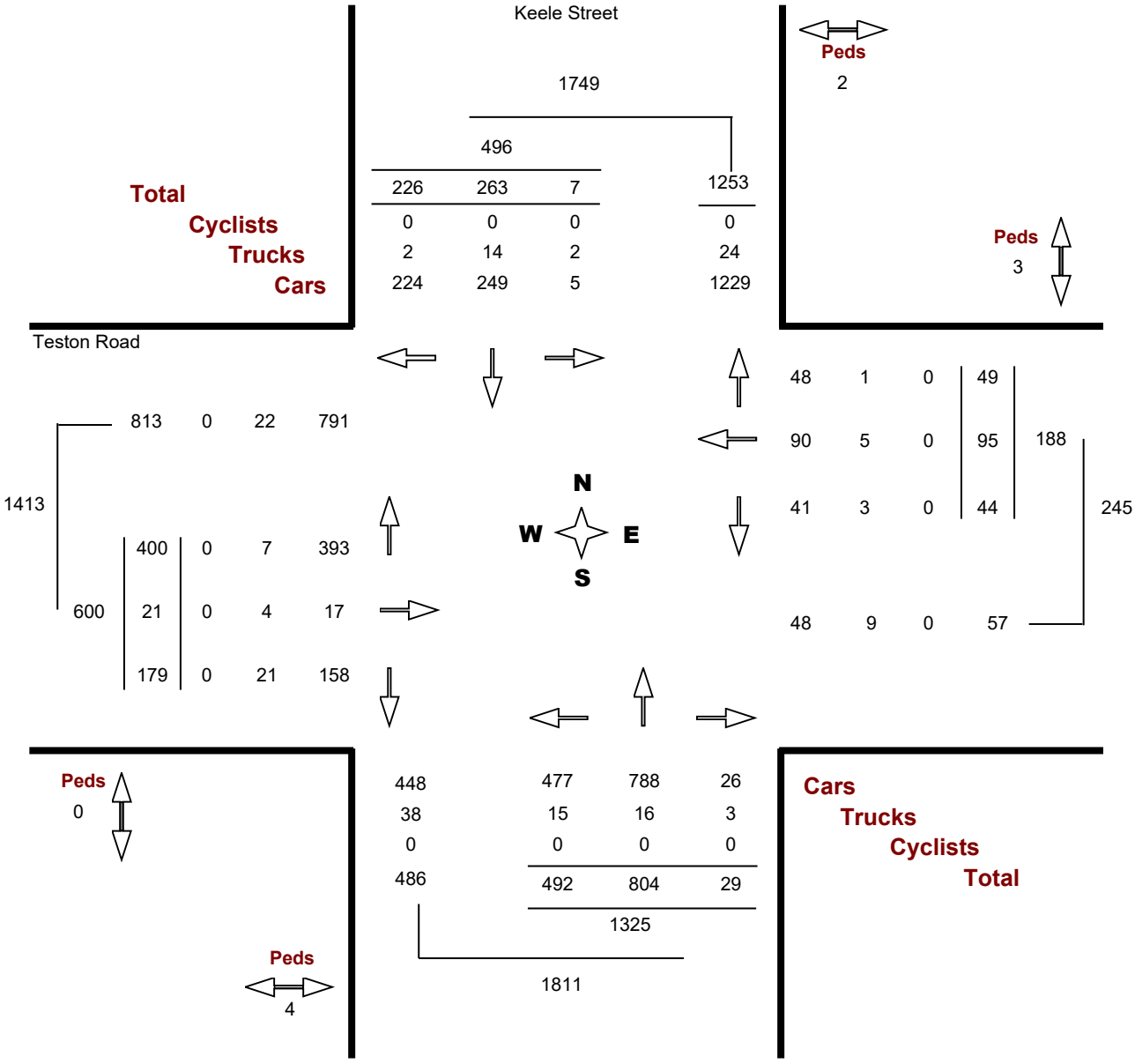


Notes:

Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Keele Street & Teston Road
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... C8F21BE9
Count Date. Tuesday, 14 June, 2011
Count Period. 03:00 PM — 06:00 PM
Peak Hour.... 04:45 PM — 05:45 PM



Notes:

Turning Movements Diagram
Peak Hour Report: AM Period

Location..... Bathurst Street & Elgin Mills Road West/Teston Road

GeoID..... DA6AE471

Municipality. Vaughan

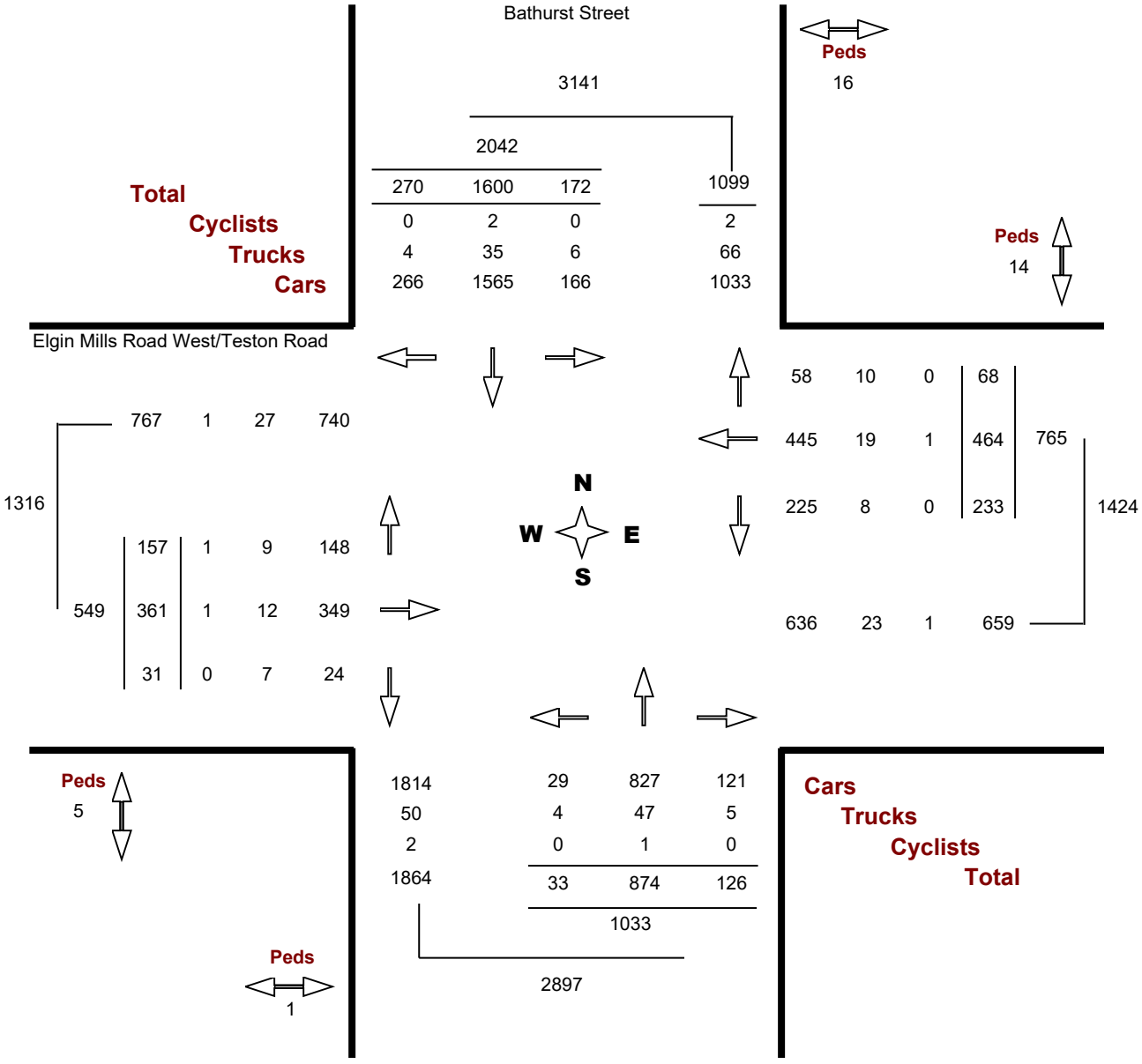
Count Date. Tuesday, 15 September, 2015

Traffic Cont. Traffic signal

Count Period. 07:00 AM — 09:00 AM

Major Dir..... None

Peak Hour.... 07:45 AM — 08:45 AM



Notes:

Turning Movements Diagram
Peak Hour Report: MD Period

Location..... Bathurst Street & Elgin Mills Road West/Teston Road

GeoID..... DA6AE471

Municipality. Vaughan

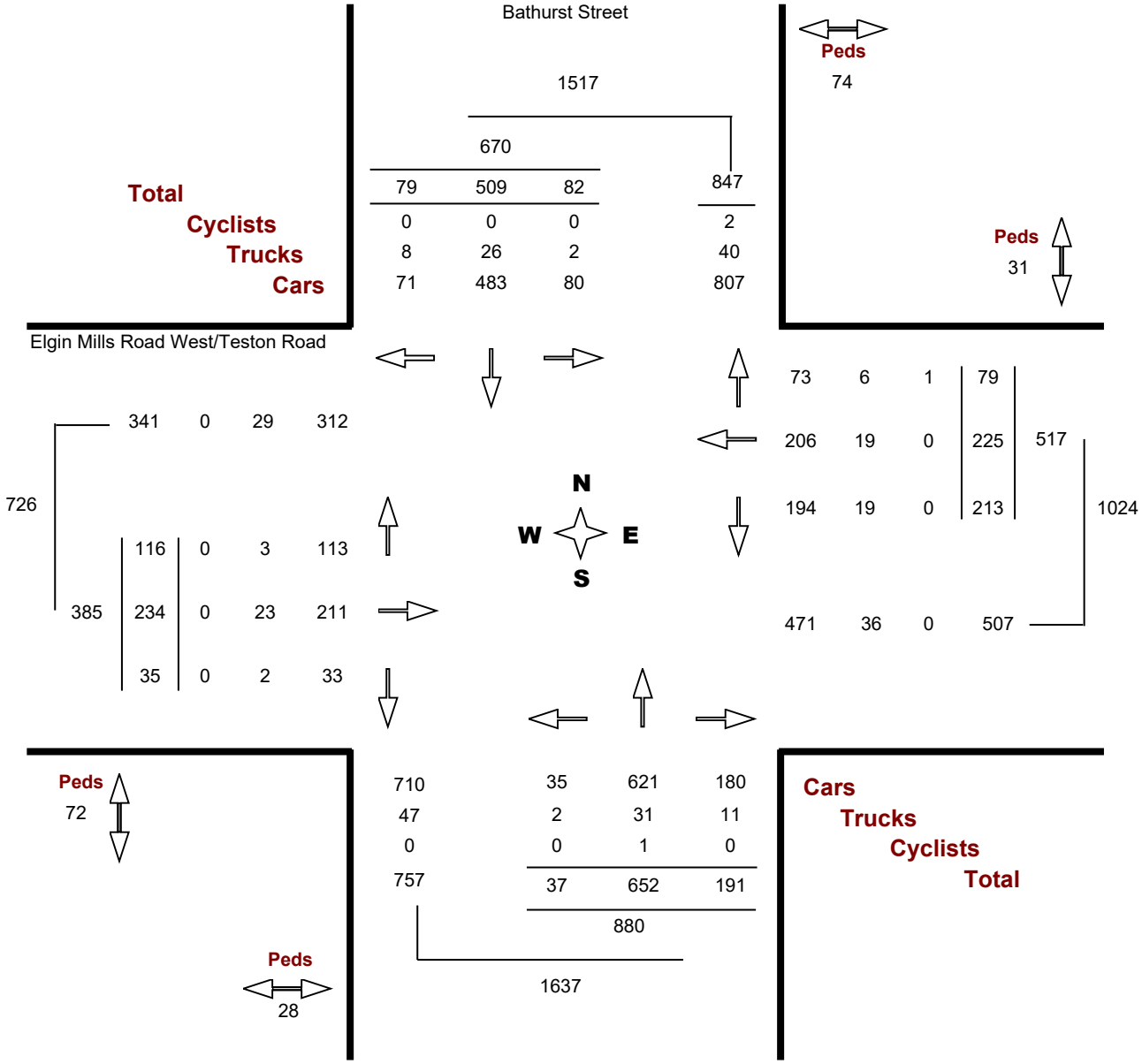
Count Date. Tuesday, 15 September, 2015

Traffic Cont. Traffic signal

Count Period. 11:00 AM — 02:00 PM

Major Dir..... None

Peak Hour.... 01:00 PM — 02:00 PM



Notes:

Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Bathurst Street & Elgin Mills Road West/Teston Road

GeoID..... DA6AE471

Municipality. Vaughan

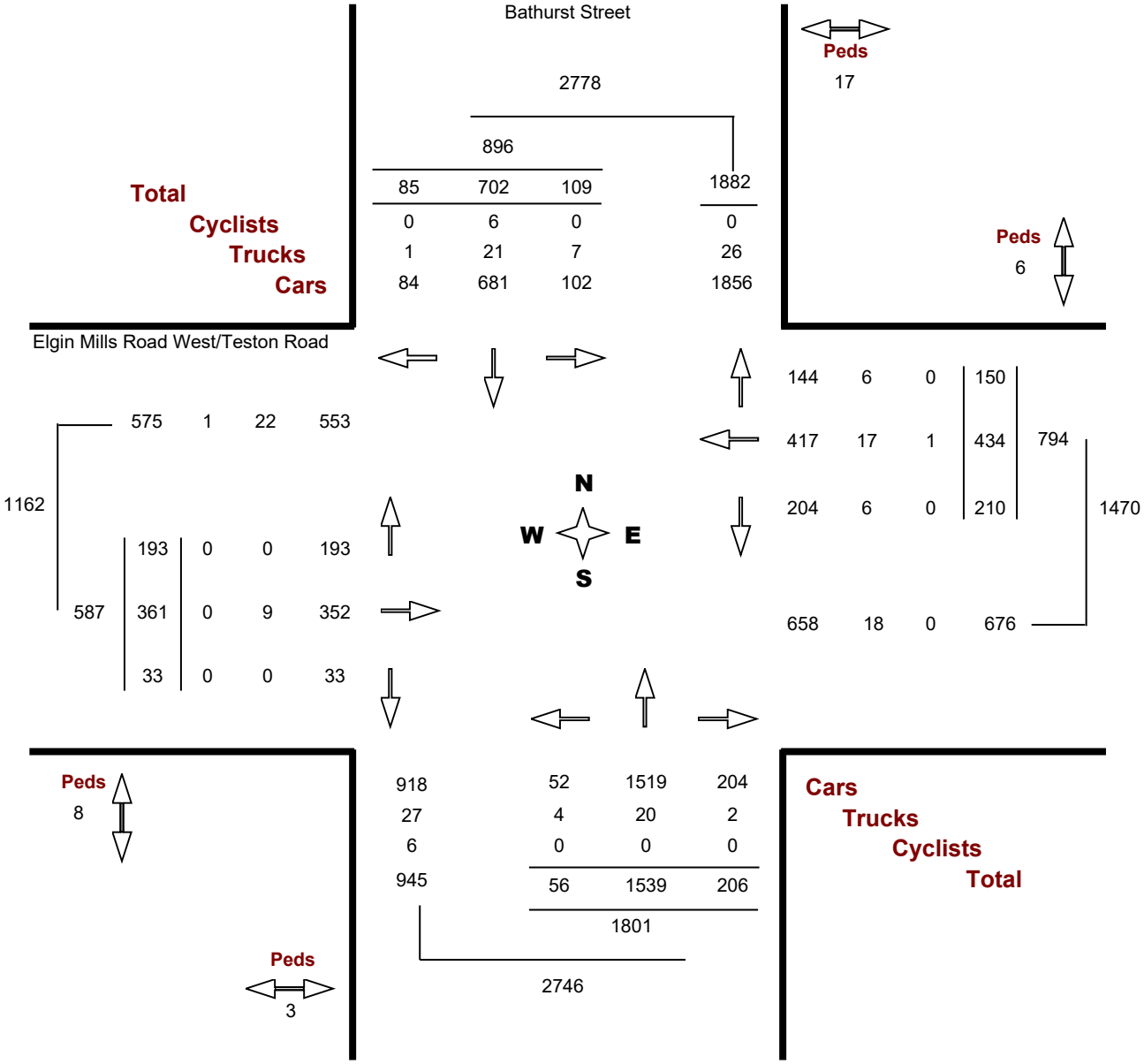
Count Date. Tuesday, 15 September, 2015

Traffic Cont. Traffic signal

Count Period. 03:00 PM — 06:00 PM

Major Dir..... None

Peak Hour.... 04:45 PM — 05:45 PM

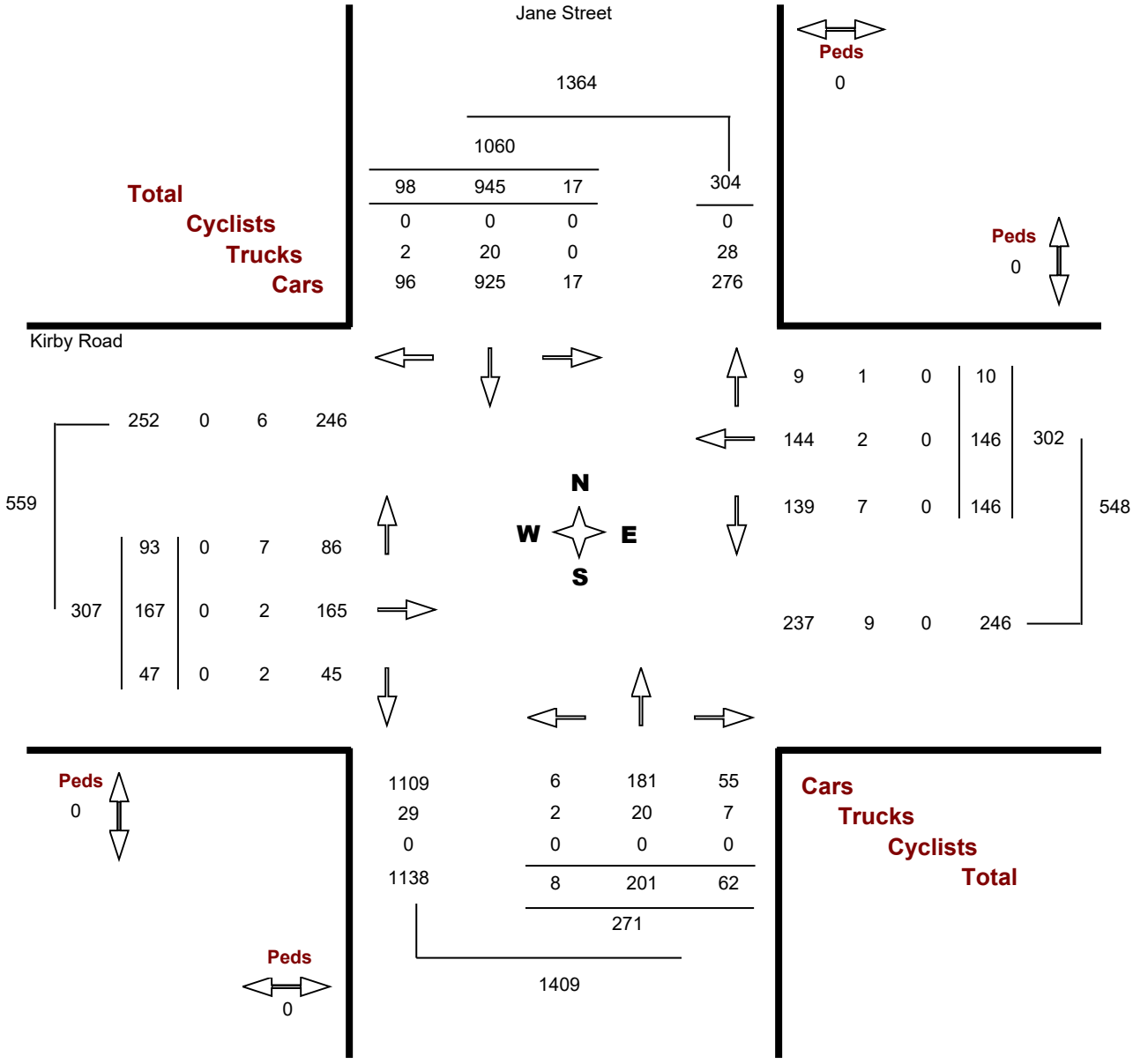


Notes:

Turning Movements Diagram
Peak Hour Report: AM Period

Location..... Jane Street & Kirby Road
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 9674ADF5
Count Date. Thursday, 12 September, 2019
Count Period. 07:00 AM — 09:00 AM
Peak Hour.... 07:30 AM — 08:30 AM

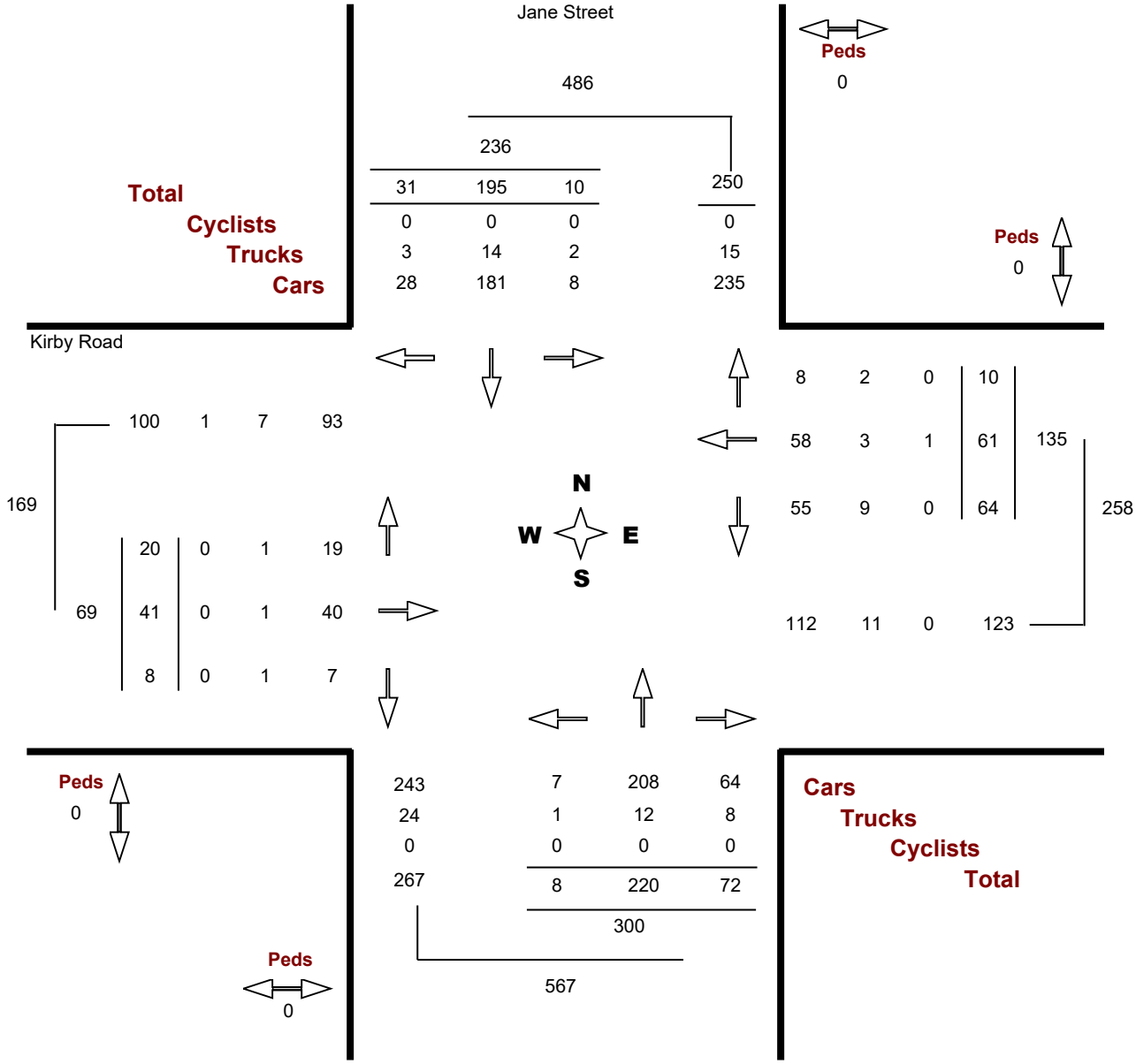


Notes:

Turning Movements Diagram
Peak Hour Report: MD Period

Location..... Jane Street & Kirby Road
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 9674ADF5
Count Date. Thursday, 12 September, 2019
Count Period. 11:00 AM — 02:00 PM
Peak Hour.... 01:00 PM — 02:00 PM

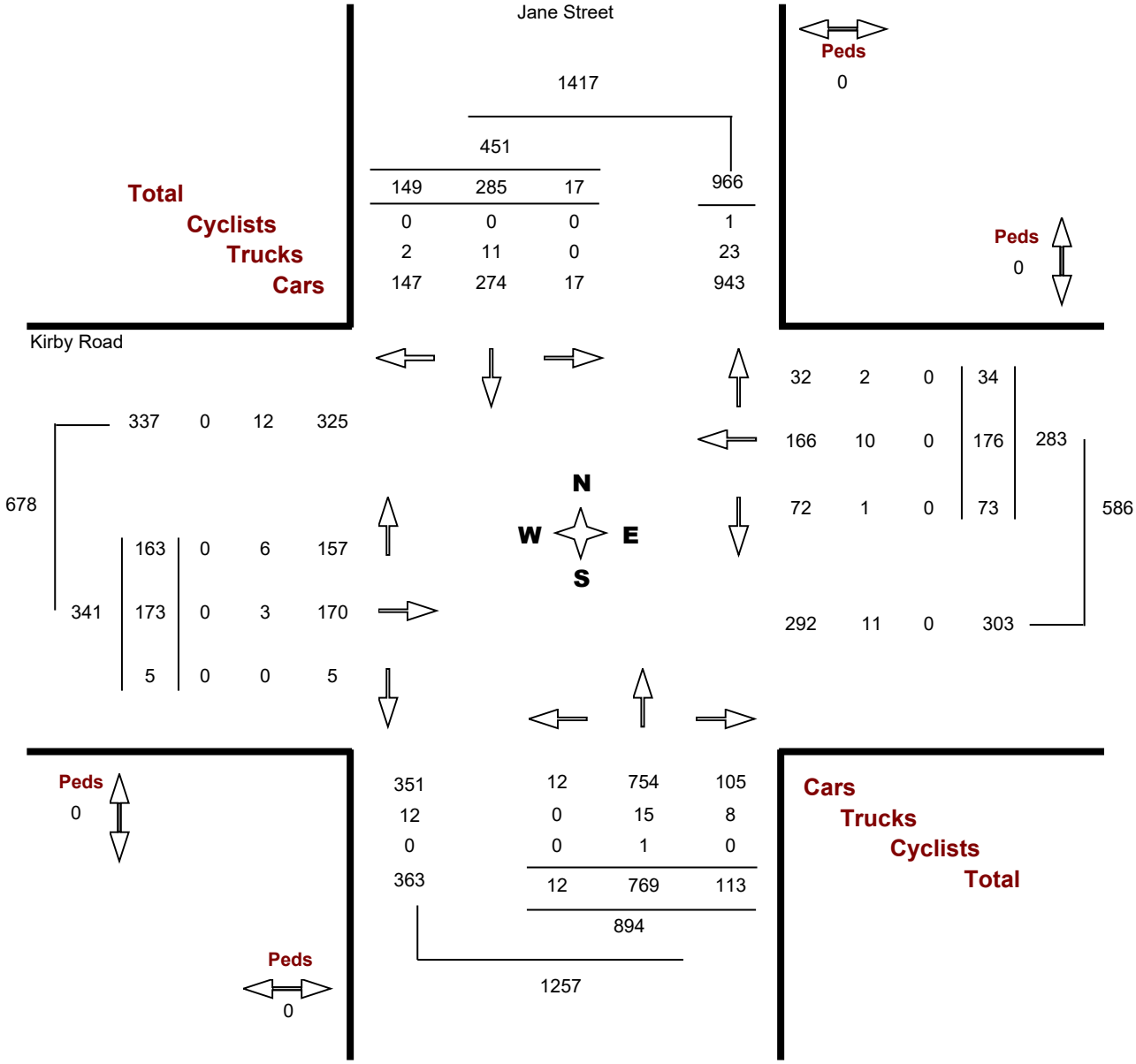


Notes:

Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Jane Street & Kirby Road
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 9674ADF5
Count Date. Thursday, 12 September, 2019
Count Period. 03:00 PM — 06:00 PM
Peak Hour.... 05:00 PM — 06:00 PM

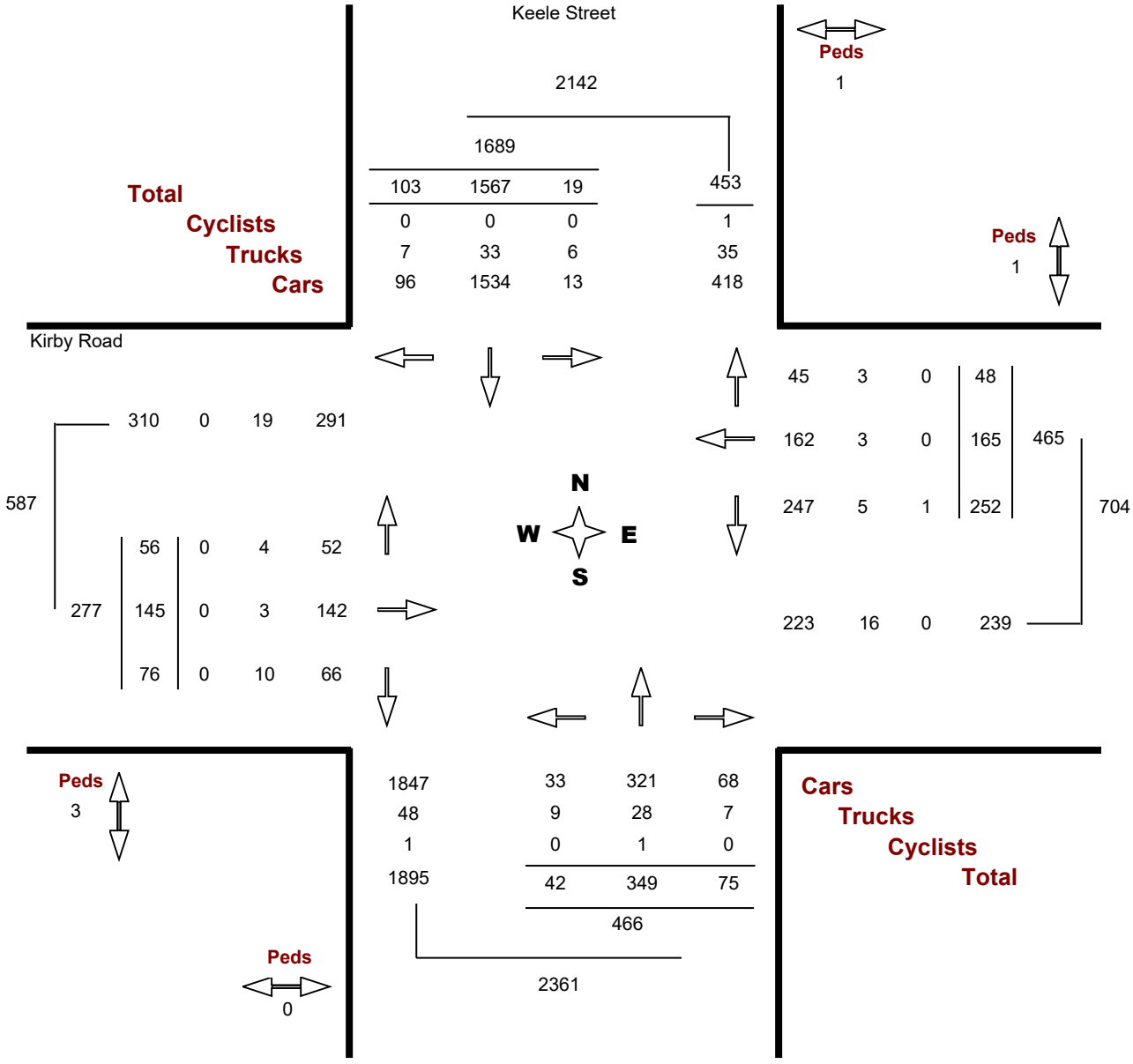


Notes:

Turning Movements Diagram
Peak Hour Report: AM Period

Location..... Keele Street & Kirby Road
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... D1243207
Count Date. Thursday, 13 September, 2018
Count Period. 07:00 AM — 09:00 AM
Peak Hour.... 07:30 AM — 08:30 AM

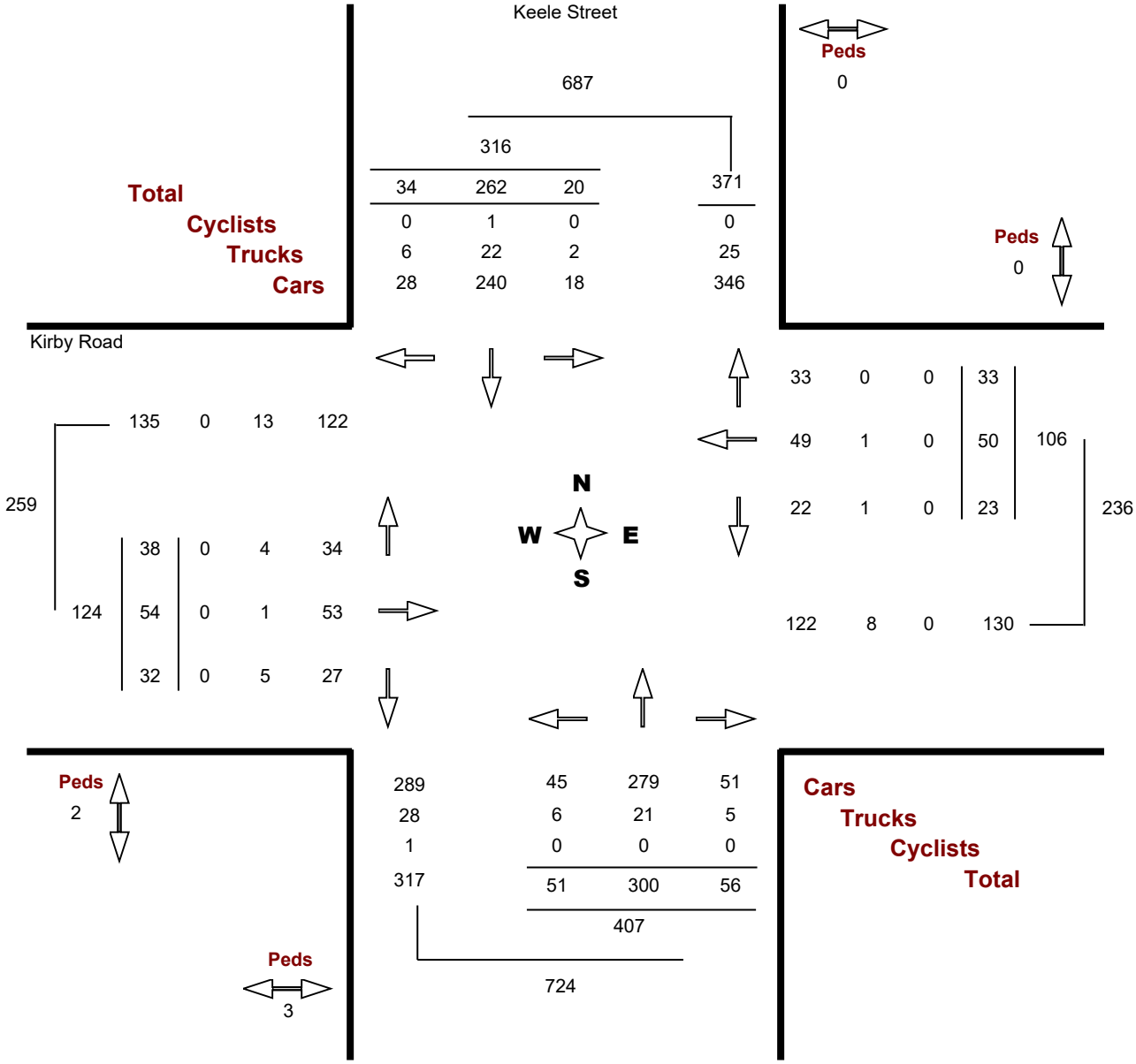


Notes:

Turning Movements Diagram
Peak Hour Report: MD Period

Location..... Keele Street & Kirby Road
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... D1243207
Count Date. Thursday, 13 September, 2018
Count Period. 11:00 AM — 02:00 PM
Peak Hour.... 11:30 AM — 12:30 PM

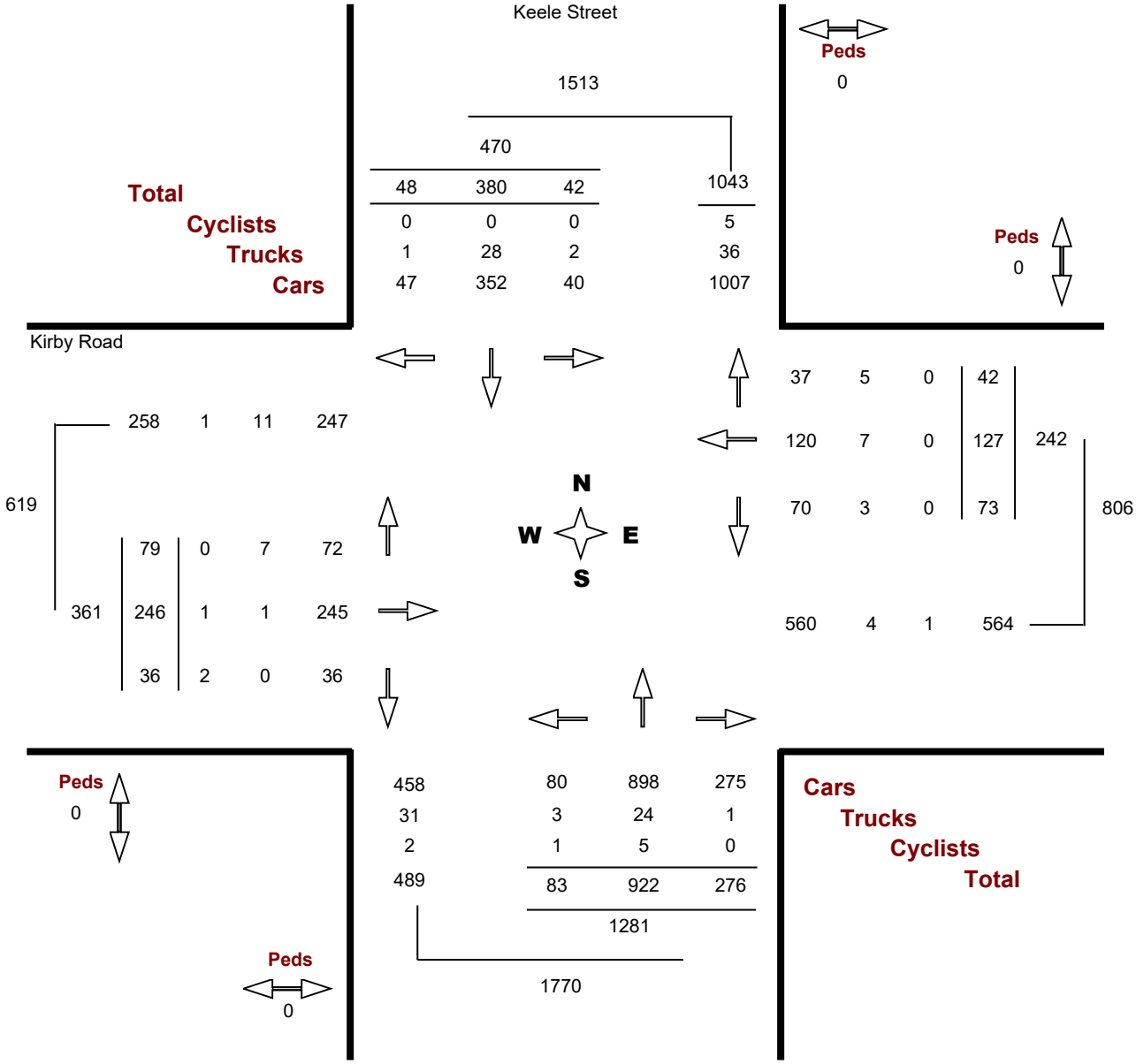


Notes:

Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Keele Street & Kirby Road
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

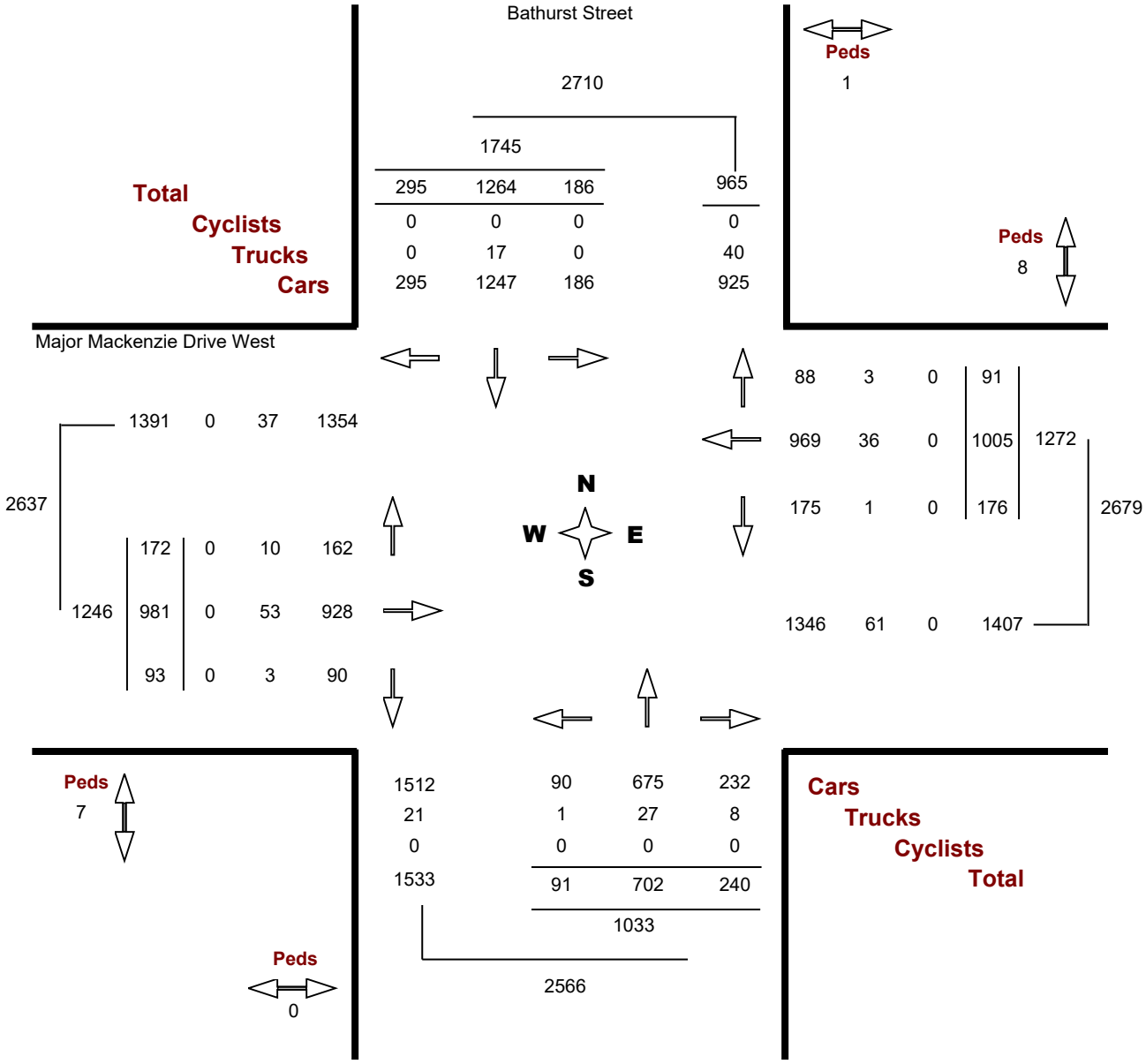
GeoID..... D1243207
Count Date. Thursday, 13 September, 2018
Count Period. 03:00 PM — 06:00 PM
Peak Hour.... 05:00 PM — 06:00 PM



Notes:

Turning Movements Diagram
Peak Hour Report: AM Period

Location..... Major Mackenzie Drive West & Bathurst Street
GeoID..... 09601327
Municipality. Vaughan
Count Date. Tuesday, 10 May, 2016
Traffic Cont. Traffic signal
Count Period. 07:00 AM — 09:00 AM
Major Dir..... None
Peak Hour.... 07:45 AM — 08:45 AM



Notes:

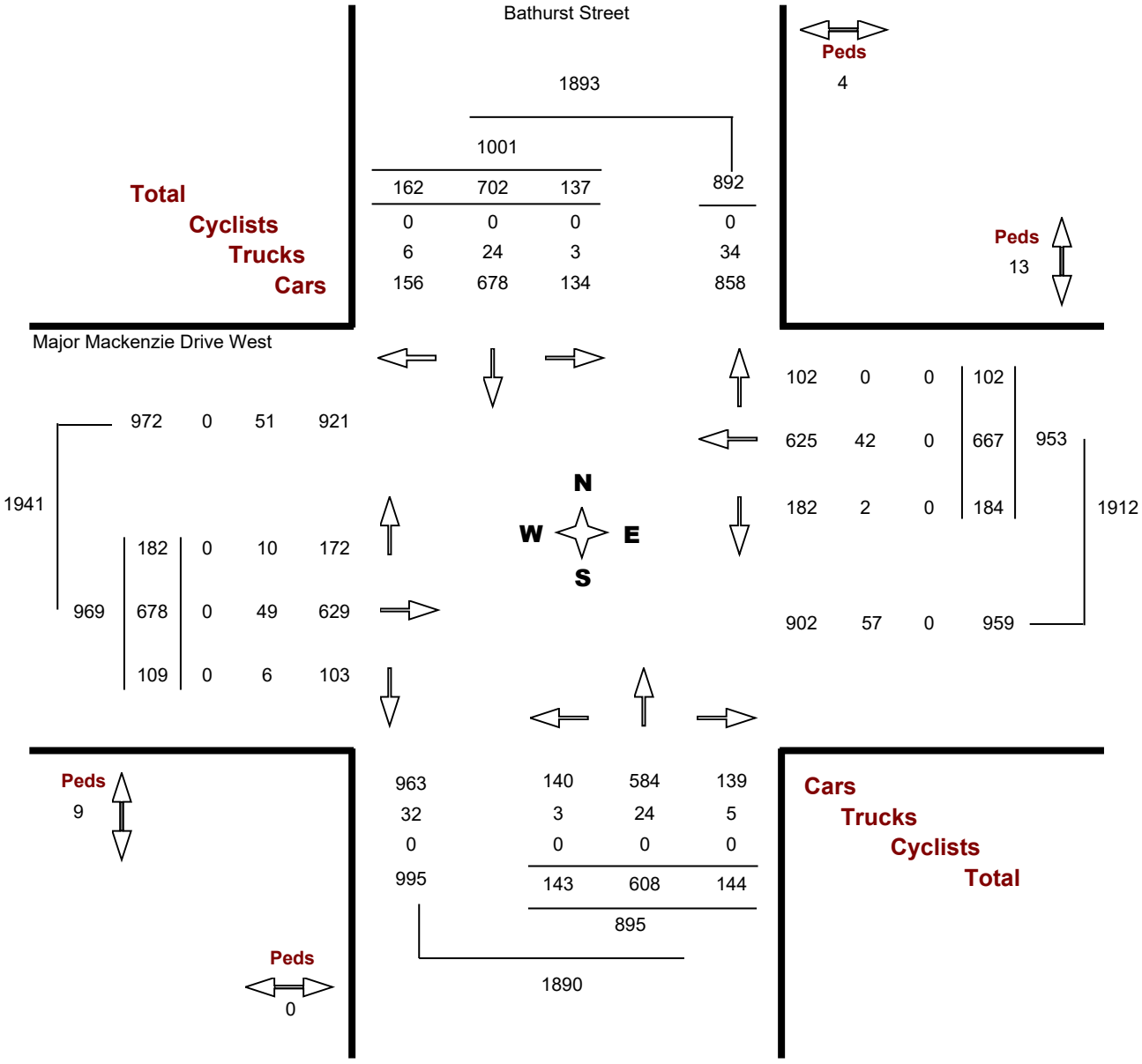
Turning Movements Diagram
Peak Hour Report: MD Period

Location..... Major Mackenzie Drive West & Bathurst Street **GeoID.....** 09601327

Municipality. Vaughan **Count Date.** Tuesday, 10 May, 2016

Traffic Cont. Traffic signal **Count Period.** 11:00 AM — 02:00 PM

Major Dir..... None **Peak Hour....** 11:45 AM — 12:45 PM



Notes:

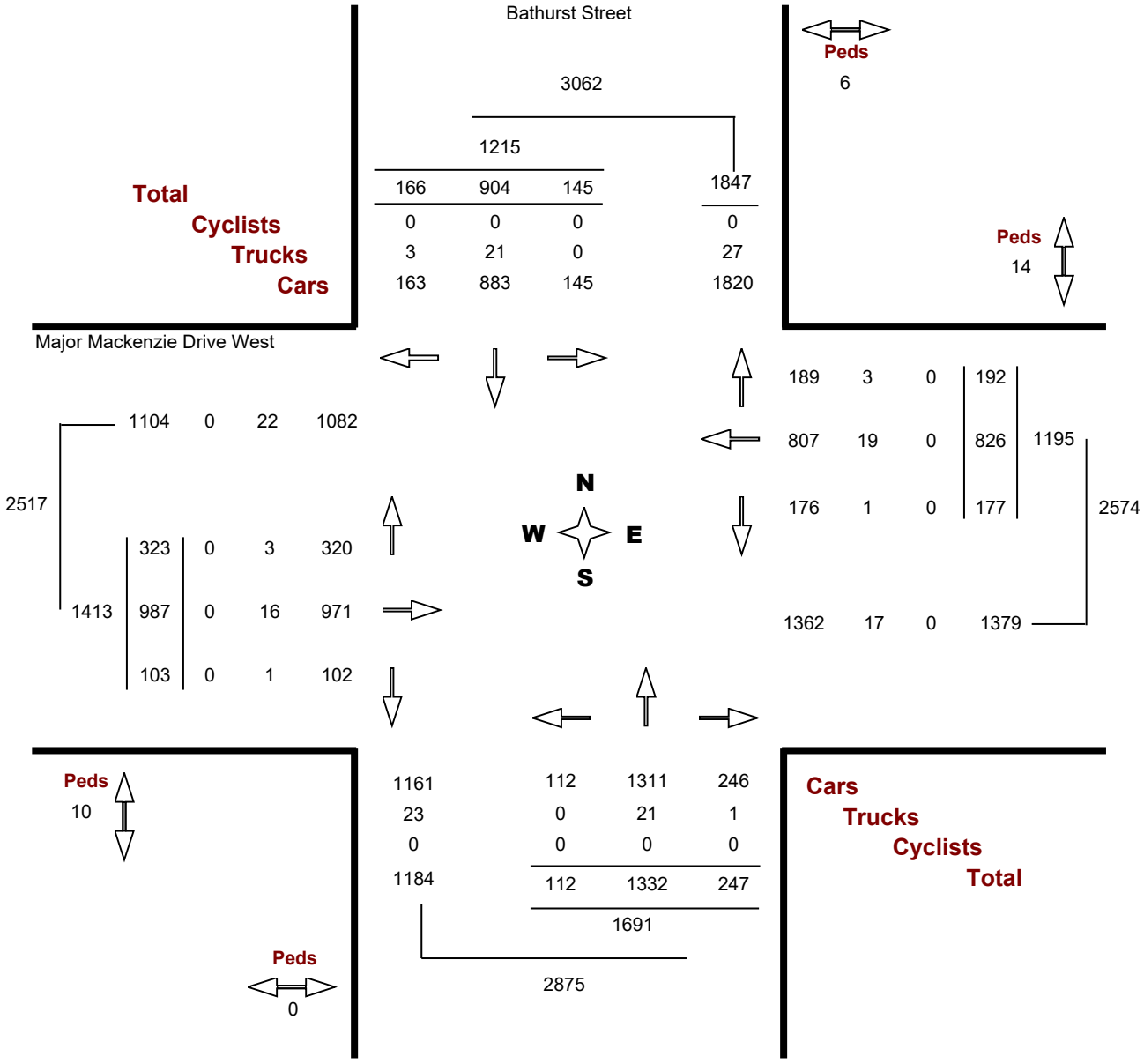
Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Major Mackenzie Drive West & Bathurst Street **GeoID.....** 09601327

Municipality. Vaughan **Count Date.** Tuesday, 10 May, 2016

Traffic Cont. Traffic signal **Count Period.** 03:00 PM — 06:00 PM

Major Dir..... None **Peak Hour....** 04:45 PM — 05:45 PM

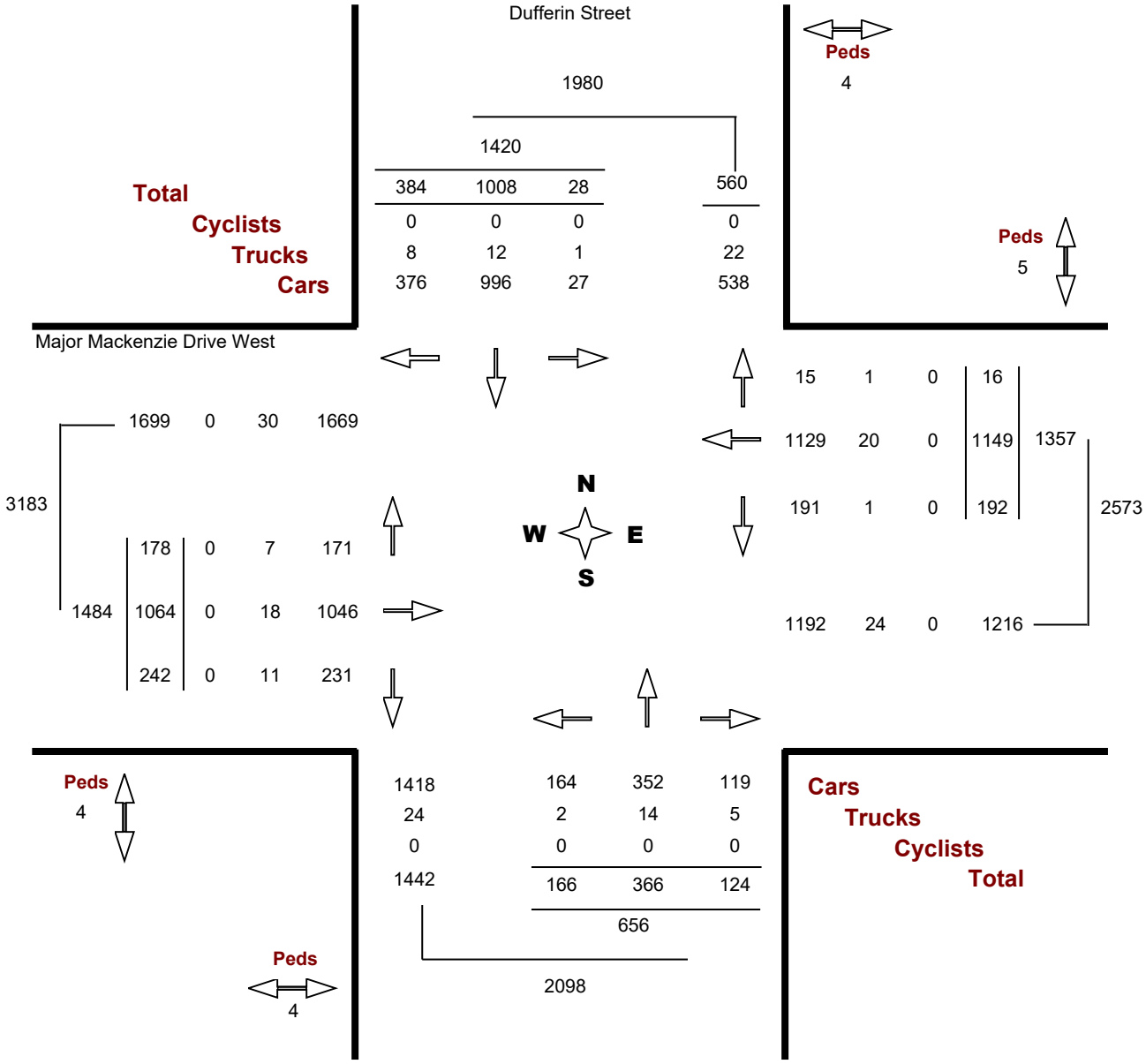


Notes:

Turning Movements Diagram
Peak Hour Report: AM Period

Location..... Major Mackenzie Drive West & Dufferin Street
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 88C4B88E
Count Date. Tuesday, 07 March, 2017
Count Period. 07:00 AM — 09:00 AM
Peak Hour.... 07:45 AM — 08:45 AM

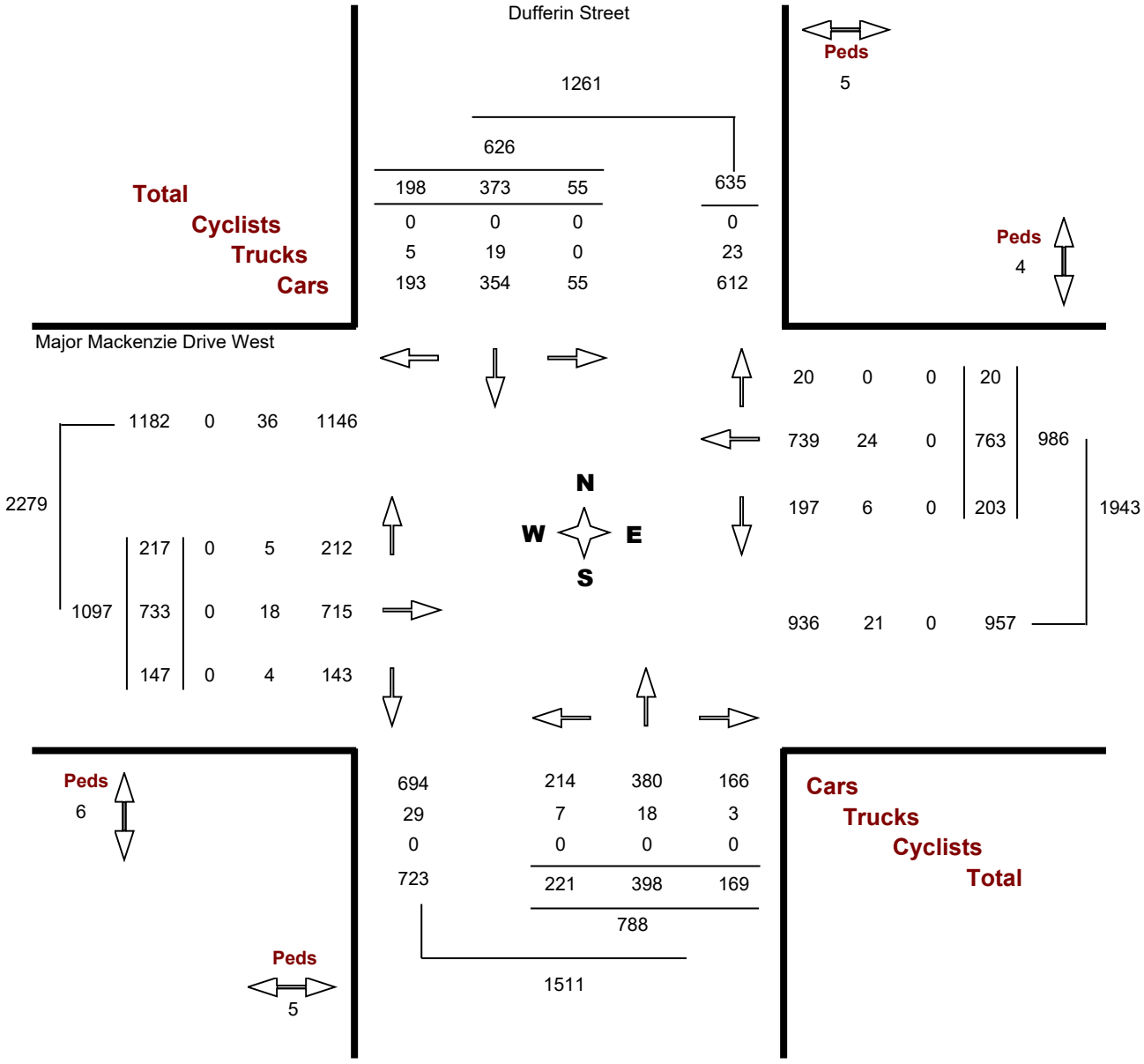


Notes:

Turning Movements Diagram
Peak Hour Report: MD Period

Location..... Major Mackenzie Drive West & Dufferin Street
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 88C4B88E
Count Date. Tuesday, 07 March, 2017
Count Period. 11:00 AM — 02:00 PM
Peak Hour.... 01:00 PM — 02:00 PM

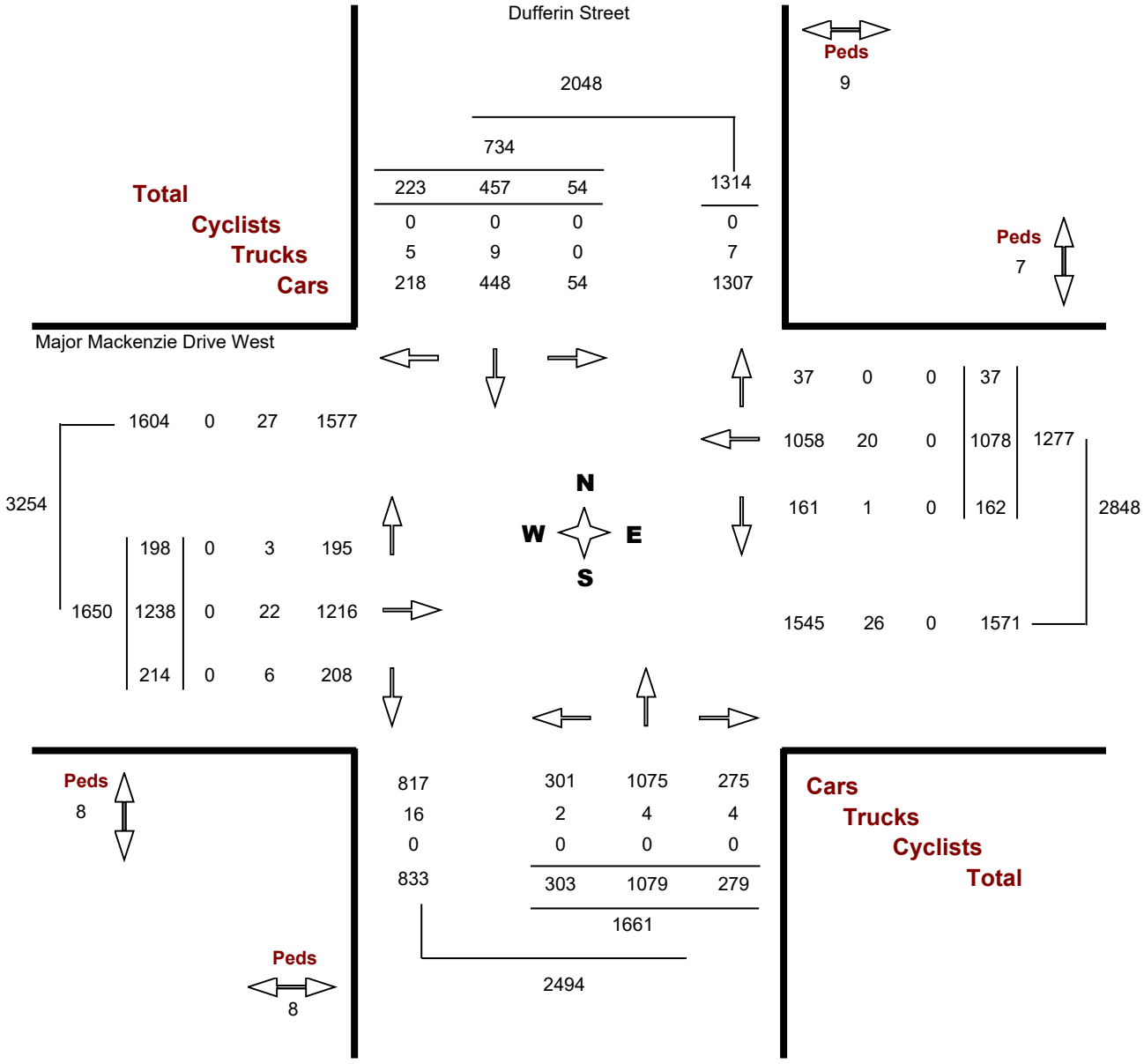


Notes:

Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Major Mackenzie Drive West & Dufferin Street
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 88C4B88E
Count Date. Tuesday, 07 March, 2017
Count Period. 03:00 PM — 06:00 PM
Peak Hour.... 04:15 PM — 05:15 PM

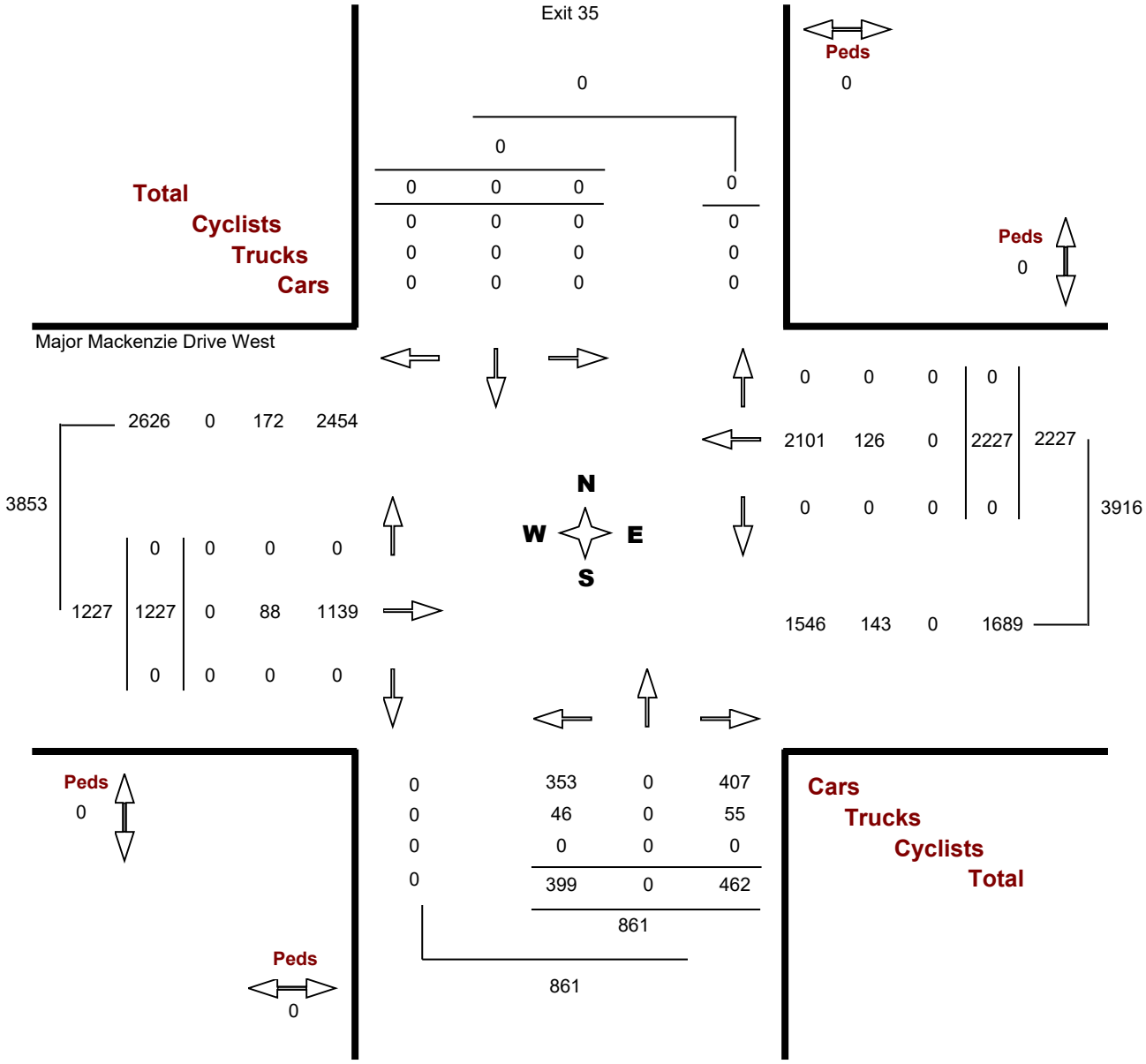


Notes:

Turning Movements Diagram
Peak Hour Report: AM Period

Location..... Major Mackenzie Drive West & Exit 35
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... EBF36208
Count Date. Monday, 04 March, 2019
Count Period. 07:00 AM — 09:00 AM
Peak Hour.... 07:30 AM — 08:30 AM

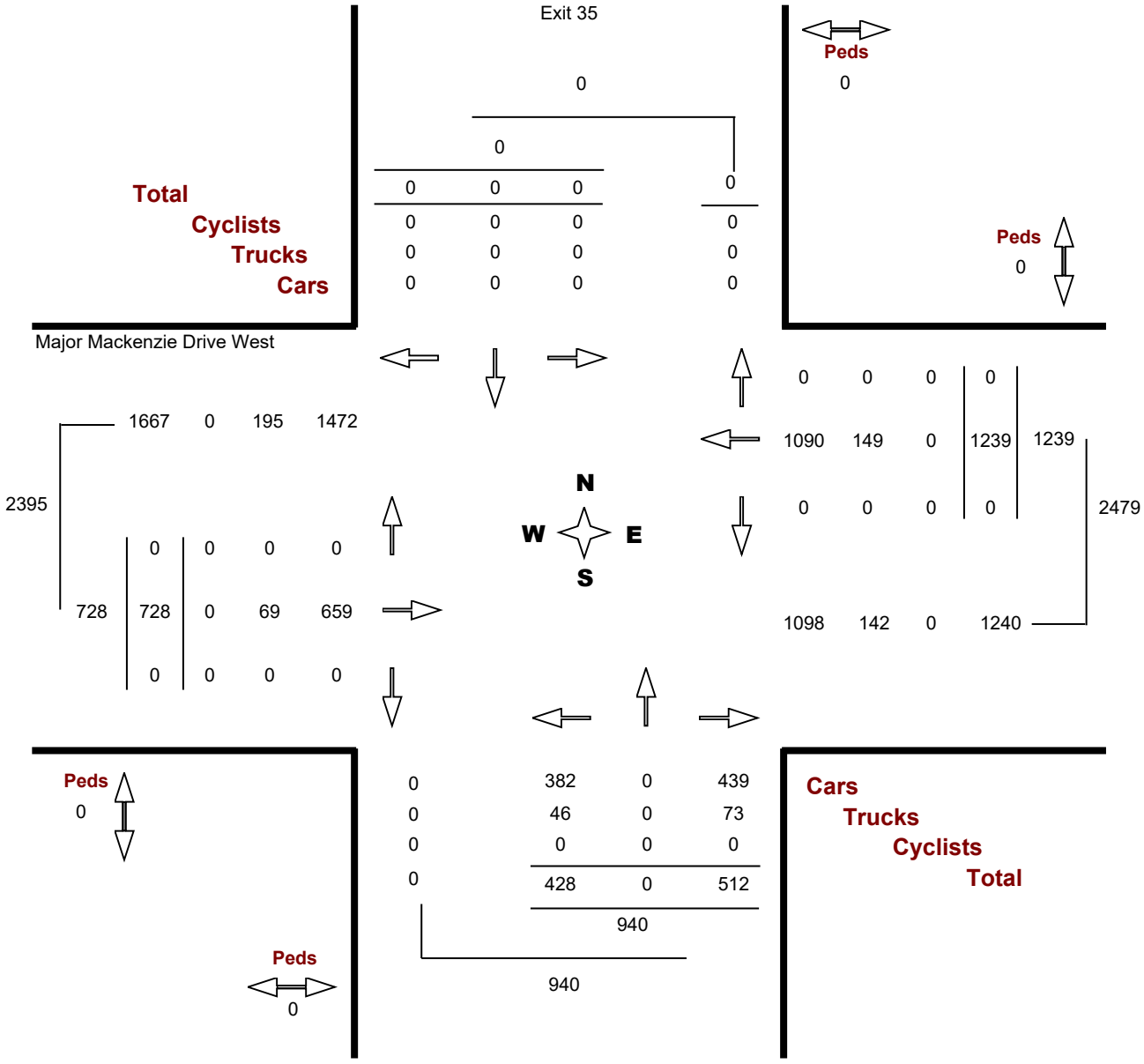


Notes:

Turning Movements Diagram
Peak Hour Report: MD Period

Location..... Major Mackenzie Drive West & Exit 35
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... EBF36208
Count Date. Monday, 04 March, 2019
Count Period. 11:00 AM — 02:00 PM
Peak Hour.... 12:00 PM — 01:00 PM

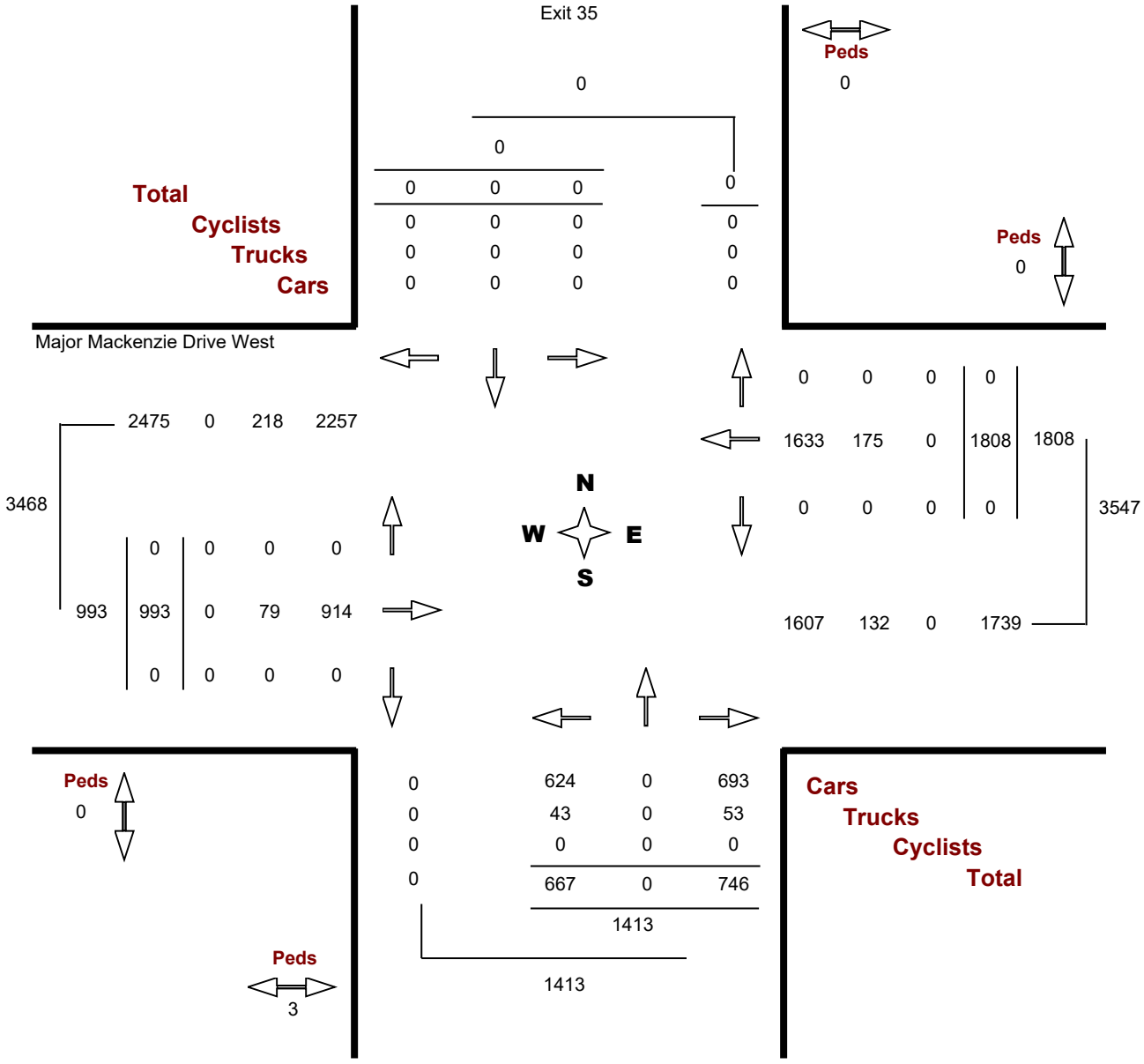


Notes:

Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Major Mackenzie Drive West & Exit 35
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... EBF36208
Count Date. Monday, 04 March, 2019
Count Period. 03:00 PM — 06:00 PM
Peak Hour.... 03:30 PM — 04:30 PM



Notes:

Turning Movements Diagram
Peak Hour Report: AM Period

Location..... Major Mackenzie Drive West & Exit 35/GO Carpool Lot - Hwy 400 & Major Mackenzie Drive West

GeoID..... CB10E2BE

Municipality. Vaughan

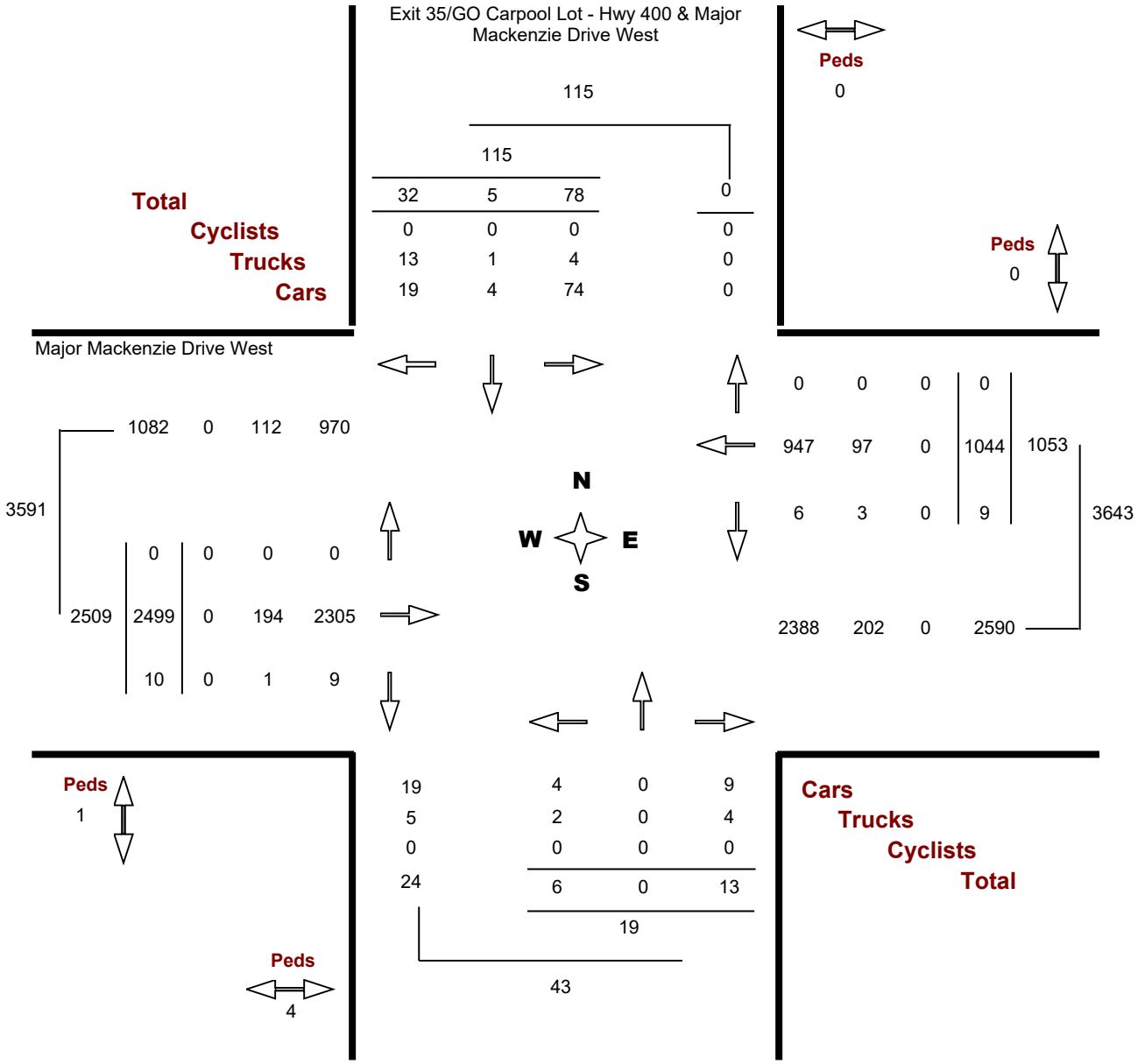
Count Date. Thursday, 21 November, 2019

Traffic Cont. Traffic signal

Count Period. 07:00 AM — 09:00 AM

Major Dir..... None

Peak Hour.... 07:45 AM — 08:45 AM



Notes:

Turning Movements Diagram
Peak Hour Report: MD Period

Location..... Major Mackenzie Drive West & Exit 35/GO Carpool Lot - Hwy 400 & Major Mackenzie Drive West

GeoID..... CB10E2BE

Municipality. Vaughan

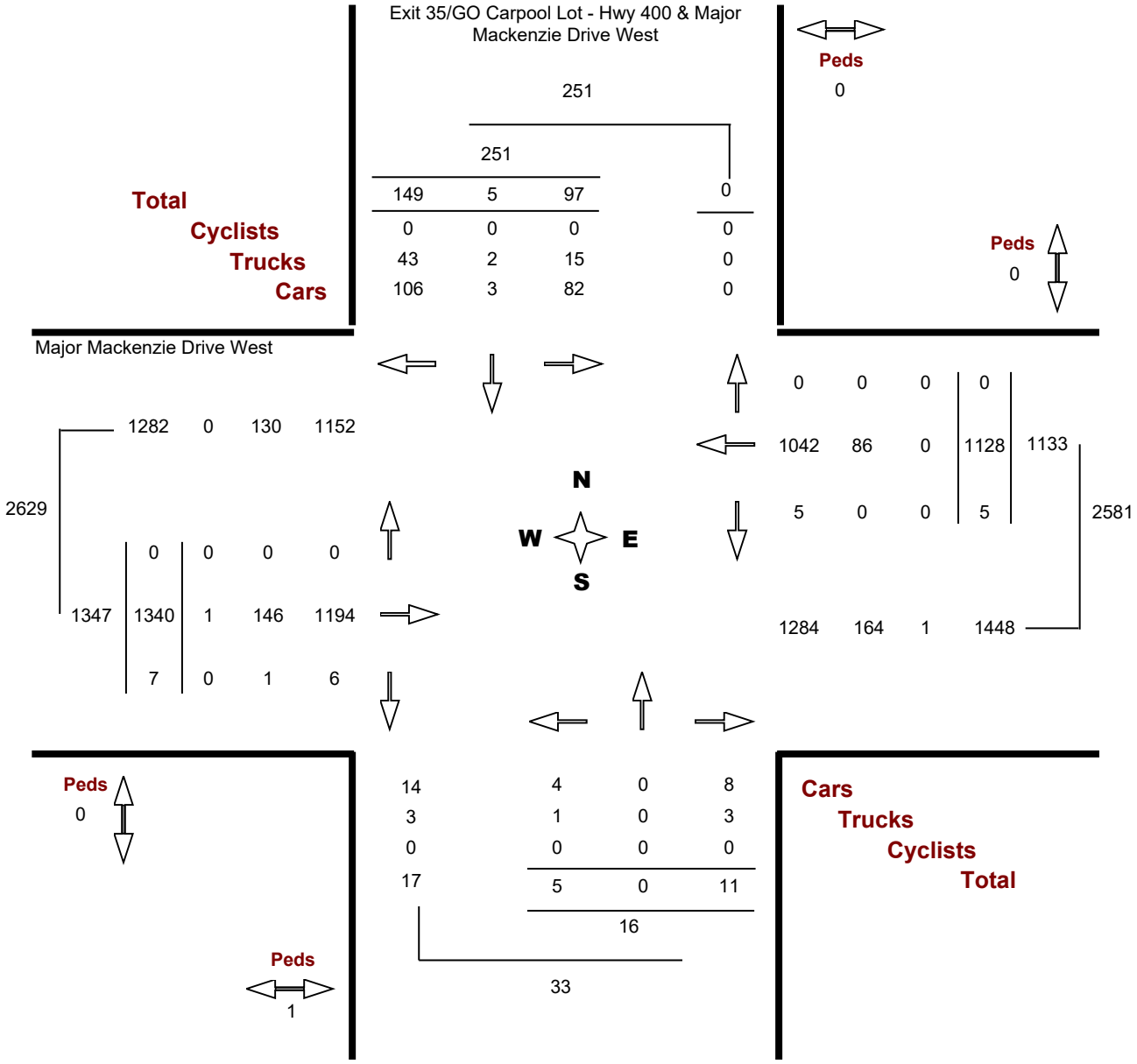
Count Date. Thursday, 21 November, 2019

Traffic Cont. Traffic signal

Count Period. 11:00 AM — 02:00 PM

Major Dir..... None

Peak Hour.... 11:45 AM — 12:45 PM



Notes:

Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Major Mackenzie Drive West & Exit 35/GO Carpool Lot - Hwy 400 & Major Mackenzie Drive West

GeoID..... CB10E2BE

Municipality. Vaughan

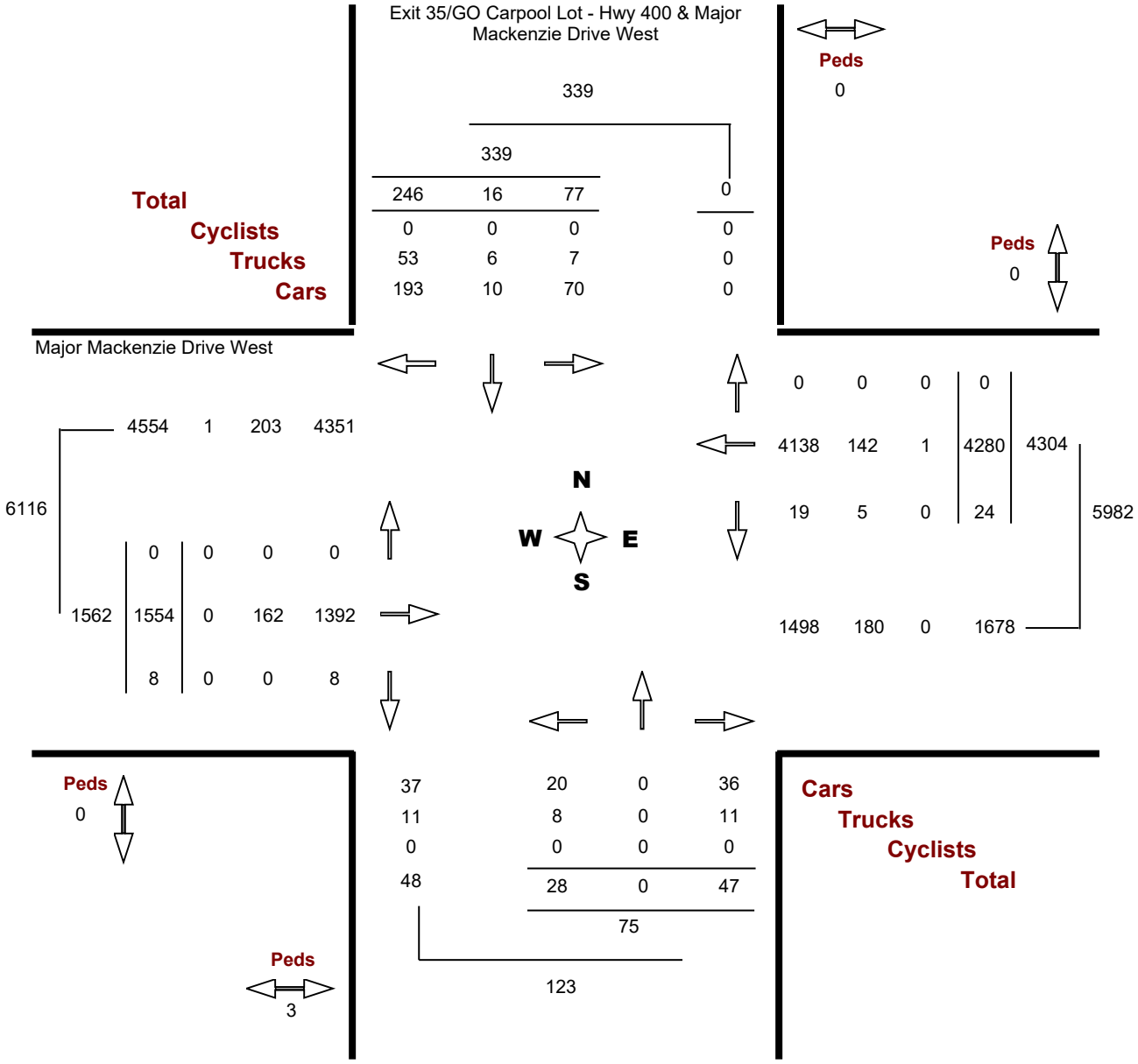
Count Date. Thursday, 21 November, 2019

Traffic Cont. Traffic signal

Count Period. 03:00 PM — 06:00 PM

Major Dir..... None

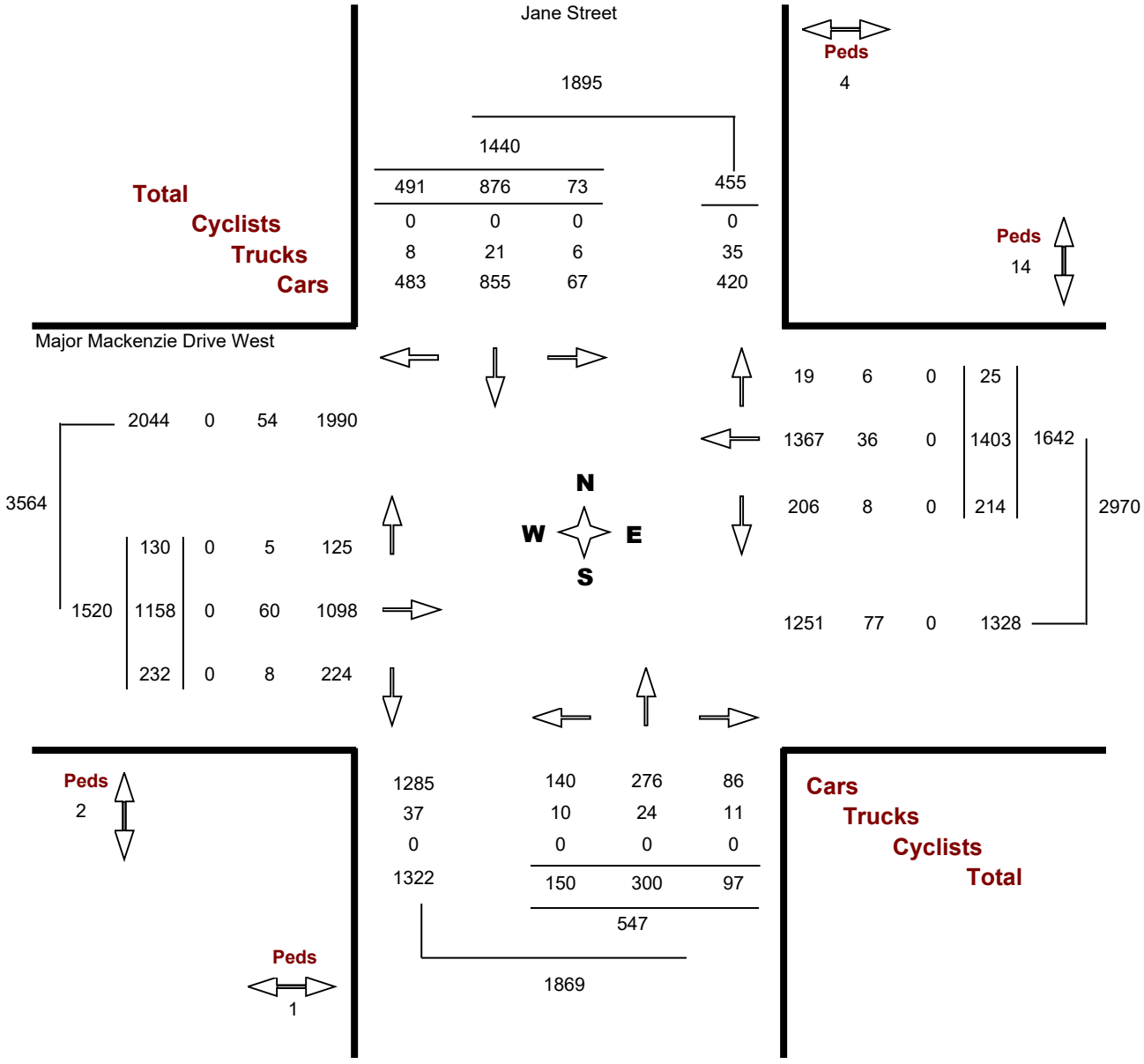
Peak Hour.... 03:15 PM — 04:15 PM



Notes:

Turning Movements Diagram
Peak Hour Report: AM Period

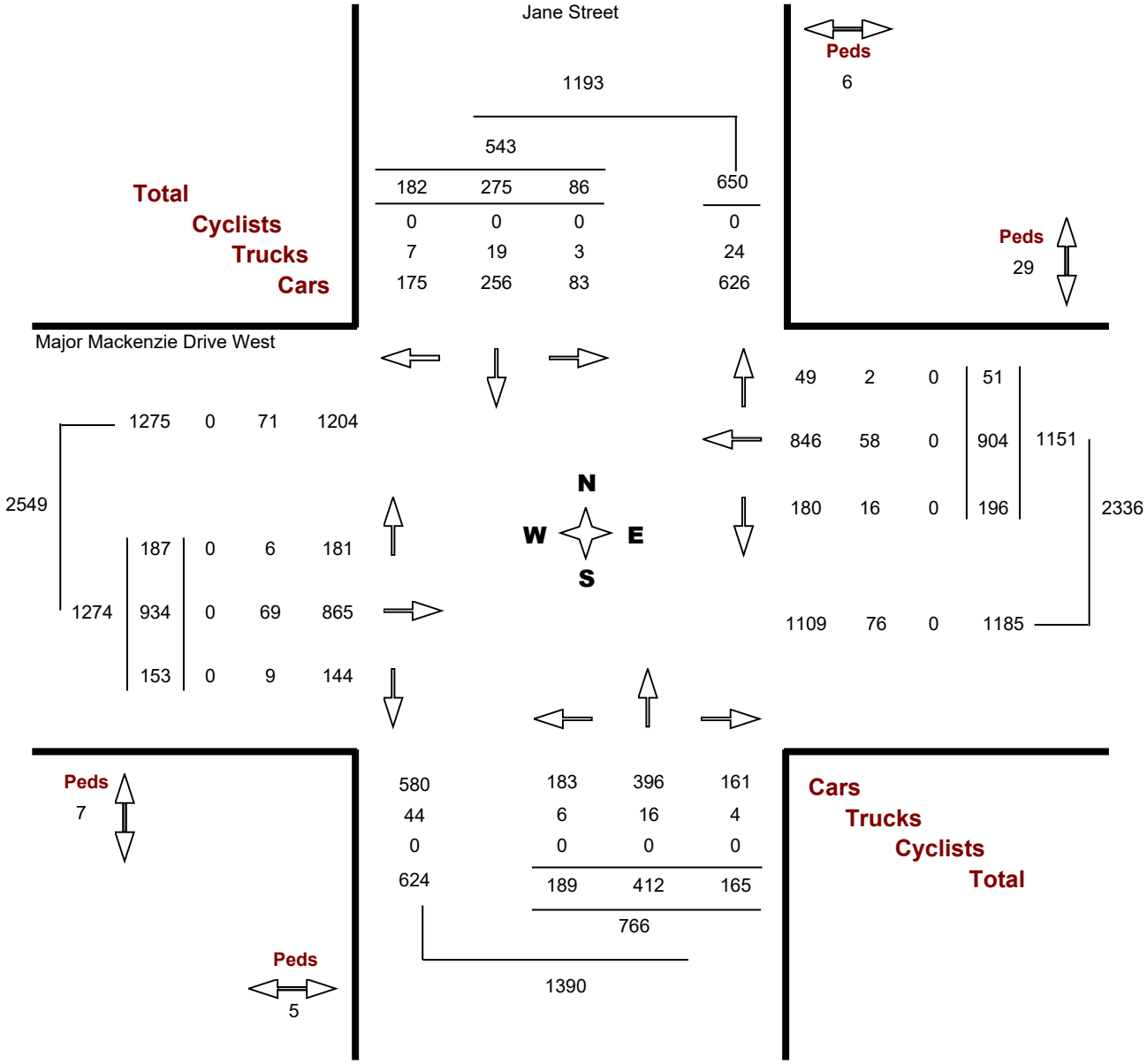
Location..... Major Mackenzie Drive West & Jane Street
GeoID..... 9C39868B
Municipality. Vaughan
Count Date. Wednesday, 23 November, 2016
Traffic Cont. Traffic signal
Count Period. 07:00 AM — 09:00 AM
Major Dir..... None
Peak Hour.... 07:45 AM — 08:45 AM



Notes:

Turning Movements Diagram
Peak Hour Report: MD Period

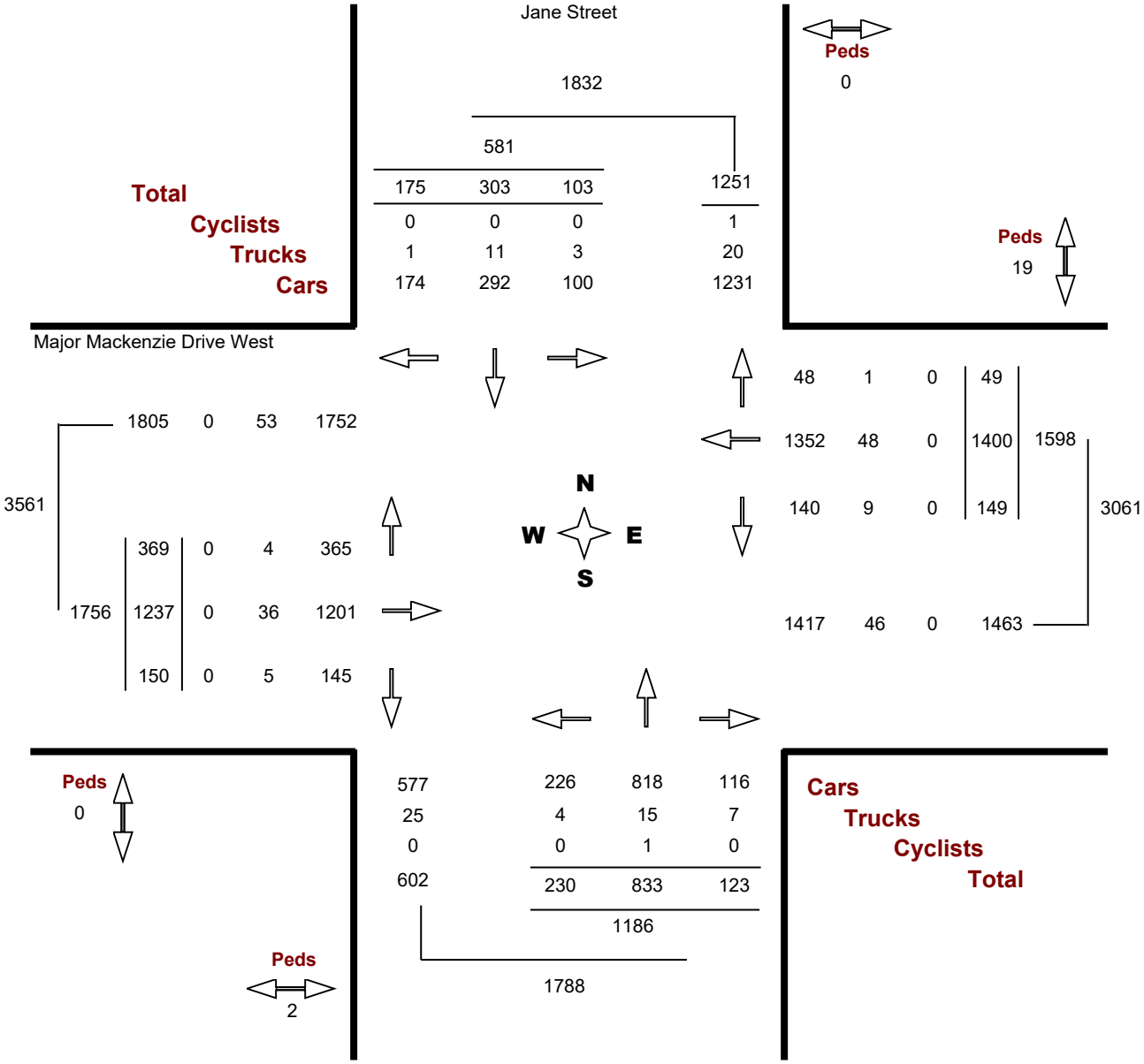
Location..... Major Mackenzie Drive West & Jane Street
GeoID..... 9C39868B
Municipality. Vaughan
Count Date. Wednesday, 23 November, 2016
Traffic Cont. Traffic signal
Count Period. 11:00 AM — 02:00 PM
Major Dir..... None
Peak Hour.... 01:00 PM — 02:00 PM



Notes:

Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Major Mackenzie Drive West & Jane Street
GeoID..... 9C39868B
Municipality. Vaughan
Count Date. Wednesday, 23 November, 2016
Traffic Cont. Traffic signal
Count Period. 03:00 PM — 06:00 PM
Major Dir..... None
Peak Hour.... 04:00 PM — 05:00 PM

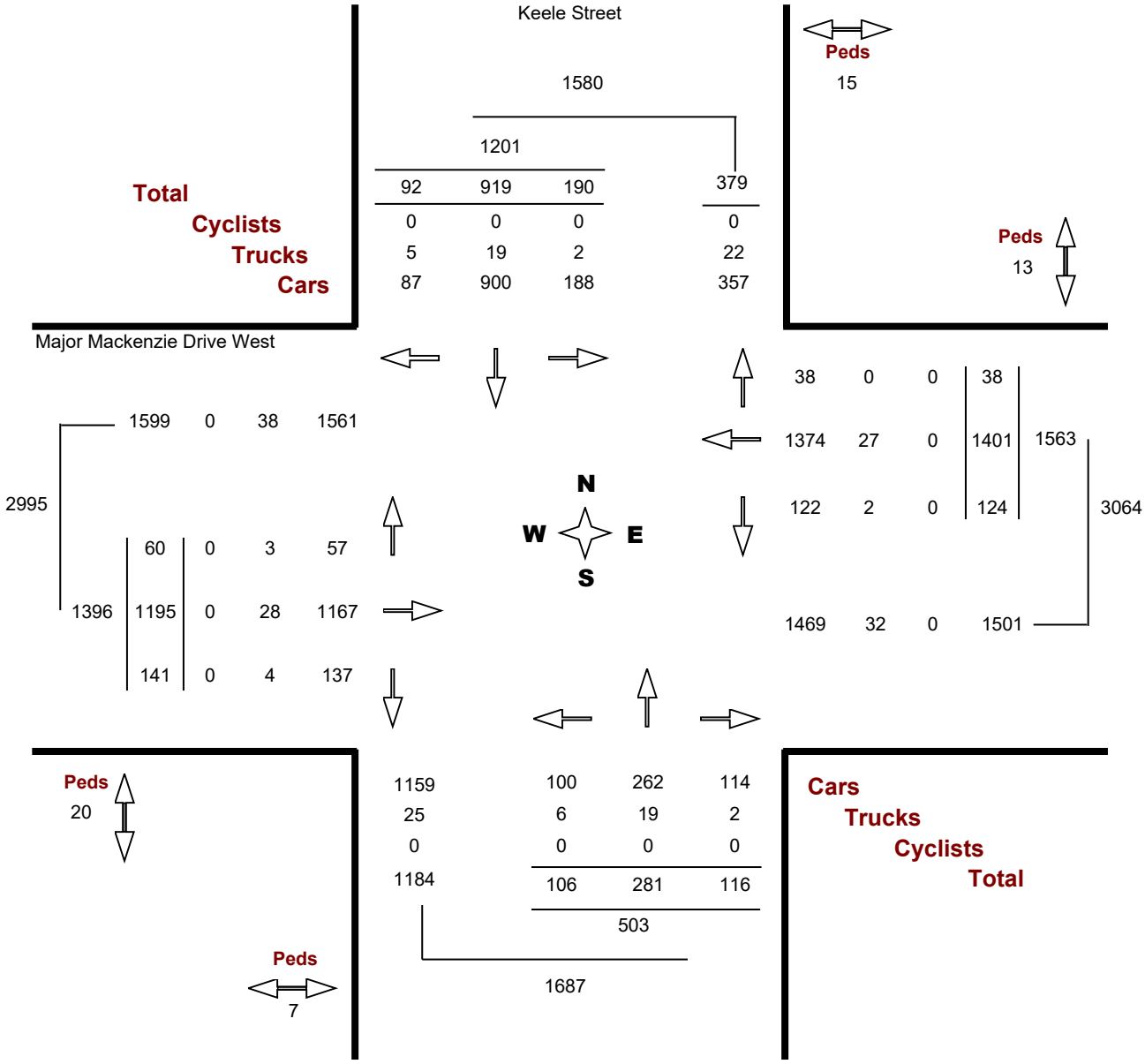


Notes:

Turning Movements Diagram
Peak Hour Report: AM Period

Location..... Keele Street & Major Mackenzie Drive West
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 54568594
Count Date. Tuesday, 24 March, 2015
Count Period. 07:00 AM — 09:00 AM
Peak Hour.... 07:30 AM — 08:30 AM

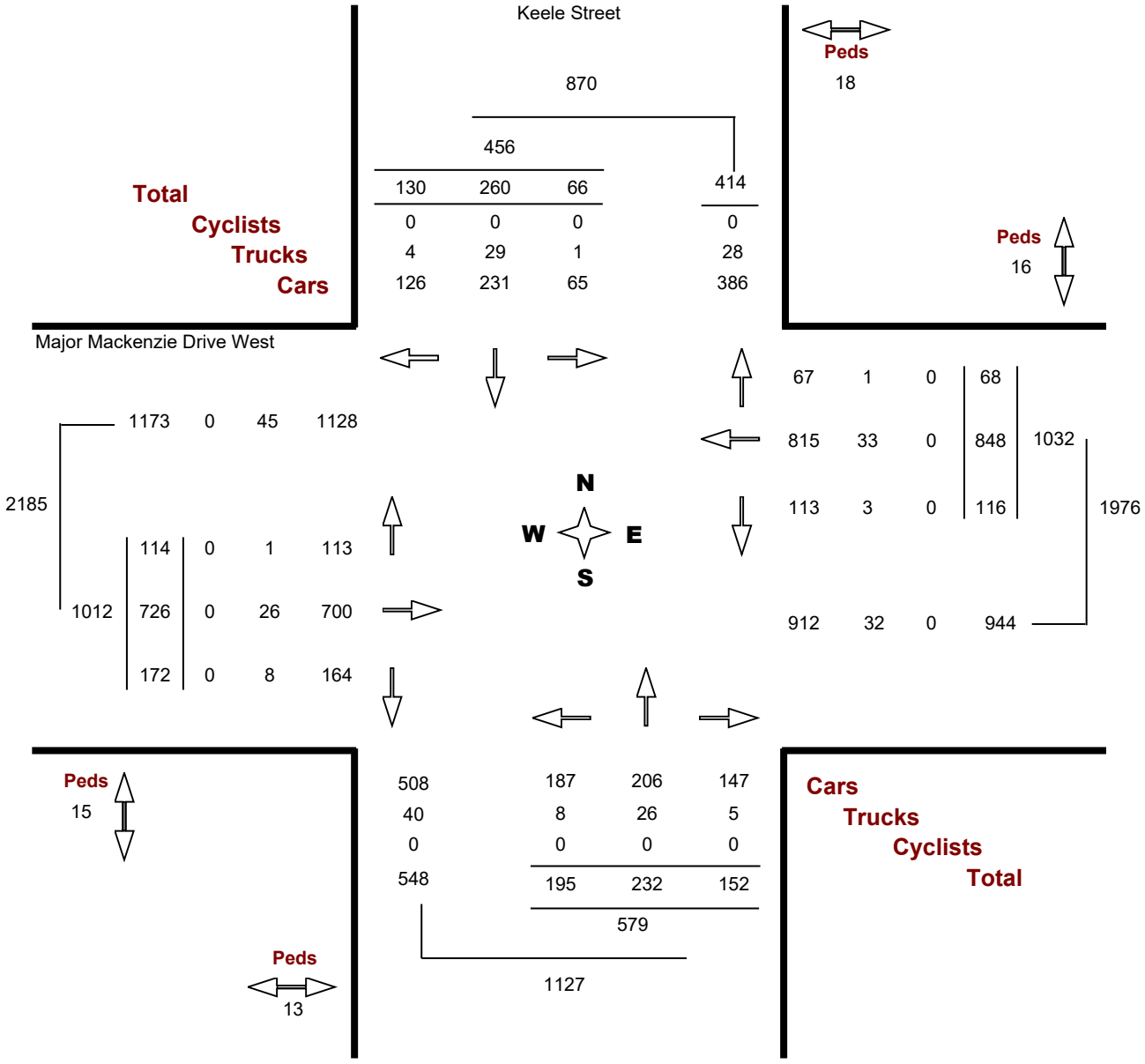


Notes:

Turning Movements Diagram
Peak Hour Report: MD Period

Location..... Keele Street & Major Mackenzie Drive West
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 54568594
Count Date. Tuesday, 24 March, 2015
Count Period. 11:00 AM — 02:00 PM
Peak Hour.... 12:00 PM — 01:00 PM

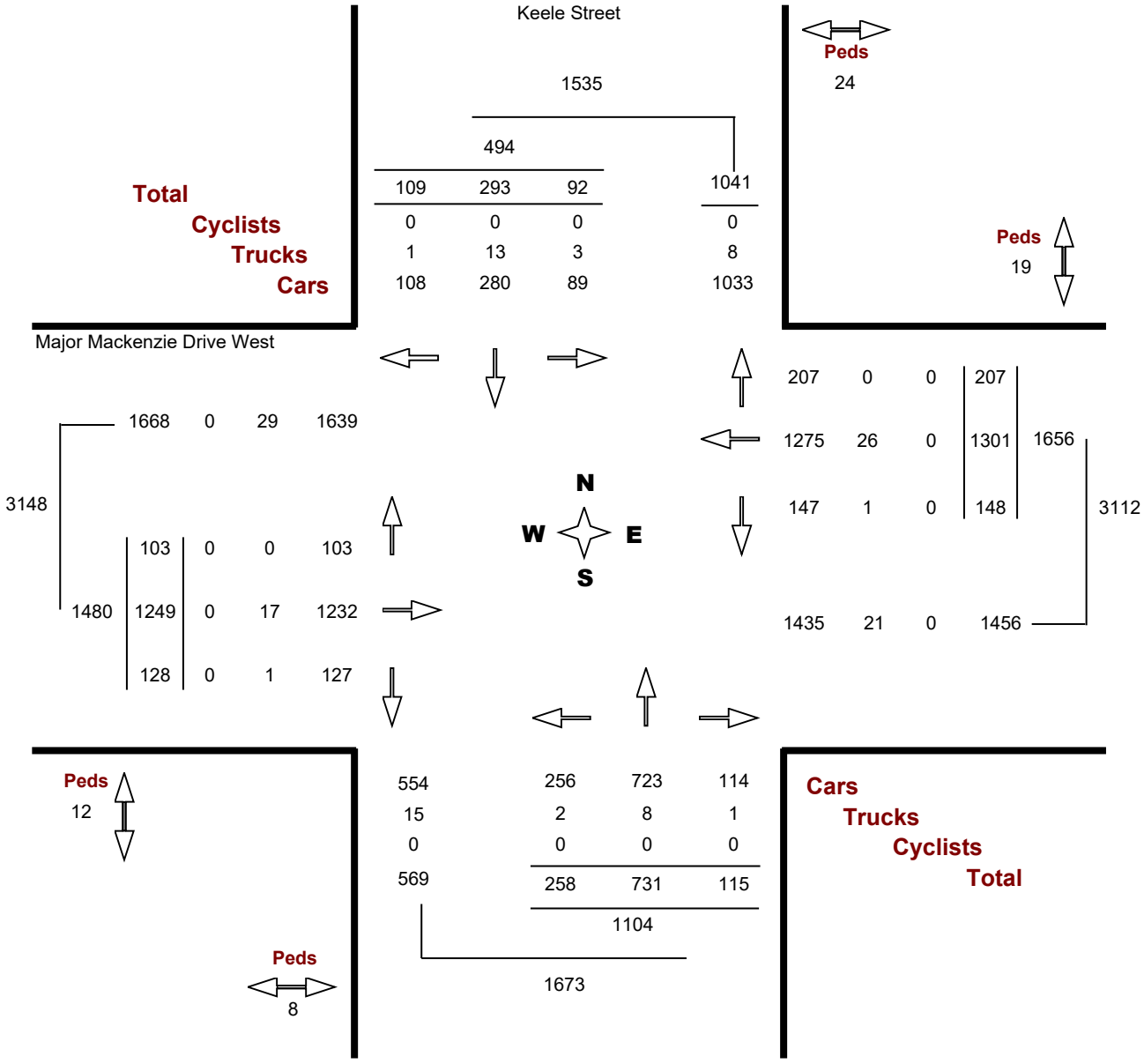


Notes:

Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Keele Street & Major Mackenzie Drive West
Municipality. Vaughan
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 54568594
Count Date. Tuesday, 24 March, 2015
Count Period. 03:00 PM — 06:00 PM
Peak Hour.... 04:30 PM — 05:30 PM



Notes:

LOCATION:	**Hwy 400 NB & Teston Rd**	*MUNICIPALITY:*	**Vaughan**
CTCS:	**753 (MTO Signal)**	*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**SA**	*CONTROLLER/CABINET TYPE:*	**Econolite Cobalt / TS2T1**
PREPARED/CHECKED BY:	**MQL**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:	**April 10, 2019**	*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**June 27, 2019**	*CHANNEL/DROP:*	

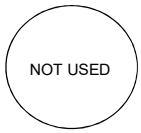
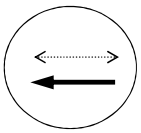
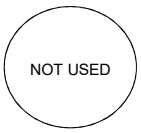
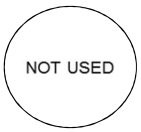
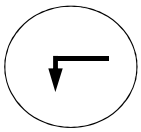
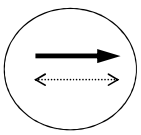
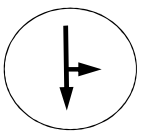
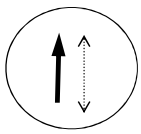
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NEMA Phase (MTO)	Normal Time	PM 16:30-18:30, M-F Pattern 98 Plan 98	Free All Other Times Pattern 99 Plan 99	Phase Mode (Fixed/Demanded/Callable)	Remarks
1. W/B Left Turn Arrow NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT				Pedestrian Minimums: EWWK = 7 sec., EWFD = 13 sec. NSWK = 7 sec., NSFD = 22 sec. **Emergency vehicle pre-emption 3/4:** Serve EWG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction.
2. Eastbound Teston Rd	WLK 7 FDW 13 MIN 20 EXT 4 MAX1 47 MAX2 37 AMB 4.5 ALR 3.0 SPLIT	**Use MAX2** **0**	**0**	Ped Recall, Veh Max Recall	NB phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum NBG is 15 seconds. If ongoing vehicle demand exists on the stopbar loop, the NBG is capable of providing vehicle extensions up to the maximum green. If a pedestrian call is received, the pedestrian minimum will be served. **Please see reverse page for Pretime.**
3. S/B Left Turn Arrow NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT				
4. Northbound Hwy 400 NB	WLK 7 FDW 22 MIN 15 EXT 3 MAX1 31 MAX2 41 AMB 4.5 ALR 3.0 SPLIT	**Use MAX2** **0**	**0**	Callable by stopbar loop and/or pushbutton Extendable by stopbar loop	
5. N/B Left Turn Arrow NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT				
6. Westbound Teston Rd	WLK 0 FDW 0 MIN 20 EXT 4 MAX1 47 MAX2 37 AMB 4.5 ALR 3.0 SPLIT	**Use MAX2** **0**	**0**	Veh Max Recall	
7. NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT				**LEGEND:** SA - Semi-Actuated signal WLK - Walk time FDW - Flashing Don't Walk time MIN - Minimum green time EXT - Extension time MAX1 - Maximum green time 1 MAX2 - Maximum green time 2 AMB - Amber ALR -All Red CL - Cycle Length OF - Offset VP - Vehicle Permissive NSWK - North/South Walk EWWK - East/West Walk NSG - North/South Green EWG - East/West Green NSFD - North/South Flashing Don't Walk EWFD - East/West Flashing Don't Walk TSP - Transit Priority APS - Audible Pedestrian Signal RLC - Red Light Camera
8. NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT				
	CL OF VP	**0 (FREE)** **0 (FREE)** **0 (FREE)**	**0 (FREE)** **0 (FREE)** **0 (FREE)**		

NOTES:

LOCATION:	**Teston Road (YR 49) at Cityview Blvd.**	*MUNICIPALITY:*	**Vaughan**
CTCS:	**747**	*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**SA**	*CONTROLLER/CABINET TYPE:*	**Econolite Cobalt / TS2T1**
PREPARED/CHECKED BY:	**M.L.**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:		*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**June 26, 2019**	*CHANNEL/DROP:*	

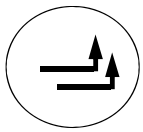
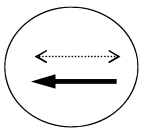
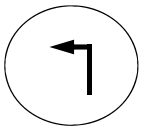
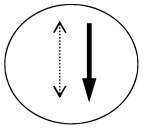
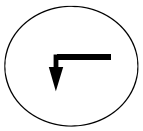
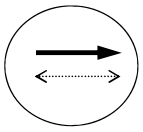
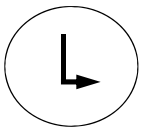
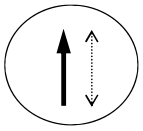
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NEMA Phase (York)		AM 6:00-10:0 M-F		Free	Phase Mode (Fixed/Demanded/Callable)	Remarks
	Local Plan	Pattern 1		Pattern 99		
	System Plan	Plan 1		Plan 99		
1.  NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT					Pedestrian Minimums: EWWK = 7 sec., EWFD = 20 sec. NSWK = 7 sec., NSFD = 25 sec.
2. Westbound  Teston Road	WLK 7 FDW 20 MIN 30 EXT 0 MAX1 50 MAX2 120 AMB 5.0 ALR 2.0 SPLIT	**USE MAX 2**			Fixed	**Emergency vehicle pre-emption 3:** Serve EWG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction. **Emergency vehicle pre-emption 4:** Serve NBG/NBDW min 20 secs and up to 100 secs if there are continuous emergency calls in NS direction.
 NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT					NS phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum NSG is 10 seconds. If ongoing vehicle demand exists on the stopbar loop, the NSG is capable of providing vehicle extensions up to the maximum green split during coordinated operation or 19 secs during Free operation. If a pedestrian call is received, the pedestrian minimum will be served. The NSWK & NSFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand. Unused extension time is given to the EWG.
 NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT					During coordinated operation, the signal constantly cycles through main street FDW to improve response time to side street vehicle and pedestrian demand.
5. W/B Left Turn Arrow 	WLK FDW MIN 7 EXT 0 MAX1 50 MAX2 90 AMB 3 ALR 1 SPLIT	**0** **USE MAX 2**			Callable/Extendable by Setback Loop	During free plan, signal rests in EWWK and does not cycle through EWFD unless there is side street vehicle or pedestrian demand. EWFD reverts to EWWK if there is no side street demand at the end of the EWFD.
6. Eastbound  Teston Road	WLK 7 FDW 20 MIN 30 EXT 0 MAX1 50 MAX2 30 AMB 5.0 ALR 2.0 SPLIT	**USE MAX 2**			Fixed	
7. Southbound Split Phase 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 10 AMB 3 ALR 2 SPLIT	**USE MAX 2**			Callable by stopbar loop	**LEGEND:** SA - Semi-Actuated signal WLK - Walk time FDW - Flashing Don't Walk time MIN - Minimum green time EXT - Extension time MAX1 - Maximum green time 1 MAX2 - Maximum green time 2 AMB - Amber ALR -All Red CL - Cycle Length OF - Offset VP - Vehicle Permissive NSWK - North/South Walk EWWK - East/West Walk NSG - North/South Green EWG - East/West Green NSFD - North/South Flashing Don't Walk EWFD - East/West Flashing Don't Walk TSP - Transit Priority APS - Audible Pedestrian Signal RLC - Red Light Camera
8. Northbound Split Phase  Cityview Blvd.	WLK 7 FDW 25 MIN 10 EXT 3 MAX1 25 MAX2 20 AMB 4.0 ALR 2.0 SPLIT	**USE MAX 2**			Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	
	CL OF VP	 **0** 0	 **0** 0	**0 (FREE)** **0 (FREE)** 0 (FREE)		

NOTES:

LOCATION:	**Major Mackenzie Dr (YR 25) & Jane St (YR 55)**	*MUNICIPALITY:*	**Vaughan**
CTCS:	**124**	*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**SA**	*CONTROLLER/CABINET TYPE:*	**Econolite ASC/3-1000 / TS2T1**
PREPARED/CHECKED BY:	**ML**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:		*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**Sep. 22,2020**	*CHANNEL/DROP:*	

N

NEMA Phase (York)		**AM** **06:00-10:00 M-F**	**PM** **15:00-20:00 M-F**	**off** **10:00-15:00, 20:00-22:00 M-F; 08:00-20:00 Sat & Sun**	**Free** **22:00-06:00 M-F; 20:00-08:00 Sat. & Sun.**	**Phase Mode** **(Fixed/Demanded/Callable)**	**Remarks**
	Local Plan	Pattern 1	Pattern 2	Pattern 3	Pattern 99		
	System Plan	Plan 1	Plan 2	Plan 3	Plan 99		
1. E/B Left Turn Arrow Fully Prot. 	WLK FDW MIN 7 EXT 3 MAX1 20 MAX2 0 AMB 3 ALR 2 SPLIT	**15**	**20**	**16**	**0**	**Fully Protected** Callable/Extendable by Stopbar Loop	
2. Westbound  Major Mackenzie Dr	WLK 7 FDW 30 MIN 37 EXT 0 MAX1 40 MAX2 0 AMB 4.0 ALR 4.0 SPLIT	**80**	**75**	**66**	**0**	Veh Ext. Recall	**Emergency vehicle pre-emption 1:** Serve EBG/EBLT min 20 secs and up to 100 secs if there are continuous emergency calls in EB direction.
3. N/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 20 MAX2 0 AMB 3 ALR 1 SPLIT	**15**	**19**	**12**	**0**	Callable/Extendable by Setback Loop	**Emergency vehicle pre-emption 2:** Serve WBG/WBLT min 20 secs and up to 100 secs if there are continuous emergency calls in WB direction.
4. Southbound  Jane St	WLK 7 FDW 30 MIN 10 EXT 3 MAX1 40 MAX2 0 AMB 4.5 ALR 3.5 SPLIT	**50**	**46**	**46**	**0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	**Emergency vehicle pre-emption 3:** Serve NSG/NSDW min 20 secs and up to 100 secs if there are continuous emergency calls in NS direction. NS phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum NSG is 10 seconds. If ongoing vehicle demand exists on the stopbar loop, the NSG is capable of providing vehicle extensions up to the maximum green split during coordinated operation or 50 secs during Free operation. If a pedestrian call is received, the pedestrian minimum will be served. The NSWK & NSFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand. Unused extension time is given to the EWG during coordinated operation.
5. W/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 20 MAX2 0 AMB 3 ALR 1 SPLIT	**20**	**12**	**16**	**0**	Callable/Extendable by Stopbar Loop	During coordinated operation, the signal constantly cycles through main street FDW to improve response time to side street vehicle and pedestrian demand. During free plan, signal rests in EWWK and does not cycle through EWFD unless there is side street vehicle or pedestrian demand.
6. Eastbound  Major Mackenzie Dr	WLK 7 FDW 30 MIN 37 EXT 0 MAX1 40 MAX2 0 AMB 4.0 ALR 4.0 SPLIT	**75**	**83**	**66**	**0**	Veh Ext. Recall	EWFD reverts to EWWK if there is no side street demand at the end of the EWFD.
7. S/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 20 MAX2 0 AMB 3 ALR 1 SPLIT	**15**	**15**	**12**	**0**	Callable/Extendable by Setback Loop	**LEGEND:** SA - Semi-Actuated signal WLK - Walk time FDW - Flashing Don't Walk time MIN - Minimum green time EXT - Extension time MAX1 - Maximum green time 1 MAX2 - Maximum green time 2 AMB - Amber ALR -All Red CL - Cycle Length OF - Offset VP - Vehicle Permissive NSWK - North/South Walk EWWK - East/West Walk NSG - North/South Green EWG - East/West Green NSFD - North/South Flashing Don't Walk EWFD - East/West Flashing Don't Walk TSP - Transit Priority APS - Audible Pedestrian Signal RLC - Red Light Camera
8. Northbound  Jane St	WLK 7 FDW 30 MIN 10 EXT 3 MAX1 40 MAX2 0 AMB 4.5 ALR 3.5 SPLIT	**50**	**50**	**46**	**0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	
	CL OF VP	**160** **0** 30	**160** **0** 30	**140** **0** 30	**0 (FREE)** **0 (FREE)** 0 (FREE)		

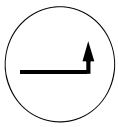
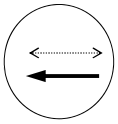
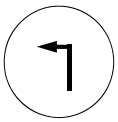
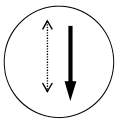
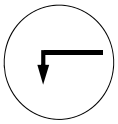
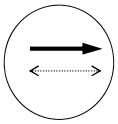
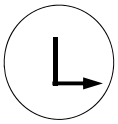
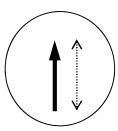
NOTES:

LOCATION:	**Hwy 400 NB Offramp & Major Mackenzie Dr (YR 25)**	*MUNICIPALITY:*	**Vaughan**
CTCS:	**441 (MTO Signal)**	*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**Fully Actuated**	*CONTROLLER/CABINET TYPE:*	**Econolite Cobalt / TS2T1**
PREPARED/CHECKED BY:	**M.L.**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:		*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**June 19,2020**	*CHANNEL/DROP:*	

NEMA Phase (MTO)				AM 06:00-10:00 M-F	PM 15:00-20:00 M-F	OFF 10:00-15:00, 20:00-22:00 M-F; 08:00-20:00 Sat. & Sun.	Free 22:00-06:00 M-F 20:00-08:00 Sat&Sun	Phase Mode (Fixed/Demanded/Callable)	Remarks
	Local Plan			Pattern 1	Pattern 2	Pattern 3	Pattern 99		
	System Plan			Plan 1	Plan 2	Plan 3	Plan 99		
1. NOT USED	WLK								Pedestrian Minimums: EWWK = 7 sec., EWFD = 22 sec.
	FDW								
	MIN								**Emergency vehicle pre-emption 3/4:**
	EXT								Serve EWG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction.
	MAX1								
	MAX2								
	AMB								
	ALR		Pre time						
	SPLIT								
2. Eastbound	WLK	7	7					Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	EW phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum EWG is 20 seconds. If ongoing vehicle demand exists on the stopbar loop, the EWG is capable of providing vehicle extensions up to the maximum green split during coordinated operation or 60 secs during Free operation. If a pedestrian call is received, the pedestrian minimum will be served. The EWWK & EWFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand.
	FDW	22	22						
	MIN	29	40						
	EXT	4	4						
	MAX1	60	40						
	MAX2	0	50						
	AMB	4.5	4.5						
	ALR	3.0	3.0						
Major Mackenzie Dr	SPLIT			**110**	**110**	**70**	**0**		
3. NOT USED	WLK								During coordinated operation, the signal constantly cycles through main street FDW to improve response time to side street vehicle and pedestrian demand.
	FDW								
	MIN								During free plan, signal rests in EWWK and does not cycle through EWFD unless there is side street vehicle or pedestrian demand.
	EXT								
	MAX1								
	MAX2								EWFD reverts to EWWK if there is no side street demand at the end of the EWFD.
	AMB								
	ALR								
	SPLIT								
4. NOT USED	WLK								
	FDW								
	MIN								
	EXT								
	MAX1								
	MAX2								
	AMB								
	ALR								
	SPLIT								
5. NOT USED	WLK								
	FDW								
	MIN								
	EXT								
	MAX1								
	MAX2								
	AMB								
	ALR								
	SPLIT								
6. Westbound	WLK	7	7					Callable by stopbar loop Extendable by stopbar loop.	
	FDW	22	22						
	MIN	29	40						
	EXT	4	4						
	MAX1	60	40						
	MAX2	0	50						
	AMB	4.5	4.5						
	ALR	3.0	3.0						
Major Mackenzie Dr	SPLIT			**110**	**110**	**70**	**0**		
7. NOT USED	WLK								**LEGEND:**
	FDW								
	MIN								SA - Semi-Actuated signal
	EXT								WLK - Walk time
	MAX1								FDW - Flashing Don't Walk time
	MAX2								MIN - Minimum green time
	AMB								EXT - Extension time
	ALR								MAX1 - Maximum green time 1
	SPLIT								MAX2 - Maximum green time 2
8. Northbound	WLK								AMB - Amber
	FDW								ALR -All Red
	MIN	10	15					Callable and extendable by stopbar loop	CL - Cycle Length
	EXT	2	2						OF - Offset
	MAX1	25	15						VP - Vehicle Permissive
	MAX2	0	25						NSWK - North/South Walk
	AMB	4.5	4.5						EWWK - East/West Walk
	ALR	2.0	2.0						NSG - North/South Green
Highway 400 NB Offramp	SPLIT			**50**	**50**	**50**	**0**		EWG - East/West Green
	CL			**160**	**160**	**120**	**0 (FREE)**		NSFD - North/South Flashing Don't Walk
	OF			**40**	**40**	**0**	**0 (FREE)**		EWFD - East/West Flashing Don't Walk
	VP			22	22	22	0 (FREE)		TSP - Transit Priority
									APS - Audible Pedestrian Signal
									RLC - Red Light Camera

NOTES:

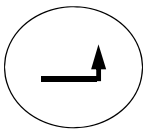
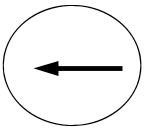
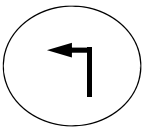
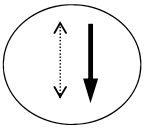
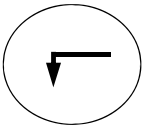
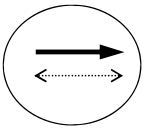
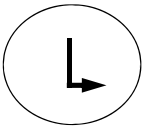
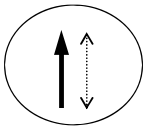
LOCATION:	**Keele St (YR 6) & Major Mackenzie Dr W (YR 25)**	*MUNICIPALITY:*	**Vaughan**
CTCS:	**27**	*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**FXT**	*CONTROLLER/CABINET TYPE:*	**Econolite Cobalt / TS2T1**
PREPARED/CHECKED BY:	**M.L.**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:		*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**Feb. 10, 2019**	*CHANNEL/DROP:*	

NEMA Phase (York)		AM 6:00-10:00 M-F	PM 15:00-20:00 M-F	OFF 10:00-15:00, 20:00-22:00 M-F 08:00-20:00 Sat. & Sun.	Free 22:00-6:00 M-F & 22:00-08:00 Sat&Sun	Phase Mode (Fixed/Demanded/Callable)	Remarks
	Local Plan	Pattern 1	Pattern 2	Pattern 3	Pattern 99		
	System Plan	Plan 1	Plan 2	Plan 3	Plan 99		
1. E/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3 ALR 1					Callable/Extendable by Setback Loop	Pedestrian Minimums: EWWK = 7 sec., EWFD = 26 sec. NSWK = 7 sec., NSFD = 25 sec.
	SPLIT	**15**	**20**	**12**	**0**		**Emergency vehicle pre-emption 3:** Serve EWG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction.
2. Westbound  Major Mackenzie Dr	WLK 7 FDW 26 MIN 28 EXT 0 MAX1 28 MAX2 0 AMB 4.0 ALR 3.0					Fixed	**Emergency vehicle pre-emption 4:** Serve NSG/NSDW min 20 secs and up to 100 secs if there are continuous emergency calls in NS direction.
	SPLIT	**73**	**68**	**50**	**0**		
3. N/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3 ALR 1					Callable/Extendable by Setback Loop	
	SPLIT	**12**	**20**	**12**	**0**		
4. Southbound  Keele St	WLK 7 FDW 25 MIN 27 EXT 3 MAX1 27 MAX2 0 AMB 4.0 ALR 3.0					Fixed	
	SPLIT	**60**	**52**	**46**	**0**		
5. W/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3 ALR 1					Callable/Extendable by Setback Loop	
	SPLIT	**15**	**20**	**12**	**0**		
6. Eastbound  Major Mackenzie Dr	WLK 7 FDW 26 MIN 28 EXT 0 MAX1 28 MAX2 0 AMB 4.0 ALR 3.0					Fixed	
	SPLIT	**73**	**68**	**50**	**0**		
7. S/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3 ALR 1					Callable/Extendable by Setback Loop	**LEGEND:** SA - Semi-Actuated signal WLK - Walk time FDW - Flashing Don't Walk time MIN - Minimum green time EXT - Extension time MAX1 - Maximum green time 1 MAX2 - Maximum green time 2 AMB - Amber ALR -All Red CL - Cycle Length OF - Offset VP - Vehicle Permissive NSWK - North/South Walk EWWK - East/West Walk NSG - North/South Green EWG - East/West Green NSFD - North/South Flashing Don't Walk EWFD - East/West Flashing Don't Walk TSP - Transit Priority APS - Audible Pedestrian Signal RLC - Red Light Camera
	SPLIT	**27**	**12**	**12**	**0**		
8. Northbound  Keele St	WLK 7 FDW 25 MIN 27 EXT 3 MAX1 27 MAX2 0 AMB 4.0 ALR 3.0					Fixed	
	SPLIT	**45**	**60**	**46**	**0**		
	CL	**160**	**160**	**120**	**0 (FREE)**		
	OF	**0**	**0**	**0**	**0 (FREE)**		
	VP	26	26	26	0 (FREE)		

NOTES:

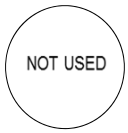
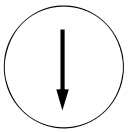
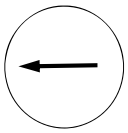
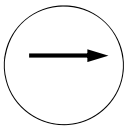
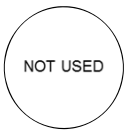
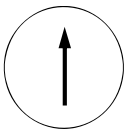
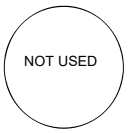
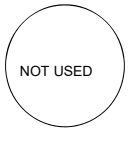
LOCATION:	**Major Mackenzie Dr (YR 25) & Bathurst ST (YR 38)**	*MUNICIPALITY:*	**Vaughan**
CTCS:	**117**	*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**SA**	*CONTROLLER/CABINET TYPE:*	**Econolite Cobalt / TS2T1**
PREPARED/CHECKED BY:	**MQL**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:	**March 23, 2015**	*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**December 6, 2017**	*CHANNEL/DROP:*	

N

NEMA Phase (York)		AM 8:00-10:00 M-F	PM 17:30-19:00 M-F	OFF 10:00-16:00, 19:00-22:00 M-F & 9:00-22:00 Sat& Sun	AM 2 6:00-8:00 M-F	PM 2 16:00-17:30 M-F	Free 22:00-6:00 M-F & 22:00-9:00 Sat& Sun	Phase Mode (Fixed/Demanded/Callable)	Remarks
	Local Plan	Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5	Pattern 99		
	System Plan	Plan 1	Plan 2	Plan 3	Plan 4	Plan 5	Plan 99		
1. E/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 20 MAX2 0 AMB 3 ALR 1 SPLIT	**13**	**19**	**13**	**13**	**19**	**0**	Callable/Extendable by Setback Loop	Pedestrian Minimums: EWWK = 7 sec., EWFD = 24 sec. NSWK = 7 sec., NSFD = 27 sec.
2. Westbound  Major Mackenzie Dr	WLK 7 FDW 24 MIN 31 EXT 0 MAX1 31 MAX2 0 AMB 4.5 ALR 2.5 SPLIT	**50**	**47**	**42**	**43**	**40**	**0**	Fixed	**Emergency vehicle pre-emption 3:** Serve EWG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction. **Emergency vehicle pre-emption 4:** Serve NSG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in NS direction.
3. N/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 20 MAX2 0 AMB 3 ALR 1 SPLIT	**12**	**12**	**12**	**12**	**12**	**0**	Callable/Extendable by Setback Loop	NS phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum NSG is 30 seconds. If ongoing vehicle demand exists on the stopbar loop, the NSG is capable of providing vehicle extensions up to the maximum green split during coordinated operation or 30 secs during Free operation. If a pedestrian call is received, the pedestrian minimum will be served. The NSWK & NSFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand. Unused extension time is given to the EWG.
4. Southbound  Bathurst St	WLK 7 FDW 27 MIN 30 EXT 3 MAX1 30 MAX2 0 AMB 4.5 ALR 2.5 SPLIT	**65**	**62**	**53**	**72**	**69**	**0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	During coordinated operation, the signal constantly cycles through main street FDW to improve response time to side street vehicle and pedestrian demand.
5. W/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 20 MAX2 0 AMB 3 ALR 1 SPLIT	**13**	**16**	**13**	**13**	**12**	**0**	Callable/Extendable by Setback Loop	During free plan, signal rests in EWWK and does not cycle through EWFD unless there is side street vehicle or pedestrian demand. EWFD reverts to EWWK if there is no side street demand at the end of the EWFD.
6. Eastbound  Major Mackenzie Dr	WLK 7 FDW 24 MIN 31 EXT 0 MAX1 31 MAX2 0 AMB 4.5 ALR 2.5 SPLIT	**50**	**50**	**42**	**43**	**47**	**0**	Fixed	
7. S/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 20 MAX2 0 AMB 3 ALR 1 SPLIT	**12**	**12**	**12**	**12**	**12**	**0**	Callable/Extendable by Setback Loop	**LEGEND:** SA - Semi-Actuated signal WLK - Walk time FDW - Flashing Don't Walk time MIN - Minimum green time EXT - Extension time MAX1 - Maximum green time 1 MAX2 - Maximum green time 2 AMB - Amber ALR -All Red CL - Cycle Length OF - Offset VP - Vehicle Permissive NSWK - North/South Walk EWWK - East/West Walk NSG - North/South Green EWG - East/West Green NSFD - North/South Flashing Don't Walk EWFD - East/West Flashing Don't Walk TSP - Transit Priority APS - Audible Pedestrian Signal
8. Northbound  Bathurst St	WLK 7 FDW 27 MIN 30 EXT 3 MAX1 30 MAX2 0 AMB 4.5 ALR 2.5 SPLIT	**65**	**62**	**53**	**72**	**69**	**0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	
	CL OF VP	**140** **45** 24	**140** **0** 24	**120** **0** 24	**140** **45** 24	**140** **0** 24	**0 (FREE)** **0 (FREE)** 0 (FREE)		

NOTES:

LOCATION:	**Jane Street (YR 55) & Kirby Road**	*MUNICIPALITY:*	**Vaughan**
CTCS:	**887**	*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**SA**	*CONTROLLER/CABINET TYPE:*	**Econolite Cobalt / TS2T1**
PREPARED/CHECKED BY:	**M.L.**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:		*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**July 13,2020**	*CHANNEL/DROP:*	

NEMA Phase (York)		Free 24 Hrs Daily	Phase Mode (Fixed/Demanded/Callable)	Remarks
	Local Plan	Pattern 99		
	System Plan	Plan 99		
	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT		NOT USED	**Emergency vehicle pre-emption 3:** Serve NSG/NSDW min 20 secs and up to 100 secs if there are continuous emergency calls in NS direction.
2. Southbound  Jane Street	WLK FDW MIN 40 EXT 0 MAX1 40 MAX2 120 AMB 5.0 ALR 3.5 SPLIT		Fixed	EB and WB phases are callable and skippable but not switchable. If EB and WB detectors are both active at the end of the NS phase, the WB phase is served first followed by the EB phase. If only the EB detector is active at the end of the NS phase, only the EB phase is served (and any late WB demand will only be served the following cycle). EB and WB phases are only permitted once per cycle.
3. Westbound  Kirby Road	WLK FDW MIN 10 EXT 3 MAX1 40 MAX2 40 AMB 4.5 ALR 2 SPLIT			
4. Eastbound  Kirby Road	WLK FDW MIN 10 EXT 3 MAX1 40 MAX2 40 AMB 4.5 ALR 2.0 SPLIT		Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	
	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT		NOT USED	
6. Northbound  Jane Street	WLK FDW MIN 40 EXT 0 MAX1 40 MAX2 120 AMB 5.0 ALR 3.5 SPLIT		Fixed	
	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT		Not Used	**LEGEND:** SA - Semi-Actuated signal WLK - Walk time FDW - Flashing Don't Walk time MIN - Minimum green time EXT - Extension time MAX1 - Maximum green time 1 MAX2 - Maximum green time 2 AMB - Amber ALR -All Red CL - Cycle Length OF - Offset VP - Vehicle Permissive NSWK - North/South Walk EWWK - East/West Walk NSG - North/South Green EWG - East/West Green NSFD - North/South Flashing Don't Walk EWFD - East/West Flashing Don't Walk TSP - Transit Priority APS - Audible Pedestrian Signal RLC - Red Light Camera
	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT		Not Used	
	CL OF VP	**0 (FREE)** **0 (FREE)** 0 (FREE)		

NOTES: Offset intersection

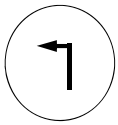
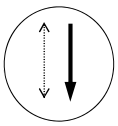
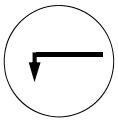
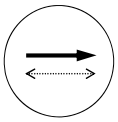
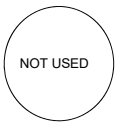
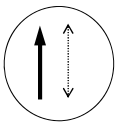
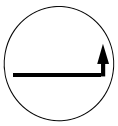
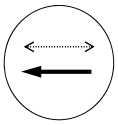
LOCATION:	**Hwy 400 SB Offramp & Major Mackenzie Dr (YR25)**	*MUNICIPALITY:*	**Vaughan**
CTCS:	**442 (MTO Signal)**	*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**SA**	*CONTROLLER/CABINET TYPE:*	**Econolite Cobalt / TS2T1**
PREPARED/CHECKED BY:	**ML**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:		*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**June 19,2020**	*CHANNEL/DROP:*	

N

NEMA Phase (MTO)		Normal Time	Pre-Time	AM 6:00-10:00 M-F	PM 16:00-19:00 M-F	OFF 10:00-16:00, 19:00-22:00 M-F,10:00-22:00 Sat & Sun	Free 22:00-6:00 M-F, 22:00-10:00 Sat &Sun	Phase Mode (Fixed/Demanded/Callable)	Remarks
				Pattern 1	Pattern 2	Pattern 3	Pattern 99		
				Plan 1	Plan 2	Plan 3	Plan 99		
1. W/B Left Turn Arrow	WLK							Callable/Extendable during Normal Time & Veh Min Recall during Pre-Time	Pedestrian Minimums: EWWK = 7 sec., EWFD = 21sec.
	FDW								**Emergency vehicle pre-emption 3/4:**
	MIN	7	7						Serve EWG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction.
	EXT	3	3						
	MAX1	10	10						
	MAX2	0	0						
	AMB	3	3						
	ALR	1	1						
	SPLIT			**12**	**12**	**12**	**0**		
2. Eastbound	WLK	7	7					Callable/Extendable during Normal Time & Veh Max Recall during Pre-Time	SB phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum SBG is 10 seconds. If ongoing vehicle demand exists on the stopbar loop, the SBG is capable of providing vehicle extensions up to the maximum green. If a pedestrian call is received, the pedestrian minimum will be served. The NSWK & NSFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand.
	FDW	21	21						
	MIN	20	**45**						
	EXT	4	4						
	MAX1	60	**50**						
	MAX2	0	0						
	AMB	4.5	4.5						
	ALR	2.5	2.5						
Major Mackenzie Dr	SPLIT			**78**	**68**	**48**	**0**		
3. Northbound	WLK							Callable/Extendable during Normal Time & Veh Min Recall during Pre-Time	During coordinated operation, the signal constantly cycles through main street FDW to improve response time to side street vehicle and pedestrian demand.
	FDW								
	MIN	10	10						
	EXT	2	2						
	MAX1	25	25						
	MAX2	0	0						
	AMB	4.5	4.5						
	ALR	3	3						
	SPLIT			**19**	**19**	**19**	**0**		
4. Southbound	WLK	7	7					Callable/Extendable during Normal Time & Veh Min Recall during Pre-Time 10 secs delay	During free plan, signal rests in EWWK and does not cycle through EWFD unless there is side street vehicle or pedestrian demand.
	FDW	25	25						
	MIN	10	**15**						
	EXT	2	2						
	MAX1	25	**30**						
	MAX2	0	0						
	AMB	4.0	4.5						
	ALR	3.0	3.0						
Hwy 400 SB Offramp	SPLIT			**41**	**41**	**41**	**0**		
5. NOT USED	WLK								
	FDW								
	MIN								
	EXT								
	MAX1								
	MAX2								
	AMB								
	ALR								
	SPLIT								
6. Westbound	WLK	7	7					Callable/Extendable during Normal Time & Veh Max Recall during Pre-Time	
	FDW	21	21						
	MIN	20	**45**						
	EXT	4	4						
	MAX1	60	**50**						
	MAX2	0	0						
	AMB	4.5	4.5						
	ALR	2.5	2.5						
Major Mackenzie Dr	SPLIT			**90**	**80**	**60**	**0**		
7. NOT USED	WLK								**LEGEND:**
	FDW								
	MIN								SA - Semi-Actuated signal
	EXT								WLK - Walk time
	MAX1								FDW - Flashing Don't Walk time
	MAX2								MIN - Minimum green time
	AMB								EXT - Extension time
	ALR								MAX1 - Maximum green time 1
	SPLIT								MAX2 - Maximum green time 2
8. Northbound NOT USED	WLK								AMB - Amber
	FDW								ALR -All Red
	MIN								CL - Cycle Length
	EXT								OF - Offset
	MAX1								VP - Vehicle Permissive
	MAX2								NSWK - North/South Walk
	AMB								EWWK - East/West Walk
	ALR								NSG - North/South Green
	SPLIT						**0**		EWG - East/West Green
	CL			**150**	**140**	**120**	**0 (FREE)**		NSFD - North/South Flashing Don't Walk
	OF			**20**	**20**	**0**	**0 (FREE)**		EWFD - East/West Flashing Don't Walk
	VP			21	21	21	0 (FREE)		TSP - Transit Priority
									APS - Audible Pedestrian Signal

NOTES:

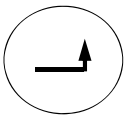
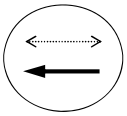
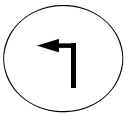
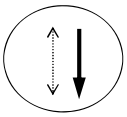
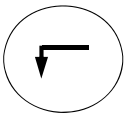
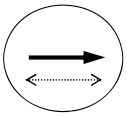
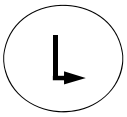
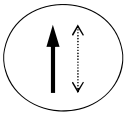
LOCATION:	**Teston Rd (YR 49) & Jane St. (YR 55)**	*MUNICIPALITY:*	**Vaughan**
CTCS:	**690**	*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**SA**	*CONTROLLER/CABINET TYPE:*	**Econolite ASC/3-1000 / TS2T1**
PREPARED/CHECKED BY:	**M.L.**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:		*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**June 18, 2019**	*CHANNEL/DROP:*	

NEMA Phase (York)		AM 6:00-10:00 M-F	PM 15:00-20:00 M-F	OFF 10:00-15:00, 20:00-22:00 M-F ; & 9:00-22:00 Sat & Sun	Free 22:00-6:00 M-F & 22:00-9:00 Sat&Sun	Phase Mode (Fixed/Demanded/Callable)	Remarks
	Local Plan	Pattern 1	Pattern 2	Pattern 3	Pattern 99		Changes were made due to closure at Major Mackeinzie Drive and McNaughton Road
	System Plan	Plan 1	Plan 2	Plan 3	Plan 99		
1. N/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 20 MAX2 0 AMB 3 ALR 1 SPLIT	12	12	12	0	Permissive/Protected Callable/Extendable by Setback Loop	Pedestrian Minimums: NSWK = 7 sec., NSFD = 27 sec. EWWK = 7 sec., EWFD = 25 sec.
2. Southbound  Jane St.	WLK 7 FDW 27 MIN 35 EXT 0 MAX1 35 MAX2 0 AMB 4.5 ALR 3.0 SPLIT	58	50	53	0	Fixed	**Emergency vehicle pre-emption 3:** Serve NSG/NSDW min 20 secs and up to 100 secs if there are continuous emergency calls in NS direction.
3. W/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3 ALR 1 SPLIT	25	20	12	0	Permissive/Protected Callable/Extendable by Setback Loop	**Emergency vehicle pre-emption 4:** Serve EWG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction.
4. Eastbound  Teston Rd	WLK 7 FDW 25 MIN 10 EXT 3 MAX1 35 MAX2 0 AMB 5.5 ALR 3.0 SPLIT	55	68	53	0	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	EW phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum EWG is 10 seconds. If ongoing vehicle demand exists on the stopbar loop, the EWG is capable of providing vehicle extensions up to the maximum green Free operation . If a pedestrian call is received, the pedestrian minimum will be served. The EWWK & EWFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand. Unused extension time is given to the NSG.
5. S/B Left Turn Arrow  NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT						During coordinated operation, the signal constantly cycles through main street FDW to improve response time to side street vehicle and pedestrian demand. During free plan, signal rests in NSWK and does not cycle through NSFD unless there is side street vehicle or pedestrian demand. NSFD reverts to NSWK if there is no side street demand at the end of the NSFD.
6. Northbound  Jane St.	WLK 7 FDW 27 MIN 35 EXT 0 MAX1 35 MAX2 0 AMB 4.5 ALR 3.0 SPLIT	70	62	65	0	Fixed	
7. Eastbound Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 20 MAX2 0 AMB 3 ALR 1 SPLIT	12	20	12	0	Permissive/Protected Callable/Extendable by Setback Loop	**LEGEND:** SA - Semi-Actuated signal WLK - Walk time FDW - Flashing Don't Walk time MIN - Minimum green time EXT - Extension time MAX1 - Maximum green time 1 MAX2 - Maximum green time 2 AMB - Amber ALR -All Red CL - Cycle Length OF - Offset VP - Vehicle Permissive NSWK - North/South Walk EWWK - East/West Walk NSG - North/South Green EWG - East/West Green NSFD - North/South Flashing Don't Walk EWFD - East/West Flashing Don't Walk TSP - Transit Priority APS - Audible Pedestrian Signal RLC - Red Light Camera
8. Westbound  Teston Rd	WLK 7 FDW 25 MIN 10 EXT 3 MAX1 35 MAX2 0 AMB 5.5 ALR 3.0 SPLIT	68	68	53	0	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	
	CL	150	150	130	0 (FREE)		
	OF	0	35	0	0 (FREE)		
	VP	27	27	27	0 (FREE)		

NOTES:

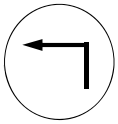
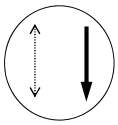
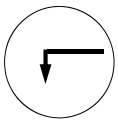
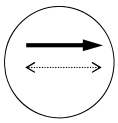
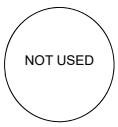
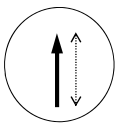
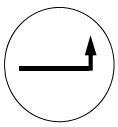
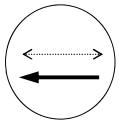
LOCATION:	**Major Mackenzie Drive (YR 25) & Dufferin St (YR 55)**			*MUNICIPALITY:*	**Richmond Hill**
CTCS:	**118**			*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**SA**			*CONTROLLER/CABINET TYPE:*	**Econolite Cobalt / TS2T1**
PREPARED/CHECKED BY:	**M.L.**			*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:				*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**Nov. 25, 2019**			*CHANNEL/DROP:*	

N

NEMA Phase (York)		AM Peak 7:00-10:00 M-F	PM Peak 16:00-21:00 M-F	WKND 07:00-22:00 Sat. & Sun.	Free 10:00-16:00 & 21:00-7:00 & M-F 22:00-07:00 Sat & Sun	Phase Mode (Fixed/Demanded/Callable)	Remarks
	Local Plan	Pattern 1	Pattern 2	Pattern 3	Pattern 99		Plan 3 were add to accommodate the closure along Rutherford Road for Metrolinx // YR Friday Nov. 29th - Sunday Dec. 1st
	System Plan	Plan 1	Plan 2	Plan 3	Plan 99		
1. E/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3.0 ALR 1.0 SPLIT	**12**	**14**	**25**	**0**	Callable/Extendable by Setback Loop	Pedestrian Minimums: EWWK = 7 sec., EWFD = 31 sec. NSWK = 7 sec., NSFD = 29 sec.
2. Westbound  Major Mackenzie Dr	WLK 7 FDW 31 MIN 30 EXT 0 MAX1 40 MAX2 0 AMB 4.5 ALR 3.0 SPLIT	**58**	**56**	**50**	**0**	Fixed	**Emergency vehicle pre-emption 3:** Serve EWG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction. **Emergency vehicle pre-emption 4:** Serve NSG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in NS direction.
3. N/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3.0 ALR 1.0 SPLIT	**12**	**12**	**25**	**0**	Callable/Extendable by Setback Loop	NS phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum NSG is 15 seconds. If ongoing vehicle demand exists on the stopbar loop, the NSG is capable of providing vehicle extensions up to the maximum green . If a pedestrian call is received, the pedestrian minimum will be served. The NSWK & NSFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand. Unused extension time is given to the EWG.
4. Southbound  Dufferin St	WLK 7 FDW 29 MIN 15 EXT 6 MAX1 40 MAX2 0 AMB 4.5 ALR 3.0 SPLIT	**58**	**58**	**50**	**0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop	During coordinated operation, the signal constantly cycles through main street FDW to improve response time to side street vehicle and pedestrian demand. EWFD reverts to EWWK if there is no side street demand at the end of the EWFD.
5. W/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3.0 ALR 1.0 SPLIT	**14**	**12**	**25**	**0**	Callable/Extendable by Setback Loop	SBLT activated to address complaint
6. Eastbound  Major Mackenzie Dr	WLK 7 FDW 31 MIN 30 EXT 0 MAX1 40 MAX2 0 AMB 4.5 ALR 3.0 SPLIT	**56**	**58**	**50**	**0**	Fixed	
7. S/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3.0 ALR 1.0 SPLIT	**12**	**12**	**25**	**0**	Callable/Extendable by Setback Loop	**LEGEND:** SA - Semi-Actuated signal WLK - Walk time FDW - Flashing Don't Walk time MIN - Minimum green time EXT - Extension time MAX1 - Maximum green time 1 MAX2 - Maximum green time 2 AMB - Amber ALR -All Red CL - Cycle Length OF - Offset VP - Vehicle Permissive NSWK - North/South Walk EWWK - East/West Walk NSG - North/South Green EWG - East/West Green NSFD - North/South Flashing Don't Walk EWFD - East/West Flashing Don't Walk TSP - Transit Priority APS - Audible Pedestrian Signal
8. Northbound  Dufferin St	WLK 7 FDW 29 MIN 15 EXT 6 MAX1 40 MAX2 0 AMB 4.5 ALR 3 SPLIT	**58**	**58**	**50**	**0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop	
	CL OF VP	**140** **0** 31	**140** **0** 31	**150** **0** 31	**0 (FREE)** **0 (FREE)** 0 (FREE)		

NOTES:

LOCATION:	**Keele St (YR 6) & Teston Road (YR 49)**	*MUNICIPALITY:*	**Vaughan**
CTCS:	**490**	*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**SA**	*CONTROLLER/CABINET TYPE:*	**Econolite Cobalt / TS2T1**
PREPARED/CHECKED BY:	**M.L.**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:		*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**June 26,2019**	*CHANNEL/DROP:*	

NEMA Phase (York)		AM 6:00-10:00 M-F	PM 15:00-20:00 M-F	OFF 10:00-15:00, 20:00-22:00 M-F ; & 9:00-22:00 Sat & Sun	Free 22:00-6:00 M-F & 22:00-9:00 Sat&Sun	Phase Mode (Fixed/Demanded/Callable)	Remarks
	Local Plan	Pattern 1	Pattern 2	Pattern 3	Pattern 99		Changes were made due to closure at Major Mackeinzie Drive and McNaughton Road
	System Plan	Plan 1	Plan 2	Plan 3	Plan 99		
1. N/B Left Turn Arrow 	WLK					Callable/Extendable by Setback Loop	Pedestrian Minimums: NSWK = 7 sec., NSFD = 21 sec. EWWK = 7 sec., EWFD = 22 sec.
	FDW						
	MIN 7						**Emergency vehicle pre-emption 3:**
	EXT 3						Serve NSG/NSDW min 20 secs and up to 100 secs if there are continuous emergency calls in NS direction.
	MAX1 7						
	MAX2 0						
	AMB 3						
	ALR 1						
	SPLIT	**20**	**37**	**20**	**0**		
2. Southbound 	WLK 7					Fixed	**Emergency vehicle pre-emption 4:**
	FDW 21						Serve EWG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction.
	MIN 30						
	EXT 0						
	MAX1 30						
	MAX2 0						
	AMB 4.0						
	ALR 3.5						
Keele Street	SPLIT	**73**	**38**	**47**	**0**		
3.W/B Left Turn Arrow 	WLK					Callable/Extendable by Setback Loop	
	FDW						
	MIN 7						
	EXT 3						
	MAX1 7						
	MAX2 0						
	AMB 3						
	ALR 1						
	SPLIT	**12**	**14**	**12**	**0**		
4. Eastbound 	WLK 7					Fixed	
	FDW 22						
	MIN 10						
	EXT 3						
	MAX1 40						
	MAX2 0						
	AMB 4.5						
	ALR 3.0						
Teston Road	SPLIT	**45**	**61**	**51**	**0**		
NOT USED 	WLK						
	FDW						
	MIN						
	EXT						
	MAX1						
	MAX2						
	AMB						
	ALR						
	SPLIT	**0**	**0**	**0**	**0**		
6. Northbound 	WLK 7					Fixed	
	FDW 21						
	MIN 30						
	EXT 0						
	MAX1 30						
	MAX2 0						
	AMB 4.0						
	ALR 3.5						
Keele Street	SPLIT	**93**	**75**	**67**	**0**		
7. E/B Left Turn Arrow 	WLK					Callable/Extendable by Setback Loop	**LEGEND:** SA - Semi-Actuated signal WLK - Walk time FDW - Flashing Don't Walk time MIN - Minimum green time EXT - Extension time MAX1 - Maximum green time 1 MAX2 - Maximum green time 2 AMB - Amber ALR -All Red CL - Cycle Length OF - Offset VP - Vehicle Permissive NSWK - North/South Walk EWWK - East/West Walk NSG - North/South Green EWG - East/West Green NSFD - North/South Flashing Don't Walk EWFD - East/West Flashing Don't Walk TSP - Transit Priority APS - Audible Pedestrian Signal RLC - Red Light Camera
	FDW						
	MIN 7						
	EXT 3						
	MAX1 7						
	MAX2 0						
	AMB 3						
	ALR 1						
	SPLIT	**17**	**37**	**20**	**0**		
8. Westbound 	WLK 7					Fixed	
	FDW 22						
	MIN 10						
	EXT 3						
	MAX1 40						
	MAX2 0						
	AMB 4.5						
	ALR 3.0						
Teston Road	SPLIT	**40**	**38**	**43**	**0**		
	CL	**150**	**150**	**130**	**0 (FREE)**		
	OF	**0**	**120**	**0**	**0 (FREE)**		
	VP	21	21	21	0 (FREE)		

NOTES:

LOCATION:	**Teston Road (YR 49) & Dufferin Street (YR 53)**	*MUNICIPALITY:*	**Vaughan**
CTCS:	**706**	*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**SA with APS**	*CONTROLLER/CABINET TYPE:*	**Econolite Cobalt / TS2T1**
PREPARED/CHECKED BY:	**AM**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:		*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**October 22, 2019**	*CHANNEL/DROP:*	

N

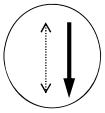
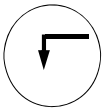
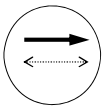
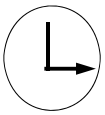
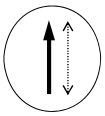
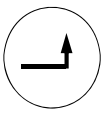
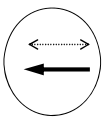
NEMA Phase (York)		AM 7:00-10:00 M-F	PM 16:00-20:00 M-F	Free 10:00- 16:00; & 20:00-7:00 M-F ; Free Sat. & Sun	Phase Mode (Fixed/Demanded/Callable)	Remarks
	Local Plan	Pattern 1	Pattern 2	Pattern 99		
	System Plan	Plan 1	Plan 2	Plan 99		
NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT	**0**	**0**	**0**		Pedestrian Minimums NSWK=7 sec, NSDW= 19sec EWWK=7 sec, EWDW= 19sec
2. Southbound Dufferin Street	WLK 7 FDW 19 MIN 30 EXT 6 MAX1 50 MAX2 60 AMB 4.5 ALR 2.5 SPLIT	**70**	**104**	**0**	Fixed	**Emergency vehicle pre-emption 3:** Serve NSG/NSDW min 20 secs and up to 100 secs if there are continuous emergency calls in NS direction. **Emergency vehicle pre-emption 4:** Serve EWG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction. APS Extended Push Activation = 3 sec When activated, APS is on for 7 seconds. PM modified due to complaint
3.W/B Left Turn Arrow	WLK FDW MIN 7 EXT 3 MAX1 30 MAX2 45 AMB 3 ALR 1 SPLIT	**36**	**12**	**0**	Callable/Extendable by Stopbar Loop	
4. Eastbound Teston Road	WLK 7 FDW 19 MIN 10 EXT 3 MAX1 40 MAX2 65 AMB 4.5 ALR 2.5 SPLIT	**34**	**34**	**0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	
5. S/B Left Turn Arrow	WLK FDW MIN 7 EXT 3 MAX1 12 MAX2 20 AMB 3 ALR 1 SPLIT	**12**	**12**	**0**	Callable/Extendable by Setback Loop	
6. Northbound Dufferin Street	WLK 7 FDW 19 MIN 30 EXT 6 MAX1 50 MAX2 60 AMB 4.5 ALR 2.5 SPLIT	**58**	**92**	**0**	Fixed	
7. E/B Left Turn Arrow	WLK FDW MIN 7 EXT 3 MAX1 30 MAX2 45 AMB 3 ALR 1 SPLIT	**36**	**12**	**0**	Callable/Extendable by Stopbar Loop	
8. Westbound Teston Road	WLK 7 FDW 19 MIN 10 EXT 3 MAX1 40 MAX2 65 AMB 4.5 ALR 2.5 SPLIT	**34**	**34**	**0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	
	CL OF VP	**140** **0** 19	**150** **120** 19	**0 (FREE)** **0 (FREE)** 0 (FREE)		

LEGEND:

SA - Semi-Actuated signal
WLK - Walk time
FDW - Flashing Don't Walk time
MIN - Minimum green time
EXT - Extension time
MAX1 - Maximum green time 1
MAX2 - Maximum green time 2
AMB - Amber
ALR -All Red
CL - Cycle Length
OF - Offset
VP - Vehicle Permissive
NSWK - North/South Walk
EWWK - East/West Walk
NSG - North/South Green
EWG - East/West Green
NSFD - North/South Flashing Don't Walk
EWFD - East/West Flashing Don't Walk
TSP - Transit Priority
APS - Audible Pedestrian Signal

NOTES:

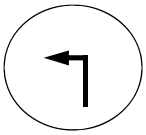
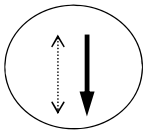
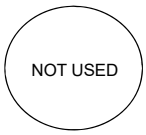
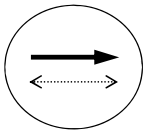
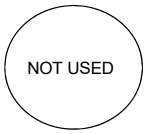
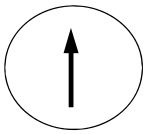
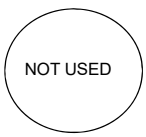
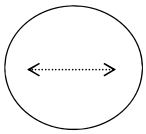
LOCATION:	**Bathurst Street (YR 38) & Elgin Mills Road/Teston Rd (R49)**	*MUNICIPALITY:*	**Vaughan**
CTCS:	**168**	*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**SA**	*CONTROLLER/CABINET TYPE:*	**Econolite ASC3 / TS2T1**
PREPARED/CHECKED BY:	**AM**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:	**November 26, 2019**	*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**November 26, 2019**		

NEMA Phase (York)		**AM** **6:00-10:00 M-F**	**PM** **16:00-19:00 M-F**	**OFF Peak** **10:00-16:00; 19:00-22:00 M-F; 09:00-22:00 Sat. & Sun.**	**Free** **22:00-6:00 M-F, and 22:00-9:00Sat. & Sun.**	**Phase Mode** **(Fixed/Callable)**	**Remarks**
	Local Plan	Pattern 1	Pattern 2	Pattern 3	Pattern 99		
	System Plan	Plan 1	Plan 2	Plan 3	Plan 99		
	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT						Pedestrian Minimums NSWK= 7sec, NSFD= 25sec EWWK= 7 sec, EWFD= 28 sec **Emergency vehicle pre-emption 3:** Serve NSG/NSFD min 20 secs and up to 100 secs if there are continuous emergency calls in NS direction.
2. Southbound  Bathurst Street	WLK 7 FDW 25 MIN 30 EXT 0 MAX1 30 MAX2 0 AMB 5.0 ALR 3.0 SPLIT	**94**	**78**	**64**	**0**	Fixed	**Emergency vehicle pre-emption 4:** Serve EWG/EWFD min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction. EW phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum EWG will be served. If ongoing vehicle demand exists on the stopbar loop, the EWG is capable of providing vehicle extensions up to the maximum green split. If a pedestrian call is received, the pedestrian minimum will be served. The EWWK & EWFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand. Unused extension time is given to the NSG.
3. W/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3.0 ALR 1 SPLIT	**12**	**12**	**12**	**0**	Callable/Extendable by Stopbar Loop	
4. Eastbound  Teston Rd	WLK 7 FDW 28 MIN 10 EXT 3 MAX1 25 MAX2 0 AMB 4.5 ALR 3.5 SPLIT	**44**	**50**	**44**	**0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	During coordinated operation, the signal constantly cycles through main street FDW to improve response time to side street vehicle and pedestrian demand. During free plan, signal rests in NSWK and does not cycle through NSFD unless there is side street vehicle or pedestrian demand.
5. S/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3 ALR 1 SPLIT	**12**	**12**	**12**	**0**	Callable/Extendable by Setback Loop	NSFD reverts to NSWK if there is no side street demand at the end of the NSFD.
6. Northbound  Bathurst Street	WLK 7 FDW 25 MIN 30 EXT 0 MAX1 30 MAX2 0 AMB 5 ALR 3 SPLIT	**82**	**66**	**52**	**0**	Fixed	
7. E/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3 ALR 1 SPLIT	**12**	**12**	**12**	**0**	Callable/Extendable by Setback Loop	**LEGEND:** SA - Semi-Actuated signal FA - Fully Actuated signal WLK - Walk time FDW - Flashing Don't Walk time MIN - Minimum green time EXT - Extension time MAX1 - Maximum green time 1 MAX2 - Maximum green time 2 AMB - Amber ALR -All Red CL - Cycle Length OF - Offset VP - Vehicle Permissive NSWK - North/South Walk EWWK - East/West Walk NSG - North/South Green EWG - East/West Green NSFD - North/South Flashing Don't Walk EWFD - East/West Flashing Don't Walk TSP - Transit Signal Priority APS - Audible Pedestrian Signal RLC - Red Light Camera
8. Westbound  Elgin Mills Road	WLK 7 FDW 28 MIN 10 EXT 6 MAX1 25 MAX2 0 AMB 4.5 ALR 3.5 SPLIT	**44**	**50**	**44**	**0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	
	CL OF VP	**150** **0** 25	**140** **60** 25	**120** **0** 25	**0 (FREE)** **0 (FREE)** 0 (FREE)		

NOTES:

LOCATION:	**Dufferin St (YR 53) & Kirby Rd**	*MUNICIPALITY:*	**Vaughan**
CTCS:	**697**	*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**SA with APS**	*CONTROLLER/CABINET TYPE:*	**Econolite Cobalt / TS2T1**
PREPARED/CHECKED BY:	**AM/JL**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:	**August 19, 2019**	*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**November 4, 2019**		

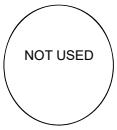
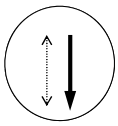
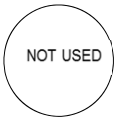
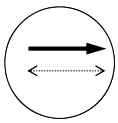
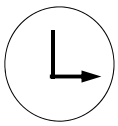
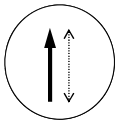
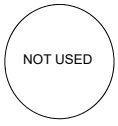
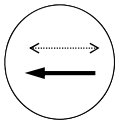
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NEMA Phase (York)		AM 07:00-10:00 M-F	PM 16:00-20:00 M-F	Free 10:00-16:00, 20:00-7:00 M-F & Sat-Sun	Phase Mode (Fixed/Demanded/Callable)	Remarks
	Local Plan	Pattern 1	Pattern 2	Pattern 99		
	System Plan	Plan 1	Plan 2	Plan 99		
1. N/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3 ALR 1 SPLIT	**0**	**0**	**0**	Permissive/Protected Callable/Extendable by Setback Loop	Pedestrian Minimums: NSWK = 7 sec., NSFD = 15 sec. EWWK = 7 sec., EWFD = 15 sec. **Emergency vehicle pre-emption 3:** Serve NSG/NSFD min 20 secs and up to 100 secs if there are continuous emergency calls in NS direction.
2. Southbound  Dufferin St	WLK 7 FDW 15 MIN 30 EXT 0 MAX1 30 MAX2 0 AMB 5.0 ALR 3.0 SPLIT	**100**	**90**	**0**	Fixed	**Emergency vehicle pre-emption 4:** Serve EWG/EWFD min 20 secs and up to 100 secs if there are continuous emergency calls in NS direction. EW phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum EWG will be serviced. If ongoing vehicle demand exists on the stopbar loop, the EWG is capable of providing vehicle extensions up to the maximum green split. If a pedestrian call is received, the pedestrian minimum will be served. The EWWK & EWFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand. Unused extension time is given to the NSG during coordinated opeation.
3.  NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT					
4. Eastbound  Kirby Rd	WLK 7 FDW 15 MIN 10 EXT 3 MAX1 30 MAX2 0 AMB 4.5 ALR 2.0 SPLIT	**40**	**50**	**0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	During coordinated operation, the signal constantly cycles through main street FDW to improve response time to side street vehicle and pedestrian demand.
5.  NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT					During free plan, signal rests in NSWK and does not cycle through NSFD unless there is side street vehicle or pedestrian demand. NSFD reverts to NSWK if there is no side street demand at the end of the NSFD.
6. Northbound  Dufferin St	WLK FDW MIN 30 EXT 0 MAX1 30 MAX2 0 AMB 5.0 ALR 3.0 SPLIT	**100**	**90**	**0**	Fixed	APS Extended Push Activation = 3 sec When activated, APS is on for 7 seconds.
7.  NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT					
8. Westbound(ped only) 	WLK 7 FDW 15 MIN 10 EXT 3 MAX1 30 MAX2 0 AMB 4.5 ALR 2.0 SPLIT				Callable by pushbutton	
	CL OF VP	**140** **0** 15	**140** **0** 15	**0 (FREE)** **0 (FREE)** 0 (FREE)		

LEGEND:
SA - Semi-Actuated signal
FA - Fully-Actuated signal
WLK - Walk time
FDW - Flashing Don't Walk time
MIN - Minimum green time
EXT - Extension time
MAX1 - Maximum green time 1
MAX2 - Maximum green time 2
AMB - Amber
ALR -All Red
CL - Cycle Length
OF - Offset
VP - Vehicle Permissive
NSWK - North/South Walk
EWWK - East/West Walk
NSG - North/South Green
EWG - East/West Green
NSFD - North/South Flashing Don't Walk
EWFD - East/West Flashing Don't Walk
TSP - Transit Signal Priority
APS - Audible Pedestrian Signal
RLC - Red Light Camera

NOTES: T Intersection (No East Leg)

LOCATION:	**Bathurst Street (YR 38) & Gamble Road / Kirby Road (YR 29)**	*MUNICIPALITY:*	**Vaughan**
CTCS:	**534**	*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**SA**	*CONTROLLER/CABINET TYPE:*	**Econolite ASC3 / TS2T1**
PREPARED/CHECKED BY:	**M.L./J.L.**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:	**Aug 20, 2019**	*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**September 17, 2019**		

NEMA Phase (York)		Free 24 Hrs Daily	Phase Mode (Fixed/Callable)	Remarks
	Local Plan	Pattern 99		
	System Plan	Plan 99		
	WLK FDW EXT MAX1 MAX2 AMB ALR SPLIT	 **0**		Pedestrian Minimums: NSWK= 7sec, NWFD= 28sec EWWK=7sec, NSFD= 24sec **Emergency vehicle pre-emption 3:** Serve NSG/NSFD min 20 secs and up to 100 secs if there are continuous emergency calls in NS direction.
2. Southbound  Bathurst Street	WLK 7 FDW 28 MIN 50 EXT 0 MAX1 50 MAX2 0 AMB 5.0 ALR 2.5 SPLIT	 **0**	Fixed	**Emergency vehicle pre-emption 4:** Serve EWG/EWFD min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction.
	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT	 **0**		EW phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum EWG will be served. If ongoing vehicle demand exists on the stopbar loop, the EWG is capable of providing vehicle extensions up to the maximum green split. If a pedestrian call is received, the pedestrian minimum will be served. The EWWK & EWFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand. Unused extension time is given to the NSG during coordinated operation.
4. Eastbound  Kirby Road	WLK 7 FDW 24 MIN 10 EXT 3 MAX1 40 MAX2 0 AMB 4.5 ALR 2.5 SPLIT	 **0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop. Split Phase	During coordinated operation, the signal constantly cycles through main street FDW to improve response time to side street vehicle and pedestrian demand.
5. S/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3 ALR 1 SPLIT	 **0**	Callable/Extendable by Stopbar Loop	During free plan, signal rests in NSWK and does not cycle through NSFD unless there is side street vehicle or pedestrian demand.
6. Northbound  Bathurst Street	WLK 7 FDW 28 MIN 50 EXT 0 MAX1 50 MAX2 0 AMB 5 ALR 2.5 SPLIT	 **0**	Fixed	NSFD reverts to NSWK if there is no side street demand at the end of the NSFD.
	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT	 **0**		**LEGEND:** SA - Semi-Actuated signal FA - Fully -Actuated signal WLK - Walk time FDW - Flashing Don't Walk time MIN - Minimum green time EXT - Extension time MAX1 - Maximum green time 1 MAX2 - Maximum green time 2 AMB - Amber ALR -All Red CL - Cycle Length OF - Offset VP - Vehicle Permissive NSWK - North/South Walk EWWK - East/West Walk NSG - North/South Green EWG - East/West Green NSFD - North/South Flashing Don't Walk EWFD - East/West Flashing Don't Walk TSP - Transit Signal Priority APS - Audible Pedestrian Signal RLC - Red Light Camera
8. Westbound  Gamble Road	WLK 7 FDW 24 MIN 10 EXT 3 MAX1 40 MAX2 0 AMB 4.5 ALR 2.5 SPLIT	 **0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop. Split Phase	
	CL OF VP	**0 (FREE)** **0 (FREE)** 0 (FREE)		

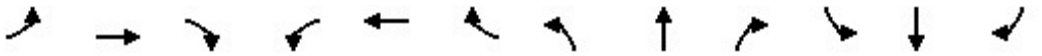
NOTES:

LOCATION:	**Keele St (YR 6) & Kirby Road**				*MUNICIPALITY:*	**Vaughan**
CTCS:	**633**				*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**SA**				*CONTROLLER/CABINET TYPE:*	**Econolite Cobalt / TS2T1**
PREPARED/CHECKED BY:	**M.L.**				*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:					*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**March 24, 2020**				*CHANNEL/DROP:*	

NEMA Phase (York)		**AM** **6:30-09:30, M-F**	**PM** **16:00-19:00 M-F**	**Free** **19:00-6:30 M-F & all day Sat&Sun**	**Phase Mode** **(Fixed/Demanded/Callable)**	**Remarks**
	Local Plan	Pattern 1	Pattern 2	Pattern 99		
	System Plan	Plan 1	Plan 2	Plan 99		
NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT	**0**	**0**	**0**		Pedestrian Minimums: NSWK=7 sec, NSFD=18sec EWWK=7sec, EWFD=21sec **Emergency vehicle pre-emption 3:** Serve EWG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction.
2. Southbound Keele St	WLK 7 FDW 18 MIN 30 EXT 0 MAX1 30 MAX2 0 AMB 5.0 ALR 2.5 SPLIT	**80**	**80**	**0**	Fixed	
NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT	**0**	**0**	**0**		
4. Eastbound Kirby	WLK 7 FDW 21 MIN 10 EXT 3 MAX1 19 MAX2 0 AMB 4.5 ALR 2.5 SPLIT	**40**	**40**	**0**	Callable by stobarloop and or push button ;Extendable by stopbar loop	
NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT	**0**	**0**	**0**		
6. Northbound Keele St	WLK 7 FDW 18 MIN 30 EXT 0 MAX1 30 MAX2 0 AMB 5.0 ALR 2.5 SPLIT	**80**	**80**	**0**	Fixed	
NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT	**0**	**0**	**0**		**LEGEND:** SA - Semi-Actuated signal WLK - Walk time FDW - Flashing Don't Walk time MIN - Minimum green time EXT - Extension time MAX1 - Maximum green time 1 MAX2 - Maximum green time 2 AMB - Amber ALR -All Red CL - Cycle Length OF - Offset VP - Vehicle Permissive NSWK - North/South Walk EWWK - East/West Walk NSG - North/South Green EWG - East/West Green NSFD - North/South Flashing Don't Walk EWFD - East/West Flashing Don't Walk TSP - Transit Priority APS - Audible Pedestrian Signal RLC - Red Light Camera
8. Westbound Kirby	WLK 7 FDW 21 MIN 10 EXT 3 MAX1 19 MAX2 0 AMB 4.5 ALR 2.5 SPLIT	**40**	**40**	**0**	Callable by stobarloop and or push button ;Extendable by stopbar loop	
	CL OF VP	**120** **0** 18	**120** **0** 18	**0 (FREE)** **0 (FREE)** 0 (FREE)		

NOTES:

Appendix C: Synchro Results for Existing Conditions (2020)



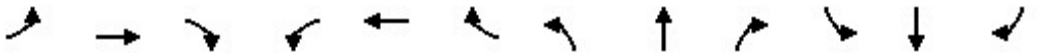
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	739	444	701	634	3	56	0	343	0	3	1
Future Volume (vph)	0	739	444	701	634	3	56	0	343	0	3	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	1.0	5.0		5.0		5.0		1.0	
Lane Util. Factor		0.95	1.00	1.00	0.95		0.97		1.00		1.00	
Frpb, ped/bikes		1.00	0.99	1.00	1.00		1.00		1.00		1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00		1.00		1.00	
Frt		1.00	0.85	1.00	1.00		1.00		0.85		0.97	
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00		1.00	
Satd. Flow (prot)		3318	1463	1630	3258		2603		1420		1856	
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00		1.00	
Satd. Flow (perm)		3318	1463	1630	3258		2603		1420		1856	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	762	458	723	654	3	58	0	354	0	3	1
RTOR Reduction (vph)	0	0	222	0	0	0	0	0	323	0	1	0
Lane Group Flow (vph)	0	762	236	723	657	0	58	0	31	0	3	0
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	10%	10%	12%	12%	0%	36%	0%	15%	0%	0%	0%
Turn Type	Perm	NA	Perm	Prot	NA		Prot		Perm		NA	
Protected Phases		6		5	2		8				7	
Permitted Phases	6		6						8	7		
Actuated Green, G (s)		53.1	53.1	64.2	121.3		12.5		12.5		1.2	
Effective Green, g (s)		55.1	55.1	67.2	123.3		13.5		13.5		5.2	
Actuated g/C Ratio		0.36	0.36	0.44	0.81		0.09		0.09		0.03	
Clearance Time (s)		7.0	7.0	4.0	7.0		6.0		6.0		5.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)		1194	526	715	2625		229		125		63	
v/s Ratio Prot		c0.23		c0.44	0.20		c0.02				c0.00	
v/s Ratio Perm			0.16						0.02			
v/c Ratio		0.64	0.45	1.01	0.25		0.25		0.25		0.05	
Uniform Delay, d1		40.7	37.4	42.9	3.6		65.0		65.0		71.5	
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00		1.00	
Incremental Delay, d2		2.6	2.8	36.5	0.2		0.6		1.1		0.3	
Delay (s)		43.3	40.1	79.4	3.8		65.6		66.1		71.8	
Level of Service		D	D	E	A		E		E		E	
Approach Delay (s)		42.1			43.4			66.0			71.8	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	46.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	153.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	826	268	0	1282	70	309
Future Volume (vph)	826	268	0	1282	70	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0		5.0	5.0	5.0
Lane Util. Factor	0.95	1.00		0.95	0.97	0.91
Frt	1.00	0.85		1.00	0.90	0.85
Flt Protected	1.00	1.00		1.00	0.98	1.00
Satd. Flow (prot)	3411	1526		3411	3075	1389
Flt Permitted	1.00	1.00		1.00	0.98	1.00
Satd. Flow (perm)	3411	1526		3411	3075	1389
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	852	276	0	1322	72	319
RTOR Reduction (vph)	0	0	0	0	102	102
Lane Group Flow (vph)	852	276	0	1322	130	57
Heavy Vehicles (%)	7%	7%	0%	7%	7%	7%
Turn Type	NA	Free		NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		Free				8
Actuated Green, G (s)	47.0	77.0		47.0	15.0	15.0
Effective Green, g (s)	49.5	77.0		49.5	17.5	17.5
Actuated g/C Ratio	0.64	1.00		0.64	0.23	0.23
Clearance Time (s)	7.5			7.5	7.5	7.5
Vehicle Extension (s)	4.0			4.0	3.0	3.0
Lane Grp Cap (vph)	2192	1526		2192	698	315
v/s Ratio Prot	0.25			c0.39	0.04	
v/s Ratio Perm		c0.18				0.04
v/c Ratio	0.39	0.18		0.60	0.19	0.18
Uniform Delay, d1	6.5	0.0		8.0	24.0	24.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.3		1.2	0.1	0.3
Delay (s)	7.1	0.3		9.3	24.1	24.3
Level of Service	A	A		A	C	C
Approach Delay (s)	5.4			9.3	24.2	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	688	230	248	979	11	190	101	96	101	657	308
Future Volume (vph)	92	688	230	248	979	11	190	101	96	101	657	308
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1772	3544	1547	1807	3510	1126	1825	3288	1555	1772	3614	1596
Flt Permitted	0.13	1.00	1.00	0.19	1.00	1.00	0.27	1.00	1.00	0.69	1.00	1.00
Satd. Flow (perm)	238	3544	1547	359	3510	1126	526	3288	1555	1280	3614	1596
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	95	709	237	256	1009	11	196	104	99	104	677	318
RTOR Reduction (vph)	0	0	162	0	0	7	0	0	52	0	0	114
Lane Group Flow (vph)	95	709	75	256	1009	4	196	104	47	104	677	204
Confl. Peds. (#/hr)			2	2								
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	3%	3%	4%	1%	4%	45%	0%	11%	5%	3%	1%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		1	6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	45.6	37.8	37.8	58.6	46.8	46.8	62.8	62.8	62.8	50.8	50.8	50.8
Effective Green, g (s)	51.6	41.3	41.3	61.6	50.3	50.3	65.8	65.3	65.3	53.3	53.3	53.3
Actuated g/C Ratio	0.38	0.30	0.30	0.45	0.37	0.37	0.48	0.48	0.48	0.39	0.39	0.39
Clearance Time (s)	4.0	8.5	8.5	4.0	8.5	8.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	209	1065	465	369	1284	412	355	1562	739	496	1401	619
v/s Ratio Prot	0.04	0.20		c0.10	c0.29		c0.04	0.03			c0.19	
v/s Ratio Perm	0.13		0.05	0.21		0.00	0.22		0.03	0.08		0.13
v/c Ratio	0.45	0.67	0.16	0.69	0.79	0.01	0.55	0.07	0.06	0.21	0.48	0.33
Uniform Delay, d1	30.5	42.0	35.3	26.9	38.8	27.7	22.3	19.5	19.5	28.0	31.7	29.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	1.6	0.2	5.6	3.2	0.0	1.9	0.1	0.2	1.0	1.2	1.4
Delay (s)	32.1	43.6	35.5	32.4	42.0	27.7	24.1	19.6	19.7	29.0	32.9	30.9
Level of Service	C	D	D	C	D	C	C	B	B	C	C	C
Approach Delay (s)		40.7			40.0			21.9			31.9	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	36.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	137.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	107.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



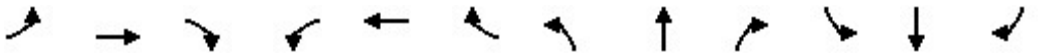
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	726	68	38	944	173	69
Future Volume (vph)	726	68	38	944	173	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3444	1541	1772	3510	1807	1526
Flt Permitted	1.00	1.00	0.35	1.00	0.95	1.00
Satd. Flow (perm)	3444	1541	661	3510	1807	1526
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	748	70	39	973	178	71
RTOR Reduction (vph)	0	20	0	0	0	59
Lane Group Flow (vph)	748	50	39	973	178	12
Heavy Vehicles (%)	6%	6%	3%	4%	1%	7%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	6			2	8	
Permitted Phases		6	2			8
Actuated Green, G (s)	64.7	64.7	64.7	64.7	14.4	14.4
Effective Green, g (s)	67.2	67.2	67.2	67.2	16.4	16.4
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.18	0.18
Clearance Time (s)	7.5	7.5	7.5	7.5	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2472	1106	474	2520	316	267
v/s Ratio Prot	0.22			c0.28	c0.10	
v/s Ratio Perm		0.03	0.06			0.01
v/c Ratio	0.30	0.05	0.08	0.39	0.56	0.05
Uniform Delay, d1	4.8	3.8	4.0	5.2	35.3	32.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.1	0.3	0.4	2.3	0.1
Delay (s)	5.1	3.9	4.3	5.6	37.6	32.2
Level of Service	A	A	A	A	D	C
Approach Delay (s)	5.0			5.5	36.1	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	93.6	Sum of lost time (s)	10.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	187	84	406	47	34	5	161	203	60	31	1031	699
Future Volume (vph)	187	84	406	47	34	5	161	203	60	31	1031	699
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	5.0	1.0	5.0		1.0	5.0		5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1738	1731	1532	1206	1560		1601	3047		1759	3544	1601
Flt Permitted	0.71	1.00	1.00	0.70	1.00		0.15	1.00		0.58	1.00	1.00
Satd. Flow (perm)	1302	1731	1532	890	1560		258	3047		1083	3544	1601
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	193	87	419	48	35	5	166	209	62	32	1063	721
RTOR Reduction (vph)	0	0	221	0	3	0	0	18	0	0	0	342
Lane Group Flow (vph)	193	87	198	48	37	0	166	253	0	32	1063	379
Confl. Peds. (#/hr)			2	2					4	4		
Heavy Vehicles (%)	5%	11%	5%	51%	21%	20%	14%	8%	38%	3%	3%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	7	4		3	8		1	6			2	
Permitted Phases	4		4	8			6			2		2
Actuated Green, G (s)	50.2	39.8	39.8	39.8	33.4		85.5	85.5		69.3	69.3	69.3
Effective Green, g (s)	53.2	42.3	42.3	45.8	35.9		88.5	88.0		71.8	71.8	71.8
Actuated g/C Ratio	0.35	0.28	0.28	0.30	0.24		0.59	0.58		0.48	0.48	0.48
Clearance Time (s)	4.0	7.5	7.5	4.0	7.5		4.0	7.5		7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	505	485	430	290	371		286	1779		515	1688	762
v/s Ratio Prot	c0.04	0.05		0.01	0.02		c0.06	0.08			c0.30	
v/s Ratio Perm	0.09		c0.13	0.04			0.28			0.03		0.24
v/c Ratio	0.38	0.18	0.46	0.17	0.10		0.58	0.14		0.06	0.63	0.50
Uniform Delay, d1	35.5	41.1	44.8	38.0	44.8		19.5	14.2		21.3	29.5	27.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.8	3.5	0.3	0.5		3.0	0.2		0.2	1.8	2.3
Delay (s)	36.0	41.9	48.3	38.3	45.3		22.5	14.4		21.5	31.3	29.4
Level of Service	D	D	D	D	D		C	B		C	C	C
Approach Delay (s)		44.1			41.5			17.5			30.4	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	32.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	150.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	2	14	792	10	247	5	302	249	251	773	3
Future Volume (vph)	1	2	14	792	10	247	5	302	249	251	773	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0		1.0	5.0		5.0	5.0	1.0	1.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1825	1669		1755	1461		1825	1715	1440	1659	1762	
Flt Permitted	0.60	1.00		0.73	1.00		0.08	1.00	1.00	0.42	1.00	
Satd. Flow (perm)	1145	1669		1340	1461		145	1715	1440	728	1762	
Peak-hour factor, PHF	0.97	0.97	0.97	1.00	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1	2	14	792	10	255	5	311	257	259	797	3
RTOR Reduction (vph)	0	11	0	0	143	0	0	0	97	0	0	0
Lane Group Flow (vph)	1	5	0	792	122	0	5	311	160	259	800	0
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	0%	0%	4%	0%	13%	0%	12%	12%	10%	9%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8			6	3	5	2	
Permitted Phases	4			8			6		6	2		
Actuated Green, G (s)	31.6	30.2		66.2	60.8		51.0	51.0	83.0	63.0	63.0	
Effective Green, g (s)	37.6	32.2		69.2	62.8		53.0	53.0	89.0	66.0	65.0	
Actuated g/C Ratio	0.26	0.22		0.48	0.44		0.37	0.37	0.62	0.46	0.45	
Clearance Time (s)	4.0	7.0		4.0	7.0		7.0	7.0	4.0	4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		6.0	6.0	3.0	6.0	3.0	
Lane Grp Cap (vph)	321	375		748	640		53	634	894	407	799	
v/s Ratio Prot	0.00	0.00		c0.26	0.08			0.18	0.04	0.05	c0.45	
v/s Ratio Perm	0.00			0.25			0.03		0.07	0.24		
v/c Ratio	0.00	0.01		1.06	0.19		0.09	0.49	0.18	0.64	1.00	
Uniform Delay, d1	39.0	43.2		34.9	24.6		29.4	34.7	11.5	28.4	39.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.1		49.6	0.7		3.5	2.7	0.1	5.4	32.1	
Delay (s)	39.0	43.2		84.4	25.3		32.9	37.4	11.6	33.7	71.2	
Level of Service	D	D		F	C		C	D	B	C	E	
Approach Delay (s)		43.0			69.6			25.8			62.1	
Approach LOS		D			E			C			E	

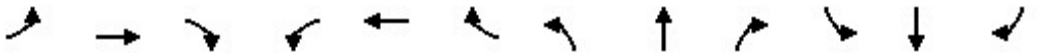
Intersection Summary			
HCM 2000 Control Delay	57.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	143.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	128.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	418	101	86	1086	130	129
Future Volume (vph)	418	101	86	1086	130	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1812	1480	1788	1883	1738	1567
Flt Permitted	1.00	1.00	0.48	1.00	0.95	1.00
Satd. Flow (perm)	1812	1480	910	1883	1738	1567
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	431	104	89	1120	134	133
RTOR Reduction (vph)	0	41	0	0	0	105
Lane Group Flow (vph)	431	63	89	1120	134	28
Confl. Peds. (#/hr)		1	1		1	1
Heavy Vehicles (%)	6%	8%	2%	2%	5%	2%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	6			2	8	
Permitted Phases		6	2			8
Actuated Green, G (s)	30.3	30.3	30.3	30.3	10.6	10.6
Effective Green, g (s)	32.8	32.8	32.8	32.8	11.6	11.6
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.21	0.21
Clearance Time (s)	7.5	7.5	7.5	7.5	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1092	892	548	1135	370	334
v/s Ratio Prot	0.24			c0.59	c0.08	
v/s Ratio Perm		0.04	0.10			0.02
v/c Ratio	0.39	0.07	0.16	0.99	0.36	0.08
Uniform Delay, d1	5.6	4.5	4.8	10.6	18.2	17.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.2	0.6	23.7	0.6	0.1
Delay (s)	6.7	4.6	5.4	34.3	18.9	17.3
Level of Service	A	A	A	C	B	B
Approach Delay (s)	6.3			32.2	18.1	
Approach LOS	A			C	B	

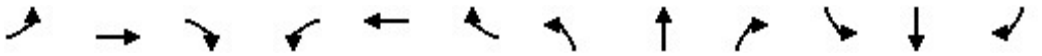
Intersection Summary			
HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	54.4	Sum of lost time (s)	10.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	166	379	33	245	488	71	35	919	132	181	1682	284
Future Volume (vph)	166	379	33	245	488	71	35	919	132	181	1682	284
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	5.0	1.0	5.0	5.0	5.0	5.0	5.0	1.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1738	1865	1330	1772	1847	1385	1644	3476	1487	1770	3579	1585
Flt Permitted	0.10	1.00	1.00	0.18	1.00	1.00	0.06	1.00	1.00	0.21	1.00	1.00
Satd. Flow (perm)	188	1865	1330	335	1847	1385	96	3476	1487	390	3579	1585
Peak-hour factor, PHF	0.97	0.97	0.97	1.00	1.00	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	171	391	34	245	488	73	36	947	136	187	1734	293
RTOR Reduction (vph)	0	0	25	0	0	54	0	0	66	0	0	89
Lane Group Flow (vph)	171	391	9	245	488	19	36	947	70	187	1734	204
Confl. Peds. (#/hr)	16		1	1		16	5		14	14		5
Confl. Bikes (#/hr)			1			1			1			2
Heavy Vehicles (%)	5%	3%	21%	3%	4%	14%	11%	5%	4%	3%	2%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8			6		5	2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	44.0	36.0	36.0	44.0	36.0	36.0	74.0	74.0	74.0	86.0	86.0	86.0
Effective Green, g (s)	50.0	39.0	39.0	50.0	39.0	39.0	77.0	77.0	77.0	89.0	89.0	89.0
Actuated g/C Ratio	0.33	0.26	0.26	0.33	0.26	0.26	0.51	0.51	0.51	0.59	0.59	0.59
Clearance Time (s)	4.0	8.0	8.0	4.0	8.0	8.0	8.0	8.0	8.0	4.0	8.0	8.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	176	484	345	217	480	360	49	1784	763	332	2123	940
v/s Ratio Prot	0.07	0.21		c0.08	c0.26			0.27		0.04	c0.48	
v/s Ratio Perm	0.25		0.01	0.29		0.01	0.38		0.05	0.29		0.13
v/c Ratio	0.97	0.81	0.03	1.13	1.02	0.05	0.73	0.53	0.09	0.56	0.82	0.22
Uniform Delay, d1	41.5	52.0	41.3	45.7	55.5	41.6	28.5	24.4	18.6	16.7	24.1	14.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	59.2	9.6	0.0	100.1	45.3	0.2	65.6	1.1	0.2	2.2	3.6	0.5
Delay (s)	100.6	61.6	41.4	145.9	100.8	41.8	94.2	25.6	18.9	18.9	27.7	14.8
Level of Service	F	E	D	F	F	D	F	C	B	B	C	B
Approach Delay (s)		71.6			109.2			26.9			25.2	
Approach LOS		E			F			C			C	

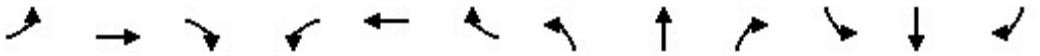
Intersection Summary			
HCM 2000 Control Delay	45.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	123.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2524	10	9	1054	0	6	0	13	79	5	32
Future Volume (vph)	0	2524	10	9	1054	0	6	0	13	79	5	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		1.0	5.0		5.0		5.0	5.0	5.0	5.0
Lane Util. Factor		0.91		1.00	0.95		1.00		1.00	0.95	0.91	0.95
Frpb, ped/bikes		1.00		1.00	1.00		1.00		1.00	1.00	1.00	0.99
Flpb, ped/bikes		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Frt		1.00		1.00	1.00		1.00		0.85	1.00	0.99	0.85
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.96	1.00
Satd. Flow (prot)		4852		1372	3349		1371		1247	1651	1521	1085
Flt Permitted		1.00		0.04	1.00		0.45		1.00	0.95	0.96	1.00
Satd. Flow (perm)		4852		52	3349		656		1247	1651	1521	1085
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	2602	10	9	1087	0	6	0	13	81	5	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	12	0	2	28
Lane Group Flow (vph)	0	2612	0	9	1087	0	6	0	1	45	42	2
Confl. Peds. (#/hr)			4	4			1					1
Heavy Vehicles (%)	0%	8%	10%	33%	9%	0%	33%	0%	31%	5%	20%	41%
Turn Type		NA		pm+pt	NA	Perm	Perm		Perm	Perm	NA	Perm
Protected Phases		2		1	6						4	
Permitted Phases				6		6	8		8	4		4
Actuated Green, G (s)		107.8		113.2	113.2		6.3		6.3	9.0	9.0	9.0
Effective Green, g (s)		109.8		116.2	115.2		8.8		8.8	11.0	11.0	11.0
Actuated g/C Ratio		0.73		0.77	0.77		0.06		0.06	0.07	0.07	0.07
Clearance Time (s)		7.0		4.0	7.0		7.5		7.5	7.0	7.0	7.0
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		3551		79	2572		38		73	121	111	79
v/s Ratio Prot		c0.54		0.00	c0.32							
v/s Ratio Perm				0.09			c0.01		0.00	0.03	0.03	0.00
v/c Ratio		0.74		0.11	0.42		0.16		0.01	0.37	0.38	0.03
Uniform Delay, d1		11.7		10.3	6.0		67.1		66.5	66.2	66.2	64.5
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		1.4		0.6	0.5		1.9		0.1	1.9	2.2	0.1
Delay (s)		13.1		11.0	6.5		69.0		66.6	68.1	68.4	64.7
Level of Service		B		B	A		E		E	E	E	E
Approach Delay (s)		13.1			6.5			67.3			67.4	
Approach LOS		B			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1239	0	0	2249	0	403	0	467	0	0	0
Future Volume (vph)	0	1239	0	0	2249	0	403	0	467	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0		5.0		5.0			
Lane Util. Factor		0.95			0.95		0.97		0.88			
Frt		1.00			1.00		1.00		0.85			
Flt Protected		1.00			1.00		0.95		1.00			
Satd. Flow (prot)		3411			3444		3190		2566			
Flt Permitted		1.00			1.00		0.95		1.00			
Satd. Flow (perm)		3411			3444		3190		2566			
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1277	0	0	2319	0	415	0	481	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	117	0	0	0
Lane Group Flow (vph)	0	1277	0	0	2319	0	415	0	364	0	0	0
Heavy Vehicles (%)	0%	7%	0%	0%	6%	0%	11%	0%	12%	0%	0%	0%
Turn Type		NA	Perm		NA	Perm	Perm		Perm			
Protected Phases		2			6							
Permitted Phases			2			6	8		8			
Actuated Green, G (s)		117.4			117.4		28.6		28.6			
Effective Green, g (s)		119.9			119.9		30.1		30.1			
Actuated g/C Ratio		0.75			0.75		0.19		0.19			
Clearance Time (s)		7.5			7.5		6.5		6.5			
Vehicle Extension (s)		3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)		2556			2580		600		482			
v/s Ratio Prot		0.37			c0.67							
v/s Ratio Perm							0.13		c0.14			
v/c Ratio		0.50			0.90		0.69		0.76			
Uniform Delay, d1		8.0			15.4		60.6		61.5			
Progression Factor		1.00			0.70		1.00		1.00			
Incremental Delay, d2		0.7			2.9		3.4		6.6			
Delay (s)		8.7			13.7		64.1		68.1			
Level of Service		A			B		E		E			
Approach Delay (s)		8.7			13.7			66.2			0.0	
Approach LOS		A			B			E			A	

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	11.5
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	1205	241	223	1460	26	156	312	101	76	912	511
Future Volume (vph)	135	1205	241	223	1460	26	156	312	101	76	912	511
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3404	3476	1564	1755	3579	1305	1722	3380	1427	1681	3579	1578
Flt Permitted	0.95	1.00	1.00	0.08	1.00	1.00	0.09	1.00	1.00	0.49	1.00	1.00
Satd. Flow (perm)	3404	3476	1564	139	3579	1305	158	3380	1427	874	3579	1578
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	139	1242	248	230	1505	27	161	322	104	78	940	527
RTOR Reduction (vph)	0	0	124	0	0	0	0	0	74	0	0	111
Lane Group Flow (vph)	139	1242	124	230	1505	27	161	322	30	78	940	416
Confl. Peds. (#/hr)	4		1	1		4	2		14	14		2
Heavy Vehicles (%)	4%	5%	3%	4%	2%	23%	6%	8%	11%	8%	2%	2%
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		4
Actuated Green, G (s)	9.7	67.1	67.1	86.7	72.0	72.0	55.0	43.7	43.7	51.6	42.0	42.0
Effective Green, g (s)	13.7	70.1	70.1	89.7	75.0	75.0	60.3	46.7	46.7	57.6	45.0	45.0
Actuated g/C Ratio	0.09	0.44	0.44	0.56	0.47	0.47	0.38	0.29	0.29	0.36	0.28	0.28
Clearance Time (s)	5.0	8.0	8.0	4.0	8.0	8.0	4.0	8.0	8.0	4.0	8.0	8.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	291	1522	685	265	1677	611	199	986	416	378	1006	443
v/s Ratio Prot	0.04	0.36		c0.10	c0.42		c0.07	0.10		0.02	0.26	
v/s Ratio Perm			0.08	0.38		0.02	0.23		0.02	0.06		c0.26
v/c Ratio	0.48	0.82	0.18	0.87	0.90	0.04	0.81	0.33	0.07	0.21	0.93	0.94
Uniform Delay, d1	69.7	39.3	27.4	44.9	39.0	23.1	40.6	44.3	41.0	34.4	56.1	56.2
Progression Factor	0.96	1.14	2.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	4.3	0.5	24.5	8.0	0.1	21.0	0.2	0.1	0.3	15.0	27.8
Delay (s)	68.1	49.3	69.1	69.4	47.0	23.2	61.6	44.5	41.1	34.7	71.1	84.0
Level of Service	E	D	E	E	D	C	E	D	D	C	E	F
Approach Delay (s)		53.9			49.5			48.6			73.6	
Approach LOS		D			D			D			E	

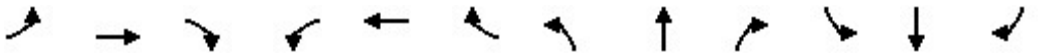
Intersection Summary			
HCM 2000 Control Delay	57.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	1256	148	130	1472	40	111	295	122	200	966	97
Future Volume (vph)	63	1256	148	130	1472	40	111	295	122	200	966	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0		1.0	5.0		1.0	5.0		1.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1738	3510		1789	3563		1738	3299		1802	3507	
Flt Permitted	0.06	1.00		0.06	1.00		0.09	1.00		0.37	1.00	
Satd. Flow (perm)	105	3510		106	3563		156	3299		705	3507	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	65	1295	153	134	1518	41	114	304	126	206	996	100
RTOR Reduction (vph)	0	6	0	0	1	0	0	27	0	0	5	0
Lane Group Flow (vph)	65	1442	0	134	1558	0	114	403	0	206	1091	0
Confl. Peds. (#/hr)	15		7	7		15	20		13	13		20
Heavy Vehicles (%)	5%	2%	3%	2%	2%	0%	5%	6%	2%	1%	2%	5%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	74.0	66.8		80.2	69.9		52.0	44.0		65.0	53.0	
Effective Green, g (s)	80.0	68.8		84.1	71.9		58.0	46.0		68.0	55.0	
Actuated g/C Ratio	0.50	0.43		0.53	0.45		0.36	0.29		0.42	0.34	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	156	1508		195	1600		165	947		436	1204	
v/s Ratio Prot	0.03	0.41		c0.06	c0.44		c0.05	0.12		0.06	c0.31	
v/s Ratio Perm	0.18			0.30			0.20			0.14		
v/c Ratio	0.42	0.96		0.69	0.97		0.69	0.43		0.47	0.91	
Uniform Delay, d1	34.8	44.2		41.3	43.2		39.6	46.3		30.5	50.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	14.9		9.6	17.1		11.8	1.4		0.8	11.4	
Delay (s)	36.6	59.1		51.0	60.2		51.4	47.7		31.3	61.5	
Level of Service	D	E		D	E		D	D		C	E	
Approach Delay (s)		58.1			59.5			48.5			56.7	
Approach LOS		E			E			D			E	

Intersection Summary			
HCM 2000 Control Delay	57.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	160.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		

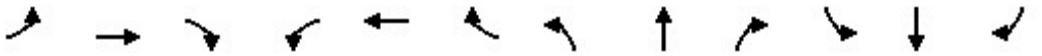
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	1096	249	198	1184	16	171	377	128	29	1039	396
Future Volume (vph)	183	1096	249	198	1184	16	171	377	128	29	1039	396
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1755	3579	1545	1807	3579	1517	1807	3510	1543	1769	3614	1575
Flt Permitted	0.08	1.00	1.00	0.08	1.00	1.00	0.08	1.00	1.00	0.50	1.00	1.00
Satd. Flow (perm)	143	3579	1545	145	3579	1517	153	3510	1543	933	3614	1575
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	189	1130	257	204	1221	16	176	389	132	30	1071	408
RTOR Reduction (vph)	0	0	103	0	0	10	0	0	81	0	0	103
Lane Group Flow (vph)	189	1130	154	204	1221	6	176	389	51	30	1071	305
Confl. Peds. (#/hr)	4		4	4		4	4		5	5		4
Heavy Vehicles (%)	4%	2%	4%	1%	2%	6%	1%	4%	4%	3%	1%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	56.6	48.6	48.6	60.6	50.6	50.6	58.8	50.8	50.8	51.4	47.1	47.1
Effective Green, g (s)	62.6	51.1	51.1	65.6	53.1	53.1	62.1	53.3	53.3	57.4	49.6	49.6
Actuated g/C Ratio	0.46	0.37	0.37	0.48	0.39	0.39	0.45	0.39	0.39	0.42	0.36	0.36
Clearance Time (s)	4.0	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	195	1337	577	227	1390	589	202	1368	601	436	1311	571
v/s Ratio Prot	c0.08	0.32		c0.09	0.34		c0.07	0.11		0.00	c0.30	
v/s Ratio Perm	c0.36		0.10	0.35		0.00	0.32		0.03	0.03		0.19
v/c Ratio	0.97	0.85	0.27	0.90	0.88	0.01	0.87	0.28	0.09	0.07	0.82	0.53
Uniform Delay, d1	38.2	39.2	29.8	38.1	38.8	25.7	33.7	28.6	26.3	23.4	39.4	34.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	54.9	6.7	1.1	33.4	8.1	0.0	31.1	0.1	0.1	0.1	4.1	1.0
Delay (s)	93.0	45.9	30.9	71.5	46.9	25.7	64.8	28.7	26.4	23.5	43.5	35.4
Level of Service	F	D	C	E	D	C	E	C	C	C	D	D
Approach Delay (s)		49.1			50.2			37.4			40.9	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	45.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	136.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.2%	ICU Level of Service	F
Analysis Period (min)	15		

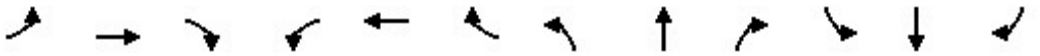
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	1021	97	183	1046	95	95	731	250	194	1315	307
Future Volume (vph)	179	1021	97	183	1046	95	95	731	250	194	1315	307
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	4.0	1.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1722	3476	1585	1807	3544	1565	1807	3510	1551	1824	3614	1600
Flt Permitted	0.09	1.00	1.00	0.09	1.00	1.00	0.07	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)	155	3476	1585	163	3544	1565	128	3510	1551	487	3614	1600
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	185	1053	100	189	1078	98	98	754	258	200	1356	316
RTOR Reduction (vph)	0	0	0	0	0	63	0	0	124	0	0	118
Lane Group Flow (vph)	185	1053	100	189	1078	35	98	754	134	200	1356	198
Confl. Peds. (#/hr)	1					1	7		8	8		7
Heavy Vehicles (%)	6%	5%	3%	1%	3%	3%	1%	4%	3%	0%	1%	0%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		Free	6		6	8		8	4		4
Actuated Green, G (s)	53.8	43.9	140.0	53.4	43.7	43.7	64.2	56.4	56.4	64.6	56.6	56.6
Effective Green, g (s)	59.8	45.9	140.0	59.4	45.7	45.7	70.2	58.4	58.4	70.6	58.6	58.6
Actuated g/C Ratio	0.43	0.33	1.00	0.42	0.33	0.33	0.50	0.42	0.42	0.50	0.42	0.42
Clearance Time (s)	4.0	7.0		4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	210	1139	1585	218	1156	510	193	1464	646	350	1512	669
v/s Ratio Prot	c0.08	0.30		0.08	c0.30		0.04	0.21		c0.04	c0.38	
v/s Ratio Perm	0.30		0.06	0.29		0.02	0.21		0.09	0.24		0.12
v/c Ratio	0.88	0.92	0.06	0.87	0.93	0.07	0.51	0.52	0.21	0.57	0.90	0.30
Uniform Delay, d1	37.4	45.4	0.0	36.4	45.7	32.5	28.1	30.3	26.0	21.0	37.9	27.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	32.1	13.8	0.1	28.3	14.5	0.3	2.1	0.3	0.2	2.3	7.4	0.2
Delay (s)	69.5	59.1	0.1	64.8	60.2	32.7	30.2	30.6	26.2	23.2	45.2	27.3
Level of Service	E	E	A	E	E	C	C	C	C	C	D	C
Approach Delay (s)		56.2			58.9			29.5			39.9	
Approach LOS		E			E			C			D	

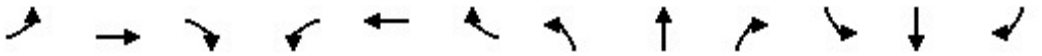
Intersection Summary			
HCM 2000 Control Delay	46.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



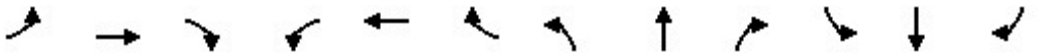
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	65	18	147	147	10	8	203	63	12	695	72
Future Volume (vph)	38	65	18	147	147	10	8	203	63	12	695	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			0.97			0.99	
Flt Protected		0.98			0.98			1.00			1.00	
Satd. Flow (prot)		1748			1809			1680			1841	
Flt Permitted		0.78			0.49			0.97			0.99	
Satd. Flow (perm)		1388			901			1640			1831	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	38	65	18	147	147	10	8	203	63	12	695	72
RTOR Reduction (vph)	0	5	0	0	1	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	116	0	0	303	0	0	274	0	0	779	0
Heavy Vehicles (%)	13%	2%	6%	5%	1%	10%	25%	10%	11%	0%	3%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		11.5			45.6			59.3			59.3	
Effective Green, g (s)		13.0			47.1			62.8			62.8	
Actuated g/C Ratio		0.09			0.34			0.46			0.46	
Clearance Time (s)		6.5			6.5			8.5			8.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		130			307			746			833	
v/s Ratio Prot												
v/s Ratio Perm		c0.08			c0.34			0.17			c0.43	
v/c Ratio		0.90			0.99			0.37			0.94	
Uniform Delay, d1		61.8			45.1			24.6			35.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		48.3			47.6			0.3			17.4	
Delay (s)		110.1			92.7			24.9			53.0	
Level of Service		F			F			C			D	
Approach Delay (s)		110.1			92.7			24.9			53.0	
Approach LOS		F			F			C			D	

Intersection Summary			
HCM 2000 Control Delay	60.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	137.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



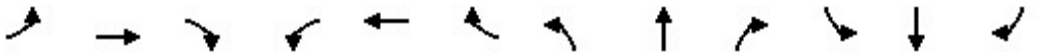
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	148	78	257	168	49	43	356	77	19	1598	105
Future Volume (vph)	57	148	78	257	168	49	43	356	77	19	1598	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor		1.00			1.00	1.00		0.95	1.00		0.95	1.00
Frpb, ped/bikes		1.00			1.00	0.99		1.00	0.98		1.00	0.97
Flpb, ped/bikes		1.00			1.00	1.00		1.00	1.00		1.00	1.00
Frt		0.96			1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99			0.97	1.00		0.99	1.00		1.00	1.00
Satd. Flow (prot)		1727			1828	1519		3319	1464		3564	1485
Flt Permitted		0.69			0.60	1.00		0.60	1.00		0.95	1.00
Satd. Flow (perm)		1196			1134	1519		2012	1464		3376	1485
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	57	148	78	257	168	49	43	356	77	19	1598	105
RTOR Reduction (vph)	0	10	0	0	0	29	0	0	37	0	0	51
Lane Group Flow (vph)	0	273	0	0	425	20	0	399	40	0	1617	54
Confl. Peds. (#/hr)	1					1	3		1	1		3
Confl. Bikes (#/hr)						1			1			
Heavy Vehicles (%)	7%	2%	13%	2%	2%	6%	21%	8%	9%	32%	2%	7%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)		44.2			44.2	44.2		57.2	57.2		57.2	57.2
Effective Green, g (s)		46.2			46.2	46.2		59.7	59.7		59.7	59.7
Actuated g/C Ratio		0.40			0.40	0.40		0.52	0.52		0.52	0.52
Clearance Time (s)		7.0			7.0	7.0		7.5	7.5		7.5	7.5
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		476			452	605		1036	754		1738	764
v/s Ratio Prot												
v/s Ratio Perm		0.23			c0.37	0.01		0.20	0.03		c0.48	0.04
v/c Ratio		0.57			0.94	0.03		0.39	0.05		0.93	0.07
Uniform Delay, d1		27.2			33.5	21.2		17.0	14.0		26.2	14.1
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		1.7			27.8	0.0		0.2	0.0		9.4	0.0
Delay (s)		28.9			61.4	21.3		17.2	14.0		35.6	14.2
Level of Service		C			E	C		B	B		D	B
Approach Delay (s)		28.9			57.2			16.7			34.3	
Approach LOS		C			E			B			C	

Intersection Summary			
HCM 2000 Control Delay	34.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	115.9	Sum of lost time (s)	10.0
Intersection Capacity Utilization	108.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	109	0	273	0	0	0	290	332	0	0	493	224
Future Volume (vph)	109	0	273	0	0	0	290	332	0	0	493	224
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0				5.0	5.0			5.0	5.0
Lane Util. Factor	1.00		1.00				1.00	1.00			1.00	1.00
Frt	1.00		0.85				1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)	1789		1601				1789	1883			1883	1601
Flt Permitted	0.95		1.00				0.45	1.00			1.00	1.00
Satd. Flow (perm)	1789		1601				854	1883			1883	1601
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	112	0	281	0	0	0	299	342	0	0	508	231
RTOR Reduction (vph)	0	0	247	0	0	0	0	0	0	0	0	48
Lane Group Flow (vph)	112	0	34	0	0	0	299	342	0	0	508	183
Heavy Vehicles (%)	2%	0%	2%	0%	0%	0%	2%	2%	0%	0%	2%	2%
Turn Type	Perm		Perm				Perm	NA			NA	Perm
Protected Phases								2			6	
Permitted Phases	4		4				2					6
Actuated Green, G (s)	13.1		13.1				92.0	92.0			92.0	92.0
Effective Green, g (s)	14.6		14.6				95.0	95.0			95.0	95.0
Actuated g/C Ratio	0.12		0.12				0.79	0.79			0.79	0.79
Clearance Time (s)	6.5		6.5				8.0	8.0			8.0	8.0
Vehicle Extension (s)	3.0		3.0				3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	218		195				678	1495			1495	1271
v/s Ratio Prot								0.18			0.27	
v/s Ratio Perm	c0.06		0.02				c0.35					0.11
v/c Ratio	0.51		0.18				0.44	0.23			0.34	0.14
Uniform Delay, d1	49.2		47.1				3.9	3.1			3.5	2.9
Progression Factor	1.00		1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	2.0		0.4				2.1	0.4			0.6	0.2
Delay (s)	51.2		47.5				6.0	3.4			4.1	3.1
Level of Service	D		D				A	A			A	A
Approach Delay (s)		48.6			0.0			4.6			3.8	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	119.6	Sum of lost time (s)	11.5
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	595	0	59	0	915	245	139	1370	0
Future Volume (vph)	0	0	0	595	0	59	0	915	245	139	1370	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.0	5.0	5.0		5.0	5.0	1.0	5.0	
Lane Util. Factor				0.95	0.95	1.00		0.95	1.00	1.00	0.95	
Frt				1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected				0.95	0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1700	1700	1601		3579	1601	1789	3579	
Flt Permitted				0.95	0.95	1.00		1.00	1.00	0.19	1.00	
Satd. Flow (perm)				1700	1700	1601		3579	1601	360	3579	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	613	0	61	0	943	253	143	1412	0
RTOR Reduction (vph)	0	0	0	0	0	39	0	0	87	0	0	0
Lane Group Flow (vph)	0	0	0	306	307	22	0	943	166	143	1412	0
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	0%	2%	2%	2%	2%	0%
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)				40.0	40.0	40.0		50.0	50.0	61.0	61.0	
Effective Green, g (s)				42.0	42.0	42.0		52.5	52.5	64.0	63.5	
Actuated g/C Ratio				0.36	0.36	0.36		0.45	0.45	0.55	0.55	
Clearance Time (s)				7.0	7.0	7.0		7.5	7.5	4.0	7.5	
Vehicle Extension (s)				3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)				618	618	582		1626	727	323	1967	
v/s Ratio Prot								0.26		0.04	c0.39	
v/s Ratio Perm				0.18	0.18	0.01			0.10	0.21		
v/c Ratio				0.50	0.50	0.04		0.58	0.23	0.44	0.72	
Uniform Delay, d1				28.5	28.5	23.7		23.3	19.2	14.8	19.3	
Progression Factor				1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2				0.6	0.6	0.0		1.5	0.7	1.0	2.3	
Delay (s)				29.1	29.2	23.7		24.8	19.9	15.8	21.6	
Level of Service				C	C	C		C	B	B	C	
Approach Delay (s)		0.0			28.7			23.8			21.1	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	115.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	112.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Appendix D: Evaluation of Active Transportation Facilities on Teston Road

TABLE 1: MMLOS INTERSECTION ANALYSIS AT TESTON ROAD AND JANE STREET

	Criteria (Intersection Analysis) [1]		Intersection Approach [2]			
			Jane Street		Teston Road	
			NB	SB	EB	WB
Auto	Automobile Performance at the Intersection Approach	Delay (seconds)	25	33	44	42
		Volume to Capacity	0.55 (NBL)	0.48 (SBT)	0.67 (EBT)	0.79 (WBT)
	Auto Level of Service (ALOS)	***Target = D***	**C**	**C**	**D**	**D**
Pedestrian [3]	Sidewalk / Multi-Use Path Width (Dimension)		1.5m	None	1.5m	None
	Buffer / Boulevard (Dimension)		1.0m	None	1.0m	None
	Signalized Crossing (Yes / No)		Yes	Yes	Yes	Yes
	Crosswalk (Yes / No)		Yes	Yes	Yes	Yes
	Pedestrian Level of Service (PLOS)	***Target = C***	**B**	**F**	**B**	**F**
Bicycle	Separated, Dedicated or Shared [4]		None	Dedicated	None	None
	Bicycle Facility Width (Dimension)		-	1.25m	-	-
	Buffer (Yes / No)		No	No	No	No
	Bicycle Treatment (e.g. bike box, bicycle signal head, etc.)		No	No	No	No
	Bicycle Level of Service (BLOS)	***Target = C***	**F**	**D**	**F**	**F**
Transit [5 & 6]	Transit Service Frequency – Headway (minutes) [7]		-	-	12	-
	Transit Service Level of Service (TSLOS)	***Target = C***	**N/A**	**N/A**	**C**	**N/A**
	Transit Vehicle Performance at the Intersection Approach [8]	Delay (seconds)	-	-	36	-
		Volume to Capacity	-	-	0.16 (EBR)	-
	Transit Performance Level of Service (TPLOS)	***Target = D***	**N/A**	**N/A**	**D**	**N/A**

[1] Overall LOS for each mode is based on the worst-case criteria.
[2] All modes evaluated in direction of travel for each intersection approach.
[3] Pedestrian facility referenced York Region Transportation Master Plan – Map 5: Sidewalk Gaps on Regional Roads dated May 12th, 2016.
[4] Bicycle facility type referenced York Region Transportation Master Plan – Map 4: Existing Cycling Network dated May 12, 2016.
[5] Transit evaluation based on York Region System Map dated September 6, 2020.
[6] Transit LOS evaluation does not include "Access to Transit Stops, Stations or Transfer Points" since this criterion is development related.
[7] Transit headway provided by YRT based on October 2019 conditions (pre-COVID).
[8] Transit Vehicle Performance evaluated based on the transit movement at the intersection.

TABLE 2: MMLOS SEGMENT ANALYSIS ON TESTON ROAD BETWEEN JANE STREET TO KEELE STREET

	Criteria (Segment Analysis) [1]		Mid-Block Segment	
			Teston Road	
			EB	WB
Auto	Automobile Performance at the Intersection Approach	Delay (seconds) [2] [3]	49	42
		Volume to Capacity [2] [3]	0.46 (EBR)	0.79 (WBT)
	Auto Level of Service (ALOS)	***Target = D***	**D**	**D**
Pedestr. [4]	Sidewalk / Multi-Use Path Width (Dimension)		3.0m	-
	Buffer / Boulevard (Dimension)		4.0m	-
	Pedestrian Level of Service (PLOS)	***Target = C***	**A**	**F**
Bicycle	Separated, Dedicated or Shared [5]		Separated	None
	Bicycle Facility Width (Dimension)		3.0m	-
	Buffer (Yes / No)		Yes	-
	Bicycle Level of Service (BLOS)	***Target = C***	**A**	**F**
Transit [6] [7]	Transit Service Frequency (Headway) [8]		-	-
	Transit Service Level of Service (TSLOS)	***Target = C***	**N/A**	**N/A**
	Transit Vehicle Performance at the Intersection Approach [9]	Delay (seconds)	-	-
		Volume to Capacity	-	-
	Transit Performance Level of Service (TPLOS)	***Target = D***	**N/A**	**N/A**

[1] Overall LOS for each mode is based on the worst-case criteria.
[2] EB segment delay and v/c ratio are for the EB approach to Keele Street.
[3] WB segment delay and v/c ratio are for the WB approach to Jane Street.
[4] Pedestrian facility referenced York Region Transportation Master Plan – Map 5: Sidewalk Gaps on Regional Roads dated May 12th, 2016.
[5] Bicycle facility type referenced York Region Transportation Master Plan – Map 4: Existing Cycling Network dated May 12, 2016.
[6] Transit evaluation based on York Region System Map dated September 6, 2020.
[7] Transit LOS evaluation does not include "Access to Transit Stops, Stations or Transfer Points" since this criterion is development related or "Boarding Volumes" since it is not available.
[8] Transit headway provided by YRT based on October 2019 conditions (pre-COVID).
[9] Transit Vehicle Performance evaluated based on the transit movement at the intersection.

TABLE 3: MMLOS INTERSECTION ANALYSIS AT TESTON ROAD AND KEELE STREET

	Criteria (Intersection Analysis) [1]		Intersection Approach [2]			
			Keele Street		Teston Road	
			NB	SB	EB	WB
Auto	Automobile Performance at the Intersection Approach	Delay (seconds)	23	32	49	46
		Volume to Capacity	0.58 (NBL)	0.63 (SBT)	0.46 (EBR)	0.10 (WBTR)
	Auto Level of Service (ALOS)	***Target = D***	**C**	**C**	**D**	**D**
Pedestrian [3]	Sidewalk / Multi-Use Path Width (Dimension)		-	-	3.0m	-
	Buffer / Boulevard (Dimension)		-	-	5.0m	-
	Signalized Crossing (Yes / No)		Yes	Yes	Yes	Yes
	Crosswalk (Yes / No)		Yes	Yes	Yes	Yes
	Pedestrian Level of Service (PLOS)	***Target = C***	**F**	**F**	**A**	**F**
Bicycle	Separated, Dedicated or Shared [4]		None	None	Separated	None
	Bicycle Facility Width (Dimension)		-	-	3.0m	-
	Buffer (Yes / No)		No	No	Yes	No
	Bicycle Treatment (e.g. bike box, bicycle signal head, etc.)		No	No	No	No
	Bicycle Level of Service (BLOS)	***Target = C***	**F**	**F**	**A**	**F**
Transit [5 & 6]	Transit Service Frequency (Headway) [7]		25 – 32 minutes	25 – 32 minutes	19 minutes	-
	Transit Service Level of Service (TSLOS)	***Target = C***	**E / F**	**E / F**	**D**	**N/A**
	Transit Vehicle Performance at the Intersection Approach [8]	Delay (seconds)	15	32	49	-
		Volume to Capacity	0.14 (NBT)	0.63 (SBT)	0.46 (EBR)	-
	Transit Performance Level of Service (TPLOS)	***Target = D***	**B**	**C**	**D**	**N/A**

[1] Overall LOS for each mode is based on the worst-case criteria.
[2] All modes evaluated in direction of travel for each intersection approach.
[3] Pedestrian facility referenced York Region Transportation Master Plan – Map 5: Sidewalk Gaps on Regional Roads dated May 12th, 2016.
[4] Bicycle facility type referenced York Region Transportation Master Plan – Map 4: Existing Cycling Network dated May 12, 2016.
[5] Transit evaluation based on York Region System Map dated September 6, 2020.
[6] Transit LOS evaluation does not include "Access to Transit Stops, Stations or Transfer Points" since this criterion is development related.
[7] Transit headway provided by YRT based on October 2019 conditions (pre-COVID).
[8] Transit Vehicle Performance evaluated based on the transit movement at the intersection.

TABLE 4: MMLOS INTERSECTION ANALYSIS AT TESTON ROAD AND DUFFERIN STREET

	Criteria (Intersection Analysis) [1]		Intersection Approach [2]			
			Dufferin Street		Teston Road	
			NB	SB	EB	WB
Auto	Automobile Performance at the Intersection Approach	Delay (seconds)	38	72	44	85
		Volume to Capacity	0.49 (NBT)	1.00 (SBT)	0.01 (EBTR)	1.06 (WBL)
	Auto Level of Service (ALOS)	***Target = D***	**D**	**E**	**D**	**F**
Pedestrian [3]	Sidewalk / Multi-Use Path Width (Dimension)		-	-	1.5m	-
	Buffer / Boulevard (Dimension)		-	-	Varies (>1.0m buffer)	-
	Signalized Crossing (Yes / No)		Yes	Yes	Yes	Yes
	Crosswalk (Yes / No)		Yes	Yes	Yes	Yes
	Pedestrian Level of Service (PLOS)	***Target = C***	**F**	**F**	**B**	**F**
Bicycle	Separated, Dedicated or Shared [4]		Dedicated	Dedicated	None	Dedicated
	Bicycle Facility Width (Dimension)		2.0m	2.0m	-	1.5m
	Buffer (Yes / No)		No	No	No	No
	Bicycle Treatment (e.g. bike box, bicycle signal head, etc.)		No	No	No	No
	Bicycle Level of Service (BLOS)	***Target = C***	**B**	**B**	**F**	**D**
Transit [5 & 6]	Transit Service Frequency (Headway) [7]		-	-	-	-
	Transit Service Level of Service (TSLOS)	***Target = C***	**N/A**	**N/A**	**N/A**	**N/A**
	Transit Vehicle Performance at the Intersection Approach [8]	Delay (seconds)	-	-	-	-
		Volume to Capacity	-	-	-	-
	Transit Performance Level of Service (TPLOS)	***Target = D***	**N/A**	**N/A**	**N/A**	**N/A**

[1] Overall LOS for each mode is based on the worst-case criteria.
[2] All modes evaluated in direction of travel for each intersection approach.
[3] Pedestrian facility referenced York Region Transportation Master Plan – Map 5: Sidewalk Gaps on Regional Roads dated May 12th, 2016.
[4] Bicycle facility type referenced York Region Transportation Master Plan – Map 4: Existing Cycling Network dated May 12, 2016.
[5] Transit evaluation based on York Region System Map dated September 6, 2020.
[6] Transit LOS evaluation does not include "Access to Transit Stops, Stations or Transfer Points" since this criterion is development related.
[7] Transit headway provided by YRT based on October 2019 conditions (pre-COVID).
[8] Transit Vehicle Performance evaluated based on the transit movement at the intersection.

TABLE 5: MMLOS SEGMENT ANALYSIS ON TESTON ROAD BETWEEN DUFFERIN STREET TO BATHURST STREET

	Criteria (Segment Analysis) [1]		Mid-Block Segment	
			Teston Road	
			EB	WB
Auto	Automobile Performance at the Intersection Approach	Delay (seconds) [2] [3]	101	85
		Volume to Capacity [2] [3]	0.97 (EBL)	1.06 (WBL)
	Auto Level of Service (ALOS)	***Target = D***	**F**	**F**
Pedestr. [4]	Sidewalk / Multi-Use Path Width (Dimension)		-	-
	Buffer / Boulevard (Dimension)		-	-
	Pedestrian Level of Service (PLOS)	***Target = C***	**F**	**F**
Bicycle	Separated, Dedicated or Shared [5]		Dedicated	Dedicated
	Bicycle Facility Width (Dimension)		1.5m	1.5m
	Buffer (Yes / No)		No	No
	Bicycle Level of Service (BLOS)	***Target = C***	**D**	**D**
Transit [6 & 7]	Transit Service Frequency (Headway) [8]		-	-
	Transit Service Level of Service (TSLOS)	***Target = C***	**N/A**	**N/A**
	Transit Vehicle Performance at the Intersection Approach [9]	Delay (seconds)	-	-
		Volume to Capacity	-	-
	Transit Performance Level of Service (TPLOS)	***Target = D***	**N/A**	**N/A**

[1] Overall LOS for each mode is based on the worst-case criteria.
[2] EB segment delay and v/c ratio are for the EB approach to Bathurst Street.
[3] WB segment delay and v/c ratio are for the WB approach to Dufferin Street.
[4] Pedestrian facility referenced York Region Transportation Master Plan – Map 5: Sidewalk Gaps on Regional Roads dated May 12th, 2016.
[5] Bicycle facility type referenced York Region Transportation Master Plan – Map 4: Existing Cycling Network dated May 12, 2016.
[6] Transit evaluation based on York Region System Map dated September 6, 2020.
[7] Transit LOS evaluation does not include "Access to Transit Stops, Stations or Transfer Points" since this criterion is development related or "Boarding Volumes" since it is not available.
[8] Transit headway provided by YRT based on October 2019 conditions (pre-COVID).
[9] Transit Vehicle Performance evaluated based on the transit movement at the intersection.

TABLE 6: MMLOS INTERSECTION ANALYSIS AT TESTON ROAD / ELGIN MILLS ROAD WEST AND BATHURST STREET

	Criteria (Intersection Analysis) [1]		Intersection Approach [2]			
			Bathurst Street		Teston Road	
			NB	SB	EB	WB
Auto	Automobile Performance at the Intersection Approach	Delay (seconds)	95	28	101	146
		Volume to Capacity	0.73 (NBL)	0.82 (SBT)	0.97 (EBL)	1.13 (WBL)
	Auto Level of Service (ALOS)	***Target = D***	**F**	**C**	**F**	**F**
Pedestrian [3]	Sidewalk / Multi-Use Path Width (Dimension)		1.5m	1.5m	1.5m	1.5m
	Buffer / Boulevard (Dimension)		2.5m	2.0m	7.0m	1.5m
	Signalized Crossing (Yes / No)		Yes	Yes	Yes	Yes
	Crosswalk (Yes / No)		Yes	Yes	Yes	Yes
	Pedestrian Level of Service (PLOS)	***Target = C***	**B**	**B**	**B**	**B**
Bicycle	Separated, Dedicated or Shared [4]		None	None	None	None
	Bicycle Facility Width (Dimension)		-	-	-	-
	Buffer (Yes / No)		No	No	No	No
	Bicycle Treatment (e.g. bike box, bicycle signal head, etc.)		No	No	No	No
	Bicycle Level of Service (BLOS)	***Target = C***	**F**	**F**	**F**	**F**
Transit [5 & 6]	Transit Service Frequency (Headway) [7]		15 minutes (Route 88)	15 minutes (Route 88) 29 minutes (Route 80)	-	29 minutes (Route 80) 35 minutes (Route 83)
	Transit Service Level of Service (TSLOS)	***Target = C***	**C**	**E**	**N/A**	**F**
	Transit Vehicle Performance at the Intersection Approach [8]	Delay (seconds)	26	28	-	42
		Volume to Capacity	0.53 (NBT)	0.82 (SBT)	-	0.05 (WBR)
	Transit Performance Level of Service (TPLOS)	***Target = D***	**C**	**C**	**N/A**	**D**

[1] Overall LOS for each mode is based on the worst-case criteria.
[2] All modes evaluated in direction of travel for each intersection approach.
[3] Pedestrian facility referenced York Region Transportation Master Plan – Map 5: Sidewalk Gaps on Regional Roads dated May 12th, 2016.
[4] Bicycle facility type referenced York Region Transportation Master Plan – Map 4: Existing Cycling Network dated May 12, 2016.
[5] Transit evaluation based on York Region System Map dated September 6, 2020.
[6] Transit LOS evaluation does not include "Access to Transit Stops, Stations or Transfer Points" since this criterion is development related.
[7] Transit headway provided by YRT based on October 2019 conditions (pre-COVID).
[8] Transit Vehicle Performance evaluated based on the transit movement at the intersection.

Appendix E: A Summary of All Collisions Involving Pedestrians and Cyclists

Table 1: Summary of Collisions in the Project Study Area involving Cyclists

#	Date	Location	Vehicle Type	Impact Type	Classification of Collision	Driver Condition / Action	Cyclist Condition / Action	Environmental Condition	Light Condition	Surface Condition
1	7/24/2018	Bathurst Street & Regent Street/Lady Nadia Drive	Passenger Vehicle	Angle	Non-Fatal	Normal / Failed to Field Right-of-Way	Normal / Driving Properly	Clear	Daylight	Dry
2	8/1/2015	Dufferin Street b/w Sir Benson Drive & Teston Road	Passenger Vehicle	Rear End	Fatal	Normal / Driving Properly	Ability Impaired (Drugs) / Failed to Field Right-of-Way	Clear	Dark	Dry
3	4/24/2015	Jane Street & Roseheath Drive/Grand Valley Boulevard	Passenger Vehicle	Turning Movement	P.D. Only	Unknown / Driving Properly	Normal / Failed to Field Right-of-Way	Clear	Daylight	Dry
4	5/1/2017	Jane Street & Roseheath Drive/Grand Valley Boulevard	Pick-up Truck	Angle	Non-Fatal	Unknown / Other	Normal / Driving Properly	Rain	Daylight	Wet
5	10/8/2017	Jane Street btwn Major Mackenzie Drive West & Roseheath Drive/Grand Valley Boulevard	Passenger Vehicle	Angle	Non-Fatal	Normal / Other	Normal / Other	Clear	Daylight	Dry
6	10/1/2016	Jane Street btwn Teston Road & Kirby Road	Passenger Vehicle	Other (SMV)	P.D. Only	Normal / Improper Passing	Normal / Driving Properly	Rain	Dark	Wet
7	7/2/2016	Keele Street & Major Mackenzie Drive West	Passenger Vehicle	Angle	Non-Fatal	Normal / Failed to Field Right-of-Way	Normal / Driving Properly	Clear	Daylight	Dry
8	9/23/2016	Keele Street & Major Mackenzie Drive West	Passenger Vehicle	Turning Movement	Non-Fatal	Normal / Failed to Field Right-of-Way	Normal / Driving Properly	Clear	Daylight	Dry
9	9/6/2018	Keele Street & Major Mackenzie Drive West	Passenger Vehicle	Angle	Non-Fatal	Normal / Failed to Field Right-of-Way	Normal / Driving Properly	Clear	Daylight	Dry

#	Date	Location	Vehicle Type	Impact Type	Classification of Collision	Driver Condition / Action	Cyclist Condition / Action	Environmental Condition	Light Condition	Surface Condition
10	10/15/2015	Keele Street & Teston Road	Dump Truck	Turning Movement	Non-Fatal	Normal / Improper Passing	Normal / Driving Properly	Clear	Daylight	Dry
11	6/7/2018	Keele Street & Teston Road	Passenger Vehicle	Sideswipe	P.D. Only	Normal / Driving Properly	Normal / Driving Properly	Clear	Daylight	Dry
12	3/14/2019	Major Mackenzie Dr. & Fortinos / Longos Entrance	Unknown	Angle	P.D. Only	/ Improper Turn	/ Improper Passing	Clear	Daylight	Dry
13	6/30/2018	Major Mackenzie Drive West & Avro Road/McNaughton Road	Passenger Vehicle	Angle	Non-Fatal	Normal / Failed to Field Right-of-Way	Normal / Failed to Field Right-of-Way	Clear	Daylight	Dry
14	6/28/2018	Major Mackenzie Drive West & Exit 35	Passenger Vehicle	Angle	P.D. Only	Normal / Failed to Field Right-of-Way	01 - Normal / Driving Properly	Clear	Daylight	Dry
15	8/9/2018	Major Mackenzie Drive West & Exit 35	Passenger Vehicle	Sideswipe	P.D. Only	Unknown / Improper Lane Change	Normal / Driving Properly	Clear	Daylight	Dry
16	5/14/2019	Major Mackenzie Drive West & Exit 35	Passenger Vehicle	Angle	Non-Fatal	Normal / Failed to Field Right-of-Way	Normal / Driving Properly	Clear	Daylight	Dry
17	8/26/2019	Major Mackenzie Drive West & Exit 35	Passenger Vehicle	Sideswipe	P.D. Only	Normal / Failed to Field Right-of-Way	Normal / Driving Properly	Clear	Dusk	Wet
18	6/25/2019	Major Mackenzie Drive West & Jane Street	Passenger Vehicle	Angle	Non-Fatal	Inattentive / Failed to Field Right-of-Way	Normal / Driving Properly	Clear	Dusk	Dry
19	11/19/2015	Major Mackenzie Drive West & Melville Avenue	Passenger Vehicle	Turning Movement	Non-Fatal	Inattentive / Lost Control	Normal / Driving Properly	Clear	Dark (Artificial)	Dry
20	9/28/2018	Major Mackenzie Drive West btwn Exit 35/GO Carpool Lot - Hwy 400 & Major Mackenzie Drive West & Exit 35	Pick-up Truck	Sideswipe	Non-Fatal	Normal / Driving Properly	Normal / Driving Properly	Clear	Daylight	Dry

#	Date	Location	Vehicle Type	Impact Type	Classification of Collision	Driver Condition / Action	Cyclist Condition / Action	Environmental Condition	Light Condition	Surface Condition
21	5/31/2019	Major Mackenzie Drive West btwn Grand Trunk Avenue & Dufferin Street	Passenger Vehicle	Angle	Non-Fatal	Normal / Failed to Field Right-of-Way	Normal / Other	Clear	Daylight	Dry
22	6/18/2016	Major Mackenzie Drive West btwn Ontario Street & Entrance to Vaughan Municipal Offices	Passenger Vehicle	Angle	Non-Fatal	Normal / Driving Properly	Normal / Driving Properly	Clear	Daylight	Dry
23	9/20/2016	Teston Road & Exit 37	Passenger Vehicle	Turning Movement	Non-Fatal	Normal / Failed to Field Right-of-Way	Normal / Driving Properly	Clear	Daylight	Dry

Table 2: Summary of Collisions in the Project Study Area involving Pedestrians

#	Date	Location	Vehicle Type	Impact Type	Classification of Collision	Driver Condition / Action	Pedestrian Condition / Action	Environmental Condition	Light Condition	Surface Condition
1	11/23/2016	Bathurst Street & Mill Street/Queen Filomena Avenue	Passenger Vehicle	Other (SMV)	Non-Fatal	Unknown / Failed to Field Right-of-Way	Normal / Crossing w/ Right-of-Way	Rain	Dark (Artificial)	Wet
2	10/31/2018	Bathurst Street & Woodland Acres Crescent	Passenger Vehicle	Other (SMV)	Non-Fatal	Normal / Driving Properly	Inattentive / Crossing without Right-of-Way	Rain	Daylight	Wet
3	4/18/2017	Bathurst Street & Gamble Road	Passenger Vehicle	Other (SMV)	Non-Fatal	Normal / Failed to Field Right-of-Way	Normal / Crossing with Right-of-Way	Clear	Daylight	Dry
4	10/24/2018	Bathurst Street btwn Regent Street/Lady Nadia Drive & Oxford Street/Lady Dolores Avenue	Passenger Vehicle	Other (SMV)	Non-Fatal	Normal / Driving Properly	Inattentive / Running onto Roadway	Clear	Dark	Wet
5	6/28/2018	Jane Street & Ahmadiyya Avenue (979F083B)	Passenger Vehicle	Other (SMV)	Non-Fatal	Unknown / Driving Properly	Normal / Crossing without Right-of-Way	Clear	Daylight	Dry
6	9/26/2017	Jane Street & America Avenue/Brandon Gate Drive	Passenger Vehicle	Other (SMV)	Non-Fatal	Unknown / Failed to Field Right-of-Way	Normal / Crossing with Right-of-Way	Clear	Dark (Artificial)	Dry
7	10/11/2017	Jane Street & America Avenue/Brandon Gate Drive	Passenger Vehicle	Other (SMV)	Non-Fatal	Normal / Failed to Field Right-of-Way	Normal / Crossing with Right-of-Way	Rain	Dawn	Wet
8	5/9/2018	Jane Street & America Avenue/Brandon Gate Drive	Passenger Vehicle	Other (SMV)	Non-Fatal	Normal / Driving Properly	Normal / Crossing without Right-of-Way	Clear	Dark (Artificial)	Dry
9	10/1/2018	Jane Street & America Avenue/Brandon Gate Drive	Passenger Vehicle	Other (SMV)	Non-Fatal	Inattentive / Failed to Field Right-of-Way	Inattentive / Crossing with Right-of-Way	Rain	Dark	Wet
10	12/26/2018	Jane Street & America Avenue/Brandon Gate Drive	Passenger Vehicle	Other (SMV)	Non-Fatal	Inattentive / Disobeyed Traffic Control	Normal / Crossing with Right-of-Way	Clear	Dark	Dry

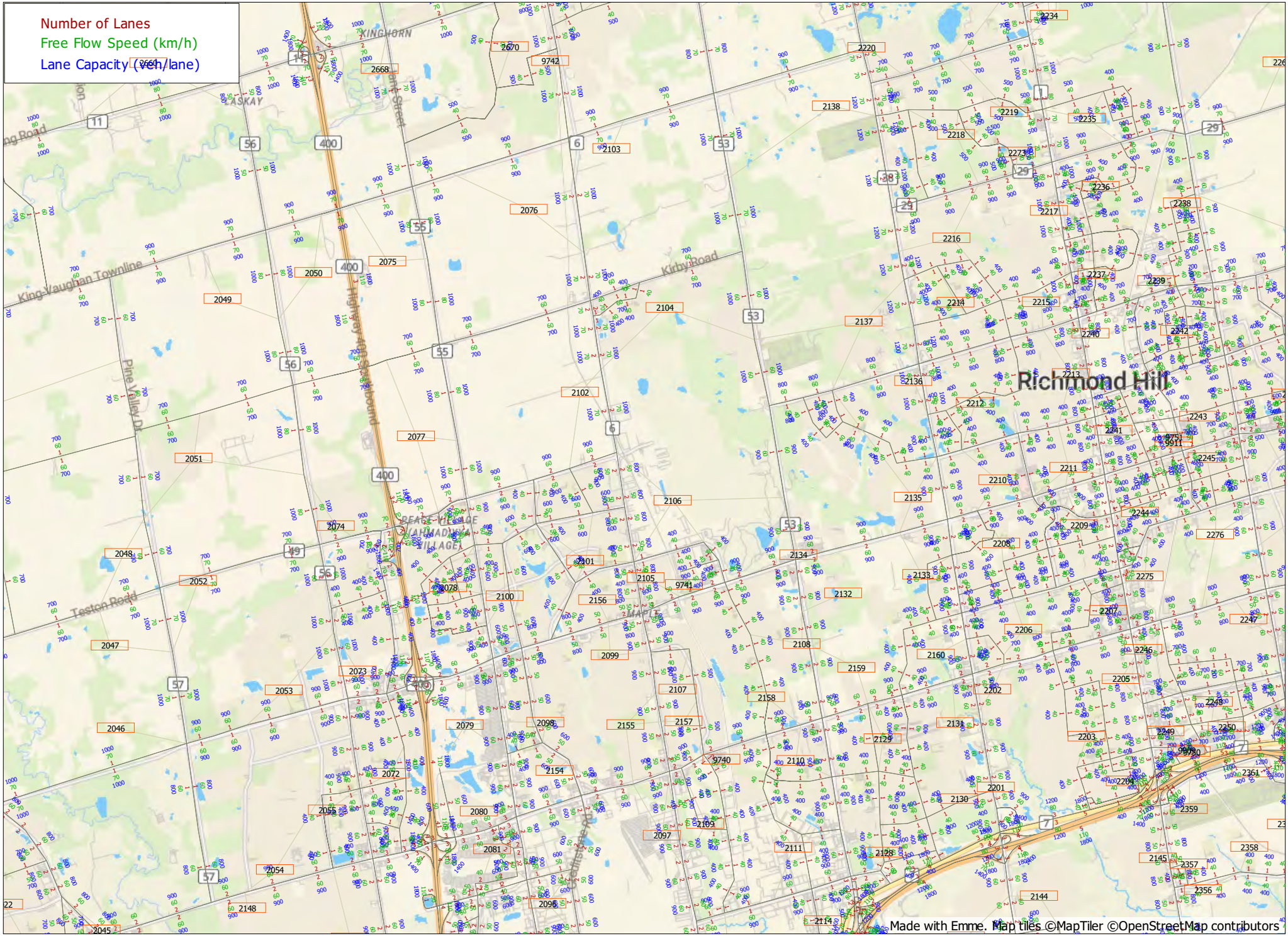
#	Date	Location	Vehicle Type	Impact Type	Classification of Collision	Driver Condition / Action	Pedestrian Condition / Action	Environmental Condition	Light Condition	Surface Condition
11	12/13/2019	Jane Street & America Avenue/Brandon Gate Drive	Passenger Vehicle	Other (SMV)	Non-Fatal	Inattentive / Failed to Field Right-of-Way	Normal / Crossing with Right-of-Way	Clear	Daylight	Dry
12	10/10/2015	Jane Street & Roseheath Drive/Grand Valley Boulevard	Passenger Vehicle	Other (SMV)	Non-Fatal	Unknown / Improper Turn	Normal / Crossing with Right-of-Way	Clear	Daylight	Dry
13	9/3/2016	Jane Street & Roseheath Drive/Grand Valley Boulevard	Pick-up Truck	Other (SMV)	Non-Fatal	Unknown / Improper Turn	Normal / Crossing with Right-of-Way	Clear	Daylight	Dry
14	2/16/2017	Jane Street & Roseheath Drive/Grand Valley Boulevard	Passenger Vehicle	Other (SMV)	Non-Fatal	Normal / Failed to Field Right-of-Way	Normal / Crossing with Right-of-Way	Clear	Daylight	Dry
15	5/3/2015	Keele Street & Major Mackenzie Drive West	Passenger Vehicle	Other (SMV)	Non-Fatal	Unknown / Driving Properly	Normal / Crossing without Right-of-Way	Clear	Daylight	Dry
16	10/10/2017	Keele Street & Major Mackenzie Drive West	Passenger Vehicle	Other (SMV)	Non-Fatal	Unknown / Driving Properly	Normal / Crossing without Right-of-Way	Clear	Dark (Artificial)	Dry
17	2/10/2018	Keele Street & Major Mackenzie Drive West	Passenger Vehicle	Other (SMV)	Non-Fatal	Normal / Failed to Field Right-of-Way	Normal / Crossing with Right-of-Way	Clear	Dark (Artificial)	Wet
18	6/12/2019	Keele Street & Major Mackenzie Drive West	School Bus	Other (SMV)	Non-Fatal	Unknown / Failed to Field Right-of-Way	Normal / Crossing with Right-of-Way	Clear	Daylight	Dry
19	1/3/2017	Keele Street & Peak Point Boulevard	Passenger Vehicle	Other (SMV)	Non-Fatal	Inattentive / Failed to Field Right-of-Way	Normal / Crossing with Right-of-Way	Rain	Dark (Artificial)	Wet
20	11/9/2015	Keele Street & Railway Street/Killian Road	Passenger Vehicle	Other (SMV)	Non-Fatal	Unknown / Failed to Field Right-of-Way	Normal / Crossing with Right-of-Way	Clear	Daylight	Dry
21	11/2/2018	Major Mackenzie Drive West & Bathurst Street	Passenger Vehicle	Other (SMV)	Non-Fatal	Unknown / Failed to Field Right-of-Way	Normal / Crossing with Right-of-Way	Rain	Dark	Wet

#	Date	Location	Vehicle Type	Impact Type	Classification of Collision	Driver Condition / Action	Pedestrian Condition / Action	Environmental Condition	Light Condition	Surface Condition
22	3/17/2019	Major Mackenzie Drive West & Bathurst Street	Passenger Vehicle	Other (SMV)	Non-Fatal	Inattentive / Failed to Field Right-of-Way	Normal / Crossing with Right-of-Way	Clear	Daylight	Dry
23	9/10/2016	Major Mackenzie Drive West & Dufferin Street	Passenger Vehicle	Other (SMV)	Non-Fatal	Normal / Improper Turn	Normal / Crossing with Right-of-Way	Clear	Dusk	Dry
24	12/27/2016	Major Mackenzie Drive West & Dufferin Street	Passenger Vehicle	Other (SMV)	Non-Fatal	Inattentive / Failed to Field Right-of-Way	Normal / Crossing with Right-of-Way	Snow	Dark (Artificial)	Wet
25	2/15/2019	Major Mackenzie Drive West & Dufferin Street	Passenger Vehicle	Other (SMV)	Non-Fatal	Unknown / Other	Normal / Crossing with Right-of-Way	Clear	Daylight	Wet
26	10/21/2015	Major Mackenzie Drive West & Exit 35	Passenger Vehicle	Other (SMV)	Non-Fatal	Normal / Failed to Field Right-of-Way	Normal / Crossing with Right-of-Way	Clear	Daylight	Dry
27	5/15/2016	Major Mackenzie Drive West & Jane Street	Passenger Vehicle	Other (SMV)	P.D. Only	Fatigue / Improper Turn	Medical or Physical Disability / Crossing with Right-of-Way	Snow	Daylight	Wet
28	9/21/2017	Major Mackenzie Drive West & Jane Street	Passenger Vehicle	Other (SMV)	Non-Fatal	Normal / Failed to Field Right-of-Way	Normal / Crossing with Right-of-Way	Clear	Dark (Artificial)	Dry
29	1/25/2018	Major Mackenzie Drive West & Jane Street	Passenger Vehicle	Other (SMV)	Non-Fatal	Inattentive / Improper Turn	Normal / Crossing with Right-of-Way	Fog, Mist, Smoke, Dust	Dark	Dry
30	12/21/2018	Major Mackenzie Drive West & Jane Street	Passenger Vehicle	Other (SMV)	Non-Fatal	Unknown / Failed to Field Right-of-Way	Normal / Crossing with Right-of-Way	Rain	Dawn	Wet
31	4/4/2016	Major Mackenzie Drive West & Netherford Road/Killian Road	Passenger Vehicle	Other (SMV)	P.D. Only	Unknown / Driving Properly	Inattentive / Crossing without Right-of-Way	Clear	Daylight	Dry
32	10/7/2018	Major Mackenzie Drive West & Netherford Road/Killian Road	Passenger Van	Other (SMV)	Non-Fatal	Inattentive / Failed to Field Right-of-Way	Normal / Crossing with Right-of-Way	Clear	Daylight	Wet

#	Date	Location	Vehicle Type	Impact Type	Classification of Collision	Driver Condition / Action	Pedestrian Condition / Action	Environmental Condition	Light Condition	Surface Condition
33	3/25/2015	Major Mackenzie Drive West & Peter Rupert Avenue/McNaughton Road East	Passenger Vehicle	Other (SMV)	Non-Fatal	Normal / Failed to Field Right-of-Way	Normal / Crossing with Right-of-Way	Rain	Daylight	Wet
34	5/22/2016	Major Mackenzie Drive West & Peter Rupert Avenue/McNaughton Road East	Passenger Van	Other (SMV)	Non-Fatal	Normal / Driving Properly	Normal / Crossing without Right-of-Way	Clear	Daylight	Dry
35	6/11/2018	Major Mackenzie Drive West & Peter Rupert Avenue/McNaughton Road East	Passenger Van	Other (SMV)	Non-Fatal	Normal / Failed to Field Right-of-Way	Normal / Crossing with Right-of-Way	Clear	Daylight	Dry
36	11/6/2019	Major Mackenzie Drive West & Peter Rupert Avenue/McNaughton Road East	Passenger Vehicle	Other (SMV)	Non-Fatal	Normal / Failed to Field Right-of-Way	Normal / Crossing with Right-of-Way	Rain	Dark	Wet
37	6/29/2016	Major Mackenzie Drive West & Sir Benson Drive	Pick-up Truck	Other (SMV)	Non-Fatal	Normal / Other	Normal / Crossing with Right-of-Way	Clear	Daylight	Dry
38	9/27/2019	Major Mackenzie Drive West btwn Entrance to Vaughan Municipal Offices & Hill Street	Truck	Other (SMV)	Non-Fatal	Unknown / Improper Passing	Normal / Other	Clear	Daylight	Dry
39	6/21/2018	Major Mackenzie Drive West btwn Grand Trunk Avenue & Dufferin Street	Passenger Vehicle	Other (SMV)	Non-Fatal	Normal / Driving Properly	Normal / Crossing without Right-of-Way	Clear	Daylight	Dry
40	3/3/2016	Major Mackenzie Drive West btwn Jackson Street & Keele Street	Passenger Vehicle	Other (SMV)	Non-Fatal	Unknown / Failed to Field Right-of-Way	Normal / On Sidewalk or Shoulder	Clear	Daylight	Dry
41	3/1/2017	Major Mackenzie Drive West btwn Jackson Street & Keele Street	Passenger Vehicle	Other (SMV)	Non-Fatal	Unknown / Driving Properly	Normal / Running onto Roadway	Rain	Dark	Wet

Appendix F: 2016 Snapshot of EMME Subarea Network

2016 Link Attributes



YRTDF Model-2016_March-2020 (I:/EMME/Emme_4_Modelling_in_2020_MASTER/Database/Model-2016_March-2020/emmebank)
Scenario 7121: 2016 MASTER Apr15-2020
2020-06-04

2016 AM 3-hour Pkpd Transit Link Volumes



YRTDF Model-2016_March-2020 (I:/EMME/Emme_4_Modelling_in_2020_MASTER/Database/Model-2016_March-2020/emmebank)
Scenario 7124: 2016 MASTER Dec17-2020
2021-01-12

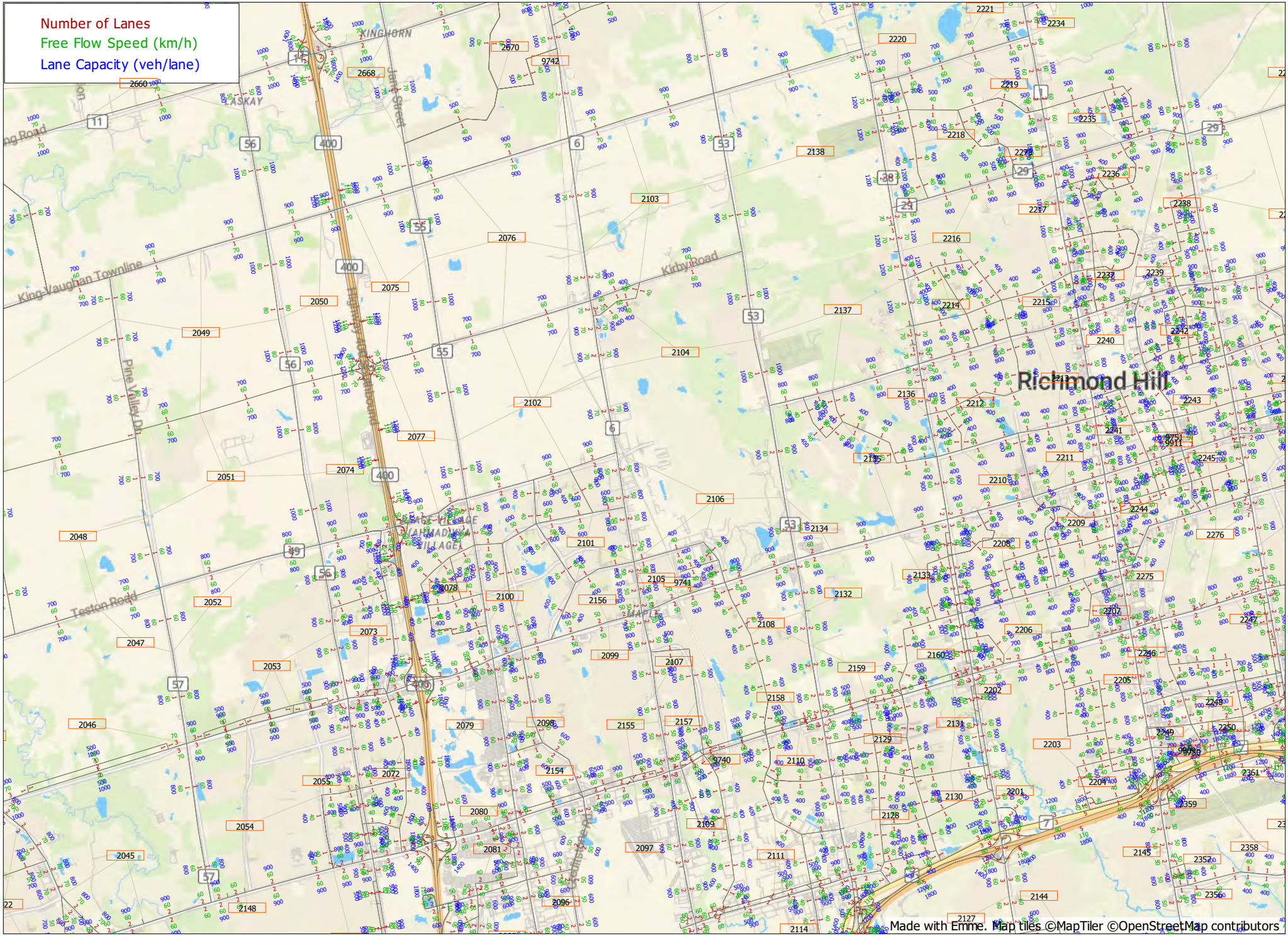

2016 Auto and Transit Assigned Trips
2000
4000
6000
8000
10000
Scale: 400
Made with Emme. Map tiles ©MapTiler ©OpenStreetMap contributors

2016 Link Volume to Capacity Ratio

Arterial Road	Travel Direction	Section	2016 # of Lanes	2016 Lane Capacity	Total Capacity	2016 EMME Assigned Volumes	2016 v/c
Teston Road	Eastbound	Hwy 400 to Jane St	2	900	1,800	648	0.36
		Jane St to Keele St	2	900	1,800	319	0.18
		Keele St to Dufferin St	Missing link	Missing link	Missing link	Missing link	Missing link
		Dufferin St to Bathurst St	1	800	800	365	0.46
	Westbound	Hwy 400 to Jane St	2	900	1,800	1,513	0.84
		Jane St to Keele St	2	900	1,800	1,175	0.65
		Keele St to Dufferin St	Missing link	Missing link	Missing link	Missing link	Missing link
		Dufferin St to Bathurst St	1	800	800	768	0.96
Kirby Road	Eastbound	Hwy 400 to Jane St	1	700	700	65	0.09
		Jane St to Keele St	1	700	700	97	0.14
		Keele St to Dufferin St	1	700	700	188	0.27
		Dufferin St to Bathurst St	Missing link	Missing link	Missing link	Missing link	Missing link
	Westbound	Hwy 400 to Jane St	1	700	700	298	0.43
		Jane St to Keele St	1	700	700	504	0.72
		Keele St to Dufferin St	1	700	700	619	0.88
		Dufferin St to Bathurst St	Missing link	Missing link	Missing link	Missing link	Missing link
Major Mackenzie Dr	Eastbound	Hwy 400 to Jane St	2	900	1,800	1,369	0.76
		Jane St to Keele St	2	800	1,600	1,073	0.67
		Keele St to Dufferin St	2	900	1,800	1,065	0.59
		Dufferin St to Bathurst St	2	900	1,800	906	0.50
	Westbound	Hwy 400 to Jane St	2	900	1,800	1,890	1.05
		Jane St to Keele St	2	800	1,600	1,362	0.85
		Keele St to Dufferin St	2	900	1,800	1,651	0.92
		Dufferin St to Bathurst St	2	900	1,800	1,780	0.99
Jane Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	179	0.10
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	232	0.13
		Teston Rd to Kirby Rd	1	1,000	1,000	176	0.18
		Kirby Rd to King Vaughan Rd	1	1,000	1,000	197	0.20
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	2,046	1.14
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	939	0.52
		Teston Rd to Kirby Rd	1	1,000	1,000	986	0.99
		Kirby Rd to King Vaughan Rd	1	1,000	1,000	833	0.83
Keele Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	276	0.15
		Major Mackenzie Dr IC to Teston Rd IC	2	800	1,600	205	0.13
		Teston Rd to Kirby Rd	2	1,000	2,000	160	0.08
		Kirby Rd to King Vaughan Rd	2	1,000	2,000	161	0.08
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	1,862	1.03
		Major Mackenzie Dr IC to Teston Rd IC	2	800	1,600	1,051	0.66
		Teston Rd to Kirby Rd	2	1,000	2,000	1,548	0.77
		Kirby Rd to King Vaughan Rd	2	1,000	2,000	1,530	0.77
Dufferin Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	730	0.41
		Major Mackenzie Dr IC to Teston Rd IC	1	900	900	333	0.37
		Teston Rd to Kirby Rd	1	1,000	1,000	428	0.43
		Kirby Rd to King Vaughan Rd	1	1,000	1,000	193	0.19
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	1,523	0.85
		Major Mackenzie Dr IC to Teston Rd IC	1	900	900	1,018	1.13
		Teston Rd to Kirby Rd	1	1,000	1,000	598	0.60
		Kirby Rd to King Vaughan Rd	1	1,000	1,000	794	0.79
Bathurst Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	862	0.48
		Major Mackenzie Dr IC to Teston Rd IC	2	1,000	2,000	745	0.37
		Teston Rd to Kirby Rd	2	1,200	2,400	790	0.33
		Kirby Rd to King Vaughan Rd	2	1,200	2,400	840	0.35
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	1,942	1.08
		Major Mackenzie Dr IC to Teston Rd IC	2	1,000	2,000	1,903	0.95
		Teston Rd to Kirby Rd	2	1,200	2,400	1,931	0.80
		Kirby Rd to King Vaughan Rd	2	1,200	2,400	1,729	0.72

Appendix G: 2031 Snapshot of EMME Subarea Network

2031 Link Attributes



YRTDF Model-2031_March-2020 (I:/EMME/Emme_4_Modelling_in_2020_MASTER/Database/Model-2031_March-2020/emmebank)
Scenario 3007: 2031 MASTER Apr15-2020
2020-06-04

2031 AM 3-hour Pkpd Transit Link Volumes



YRTDF Model-2031_March-2020 (I:/EMME/Emme_4_Modelling_in_2020_MASTER/Database/Model-2031_March-2020/emmebank)
Scenario 3009: 2031 MASTER Jun29-2020
2020-08-24


2031 Auto and Transit Assigned Trips
2000
4000
6000
8000
10000
Scale: 400
Made with Emme. Map tiles ©MapTiler ©OpenStreetMap contributors

2031 Link Volume to Capacity Ratio

Arterial Road	Travel Direction	Section	2031 # of Lanes	2031 Lane Capacity	Total Capacity	2031 EMME Counts	2031 v/c
Teston Road	Eastbound	Hwy 400 to Jane St	2	900	1,800	1,076	0.60
		Jane St to Keele St	2	900	1,800	918	0.51
		Keele St to Dufferin St	Missing link	Missing link	Missing link	Missing link	Missing link
		Dufferin St to Bathurst St	1	800	800	503	0.63
	Westbound	Hwy 400 to Jane St	2	900	1,800	1,519	0.84
		Jane St to Keele St	2	900	1,800	1,321	0.73
		Keele St to Dufferin St	Missing link	Missing link	Missing link	Missing link	Missing link
		Dufferin St to Bathurst St	1	800	800	1,026	1.28
Kirby Road	Eastbound	Hwy 400 to Jane St	1	700	700	385	0.55
		Jane St to Keele St	1	700	700	163	0.23
		Keele St to Dufferin St	1	700	700	426	0.61
		Dufferin St to Bathurst St	Missing link	Missing link	Missing link	Missing link	Missing link
	Westbound	Hwy 400 to Jane St	1	700	700	736	1.05
		Jane St to Keele St	1	700	700	521	0.74
		Keele St to Dufferin St	1	700	700	646	0.92
		Dufferin St to Bathurst St	Missing link	Missing link	Missing link	Missing link	Missing link
Major Mackenzie Dr	Eastbound	Hwy 400 to Jane St	3	900	2,700	2,040	0.76
		Jane St to Keele St	2	800	1,600	1,178	0.74
		Keele St to Dufferin St	2	900	1,800	1,198	0.67
		Dufferin St to Bathurst St	2	900	1,800	1,197	0.67
	Westbound	Hwy 400 to Jane St	3	900	2,700	2,411	0.89
		Jane St to Keele St	2	800	1,600	1,439	0.90
		Keele St to Dufferin St	2	900	1,800	1,801	1.00
		Dufferin St to Bathurst St	2	900	1,800	1,699	0.94
Jane Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	269	0.15
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	240	0.13
		Teston Rd to Kirby Rd	1	1,000	1,000	216	0.22
		Kirby Rd to King Vaughan Rd	1	1,000	1,000	399	0.40
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	2342	1.30
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	1507	0.84
		Teston Rd to Kirby Rd	1	1,000	1,000	912	0.91
		Kirby Rd to King Vaughan Rd	1	1,000	1,000	1019	1.02
Keele Street		Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	718	0.40
		Major Mackenzie Dr IC to Teston Rd IC	2	800	1,600	658	0.41
		Teston Rd to Kirby Rd	2	900	1,800	514	0.29
		Kirby Rd to King Vaughan Rd	2	900	1,800	398	0.22
		Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	2309	1.28
		Major Mackenzie Dr IC to Teston Rd IC	2	800	1,600	1510	0.94
		Teston Rd to Kirby Rd	2	900	1,800	1710	0.95
		Kirby Rd to King Vaughan Rd	2	900	1,800	1819	1.01
Dufferin Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	975	0.54
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	714	0.40
		Teston Rd to Kirby Rd	1	1,000	1,000	627	0.63
		Kirby Rd to King Vaughan Rd	1	900	900	242	0.27
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	1899	1.06
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	1816	1.01
		Teston Rd to Kirby Rd	1	1,000	1,000	1032	1.03
		Kirby Rd to King Vaughan Rd	1	900	900	867	0.96
Bathurst Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	3	900	2,700	1129	0.42
		Major Mackenzie Dr IC to Teston Rd IC	2	1,000	2,000	915	0.46
		Teston Rd to Kirby Rd	2	1,200	2,400	1063	0.44
		Kirby Rd to King Vaughan Rd	2	1,200	2,400	1187	0.49
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	3	900	2,700	2740	1.01
		Major Mackenzie Dr IC to Teston Rd IC	2	1,000	2,000	2142	1.07
		Teston Rd to Kirby Rd	2	1,200	2,400	2422	1.01
		Kirby Rd to King Vaughan Rd	2	1,200	2,400	2392	1.00

Appendix H: 2031 Snapshot of EMME Subarea Network with 2041 Demand


2041 Auto and Transit Assigned Trips with 2031 Road Improvements
2000
4000
6000
8000
10000
Scale: 500
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2041 Link Volume to Capacity Ratio with 2031 Road Improvements

Arterial Road	Travel Direction	Section	2031 # of Lanes	2031 Lane Capacity	Total Capacity	2031 EMME Counts	2031 v/c
Teston Road	Eastbound	Hwy 400 to Jane St	2	900	1,800	1,280	0.71
		Jane St to Keele St	2	900	1,800	982	0.55
		Keele St to Dufferin St	Missing link	Missing link	Missing link	Missing link	Missing link
		Dufferin St to Bathurst St	1	800	800	678	0.85
	Westbound	Hwy 400 to Jane St	2	900	1,800	1,735	0.96
		Jane St to Keele St	2	900	1,800	1,381	0.77
		Keele St to Dufferin St	Missing link	Missing link	Missing link	Missing link	Missing link
		Dufferin St to Bathurst St	1	800	800	1,135	1.42
Kirby Road	Eastbound	Hwy 400 to Jane St	1	700	700	529	0.76
		Jane St to Keele St	1	700	700	483	0.69
		Keele St to Dufferin St	1	700	700	590	0.84
		Dufferin St to Bathurst St	Missing link	Missing link	Missing link	Missing link	Missing link
	Westbound	Hwy 400 to Jane St	1	700	700	805	1.15
		Jane St to Keele St	1	700	700	659	0.94
		Keele St to Dufferin St	1	700	700	773	1.10
		Dufferin St to Bathurst St	Missing link	Missing link	Missing link	Missing link	Missing link
Major Mackenzie Dr	Eastbound	Hwy 400 to Jane St	3	900	2,700	2,294	0.85
		Jane St to Keele St	2	800	1,600	1,342	0.84
		Keele St to Dufferin St	2	900	1,800	1,404	0.78
		Dufferin St to Bathurst St	2	900	1,800	1,366	0.76
	Westbound	Hwy 400 to Jane St	3	900	2,700	2,597	0.96
		Jane St to Keele St	2	800	1,600	1,590	0.99
		Keele St to Dufferin St	2	900	1,800	2,006	1.11
		Dufferin St to Bathurst St	2	900	1,800	1,882	1.05
Jane Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	727	0.40
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	547	0.30
		Teston Rd to Kirby Rd	1	1,000	1,000	551	0.55
		Kirby Rd to King Vaughan Rd	1	1,000	1,000	775	0.78
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	2624	1.46
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	1994	1.11
		Teston Rd to Kirby Rd	1	1,000	1,000	1362	1.36
		Kirby Rd to King Vaughan Rd	1	1,000	1,000	1371	1.37
Keele Street		Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	928	0.52
		Major Mackenzie Dr IC to Teston Rd IC	2	800	1,600	910	0.57
		Teston Rd to Kirby Rd	2	900	1,800	939	0.52
		Kirby Rd to King Vaughan Rd	2	900	1,800	944	0.52
		Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	2620	1.46
		Major Mackenzie Dr IC to Teston Rd IC	2	800	1,600	1948	1.22
		Teston Rd to Kirby Rd	2	900	1,800	1993	1.11
		Kirby Rd to King Vaughan Rd	2	900	1,800	2183	1.21
Dufferin Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	1109	0.62
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	1012	0.56
		Teston Rd to Kirby Rd	1	1,000	1,000	827	0.83
		Kirby Rd to King Vaughan Rd	1	900	900	361	0.40
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	2098	1.17
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	2150	1.19
		Teston Rd to Kirby Rd	1	1,000	1,000	1293	1.29
		Kirby Rd to King Vaughan Rd	1	900	900	1010	1.12
Bathurst Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	3	900	2,700	1288	0.48
		Major Mackenzie Dr IC to Teston Rd IC	2	1,000	2,000	995	0.50
		Teston Rd to Kirby Rd	2	1,200	2,400	1319	0.55
		Kirby Rd to King Vaughan Rd	2	1,200	2,400	1511	0.63
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	3	900	2,700	3031	1.12
		Major Mackenzie Dr IC to Teston Rd IC	2	1,000	2,000	2451	1.23
		Teston Rd to Kirby Rd	2	1,200	2,400	2905	1.21
		Kirby Rd to King Vaughan Rd	2	1,200	2,400	2881	1.20

Appendix I: 2041 Snapshot of EMME Subarea Network without GTA West

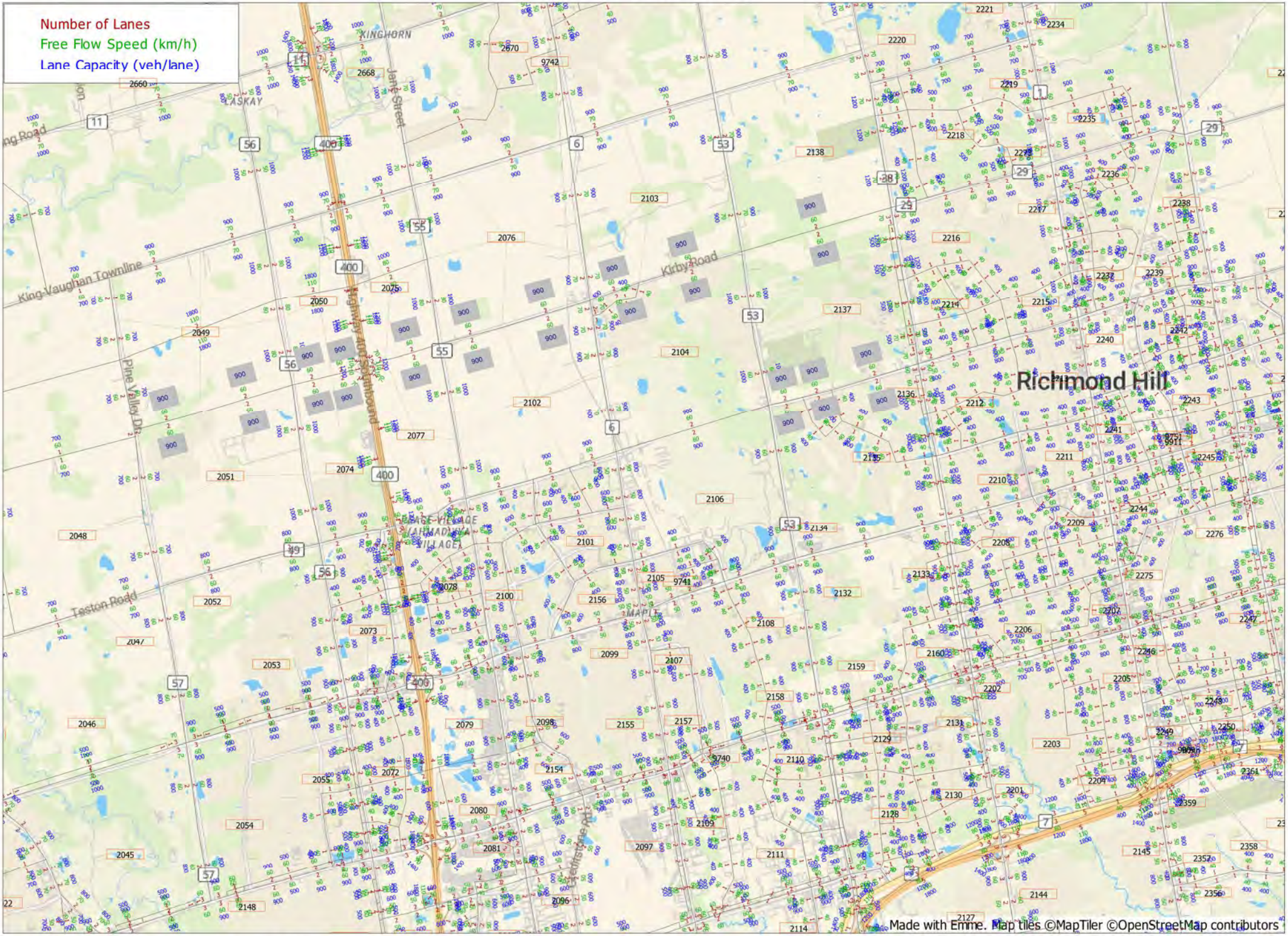

2041 Auto and Transit Assigned Trips without GTA West Freeway
2000
4000
6000
8000
10000
Scale: 500
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2041 Link Volume to Capacity Ratio without GTA West Corridor

Arterial Road	Travel Direction	Section	2041# of Lanes	2041 Lane Capacity	Total Capacity	2041 EMME Assigned Volumes	2041 v/c
Teston Road	Eastbound	Hwy 400 to Jane St	2	900	1,800	1,131	0.63
		Jane St to Keele St	2	900	1,800	1,376	0.76
		Keele St to Dufferin St	2	900	1,800	1,171	0.65
		Dufferin St to Bathurst St	2	900	1,800	1,326	0.74
	Westbound	Hwy 400 to Jane St	2	900	1,800	1,632	0.91
		Jane St to Keele St	2	900	1,800	1,500	0.83
		Keele St to Dufferin St	2	900	1,800	1,518	0.84
		Dufferin St to Bathurst St	2	900	1,800	1,555	0.86
Kirby Road	Eastbound	Hwy 400 to Jane St	2	900	1,800	1,243	0.69
		Jane St to Keele St	2	900	1,800	852	0.47
		Keele St to Dufferin St	2	900	1,800	1,262	0.70
		Dufferin St to Bathurst St	2	900	1,800	1,196	0.66
	Westbound	Hwy 400 to Jane St	2	900	1,800	1,535	0.85
		Jane St to Keele St	2	900	1,800	1,237	0.69
		Keele St to Dufferin St	2	900	1,800	1,411	0.78
		Dufferin St to Bathurst St	2	900	1,800	1,369	0.76
Major Mackenzie Dr	Eastbound	Hwy 400 to Jane St	3	900	2,700	1,579	0.58
		Jane St to Keele St	2	800	1,600	1,074	0.67
		Keele St to Dufferin St	2	900	1,800	874	0.49
		Dufferin St to Bathurst St	2	900	1,800	1,127	0.63
	Westbound	Hwy 400 to Jane St	3	900	2,700	1,943	0.72
		Jane St to Keele St	2	800	1,600	1,385	0.87
		Keele St to Dufferin St	2	900	1,800	1,628	0.90
		Dufferin St to Bathurst St	2	900	1,800	1,610	0.89
Jane Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	405	0.23
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	575	0.32
		Teston Rd to Kirby Rd	2	1,000	2,000	470	0.24
		Kirby Rd to King Vaughan Rd	2	1,000	2,000	1161	0.58
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	2527	1.40
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	2376	1.32
		Teston Rd to Kirby Rd	2	1,000	2,000	1988	0.99
		Kirby Rd to King Vaughan Rd	2	1,000	2,000	2086	1.04
Keele Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	408	0.23
		Major Mackenzie Dr IC to Teston Rd IC	2	800	1,600	407	0.25
		Teston Rd to Kirby Rd	2	900	1,800	723	0.40
		Kirby Rd to King Vaughan Rd	2	900	1,800	722	0.40
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	2573	1.43
		Major Mackenzie Dr IC to Teston Rd IC	2	800	1,600	1806	1.13
		Teston Rd to Kirby Rd	2	900	1,800	1798	1.00
		Kirby Rd to King Vaughan Rd	2	900	1,800	2077	1.15
Dufferin Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	1045	0.58
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	814	0.45
		Teston Rd to Kirby Rd	2	1,000	2,000	485	0.24
		Kirby Rd to King Vaughan Rd	2	900	1,800	328	0.18
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	2078	1.15
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	2183	1.21
		Teston Rd to Kirby Rd	2	1,000	2,000	1792	0.90
		Kirby Rd to King Vaughan Rd	2	900	1,800	1611	0.90
Bathurst Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	3	900	2,700	1380	0.51
		Major Mackenzie Dr IC to Teston Rd IC	3	1,000	3,000	1390	0.46
		Teston Rd to Kirby Rd	3	1,200	3,600	1570	0.44
		Kirby Rd to King Vaughan Rd	2	1,200	2,400	1093	0.46
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	3	900	2,700	2940	1.09
		Major Mackenzie Dr IC to Teston Rd IC	3	1,000	3,000	2747	0.92
		Teston Rd to Kirby Rd	3	1,200	3,600	2905	0.81
		Kirby Rd to King Vaughan Rd	2	1,200	2,400	2338	0.97

Appendix J: 2041 Snapshot of EMME Subarea Network with GTA West

2041 Link Attributes



YRTDF Model-2041_March-2020 (I:/EMME/Emme_4_Modelling_in_2020_MASTER/Database/Model-2041_March-2020/emmebank)
Scenario 9422: 2041 MASTER Apr15-2020
2020-06-04

2041 AM 3-hour Pkpd Transit Link Volumes



YRTDF Model-2041_March-2020 (I:/EMME/Emme_4_Modelling_in_2020_MASTER/Database/Model-2041_March-2020/emmebank)
Scenario 9424: 2041 MASTER Jun29-2020
2020-08-24


2041 Auto and Transit Assigned Trips with GTA West Freeway
2000
4000
6000
8000
10000
Scale: 500
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2041 Link Volume to Capacity Ratio with GTA West Corridor

Arterial Road	Travel Direction	Section	2041# of Lanes	2041 Lane Capacity	Total Capacity	2041 EMME Assigned Volumes	2041 v/c
Teston Road	Eastbound	Hwy 400 to Jane St	2	900	1,800	1,160	0.64
		Jane St to Keele St	2	900	1,800	1,340	0.74
		Keele St to Dufferin St	2	900	1,800	1,142	0.63
		Dufferin St to Bathurst St	2	900	1,800	1,320	0.73
	Westbound	Hwy 400 to Jane St	2	900	1,800	1,480	0.82
		Jane St to Keele St	2	900	1,800	1,522	0.85
		Keele St to Dufferin St	2	900	1,800	1,637	0.909
		Dufferin St to Bathurst St	2	900	1,800	1,611	0.90
Kirby Road	Eastbound	Hwy 400 to Jane St	2	900	1,800	618	0.34
		Jane St to Keele St	2	900	1,800	839	0.47
		Keele St to Dufferin St	2	900	1,800	1,270	0.71
		Dufferin St to Bathurst St	2	900	1,800	1,184	0.66
	Westbound	Hwy 400 to Jane St	2	900	1,800	1,235	0.69
		Jane St to Keele St	2	900	1,800	1,503	0.84
		Keele St to Dufferin St	2	900	1,800	1,585	0.88
		Dufferin St to Bathurst St	2	900	1,800	1,518	0.84
Major Mackenzie Dr	Eastbound	Hwy 400 to Jane St	3	900	2,700	1,552	0.57
		Jane St to Keele St	2	800	1,600	1,093	0.68
		Keele St to Dufferin St	2	900	1,800	879	0.49
		Dufferin St to Bathurst St	2	900	1,800	1,164	0.65
	Westbound	Hwy 400 to Jane St	3	900	2,700	1,826	0.68
		Jane St to Keele St	2	800	1,600	1,355	0.85
		Keele St to Dufferin St	2	900	1,800	1,568	0.87
		Dufferin St to Bathurst St	2	900	1,800	1,616	0.90
Jane Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	391	0.22
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	377	0.21
		Teston Rd to Kirby Rd	2	1,000	2,000	503	0.25
		Kirby Rd to King Vaughan Rd	2	1,000	2,000	648	0.32
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	2487	1.38
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	2224	1.24
		Teston Rd to Kirby Rd	2	1,000	2,000	1805	0.90
		Kirby Rd to King Vaughan Rd	2	1,000	2,000	1959	0.98
Keele Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	439	0.24
		Major Mackenzie Dr IC to Teston Rd IC	2	800	1,600	391	0.24
		Teston Rd to Kirby Rd	2	900	1,800	805	0.45
		Kirby Rd to King Vaughan Rd	2	900	1,800	685	0.38
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	2504	1.39
		Major Mackenzie Dr IC to Teston Rd IC	2	800	1,600	1675	1.05
		Teston Rd to Kirby Rd	2	900	1,800	1723	0.96
		Kirby Rd to King Vaughan Rd	2	900	1,800	2049	1.14
Dufferin Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	1002	0.56
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	780	0.43
		Teston Rd to Kirby Rd	2	1,000	2,000	369	0.18
		Kirby Rd to King Vaughan Rd	2	900	1,800	246	0.14
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	1998	1.11
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	2132	1.18
		Teston Rd to Kirby Rd	2	1,000	2,000	1747	0.87
		Kirby Rd to King Vaughan Rd	2	900	1,800	1606	0.89
Bathurst Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	3	900	2,700	1327	0.49
		Major Mackenzie Dr IC to Teston Rd IC	3	1,000	3,000	1397	0.47
		Teston Rd to Kirby Rd	3	1,200	3,600	1599	0.44
		Kirby Rd to King Vaughan Rd	2	1,200	2,400	1127	0.47
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	3	900	2,700	2871	1.06
		Major Mackenzie Dr IC to Teston Rd IC	3	1,000	3,000	2698	0.90
		Teston Rd to Kirby Rd	3	1,200	3,600	2840	0.79
		Kirby Rd to King Vaughan Rd	2	1,200	2,400	2329	0.97

Appendix K: 2041 Snapshot of EMME Subarea Network for Do-Nothing Option

2041 AM 3-hour Pkpd Transit Volumes - Do-Nothing scenario



YRTDF Model-2041_March-2020 (I:/EMME/Emme_4_Modelling_in_2020_MASTER/Database/Model-2041_March-2020/emmebank)
Scenario 100 4: cp Sc9424, with GTAWest no Teston Extension
2021-01-04


2041 Auto and Transit Assigned Trips with GTA West Freeway (Do-Nothing Option)
2000
4000
6000
8000
10000
Scale: 500
Made with Emme. Map tiles ©MapTiler ©OpenStreetMap contributors

2041 Link Volume to Capacity Ratio with GTA West Corridor for Do-Nothing Option

Arterial Road	Travel Direction	Section	2041# of Lanes	2041 Lane Capacity	Total Capacity	2041 EMME Assigned Volumes	2041 v/c
Teston Road	Eastbound	Hwy 400 to Jane St	2	900	1,800	923	0.51
		Jane St to Keele St	2	900	1,800	861	0.48
		Keele St to Dufferin St	2	900	1,800	Missing Link	
		Dufferin St to Bathurst St	2	900	1,800	1,035	0.58
	Westbound	Hwy 400 to Jane St	2	900	1,800	1,370	0.76
		Jane St to Keele St	2	900	1,800	1,217	0.68
		Keele St to Dufferin St	2	900	1,800	Missing Link	
		Dufferin St to Bathurst St	2	900	1,800	1,406	0.78
Kirby Road	Eastbound	Hwy 400 to Jane St	2	900	1,800	762	0.42
		Jane St to Keele St	2	900	1,800	896	0.50
		Keele St to Dufferin St	2	900	1,800	1,694	0.94
		Dufferin St to Bathurst St	2	900	1,800	1,345	0.75
	Westbound	Hwy 400 to Jane St	2	900	1,800	1,353	0.75
		Jane St to Keele St	2	900	1,800	1,497	0.83
		Keele St to Dufferin St	2	900	1,800	2,114	1.17
		Dufferin St to Bathurst St	2	900	1,800	1,489	0.83
Major Mackenzie Dr	Eastbound	Hwy 400 to Jane St	3	900	2,700	1,560	0.58
		Jane St to Keele St	2	800	1,600	1,282	0.80
		Keele St to Dufferin St	2	900	1,800	1,284	0.71
		Dufferin St to Bathurst St	2	900	1,800	1,169	0.65
	Westbound	Hwy 400 to Jane St	3	900	2,700	1,773	0.66
		Jane St to Keele St	2	800	1,600	1,439	0.90
		Keele St to Dufferin St	2	900	1,800	2,039	1.13
		Dufferin St to Bathurst St	2	900	1,800	1,823	1.01
Jane Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	357	0.20
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	299	0.17
		Teston Rd to Kirby Rd	2	1,000	2,000	550	0.28
		Kirby Rd to King Vaughan Rd	2	1,000	2,000	644	0.32
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	2479	1.38
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	2112	1.17
		Teston Rd to Kirby Rd	2	1,000	2,000	1901	0.95
		Kirby Rd to King Vaughan Rd	2	1,000	2,000	1995	1.00
Keele Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	460	0.26
		Major Mackenzie Dr IC to Teston Rd IC	2	800	1,600	836	0.52
		Teston Rd to Kirby Rd	2	900	1,800	672	0.37
		Kirby Rd to King Vaughan Rd	2	900	1,800	696	0.39
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	2499	1.39
		Major Mackenzie Dr IC to Teston Rd IC	2	800	1,600	1728	1.08
		Teston Rd to Kirby Rd	2	900	1,800	1748	0.97
		Kirby Rd to King Vaughan Rd	2	900	1,800	2081	1.16
Dufferin Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	1005	0.56
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	819	0.46
		Teston Rd to Kirby Rd	2	1,000	2,000	1159	0.58
		Kirby Rd to King Vaughan Rd	2	900	1,800	477	0.27
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	2	900	1,800	2025	1.13
		Major Mackenzie Dr IC to Teston Rd IC	2	900	1,800	2139	1.19
		Teston Rd to Kirby Rd	2	1,000	2,000	1914	0.96
		Kirby Rd to King Vaughan Rd	2	900	1,800	1509	0.84
Bathurst Street	Northbound	Rutherford Rd IC to Major Mackenzie Dr IC	3	900	2,700	1290	0.48
		Major Mackenzie Dr IC to Teston Rd IC	3	1,000	3,000	1206	0.40
		Teston Rd to Kirby Rd	3	1,200	3,600	1460	0.41
		Kirby Rd to King Vaughan Rd	2	1,200	2,400	1036	0.43
	Southbound	Rutherford Rd IC to Major Mackenzie Dr IC	3	900	2,700	2859	1.06
		Major Mackenzie Dr IC to Teston Rd IC	3	1,000	3,000	2657	0.89
		Teston Rd to Kirby Rd	3	1,200	3,600	2942	0.82
		Kirby Rd to King Vaughan Rd	2	1,200	2,400	2293	0.96

Appendix L: Synchro Results for Do-Nothing Conditions (2041)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	880	528	944	854	4	30	0	183	0	3	1
Future Volume (vph)	0	880	528	944	854	4	30	0	183	0	3	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	1.0	5.0		5.0		5.0		1.0	
Lane Util. Factor		0.95	1.00	1.00	0.95		0.97		1.00		1.00	
Frpb, ped/bikes		1.00	0.99	1.00	1.00		1.00		1.00		1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00		1.00		1.00	
Frt		1.00	0.85	1.00	1.00		1.00		0.85		0.97	
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00		1.00	
Satd. Flow (prot)		3318	1464	1630	3258		2603		1420		1856	
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00		1.00	
Satd. Flow (perm)		3318	1464	1630	3258		2603		1420		1856	
Peak-hour factor, PHF	0.97	0.97	0.97	1.00	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	907	544	944	880	4	31	0	189	0	3	1
RTOR Reduction (vph)	0	0	328	0	0	0	0	0	171	0	1	0
Lane Group Flow (vph)	0	907	216	944	884	0	31	0	18	0	3	0
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	10%	10%	12%	12%	0%	36%	0%	15%	0%	0%	0%
Turn Type	Perm	NA	Perm	Prot	NA		Prot		Perm		NA	
Protected Phases		6		5	2		8				7	
Permitted Phases	6		6						8	7		
Actuated Green, G (s)		33.1	33.1	56.2	93.3		10.8		10.8		1.3	
Effective Green, g (s)		35.1	35.1	59.2	95.3		11.8		11.8		5.3	
Actuated g/C Ratio		0.28	0.28	0.48	0.77		0.10		0.10		0.04	
Clearance Time (s)		7.0	7.0	4.0	7.0		6.0		6.0		5.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)		943	416	781	2516		248		135		79	
v/s Ratio Prot		c0.27		c0.58	0.27		0.01				c0.00	
v/s Ratio Perm			0.15						c0.01			
v/c Ratio		0.96	0.52	1.21	0.35		0.12		0.13		0.04	
Uniform Delay, d1		43.5	37.1	32.1	4.4		51.1		51.1		56.6	
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00		1.00	
Incremental Delay, d2		21.4	4.6	105.8	0.4		0.2		0.5		0.2	
Delay (s)		64.9	41.7	137.9	4.8		51.3		51.6		56.8	
Level of Service		E	D	F	A		D		D		E	
Approach Delay (s)		56.2			73.5			51.5			56.8	
Approach LOS		E			E			D			E	

Intersection Summary			
HCM 2000 Control Delay	64.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	123.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	402	130	0	1467	262	1158
Future Volume (vph)	402	130	0	1467	262	1158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0		5.0	5.0	5.0
Lane Util. Factor	0.95	1.00		0.95	0.97	0.91
Frt	1.00	0.85		1.00	0.90	0.85
Flt Protected	1.00	1.00		1.00	0.98	1.00
Satd. Flow (prot)	3411	1526		3411	3075	1389
Flt Permitted	1.00	1.00		1.00	0.98	1.00
Satd. Flow (perm)	3411	1526		3411	3075	1389
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	414	134	0	1512	270	1194
RTOR Reduction (vph)	0	0	0	0	277	277
Lane Group Flow (vph)	414	134	0	1512	590	320
Heavy Vehicles (%)	7%	7%	0%	7%	7%	7%
Turn Type	NA	Free		NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		Free				8
Actuated Green, G (s)	47.3	86.4		47.3	24.1	24.1
Effective Green, g (s)	49.8	86.4		49.8	26.6	26.6
Actuated g/C Ratio	0.58	1.00		0.58	0.31	0.31
Clearance Time (s)	7.5			7.5	7.5	7.5
Vehicle Extension (s)	4.0			4.0	3.0	3.0
Lane Grp Cap (vph)	1966	1526		1966	946	427
v/s Ratio Prot	0.12			c0.44	0.19	
v/s Ratio Perm		0.09				c0.23
v/c Ratio	0.21	0.09		0.77	0.62	0.75
Uniform Delay, d1	8.8	0.0		13.9	25.6	26.9
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1		3.0	1.3	7.1
Delay (s)	9.1	0.1		16.9	26.9	34.0
Level of Service	A	A		B	C	C
Approach Delay (s)	6.9			16.9	29.8	
Approach LOS	A			B	C	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	86.4	Sum of lost time (s)	10.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	629	210	321	1266	14	147	78	74	220	1430	671
Future Volume (vph)	84	629	210	321	1266	14	147	78	74	220	1430	671
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1772	3544	1547	1807	3510	1126	1825	3288	1555	1772	3614	1597
Flt Permitted	0.10	1.00	1.00	0.21	1.00	1.00	0.07	1.00	1.00	0.70	1.00	1.00
Satd. Flow (perm)	182	3544	1547	399	3510	1126	125	3288	1555	1310	3614	1597
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	1.00	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	87	648	216	331	1266	14	152	80	76	227	1474	692
RTOR Reduction (vph)	0	0	94	0	0	9	0	0	39	0	0	89
Lane Group Flow (vph)	87	648	122	331	1266	5	152	80	37	227	1474	603
Confl. Peds. (#/hr)			2	2								
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	3%	3%	4%	1%	4%	45%	0%	11%	5%	3%	1%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		1	6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	44.9	37.9	37.9	60.5	49.5	49.5	68.5	68.5	68.5	57.5	57.5	57.5
Effective Green, g (s)	50.9	41.4	41.4	63.5	53.0	53.0	71.5	71.0	71.0	60.0	60.0	60.0
Actuated g/C Ratio	0.35	0.29	0.29	0.44	0.37	0.37	0.49	0.49	0.49	0.41	0.41	0.41
Clearance Time (s)	4.0	8.5	8.5	4.0	8.5	8.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	173	1011	441	384	1282	411	178	1609	761	542	1495	660
v/s Ratio Prot	0.03	0.18		c0.13	c0.36		c0.06	0.02			c0.41	
v/s Ratio Perm	0.14		0.08	0.25		0.00	0.36		0.02	0.17		0.38
v/c Ratio	0.50	0.64	0.28	0.86	0.99	0.01	0.85	0.05	0.05	0.42	0.99	0.91
Uniform Delay, d1	37.0	45.3	40.2	30.5	45.7	29.3	38.8	19.4	19.3	30.1	42.1	40.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.3	1.4	0.3	17.7	21.9	0.0	30.6	0.1	0.1	2.4	20.2	19.3
Delay (s)	39.3	46.7	40.5	48.2	67.6	29.3	69.4	19.4	19.5	32.5	62.2	59.3
Level of Service	D	D	D	D	E	C	E	B	B	C	E	E
Approach Delay (s)		44.6			63.3			44.1			58.6	
Approach LOS		D			E			D			E	

Intersection Summary			
HCM 2000 Control Delay	56.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	115.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	594	56	63	1576	138	55
Future Volume (vph)	594	56	63	1576	138	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3444	1541	1772	3510	1807	1526
Flt Permitted	1.00	1.00	0.42	1.00	0.95	1.00
Satd. Flow (perm)	3444	1541	779	3510	1807	1526
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	612	58	65	1625	142	57
RTOR Reduction (vph)	0	15	0	0	0	48
Lane Group Flow (vph)	612	43	65	1625	142	9
Heavy Vehicles (%)	6%	6%	3%	4%	1%	7%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	6			2	8	
Permitted Phases		6	2			8
Actuated Green, G (s)	66.0	66.0	66.0	66.0	12.8	12.8
Effective Green, g (s)	68.5	68.5	68.5	68.5	14.8	14.8
Actuated g/C Ratio	0.73	0.73	0.73	0.73	0.16	0.16
Clearance Time (s)	7.5	7.5	7.5	7.5	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2528	1131	571	2577	286	242
v/s Ratio Prot	0.18			c0.46	c0.08	
v/s Ratio Perm		0.03	0.08			0.01
v/c Ratio	0.24	0.04	0.11	0.63	0.50	0.04
Uniform Delay, d1	4.0	3.4	3.6	6.1	35.8	33.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1	0.4	1.2	1.4	0.1
Delay (s)	4.2	3.5	4.0	7.3	37.2	33.3
Level of Service	A	A	A	A	D	C
Approach Delay (s)	4.2			7.2	36.1	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	93.3	Sum of lost time (s)	10.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	238	107	517	47	34	5	318	401	118	35	1154	782
Future Volume (vph)	238	107	517	47	34	5	318	401	118	35	1154	782
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	5.0	1.0	5.0		1.0	5.0		5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1738	1731	1533	1207	1560		1601	3050		1765	3544	1601
Flt Permitted	0.71	1.00	1.00	0.69	1.00		0.10	1.00		0.45	1.00	1.00
Satd. Flow (perm)	1298	1731	1533	872	1560		169	3050		842	3544	1601
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	1.00	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	245	110	533	48	35	5	318	413	122	36	1190	806
RTOR Reduction (vph)	0	0	276	0	4	0	0	25	0	0	0	478
Lane Group Flow (vph)	245	110	257	48	36	0	318	510	0	36	1190	328
Confl. Peds. (#/hr)			2	2					4	4		
Heavy Vehicles (%)	5%	11%	5%	51%	21%	20%	14%	8%	38%	3%	3%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	7	4		3	8		1	6			2	
Permitted Phases	4		4	8			6			2		2
Actuated Green, G (s)	39.1	31.5	31.5	35.7	29.8		54.4	54.4		35.8	35.8	35.8
Effective Green, g (s)	44.4	34.0	34.0	41.7	32.3		57.4	56.9		38.3	38.3	38.3
Actuated g/C Ratio	0.40	0.31	0.31	0.38	0.29		0.52	0.51		0.35	0.35	0.35
Clearance Time (s)	4.0	7.5	7.5	4.0	7.5		4.0	7.5		7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	562	531	470	355	454		315	1566		291	1225	553
v/s Ratio Prot	c0.04	0.06		0.01	0.02		c0.16	0.17			c0.34	
v/s Ratio Perm	0.13		c0.17	0.04			0.36			0.04		0.21
v/c Ratio	0.44	0.21	0.55	0.14	0.08		1.01	0.33		0.12	0.97	0.59
Uniform Delay, d1	23.2	28.4	32.0	22.4	28.5		34.1	15.7		24.8	35.7	29.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.9	4.5	0.2	0.3		53.1	0.6		0.9	19.7	4.6
Delay (s)	23.7	29.3	36.5	22.6	28.8		87.2	16.3		25.7	55.4	34.5
Level of Service	C	C	D	C	C		F	B		C	E	C
Approach Delay (s)		32.1			25.4			42.7			46.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	41.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	110.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	2	14	1004	13	313	7	445	367	508	1563	6
Future Volume (vph)	1	2	14	1004	13	313	7	445	367	508	1563	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0		1.0	5.0		5.0	5.0	1.0	1.0	5.0	
Lane Util. Factor	1.00	1.00		0.97	1.00		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1825	1669		3404	1461		1825	3259	1449	1659	3348	
Flt Permitted	0.56	1.00		0.95	1.00		0.12	1.00	1.00	0.31	1.00	
Satd. Flow (perm)	1073	1669		3404	1461		222	3259	1449	535	3348	
Peak-hour factor, PHF	0.97	0.97	0.97	1.00	0.97	0.97	0.97	0.97	0.97	1.00	1.00	0.97
Adj. Flow (vph)	1	2	14	1004	13	323	7	459	378	508	1563	6
RTOR Reduction (vph)	0	7	0	0	177	0	0	0	185	0	0	0
Lane Group Flow (vph)	1	9	0	1004	159	0	7	459	193	508	1569	0
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	0%	0%	4%	0%	13%	0%	12%	12%	10%	9%	0%
Turn Type	pm+pt	NA		Prot	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8			6	3	5	2	
Permitted Phases	4						6		6	2		
Actuated Green, G (s)	30.6	29.2		37.0	64.8		32.6	32.6	69.6	64.0	64.0	
Effective Green, g (s)	36.6	31.2		40.0	66.8		34.6	34.6	75.6	67.0	66.0	
Actuated g/C Ratio	0.25	0.21		0.27	0.45		0.23	0.23	0.51	0.45	0.45	
Clearance Time (s)	4.0	7.0		4.0	7.0		7.0	7.0	4.0	4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		6.0	6.0	3.0	6.0	3.0	
Lane Grp Cap (vph)	287	351		918	658		51	760	739	472	1491	
v/s Ratio Prot	0.00	0.01		c0.29	c0.11			0.14	0.07	c0.22	c0.47	
v/s Ratio Perm	0.00						0.03		0.06	0.27		
v/c Ratio	0.00	0.03		1.09	0.24		0.14	0.60	0.26	1.08	1.05	
Uniform Delay, d1	42.0	46.4		54.1	25.1		45.0	50.7	20.5	33.5	41.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.1		58.6	0.9		5.5	3.5	0.2	63.4	38.4	
Delay (s)	42.0	46.6		112.7	25.9		50.5	54.2	20.7	97.0	79.5	
Level of Service	D	D		F	C		D	D	C	F	E	
Approach Delay (s)		46.3			91.0			39.2			83.8	
Approach LOS		D			F			D			F	

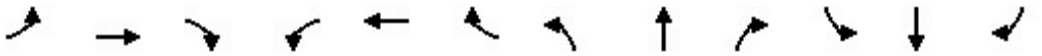
Intersection Summary			
HCM 2000 Control Delay	77.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	148.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	116.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	739	179	81	1021	93	93
Future Volume (vph)	739	179	81	1021	93	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3444	1480	1789	3579	1738	1581
Flt Permitted	1.00	1.00	0.36	1.00	0.95	1.00
Satd. Flow (perm)	3444	1480	674	3579	1738	1581
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	762	185	84	1053	96	96
RTOR Reduction (vph)	0	65	0	0	0	80
Lane Group Flow (vph)	762	120	84	1053	96	16
Confl. Peds. (#/hr)		1	1		1	1
Heavy Vehicles (%)	6%	8%	2%	2%	5%	2%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	6			2	8	
Permitted Phases		6	2			8
Actuated Green, G (s)	33.1	33.1	33.1	33.1	8.1	8.1
Effective Green, g (s)	35.6	35.6	35.6	35.6	9.1	9.1
Actuated g/C Ratio	0.65	0.65	0.65	0.65	0.17	0.17
Clearance Time (s)	7.5	7.5	7.5	7.5	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2241	963	438	2329	289	263
v/s Ratio Prot	0.22			c0.29	c0.06	
v/s Ratio Perm		0.08	0.12			0.01
v/c Ratio	0.34	0.13	0.19	0.45	0.33	0.06
Uniform Delay, d1	4.3	3.6	3.8	4.7	20.1	19.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.3	1.0	0.6	0.7	0.1
Delay (s)	4.7	3.9	4.8	5.4	20.8	19.3
Level of Service	A	A	A	A	C	B
Approach Delay (s)	4.5			5.3	20.0	
Approach LOS	A			A	C	

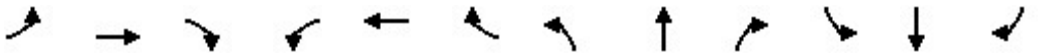
Intersection Summary			
HCM 2000 Control Delay	6.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	54.7	Sum of lost time (s)	10.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	206	471	41	265	527	77	39	816	146	265	1973	416
Future Volume (vph)	206	471	41	265	527	77	39	816	146	265	1973	416
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	5.0	1.0	5.0	5.0	5.0	5.0	5.0	1.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1738	3544	1331	1772	1847	1387	1644	3476	1522	1771	3579	1586
Flt Permitted	0.10	1.00	1.00	0.32	1.00	1.00	0.06	1.00	1.00	0.23	1.00	1.00
Satd. Flow (perm)	191	3544	1331	604	1847	1387	107	3476	1522	431	3579	1586
Peak-hour factor, PHF	0.97	0.97	0.97	1.00	1.00	0.97	0.97	0.97	0.97	0.97	1.00	0.97
Adj. Flow (vph)	212	486	42	265	527	79	40	841	151	273	1973	429
RTOR Reduction (vph)	0	0	30	0	0	57	0	0	81	0	0	123
Lane Group Flow (vph)	212	486	12	265	527	22	40	841	70	273	1973	306
Confl. Peds. (#/hr)	16		1	1		16	5		14	14		5
Confl. Bikes (#/hr)			1			1			1			2
Heavy Vehicles (%)	5%	3%	21%	3%	4%	14%	11%	5%	4%	3%	2%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8			6		5	2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	45.0	35.4	35.4	46.2	36.0	36.0	61.9	61.9	61.9	74.4	74.4	74.4
Effective Green, g (s)	51.0	38.4	38.4	52.2	39.0	39.0	64.9	64.9	64.9	77.4	77.4	77.4
Actuated g/C Ratio	0.36	0.27	0.27	0.37	0.28	0.28	0.46	0.46	0.46	0.55	0.55	0.55
Clearance Time (s)	4.0	8.0	8.0	4.0	8.0	8.0	8.0	8.0	8.0	4.0	8.0	8.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	208	972	365	335	514	386	49	1611	705	348	1978	876
v/s Ratio Prot	c0.09	0.14		c0.07	c0.29			0.24		0.06	c0.55	
v/s Ratio Perm	0.28		0.01	0.22		0.02	0.37		0.05	0.37		0.19
v/c Ratio	1.02	0.50	0.03	0.79	1.03	0.06	0.82	0.52	0.10	0.78	1.00	0.35
Uniform Delay, d1	39.2	42.7	37.2	34.9	50.5	37.0	32.4	26.6	21.1	19.2	31.2	17.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	67.5	0.4	0.0	12.0	46.3	0.2	82.0	1.2	0.3	11.0	19.6	1.1
Delay (s)	106.7	43.1	37.2	46.9	96.8	37.2	114.4	27.8	21.4	30.2	50.9	18.5
Level of Service	F	D	D	D	F	D	F	C	C	C	D	B
Approach Delay (s)		61.0			76.2			30.2			43.6	
Approach LOS		E			E			C			D	

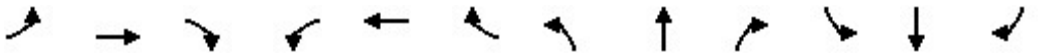
Intersection Summary			
HCM 2000 Control Delay	48.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	135.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1983	8	14	1670	0	6	0	13	856	54	347
Future Volume (vph)	0	1983	8	14	1670	0	6	0	13	856	54	347
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		1.0	5.0		5.0		5.0	5.0	5.0	5.0
Lane Util. Factor		0.91		1.00	0.95		1.00		1.00	0.95	0.91	0.95
Frpb, ped/bikes		1.00		1.00	1.00		1.00		1.00	1.00	1.00	0.99
Flpb, ped/bikes		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Frt		1.00		1.00	1.00		1.00		0.85	1.00	0.99	0.85
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.96	1.00
Satd. Flow (prot)		4852		1372	3349		1371		1247	1651	1522	1085
Flt Permitted		1.00		0.06	1.00		0.47		1.00	0.95	0.96	1.00
Satd. Flow (perm)		4852		82	3349		679		1247	1651	1522	1085
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	2044	8	14	1722	0	6	0	13	882	56	358
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	12	0	1	81
Lane Group Flow (vph)	0	2052	0	14	1722	0	6	0	1	494	475	245
Confl. Peds. (#/hr)			4	4			1					1
Heavy Vehicles (%)	0%	8%	10%	33%	9%	0%	33%	0%	31%	5%	20%	41%
Turn Type		NA		pm+pt	NA	Perm	Perm		Perm	Perm	NA	Perm
Protected Phases		2		1	6						4	
Permitted Phases				6		6	8		8	4		4
Actuated Green, G (s)		66.7		73.5	73.5		6.0		6.0	49.0	49.0	49.0
Effective Green, g (s)		68.7		76.5	75.5		8.5		8.5	51.0	51.0	51.0
Actuated g/C Ratio		0.46		0.51	0.50		0.06		0.06	0.34	0.34	0.34
Clearance Time (s)		7.0		4.0	7.0		7.5		7.5	7.0	7.0	7.0
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		2222		91	1685		38		70	561	517	368
v/s Ratio Prot		0.42		0.01	c0.51							
v/s Ratio Perm				0.07			c0.01		0.00	0.30	0.31	0.23
v/c Ratio		0.92		0.15	1.02		0.16		0.01	0.88	0.92	0.67
Uniform Delay, d1		38.2		28.4	37.2		67.3		66.8	46.6	47.5	42.2
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		7.9		0.8	27.6		1.9		0.1	15.0	21.2	4.5
Delay (s)		46.1		29.2	64.9		69.3		66.8	61.6	68.7	46.7
Level of Service		D		C	E		E		E	E	E	D
Approach Delay (s)		46.1			64.6			67.6			60.5	
Approach LOS		D			E			E			E	

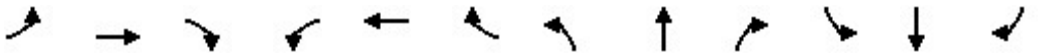
Intersection Summary			
HCM 2000 Control Delay	56.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	89.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1026	0	0	1668	0	483	0	560	0	0	0
Future Volume (vph)	0	1026	0	0	1668	0	483	0	560	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0		5.0		5.0			
Lane Util. Factor		0.95			0.95		0.97		0.88			
Frt		1.00			1.00		1.00		0.85			
Flt Protected		1.00			1.00		0.95		1.00			
Satd. Flow (prot)		3411			3444		3190		2566			
Flt Permitted		1.00			1.00		0.95		1.00			
Satd. Flow (perm)		3411			3444		3190		2566			
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1058	0	0	1720	0	498	0	577	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	181	0	0	0
Lane Group Flow (vph)	0	1058	0	0	1720	0	498	0	396	0	0	0
Heavy Vehicles (%)	0%	7%	0%	0%	6%	0%	11%	0%	12%	0%	0%	0%
Turn Type		NA	Perm		NA	Perm	Perm		Perm			
Protected Phases		2			6							
Permitted Phases			2			6	8		8			
Actuated Green, G (s)		114.3			114.3		31.7		31.7			
Effective Green, g (s)		116.8			116.8		33.2		33.2			
Actuated g/C Ratio		0.73			0.73		0.21		0.21			
Clearance Time (s)		7.5			7.5		6.5		6.5			
Vehicle Extension (s)		3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)		2490			2514		661		532			
v/s Ratio Prot		0.31			c0.50							
v/s Ratio Perm							c0.16		0.15			
v/c Ratio		0.42			0.68		0.75		0.74			
Uniform Delay, d1		8.5			11.7		59.6		59.4			
Progression Factor		1.00			0.70		1.00		1.00			
Incremental Delay, d2		0.5			0.1		4.9		5.6			
Delay (s)		9.0			8.2		64.4		65.0			
Level of Service		A			A		E		E			
Approach Delay (s)		9.0			8.2			64.7			0.0	
Approach LOS		A			A			E			A	

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	11.5
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	133	1188	238	225	1470	26	98	196	64	135	1620	908
Future Volume (vph)	133	1188	238	225	1470	26	98	196	64	135	1620	908
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3404	3476	1564	1755	3579	1305	1722	3380	1427	1676	3579	1578
Flt Permitted	0.95	1.00	1.00	0.07	1.00	1.00	0.06	1.00	1.00	0.62	1.00	1.00
Satd. Flow (perm)	3404	3476	1564	130	3579	1305	107	3380	1427	1090	3579	1578
Peak-hour factor, PHF	0.97	1.00	0.97	1.00	1.00	0.97	0.97	0.97	0.97	0.97	1.00	1.00
Adj. Flow (vph)	137	1188	245	225	1470	27	101	202	66	139	1620	908
RTOR Reduction (vph)	0	0	70	0	0	0	0	0	38	0	0	83
Lane Group Flow (vph)	137	1188	175	225	1470	27	101	202	28	139	1620	825
Confl. Peds. (#/hr)	4		1	1		4	2		14	14		2
Heavy Vehicles (%)	4%	5%	3%	4%	2%	23%	6%	8%	11%	8%	2%	2%
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		4
Actuated Green, G (s)	7.0	53.0	53.0	67.0	56.0	56.0	72.0	65.0	65.0	72.0	65.0	65.0
Effective Green, g (s)	11.0	56.0	56.0	71.0	59.0	59.0	78.0	68.0	68.0	78.0	68.0	68.0
Actuated g/C Ratio	0.07	0.35	0.35	0.44	0.37	0.37	0.49	0.42	0.42	0.49	0.42	0.42
Clearance Time (s)	5.0	8.0	8.0	4.0	8.0	8.0	4.0	8.0	8.0	4.0	8.0	8.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	234	1216	547	199	1319	481	153	1436	606	568	1521	670
v/s Ratio Prot	0.04	0.34		c0.10	c0.41		c0.04	0.06		0.02	0.45	
v/s Ratio Perm			0.11	0.40		0.02	0.28		0.02	0.10		c0.52
v/c Ratio	0.59	0.98	0.32	1.13	1.11	0.06	0.66	0.14	0.05	0.24	1.07	1.23
Uniform Delay, d1	72.3	51.4	38.1	50.0	50.5	32.6	35.9	28.1	27.0	22.9	46.0	46.0
Progression Factor	1.06	0.93	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.3	19.2	1.3	103.3	62.5	0.2	10.2	0.0	0.0	0.2	42.6	117.0
Delay (s)	80.2	67.1	37.2	153.4	113.0	32.8	46.1	28.2	27.0	23.1	88.6	163.0
Level of Service	F	E	D	F	F	C	D	C	C	C	F	F
Approach Delay (s)		63.6			117.0			32.9			110.5	
Approach LOS		E			F			C			F	

Intersection Summary			
HCM 2000 Control Delay	96.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	114.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	1098	129	151	1712	47	96	256	106	348	1679	169
Future Volume (vph)	55	1098	129	151	1712	47	96	256	106	348	1679	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0		1.0	5.0		1.0	5.0		1.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1738	3510		1789	3563		1738	3299		1800	3505	
Flt Permitted	0.06	1.00		0.06	1.00		0.08	1.00		0.43	1.00	
Satd. Flow (perm)	115	3510		116	3563		146	3299		814	3505	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	1.00	0.97	0.97	0.97	0.97	0.97	1.00	0.97
Adj. Flow (vph)	57	1132	133	156	1712	48	99	264	109	359	1679	174
RTOR Reduction (vph)	0	5	0	0	1	0	0	28	0	0	5	0
Lane Group Flow (vph)	57	1260	0	156	1759	0	99	345	0	359	1848	0
Confl. Peds. (#/hr)	15		7	7		15	20		13	13		20
Heavy Vehicles (%)	5%	2%	3%	2%	2%	0%	5%	6%	2%	1%	2%	5%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	66.4	60.8		71.2	63.2		54.0	47.0		74.0	63.0	
Effective Green, g (s)	72.4	62.8		75.8	65.2		60.0	49.0		77.0	65.0	
Actuated g/C Ratio	0.45	0.39		0.47	0.41		0.37	0.30		0.48	0.40	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	138	1370		169	1444		153	1005		549	1416	
v/s Ratio Prot	0.02	0.36		c0.06	c0.49		0.04	0.10		c0.11	c0.53	
v/s Ratio Perm	0.16			0.37			0.20			0.21		
v/c Ratio	0.41	0.92		0.92	1.22		0.65	0.34		0.65	1.31	
Uniform Delay, d1	36.6	46.6		45.6	47.8		40.5	43.4		27.7	47.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	11.4		47.2	104.6		9.1	0.9		2.8	142.6	
Delay (s)	38.6	58.0		92.8	152.4		49.5	44.3		30.5	190.5	
Level of Service	D	E		F	F		D	D		C	F	
Approach Delay (s)		57.2			147.6			45.4			164.5	
Approach LOS		E			F			D			F	

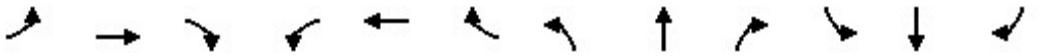
Intersection Summary			
HCM 2000 Control Delay	125.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	160.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	127.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	921	209	259	1548	21	253	559	190	41	1458	556
Future Volume (vph)	154	921	209	259	1548	21	253	559	190	41	1458	556
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1755	3579	1544	1807	3579	1518	1807	3510	1542	1771	3614	1574
Flt Permitted	0.08	1.00	1.00	0.12	1.00	1.00	0.08	1.00	1.00	0.34	1.00	1.00
Satd. Flow (perm)	146	3579	1544	230	3579	1518	143	3510	1542	635	3614	1574
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	1.00	0.97	1.00	0.97	0.97	0.97	1.00	0.97
Adj. Flow (vph)	159	949	215	267	1548	22	253	576	196	42	1458	573
RTOR Reduction (vph)	0	0	91	0	0	13	0	0	122	0	0	82
Lane Group Flow (vph)	159	949	124	267	1548	9	253	576	74	42	1458	491
Confl. Peds. (#/hr)	4		4	4		4	4		5	5		4
Heavy Vehicles (%)	4%	2%	4%	1%	2%	6%	1%	4%	4%	3%	1%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	54.5	47.5	47.5	65.5	54.5	54.5	57.7	50.7	50.7	54.9	49.3	49.3
Effective Green, g (s)	60.5	50.0	50.0	68.5	57.0	57.0	63.3	53.2	53.2	60.9	51.8	51.8
Actuated g/C Ratio	0.43	0.36	0.36	0.49	0.40	0.40	0.45	0.38	0.38	0.43	0.37	0.37
Clearance Time (s)	4.0	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	177	1270	548	302	1448	614	182	1326	582	344	1329	579
v/s Ratio Prot	c0.06	0.27		c0.11	c0.43		c0.10	0.16		0.01	c0.40	
v/s Ratio Perm	0.32		0.08	0.32		0.01	0.53		0.05	0.05		0.31
v/c Ratio	0.90	0.75	0.23	0.88	1.07	0.01	1.39	0.43	0.13	0.12	1.10	0.85
Uniform Delay, d1	36.1	39.9	31.8	32.3	41.9	25.1	40.3	32.6	28.6	23.7	44.5	40.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	39.7	4.0	1.0	24.9	44.5	0.0	205.6	0.2	0.1	0.2	55.7	11.2
Delay (s)	75.8	43.9	32.8	57.2	86.4	25.1	245.9	32.8	28.7	23.9	100.2	52.1
Level of Service	E	D	C	E	F	C	F	C	C	C	F	D
Approach Delay (s)		45.9			81.4			84.6			85.3	
Approach LOS		D			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	75.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	140.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	120.6%	ICU Level of Service	H
Analysis Period (min)	15		

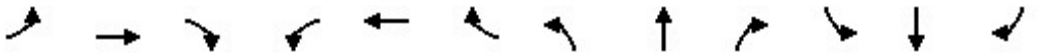
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	928	88	178	1018	92	114	703	301	314	1703	497
Future Volume (vph)	163	928	88	178	1018	92	114	703	301	314	1703	497
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	4.0	1.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1722	3476	1585	1807	3544	1565	1807	3510	1551	1824	3614	1600
Flt Permitted	0.10	1.00	1.00	0.10	1.00	1.00	0.07	1.00	1.00	0.26	1.00	1.00
Satd. Flow (perm)	173	3476	1585	181	3544	1565	131	3510	1551	499	3614	1600
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	1.00	0.97	0.97	0.97	0.97	0.97	1.00	0.97
Adj. Flow (vph)	168	957	91	184	1018	95	118	725	310	324	1703	512
RTOR Reduction (vph)	0	0	0	0	0	67	0	0	113	0	0	95
Lane Group Flow (vph)	168	957	91	184	1018	28	118	725	197	324	1703	417
Confl. Peds. (#/hr)	1					1	7		8	8		7
Heavy Vehicles (%)	6%	5%	3%	1%	3%	3%	1%	4%	3%	0%	1%	0%
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		Free	6		6	8		8	4		4
Actuated Green, G (s)	46.0	39.0	140.0	46.0	39.0	39.0	62.1	55.1	55.1	76.0	65.0	65.0
Effective Green, g (s)	52.0	41.0	140.0	52.0	41.0	41.0	68.1	57.1	57.1	79.0	67.0	67.0
Actuated g/C Ratio	0.37	0.29	1.00	0.37	0.29	0.29	0.49	0.41	0.41	0.56	0.48	0.48
Clearance Time (s)	4.0	7.0		4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	174	1017	1585	183	1037	458	183	1431	632	469	1729	765
v/s Ratio Prot	0.07	0.28		c0.07	c0.29		0.05	0.21		c0.10	c0.47	
v/s Ratio Perm	0.29		0.06	0.30		0.02	0.27		0.13	0.29		0.26
v/c Ratio	0.97	0.94	0.06	1.01	0.98	0.06	0.64	0.51	0.31	0.69	0.98	0.55
Uniform Delay, d1	36.2	48.3	0.0	36.1	49.1	35.6	30.9	30.9	28.1	18.3	36.0	25.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	57.6	17.2	0.1	68.0	23.9	0.3	7.6	0.3	0.3	4.4	18.0	0.8
Delay (s)	93.7	65.5	0.1	104.1	73.0	35.9	38.5	31.2	28.4	22.7	54.0	26.5
Level of Service	F	E	A	F	E	D	D	C	C	C	D	C
Approach Delay (s)		64.5			74.7			31.2			44.5	
Approach LOS		E			E			C			D	

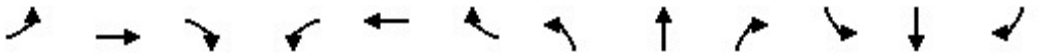
Intersection Summary			
HCM 2000 Control Delay	52.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	105.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group



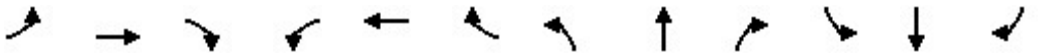
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	239	409	113	823	823	56	16	407	126	31	1779	184
Future Volume (vph)	239	409	113	823	823	56	16	407	126	31	1779	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	5.0	1.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1615	3579	1541	1738	3614	1484	1460	3318	1471	1825	3544	1585
Flt Permitted	0.32	1.00	1.00	0.29	1.00	1.00	0.08	1.00	1.00	0.49	1.00	1.00
Satd. Flow (perm)	551	3579	1541	523	3614	1484	129	3318	1471	942	3544	1585
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	239	409	113	823	823	56	16	407	126	31	1779	184
RTOR Reduction (vph)	0	0	100	0	0	40	0	0	0	0	0	0
Lane Group Flow (vph)	239	409	13	823	823	16	16	407	126	31	1779	184
Heavy Vehicles (%)	13%	2%	6%	5%	1%	10%	25%	10%	11%	0%	3%	3%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	20.0	10.0	10.0	41.0	27.0	27.0	44.0	44.0	44.0	44.0	44.0	44.0
Effective Green, g (s)	26.0	11.5	11.5	44.0	28.5	28.5	47.5	47.5	47.5	47.5	47.5	47.5
Actuated g/C Ratio	0.26	0.12	0.12	0.44	0.28	0.28	0.48	0.48	0.48	0.48	0.48	0.48
Clearance Time (s)	4.0	6.5	6.5	4.0	6.5	6.5	8.5	8.5	8.5	8.5	8.5	8.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	281	411	177	594	1029	422	61	1576	698	447	1683	752
v/s Ratio Prot	0.11	c0.11		c0.42	0.23			0.12			c0.50	
v/s Ratio Perm	0.11		0.01	0.19		0.01	0.12		0.09	0.03		0.12
v/c Ratio	0.85	1.00	0.07	1.39	0.80	0.04	0.26	0.26	0.18	0.07	1.06	0.24
Uniform Delay, d1	32.1	44.2	39.5	25.9	33.1	25.8	15.7	15.7	15.1	14.3	26.2	15.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	21.1	42.8	0.2	183.8	4.4	0.0	2.3	0.1	0.1	0.1	38.8	0.2
Delay (s)	53.2	87.1	39.7	209.6	37.5	25.9	18.0	15.8	15.2	14.3	65.0	15.8
Level of Service	D	F	D	F	D	C	B	B	B	B	E	B
Approach Delay (s)		69.4			120.4			15.7			59.7	
Approach LOS		E			F			B			E	

Intersection Summary			
HCM 2000 Control Delay	77.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	117.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



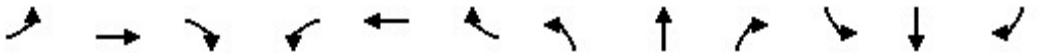
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	468	247	1014	663	193	61	503	109	23	1931	127
Future Volume (vph)	180	468	247	1014	663	193	61	503	109	23	1931	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	1.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1705	3579	1445	1789	3579	1519	1508	3380	1477	1382	3579	1500
Flt Permitted	0.40	1.00	1.00	0.28	1.00	1.00	0.06	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	717	3579	1445	522	3579	1519	96	3380	1477	591	3579	1500
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	180	468	247	1014	663	193	61	503	109	23	1931	127
RTOR Reduction (vph)	0	0	50	0	0	101	0	0	59	0	0	33
Lane Group Flow (vph)	180	468	197	1014	663	92	61	503	50	23	1931	94
Confl. Peds. (#/hr)	1					1	3		1	1		3
Confl. Bikes (#/hr)						1			1			
Heavy Vehicles (%)	7%	2%	13%	2%	2%	6%	21%	8%	9%	32%	2%	7%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	29.0	29.0	29.0	67.0	67.0	67.0	63.5	63.5	63.5	63.5	63.5	63.5
Effective Green, g (s)	31.0	31.0	31.0	70.0	69.0	69.0	66.0	66.0	66.0	66.0	66.0	66.0
Actuated g/C Ratio	0.21	0.21	0.21	0.48	0.48	0.48	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	7.0	7.0	7.0	4.0	7.0	7.0	7.5	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	153	765	308	575	1703	722	43	1538	672	269	1629	682
v/s Ratio Prot		0.13		c0.45	0.19			0.15			0.54	
v/s Ratio Perm	c0.25		0.14	0.40		0.06	c0.63		0.03	0.04		0.06
v/c Ratio	1.18	0.61	0.64	1.76	0.39	0.13	1.42	0.33	0.07	0.09	1.19	0.14
Uniform Delay, d1	57.0	51.6	51.9	32.7	24.4	21.2	39.5	25.3	22.3	22.4	39.5	23.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	128.1	1.5	4.3	350.6	0.1	0.1	282.8	0.1	0.0	0.1	90.0	0.1
Delay (s)	185.1	53.0	56.2	383.4	24.6	21.3	322.3	25.4	22.3	22.5	129.5	23.1
Level of Service	F	D	E	F	C	C	F	C	C	C	F	C
Approach Delay (s)		80.4			218.8			51.8			121.8	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	139.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.43		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	136.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	1217	358	34	1405	106	506	580	43	100	969	441
Future Volume (vph)	143	1217	358	34	1405	106	506	580	43	100	969	441
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	5.0	6.5	5.0	6.5	1.0	5.0	8.0	8.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3650	1601	1825	3650	1633	1789	3579	1633	1825	3579	1601
Flt Permitted	0.08	1.00	1.00	0.09	1.00	1.00	0.11	1.00	1.00	0.43	1.00	1.00
Satd. Flow (perm)	155	3650	1601	174	3650	1633	209	3579	1633	818	3579	1601
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	1.00	0.97	1.00	0.97	0.97	0.97	1.00	0.97
Adj. Flow (vph)	147	1255	369	35	1405	109	506	598	44	103	969	455
RTOR Reduction (vph)	0	0	117	0	0	72	0	0	24	0	0	91
Lane Group Flow (vph)	147	1255	252	35	1405	37	506	598	20	103	969	364
Heavy Vehicles (%)	2%	0%	2%	0%	0%	0%	2%	2%	0%	0%	2%	2%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	55.5	55.5	55.5	44.5	44.5	44.5	60.0	60.0	60.0	32.0	32.0	32.0
Effective Green, g (s)	58.5	57.0	57.0	44.5	46.0	44.5	63.0	63.0	60.0	32.0	35.0	35.0
Actuated g/C Ratio	0.45	0.44	0.44	0.34	0.35	0.34	0.48	0.48	0.46	0.25	0.27	0.27
Clearance Time (s)	4.0	6.5	6.5	6.5	6.5	6.5	4.0	8.0	8.0	8.0	8.0	8.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	195	1600	701	59	1291	558	429	1734	753	201	963	431
v/s Ratio Prot	0.06	c0.34			c0.38		c0.24	0.17			c0.27	
v/s Ratio Perm	0.28		0.16	0.20		0.02	0.33		0.01	0.13		0.23
v/c Ratio	0.75	0.78	0.36	0.59	1.09	0.07	1.18	0.34	0.03	0.51	1.01	0.84
Uniform Delay, d1	29.7	31.2	24.3	35.3	42.0	28.8	40.3	20.7	19.1	42.3	47.5	44.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.2	2.6	0.3	15.0	52.7	0.1	102.5	0.5	0.1	9.0	30.5	18.0
Delay (s)	44.9	33.8	24.6	50.3	94.7	28.8	142.8	21.3	19.1	51.3	78.0	62.9
Level of Service	D	C	C	D	F	C	F	C	B	D	E	E
Approach Delay (s)		32.8			89.1			74.8			71.7	
Approach LOS		C			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	65.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	116.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	921	431	413	1081	41	477	865	231	215	2116	24
Future Volume (vph)	24	921	431	413	1081	41	477	865	231	215	2116	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	3650	1633	1789	3650	1601	1825	3579	1601	1789	3579	1633
Flt Permitted	0.12	1.00	1.00	0.11	1.00	1.00	0.06	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	233	3650	1633	215	3650	1601	116	3579	1601	446	3579	1633
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	24	921	431	413	1081	41	477	865	231	215	2116	24
RTOR Reduction (vph)	0	0	119	0	0	27	0	0	121	0	0	13
Lane Group Flow (vph)	24	921	312	413	1081	14	477	865	110	215	2116	11
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	0%	2%	2%	2%	2%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	31.0	31.0	31.0	46.0	46.0	46.0	77.2	64.2	64.2	73.8	62.5	62.5
Effective Green, g (s)	33.0	33.0	33.0	49.0	48.0	48.0	82.5	66.7	66.7	79.8	65.0	65.0
Actuated g/C Ratio	0.24	0.24	0.24	0.35	0.34	0.34	0.59	0.48	0.48	0.57	0.46	0.46
Clearance Time (s)	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.5	7.5	4.0	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	54	860	384	232	1251	548	263	1705	762	391	1661	758
v/s Ratio Prot		c0.25		c0.18	0.30		c0.21	0.24		0.06	c0.59	
v/s Ratio Perm	0.10		0.19	0.44		0.01	0.86		0.07	0.26		0.01
v/c Ratio	0.44	1.07	0.81	1.78	0.86	0.03	1.81	0.51	0.14	0.55	1.27	0.01
Uniform Delay, d1	45.7	53.5	50.6	39.8	43.0	30.5	47.9	25.3	20.6	16.5	37.5	20.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.7	51.5	12.3	368.0	6.4	0.0	380.8	1.1	0.4	1.6	128.1	0.0
Delay (s)	51.4	105.0	62.9	407.8	49.4	30.5	428.7	26.4	21.0	18.1	165.6	20.3
Level of Service	D	F	E	F	D	C	F	C	C	B	F	C
Approach Delay (s)		90.9			145.3			147.6			150.7	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	136.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	148.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			