An Integrated Behavior and Demand-Oriented Methodology for Quality of Service Evaluation of Bicycle Infrastructure

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

Cycling is a viable mode of transport, and its mode share is consistently growing in many parts of the globe. However, many existing infrastructures still lack the safety and convenience that cyclists of all levels of experience desire. As well, several methodologies exist that can be applied to assess the quality of service of individual road segments for cycling, but it is still unclear how to translate that information into one at a route-level or a network-level. Without this process, the quality of service (QOS) of a cycling infrastructure cannot be fully assessed, and projects for improving the cycling infrastructure may not produce optimal results. A systematic approach of evaluating bicycle networks in terms of safety and connectivity is required for engineers and planners to determine their adequacy and suitability for cycling experiences.

After a review of existing assessment methodologies, this study proposes a systematic network-level evaluation methodology that consists of an integrated link-level QOS model, a behavior-based route-level QOS model, and a demand-oriented network-level QOS model. Firstly, the link-level QOS model integrates the existing analysis methodologies of bicycle compatibility index and bicycle level of service in a way to address their limitations and weaknesses. Secondly, the route-level QOS model incorporates how cyclists would form their overall perception and experience of a cycling route based on ones from its individual components, that is, the road segments. The proposed model allows for future calibration and further development when a stronger understanding of cyclist behavior is achieved. Thirdly, the network-level QOS model outputs zone-level QOS scores as well as a single network-level QOS score by weighing the various route-level QOS scores by the corresponding level of demand.

Two case studies on how the proposed methodology can be applied on a single route as well as for an entire network are provided with data from the City of Kitchener. The goal is to

illustrate how the proposed methodology may help in evaluating alternative cycling infrastructure improvement projects. For example, the optimal link to improve may be the one that produces not just the greatest improvement, but the greatest improvement relative to the cost. The methodology can also help in determining the effects of a hypothetical change in travel demand following infrastructure improvements. For example, the overall zone-level and network-level QOS would be affected the most positively if some improvements were made on routes or links with a high cycling demand. On the other hand, if cycling demand unexpectedly increases along corridors or links of low QOS, the overall zone-level and network-level QOS would decrease.

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Table of Contents

List of Tables

List of Figures

1 Introduction

Cycling is a viable and growing mode of transport, and a way to evaluate cyclist experiences in the existing infrastructure is needed. Although efforts have been made in pursuit of this goal, current methodologies focus on fragmented approaches in assessing trip experiences only at a link-level perspective. However, independent analyses and improvements made on single links cannot provide sufficient insight on how they impact routes or networks as a whole. The knowledge of a link's effect on the overall cycling infrastructure will greatly aid in effective investment decisions and planning approaches. Therefore, this study proposes a methodology that allows the evaluation of cycling facilities from a network-level perspective.

1.1 Cycling as a Viable Transportation Mode

Motor vehicles are the dominant form of transportation around the globe. However, it has been realized that the usage of automobiles and the resulting emission of greenhouse gas are leading causes of global warming and climatic changes (Mamalis et al., 2013; Morfeldt et al., 2021; Szell et al., 2022). It is also argued that the extreme dependence on automobile-oriented trips is contributing to congestion, low physical activities, and social isolation (Thomas & DeRobertis, 2013; Giles-Corti et al., 2016; Sallis et al., 2016; Kang & Fricker, 2018).

To combat these concerns, cycling is recognized as a competitive and viable mode of transport as it promotes human health, sustainability, and energy efficiency (Kang & Fricker, 2018). Compared to motor vehicles contributing to adverse climatic impacts, cycling is a feasible alternative as it is fueled by human power (Mamalis et al., 2013; Morfeldt et al., 2021). Furthermore, it can be especially superior to driving when parking is not available near a traveller's

destination as well as superior to public transit when it may not be the most convenient with service reliability and connectivity issues (Buehler & Hamre, 2014).

European countries generally have a much higher cycling mode share compared to North America; the Netherlands have about 26.8% of bicycle mode share, Germany 9.3%, Finland 7.8%, Switzerland 6.7%, and England 2.1% (Goel et al., 2021). In North America, bicycle mode share is lower but steadily growing; in 2020, a study determined that the highest cycling rates in the US are 2.43% in Portland, Oregon, 2.00% in San Francisco, California, and 1.82% in San Jose, California (Tyndall, 2020). In Canada, cycling rates are also lower, but a study in 2019 showed that the number is growing consistently as shown in Figure 1 (Verlinden et al., 2019).

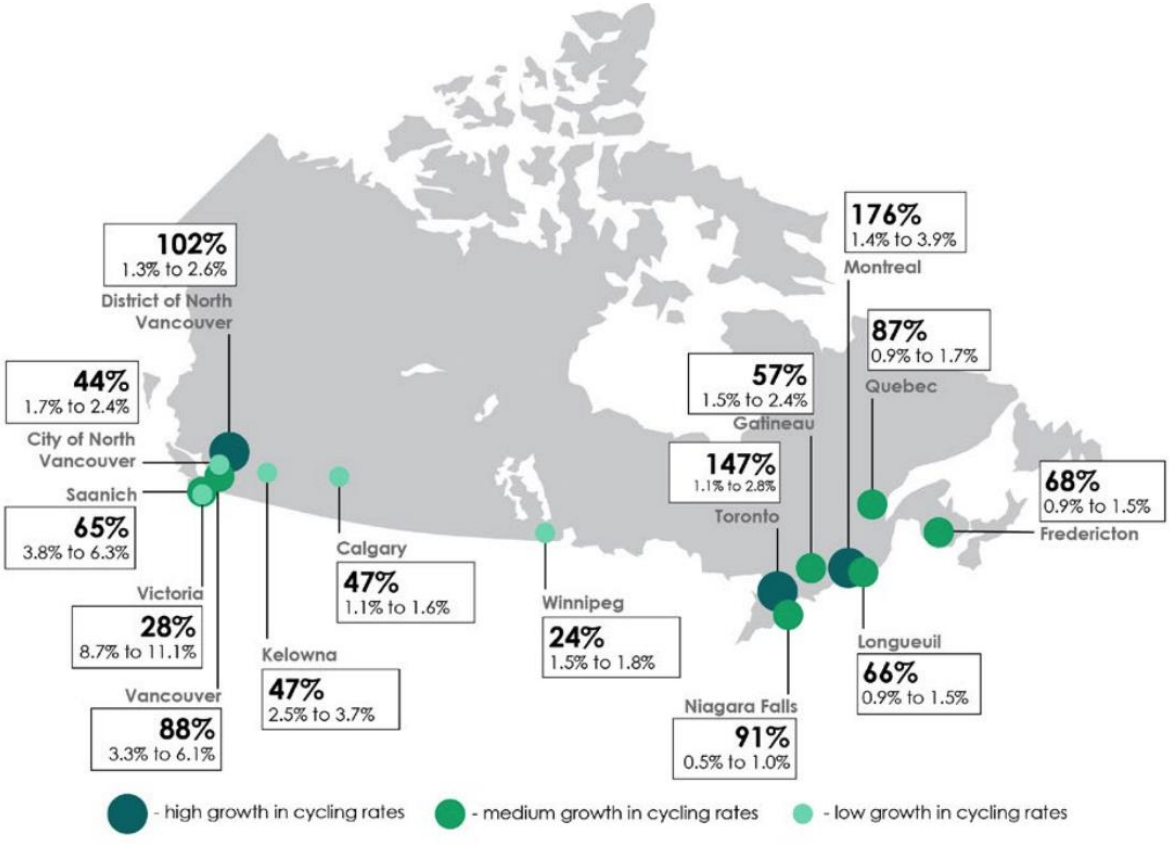


Figure 1: Cycling Mode Share Growth in Canada for 1996-2016 (Verlinden et al., 2019)

1.2 Challenges in Cycling Infrastructure Developments

The growth of cycling mode share depends highly on the availability of high-quality safe and user-friendly cycling infrastructures (Lingwood, 2004; Marshall & Garrick, 2011). It has been conclusively shown that bicycle ridership in areas close to new and more advanced bicycle infrastructures increases more significantly than in areas further away (Krizek et al., 2009). Moreover, a study showed that 60% of North American population are "interested but concerned" about cycling in urban cores and that 80% of those will be willing to ride on roadways with safer cycling facilities (National Association of City Transportation Officials, 2016).

Many cities in Canada and the US are investing significant resources in improving and expanding bicycle infrastructure to promote sustainable transportation options such as cycling and transit. In general, the trend in city planning is shifting away from more dispersed and automobile-dependent shapes prevalent in North America to more walkable, sustainable, and healthy forms (Kuzmyak & Dill, 2012; Bastian & Börjesson, 2018; Bojković et al., 2018; Macke et al., 2019; Martínez-Bravo et al., 2019). Numerous studies highlight the crucial role of government bodies in implementing policies and promoting healthy transportation practices in this process (Tran, 2016; Huovila et al., 2019; Loo, 2021). As a result, more investments and plannings are being targeted towards establishing multimodal travel patterns supporting not only drivers but also pedestrians and cyclists (Ahvenniemi et al., 2017; Geng et al., 2019; Bibri et al., 2020).

The COVID-19 pandemic in 2020 was a significant contributor to changes in roadway infrastructure. Because cycling allows physical distancing and is therefore associated with a much lower risk of disease transmission, some governments encouraged it by redesigning existing street space (Kraus & Koch, 2021). Specifically, in 106 European cities within a period of four months, 11.5 km of pop-up bicycle lanes on average were installed; researchers believe that this new

infrastructure will result in between $1 billion and $7 billion of health benefits per year if cycling activities are maintained (Kraus & Koch, 2021).

As well, many Canadian provincial and municipal governments have adopted similar multimodal sustainable transportation development visions (Fisher & Winters, 2021). For example, Victoria, British Columbia expanded its sidewalk and street space dedicated for active transport modes (City of Victoria, 2020). Kelowna, British Columbia closed one of its downtown streets to allow for exclusive bicycle travels (City of Kelowna, 2020) while the downtown bicycle network in Halifax increased by 20% (Halifax Regional Municipality, 2020). Further, the government announced the launch of the first federal fund for active transportation facilities in 2021 (Government of Canada, 2021). The $400 million fund is being used to construct new and expand existing networks of bicycle lanes, trails, and pedestrian bridges. While researchers concluded that changes in street structures generate more walking and cycling activities, they also noted that effective street allocation requires more planning and resources (Fisher & Winters, 2021).

Although it is evident that a modal shift is needed and is occurring in some areas, bicycles have yet been accepted in North America as an essential daily mode of transport due to a lack of high-quality, safe, and convenient cycling infrastructures. In 2019 in the US, 846 bicyclists were killed, and approximately 49,000 cyclists were seriously injured in vehicle-bicycle collisions (National Highway Traffic Safety Administration, 2021). As well, every year in North America, approximately 1,000 cyclists die, and more than 130,000 are injured in roadway crashes (Centers for Disease Control and Prevention, 2021).

Many municipalities in North America including the City of Toronto, the City of Kitchener, and numerous cities in the US have incorporated the Vision Zero approach in their infrastructure planning, aiming to achieve zero fatalities in their transportation network (Toronto, n.d.; Kitchener,

n.d.). Most of these Vision Zero programs incorporate a cycling component and need technical support in assessing the quality of service of existing and proposed cycling facilities. As well, a majority of existing studies focus on evaluating the cycling experiences at a single corridor of the system and fail to recognize the importance of translating the information into that at a greater scale as well as providing meaningful connectivity in the network at the same time. Even if individual segments within a route are all extremely safe, the segments do not provide much value if they do not lead to any significant destinations. Similarly, if an unsafe link is a part of the only connection between two important activity centers, it can cause a severe quality reduction in the trips made between the two locations. Without an understanding of safety, cyclists will continue to be exposed to roadway risks; without an understanding of connectivity, a network will not be serving its purpose of moving cyclists.

1.3 Definitions

In order to achieve consistency between terms used in this thesis and in the existing pool of research, a set of definitions is established before further discussions. The Highway Capacity Manual's (HCM) definition of the terms, "quality of service", "level of service", and "service measure", are incorporated into this study:

- Quality of service (QOS): The HCM defines this term as "how well a transportation facility or service operates from the traveler's perspective" (Transportation Research Board [TRB], 2010). The QOS can be evaluated by various approaches such as directly observing parameters like speed or delay or conducting traveler surveys (TRB, 2010). There are various aspects to the QOS such as travel time, safety, and user cost (TRB, 2010).

- Level of service (LOS): The HCM defines this term as "a quantitative stratification of a performance measure or measures that represent quality of service" (TRB, 2010). It is typically defined by the output from a mathematical model based on one or more service measures (TRB, 2010). LOS is one type of approach to assess the quality of service, but not the only one.
- Service measure: The HCM defines this term as "performance measures used to define the LOS for transportation system elements" (TRB, 2010). Service measures shall exhibit travelers' perceptions, be useful to operating agencies, be directly measurable in the field, and be estimable when given a set of known conditions (TRB, 2010).

1.4 Problem Statement and Research Objectives

In an effort to respond to the growing demand of cycling facilities, this study proposes a comprehensive methodology for systematically evaluating the QOS of bicycle networks. The research is motivated by the following two main research questions:

1. How can we incorporate different aspects of a bicycle facility, such as safety, travel time, convenience, route aesthetics, and comfort, in evaluating its overall QOS?
2. How can we integrate link-level QOS in assessing route-level and network-level QOS of a bicycle infrastructure? That is, how can we determine the QOS of a bicycle route or a bicycle network connecting specific origins and destinations based on the QOS of individual links?

The following objectives will guide the course of the study:

1. Develop an integrated link-level QOS model that encompasses existing methods of link-level bicycle QOS analysis. The research will start with a review of the main features and limitations of the existing methods and lead to potential methods for combining these existing analysis methods.
2. Develop a behavior-based route-level QOS model that captures how human behavior and perception shape overall trip experience. Specifically, the research will investigate if negative and positive experiences have different extents of effects on the overall experience and if the length of the individual experiences matter.
3. Develop a network-level QOS model that would reflect the underlying bicycle travel demands being serviced by the network.

1.5 Thesis Structure

The remainder of this thesis is divided into four sections. Section 2 provides a literature review on existing link-level and route-level bicycle QOS methods. Based on the knowledge obtained during the review, Section 3 proposes the methodology on how an integrated link-level QOS model, a behavior-based route-level QOS model, and a demand-oriented network-level QOS model are built. Section 4 presents two case studies on how the methodology can be applied to a single route and on an entire bicycle network using the data from the City of Kitchener. Finally, Section 5 concludes the study with recommendations for future works.

2 Literature Review

This section provides a review of the existing literature and studies on link-level bicycle QOS methodologies and route-level bicycle QOS methodologies.

2.1 Link-Level Bicycle Quality of Service

A cyclist's experience when travelling on a roadway is shaped by multiple factors such as safety, travel time, convenience, route aesthetics, and grade. Consequently, in order to capture the comprehensive effect of these factors, the extent to which they influence cycling experience and how they can be incorporated into the overall evaluation should be studied. As well, the feasibility of studying the various aspects involved in bicycle trips should also be investigated.

The importance of cyclists' safety has been given more attention in the past few years, and it is often referred to as one of the most influential factors on a traveller's decision to cycle (Hunt & Abraham, 2007; Pucher & Buehler, 2008; Winters et al., 2010). Cyclists are more vulnerable users compared to motor vehicle drivers, and they often cycle at a very close distance from vehicles that travel at higher speeds. In the event of crashes between a cyclist and a motor vehicle, the physical injury experienced by the former is often much more severe. Table 1 displays typical travelling scenarios for cyclists.

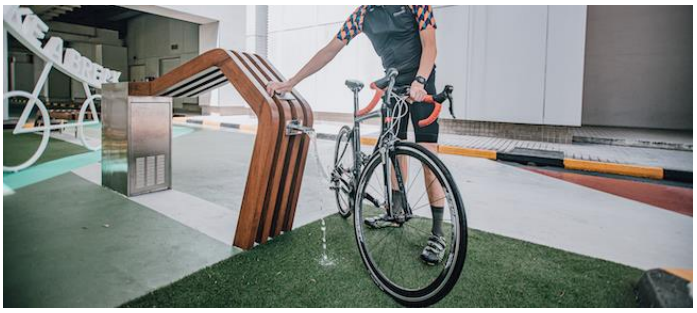
Table 1: Typical Cycling Scenarios

Illustration	Description
	Cycling in mixed traffic in Garden City, Idaho, USA (Kostelec, 2019)
	Low-speed shared streets in Chicago, Illinois, USA (Landscape Architecture Foundation, n.d.)
	Dedicated bicycle lane with no physical separation in Cambridge, Massachusetts, USA (Cambridge, n.d.)
	Dedicated bicycle lane with physical separation in San Diego, California, USA (August 2021)

Travel time or distance is another important consideration for cyclists when they choose to cycle. A longer travel distance equates to a longer travel time because cyclists are usually able to travel at their desired speeds as bicycle facilities rarely reach capacity. Further, it is understood that a longer travel distance presents more discomfort for travellers, and they would prefer to cycle on a shorter route if all other factors are equal.

Convenience of cycling facilities refers to the presence of ancillary elements within a cycling network, such as secure parking, lockers, and shower facilities, as shown in Table 2. Secure bicycle parking is especially crucial as it provides a sense of security since cyclists are typically reluctant to park in public places (Márquez & Soto, 2021). The presence of lockers and shower facilities is also associated with high cycling levels. Some suggest that financial incentives are an extremely effective approach in encouraging commuters to cycle (Wardman et al., 2007). Moreover, some countries like the Netherlands, Denmark, and Germany have adopted the approach of allowing free bicycle trips for business purposes during the day (Pucher & Buehler, 2008). Although the factor of convenience does play a role in shaping a cyclist's experience, many municipalities do not maintain full records of such facilities within their database. As well, the impact of this factor is assumed to be not as significant as that of safety and travelling distance. As a result, this factor was not widely considered as a performance measure in the past studies.

Table 2: Ancillary Elements for Cyclists

Illustration	Description
	Bicycle parking (Done, 2018)
	Bicycle locker (Changi Airport Group, n.d.)
	Shower facility (Marinova, 2018)
	Bicycle washing station (Changi Airport Group, n.d.)

Route aesthetics can also be an important factor when a traveller makes the decision to cycle. This holds true especially when the traveller is cycling for recreational purposes rather than commuting purposes. However, the factor of route aesthetics is challenging to define, is difficult to measure, and can be subjective. As a result, this factor is commonly not considered in QOS evaluation, especially when the focus is more on the effect of parameters on regular cyclists such as those that regularly commute with bicycles.

Lastly, roadway grades also impact cyclists' experiences. This factor correlates to the level of comfort as bicycles are typically geared with physical human power. Cyclists with less experience or less physical abilities may be impacted by this factor more significantly. However, many municipalities do not hold record of the level of grade in their roadway database, and as a result, this factor is often omitted in performance evaluation.

In summary, travel distance and safety have been considered as the major factors influencing the QOS of a bicycle facility. For travel distance, it is understood that a higher value corresponds a lower quality of service. For safety, many models have been developed of which five are studied in this thesis: bicycle stress level (BSL) (Sorton & Walsh, 1994), bicycle compatibility index (BCI) (Harkey et al., 1998), bicycle score for directional segment of street (BSeg) (National Cooperative Highway Research Program [NCHRP], 2008), bicycle level of service (BLOS) (TRB, 2010), and multi-modal level of service (MMLOS) (Ontario Traffic Council [OTC], 2022). Naturally, the later methodologies expanded on and aimed to address the weaknesses of the previous ones. Further, the methodologies use slightly different sets of roadway characteristics and incorporate different assumptions. However, the core idea is similar in that numerical scores are assigned to various roadway attributes and are combined in a way to yield a final score for the road segment, as detailed in the following section.

2.1.1 Bicycle Stress Level (BSL)

The BSL methodology was developed in order to incorporate the concept of bicycle competency into roadway analyses (Sorton & Walsh, 1994). It is based on the assumption that bicyclists not only want to minimize their physical effort but also to "avoid conflict with motor vehicles, harassment from heavy traffic, and the strain of having to concentrate for long periods while riding along narrow, high-speed, high-volume roads" (Sorton & Walsh, 1994). Therefore, the methodology integrates those service measures that present challenges to different types of cyclists. It was developed using survey data on personal experiences and perceptions on various cycling facilities.

Firstly, bicyclists are classified into four different categories as shown in Table 3. It is noted that for the "child" category, children under the age of 10 are not considered in the analysis as they should only ride under supervision when on or near streets (Sorton & Walsh, 1994). Furthermore, a BSL score range from 1 to 5 was proposed that is associated with different types of facility conditions. A BSL value of 1 suggests that the facility conditions are extremely favorable and that all groups of bicyclists should have little to no problem. On the contrary, a BSL value of 5 implies that the facility conditions are unfavorable and that all bicyclist types will likely observe the roadway to be unsafe. Table 4 links each BSL to the appropriate groups of bicyclists in terms of their bicycling competency and comfort level.

Table 3: BSL Bicyclist Classification (Sorton & Walsh, 1994)

Classification	Description
Child	Bicyclists that are enrolled in primary school
Youth	Bicyclists that are enrolled in secondary school
Casual	Bicyclists that bike for recreational purposes
Experienced	Bicyclists that have extensive on-street bicycling skill level

Table 4: Appropriate Bicyclist Types based on BSL (Sorton & Walsh, 1994)

BSL	Appropriate Bicyclist Types
1	Roadway is appropriate for all bicyclist types.
2	Roadway can accommodate experienced and casual bicyclists and may require alterations to accommodate youth bicyclists.
3	Roadway can accommodate experienced bicyclists and may require alterations to accommodate casual bicyclists. Roadway is unsuited for youth bicyclists.
4	Roadway may require alterations to accommodate experienced bicyclists. Roadway is unsuited for casual and youth bicyclists.
5	Roadway may not be suitable for bicycle use.

The BSL methodology takes into account three service measures in its analysis: curb lane traffic volume, vehicular speed, and curb lane width (Sorton & Walsh, 1994). Based on the findings from various earlier works, a set of intermediate BSL scores is first defined on the basis

of the individual service measures separately. The intermediate BSL values from the three service measures are then averaged to yield the final BSL.

Curb lanes on urban streets are considered at capacity when there are 450 to 800 vehicles per hour per lane (vphpl) (Fisher et al., 1972). To be conservative for the BSL framework, the researchers adopted a value of 450 vphpl to result in a BSL of 5 (Sorton & Walsh, 1994). The suggested intermediate BSL for curb lane traffic volume are given in Table 5.

Table 5: Intermediate BSL for Curb Lane Traffic Volume (Sorton & Walsh, 1994)

Intermediate BSL	Curb Lane Traffic Volume (vphpl)
1	≤ 50
2	150
3	250
4	350
5	≥ 450

To evaluate the impact of vehicular traffic speed, the 85^{th} percentile speed is used regardless of the posted speed limit (Sorton & Walsh, 1994). It was determined that the turbulence from vehicles travelling at or faster than 75 km/h affects the stability of adjacent bicyclists (Smith, 1975). Therefore, the intermediate BSL associated with a vehicular speed of 75 km/h is 5 (Sorton & Walsh, 1994). Table 6 summarizes the intermediate BSL values relating to vehicular speed.

Table 6: Intermediate BSL for Vehicular Speed (Sorton & Walsh, 1994)

Intermediate BSL	Vehicular Speed (km/h)
1	≤ 40
2	50
3	60
4	65
5	≥ 75

The curb lane width is another significant variable as it restricts bicyclists' space (Sorton & Walsh, 1994). Previous works identified that a curb lane width of 4.6 m or wider can accommodate bicyclists and vehicles sharing the same lane for speeds of 65 km/h or less (McHenry & Wallace, 1985). A curb lane width of 3.3 m or less poses a challenge as vehicles are required to leave the curb lane to pass a preceding bicyclist. With these values, the curb lane widths that correspond to each intermediate BSL were developed as shown in Table 7.

Table 7: Intermediate BSL for Curb Lane Width (Sorton & Walsh, 1994)

Intermediate BSL	Curb Lane Width (m)
1	≥ 4.6
2	4.3
3	4.0
4	3.7
5	≤ 3.3

Again, after the three intermediate BSL values are identified, they are averaged to yield the final BSL value for the road segment.

2.1.2 Bicycle Compatibility Index (BCI)

The methodology for computing link BCI was developed to address the lack of consideration of bicyclists' perspectives in earlier evaluation models (Harkey et al., 1998). It is defined as a measure that can "evaluate the capability of specific roadways to accommodate both motorists and bicyclists" (Harkey et al., 1998). Moreover, the researchers note that the method is intended to be used for urban and suburban roadway segments; as well, it incorporates variables that cyclists typically use to assess the bikeability of a roadway.

With the cyclists' perspectives integrated into an evaluation framework, the researchers studied if they would decide whether a road segment satisfies their personal comfort level for travelling in the presence of vehicular traffic (Harkey et al., 1998). Videotapes recorded from the positioning shown in Figure 2 were used to minimize risk exposure and test specific variables in a controlled manner (Harkey et al., 1998; Federal Highway Administration [FHWA], 1998). Cameras were positioned on the curb of a roadway close to the lane, and the height of the lens was set to be about 1.4 m to 1.5 m to capture cyclists' eye level (FHWA, 1998). As well, they were placed as far upstream as possible on a continuous road segment to capture the various geometric and operational features present along a typical segment. 67 video clips were recorded of traffic conditions in ten cities in the US, and they were reviewed by 202 participants who provided ratings (Harkey et al., 1998). The ratings were based on the volume of adjacent traffic, the vehicular speed, and the width of bicycle riding space; as well, an overall rating was provided that accounted for these three variables along with any additional factors that may have impacted the level of comfort.

Figure 2: Camera Position for Videoclip Recording for BCI (FHWA, 1998)

Following video surveys, the researchers also conducted field surveys with a different set of participants (FHWA, 1998). 13 observation locations were selected, and the surveys were performed over four four-hour periods. At each location, the participants were asked to stand on the same point that the cameras were previously placed on (shown in Figure 3) in order to achieve the same vantage point, and they were asked to provide ratings associated with their perceived level of safety on vehicular volume, speed, and lane width as well as an overall rating.

Figure 3: Participant Position for Field Survey for BCI (FHWA, 1998)

After, roadway and traffic variables that may influence bicyclists' travel experiences were determined and used to construct a regression model (Harkey et al., 1998). Mean ratings for road segments were inputted into the model as the dependent variable, and the model was fitted to the collected data from the videotape and survey experiments. The equation for calculating the BCI is provided in Equation (1), and the associated service measures are explained in Table 8. As well, the calculation process for AF, the adjustment factor for truck volume, parking turnover, and right-turn volume, is explained in Equation (2) and Tables 9 to 11. It is noted that right-turning vehicles refer to vehicles that turn into residential or commercial driveways.

$$BCI = 3.67 - 0.996BL - 0.410BLW - 0.498CLW + 0.002CLV + 0.0004OLV + 0.022SPD + 0.506PKG - 0.264AREA + AF \quad (1)$$

$$AF = f_t + f_p + f_{rt} \quad (2)$$

Table 8: Service Measures Required for BCI Calculation (Harkey et al., 1998)

Variable	Description	Unit
BL	Presence of a bicycle lane or paved shoulder $\geq 0.9\ m$ [$yes = 1; no = 0$]	unitless
BLW	Bicycle lane (or paved shoulder) width	m
CLW	Curb lane width	m
CLV	Curb lane volume	veh/h
OLV	Other lane(s) volume	veh/h
SPD	85th percentile speed of traffic	km/h
PKG	Presence of a parking lane with more than 30% occupancy [$yes = 1; no = 0$]	unitless
$AREA$	Type of roadside development [$residential = 1; other\ type = 0$]	unitless

Table 9: BCI Adjustment Factor for Truck Volume (Harkey et al., 1998)

Hourly Curb Lane Large Truck Volume	f_t
$\geq$ 120	0.5
60 – 119	0.4
30 – 59	0.3
20 – 29	0.2
10 – 19	0.1
$<$ 10	0.0

Table 10: BCI Adjustment Factor for Parking Turnover (Harkey et al., 1998)

Parking Time Limit (min)	f_p
$\leq$ 15	0.6
16 - 30	0.5
31 - 60	0.4
61 – 120	0.3
121 – 240	0.2
241 - 480	0.1
$>$ 480	0.0

Table 11: BCI Adjustment Factor for Right-turn Volume (Harkey et al., 1998)

Hourly Right Turn Volume	f_{rt}
$\geq$ 270	0.1
$<$ 270	0.0

When the process was being developed, the site with the lowest overall rating provided by research participants yielded an average of 1.24, and that of the overall highest rating yielded an average of 5.49 (Harkey et al., 1998). These two extreme values were assumed to represent the extreme cases expected in actual traffic settings, and the overall rating system was established accordingly as shown in Figure 4. In other words, a BCI of 1.24 would indicate that the road section is comfortable to cycle on for all bicyclists, and a BCI of 5.49 would indicate that no cyclists are comfortable riding on the roadway.

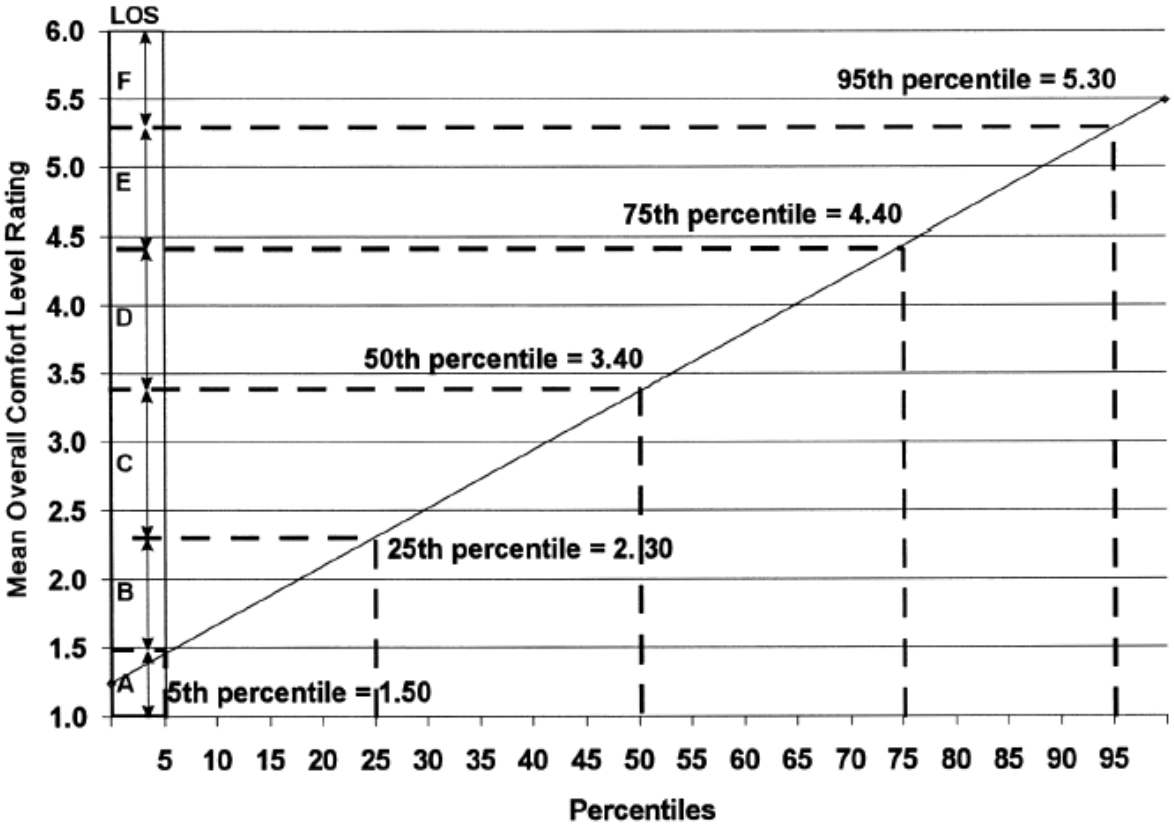


Figure 4: BCI Score Distribution Used for LOS Designation (Harkey et al., 1998)

The conversion system for calculated BCI values is summarized in Table 12 (Harkey et al., 1998). As shown in Figure 4, the breakpoint for the highest and lowest designation occurred at the 5th percentile mark from each end of the extreme, that for the second highest and lowest designation occurred at the 25th percentile mark, and that between LOS C and D occurred at the 50th percentile mark. The compatibility level qualifiers correspond to an average adult bicyclist in the US.

Table 12: BCI Conversion System (Harkey et al., 1998)

BCI Score	BCI Letter Grade	Compatibility Level
$x \leq 1.50$	A	Extremely High
$1.50 < x \leq 2.30$	B	Very High
$2.30 < x \leq 3.40$	C	Moderately High
$3.40 < x \leq 4.40$	D	Moderately Low
$4.40 < x \leq 5.30$	E	Very Low
$x > 5.30$	F	Extremely Low

2.1.3 Bicycle Score for Directional Segment of Street (BSeg)

BSeg was proposed in 2008 as a part of National Cooperative Highway Research Program (NCHRP) Report 616 (NCHRP, 2008). Data was collected through real-time field-data collections and video simulation technology. For simulations, 30 unique video clips were recorded of urban street segments in Tampa, Florida that were selected based on factors such as the presence of bicycle lanes, vehicular flow on the outside lane, and speed limit. In both cases, cyclists were asked to provide their perceptions of the level of accommodation provided by the roadways. The developed model is shown in Equation (3), and the required service measures are summarized in Table 13.

$$BSeg = 0.507 \ln\left(\frac{V}{4PHF \cdot L}\right) + 0.199Fs(1 + 10.38HV)^2 + 7.066\left(\frac{1}{PC}\right)^2 \quad (3)$$

Table 13: Service Measures Required for BSeg Calculation (NCHRP, 2010)

Variable	Description	Unit
V	Directional motorized vehicle volume	veh/h
PHF	Peak Hour Factor	unitless
L	Total number of directional through lanes	lane
Fs	Effective speed factor $[Fs = 1.1199 \ln(S - 20) + 0.8103]$	unitless
S	Average running speed of motorized vehicles	mi/h
HV	Proportion of heavy vehicles in motorized vehicle volume	decimal
PC	FHWA's five-point pavement surface condition rating[1]	unitless
We	Average effective width of outside through lane $[We = Wv + W1 - 2(10 \cdot \%OSP)]$	ft
Wv	Effective width as a function or traffic volume $[Wv = Wt(2 - 0.005V)]$	ft
Wt	Width of outside through lane plus paved shoulder	ft
$W1$	Width of paving between the outside lane stripe and the edge of pavement	ft
$\%OSP$	Percentage of segment with occupied on-street parking	decimal

[1] 5 = Excellent, 1 = Poor; A default of 3 may be used for good to excellent pavement

2.1.4 Bicycle Level of Service (BLOS)

The concept of BLOS was established in 2010 as a part of HCM improvements for active transportation modes and builds closely on previous efforts by NCHRP (TRB, 2010). 26 video clips were recorded of typical urban street segments in the US. The clips were shot from the perspective of bicycle riders, and they were shown to 145 participants in four different urban regions in the US. The participants were asked to rate their perceived level of safety from the displayed scenes on a scale from A to F, with A defined as the safest and F defined as the least safe. After, a model was proposed that fits the data collected from this experiment. A list of service measures required to calculate BLOS scores is provided in Table 14.

Table 14: Service Measures Required for BLOS Calculation (TRB, 2010)

Variable	Description	Unit
N_{th}	Number of through lanes on the segment in the direction of travel	lane
p_{pk}	Proportion of on-street parking occupied	decimal
v_m	Midsegment demand flow rate	veh/h
W_{ol}	Width of outside through lane	ft
W_{bl}	Width of bicycle lane (0.0 if bicycle lane not provided)	ft
W_{os}	Width of paved outside shoulder	ft
P_{HV}	Percent heavy vehicles in the midsegment demand flow rate	%
S_R	Motorized vehicle running speed	mi/h
P_c	Pavement condition rating	unitless

P_c, the pavement condition rating, can be determined using the information presented in the HCM as shown in Table 15. Liu et al. (2019) also proposed a set of real-life illustrations that

would correspond to the condition ratings as shown on the fourth column. As well, intermediate variables are listed in Table 16, and the calculation process is summarized in Table 17.

Table 15: Pavement Condition Rating for BLOS (TRB, 2010; Liu et al, 2019)

P_c	Description	Illustration
5	Free of cracks and patches.	
4	Rutting and minor cracks.	
3	Rutting, patching, fractures, and cracks.	
2	Distress of 50% or more. Large potholes, deep cracks, joint spalling, and patching.	
1	Distress of 75% or more. Excessive potholes and deep cracks.	

Table 16: BLOS Intermediate Variables (TRB, 2010)

Variable	Description	Unit
W_{os}^{*}	Adjusted width of paved outside shoulder	ft
W_t	Total width of the outside through lane, bicycle lane, and shoulder	ft
W_v	Effective total width of outside through lane, bicycle lane, and shoulder	ft
W_e	Effective width of outside through lane	ft
P_{HV_a}	Adjusted percent heavy vehicles in midsegment demand flow rate	%
S_{Ra}	Adjusted motorized vehicle running speed	mi/h
v_{ma}	Adjusted midsegment demand flow rate	veh/h

Table 17: Calculation of BLOS Intermediate Variables (TRB, 2010)

Condition	When Condition Satisfied	When Condition Not Satisfied
Curb is present	$W_{os}^{*} = W_{os} - 1.5$	$W_{os}^{*} = W_{os}$
$p_{pk} = 0.0$	$W_t = W_{ol} + W_{bl} + W_{os}^{*}$	$W_t = W_{ol} + W_{bl}$
$v_m > 160\ veh/h$ or street is divided	$W_v = W_t$	$W_v = W_t(2 - 0.005v_m)$
$W_{bl} + W_{os}^{*} < 4.0\ ft$	$W_e = W_v - 10p_{pk} \geq 0.0$	$W_e = W_v + W_{bl} + W_{os}^{*} - 20p_{pk} \geq 0.0$
$v_m(1 - 0.01P_{HV}) < 200\ veh/h$ and $P_{HV} > 50\%$	$P_{HV_a} = 50\%$	$P_{HV_a} = P_{HV}$
$S_R < 21\ mi/h$	$S_{Ra} = 21\ mi/h$	$S_{Ra} = S_R$
$v_m > 4N_{th}$	$v_{ma} = v_m$	$v_{ma} = 4N_{th}$

The link BLOS score, I_b, is calculated using Equations (4) through (8) (TRB, 2010). F_w is a cross-section adjustment factor, F_v is a motorized vehicle volume adjustment factor, F_s is a motorized vehicle speed adjustment factor, and F_p is a pavement condition adjustment factor.

$$I_b = 0.760 + F_w + F_v + F_s + F_p \tag{4}$$

$$F_w = -0.005 W_e^2 \tag{5}$$

$$F_v = 0.507 \ln\left(\frac{v_{ma}}{4N_{th}}\right) \tag{6}$$

$$F_s = 0.199(1.1199 \ln(S_{Ra} - 20) + 0.8103)\left(1 + 0.1038 P_{HV_a}\right)^2 \tag{7}$$

$$F_p = \frac{7.066}{P_c^2} \tag{8}$$

The numerical BLOS score is converted to a letter grade using the information shown in Table 18.

Table 18: BLOS Conversion System (TRB, 2010)

BLOS Score	BLOS Letter Grade
$x \leq 2.00$	A
$2.00 < x \leq 2.75$	B
$2.75 < x \leq 3.50$	C
$3.50 < x \leq 4.25$	D
$4.25 < x \leq 5.00$	E
$x > 5.00$	F

2.1.5 Multi-Modal Level of Service (MMLOS)

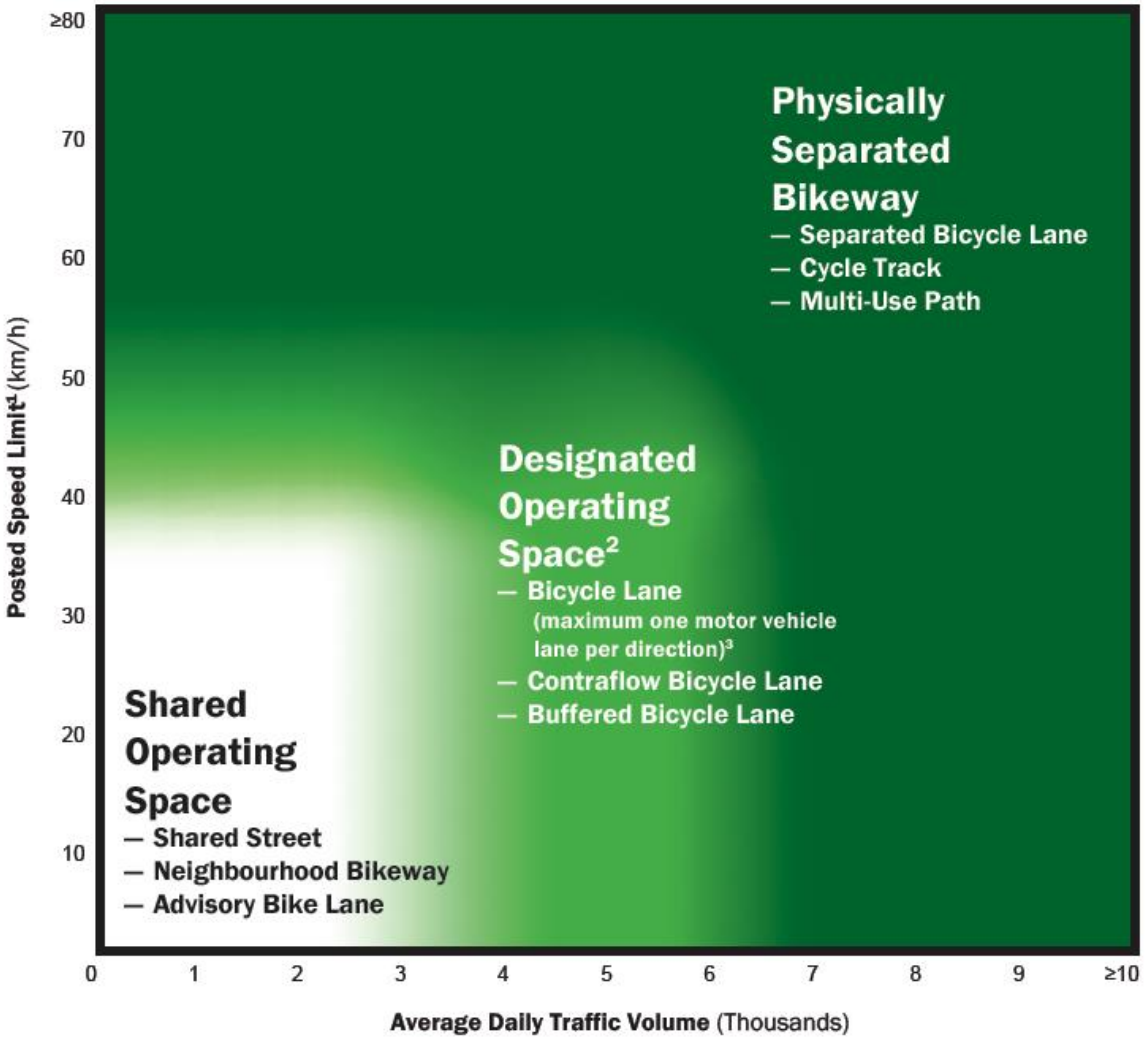
The Ontario Traffic Council (OTC) produced a guideline for a MMLOS analysis for users with different modes along street segments and intersections (OTC, 2022). Because traditional LOS evaluations highly focus on vehicular delay and congestion, the resulting design decisions typically prioritize driver experiences over other those of other users such as cyclists and pedestrians. Therefore, the MMLOS guideline provides a tool that can be used to evaluate and construct streets that support trips by modes other than motor vehicles. This thesis focuses on the bicycle analysis section of the guideline.

The guideline measures the performance of bicycle experiences by using two approaches: an active transportation design check and a LOS evaluation (OTC, 2022). In order for an existing facility to pass the active transportation design check for its bicycle portion, it needs to satisfy all minimum guidance conditions listed in Table 19 imported from the guideline itself. Figures 5 and 6 are imported from the guideline as well.

Table 19: Active Transportation Design Check for Bicycle Portion (OTC, 2022)

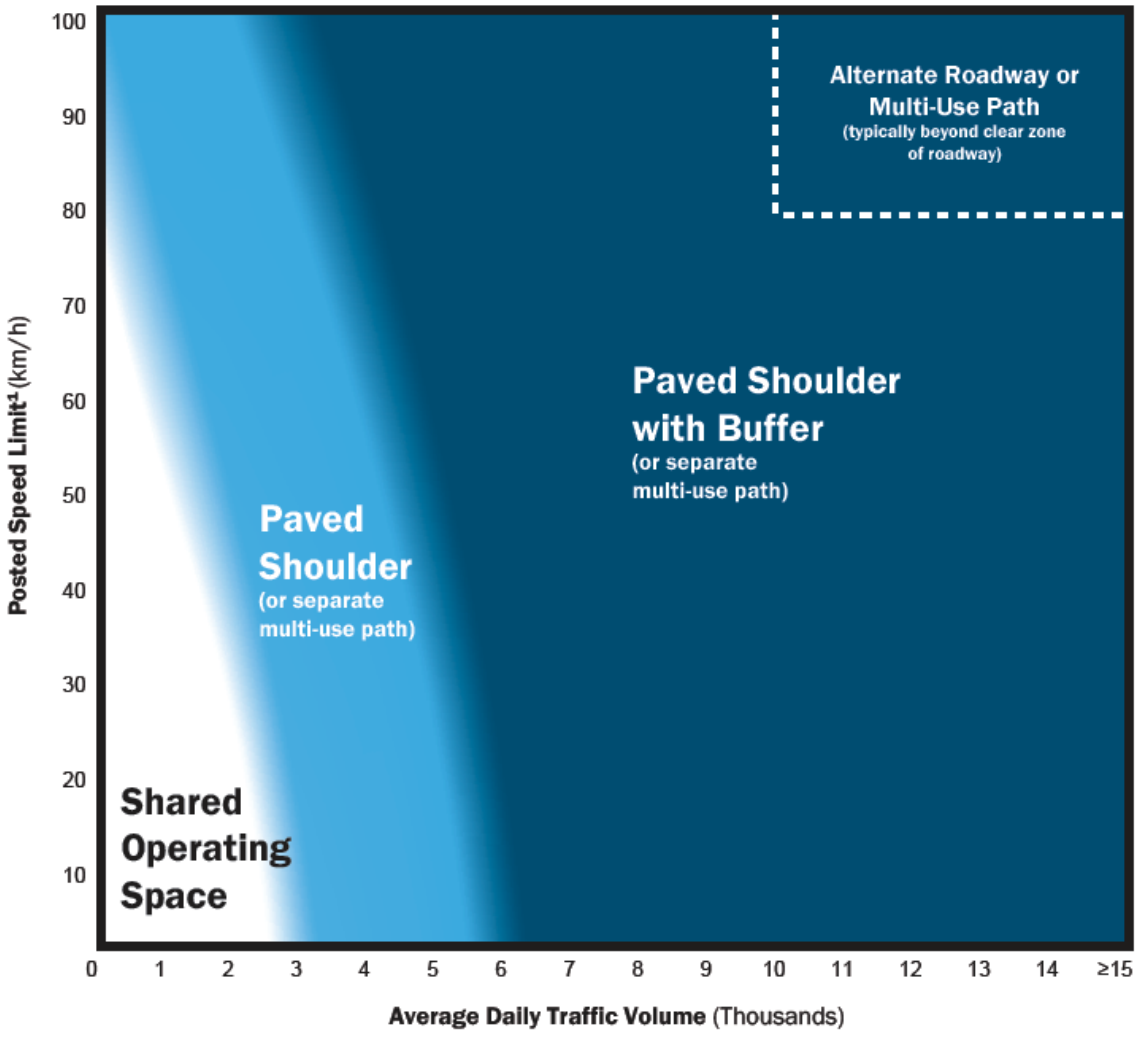
Category	Minimum Guidance
Separation	Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph?[1]
Consistency	Does the approaching bike facility continue at a consistent width up to the edge of the intersection (crosswalk or curb edge of intersecting roadway)?
Continuity	Is a continuous amount of space and accompanying pavement markings delineated for cyclists throughout the intersection?
Connectivity	Does the intersection design provide features which facilitate all the intended turn movements for cyclists (e.g. bike boxes, queuing space, protected intersection, etc)?

[1] Refer to Figures 5 and 6



1 Operating speeds are assumed to be similar to posted speeds. If evidence suggests this is not the case, practitioners may consider using 85th percentile speeds or implementing measures to reduce operating speeds.
2 Physically separated bikeways may always be considered in the designated operating space area of the nomograph.
3 On roadways with two or more lanes per direction (including multi-lane one-way roadways), a buffered bicycle lane should be considered the minimum with a typical facility being a physically separated bikeway.

Figure 5: Urban/Suburban Bike Facility Selection Tool (OTC, 2022)



1 In rural town/hamlet/village contexts, the urban/suburban nomograph may be used.
2 Operating speeds are assumed to be similar to posted speeds. If evidence suggests this is not the case, practitioners may consider using 85th percentile speeds or implementing measures to reduce operating speeds.

Figure 6: Rural Bike Facility Selection Tool (OTC, 2022)

For the LOS evaluation portion, the guideline provides gradation tables for segment and intersections service measures (OTC, 2022). This thesis focuses on the segment service measures as shown in Table 20. For the category of conflicts with other modes, two different types of conflicts are considered: crossing point conflict and in-lane conflict. The criteria for these conflicts are summarized in Tables 21 and 22.

Table 20: Grades for Segment Service Measures (OTC, 2022)

Service Measure	Weight	LOS A	LOS B	LOS C	LOS D	LOS E	LOS F
Facility Width (m)	33%	> 2.4	2.2 - 2.4	1.9 - 2.1	1.6 - 1.8	1.2 - 1.5	< 1.2
Buffer Width (m)	33%	Has physical measures AND buffer width > 1.0	Has physical measure AND buffer width is 0.50 - 1.0	N/A[1]	Has physical measures and buffer width is 0.30 - 0.49 OR Has no physical measures and width is ≥ 0.50	N/A[1]	No physical measures AND Buffer width is < 0.50
Conflicts with Other Modes	33%	Two "Low" conflicts	One "Low" conflict and one "Moderate" conflict	Two "Moderate" conflicts	One "Low conflict and one "High" conflict	One "Moderate" conflict and one "High" conflict	Two "High" conflicts

[1] For some measures, only a limited number of LOS scores are possible. The ones that cannot be obtained for that metric are marked as "N/A".
[2] Refer to Tables 21 and 22

Table 21: Crossing Point Conflict (OTC, 2022)

Conflict	Number of Crossing Points per km
Low	< 3
Moderate	3 - 7
High	> 7

Table 22: In-Lane Conflict (OTC, 2022)

Conflict	Volume (veh/h or ped/h)
Low	< 50
Moderate	50 - 300
High	> 300

2.1.6 Other Relevant Studies

Level of traffic stress (LTS) is another measure developed for evaluating the QOS of bicycle facilities with a consideration of the level of stress or risk perceived by the cyclist based on their level of experience (Furth et al., 2016). This measure was proposed to address the limitation of the BLOS method which focuses on the operational characteristics of roadways. As well, it builds on previous works of Sorton and Walsh (1994) on BSL which incorporated curb lane traffic volume, curb lane width, and vehicular speed. It further considers the presence and width of bicycle lanes and the presence of on-street parking The method presents four LTS levels into which each street segment can be classified. For example, a road segment with a LTS of 1 requires little attention to traffic from cyclists and is suitable for a relaxing ride with children; a

link with a LTS of 4 indicates that it is typically located near a high-speed vehicular traffic and intersects with dangerous crossings.

Götschi et al (2018) studied objective and subjective safety for cyclists before and after installing a bicycle box on a mixed traffic lane originally used for left turning and straight movements. It took place at an intersection, and the distance between left-turning cyclists and the following motor vehicle passing to make a straight movement was selected as the indicator of objective safety. Although the median values of these distances changed from 2.51 m to 2.42 m after the implementation, the statistical significance of the effect was not shown. To determine perceived safety, an in-situ survey was conducted in which 277 cyclists that just made a left turn participated; before the change, they were shown a picture of the roadway with the bicycle box and were asked to rate the level of safety on a scale from 0 to 10 with 0 being the least safe and 10 being the safest, and after the change, the same was done with a picture of the roadway without the bicycle box. The participants assessed the safety at the intersection with a mean score of 4.10 without a bicycle box and 6.84 with one.

In 2020, a study aiming to validate the LTS methodology against the results from a safety perception survey was conducted; parent responses were used because children are typically not aware of road hazards and are often supervised by parents when on roads (Ferenchak & Marshall, 2020). The survey presented a randomly selected set of traffic scenarios from a pool of 612 possibilities and asked if parents would allow their children to cycle in those scenarios. After, the LTS of the 612 environments were calculated. A roadway with a LTS of 1 represents one with a level of traffic stress that children can tolerate; the researchers aimed to determine if this hypothesis holds true. Also, the correlation between roadways with higher LTS and higher percentages of parents' allowance was observed. The researchers concluded that as LTS increases, allowance

percentages decrease with statistical significance, and that roadways with a LTS in the range of 2 and 3 may potentially be improved to ones with a LTS of 1 if a sufficient reduction in its vehicular volume can be achieved.

In 2021, virtual reality technology was used to assess cyclists' perceived risk when cycling (Nazemi et al., 2021). 150 participants virtually bicycled through five different cycling environments: on a sidewalk adjacent to pedestrians, on a painted bicycle path on a sidewalk, on a painted bicycle path on a road, in mixed traffic with motor vehicles, and on a separated bicycle path. As well, each participant was either exposed to a high or low pedestrian/motor vehicle traffic volume in the environment. For each environment, they were asked to provide ratings on their perceived level of safety. Pairwise comparison analyses revealed that cyclists preferred to travel on the separated bicycle path followed by the painted bicycle path on the road followed by mixed traffic. The difference in preference was expressed more strongly in the high vehicular volume setting. As well, travelling on the painted cycling path on the sidewalk was determined to be more preferred than travelling on the sidewalk for both pedestrian volume scenarios although the difference was greater in the high-volume scenario. Because researchers believed that bicycle-vehicle interactions and bicycle-pedestrian interactions are different, no direct comparisons were made between these two groups of settings.

2.1.7 Summary of Link-Level Level of Service Calculation Methods

This section provides a summary of the existing link-level LOS calculation methods. Table 23 summarizes the service measure requirement for the five LOS methods discussed in Sections 2.1.1 to 2.1.3.

Table 23: Service Measures Required for BSL, BCI, and BLOS

Service Measure	BSL	BCI	Bseg	BLOS	MMLOS
Vehicular traffic volume	✓	✓	✓	✓	-
Vehicular speed	✓	✓	✓	✓	-
Width of outside lane	✓	✓	✓	✓	-
Width of bicycle lane	-	✓	✓	✓	✓
Width of paved shoulder	-	✓	✓	✓	-
Number of lanes	-	-	✓	✓	-
On-street parking	-	✓	✓	✓	-
Heavy vehicle percentage	-	-	✓	✓	-
Adjacent land use	-	✓	-	-	-
Pavement condition	-	-	✓	✓	-
Buffer	-	-	-	-	✓
Conflict with other modes	-	-	-	-	✓

The main advantage of the BSL method is that there is no extensive requirement of data collection. Compared to the BLOS or BCI methods which require data on more than ten different service measures, BSL only requires three different types of data. Although this means that the method ensures simple execution, it also indicates that the calculation process may not incorporate a broad range of environmental and psychological factors that are often believed to impact bicycle safety (Pritchard et al., 2019). As well, the final BSL score is calculated by simply averaging the three intermediate BSL values which may not accurately reflect the true level of impact these variables have on the overall experience. Lastly, the BSL method was constructed by quantifying the personal experiences and perspectives of the research team rather than incorporating those of external cyclists (Sorton & Walsh, 1994). Although this calculation method was one of the earlier works that established a foundation on which future methodologies were built upon, it is excluded from further analysis in this study as it is believed that it may not be able to capture the effects of many attributes that cyclists consider when travelling.

Moreover, BSeg and the bicycle portion of the MMLOS method are also excluded from additional investigation. The ideas and assumptions behind the BSeg method are closely considered in the development of the BLOS method (TRB, 2010). Further, the types of service measures considered and the calculation processes are also well reflected in the BLOS method. Therefore, the inclusion of the BLOS method in further analysis will discover the effects of the BSeg method as well. The bicycle portion of MMLOS is excluded since it does not incorporate many service measures in its analysis procedure; since the aim of the overall MMLOS evaluation process is to evaluate road segments and intersections from a wider perspectives of all road users, the amount of effort dedicated to the mode of cycling in this model is smaller compared to that of other models.

The BCI and BLOS methods aimed to integrate more roadway service measures in the analysis in order to increase the accuracy of the results. Both utilized video clips recorded of actual roadway settings and proposed detailed calculation processes that yield a numerical value and a LOS designation that relate back to cycling experiences.

2.2 Route-Level Bicycle Quality of Service

In the existing pool of research, not much attention has been given to determining route-level QOS from link-level QOS. The analysis of a single link provides information on if that link requires improvements; but it cannot provide sufficient insight on that link's impact on the routes that it is a part of. Without this insight, it is challenging to assess the extent of impact of link-level improvements on the routes as well as on the overall network. For example, if a municipality identified two links that required the same type of improvement, a link-level analysis would not provide information on which improvement should be prioritized. Therefore, the translation of link-level QOS to that at a route-level provides meaningful information.

A study in 2018 focused on how public transit users construct their overall level of satisfaction about door-to-door trips (Abenoza et al., 2018). Researchers assumed that door-to-door trips involving public transit always involve a walking time from the user's origin to a transit stop and another walking time from a different transit stop to the user's destination; as well, they assumed that some sort of transfers from one transit vehicle to another may also occur during the trips. This pattern indicated that a public transit trip can always be considered a multimodal trip, and the researchers aimed to understand how the users' perceptions on each section of the trip (e.g. walking time from origin to transit stop #1, in-vehicle time in transit #1, waiting time for transfer from transit #1 to transit #2, in-vehicle time in transit #2, and walking time from transit stop #2 to

destination) would impact the overall experience. A number of hypotheses were tested by the research team, and they are investigated further in this study to be applied to cycling scenarios.

The hypotheses are largely classified into two groups: normative and heuristic (Abenoza et al., 2018). The researchers defined that a normative hypothesis considers a traveller's perception on all trip sections to achieve an overall perception while a heuristic hypothesis only considers one or two exclusively. Table 24 lists the hypotheses tested by Abenoza et al. (2018) that will be further investigated in Sections 2.2.1 to 2.2.6.

Table 24: Hypotheses for Route-Level QOS (Abenoza et al., 2018)

Hypothesis	Number of Sections Considered	Classification
Equal-weighted average	All	Normative
Duration (distance)-weighted average	All	Normative
End rule	One	Heuristic
Serial position rule	Two	Heuristic
Peak rule	One	Heuristic
Peak-end rule	Two	Heuristic

Moreover, for the purpose of explanations in the study, the research team defined a sequence of trip sections as $j = \{l_{j,1}, l_{j,2}, \ldots, l_{j,|j|}\}$. The overall level of satisfaction s_j and the section level of satisfaction $s_{j,i}$ with $i = 1, 2, \ldots, |j|$ were also defined; lastly, the section trip time $t_{l_{j,i}}^{m}$ was defined for section $l_{j,i}$.

2.2.1 Equal-Weighted Average Hypothesis

The equal-weighted average hypothesis proposes that the levels of satisfaction on each section of the trip are considered equally, or simply averaged, when establishing the overall level of satisfaction as shown in Equation (9) (Abenoza et al., 2018).

$$s_j = \frac{\sum_{i \in j} s_{l_{j,i}}}{|j|} \tag{9}$$

2.2.2 Duration (Distance)-Weighted Average Hypothesis

The duration-weighted average hypothesis also proposes that the level of satisfaction on all links matter, but it is weighted in relation to the duration of the corresponding section as shown in Equation (10) (Abenoza et al., 2018).

$$s_j = \frac{\sum_{i \in j} s_{l_{j,i}} t^m_{l_{j,i}}}{\sum_{i \in j} t^m_{l_{j,i}}} \tag{10}$$

A similar work was performed in the sociology profession that tried to understand how people achieve evaluations of multi-episode days (Miron-Shatz, 2009). Participants were asked to reconstruct and record their emotions during each episode throughout a previous day. For each episode, they recorded the location, starting and finishing time mark, their actions, and the extent to which they experienced various emotions from 0 (not at all) to 6 (very much). As well, they provided an overall evaluation for the day in whole following the same scale. With the responses from 2,435 participants from the US, France, and Denmark, the study concluded that the duration-weighted net effect was the most highly predictive of the evaluation of the previous day.

In 2014, Suzuki et al., (2013) developed a trip level of satisfaction aggregation model based on 713 responses from work commuters in Sweden. The questionnaire included questions on work commute (departure and arrival times, intermediate stops, and travel mode), overall satisfaction level, and sociodemographic. The researchers concluded that the duration-weighted average method results in a better fit to the data than any other aggregation methods.

2.2.3 End Rule Hypothesis

The end rule hypothesis proposes that the level of satisfaction associated with the final section that the traveller traveled on explains the overall trip satisfaction as shown in Equation (11) (Abenoza et al., 2018).

$$s_j = s_{l_{j,|j|}} \tag{11}$$

An experiment in 2001 studied the effect of the ending of a life on the perceived desirability of that life (Diener et al., 2001). A group of undergraduate students were presented with the description of a fictional character's life and were asked to provide their perception on the quality of the life. It was observed that many participants consistently failed to judge the global quality of life and assigned heavy weights to the events that happened towards the end of their lives. Further, the study concluded that a life with a few moderately bad years toward the end was perceived to be more desirable than one ending abruptly without the few additional years. As well, adding in moderately intense years, either positive or negative, in mid-life did not produce as strong of an effect as adding them towards the end of the life.

A study in 2010 investigated the effects of perceptions about sequential events on learning experiences (Finn, 2010). A group of undergraduate students were asked to study a list of Spanish-English translation words; in the process, they were asked to make discomfort ratings every six seconds (which was about every three words) on a scale from 0 (no discomfort) to 10 (extreme discomfort). The result indicated that the discomfort ratings were sensitive to the change in the difficulty level of the word being studied right before participants were asked to provide the rating.

2.2.4 Serial Position Rule Hypothesis

The serial position rule hypothesis proposes that the first and final events within a sequence of events are better remembered because of primacy and recency effects and therefore solely influence the overall perception as shown in Equation (12) (Abenoza et al., 2018).

$$s_j = \frac{s_{l_{j,1}} + s_{l_{j,|j|}}}{2} \tag{12}$$

A study in 2005 experimented with different types of scoring methods in a song contest in order to determine how people process memory (Bruine de Bruin, 2005). Two types of scoring methods were used: an end-of-sequence method where all scores are generated by the judges after all candidates have performed and a step-by-step method where scores are produced immediately after each performance. The researchers concluded that with both evaluation methods, judges assigned relatively higher scores to the very first and the very last candidate, demonstrating the serial position effect on free recall.

Page and Page (2010) conducted a similar experiment with pop idol live shows where television viewers vote for their favorite singers through phone calls. The study concludes that in

contests, the order of the contestants plays a decisive role in the evaluation of their performances. Regardless of ability, the contestant that performed first generally received positive evolutions which serves as evidence to primacy effect, and as more contestants performed, those in the later serial positions tend to receive positive feedback as well, indicating recency effect.

2.2.5 Peak Rule Hypothesis

The peak rule hypothesis proposes that the most salient experience affects the overall perception for the trip the most strongly. This hypothesis identifies the trip section with the greatest deviation from the average satisfaction as shown in Equation (13) (Abenoza et al., 2018).

$$s_j = \max_{i \in j} \left| s_{l_{j,i}} - \frac{\sum_{i \in j} s_{l_{j,i}}}{|j|} \right| \tag{13}$$

Some argue that the deviation can either be positive or negative (Fredrickson & Kahneman, 1993) while others argue that negative experiences prevail (Baumeister et al., 2001; Friman et al., 2001; Kensinger, 2009). In order to gain a more conservative understanding of the worst-case scenario, the latter is selected for further investigation in this study.

A study in 2001 concluded that bad events are processed more thoroughly and are more resistant to disconfirmation than good events (Baumeister et al., 2001). The researchers argue that this principle held true across a wide range of psychological phenomena and suggest that it may be a part of humans' instinctive adaptation process. When applied to a bicycle route with bad links and good links, cyclists may remember their experience on the bad links more vividly in order to avoid the unpleasant experience in their future trips; and essentially, they would choose to avoid that entire route completely because of the one link. Some research also suggests that focal

enhancements are significantly stronger for negative emotions than the positive; the stronger enhancements lead to the engagement of different sensory processes which allow for higher memory accuracy and confidence (Kensinger, 2009).

2.2.6 Peak-End Rule Hypothesis

The peak-end rule hypothesis proposes that the overall perception is shaped by averaging two most distinct experiences: the most salient experience and the latest experience as shown in Equation (14) (Abezona et al., 2018).

$$s_j = \frac{\max_{i \in j} \left| s_{l_{j,i}} - \frac{\sum_{i \in j} s_{l_{j,i}}}{|j|} \right| + s_{l_{j,|j|}}}{2} \tag{14}$$

A study in 1996 concluded that memories are imperfect and susceptible to bias by studying patients' memories of medical procedures and their impact on decisions about future treatments (Redelmeier & Kahneman, 1996). Patients that were receiving colonoscopy and lithotripsy provided their recollections about the total amount of pain they experienced after the procedures were complete. As well, real-time measures of pain intensity were recorded with a hand-held device used to control the position of a marker on a screen that measured emotional responses. After comparison of the two datasets, the research team concluded that the overall perception of pain was strongly characterized by peak and end events and did not correlate to the durations of the individual events.

In 2014, a study tested the effect of the peak-end rule on how music is perceived (SchÃ¤fer et al., 2014). Participants were asked to listen to unknown songs and provide moment-to-moment

ratings about the intensity of emotions they are feeling. The research concluded that the average impression does play a role in the overall perception but that the most intensely felt emotion and the emotion felt towards the end of the song contributed substantially. Therefore, the researchers proposed that certain moments within a chain of experiences, such as the peak and the end experiences in this case, should be assigned a heavier weight in overall evaluation.

2.2.7 Cyclist Route Choice Behavior

In order to assess route-level bicycle performance, cyclists' thought process behind selecting routes to travel on needs to be understood. Even if a network is deemed safe based on various performance measure calculations, it is not very useful if it does not provide meaningful connections to important activity centers.

Until recently, operational bicycle trip forecasting models used in North America assumed that cyclists choose paths with the minimum distance between origins and destinations without considering other roadway characteristics such as adjacent vehicular volume, slope, and the presence of bicycle lanes (Hunt & Abraham, 2006). Now, the number of studies is increasing that evaluate of the trade-offs that cyclists make between the directness of a path and other factors that make it more pleasing to ride on (Lawrence & Oxley, 2019).

In 2006, an experimental investigation was conducted that analyzed the influence of various attributes linked to bicycle use on stated preference of route choices (Hunt & Abraham, 2006). 1,128 survey questionnaire forms were collected that contained information on gender, age, level of cycling experience, and comfort level with cycling in mixed traffic. As well, the survey included a question that displayed a randomly selected set of hypothetical bicycle travel alternatives and asked the participant to indicate the preferred alternative. The alternatives

presented differences in cycling attributes such as travelling in mixed traffic and total cycling time. With this data, five functions were generated with considerations given to different combinations of cyclists. For example, one function was designed to test the hypothesis that preferences for different cycling attributes vary according to cyclists' comfort level with cycling in mixed traffic, and another aimed to test that preferences vary based on cyclists' overall experience. The researchers concluded that different groupings of cyclists do not result in significant variations in preferences. However, regardless of the grouping system of cyclists, preferences vary significantly with different types of cycling facility; 1 minute of cycling in mixed traffic was determined to be equivalent to 4.1 minutes in a designated bicycle lane.

In 2007, a tool was developed that quantifies a set of evaluation criteria, perceived safety and travel distance, that cyclists adopt when choosing their path (Klobucar & Fricker, 2007). The value of perceived safety was computed based on the bicycle compatibility index which incorporates various roadway attributes such as the presence of a bicycle lane, the width of the operating space, and the vehicular volume on the curb lane. The products of perceived safety and link length were summed to establish the overall discomfort of each route as it would indicate that long unsafe routes are less attractive than short safe links. Cyclists would choose to travel on routes that minimize the overall discomfort.

In 2010, a study concluded that cyclists' actual travel routes are typically longer than the shortest possible routes (Winters et al., 2010). The researchers showed that cyclists choose to detour through routes that are not the shortest physical paths between an origin and a destination if the detoured routes provide more bicycle facilities. The investigation into the shortest path and the actual path showed that the latter on average had two more traffic calming measures, 10 more bicycle stencils, and seven more signages.

The major weakness of stated preference models is that their connection to actual travel choices may not be known (Casello & Usyukov, 2014). Therefore, a study was conducted that observed cyclists' actual route choice and alternative paths generated by a geographic information (GIS) system in order to quantify characteristics that are important in route choice behavior. Global positional system units were provided to more than 400 cyclists in Waterloo, Canada that tracked their cycling activity for two weeks during which more than 2,000 trips were made. For the recorded origin-destination pairs, a GIS produced two alternate routes that are more direct but less safe than the chosen route and two alternate routes that are less direct but safer than the chosen route. The former was generated by using the built-in shortest path algorithms in the GIS, and the latter was generated by the same algorithms with an addition of artificial travel penalties on the chosen route and the two previously generated paths. The research produced two models that predict cyclists' route choice on the basis of route length, posted vehicular speed limit, vehicular volume, elevation change, and the presence of dedicated cycling lanes.

In 2017, an evaluation methodology was proposed for attributes that influence cycling route choice (Majumdar & Mitra, 2017). With the results from a survey that asked for participants' socioeconomic factors and choices from a provided set of travel scenarios, a multinomial logit model and a random parameter logit model were developed that calculated participants' willingness-to-pay. The models estimated that the most influential variable on route choice is safety followed by travel time, route visibility, and operating width. As well, the investigation of the socioeconomic parameters associated with riders with lower incomes revealed that they value shorter travel time more than safety. The study concluded that such variation in preference indicates that a single policy or infrastructure provision without considering unique user needs will not correlate to overall improvements.

Route choice studies mainly branch out to two directions: stated preference and actual preference. One limitation of stated preference studies is that it is difficult to determine if stated route preferences correlate to actual route preferences (Casello & Usyukov, 2014). In real life, cyclists may make changes to their initial route plan as they travel because of obstacles encountered during the trip which would be challenging to predict. The main limitation for stated preference studies is that the full set of alternatives that may be present cannot realistically be considered in the research; participants often provide feedback on a few routes selected by the researchers, and therefore these studies do not provide much information on decision process or alternative routes considered (Majumdar & Mitra, 2017).

3 Methodology

The network-level bicycle QOS evaluation methodology is built based on the overall process provided in Figure 7. This study contributes to the existing pool of research on bicycle infrastructures and their performance through its work on the following three tools: an integrated link-level QOS method, a behavior-based route-level QOS method, and a demand-oriented network-level QOS method. This section provides a detailed discussion on the building block of this proposed methodology.

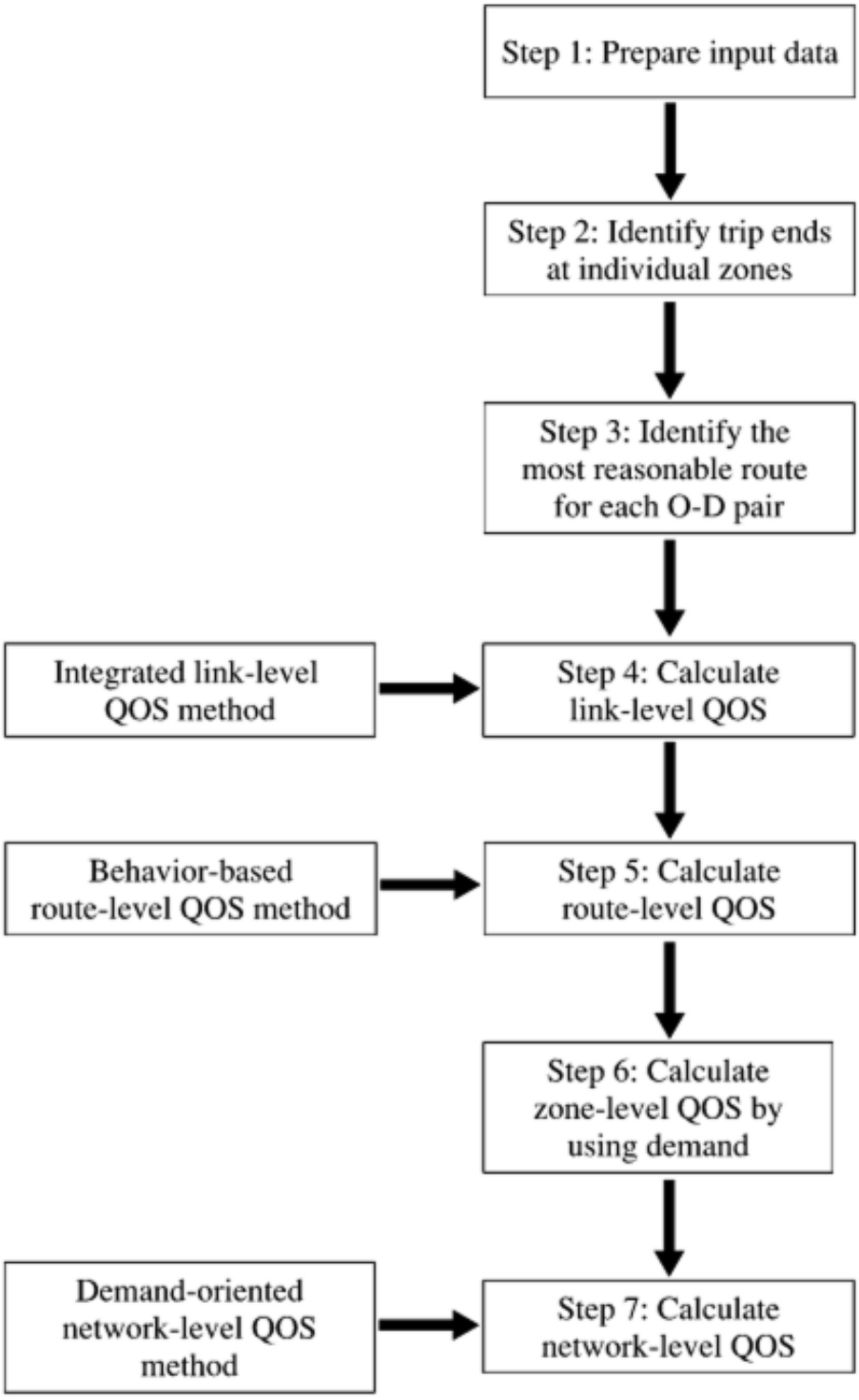


Figure 7: Bicycle Network-Level QOS Evaluation Methodology Overview

3.1 Integrated Link-Level Quality of Service Method

Firstly, an integrated link-level QOS is proposed that combines the two bicycle facility QOS measures from the literature, namely, BCI and BLOS that incorporate in the analysis eight and nine service measures, respectively. Based on the details on these two measures described previously in Sections 2.1.2 and 2.1.3, this section starts with an analysis of their sensitivity to various performance factors followed by a discussion on the limitations of each measure in capturing all important factors.

3.1.1 Bicycle Compatibility Index Sensitivity Analysis and Limitations

Following the analysis process proposed by Harkey et al. (1998), a sensitivity analysis on the variables used in determining BCI is performed in this study to understand their scale of impact on the final BCI rating. A baseline road segment was established to compare against varying conditions, and the analysis results are shown in Table 25. The base condition was intended to reflect typical arterial roadway conditions in Ontario, Canada. The modified conditions were created by changing one attribute at a time as shown in the leftmost column in the table while holding all others constant.

Table 25: BCI Sensitivity Analysis

Variation in Attributes	BL[1]	BLW[2]	CLW[3]	CLV[4]	OLV[5]	SPD[6]	PKG[7]	AREA[8]	AF[9]	BCI	% Change
Base condition	0	0	3.5	200	200	65	0	0	0.4	4.24	-
Add a 1.8 m bicycle lane	1	1.8	3.5	200	200	65	0	0	0.4	2.53	-40.2
Increase curb lane width by 10%	0	0	3.85	200	200	65	0	0	0.4	4.06	-4.1
Decrease curb lane volume by 50%	0	0	3.5	100	200	65	0	0	0.4	4.04	-4.7
Decrease other lane volume by 50%	0	0	3.5	200	100	65	0	0	0.4	4.20	-0.9
Decrease speed by 10%	0	0	3.5	200	200	58.5	0	0	0.4	4.09	-3.4
Add on-street parking with 30% occupancy	0	0	3.5	200	200	65	1	0	0.4	4.74	11.9
Same roadway segment in residential area	0	0	3.5	200	200	65	0	1	0.4	3.97	-6.2

[1] Presence of a bicycle lane or paved shoulder greater or equal to 0.9 m – if yes, 1, and if no, 0
[2] Bicycle lane (or paved shoulder) width (in meters)
[3] Curb lane width (in meters)
[4] Curb lane volume (in vehicles per hour)
[5] Other lane(s) volume (in vehicles per hour)
[6] 85th percentile speed of traffic (in kilometers per hour)
[7] Presence of a parking lane with more than 30% occupancy – if yes, 1, and if no, 0
[8] Type of roadside development – if residential, 1, and if other type, 0
[9] Adjustment factor for truck volume, parking turnover, and right-turn volume (unitless)

It is shown that adding a dedicated bicycle lane on a roadway without one decreases the BCI drastically by about 40% which corresponds to a much higher level of safety. Moreover, increasing the curb lane width where cyclists may travel on, decreasing the vehicular traffic volume, decreasing the vehicular speed, and having a residential area along the link can also improve the level of safety for cyclists to a noticeable extent. Lastly, the presence of occupied on-street parking increases the BCI by about 11% which correlates to a lower level of safety.

The main limitation of the BCI method is that it only considers dedicated bicycle lanes and no other types of bicycle-specific treatments such as physical barriers between a bicycle lane and the adjacent vehicular lane, bicycle boxes, and dedicated cyclist traffic signals (Lowry et al., 2012). As a result, the application of the BCI method for evaluating various bicycle facility improvement projects may be limited.

3.1.2 Bicycle Level of Service Sensitivity Analysis and Limitations

Similar to the previous analysis on BCI, a sensitivity analysis is conducted to evaluate how BLOS varies based on various characteristics related to a bicycle facility. Specifically, the analysis focuses on the following factors: proportion of on-street parking occupied (p_{pk}), vehicular flow rate (v_m), bicycle lane width (W_{bl}), heavy vehicle percentage (P_{HV}), and vehicular speed (S_R). A default set of values was established for all these factors as shown on Table 26 that served as the basis of the analysis. For the analysis of the effect of each factor, the values of all other factors were held constant except for the one in question.

Table 26: Base Values of the Factors for BLOS Sensitivity Analysis

Service Measure	Value
N_{th}	1
p_{pk}	0.95
v_m	250
W_{ol}	10.5
W_{bl}	5
W_{os}	10
P_{HV}	5
S_R	24.8
P_c	3

For the first case, the effect of varying p_{pk} on BLOS was studied as shown in Figure 8. Firstly, it is shown that as the curbside parking occupancy increases, the QOS decreases. For the case of no curbside parking, that is, p_{pk} is equal to zero, BLOS score reaches the lowest which correlates to the highest level of QOS. The BLOS score increases, and the QOS decreases significantly with the presence of any level of curbside parking. These results are reasonable since a zero p_{pk} directly adds the adjusted outside shoulder to the effective operating width for the cyclists, and the presence of curbside parking is expected to have a significant impact on the safety and comfort of the bicycle traffic. If on-street parking occupancy is any greater than zero, the BLOS is affected at a fairly linear rate.

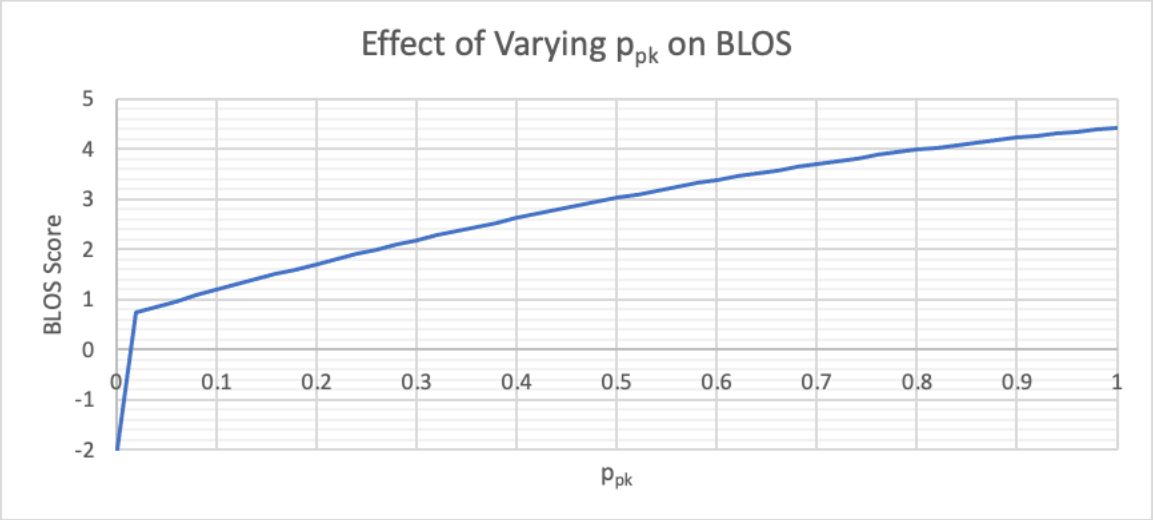


Figure 8: BLOS Sensitivity to On-Street Parking Occupancy

Figure 9 illustrates the effect of vehicular traffic flow rate on BLOS. It can be seen that generally, a greater vehicular flow worsens the BLOS. It is also shown that the rate of degradation is greater when the flow is less than 160 veh/h. At flow rates below 160 veh/h, the effective total width consistently decreases as the flow rate increases whereas at rates above 160 veh/h, the effective total width stays constant. Therefore, BLOS is more sensitive to flow rate changes at lower volumes. Since bicycle networks usually comprise local roads, the motor vehicular volumes on these roads are not assumed to be significantly high; therefore, it will be important to obtain accurate traffic volume data to yield credible results.

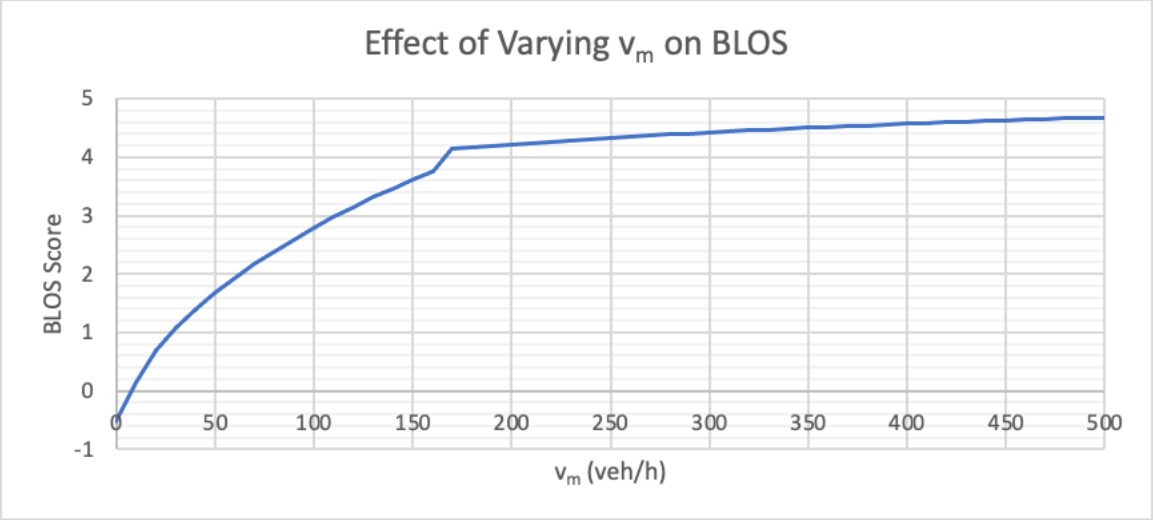


Figure 9: BLOS Sensitivity to Midsegment Demand Flow Rate

The sensitivity of BLOS to bicycle lane width is presented in Figure 10. Generally, a wider bicycle lane lowers the BLOS score thereby yielding a higher quality of service. The calculation yields almost no difference between zero width and 2 ft of bicycle lane width. After, it yields a smooth curve but does not improve the BLOS significantly until the width is approximately 5 ft; after this point, the BLOS is more sensitive to increases in the lane width. This result seems reasonable since 5 ft is the typical width of dedicated bicycle lanes which indicates that cyclists need at least this much room to perceive their trip to be safe.

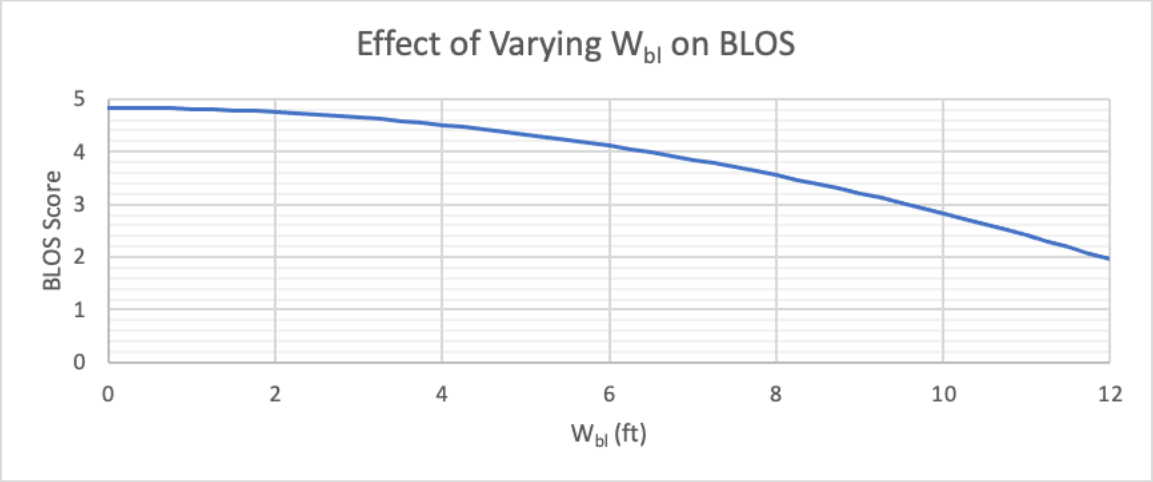


Figure 10: BLOS Sensitivity to Bicycle Lane Width

Figure 11 shows the relationship between the BLOS and heavy vehicle percentage. As the percentage increases, the BLOS increases in a quadratic manner. It is noted that when the percentage reaches about 12%, the BLOS score is at 5 which corresponds to a failing grade of F. Thus, it is noted that the factor of heavy vehicles alone can produce a failing grade of BLOS.

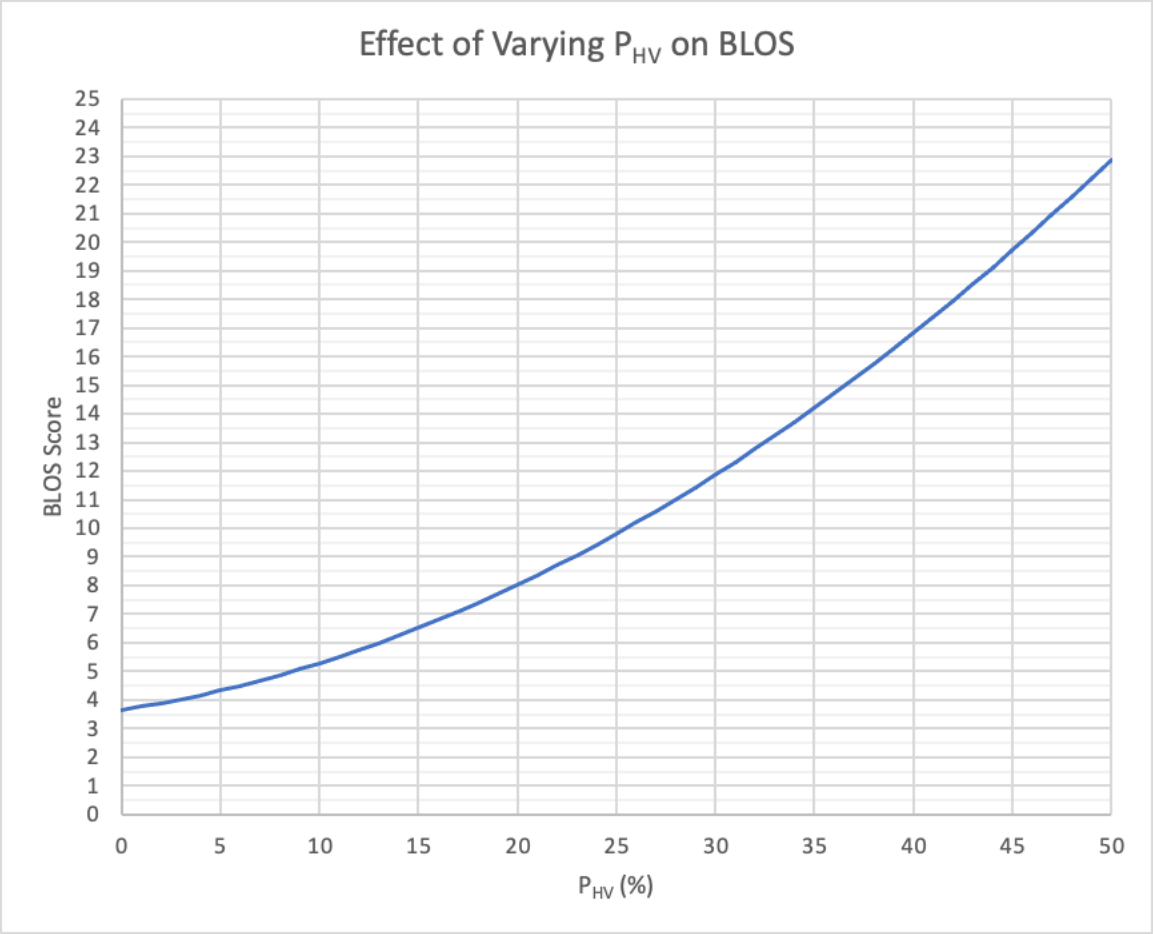


Figure 11: BLOS Sensitivity to Heavy Vehicle Percentage

Figure 12 depicts the sensitivity of BLOS to varying vehicular operating speed. It is seen that at lower speeds, the BLOS is affected at a steeper rate compared to higher speeds. An increase of about 5 mph (or 8 km/h) from 21 mph to 26 mph increases the BLOS score by about 0.9. A similar increase from 35 mph to 40 mph results in an increase of approximately 0.1. Since this evaluation methodology is expected to be used in local road settings, the operating speeds of adjacent motor vehicles are expected to be around or lower than 31 mph or 50 km/h. Since the BLOS score is more sensitive to varying speeds at this range, it is important to collect accurate values for this parameter.

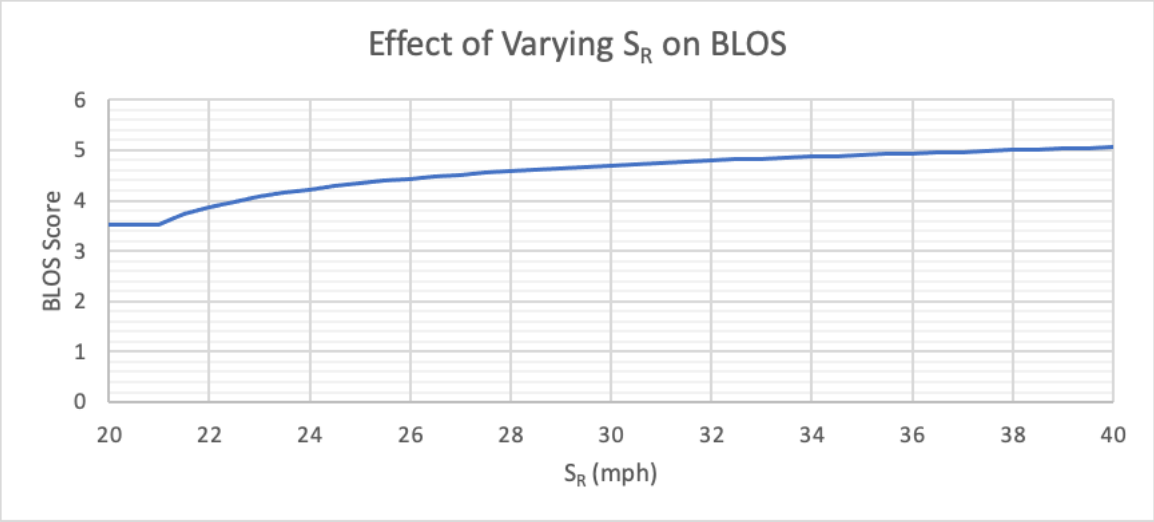


Figure 12: BLOS Sensitivity to Vehicular Speed

The BLOS sensitivity analysis has indicated which service measures should be more carefully examined for BLOS calculations. The percentage of heavy vehicles can influence the BLOS significantly; however, since this methodology is to be applied at local bicycle networks, the heavy vehicle percentage is not expected to be high. Further, the adjacent vehicular traffic volume and operating speed may have greater impacts especially at lower levels; since local roads may possibly have lower traffic volumes travelling at relatively lower speeds, these two service measures may be significant in determining the BLOS score.

The BLOS method is built on several previous studies and can be effective in representing the level of operation and performance of bicycle infrastructures. However, it also has several known limitations. Firstly, just like the BCI method, the BLOS method is not sensitive to bicycle-specific treatments such as colored paint in bicycle lanes, striped buffers, physical barriers between bicycle and traffic lanes, and bicycle boxes (Lowry et al., 2012). Currently, relatively little work has been performed to incorporate the effects of these devices into the calculation of cycling safety, and it may be an opportunity for further studies and investigation. Further, the BLOS method does

not consider cyclist crowding which indicates that it is insensitive to infrastructure improvement that would increase capacity (Huff & Liggett, 2014). However, this would not be a significant problem as cycling facilities typically do not reach maximum capacity.

3.1.3 Integrated Link-Level Quality of Service

Although the BCI and BLOS methods present viable explanations for how roadway characteristics shape cycling experience, they both also have known weaknesses and limitations as discussed in the previous sections. BCI and BLOS individually do not cover all important factors often considered in bicycle facility analysis. As well, they consider in the analysis slightly different sets of service measures. Therefore, the link-level QOS calculation step for the proposed methodology will incorporate a combination of both methods as a way of accounting for all factors considered in these two LOS methods. The core idea remains in that a higher link-level LOS, and in turn QOS, corresponds to a lower level of safety.

The difference in the types of roadway attributes considered for BCI and BLOS comes from roadside development and pavement condition. The distinction between residential areas and others is made only in the BCI calculation, and the impact of pavement surface conditions are considered only in the BLOS calculation. Liu et al. (2019) confirmed the significance of pavement condition on cycling experiences and noted that poor paving conditions had an extremely significant impact on the BLOS while good conditions did not as much. Further, Callister and Lowry (2013) concluded that the usage of the BLOS method is expected to increase in the engineering practice in US since it is a part of the universal HCM. As well, the BLOS method is the most recent of the many existing bicycle infrastructure performance measures. Therefore, this

study adopts the BLOS values and conversion system as the basis in its link-level QOS assessment and incorporating the BCI values accordingly.

The lowest BCI score considered in the conversion to a BCI letter grade is 1.50, and any values lower than that is assigned a letter grade of A. The highest score considered is 5.30, and any value higher than that is assigned a letter grade of F. Upon experimentation with numerous data points, it was discovered in this study that the lowest BCI score that can be produced with realistic roadway conditions was 1.62, and the highest was determined to be 8.63.

A similar investigation was performed for BLOS as well. The lowest and highest BLOS scores considered in the conversion to a BLOS letter grade are 2.00 (any values lower than that corresponds to a letter grade of A) and 5.00 (any values higher than that corresponds to a letter grade of F), respectively. Upon experimentation, the lowest value that could be produced was 0.06, and the highest was 4.95.

In order to incorporate the BCI values into the BLOS values and conversion system, the calculated BCI values would be adjusted from the original scale between 1.50 and 5.30 to one between 2.00 and 5.00 which is the scale that the BLOS values lie in. The proposed calculation is shown in Equation (15). However, this process would fail to capture the BCI values that lie outside the range between 1.50 and 5.30. As mentioned previously, the highest BCI value discovered in this study was 8.63. Therefore, for the adjustment process, any BCI values that is higher than 5.30 will be considered 5.30. As well, although not found in this study, if any BCI values are calculated to be lower than 1.50, they will be considered 1.50 for adjustment purposes.

$$BCI_{adjusted} = BCI \times 0.7895 + 0.8158 \quad (15)$$

Then, the final link-level QOS is calculated by averaging the BLOS and the adjusted BCI values as shown in Equation (16). The letter grade for that link is then assigned using the BLOS conversion system shown in Table 17 in Section 2.1.3.

$$QOS_{link} = \frac{BCI_{adjusted} + BLOS}{2} \quad (16)$$

3.1.4 Link-Level Quality of Service Example

A simple example is provided for a roadway to aid with understanding. It is noted that from here on, the letter grade associated with each LOS or QOS score would simply be called the LOS or QOS for that element. Table 27 displays the information from BCI and BLOS calculations for five example links, and the roadway characteristics are summarized in Appendix A. Table 28 summarizes the adjusted BCI scores, the corresponding link-level QOS scores, and the associated QOS for each link.

Table 27: Example Roadway Link-Level BCI and BLOS Calculations

Link	BCI Score	BCI	BLOS Score	BLOS
1	5.090	E	4.161	D
2	3.421	D	3.769	D
3	4.573	E	4.068	D
4	2.020	B	3.839	D
5	1.757	B	3.471	C

Table 28: Example Roadway Link-Level QOS

Link	Adjusted BCI Score	Link-Level QOS Score	QOS
1	4.834	4.497	E
2	3.516	3.643	D
3	4.426	4.247	D
4	2.411	3.125	C
5	2.203	2.837	C

It is seen that in this example, the final link-level QOS is not affected if the original BCI and BLOS scores both indicate an identical grade. However, if the original scores corresponded to different letter grades, the final link-level QOS changes depending on the original scores. There is not a distinct pattern where the final grade strictly follows the original BCI letter grade or the BLOS letter grade, but it is seen that the combination of the two scores plays a role.

3.2 Behavior-Based Route-Level Quality of Service Method

Building on the review of behavioral hypotheses provided in Section 2.2, this section discusses the development of a behavior-based route-level QOS method. The same example roadway in Table 28 is used to provide a comparison of the behavioral hypotheses. For readability, the example link-level QOS scores from Table 28 are provided once more in Table 29 along with the information on the length of each link. The route-level QOS values were established using the six methods as shown in Table 30 and Figure 13. It is noted that the duration-weighted average method is modified to the distance-weighted average method as cyclists are typically able to travel at their desired speeds.

Table 29: Example Link-Level QOS (from Table 28) and Link Length

Link	Link-Level QOS Score	Length
1	4.497	697.462
2	3.643	114.18
3	4.247	482.211
4	3.125	74.538
5	2.837	115.136

Table 30: Example Route-Level QOS Using Six Calculation Methods

Calculation Method	Route-Level QOS Score	Route-Level QOS
Equal-weighted average	3.670	D
Distance-weighted average	4.152	D
End rule	2.837	C
Serial position rule	3.667	D
Peak rule	4.497	E
Peak-end rule	3.667	D

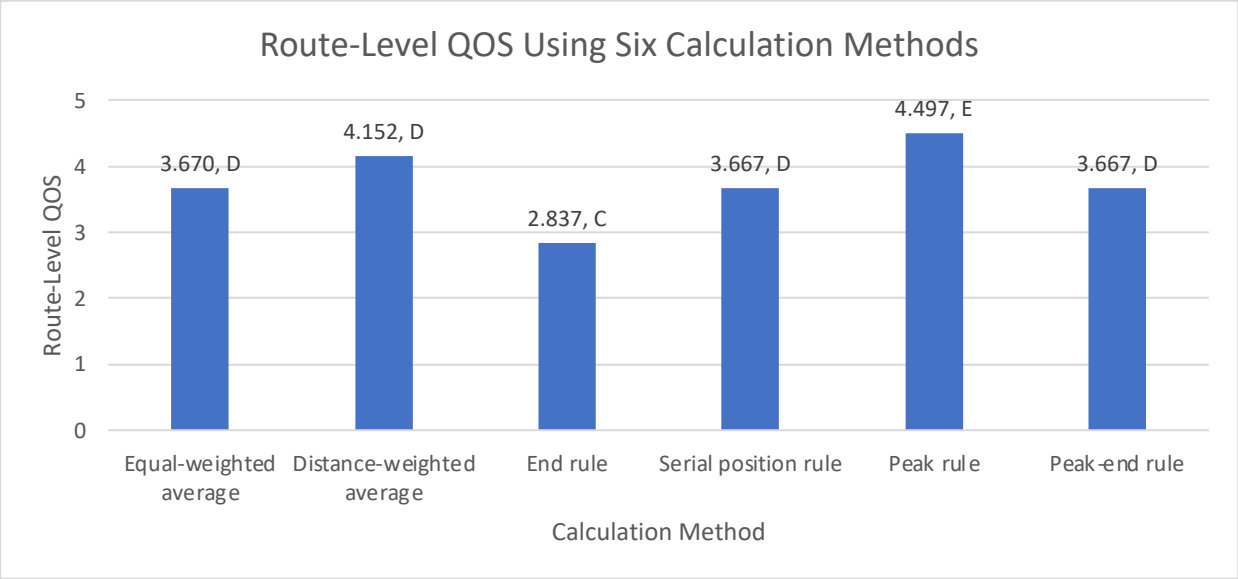


Figure 13: Example Route-Level QOS Using Six Calculation Methods

Out of the six methods, the distance-weighted average method and a modified form of the peak rule method were used to develop a preliminary form of the overall route-level QOS calculation method. It was desired to produce one mathematical expression that encompasses the effects of these two studied methods, and in order to do so, individual expressions were first developed. The expression for the route-level QOS calculated using the distance-weighted average method is provided in Equation (17). $QOS_{link,i}$ represents the link-level QOS of link i, and L_i represents the length of link i.

$$QOS_{Route,Distance-Weighted\ Average} = \frac{\sum_{i=1}^{N} QOS_{link,i} L_i}{\sum_{i=1}^{N} L_i} \quad (17)$$

The peak rule method, which originally only takes into account one worst-performing link, was modified to better reflect cyclists' behavior and thought process. The modification was based

on the idea that although more negative experiences have greater impacts on the overall impression on a trip, less negative experiences play a role as well. To represent this relationship, a generic model is proposed with a QOS-dependent link length adjustment factor as shown in Equation (18). Since a higher QOS score corresponds to a worse performance, the factor ensures that a higher link-level QOS is multiplied by a bigger factor to indicate a greater impact on the overall score as shown in Equation (19). Again, $QOS_{link,i}$ represents the link-level QOS of link i.

$$\beta_{Peak\ Rule,i} = \frac{1}{5 - QOS_{link,i}} \tag{18}$$

$$QOS_{Route,Peak\ Rule} = \frac{\sum_{i=1}^{N} \beta_{Peak\ Rule.i} QOS_{link,i}}{\sum_{i=1}^{N} \beta_{Peak\ Rule,i}} \tag{19}$$

In order to produce one model that collectively represents the effects of Equations (17) and (19), it was decided to modify the β factor introduced in Equation (18). It was determined that if different superscripts are introduced to this factor, it can in fact work to produce the effects of the distance-weighted average method and a modified form of the peak rule method as shown in Equation (20). With this new β factor, Equation (21) is introduced. $QOS_{link,i}$ represents the link-level QOS of link i, and L_i represents the length of link i.

$$\beta_i = \left(\frac{1}{5 - QOS_{link,i}}\right)^{\alpha} \tag{20}$$

$$QOS_{route} = \frac{\sum_{i=1}^{N} QOS_{link,i}\beta_i L_i}{\sum_{i=1}^{N} \beta_i L_i} \quad (21)$$

For example, an α of 0 would translate to the distance-weighted average method, and an α of 1 would produce a model that is dependent on the link-level QOS values as well as the link lengths. Although the proposed α value in this study can only represent the effects of the distance-weighted average method and the peak rule method, it is important to note that the ability to set different α values provides flexibility that will allow the route-level evaluation method to be more finely tuned and calibrated as further findings and empirical data become available in future studies. For example, the α values may be adjusted with a better interpretation of human perception and the impact of roadway attributes on human behavior. This study aims to contribute to the basic understanding of network-level analysis by proposing an introductory model. Although the study does not incorporate collecting empirical data and using it for calibration, it provides a generalized equation that encompasses some of the existing hypotheses and models.

3.2.1 Route-Level Quality of Service Example

An example usage of the proposed equation is presented with the two α factors and three example scenarios. The different scenarios are meant to disclose the effect of the different α factors as well as the attributes of the individual links that make up a route. Scenario 1 is shown in Table 31 with two links with lower QOS scores and two with higher QOS scores. Scenario 2 is summarized in Table 32 with the same link-level QOS, but the lengths of the poorly performing links are longer than the well-performing links. Scenario 3, summarized in Table 33, is identical to the second scenario except for that the lengths of the lower-QOS links are longer than the higher-QOS links. The calculation results are presented in Table 34.

Table 31: Example Scenario 1

Link	Link-Level QOS Score	Link-Level QOS	Length
1	1.80	A	2
2	2.20	B	2
3	4.80	E	2
4	4.90	E	2

Table 32: Example Scenario 2

Link	Link-Level QOS Score	Link-Level QOS	Length
1	1.80	A	0.5
2	2.20	B	1
3	4.80	E	2
4	4.90	E	3

Table 33: Example Scenario 3

Link	Link-Level QOS Score	Link-Level QOS	Length
1	1.80	A	3
2	2.20	B	2
3	4.80	E	1
4	4.90	E	0.5

Table 34: Example Route-Level QOS Using Different α Values

Scenario	α	Route-Level QOS Score	Route-Level QOS
1	0	3.43	C
	1	4.74	E
2	0	4.22	D
	1	4.84	E
3	0	2.62	B
	1	4.44	E

The α value of 0 provides a distance-weighted average and considers factors of discomfort such as the physical and mental energy that is required during a longer bicycle ride. In scenario 1, the QOS calculated with this factor is identical to a simple numerical average of the link-level QOS values because the link lengths are identical. Thus, the extent of comfort or discomfort experienced in each link was perceived with the same weight. In scenario 2, because the two links with worse link-level QOS were longer in length than the two with better link-level QOS, the level of discomfort experienced on the longer links was more exaggerated compared to the level of comfort experienced on the shorter links. Therefore, the resulting route-level QOS is worse than the same calculated in scenario 1. Scenario 3 presents a reversed case where the two links with the worse link-level QOS are shorter in length. Therefore, the resulting route-level QOS is in fact better than the same in scenarios 1 and 2. In other words, the more positive experiences on links 1 and 2 were more exaggerated because cyclists travelled on them for a longer period of time compared to links 3 and 4.

Lastly, the α value of 1 not only considers the perception associated with the link lengths but also that associated with the link-level LOS themselves. Although the route-level QOS calculated with this α value throughout the three scenarios do vary slightly, they are consistently worse compared to the values calculated using the other α value of 0. This is reasonable as the link-level QOS values never changed. This factor produced the worst route-level QOS in scenario 2 as the links with worse link-level QOS were also associated with longer lengths which both negatively impact the cycling experience.

3.3 Demand-Oriented Network-Level Quality of Service Method

The next component of the proposed methodology is to address the need to evaluate the QOS of a bicycle network servicing a particular area of interest such as activity centre, district, or zone. A demand-weighted QOS evaluation method is proposed, which considers not only the QOS of the individual bicycle routes connecting the area to other trip origins and destinations but also the expected usage of these routes, that is, bicycle travel demand. The premise of this proposed approach is that the QOS of the bicycle network servicing a given area should reflect not only the QOS of the routes connecting to this area but also its core purpose of moving people. Similarly, improvements made to a cycling link without the knowledge on its level of usage may not produce desired outcomes. Thus, it is crucial to incorporate demand into the network evaluation methodology in order to assess the relative importance of a link or route compared to others.

3.3.1 Zone-Level Quality of Service

Consider the problem of evaluating the QOS of a bicycle network servicing zone i. It is assumed that zone i is connected to zone j in the network ($j, j = 1, 2, \dots, N$) by a single bicycle route which is used by all bicycle trips between zone i and zone j. It is noted that this assumption is introduced to simplify the subsequent demonstration. For example, multiple origin and destination points at both zones could be identified and used to generate multiple routes for each zone pair, which would be a more realistic representation of realistic bicycle routes. Understandably, different trip routes would result in different route-level QOS values. With this assumption, the zone-level QOS of the origin zone can be calculated using Equation (22) which incorporates the route-level QOS of each route that connects the origin zone to each destination zone and the associated travel demand. In the equation, $QOS_{i,j}$ represents the route-level QOS between zone i and zone j, $TD_{i,j}$ represents the travel demand between zone i and zone j, and N is the number of zones.

$$QOS_i = \frac{\sum_{j=1}^{N} QOS_{i,j} \cdot TD_{i,j}}{\sum_{j=1}^{n} TD_{i,j}} \tag{22}$$

3.3.2 Network-Level Quality of Service

The QOS of the whole network would be the proportional sum of the QOS of the individual zones as shown in Equation (23). QOS_i represents the zone-level QOS of zone i, TD_i is the total travel demand that between zone i and all other zones, and N represents the number of zones in the network.

$$QOS_{network} = \frac{\sum_{i=1}^{N} QOS_i \cdot TD_i}{\sum_{i=1}^{N} TD_i} \quad (23)$$

3.3.3 Network-Level Quality of Service Example

With the methods developed, a simple example network-level QOS calculation is provided. The travel demand data for the example network with three zones is provided in Table 35. The route-level QOS values for the corridors that connect each zone are presented in Table 36.

Table 35: Example Network Travel Demand Data

O\D	1	2	3	Total
1	-	200	150	350
2	400	-	550	950
3	200	300	-	500
Total	600	500	700	1800

Table 36: Example Route-Level QOS between Zones

O\D	1	2	3
1	-	2.65 (B)	3.80 (D)
2	4.15 (D)	-	3.10 I
3	3.50 I	2.95 I	-

Using this information, the zone-level QOS score for each zone and the network-level QOS score can be calculated. The zone-level QOS results are shown in Table 37, and the associated network-level QOS score is determined to be 3.361 with a network-level QOS of C.

Table 37: Example Zone-Level QOS

Zone	Zone-Level QOS Score	Zone-Level QOS
1	3.143	C
2	3.542	D
3	3.170	C

4 Case Studies

To present how this methodology can be applied to transportation engineering and planning projects, two case studies are provided for a single roadway corridor and for an entire network in the City of Kitchener. Section 4.1 begins with a modified application of the methodology on a single route in order to explain how link-level QOS is translated into route-level QOS. Section 4.2 presents a complete application of the methodology at a network-level. The City of Kitchener roadway data was collected from the Region of Waterloo Open Data Portal (Region of Waterloo, n.d.). As well, the steps introduced in Figure 5 in Section 3 were utilized.

4.1 Route-Level Application

In order to determine the impact of the different route-level QOS hypotheses shaped by human behavior and perception, a partial case study of the methodology is presented for a single route. A route in the City of Kitchener from Kitchener downtown, specifically King St. W. at Queen St. S., to Grand River Hospital, specifically King St. W. at Green St., was selected for analysis. An aerial image of the route is provided in Figure 14, and a simplified diagram is presented in Figure 15. As well, each link on the corridor was assigned a number as shown in Table 38. For the case study on a single route, only steps 1, 4, and 5 were applicable.

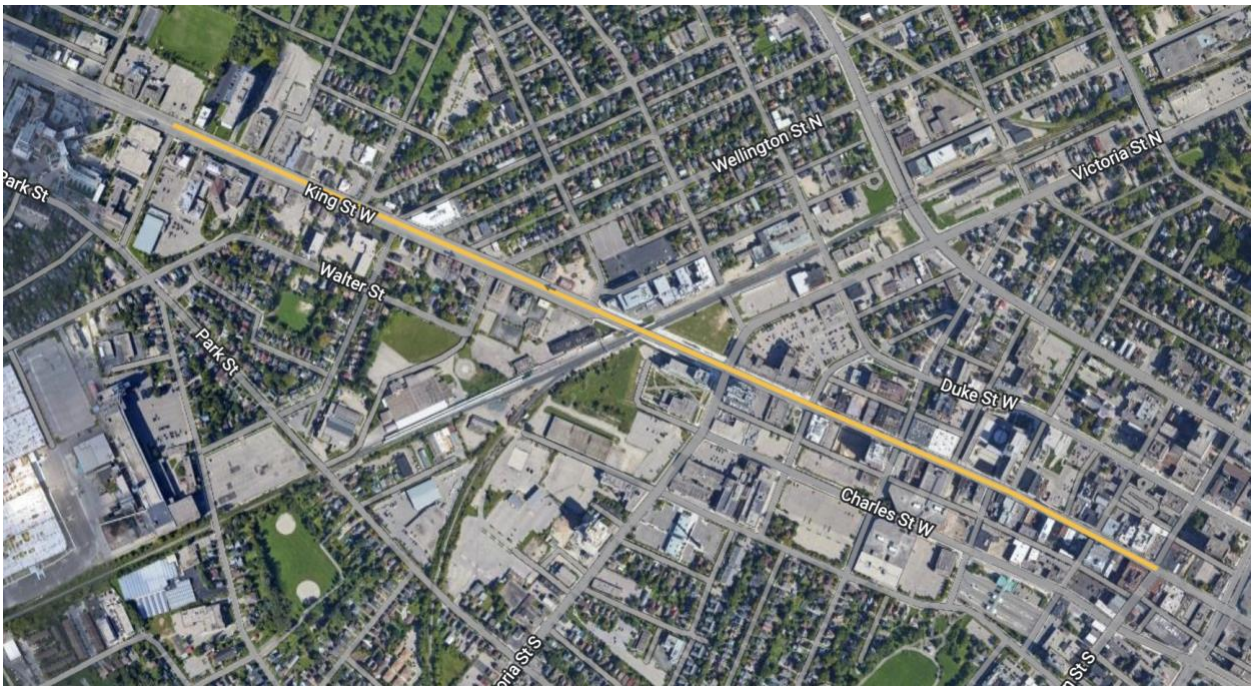


Figure 14: King St. W. Route between Queen St. S. and Green St. (Google Maps, n.d.-a)

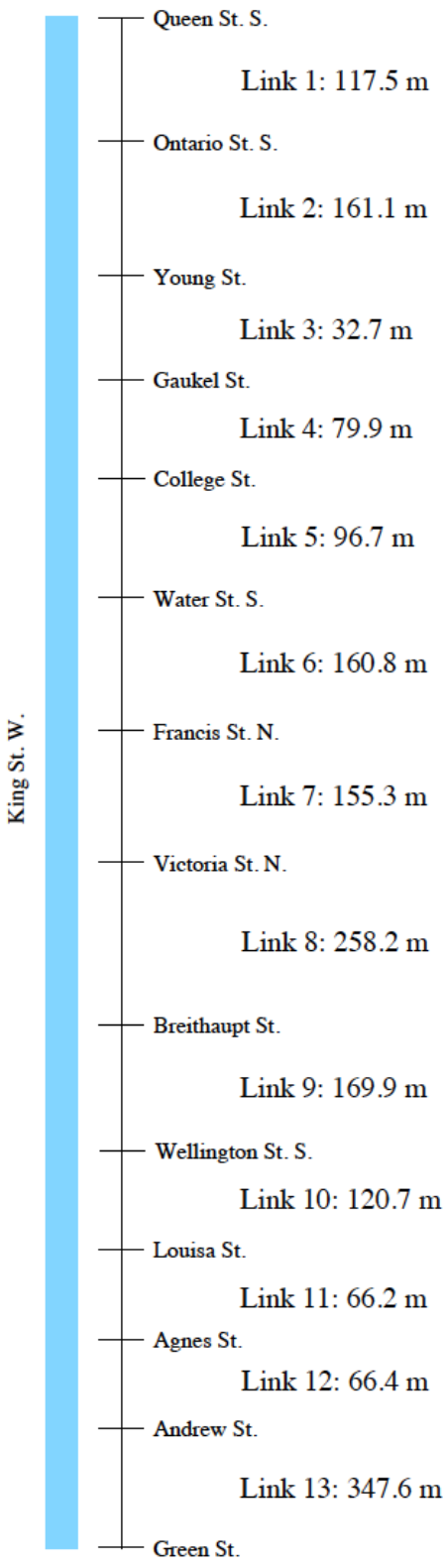


Figure 15: A Simplified Diagram of King St. W. between Queen St. S. and Green St.

Table 38: Links in King St. W. Route

Link	From	To	Length
1	Queen St. S.	Ontario St. S.	117.498
2	Ontario St. S.	Young St.	161.055
3	Young St.	Gaukel St.	32.743
4	Gaukel St.	College St.	79.946
5	College St.	Water St. S.	96.729
6	Water St. S.	Francis St. N.	160.829
7	Francis St. N.	Victoria St. N.	155.320
8	Victoria St. N.	Breithaupt St.	258.155
9	Breithaupt St.	Wellington St. S.	169.869
10	Wellington St. S.	Louisa St.	120.673
11	Louisa St.	Agnes St.	66.158
12	Agnes St.	Andrew St.	66.375
13	Andrew St.	Green St.	347.594

4.1.1 Route-Level Quality of Service Evaluation

The City of Kitchener roadway data was collected from the Region of Waterloo Open Data Portal for the King St. W. corridor between Kitchener downtown at Queen St. S. and Grand River Hospital at Green St. The complete roadway dataset for this section is provided in Appendix B. With the roadway data, BCI and BLOS were calculated for all 13 links in the route. The data set did not include some of the service measures required for calculation, and therefore assumptions were made as listed below. Although no site visits were conducted in this study, visits to the study

area may replace some of these assumptions and therefore provide more robust results. Site visits and the confirmation these assumed service measure values are highly recommended to be a part of future studies.

- BCI calculation
    - To convert AADT to v_m, the following equation was used: $v_m = AADT \times K \times D$. K was assumed to be 0.15, D was assumed to be 0.5.
    - Shoulder widths were assumed to be 0.8 m.
    - The BCI calculation requires 85th percentile speed. Since the obtained dataset does not include it, the speed limit was used for the calculation instead.
    - For road types "private", "cul-de-sac", "alleyway", and "local street", it was assumed that on-street parking with over 30% occupancy is present.
    - If on-street parking was available, the time limit was assumed to be two hours.
    - It was assumed that a third of curb lane vehicular volume was turning right (either at intersections or into driveways).
- BLOS calculation
    - To convert AADT to v_m, the following equation was used: $v_m = AADT \times K \times D$. K was assumed to be 0.15, D was assumed to be 0.5.
    - Pavement condition rating was assumed to be 3.
    - Truck percentage was assumed to be 3%.
    - Wherever on-street parking is permitted, the occupancy was assumed to be 0.8.
    - It was assumed that no dedicated bicycle lanes exist.

Table 39 summarizes the BCI score, the adjusted BCI score, the BLOS score, and the link-level QOS of each link.

Table 39: Link-Level QOS

Link	BCI Score	Adjusted BCI Score	BLOS Score	Link-Level QOS Score	Link-Level QOS
1	4.083	4.039	3.858	3.949	D
2	3.883	3.881	3.782	3.832	D
3	4.149	4.091	3.881	3.986	D
4	4.149	4.091	3.881	3.986	D
5	3.995	3.970	3.826	3.898	D
6	4.549	4.407	3.973	4.190	D
7	3.642	3.691	3.529	3.610	D
8	5.300	5.000	4.238	4.619	E
9	5.300	5.000	4.328	4.664	E
10	5.300	5.000	4.349	4.675	E
11	5.300	5.000	4.287	4.644	E
12	5.300	5.000	4.289	4.645	E
13	5.300	5.000	4.277	4.639	E

Next, the route-level QOS values are calculated. For this demonstration, an α value of 1 is selected which accounts for the link length and the link-level QOS in the route-level QOS calculation. Table 40 lists the link-level QOS value, the associated β value, and the link length.

Table 40: Link-Level Information with $\alpha = 1$

Link	Link-Level QOS Score	β	Length
1	3.949	0.951	117.498
2	3.832	0.856	161.055
3	3.986	0.986	32.743
4	3.986	0.986	79.946
5	3.898	0.907	96.729
6	4.190	1.235	160.829
7	3.610	0.719	155.320
8	4.619	2.626	258.155
9	4.664	2.977	169.869
10	4.675	3.072	120.673
11	4.644	2.806	66.158
12	4.645	2.814	66.375
13	4.639	2.766	347.594

Finally, the route-level QOS score is calculated to be 4.497 that associates to a route-level QOS of E. About half of the links exhibited a link-level QOS of D, and the other half were designated E. And the ones with E generally had a longer link length compared to the ones with D. Therefore, the calculated route-level QOS of E seems reasonable as the worse experiences on the longer links were reflected with a greater significance.

4.1.2 Low Cost Route-Level Quality of Service Improvement

This route with a route-level QOS score of 4.497 and a route-level QOS of E consists of 13 links. Infrastructure improvements on any of these links would result in an improvement in the route-level QOS. In this section, it is assumed that the City of Kitchener is planning on lowering the speed limits from the current one of 50 km/h to 30 km/h on the links in this route which would be a countermeasure that requires minimal cost. A low implementation cost implies that improvements made on a longer link would be similar to that made on a shorter link. A valuable usage of this methodology would be in determining which links should be prioritized for such improvements.

Firstly, it is assumed that this improvement is implemented on all links in the entire route. The changed link-level QOS are summarized in Table 41, and the associated β values with an α value of 1 are presented in Table 42. With this full change of the speed limit, the route-level QOS score is calculated to be 4.157 and results in a QOS of D.

Table 41: Link-Level QOS (Full Speed Limit Change)

Link	BCI Score	Adjusted BCI Score	BLOS Score	Link-Level QOS Score	Link-Level QOS
1	3.643	3.692	3.322	3.507	D
2	3.443	3.534	3.246	3.390	C
3	3.709	3.744	3.345	3.544	D
4	3.709	3.744	3.345	3.544	D
5	3.555	3.623	3.290	3.456	C
6	4.109	4.060	3.437	3.749	D
7	3.202	3.343	2.990	3.167	C
8	5.300	5.000	3.699	4.350	E
9	5.300	5.000	3.789	4.395	E
10	5.300	5.000	3.810	4.405	E
11	5.300	5.000	3.748	4.374	E
12	5.300	5.000	3.750	4.375	E
13	5.300	5.000	3.738	4.369	E

Table 42: Link-Level Information (Full Speed Limit Change)

Link	Link-Level QOS Score	β	Length
1	3.507	0.670	117.498
2	3.390	0.621	161.055
3	3.544	0.687	32.743
4	3.544	0.687	79.946
5	3.456	0.648	96.729
6	3.749	0.799	160.829
7	3.167	0.545	155.320
8	4.350	1.538	258.155
9	4.395	1.652	169.869
10	4.405	1.681	120.673
11	4.374	1.598	66.158
12	4.375	1.600	66.375
13	4.369	1.585	347.594

If complete improvements are not possible, the methodology can aid in determining which link should be prioritized. In this analysis, the speed limit improvement was made on a single link at a time, and Table 43 summarizes the updated route-level QOS scores as well as the percent changes relative to the initial route-level QOS score of the route. In each case, the link-level QOS of the unaffected links remained constant.

Table 43: Changes in Route-Level QOS (Partial Speed Limit Change)

Improved Link	Changed Route-Level QOS Score	Percent Change
1	4.493	-0.099
2	4.492	-0.121
3	4.496	-0.032
4	4.494	-0.077
5	4.494	-0.077
6	4.488	-0.210
7	4.494	-0.077
8	4.455	-0.944
9	4.464	-0.744
10	4.473	-0.544
11	4.486	-0.255
12	4.486	-0.255
13	4.434	-1.411

It is shown that reducing the speed limit on any of the links results in a reduction on the route-level QOS score which is reasonable as a lower vehicular speed limit enhances cycling experience. It is seen that links 13 and 8 resulted in the greatest reduction in the overall route-level QOS. Originally, links 13 and 8 had relatively high link-level QOS scores and also were the two longest links. Further, it is seen that link 3 produced the smallest reduction followed by links 4, 5, and 7. Originally, link 3 had a relatively low link-level QOS score and was the shortest link. Links 4, 5, and 7 also had relatively low link-level QOS scores but were not necessarily the shortest links

in this route; links 11 and 12 were shorter and displayed relatively high link-level QOS scores. Therefore, this analysis shows links with longer lengths respond better to speed limit reductions than those with higher link-level QOS scores.

4.1.3 High Cost Route-Level Quality of Service Improvement

In this section, it is assumed that the City is planning on installing a new set of dedicated bicycle lanes (1.524 m or 5 ft) anywhere on this route. As this type of improvement requires a higher implementation cost, it is noted that the cost of improving a longer link would be higher than the cost of improving a shorter link.

Firstly, if dedicated bicycle lanes are introduced all throughout the entire route, the changes in the link-level QOS are as shown in Table 44. The corresponding β values with an α value of 1 are presented in Table 45. With this full improvement, the route-level QOS score is calculated to be 2.827 which corresponds to a route-level QOS of C.

Table 44: Link-Level QOS (Full Dedicated Bicycle Lanes)

Link	BCI Score	Adjusted BCI Score	BLOS Score	Link-Level QOS Score	Link-Level QOS
1	2.565	2.841	1.312	2.077	B
2	2.365	2.683	1.236	1.960	A
3	2.631	2.893	1.335	2.114	B
4	2.631	2.893	1.335	2.114	B
5	2.477	2.772	1.280	2.026	B
6	3.031	3.209	1.428	2.318	B
7	2.124	2.492	0.983	1.738	A
8	4.543	4.403	1.693	3.048	C
9	5.127	4.864	1.783	3.323	C
10	5.277	4.982	1.804	3.393	C
11	4.847	4.643	1.742	3.192	C
12	4.861	4.654	1.744	3.199	C
13	4.781	4.591	1.732	3.161	C

Table 45: Link-Level Information (Full Dedicated Bicycle Lanes)

Link	Link-Level QOS Score	β	Length
1	2.077	0.342	117.498
2	1.960	0.329	161.055
3	2.114	0.347	32.743
4	2.114	0.347	79.946
5	2.026	0.336	96.729
6	2.318	0.373	160.829
7	1.738	0.307	155.320
8	3.048	0.512	258.155
9	3.323	0.596	169.869
10	3.393	0.622	120.673
11	3.192	0.553	66.158
12	3.199	0.555	66.375
13	3.161	0.544	347.594

If full improvements are not feasible, the methodology can again be used to determine which link improvements would yield more significant benefits overall. In this analysis, bicycle lanes are added in a single link at a time, and the link-level QOS of the unaffected links remain constant for each case. The results should be interpreted slightly differently from the previous section with speed limit changes as this type of improvement requires implementation costs. This means that adding dedicated bicycle lanes on a longer link costs more than doing so on a shorter

link. Therefore, the percent change on the route-level QOS score per meter of improvement is considered in the analysis as well. The results are summarized in Table 46.

Table 46: Changes in Route-Level QOS (Partial Dedicated Bicycle Lanes)

Improved Link	Changed Route-Level QOS Score	Percent Change	Length of Improvement (m)	Percent Change per Meter (%/m)
1	4.487	-0.232	117.498	-0.00198
2	4.485	-0.277	161.055	-0.00172
3	4.495	-0.054	32.743	-0.00166
4	4.490	-0.166	79.946	-0.00207
5	4.490	-0.166	96.729	-0.00171
6	4.478	-0.432	160.829	-0.00269
7	4.488	-0.210	155.320	-0.00135
8	4.409	-1.967	258.155	-0.00762
9	4.435	-1.388	169.869	-0.00817
10	4.453	-0.988	120.673	-0.00819
11	4.476	-0.477	66.158	-0.00721
12	4.476	-0.477	66.375	-0.00718
13	4.362	-3.012	347.594	-0.00866

From the results, it is seen that adding dedicated bicycle lanes anywhere on the route improves the route-level QOS. To interpret the results better, an additional table is presented, Table 47, that lists the links in an ascending order based on percent change per meter.

Table 47: Changes in Route-Level QOS Sorted Based on Percent Change per Meter

Improved link	Initial Link-Level QOS Score	Length
13	4.639	347.594
10	4.675	120.673
9	4.664	169.869
8	4.619	258.155
11	4.644	66.158
12	4.645	66.375
6	4.190	160.829
4	3.986	79.946
1	3.949	117.498
2	3.832	161.055
5	3.898	96.729
3	3.986	32.743
7	3.610	155.320

It is seen that generally, greater route-level QOS score reductions are more closely associated with improvements on links that originally displayed higher link-level QOS scores. The exceptions to this general rule seem to occur when the link lengths are exceptionally long or short. For example, link 13 was did not have the highest link-level QOS score in the original route. However, it resulted in the greatest percent change per meter because its length was especially long compared to the other links in the route.

4.2 Network-Level Application

In this section, the network evaluation methodology is applied to the existing roadway network in the City of Kitchener. An aerial view of the study area is shown in Figure 16. The same aerial screenshot is used as the underlying layer for the rest of the figures presented in this section.

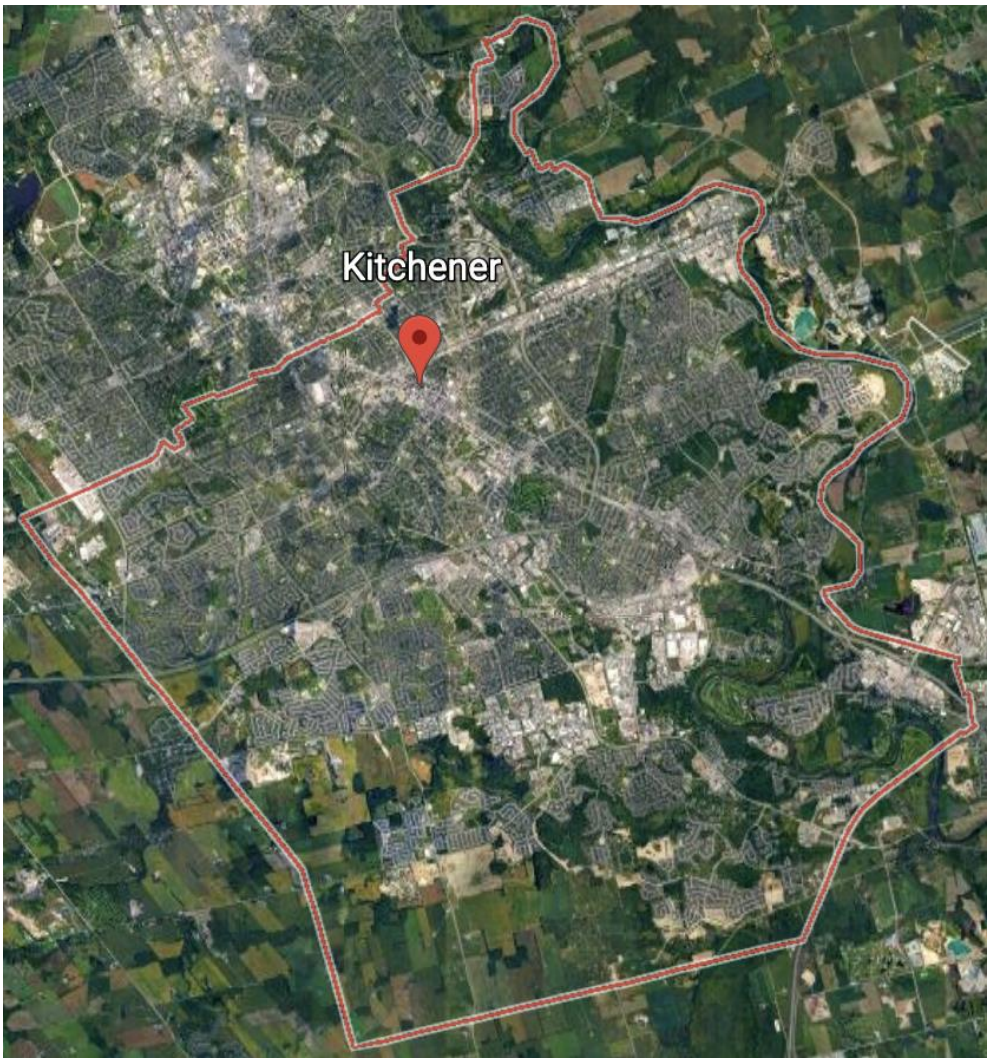


Figure 16: City of Kitchener Network (Google Maps, n.d.-b)

4.2.1 Network-Level Quality of Service Evaluation

For this case study, the City of Kitchener roadway data and population data were collected from the Region of Waterloo Open Data Portal. The population data was provided in the form of a household count on a basis of ten wards within the city. For consistency in terms, wards will be referred to as zones in the following sections. The zones and the corresponding zone numbers are shown in Figure 17.

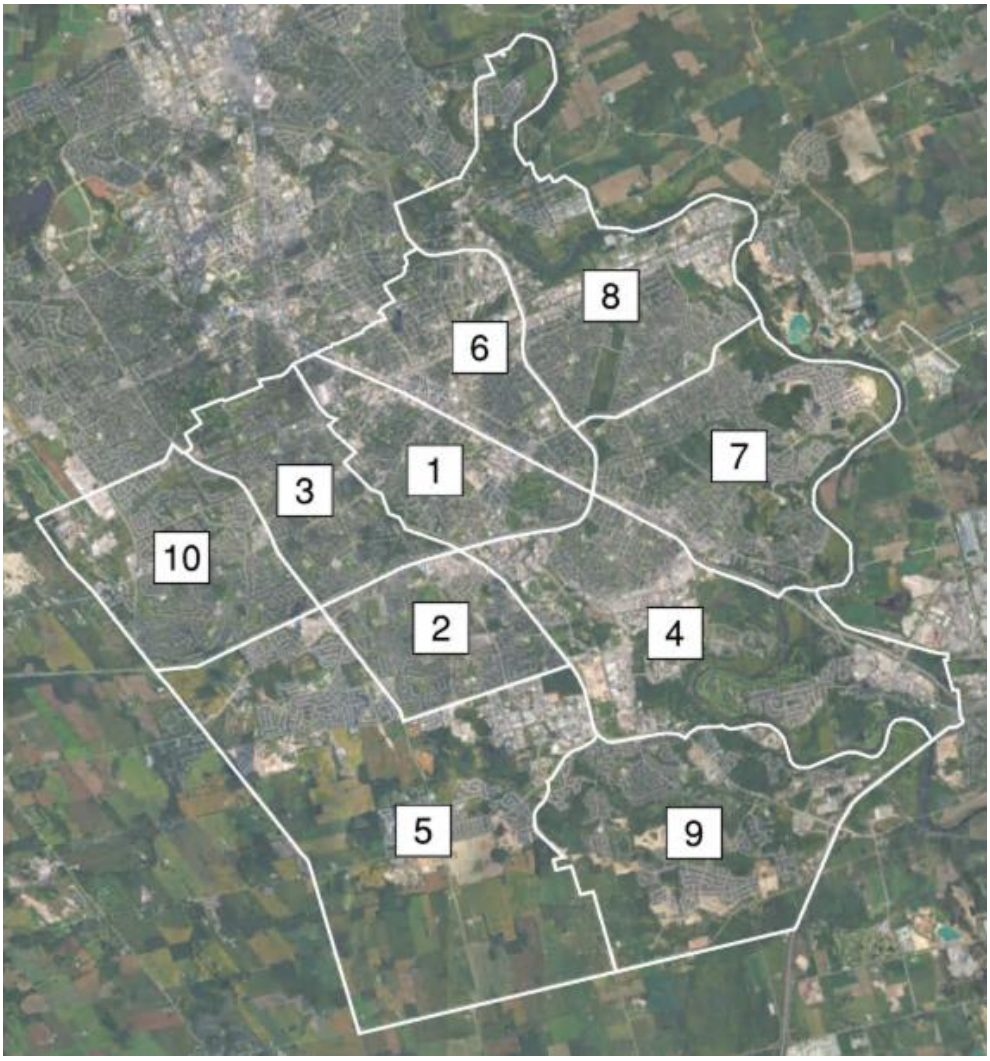


Figure 17: City of Kitchener Zones

For each of the ten zones, a location was chosen to serve as the origin and destination of that zone. Again, although it is not a realistic assumption that bicycle trips will only start at or end in these locations, it allows the demonstration of the general application of the methodology. These locations are listed in Table 48 and shown in Figure 18 in yellow.

Table 48: Locations Selected to be Origins/Destinations in City of Kitchener Network

Zone	Location
1	Park St. / Victoria St. S.
2	Ottawa St. S. / Strasburg Rd.
3	Westmount Rd. / Victoria St. S.
4	Manitou Dr. / Courtland Ave. E.
5	Ottawa St. S. / International Pl.
6	Weber St. E. / Victoria St. N.
7	King St. E. / Fairway Rd. N.
8	Bridgeport Rd. E. / Lancaster St. W.
9	Doon Village Rd. / Pioneer Dr.
10	Westheights Dr. / Highland Rd. W.

Figure 18: Locations Selected to be Origins/Destinations in City of Kitchener Network

Since cyclists typically do not have much understanding of how safe or pleasing their experiences would be on each possible route, they would reasonably choose to cycle on the physically shortest route. Therefore, for this case study, reasonable routes were defined to be the physically shortest routes for each origin-destination pair.

Each route consists of multiple links. The link-level QOS for the individual links were calculated using the integrated link-level QOS methodology presented in Section 3.1. The utilized roadway dataset is presented in Appendix C, and the calculation results are shown in Appendix D.

The behavior-based route-level QOS methodology is based on hypotheses on how cyclists would construct their overall level of satisfaction based on parts of the whole experience. With the proposed method in Equation (20) and an α value of 1, route-level QOS were calculated for the routes that connect each zone. This α value implies that the route-level QOS would be affected by both the length and the link-level QOS of each link comprising the route. It was also assumed that the route-level QOS of the route connecting zone X to zone Y is identical to that connecting zone Y to zone X since one road segment typically shares the same operational characteristics in both directions. The calculation results are summarized in Tables 49 and 50 as well as in Figure 19. In this case study, all routes resulted in a route-level QOS of D or E.

Table 49: Route-Level QOS Score for City of Kitchener Network

O\D	1	2	3	4	5	6	7	8	9	10
1	-	4.233	4.300	4.269	4.298	4.117	4.089	4.289	4.423	4.135
2	4.233	-	4.159	3.873	4.047	4.276	4.265	4.194	4.346	3.883
3	4.300	4.159	-	4.331	4.254	4.243	4.389	4.147	4.364	3.818
4	4.269	3.873	4.331	-	4.330	4.168	4.521	4.186	4.680	4.517
5	4.298	4.047	4.254	4.330	-	4.046	4.365	4.154	4.508	4.196
6	4.117	4.276	4.243	4.168	4.046	-	4.084	4.334	4.303	4.131
7	4.089	4.265	4.389	4.521	4.365	4.084	-	4.135	4.424	4.282
8	4.194	4.183	4.147	4.186	4.154	4.334	4.135	-	4.287	4.223
9	4.423	4.346	4.364	4.680	4.508	4.303	4.424	4.287	-	4.486
10	4.135	3.883	3.818	4.517	4.196	4.131	4.282	4.223	4.486	-

Table 50: Route-Level QOS for City of Kitchener Network

O\D	1	2	3	4	5	6	7	8	9	10
1	-	D	E	E	E	D	D	E	E	D
2	D	-	D	D	D	E	E	D	E	D
3	E	D	-	E	E	D	E	D	E	D
4	E	D	E	-	E	D	E	D	E	E
5	E	D	E	E	-	D	E	D	E	D
6	D	E	D	D	D	-	D	E	E	D
7	D	E	E	E	E	D	-	D	E	E
8	E	D	D	D	D	E	D	-	E	D
9	E	E	E	E	E	E	E	E	-	E
10	D	D	D	E	D	D	E	D	E	-

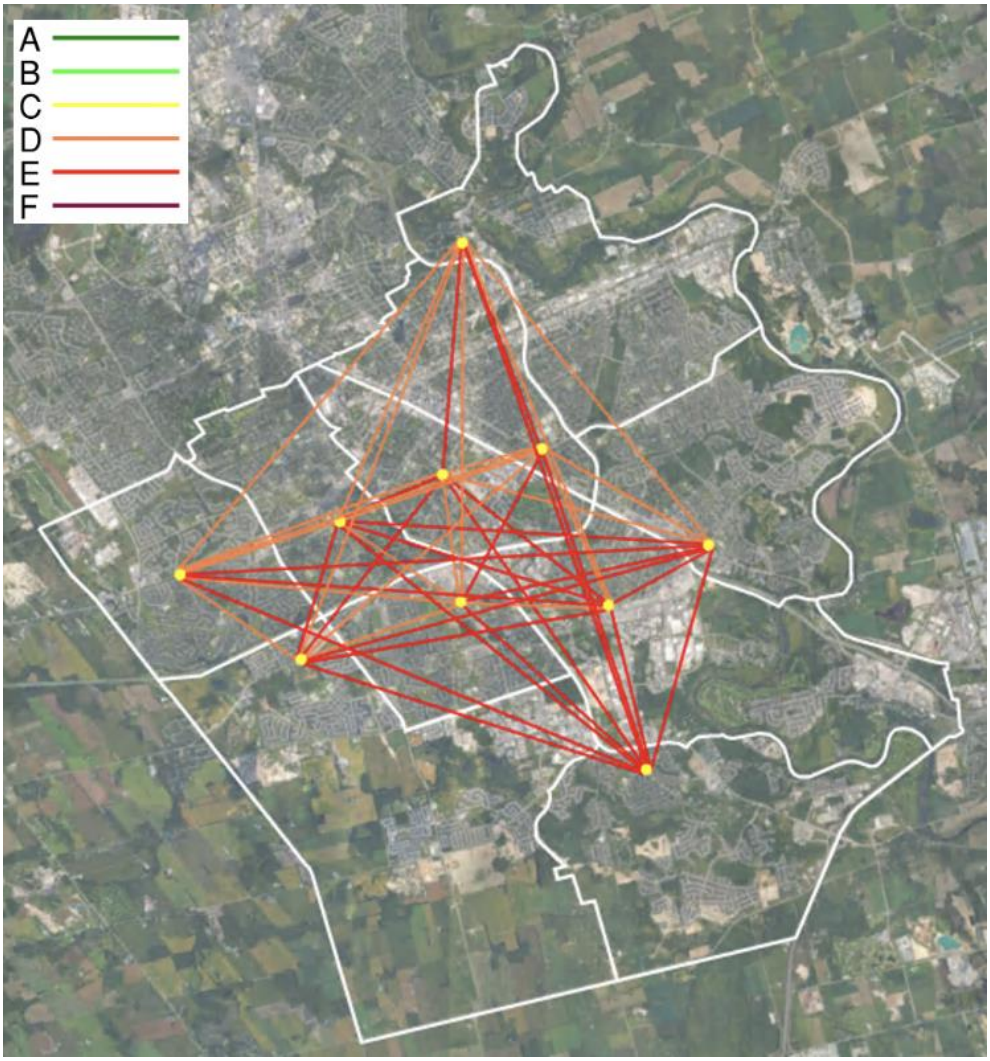


Figure 19: Route-Level QOS for City of Kitchener Network

Next, the zone-level QOS are calculated by using Equation (21). The travel demand data used in this step is presented in Appendix E. The zone-level QOS results are summarized in Table 51 and Figure 20. As all routes had a route-level QOS of D or E, the zone-level QOS were all calculated to be D or E as well.

Table 51: Zone-Level QOS for City of Kitchener Network

Zone	Zone-Level QOS Score	Zone-Level QOS
1	4.235	D
2	4.152	D
3	4.231	D
4	4.324	E
5	4.246	D
6	4.183	D
7	4.276	E
8	4.218	D
9	4.421	E
10	4.184	D

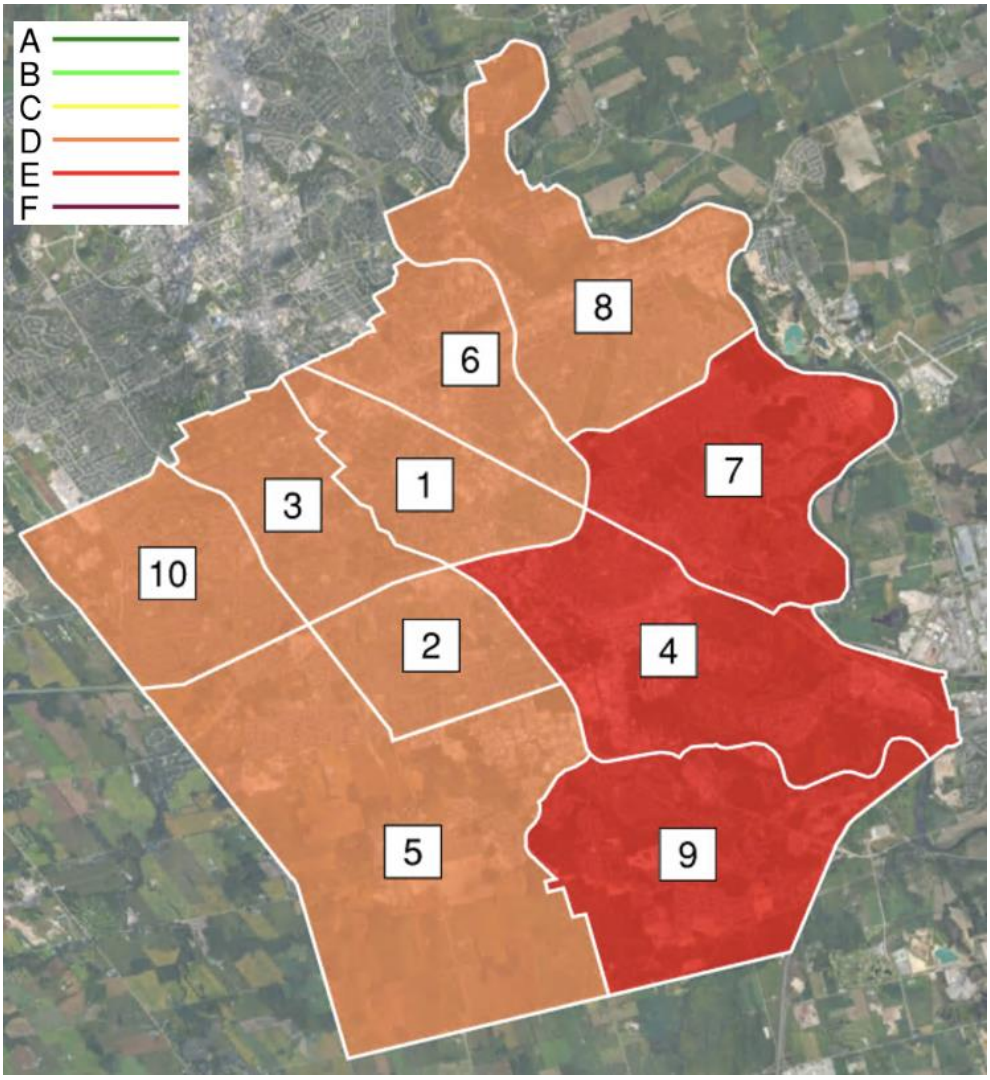


Figure 20: Zone-Level QOS for City of Kitchener Network

Finally, using the zone-level QOS values and the proposed method in Equation (22), the network-level QOS score is 4.247 which associates to a network-level QOS of D.

4.2.2 Network-Level Quality of Service Improvement (Route-Level)

In this network-level application case study, the improvement possibility with a minimal cost is not studied as how it is done is similar to that in a route-level application. In this scenario,

the possibility of installing dedicated bicycle lanes (5 ft or 1.524 m) in one of the routes in the network is explored. Only one route was improved at a time and the other routes were untouched. Again, the α value was set to be 1 which reflects both the link length and the link-level QOS score in the analysis. Appendix F provides the complete results, and Table 52 summarizes five routes that produced the most significant change in the network-level QOS score relative to the length of the improvement. It is assumed that the City of Kitchener aims to make the most cost-efficient decision and therefore decides to improve the route connecting Zones 1 and 6.

Table 52: Changes in Network-Level QOS

Improved Route	Initial Route-Level QOS Score	Changed Route-Level QOS Score	Changed Network-Level QOS Score	Percent Change	Route Length	Percent Change per Meter (%/m)
1 - 6	4.117	2.225	4.193	-1.27149	1,045.319	-0.001216
1 - 3	4.300	2.431	4.200	-1.10666	1,823.483	-0.000607
4 - 7	4.521	2.795	4.208	-0.91830	2,192.462	-0.000419
3 - 10	3.818	2.187	4.214	-0.77702	1,861.836	-0.000417
3 - 6	4.243	2.359	4.199	-1.13021	2,868.802	-0.000394

4.2.3 Network-Level Quality of Service Improvement (Link-Level)

It would be more preferrable to improve the entire route that serves Zones 1 and 6, but it is assumed that the City desires to improve a single link within that route that will bring the most significant impact. This route consists of 12 links. Table 53 summarizes the results from improving one link at a time.

Table 53: Link Information for the Route that Connects Zones 1 and 6

Improved Link	Initial Link-Level QOS Score	Changed Link-Level QOS Score	Changed Network-Level QOS Score	Percent Change	Link Length	Percent Change per Meter (%/m)
1	4.199	2.328	4.245	-0.04709	73.971	-0.000637
2	4.207	2.336	4.245	-0.04709	69.628	-0.000676
3	4.215	2.343	4.246	-0.02355	16.729	-0.001407
4	4.224	2.352	4.245	-0.04709	62.456	-0.000754
5	1.838	1.159	4.247	0.00000	43.232	0.000000
6	4.232	2.360	4.246	-0.02355	26.468	-0.000890
7	4.239	2.367	4.245	-0.04709	78.125	-0.000603
8	4.238	2.366	4.244	-0.07064	128.650	-0.000549
9	4.152	2.280	4.246	-0.02355	55.411	-0.000425
10	3.986	2.114	4.246	-0.02355	58.907	-0.000400
11	3.885	2.013	4.243	-0.09418	251.991	-0.000374
12	4.230	2.358	4.243	-0.09418	179.751	-0.000524

It is seen that improving Link 5 that initially had a link-level QOS score of 1.838 which corresponds to a link-level QOS of A brings extremely minimal impact. As well, improving Link 11, the one with the longest length, also does not bring the greatest impact as it was operating at a better link-level QOS compared to the other links in the route. Improvements on Link 6 or 4 would result in the greatest change in the network-level QOS in this case.

4.2.4 Network-Level Quality of Service Improvement (Demand Increase)

Improvements on a route that connects two zones would probably lead to an increase in travel demand that utilizes that route. Another hypothetical scenario that can be tested is assuming that because of the infrastructure improvement all along the route between Zones 1 and 6, more activity centers are created in these two zones, and the demand from all other zones to the two zones increases. In this section, the effect of the travel demand to Zone 1 and Zone 6 from all other zones increasing by twice is studied. This hypothetical demand is summarized in Appendix G. The zone-level QOS incorporating the updated route-level QOS between Zones 1 and 6 as well as the increased demand are presented in Table 54. For reference, the table also includes the original zone-level QOS scores before the infrastructure improvement and the demand change. The associated network-level QOS score is 4.143 which corresponds to a network-level QOS of D.

Table 54: Zone-Level QOS when Demand Increases

Zone	Initial Zone-Level QOS Score	Changed Zone-Level QOS Score	Changed Zone-Level QOS
1	4.235	3.794	D
2	4.152	4.172	D
3	4.231	4.239	D
4	4.324	4.303	E
5	4.246	4.231	D
6	4.183	3.749	D
7	4.276	4.238	D
8	4.218	4.237	D
9	4.421	4.421	E
10	4.184	4.184	D

The changes in infrastructure and demand did not result in a significant improvement in the network-level QOS scores, but they positively impacted the zone-level QOS scores for Zones 1 and 6. It is also important to note that the changes affected other zone-level scores as well but not with a consistent pattern. One factor that would initiate a positive change in these other zones is that some of the improved links are utilized in routes that connect other zones as well. One factor that would result in a negative change is demand increasing on a link that is not improved and therefore is performing with a worse link-level QOS.

4.3 Discussion of the Proposed Methodology

The proposed integrated behavior and demand-oriented QOS methodology allows for the evaluation of bicycle experiences at a network-level that has not been widely studied in the existing pool of research. Standalone link-level analyses are not comprehensive since they do not provide users information on how to travel from point A to point B. A cyclist believing that an entire route will be comfortable for travel based on an analysis on a single link that yielded a positive result may be misleading since that route may contain many other links that are in fact uncomfortable to ride on for that cyclist's experience level and comfort threshold. Moreover, standalone route-level analyses may not provide meaningful interpretation as well. Even if a route is operating on a high QOS, it is not useful if it is not being utilized by cyclists; similarly, a low QOS route with a higher demand affects the overall bicycle experiences more than a low QOS route with a lower demand.

The main limitations of the presented case study are that no site visits were conducted and that real-world bicycle travel demands were not utilized. Assumptions were made for several service measures, and therefore the results may vary if more realistic datasets are incorporated. Thus, it is highly recommended in future studies to incorporate these elements to yield a more robust understanding of the network-level cycling experiences.

5 Conclusions and Future Works

Cycling is becoming a viable mode of transport as it generates numerous environmental, economic, and health-related benefits. However, more attention should be given to the level of risk cyclists are exposed to and the level of connectivity cycling facilities provide. In order to comprehensively analyze safety and connectivity, this study proposed a bicycle network-level QOS evaluation methodology. This methodology is constructed in three main parts.

Firstly, the integrated link-level QOS model combines two existing link-level analysis methodologies: BCI and BLOS. How these methodologies were developed, the types of service measures they consider, their limitations in application, and sensitivity analysis to different service measures were studied. The proposed link-level QOS model is built based on the knowledge gained in this process and aims to address the weaknesses of these existing methodologies. The calculation produces a numerical score from 2 to 5 that can be converted into a letter grade.

Secondly, the behavior-based route-level QOS model incorporates human behavior and perception into its analysis. Various hypotheses on how humans interpret an experience based on small parts of it were studied. The hypotheses that were believed to be more relevant to this study was the distance-weighted average hypothesis and the peak rule hypothesis. The former assumes that when travelling on a route, humans remember more vividly recall their perception on the physically longest route, whether positive or negative. The latter suggests that whichever portion of the travel that posed the most negative experience is remembered with the greatest significance. With these ideas in mind, the route-level QOS model in this study combines link-level QOS scores into a route-level QOS score and also proposes an α factor that can be further modified and calibrated in the future. Since the scope of this study is limited and more empirical data were not available, this study leaves more room for the model to be developed further.

Thirdly, a demand-oriented network-level QOS model was proposed to incorporate travel demand as a way to consider the relative importance of the various routes that service the underlying bicycle trips. The core idea behind the construct of this model is that the fundamental goal of a network is to serve the maximum number of users at the highest level of safety and connectivity. Therefore, this model assigns zone-level QOS scores and outputs a single network-level QOS score by weighing the route-level QOS scores proportionally to the travel demand on each route.

The study presented two sets of case studies, one on a single route and one on an entire network, using the data from the City of Kitchener. They demonstrated how the methodology can be used to determine investment directions for low-cost and high-cost infrastructure improvement possibilities. Specifically for the high-cost option, it is important to consider the improvement in the link-level or route-level QOS scores relative to the associated infrastructure improvement costs. Further, the methodology can also test how an anticipated change in demand affects the zone-level and network level QOS scores. Bicycle facility improvements that lead to mode shift and demand increase may seem to be a strictly positive thing; however, if demand is increased on a route that contains links with a poor link-level QOS, the overall zone-level and network-level QOS scores may in fact worsen.

The scope of this study is limited in that it did not incorporate several aspects of bicycling experience. Specifically, intersection QOS and physical bicycle facility treatments were not covered in this study. Since these factors play a role in shaping cyclist behavior and perception, they should be further investigated in future studies. As well, site visits to study areas and confirming the values of various service measures such as heavy vehicle percentage and shoulder width would be beneficial in achieving more accurate results. Lastly, integrating real-world bicycle

trip demand from surveys such as Transportation Tomorrow Survey in Canada would assist in producing more meaningful interpretations as well.

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Appendix A

Roadway Data for Five Example Links

Link	1	2	3	4	5
Link Length (m)	697.462	114.18	482.211	74.538	115.136
Number of Through Lanes	2	2	2	2	2
Parking Occupancy (decimal)	0	0	0	0.5	0.5
Parking Time Limit (min)	-	-	-	60	60
Vehicle Volume (veh/h)	2584	1193	2153	424	205
Outside Lane Width (m)	3.6	3.6	3.6	3.6	3.6
Bicycle Lane Width (m)	0	0	0	0	0
Shoulder Width (m)	1.2	1.2	1.2	1.2	1.2
Heavy Vehicle (decimal)	0.03	0.03	0.03	0	0
Vehicle Speed (km/h)	50	50	50	40	40
Curb Present	Yes	Yes	Yes	Yes	Yes
Median Present	Yes	No	Yes	No	No
Pavement Condition	3	3	3	3	3
Roadside Development	Other	Other	Other	Residential	Residential
Proportion of Right-Turning Vehicles	0.333	0.333	0.333	0.333	0.333
BCI Score	5.090	3.421	4.573	2.020	1.757
BCI Letter Grade	E	D	E	B	B
BLOS Score	4.161	3.769	4.068	3.839	3.471
BLOS Letter Grade	D	D	D	D	C

Appendix B

Route-Level Application: Roadway Data

Object ID	Road Segment ID	Street	From_Street	To_Street	Lanes	Road Class	Median (Y/N)	Subcategory	Shoulder	Flow Direction	Surface Layer Type	Speed Limit	Truck Access	AADT	AADT Year	AADT Type	Shape Length
56589	6631	KING ST W	QUEEN ST S	ONTARIO ST S	2	Arterial	NO	MAJOR	PAVED	TwoWay	PAVED	50	NO ACCESS	9,554	2014	24 HR AADT	117.498
55935	6698	KING ST W	ONTARIO ST S	YOUNG ST	2	Arterial	NO	MAJOR	PAVED	TwoWay	PAVED	50	NO ACCESS	8,220	2012	24 HR AADT	161.055
56590	6668	KING ST W	YOUNG ST	GAUKEL ST	2	Arterial	NO	MAJOR	PAVED	TwoWay	PAVED	50	NO ACCESS	10,000	2003	ESTIMATE	32.743
56654	6671	KING ST W	GAUKEL ST	COLLEGE ST	2	Arterial	NO	MAJOR	PAVED	TwoWay	PAVED	50	NO ACCESS	10,000	2003	ESTIMATE	79.946
56638	8919	KING ST W	COLLEGE ST	WATER ST S	2	Arterial	NO	MAJOR	PAVED	TwoWay	PAVED	50	NO ACCESS	8,966	2014	24 HR AADT	96.729
58777	8939	KING ST W	WATER ST S	FRANCIS ST N	2	Arterial	NO	MAJOR	PAVED	TwoWay	PAVED	50	NO ACCESS	12,000	2003	ESTIMATE	160.829
57054	5901	KING ST W	FRANCIS ST N	VICTORIA ST N	4	Arterial	NO	MAJOR	PAVED	TwoWay	PAVED	50	24HR	9,897	2014	24 HR AADT	155.320
59256	5880	KING ST W	VICTORIA ST N	BREITHAUPT ST	2	Arterial	NO	MAJOR	PAVED	TwoWay	PAVED	50	24HR	20,068	2015	24 HR AADT	258.155
57268	5880	KING ST W	VICTORIA ST N	BREITHAUPT ST	2	Arterial	NO	MAJOR	PAVED	TwoWay	PAVED	50	24HR	20,068	2015	24 HR AADT	258.155
56558	8898	KING ST W	WELLINGTON ST S	LOUISA ST	3	Arterial	NO	MAJOR	PAVED	TwoWay	PAVED	50	24HR	24,968	2015	24 HR AADT	120.673
57267	1746	KING ST W	LOUISA ST	AGNES ST	2	Arterial	NO	MAJOR	PAVED	TwoWay	PAVED	50	24HR	22,102	2015	24 HR AADT	66.158
56221	1776	KING ST W	AGNES ST	ANDREW ST	2	Arterial	NO	MAJOR	PAVED	TwoWay	PAVED	50	24HR	22,195	2015	24 HR AADT	66.375
56038	11061	KING ST W	ANDREW ST	GREEN ST	3	Arterial	NO	MAJOR	PAVED	TwoWay	PAVED	50	24HR	21,661	2015	24 HR AADT	347.594

Appendix C

Network-Level Application: Roadway Data

Object ID	Road Segment ID	Street	From_Street	To_Street	Lanes	Road Class	Median (Y/N)	Shoulder	Speed Limit	Truck Access	AADT	Shape Length
55695	5879	PARK ST	DEVON ST	VICTORIA ST S	2	Collector	NO	PAVED	50	NO ACCESS	5887	213.025
53875	5876	JUBILEE DR	THERESA ST	PARK ST	2	Local Street	NO	PAVED	30	NO ACCESS	8000	95.395
57351	5869	JUBILEE DR	HEINS AVE	THERESA ST	2	Local Street	NO	PAVED	30	NO ACCESS	9337	80.559
53876	5870	JUBILEE DR	WATER ST S	HEINS AVE	2	Local Street	NO	PAVED	30	NO ACCESS	8751	42.083
53877	5873	JUBILEE DR	WATER ST S	WATER ST S	2	Local Street	NO	PAVED	30	NO ACCESS	6933	126.616
53879	5868	JUBILEE DR	DAVID ST	WATER ST S	2	Local Street	NO	PAVED	30	NO ACCESS	6833	189.390
55368	6728	COURTLAND AVE W	COURTLAND AVE E	DAVID ST	2	Local Street	NO	PAVED	50	NO ACCESS	8000	137.592
54809	9169	COURTLAND AVE E	QUEEN ST S	CLEMENS LANE	4	Arterial	NO	PAVED	50	24HR	16130	71.349
55930	9180	COURTLAND AVE E	CLEMENS LANE	BENTON ST	3	Arterial	NO	PAVED	50	24HR	12404	70.945
58811	6610	COURTLAND AVE E	BENTON ST	HEBEL PL	3	Arterial	NO	PAVED	50	24HR	10659	114.546
55929	11293	COURTLAND AVE E	HEBEL PL	PETER ST	2	Arterial	NO	PAVED	50	24HR	10631	114.991
55928	6647	COURTLAND AVE E	PETER ST	CEDAR ST S	2	Arterial	NO	PAVED	50	24HR	13784	201.694
53521	6650	COURTLAND AVE E	CEDAR ST S	MADISON AVE S	2	Arterial	NO	PAVED	50	24HR	14894	128.286
59075	11607	COURTLAND AVE E	MADISON AVE S	STIRLING AVE S	4	Arterial	NO	PAVED	50	24HR	12831	140.245
57661	11390	COURTLAND AVE E	STIRLING AVE S	STIRLING AVE S	4	Arterial	NO	PAVED	50	24HR	21822	51.616
58881	11382	COURTLAND AVE E	STIRLING AVE S	VERNON AVE	3	Arterial	NO	PAVED	50	24HR	12337	102.949
58927	11373	COURTLAND AVE E	VERNON AVE	PALMER AVE	2	Arterial	NO	PAVED	50	24HR	12165	94.348
57861	11661	COURTLAND AVE E	PALMER AVE	KENT AVE	2	Arterial	NO	PAVED	50	24HR	11994	177.065
57024	6899	COURTLAND AVE E	KENT AVE	BORDEN AVE S	2	Arterial	NO	PAVED	50	24HR	11706	189.170
56817	6894	COURTLAND AVE E	BORDEN AVE S	GRENVILLE AVE	2	Arterial	NO	PAVED	50	24HR	11219	96.932
56850	6888	COURTLAND AVE E	GRENVILLE AVE	OTTAWA ST S	3	Arterial	NO	PAVED	50	24HR	10544	91.063
56864	6886	OTTAWA ST S	COURTLAND AVE E	LILAC ST	3	Arterial	NO	PAVED	50	24HR	13697	86.996
54548	6890	OTTAWA ST S	LILAC ST	ACACIA ST	2	Arterial	NO	PAVED	50	24HR	13452	137.164
55624	10901	OTTAWA ST S	ACACIA ST	MILL ST	3	Arterial	NO	PAVED	50	24HR	13205	81.430
58131	11457	OTTAWA ST S	MILL ST	MILL ST	4	Arterial	NO	PAVED	50	24HR	16153	43.410
58130	11449	OTTAWA ST S	MILL ST	PATTANDON AVE	4	Arterial	NO	PAVED	50	24HR	18222	52.690
55914	10877	OTTAWA ST S	PATTANDON AVE	HOFFMAN ST	4	Arterial	NO	PAVED	50	24HR	17504	211.713
57499	11743	OTTAWA ST S	HOFFMAN ST	KEHL ST	4	Arterial	NO	PAVED	50	24HR	16417	294.531
58491	11639	OTTAWA ST S	KEHL ST	IMPERIAL DR	4	Arterial	NO	PAVED	50	24HR	15039	76.425
54058	11747	OTTAWA ST S	IMPERIAL DR	C_PKY WAT ONRAMP	4	Arterial	YES	PAVED	50	24HR	22154	159.119
54059	11761	OTTAWA ST S	C_PKY WAT ONRAMP	HOMER WATSON BLVD	6	Arterial	YES	PAVED	50	24HR	25137	76.108
55964	10839	OTTAWA ST S	HOMER WATSON BLVD	ALPINE RD	6	Arterial	YES	NONE	50	24HR	29227	134.788
58492	11628	OTTAWA ST S	ALPINE RD	STRASBURG RD	6	Arterial	NO	PAVED	50	24HR	24565	428.425
58640	8767	VICTORIA ST S	PARK ST	HENRY ST	5	Arterial	NO	PAVED	50	24HR	20104	83.478
58912	8763	VICTORIA ST S	HENRY ST	WALNUT ST	3	Arterial	NO	PAVED	50	24HR	19935	98.012
55566	8536	VICTORIA ST S	WALNUT ST	STRANGE ST	4	Arterial	NO	PAVED	50	24HR	19765	222.224
56381	8689	VICTORIA ST S	STRANGE ST	PATRICIA AVE	4	Arterial	NO	PAVED	50	24HR	19596	295.170
57039	8684	VICTORIA ST S	PATRICIA AVE	BELMONT AVE W	4	Arterial	NO	PAVED	50	24HR	16892	271.864
56433	1717	VICTORIA ST S	BELMONT AVE W	LAWRENCE AVE	3	Arterial	NO	PAVED	50	24HR	18185	246.471
56774	1720	VICTORIA ST S	LAWRENCE AVE	ALICE AVE	4	Arterial	NO	PAVED	50	24HR	19252	120.907
54564	8631	VICTORIA ST S	ALICE AVE	PAULANDER DR	4	Arterial	NO	PAVED	50	24HR	18872	205.677
57303	8515	VICTORIA ST S	PAULANDER DR	WEICHEL ST	4	Arterial	NO	PAVED	50	24HR	19820	164.245
56584	1726	VICTORIA ST S	WEICHEL ST	WESTMOUNT RD W	5	Arterial	NO	PAVED	50	24HR	22475	115.434
56818	9373	COURTLAND AVE E	OTTAWA ST S	SYDNEY ST S	3	Arterial	NO	PAVED	50	24HR	9353	196.764
54547	9387	COURTLAND AVE E	SYDNEY ST S	BEDFORD RD	2	Arterial	NO	PAVED	50	24HR	9764	207.368
56862	11454	COURTLAND AVE E	BEDFORD RD	MILL ST	3	Arterial	NO	PAVED	50	24HR	16623	9.514
52893	11451	COURTLAND AVE E	MILL ST	CARWOOD AVE	4	Arterial	NO	PAVED	50	24HR	16433	204.267

Object ID	Road Segment ID	Street	From_Street	To_Street	Lanes	Road Class	Median (Y/N)	Shoulder	Speed Limit	Truck Access	AADT	Shape Length
57498	11450	COURTLAND AVE E	CARWOOD AVE	C_PKY STR OFFRAMP	5	Arterial	NO	PAVED	50	24HR	16106	180.954
57610	11521	COURTLAND AVE E	C_PKY STR OFFRAMP	C_PKY STR ONRAMP	5	Arterial	NO	PAVED	50	24HR	21527	15.566
53958	11445	COURTLAND AVE E	C_PKY STR ONRAMP	C_PKY STR ONRAMP	4	Arterial	NO	PAVED	50	24HR	20039	97.423
53025	10886	COURTLAND AVE E	C_PKY WAT OFFRAMP	OVERLAND DR	5	Arterial	NO	PAVED	50	24HR	20039	118.477
54897	10863	COURTLAND AVE E	OVERLAND DR	WALTON AVE	6	Arterial	NO	PAVED	50	24HR	25834	235.245
58701	10747	COURTLAND AVE E	WALTON AVE	HAYWARD AVE	4	Arterial	NO	PAVED	50	24HR	23397	117.600
59136	9416	COURTLAND AVE E	HAYWARD AVE	HILLMOUNT ST	5	Arterial	NO	PAVED	50	24HR	24181	385.603
54077	103944	COURTLAND AVE E	HILLMOUNT ST	BLOCK LINE RD	5	Arterial	NO	PAVED	60	24HR	26824	187.219
54075	10093	COURTLAND AVE E	BLOCK LINE RD	SHELLEY DR	6	Arterial	NO	PAVED	50	24HR	24965	256.802
53709	10103	COURTLAND AVE E	SHELLEY DR	SIEBERT AVE	5	Arterial	NO	PAVED	50	24HR	25145	145.186
54896	10099	COURTLAND AVE E	SIEBERT AVE	BALZER RD	5	Arterial	NO	PAVED	50	24HR	31777	249.149
58368	21835	COURTLAND AVE E	BALZER RD	MANITOU DR	7	Arterial	NO	PAVED	50	24HR	27591	143.351
58396	1724	VICTORIA ST S	WESTMOUNT RD W	VICMOUNT DR	5	Arterial	NO	PAVED	50	24HR	18931	213.129
58343	1729	VICTORIA ST S	VICMOUNT DR	HAZELGLEN DR	4	Arterial	NO	PAVED	50	24HR	20442	48.243
54362	6098	VICTORIA ST S	HAZELGLEN DR	MONTE CARLO ST	4	Arterial	NO	PAVED	50	24HR	18601	205.860
57388	20631	VICTORIA ST S	MONTE CARLO ST	FISCHER HALLMAN RD	5	Arterial	NO	PAVED	50	24HR	17868	264.743
57387	20652	FISCHER HALLMAN RD	VICTORIA ST S	BANKSIDE DR	6	Arterial	YES	PAVED	60	24HR	24237	354.000
59115	20736	FISCHER HALLMAN RD	BANKSIDE DR	HIGHLAND RD W	5	Arterial	YES	PAVED	60	24HR	19691	246.037
59114	5601	FISCHER HALLMAN RD	HIGHLAND RD W	QUEENS BLVD	5	Arterial	YES	PAVED	50	24HR	22805	363.091
58397	6174	FISCHER HALLMAN RD	QUEENS BLVD	SUMMIT AVE	5	Arterial	YES	PAVED	50	24HR	26473	187.597
54565	6180	FISCHER HALLMAN RD	SUMMIT AVE	FOREST HILL DR	5	Arterial	YES	PAVED	50	24HR	20351	331.539
58085	6137	FISCHER HALLMAN RD	FOREST HILL DR	MCGARRY DR	5	Arterial	NO	PAVED	50	24HR	25216	173.881
53820	6143	FISCHER HALLMAN RD	MCGARRY DR	C_PKY STR ONRAMP	5	Arterial	NO	PAVED	50	24HR	29687	414.094
52961	6296	FISCHER HALLMAN RD	C_PKY WAT ONRAMP	C_PKY WAT ONRAMP	5	Arterial	NO	PAVED	50	24HR	28238	94.310
55076	6149	FISCHER HALLMAN RD	C_PKY STR ONRAMP	C_PKY STR OFFRAMP	6	Arterial	NO	PAVED	50	24HR	22429	9.411
58603	6303	FISCHER HALLMAN RD	C_PKY WAT OFFRAMP	OTTAWA ST S	7	Arterial	NO	PAVED	50	24HR	41099	176.744
55753	9503	OTTAWA ST S	FISCHER HALLMAN RD	INTERNATIONAL PL	5	Arterial	NO	PAVED	50	24HR	13439	630.408
54345	8774	VICTORIA ST S	THERESA ST	PARK ST	5	Arterial	NO	PAVED	50	24HR	20274	73.971
58148	8793	VICTORIA ST S	BRAMM ST	THERESA ST	4	Arterial	NO	PAVED	50	24HR	20442	69.628
58149	8791	VICTORIA ST S	MICHAEL ST	BRAMM ST	4	Arterial	NO	PAVED	50	24HR	20612	16.729
58342	1691	VICTORIA ST S	GARMENT ST	MICHAEL ST	4	Arterial	NO	PAVED	50	24HR	20781	62.456
78084	604291	VICTORIA ST S	OAK ST	GARMENT ST	4	Arterial	NO	PAVED	50	NO ACCESS	1000	43.232
58150	8798	VICTORIA ST S	ARTHUR PL	OAK ST	4	Arterial	NO	PAVED	50	24HR	20951	26.468
53719	8788	VICTORIA ST S	JOSEPH ST	ARTHUR PL	5	Arterial	NO	PAVED	50	24HR	21120	78.125
59091	8787	VICTORIA ST S	CHARLES ST W	JOSEPH ST	5	Arterial	NO	PAVED	50	24HR	21085	128.650
59243	8923	VICTORIA ST S	HALLS LANE W	CHARLES ST W	4	Arterial	NO	PAVED	50	24HR	19306	55.411
55534	9033	VICTORIA ST S	KING ST W	HALLS LANE W	4	Arterial	NO	PAVED	50	24HR	17527	58.907
57312	5898	VICTORIA ST N	KING ST W	DUKE ST W	5	Arterial	NO	PAVED	50	24HR	14774	251.991
52996	7052	VICTORIA ST N	DUKE ST W	WEBER ST W	5	Arterial	NO	PAVED	50	24HR	20911	179.751
53264	7053	WEBER ST W	HEIT LANE	VICTORIA ST N	5	Arterial	NO	PAVED	50	7-7 MON-FRI	18559	64.895
53260	7055	WEBER ST W	WATER ST N	HEIT LANE	4	Arterial	NO	PAVED	50	7-7 MON-FRI	18733	31.741
55369	6666	WEBER ST W	COLLEGE ST	WATER ST N	4	Arterial	NO	PAVED	50	7-7 MON-FRI	19928	105.647
58989	6492	WEBER ST W	YOUNG ST	COLLEGE ST	4	Arterial	NO	PAVED	50	7-7 MON-FRI	19703	111.870
57525	6479	WEBER ST W	ONTARIO ST N	YOUNG ST	4	Arterial	NO	PAVED	50	7-7 MON-FRI	19478	168.674
58596	6766	WEBER ST W	QUEEN ST N	ONTARIO ST N	4	Arterial	NO	PAVED	50	7-7 MON-FRI	19254	121.795
58222	6770	WEBER ST E	QUEEN ST N	FREDERICK ST	5	Arterial	NO	PAVED	50	7-7 MON-FRI	19029	125.407
58598	6759	WEBER ST E	FREDERICK ST	SCOTT ST	5	Arterial	NO	PAVED	50	7-7 MON-FRI	18804	155.076

Object ID	Road Segment ID	Street	From_Street	To_Street	Lanes	Road Class	Median (Y/N)	Shoulder	Speed Limit	Truck Access	AADT	Shape Length
58990	6879	WEBER ST E	SCOTT ST	KRUG ST	4	Arterial	NO	PAVED	50	7-7 MON-FRI	18579	270.698
58615	6885	WEBER ST E	KRUG ST	MADISON AVE N	4	Arterial	NO	PAVED	50	7-7 MON-FRI	18354	127.385
53939	6863	WEBER ST E	MADISON AVE N	CAMERON ST N	4	Arterial	NO	PAVED	50	7-7 MON-FRI	18130	125.207
53940	6859	WEBER ST E	CAMERON ST N	BETZNER AVE N	4	Arterial	NO	PAVED	50	7-7 MON-FRI	17905	98.276
56893	6846	WEBER ST E	BETZNER AVE N	PANDORA AVE N	4	Arterial	NO	PAVED	50	7-7 MON-FRI	17680	86.975
58299	9859	WEBER ST E	PANDORA AVE N	FAIRVIEW AVE	4	Arterial	NO	PAVED	50	7-7 MON-FRI	17455	90.581
58672	9846	WEBER ST E	FAIRVIEW AVE	STIRLING AVE N	4	Arterial	NO	PAVED	50	7-7 MON-FRI	17231	88.304
58298	10164	WEBER ST E	STIRLING AVE N	SIMEON ST	4	Arterial	NO	PAVED	50	7-7 MON-FRI	17006	172.143
52824	10165	WEBER ST E	SIMEON ST	SIMEON ST	4	Arterial	NO	PAVED	50	7-7 MON-FRI	15000	175.103
58297	10178	WEBER ST E	BORDEN AVE N	ONWARD AVE	4	Arterial	NO	PAVED	50	7-7 MON-FRI	16836	96.569
58614	10185	WEBER ST E	ONWARD AVE	EAST AVE	4	Arterial	NO	PAVED	50	7-7 MON-FRI	16892	222.535
52828	10189	WEBER ST E	EAST AVE	EAST AVE	5	Arterial	NO	PAVED	50	7-7 MON-FRI	16947	32.610
57524	10182	WEBER ST E	EAST AVE	OTTAWA ST N	5	Arterial	NO	PAVED	50	7-7 MON-FRI	16947	20.287
56571	11704	WEBER ST E	OTTAWA ST N	SYDNEY ST N	5	Arterial	NO	PAVED	50	7-7 MON-FRI	17002	122.042
59120	11705	WEBER ST E	SYDNEY ST N	SHELDON AVE N	4	Arterial	NO	PAVED	50	7-7 MON-FRI	17058	129.245
56572	10143	WEBER ST E	SHELDON AVE N	RAYMOND RD	4	Arterial	NO	PAVED	50	7-7 MON-FRI	17113	107.369
56568	10142	WEBER ST E	RAYMOND RD	EDMUND RD	4	Arterial	NO	PAVED	50	7-7 MON-FRI	17169	101.117
56569	11675	WEBER ST E	EDMUND RD	JACKSON AVE	4	Arterial	NO	PAVED	50	7-7 MON-FRI	17224	101.306
52829	10015	WEBER ST E	JACKSON AVE	MONTGOMERY RD	4	Arterial	NO	PAVED	50	7-7 MON-FRI	17279	431.494
58483	13270	WEBER ST E	MONTGOMERY RD	SHANTZ LANE	4	Arterial	NO	PAVED	50	7-7 MON-FRI	16730	225.136
57049	10030	WEBER ST E	SHANTZ LANE	ROSS AVE	4	Arterial	NO	PAVED	50	7-7 MON-FRI	16236	91.685
53646	13158	WEBER ST E	ROSS AVE	WILFRED AVE	4	Arterial	NO	PAVED	50	7-7 MON-FRI	15741	139.461
58568	13156	WEBER ST E	WILFRED AVE	EMERALD AVE	4	Arterial	NO	PAVED	50	7-7 MON-FRI	15247	91.609
54369	10038	WEBER ST E	EMERALD AVE	DELLROY AVE	4	Arterial	NO	PAVED	50	7-7 MON-FRI	14753	89.440
54370	13146	WEBER ST E	DELLROY AVE	EULER AVE	4	Arterial	NO	PAVED	50	7-7 MON-FRI	14930	89.029
54371	13145	WEBER ST E	EULER AVE	BROADVIEW AVE	5	Arterial	NO	PAVED	50	7-7 MON-FRI	15108	88.270
59056	10993	WEBER ST E	BROADVIEW AVE	FRANKLIN ST N	5	Arterial	NO	PAVED	50	7-7 MON-FRI	15290	144.193
53289	10963	WEBER ST E	FRANKLIN ST N	PINECREST DR	5	Arterial	NO	PAVED	50	7-7 MON-FRI	20330	86.260
56776	13144	WEBER ST E	PINECREST DR	ARLINGTON BLVD	5	Arterial	NO	PAVED	50	7-7 MON-FRI	20548	87.505
53742	10991	WEBER ST E	ARLINGTON BLVD	FERGUS AVE	5	Arterial	NO	PAVED	50	7-7 MON-FRI	20765	342.363
57349	22350	WEBER ST E	FERGUS AVE	KINZIE AVE	5	Arterial	NO	PAVED	50	7-7 MON-FRI	23134	325.599
54310	22330	WEBER ST E	KINZIE AVE	KING ST E	5	Arterial	NO	PAVED	50	7-7 MON-FRI	20346	231.651
54047	12115	KING ST E	KING ST BYPASS OFFRAMP	KINGSBURY DR	6	Arterial	NO	PAVED	50	24HR	26267	150.463
55917	12119	KING ST E	KINGSBURY DR	MORGAN AVE	5	Arterial	NO	PAVED	50	24HR	25524	32.821
56673	12116	KING ST E	MORGAN AVE	FAIRWAY RD N	6	Arterial	NO	PAVED	50	24HR	22263	178.839
54494	11079	VICTORIA ST N	WEBER ST W	WATER ST N	5	Arterial	NO	PAVED	50	24HR	14540	162.896
54028	40174	VICTORIA ST N	WATER ST N	AHRENS ST W	4	Arterial	NO	PAVED	50	24HR	14540	13.631
58951	6659	VICTORIA ST N	AHRENS ST W	AHRENS ST W	4	Arterial	NO	PAVED	50	24HR	21586	31.798
54554	6662	VICTORIA ST N	AHRENS ST W	MARGARET AVE	5	Arterial	NO	PAVED	50	24HR	21762	211.878
58457	6780	VICTORIA ST N	MARGARET AVE	ELLEN ST W	5	Arterial	NO	PAVED	50	24HR	23177	140.463
57443	6787	VICTORIA ST N	ELLEN ST W	ST LEGER ST	5	Arterial	NO	PAVED	50	24HR	22732	159.880
56553	6958	VICTORIA ST N	ST LEGER ST	HERMIE PL	5	Arterial	NO	PAVED	50	24HR	22014	213.228
57219	6968	VICTORIA ST N	HERMIE PL	LANCASTER ST W	5	Arterial	NO	PAVED	50	24HR	23226	65.179
59066	7046	LANCASTER ST W	VICTORIA ST N	BREITHAUPT ST	4	Arterial	NO	PAVED	50	24HR	14115	147.268
59065	11114	LANCASTER ST W	BREITHAUPT ST	BREITHAUPT ST	4	Arterial	NO	PAVED	50	24HR	17656	51.847
53634	7042	LANCASTER ST W	BREITHAUPT ST	WELLINGTON ST N	4	Arterial	NO	PAVED	50	24HR	17415	71.093
58564	7036	LANCASTER ST W	WELLINGTON ST N	LOUISA ST	3	Arterial	NO	PAVED	50	24HR	17758	123.127

Object ID	Road Segment ID	Street	From_Street	To_Street	Lanes	Road Class	Median (Y/N)	Shoulder	Speed Limit	Truck Access	AADT	Shape Length
58038	7041	LANCASTER ST W	LOUISA ST	HILLVIEW ST	2	Arterial	NO	PAVED	50	24HR	15064	96.374
53099	6961	LANCASTER ST W	HILLVIEW ST	HILL ST	2	Arterial	NO	PAVED	50	24HR	14922	132.055
53098	12646	LANCASTER ST W	HILL ST	GUELPH ST	3	Arterial	NO	PAVED	50	24HR	14783	171.802
56041	10483	LANCASTER ST W	GUELPH ST	ARNOLD ST	2	Arterial	NO	PAVED	50	24HR	12678	253.614
53096	10485	LANCASTER ST W	ARNOLD ST	ELIZABETH ST	2	Arterial	NO	PAVED	50	24HR	12850	69.323
57080	10487	LANCASTER ST W	ELIZABETH ST	CLIFTON RD	2	Arterial	NO	PAVED	50	24HR	12582	27.858
58331	10389	LANCASTER ST W	CLIFTON RD	ASH ST	2	Arterial	NO	PAVED	50	24HR	14214	56.418
57143	10381	LANCASTER ST W	ASH ST	UNION ST	2	Arterial	NO	PAVED	50	24HR	14076	221.163
55683	6953	LANCASTER ST W	UNION ST	C_PKY STR OFFRAMP	4	Arterial	NO	PAVED	50	24HR	15480	98.787
56965	6985	LANCASTER ST W	C_PKY WAT ONRAMP	C_PKY STR OFFRAMP	4	Arterial	NO	PAVED	50	24HR	23451	188.289
54972	12419	LANCASTER ST W	C_PKY WAT ONRAMP	HAMEL AVE	4	Arterial	NO	PAVED	50	24HR	16665	175.651
54971	12415	LANCASTER ST W	HAMEL AVE	BRIDGEPORT RD	4	Arterial	NO	PAVED	50	24HR	11848	150.168
59070	10766	HOMER WATSON BLVD	OTTAWA ST S	HANSON AVE	5	Arterial	YES	PAVED	70	24HR	34914	608.822
54229	10944	HOMER WATSON BLVD	HANSON AVE	BLOCK LINE RD	4	Arterial	YES	PAVED	50	24HR	27150	695.316
54230	9611	HOMER WATSON BLVD	BLOCK LINE RD	BLEAMS RD	5	Arterial	YES	PAVED	70	24HR	26448	1178.693
59041	21862	HOMER WATSON BLVD	BLEAMS RD	BEASLEY DR	6	Arterial	YES	PAVED	70	24HR	23511	548.731
59042	21808	HOMER WATSON BLVD	BEASLEY DR	HOMER WATSON OFFRAMP	6	Arterial	YES	PAVED	70	24HR	24029	193.438
59043	25666	HOMER WATSON BLVD	HOMER WATSON OFFRAMP	HOMER WATSON ONRAMP	4	Arterial	YES	PAVED	70	24HR	28662	602.619
59044	21992	HOMER WATSON BLVD	HOMER WATSON ONRAMP	DOON VILLAGE RD	6	Arterial	YES	PAVED	70	24HR	24430	232.906
55821	21996	DOON VILLAGE RD	HOMER WATSON BLVD	MILLWOOD CRES	4	Collector	NO	PAVED	50	NO ACCESS	15000	124.549
56337	21937	DOON VILLAGE RD	MILLWOOD CRES	UPPER CANADA DR	4	Collector	NO	PAVED	50	NO ACCESS	15000	92.566
56085	22006	DOON VILLAGE RD	UPPER CANADA DR	MILLWOOD CRES	4	Collector	NO	PAVED	50	NO ACCESS	10298	58.011
55823	21939	DOON VILLAGE RD	MILLWOOD CRES	PIONEER DR	4	Collector	NO	PAVED	50	NO ACCESS	11993	166.822
53653	1696	BELMONT AVE W	JACK AVE	VICTORIA ST S	4	Collector	NO	PAVED	50	24HR	10000	117.374
54864	8518	BELMONT AVE W	EDGEWOOD DR	JACK AVE	4	Collector	NO	PAVED	50	24HR	10000	28.968
56546	8651	BELMONT AVE W	SANDRA AVE	EDGEWOOD DR	4	Collector	NO	PAVED	50	24HR	7278	66.790
54772	8649	BELMONT AVE W	METZLOFF DR	SANDRA AVE	4	Collector	NO	PAVED	50	24HR	10000	97.272
58127	8635	BELMONT AVE W	BURN PL	METZLOFF DR	4	Collector	NO	PAVED	50	24HR	7486	91.926
56466	8755	BELMONT AVE W	HIGHLAND RD W	BURN PL	4	Collector	NO	PAVED	50	24HR	10000	112.563
54452	8663	HIGHLAND RD W	BELMONT AVE W	ROXBOROUGH AVE	4	Arterial	NO	PAVED	50	24HR	18367	111.849
54453	20988	HIGHLAND RD W	ROXBOROUGH AVE	LAWRENCE AVE	4	Arterial	NO	PAVED	50	24HR	21600	151.146
56094	20964	HIGHLAND RD W	LAWRENCE AVE	BUTLER LANE	4	Arterial	NO	PAVED	50	24HR	21748	115.480
56093	20994	HIGHLAND RD W	BUTLER LANE	WESTMOUNT RD W	5	Arterial	NO	PAVED	50	24HR	20398	298.898
54157	20719	HIGHLAND RD W	WESTMOUNT RD W	HIGHLAND CRES	6	Arterial	YES	PAVED	60	24HR	18945	168.450
57540	20717	HIGHLAND RD W	HIGHLAND CRES	FIELDGATE ST	4	Arterial	NO	PAVED	60	24HR	14183	338.280
59064	20702	HIGHLAND RD W	FIELDGATE ST	EAGEN DR	5	Arterial	NO	PAVED	60	24HR	14113	172.606
58669	20757	HIGHLAND RD W	EAGEN DR	HIGHLAND CRES	5	Arterial	NO	PAVED	60	24HR	14044	163.551
57798	6104	HIGHLAND RD W	HIGHLAND CRES	FISCHER HALLMAN RD	6	Arterial	NO	PAVED	60	24HR	13700	184.851
58037	20737	HIGHLAND RD W	FISCHER HALLMAN RD	WESTHEIGHTS DR	4	Arterial	NO	PARTIALLY GRAVEL	60	24HR	14283	536.632
90562	605989	OTTAWA ST S	STRASBURG RD	HUNTSWORTH AVE	5	Arterial	NO	PAVED	50	NO ACCESS	1000	267.184
53064	6586	OTTAWA ST S	HUNTSWORTH AVE	ELMSDALE DR	5	Arterial	NO	PAVED	50	24HR	19791	276.007
58706	6388	OTTAWA ST S	ELMSDALE DR	HOWLAND DR	4	Arterial	NO	PAVED	50	24HR	19858	276.702
57326	6377	OTTAWA ST S	HOWLAND DR	MOWAT BLVD	4	Arterial	NO	PAVED	50	24HR	18309	96.443
54176	6376	OTTAWA ST S	MOWAT BLVD	WESTMOUNT RD E	5	Arterial	NO	PAVED	50	24HR	19113	276.205
56624	6390	WESTMOUNT RD E	GILMOUR CRES	OTTAWA ST S	5	Arterial	NO	PAVED	50	7-7 MON-FRI	19717	423.900
54417	6605	WESTMOUNT RD E	GILMOUR CRES	GILMOUR CRES	4	Arterial	NO	PAVED	50	7-7 MON-FRI	19591	86.809
57507	6565	WESTMOUNT RD E	STONYBROOK DR	GILMOUR CRES	4	Arterial	NO	PAVED	50	7-7 MON-FRI	19465	111.863

Object ID	Road Segment ID	Street	From_Street	To_Street	Lanes	Road Class	Median (Y/N)	Shoulder	Speed Limit	Truck Access	AADT	Shape Length
55514	6560	WESTMOUNT RD E	VILLAGE RD	STONYBROOK DR	4	Arterial	NO	PAVED	50	7-7 MON-FRI	20550	259.782
53818	6493	WESTMOUNT RD E	GREENBROOK DR	VILLAGE RD	5	Arterial	NO	PAVED	50	7-7 MON-FRI	16469	96.805
53817	6506	WESTMOUNT RD E	EVERGREEN CRES	GREENBROOK DR	5	Arterial	NO	PAVED	50	7-7 MON-FRI	18355	87.806
53787	6508	WESTMOUNT RD E	FOREST HILL DR	EVERGREEN CRES	4	Arterial	NO	PAVED	50	7-7 MON-FRI	19195	270.400
57945	20900	WESTMOUNT RD E	GATEWOOD RD	FOREST HILL DR	4	Arterial	NO	PAVED	50	7-7 MON-FRI	20037	87.764
55915	21000	WESTMOUNT RD E	QUEENS BLVD	GATEWOOD RD	5	Arterial	NO	PAVED	50	7-7 MON-FRI	20877	188.056
54562	6277	WESTMOUNT RD W	QUEENS BLVD	OVERLEA DR	5	Arterial	YES	PAVED	50	7-7 MON-FRI	24620	338.380
56095	20991	WESTMOUNT RD W	OVERLEA DR	HIGHLAND RD W	6	Arterial	YES	PAVED	50	7-7 MON-FRI	23253	120.110
55630	20989	WESTMOUNT RD W	HIGHLAND RD W	VICMOUNT DR	6	Arterial	NO	PAVED	60	7-7 MON-FRI	21886	531.551
55704	6168	WESTMOUNT RD W	VICMOUNT DR	VICTORIA ST S	5	Arterial	NO	PAVED	60	7-7 MON-FRI	21183	167.835
55912	10824	STRASBURG RD	OTTAWA ST S	KINGSWOOD DR	4	Arterial	NO	PAVED	50	NO ACCESS	9256	246.602
57358	10836	STRASBURG RD	KINGSWOOD DR	BARWOOD CRES	4	Arterial	NO	PAVED	50	NO ACCESS	10000	28.224
57359	10825	STRASBURG RD	BARWOOD CRES	BARWOOD CRES	4	Arterial	NO	PAVED	50	NO ACCESS	10394	188.857
55918	10834	STRASBURG RD	BARWOOD CRES	SELKIRK DR	4	Arterial	NO	PAVED	50	NO ACCESS	10231	187.137
55916	10815	STRASBURG RD	SELKIRK DR	BLACKHORNE DR	4	Arterial	NO	PAVED	50	NO ACCESS	10296	192.727
55913	10812	STRASBURG RD	BLACKHORNE DR	BLOCK LINE RD	4	Arterial	NO	PAVED	50	NO ACCESS	9645	143.435
58018	10915	BLOCK LINE RD	STRASBURG RD	COUNTRY HILL DR	4	Arterial	NO	PAVED	50	NO ACCESS	10450	374.928
57304	10918	BLOCK LINE RD	COUNTRY HILL DR	KINGSWOOD DR	4	Arterial	NO	PAVED	50	NO ACCESS	11322	215.069
55689	10928	BLOCK LINE RD	KINGSWOOD DR	HOMER WATSON BLVD	2	Arterial	NO	PAVED	50	NO ACCESS	11589	178.442
55690	600353	BLOCK LINE RD	HOMER WATSON BLVD	FALLOWFIELD DR	4	Arterial	NO	PAVED	50	NO ACCESS	4226	183.180
55631	600915	BLOCK LINE RD	FALLOWFIELD DR	LENNOX LEWIS WAY	4	Arterial	NO	PAVED	50	NO ACCESS	4230	358.988
55632	103019	BLOCK LINE RD	LENNOX LEWIS WAY	COURTLAND AVE E	4	Arterial	NO	PAVED	50	NO ACCESS	50	270.826
58431	6389	OTTAWA ST S	WESTMOUNT RD E	PINEDALE DR	5	Arterial	NO	PAVED	50	24HR	20580	213.367
58430	6399	OTTAWA ST S	PINEDALE DR	HOWE DR	4	Arterial	NO	PAVED	50	24HR	20056	137.890
53026	6256	OTTAWA ST S	HOWE DR	WILLIAMSBURG RD	4	Arterial	NO	PAVED	60	24HR	18524	188.681
57088	6292	OTTAWA ST S	WILLIAMSBURG RD	VALLEYVIEW RD	4	Arterial	NO	PAVED	60	24HR	18129	164.702
57087	6306	OTTAWA ST S	VALLEYVIEW RD	NINE PINES RD	4	Arterial	NO	PAVED	60	24HR	20540	79.165
58900	6410	OTTAWA ST S	NINE PINES RD	FISCHER HALLMAN RD	6	Arterial	NO	PAVED	60	24HR	18236	102.591
56216	11763	HOMER WATSON BLVD	C_PKY STR ONRAMP	OTTAWA ST S	4	Arterial	YES	NONE	60	7-7 MON-SUN	25524	310.133
57186	40083	HOMER WATSON BLVD	C_PKY STR OFFRAMP	C_PKY STR ONRAMP	4	Arterial	YES	PAVED	60	7-7 MON-SUN	16086	220.505
53460	40082	HOMER WATSON BLVD	HOFFMAN ST	C_PKY STR OFFRAMP	4	Arterial	YES	PAVED	60	7-7 MON-SUN	18193	64.600
53613	11424	HOFFMAN ST	HIGHLAND RD E	HOMER WATSON BLVD	2	Arterial	NO	PAVED	50	7-7 MON-SUN	6969	176.649
53612	11419	HIGHLAND RD E	HEIMAN ST	HOFFMAN ST	3	Arterial	NO	PAVED	50	7-7 MON-SUN	7458	354.803
57180	11340	HIGHLAND RD E	MAUSSER AVE	HEIMAN ST	3	Arterial	NO	PAVED	50	7-7 MON-SUN	6953	258.645
56272	6314	HIGHLAND RD E	STIRLING AVE S	MAUSSER AVE	3	Arterial	NO	PAVED	50	7-7 MON-SUN	7000	108.733
57181	6719	HIGHLAND RD E	DELAWARE AVE	STIRLING AVE S	2	Arterial	NO	PAVED	50	7-7 MON-SUN	8617	188.568
56032	6723	HIGHLAND RD E	SPADINA RD E	DELAWARE AVE	2	Arterial	NO	PAVED	50	7-7 MON-SUN	7030	141.347
56033	6433	HIGHLAND RD E	RUBY ST	SPADINA RD E	2	Arterial	NO	PAVED	50	7-7 MON-SUN	10346	294.330
57377	5722	HIGHLAND RD E	WINSLOW DR	RUBY ST	2	Arterial	NO	PAVED	50	7-7 MON-SUN	13000	78.565
56214	5729	HIGHLAND RD E	QUEENS BLVD	WINSLOW DR	2	Arterial	NO	PAVED	50	7-7 MON-SUN	13000	96.764
59214	5725	HIGHLAND RD W	QUEENS BLVD	GARDEN AVE	2	Arterial	NO	PAVED	50	24HR	15131	141.924
58889	8664	HIGHLAND RD W	GARDEN AVE	WEST AVE	3	Arterial	NO	PAVED	50	24HR	18158	178.913
52854	1702	WEST AVE	HIGHLAND RD W	BROCK ST	2	Collector	NO	PAVED	50	NO ACCESS	3900	81.466
54502	1701	WEST AVE	BROCK ST	HOMEWOOD AVE	2	Collector	NO	PAVED	50	NO ACCESS	3709	154.383
57222	8534	WEST AVE	HOMEWOOD AVE	VICTORIA ST S	2	Collector	NO	PAVED	50	NO ACCESS	3856	345.477
53770	10714	FAIRWAY RD S	WILSON AVE	MANITOU DR	5	Arterial	NO	PAVED	60	24HR	30322	908.648
55327	600416	FAIRWAY RD S	WABANAKI DR	WILSON AVE	6	Arterial	YES	PAVED	50	24HR	28698	482.211

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55326	22103	FAIRWAY RD S	KING ST BYPASS OFFRAMP	WABANAKI DR	6	Arterial	YES	PAVED	60	24HR	31028	294.788
53241	22107	FAIRWAY RD S	KING ST BYPASS ONRAMP	KING ST BYPASS OFFRAMP	5	Arterial	NO	PAVED	60	24HR	42120	16.876
58635	22324	FAIRWAY RD S	FAIRWAY RD N	KING ST BYPASS ONRAMP	6	Arterial	NO	PAVED	60	24HR	34928	489.939
58055	6608	BENTON ST	ST GEORGE ST	COURTLAND AVE E	4	Arterial	NO	PAVED	50	24HR	7797	197.430
58101	6707	BENTON ST	CHURCH ST	ST GEORGE ST	4	Arterial	NO	PAVED	50	24HR	3970	131.789
58102	11314	BENTON ST	CHARLES ST E	CHURCH ST	5	Arterial	NO	PAVED	50	24HR	7835	93.833
57764	11322	BENTON ST	HALLS LANE E	CHARLES ST E	4	Arterial	NO	PAVED	50	24HR	7583	38.729
57765	11320	BENTON ST	KING ST E	HALLS LANE E	4	Arterial	NO	PAVED	50	24HR	9629	66.080
53625	6801	FREDERICK ST	KING ST E	GOUDIES LANE	4	Arterial	NO	PAVED	50	24HR	9242	60.625
53626	6802	FREDERICK ST	GOUDIES LANE	DUKE ST E	4	Arterial	NO	PAVED	50	24HR	7840	78.411
56682	6744	FREDERICK ST	DUKE ST E	WEBER ST E	4	Arterial	NO	PAVED	50	7-7 MON-SAT	8470	133.442
54055	6776	FREDERICK ST	WEBER ST E	SPETZ ST	5	Arterial	NO	PAVED	50	7-7 MON-SAT	11543	105.202
54033	6754	FREDERICK ST	SPETZ ST	IRVIN ST	4	Arterial	NO	PAVED	50	7-7 MON-SAT	11643	113.431
57867	6788	FREDERICK ST	IRVIN ST	OTTO ST	4	Arterial	NO	PAVED	50	7-7 MON-SAT	10280	74.124
57868	6750	FREDERICK ST	OTTO ST	LANCASTER ST E	4	Arterial	NO	PAVED	50	7-7 MON-SAT	11842	141.813
56156	11153	LANCASTER ST E	MIEHM PL	FREDERICK ST	2	Arterial	NO	PAVED	50	NO ACCESS	6000	74.995
56608	11136	LANCASTER ST E	CLARENCE PL	MIEHM PL	2	Arterial	NO	PAVED	50	NO ACCESS	6000	35.822
56053	11133	LANCASTER ST E	MANSION ST	CLARENCE PL	2	Arterial	NO	PAVED	50	NO ACCESS	5412	179.664
56054	602203	LANCASTER ST E	MANSION ST	MANSION ST	2	Arterial	NO	PAVED	50	NO ACCESS	7712	18.011
56966	11160	LANCASTER ST E	LUELLA ST	MANSION ST	2	Arterial	NO	PAVED	50	NO ACCESS	5800	80.346
56837	6971	LANCASTER ST E	QUEEN ST N	LUELLA ST	2	Arterial	NO	PAVED	50	NO ACCESS	6218	96.615
56212	6970	LANCASTER ST W	QUEEN ST N	VICTORIA ST N	4	Arterial	NO	PAVED	50	NO ACCESS	9500	63.726
57189	21006	QUEENS BLVD	WESTMOUNT RD E	CECILE DR	4	Arterial	NO	PAVED	50	NO ACCESS	7598	395.922
57188	20720	QUEENS BLVD	CECILE DR	WARREN RD	4	Arterial	NO	PAVED	50	NO ACCESS	5095	113.549
53611	20995	QUEENS BLVD	WARREN RD	KELLY DR	4	Arterial	NO	PAVED	50	NO ACCESS	8652	141.917
57187	20739	QUEENS BLVD	KELLY DR	SILVERSPRING CRES	4	Arterial	NO	PAVED	50	NO ACCESS	8120	36.630
56081	6187	QUEENS BLVD	SILVERSPRING CRES	EAGEN DR	4	Arterial	NO	PAVED	40	NO ACCESS	6606	179.391
53621	6177	QUEENS BLVD	EAGEN DR	BONFAIR CRT	4	Arterial	NO	PAVED	50	NO ACCESS	5213	136.299
53620	6170	QUEENS BLVD	BONFAIR CRT	OVERLEA DR	4	Arterial	NO	PAVED	50	NO ACCESS	8500	49.689
53619	5602	QUEENS BLVD	OVERLEA DR	FISCHER HALLMAN RD	4	Arterial	NO	PAVED	50	NO ACCESS	9716	166.644
57634	5603	QUEENS BLVD	FISCHER HALLMAN RD	ELM RIDGE DR	4	Collector	NO	PAVED	50	NO ACCESS	6118	385.325
59248	5425	QUEENS BLVD	ELM RIDGE DR	WESTHEIGHTS DR	4	Collector	NO	PAVED	50	NO ACCESS	6640	166.980
58831	20732	WESTHEIGHTS DR	BLACKWELL DR	QUEENS BLVD	4	Collector	NO	PAVED	50	NO ACCESS	4291	134.162
57835	20807	WESTHEIGHTS DR	HIGHLAND RD W	BLACKWELL DR	4	Collector	NO	PAVED	50	NO ACCESS	5484	209.666
54241	6573	GREENBROOK DR	FARMBROOK PL	WESTMOUNT RD E	2	Collector	NO	PAVED	50	NO ACCESS	4180	277.682
52982	6249	GREENBROOK DR	FOREST HILL DR	FARMBROOK PL	2	Collector	NO	PAVED	50	NO ACCESS	5410	98.224
55458	6346	GREENBROOK DR	VILLAGE RD	FOREST HILL DR	2	Collector	NO	PAVED	50	NO ACCESS	5769	279.998
58772	6456	GREENBROOK DR	STIRLING AVE S	LAKESIDE DR	2	Collector	NO	PAVED	50	NO ACCESS	5902	212.156
54795	6591	STIRLING AVE S	HOMER WATSON BLVD	GREENBROOK DR	2	Collector	NO	PAVED	50	NO ACCESS	7788	188.201
57562	6590	HOMER WATSON BLVD	STIRLING AVE S	HOFFMAN ST	4	Collector	YES	PAVED	60	NO ACCESS	12614	640.857
53572	1725	WESTMOUNT RD W	VICTORIA ST S	KARN ST	5	Arterial	NO	PAVED	60	7-7 MON-FRI	22714	317.024
56036	1310	WESTMOUNT RD W	KARN ST	CHOPIN DR	5	Arterial	NO	PAVED	60	7-7 MON-FRI	23339	142.488
56035	1307	WESTMOUNT RD W	CHOPIN DR	GAGE AVE	5	Arterial	NO	PAVED	60	7-7 MON-FRI	22250	183.503
56034	1258	WESTMOUNT RD W	GAGE AVE	WESTWOOD DR	5	Arterial	NO	PAVED	60	7-7 MON-FRI	22180	170.058
53051	8722	WESTMOUNT RD W	WESTWOOD DR	GLASGOW ST	4	Arterial	NO	PAVED	60	7-7 MON-FRI	20229	333.883
57301	1243	GLASGOW ST	DUNBAR RD	WESTMOUNT RD W	2	Collector	NO	PAVED	40	NO ACCESS	6750	281.893
53864	1298	GLASGOW ST	AVONDALE AVE	DUNBAR RD	2	Collector	NO	PAVED	50	NO ACCESS	6517	92.510

Object ID	Road Segment ID	Street	From_Street	To_Street	Lanes	Road Class	Median (Y/N)	Shoulder	Speed Limit	Truck Access	AADT	Shape Length
54328	1322	GLASGOW ST	MARINA RD	AVONDALE AVE	2	Collector	NO	PAVED	40	NO ACCESS	10000	36.536
55237	1304	GLASGOW ST	EARL ST	MARINA RD	2	Collector	NO	PAVED	40	NO ACCESS	10000	57.581
53582	1266	GLASGOW ST	BELMONT AVE W	EARL ST	2	Collector	NO	PAVED	40	NO ACCESS	10000	140.479
53581	1252	GLASGOW ST	EDEN AVE	BELMONT AVE W	2	Collector	NO	PAVED	50	NO ACCESS	15770	146.695
59132	1249	GLASGOW ST	YORK ST	EDEN AVE	2	Collector	NO	PAVED	50	NO ACCESS	6879	194.556
53426	8576	GLASGOW ST	PARK ST	YORK ST	2	Collector	NO	PAVED	50	NO ACCESS	7779	258.201
56723	8866	GLASGOW ST	GRUHN ST	PARK ST	2	Collector	NO	PAVED	50	NO ACCESS	5000	76.528
56495	40031	GLASGOW ST	WALTER ST	GRUHN ST	2	Collector	NO	PAVED	50	NO ACCESS	2526	94.658
56432	8865	WALTER ST	AGNES ST	GLASGOW ST	2	Collector	NO	PAVED	50	NO ACCESS	2526	238.563
54842	8899	WALTER ST	WELLINGTON ST S	AGNES ST	2	Collector	NO	PAVED	50	NO ACCESS	3767	178.019
56013	40013	WELLINGTON ST S	KING ST W	WALTER ST	2	Collector	NO	PAVED	50	NO ACCESS	2954	121.246
52939	8900	WELLINGTON ST N	KING ST W	MOORE AVE	2	Collector	NO	PAVED	50	24HR	7175	154.952
58344	8835	WELLINGTON ST N	MOORE AVE	WATERLOO ST	2	Collector	NO	PAVED	50	24HR	3099	181.975
59184	8832	WELLINGTON ST N	WATERLOO ST	DUKE ST W	2	Collector	NO	PAVED	50	24HR	5875	183.375
55104	8830	WELLINGTON ST N	DUKE ST W	WEBER ST W	2	Collector	NO	PAVED	50	24HR	3447	165.855
56280	6676	WELLINGTON ST N	WEBER ST W	AHRENS ST W	2	Collector	NO	PAVED	50	24HR	5229	189.213
52950	6682	WELLINGTON ST N	AHRENS ST W	MARGARET AVE	2	Collector	NO	PAVED	50	24HR	4108	243.264
53788	7019	WELLINGTON ST N	MARGARET AVE	ST LEGER ST	2	Collector	NO	PAVED	50	24HR	4953	302.103
53668	11111	WELLINGTON ST N	ST LEGER ST	MAJOR ST	2	Collector	NO	PAVED	50	24HR	5679	215.975
55999	7043	WELLINGTON ST N	MAJOR ST	LANCASTER ST W	2	Collector	NO	PAVED	50	24HR	5578	112.247
58645	20800	VICTORIA ST S	FISCHER HALLMAN RD	OPRINGTON DR	5	Arterial	NO	PARTIALLY GRAVEL	50	NO ACCESS	11834	350.141
52907	20844	OPRINGTON DR	VICTORIA ST S	BENESFORT DR	2	Collector	NO	PAVED	50	NO ACCESS	2825	137.593
57381	20839	OPRINGTON DR	BENESFORT DR	OPRINGTON CRT	2	Collector	NO	PAVED	50	NO ACCESS	1680	160.632
56996	20521	OPRINGTON DR	OPRINGTON CRT	BANKSIDE DR	2	Collector	NO	PAVED	50	NO ACCESS	1653	83.950
56502	20517	BANKSIDE DR	OPRINGTON DR	EASTFOREST TRAIL	2	Collector	NO	PAVED	50	NO ACCESS	1178	147.937
59235	20501	EASTFOREST TRAIL	HIGHLAND RD W	BANKSIDE DR	3	Collector	NO	PAVED	50	NO ACCESS	3039	249.610
55406	10709	WILSON AVE	KINGSWAY DR	FAIRWAY RD S	4	Collector	NO	PAVED	50	NO ACCESS	11500	165.282
53302	10728	KINGSWAY DR	GREENFIELD AVE	WILSON AVE	3	Collector	NO	PAVED	50	NO ACCESS	9840	304.463
58097	10973	KINGSWAY DR	CEDARWOODS CRES	GREENFIELD AVE	3	Collector	NO	PAVED	50	NO ACCESS	6091	315.068
53551	22334	KINGSWAY DR	ST JEROME AVE	CEDARWOODS CRES	2	Collector	NO	GRAVEL	50	NO ACCESS	6632	846.018
56077	22354	KINGSWAY DR	NINTH AVE	ST JEROME AVE	2	Collector	NO	PAVED	50	NO ACCESS	14000	241.471
57678	10962	KINGSWAY DR	EIGHTH AVE	NINTH AVE	2	Collector	NO	PAVED	50	NO ACCESS	14000	100.417
57677	10850	KINGSWAY DR	FRANKLIN ST S	EIGHTH AVE	2	Collector	NO	PAVED	50	NO ACCESS	12633	90.496
56578	10846	FRANKLIN ST S	KINGSWAY DR	FRANKLIN ST N	3	Collector	NO	PAVED	50	NO ACCESS	14230	54.639
57679	10781	FRANKLIN ST N	WEBER ST E	PROSPECT AVE	2	Collector	NO	PAVED	50	NO ACCESS	5139	179.767
53771	10703	MANITOU DR	COURTLAND AVE E	WEBSTER RD	5	Arterial	NO	PAVED	60	24HR	28353	379.030
58595	21855	MANITOU DR	WEBSTER RD	CRESS LANE	4	Arterial	NO	GRAVEL	60	24HR	26320	46.328
75843	603990	MANITOU DR	CRESS LANE	CONNOR ST	3	Arterial	NO	GRAVEL	50	NO ACCESS	1000	39.798
58238	21854	MANITOU DR	CONNOR ST	BLEAMS RD	4	Arterial	NO	GRAVEL	60	24HR	27821	367.777
54192	21804	MANITOU DR	BLEAMS RD	WABANAKI DR	4	Arterial	NO	GRAVEL	60	24HR	15845	479.675
54193	21823	MANITOU DR	WABANAKI DR	SASAGA DR	5	Arterial	NO	GRAVEL	60	24HR	23737	149.250
58239	21821	MANITOU DR	SASAGA DR	CAYUGA DR	4	Arterial	NO	GRAVEL	60	24HR	25539	616.201
58704	21903	MANITOU DR	CAYUGA DR	HOMER WATSON BLVD	6	Arterial	NO	GRAVEL	60	24HR	25360	256.935
55310	21852	BLEAMS RD	MANITOU DR	OTONABEE DR	4	Arterial	NO	PAVED	50	NO ACCESS	14744	214.377
57607	601242	BLEAMS RD	OTONABEE DR	FALLOWFIELD DR	4	Arterial	NO	PAVED	50	NO ACCESS	16894	438.529
57608	21984	BLEAMS RD	FALLOWFIELD DR	HOMER WATSON BLVD	5	Arterial	NO	PAVED	50	NO ACCESS	16619	331.386
58428	9612	BLEAMS RD	HOMER WATSON BLVD	CENTURY HILL DR	5	Arterial	NO	PAVED	60	7-7 MON-SUN	17507	419.164

Object ID	Road Segment ID	Street	From_Street	To_Street	Lanes	Road Class	Median (Y/N)	Shoulder	Speed Limit	Truck Access	AADT	Shape Length
58834	9679	BLEAMS RD	CENTURY HILL DR	STRASBURG RD	5	Arterial	NO	PAVED	60	7-7 MON-SUN	15560	745.741
55498	9665	BLEAMS RD	STRASBURG RD	COLONY DR	5	Arterial	NO	PAVED	60	7-7 MON-SUN	14689	362.732
55313	9671	BLEAMS RD	COLONY DR	TRILLIUM DR	3	Arterial	NO	GRAVEL	60	7-7 MON-SUN	14457	534.862
55493	9724	BLEAMS RD	TRILLIUM DR	WASHBURN DR	3	Arterial	NO	GRAVEL	60	7-7 MON-SUN	14095	589.471
55312	9723	BLEAMS RD	WASHBURN DR	FISCHER HALLMAN RD	4	Arterial	NO	PARTIALLY GRAVEL	60	7-7 MON-SUN	15639	357.564
56861	9756	FISCHER HALLMAN RD	ROCKWOOD RD	BLEAMS RD	5	Arterial	NO	PARTIALLY GRAVEL	60	24HR	20516	240.828
52885	40196	FISCHER HALLMAN RD	WESTMOUNT RD E	ROCKWOOD RD	6	Arterial	NO	PARTIALLY GRAVEL	50	24HR	20203	321.932
55325	600405	FISCHER HALLMAN RD	COTTON GRASS ST	WESTMOUNT RD E	6	Arterial	NO	PAVED	50	24HR	16075	278.474
55324	40063	FISCHER HALLMAN RD	ACTIVA AVE	COTTON GRASS ST	5	Arterial	NO	PARTIALLY GRAVEL	50	24HR	16228	804.674
56099	21754	FISCHER HALLMAN RD	OTTAWA ST S	ACTIVA AVE	6	Arterial	NO	PAVED	50	24HR	24140	434.870
52889	6302	FISCHER HALLMAN RD	C_PKY WAT ONRAMP	C_PKY WAT OFFRAMP	6	Arterial	NO	PAVED	50	24HR	30616	10.338
54523	20924	QUEENS BLVD	HAHN PL	WESTMOUNT RD E	4	Arterial	NO	PAVED	50	NO ACCESS	12364	151.677
54525	20681	QUEENS BLVD	BLUERIDGE AVE	HAHN PL	4	Arterial	NO	PAVED	50	NO ACCESS	9829	35.405
57363	6341	QUEENS BLVD	BELMONT AVE E	BLUERIDGE AVE	4	Arterial	NO	PAVED	50	NO ACCESS	8147	444.039
55321	20946	BELMONT AVE W	QUEENS BLVD	SPADINA RD W	2	Collector	NO	PAVED	50	NO ACCESS	3900	72.111
53711	20954	BELMONT AVE W	SPADINA RD W	FARNHAM AVE	2	Collector	NO	PAVED	50	NO ACCESS	2762	107.080
53888	20958	BELMONT AVE W	FARNHAM AVE	MARLBOROUGH AVE	2	Collector	NO	PAVED	50	NO ACCESS	2953	203.624
57556	8662	BELMONT AVE W	MARLBOROUGH AVE	HIGHLAND RD W	2	Collector	NO	PAVED	50	NO ACCESS	3900	94.171
57378	20684	QUEENS BLVD	QUEENS BLVD	BELMONT AVE E	4	Arterial	NO	PAVED	50	NO ACCESS	10500	46.265
56390	40134	QUEENS BLVD	SOUTH DR	QUEENS BLVD	2	Arterial	NO	PAVED	50	NO ACCESS	8600	20.520
56090	20948	QUEENS BLVD	BARCLAY AVE	SOUTH DR	2	Arterial	NO	PAVED	50	NO ACCESS	6532	92.147
55969	20940	QUEENS BLVD	PLEASANT AVE	BARCLAY AVE	2	Arterial	NO	PAVED	50	NO ACCESS	6395	73.491
55968	20977	QUEENS BLVD	QUEENS BLVD	PLEASANT AVE	2	Arterial	NO	PAVED	50	NO ACCESS	6275	74.342
54373	1689	QUEENS BLVD	REX DR	QUEENS BLVD	2	Arterial	NO	PAVED	50	NO ACCESS	6150	29.523
54375	1686	QUEENS BLVD	SPADINA RD E	REX DR	2	Arterial	YES	PAVED	50	NO ACCESS	8702	93.239
53614	5716	QUEENS BLVD	HIGHLAND RD E	SPADINA RD E	2	Arterial	YES	PAVED	50	NO ACCESS	7663	217.926
57132	5730	QUEEN ST S	BROCK ST	HIGHLAND RD W	4	Arterial	NO	PAVED	50	24HR	15742	99.380
56907	5734	QUEEN ST S	WOODSIDE AVE	BROCK ST	3	Arterial	NO	PAVED	50	24HR	16241	54.671
57664	5735	QUEEN ST S	HOMEWOOD AVE	WOODSIDE AVE	3	Arterial	NO	PAVED	50	24HR	16739	29.676
57946	5739	QUEEN ST S	MILL ST	HOMEWOOD AVE	3	Arterial	NO	PAVED	50	24HR	17238	254.215
59247	8707	QUEEN ST S	SCHNEIDER AVE	MILL ST	2	Arterial	NO	PAVED	50	24HR	17419	21.829
59196	9168	QUEEN ST S	MITCHELL ST	SCHNEIDER AVE	3	Arterial	NO	PAVED	50	24HR	17736	82.795
58961	6727	QUEEN ST S	COURTLAND AVE E	MITCHELL ST	3	Arterial	NO	PAVED	50	24HR	18235	165.978
56602	6729	QUEEN ST S	ST GEORGE ST	COURTLAND AVE E	2	Arterial	NO	PAVED	50	NO ACCESS	668	198.331
56603	6476	QUEEN ST S	JOSEPH ST	ST GEORGE ST	2	Arterial	NO	PAVED	50	NO ACCESS	12190	57.563
56605	6477	QUEEN ST S	CHURCH ST	JOSEPH ST	2	Arterial	NO	PAVED	50	NO ACCESS	9500	74.802
56606	6478	QUEEN ST S	CHARLES ST W	CHURCH ST	2	Arterial	NO	PAVED	50	NO ACCESS	3896	58.458
56777	6612	QUEEN ST S	HALLS LANE W	CHARLES ST W	2	Arterial	NO	PAVED	50	NO ACCESS	8925	58.394
56111	6690	QUEEN ST S	KING ST E	HALLS LANE E	2	Arterial	NO	PAVED	50	NO ACCESS	3447	54.064
56593	6740	QUEEN ST N	GOUDIES LANE	GOUDIES LANE	2	Arterial	NO	PAVED	50	NO ACCESS	8425	10.095
56778	6741	QUEEN ST N	GOUDIES LANE	DUKE ST W	2	Arterial	NO	PAVED	50	NO ACCESS	3361	61.124
56662	6769	QUEEN ST N	DUKE ST W	WEBER ST W	2	Arterial	NO	PAVED	50	NO ACCESS	3361	136.843
56597	6765	QUEEN ST N	WEBER ST W	ROY ST	2	Arterial	NO	PAVED	50	NO ACCESS	3042	99.376
56549	6738	QUEEN ST N	ROY ST	AHRENS ST E	2	Arterial	NO	PAVED	50	NO ACCESS	7950	77.434
56594	6737	QUEEN ST N	AHRENS ST E	MARGARET AVE	2	Arterial	NO	PAVED	50	NO ACCESS	8162	153.254
56595	11147	QUEEN ST N	MARGARET AVE	ELLEN ST W	2	Arterial	NO	PAVED	50	NO ACCESS	6772	114.522
56477	11146	QUEEN ST N	ELLEN ST W	ST LEGER ST	2	Arterial	NO	PAVED	50	NO ACCESS	2489	131.990

Object ID	Road Segment ID	Street	From_Street	To_Street	Lanes	Road Class	Median (Y/N)	Shoulder	Speed Limit	Truck Access	AADT	Shape Length
56607	6969	QUEEN ST N	ST LEGER ST	LANCASTER ST W	2	Arterial	NO	PAVED	50	NO ACCESS	4525	220.540
56970	25354	WILDERNESS DR	OTTAWA ST S	GREY FOX DR	2	Local Street	NO	PAVED	50	NO ACCESS	3900	109.987
54484	25338	GREY FOX DR	QUEEN CHARLOTTE CRES	WILDERNESS DR	2	Local Street	NO	PAVED	50	NO ACCESS	932	215.210
55553	25339	GREY FOX DR	ORCHID CRES	QUEEN CHARLOTTE CRES	2	Local Street	NO	PAVED	50	NO ACCESS	742	191.390
54485	25340	GREY FOX DR	WOODPOPPY CRT	ORCHID CRES	2	Local Street	NO	PAVED	50	NO ACCESS	300	88.937
54309	40059	GREY FOX DR	ACTIVA AVE	WOODPOPPY CRT	2	Local Street	NO	PAVED	50	NO ACCESS	450	105.696
55255	40058	ACTIVA AVE	FISCHER HALLMAN RD	GREY FOX DR	2	Collector	NO	PAVED	50	NO ACCESS	2053	95.986
57032	22093	WILSON AVE	FAIRWAY RD S	WEBSTER RD	4	Collector	NO	PAVED	50	NO ACCESS	8652	495.057
58688	21891	WILSON AVE	WEBSTER RD	GOODRICH DR	4	Collector	NO	PAVED	50	NO ACCESS	13114	116.412
57627	22091	WILSON AVE	GOODRICH DR	WABANAKI DR	4	Collector	NO	PAVED	50	NO ACCESS	9552	717.610
56071	21906	WABANAKI DR	KEVCO PL	WILSON AVE	4	Collector	NO	PAVED	50	NO ACCESS	8495	114.415
54775	21897	WABANAKI DR	MANITOU DR	KEVCO PL	4	Collector	NO	PAVED	50	NO ACCESS	4364	553.647

Appendix D

Network-Level Application: Link-Level QOS Calculation Results

Zone 1 - Zone 2													
Route-Level QOS Score	4.233												
Route-Level QOS	D												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
55695	5879	PARK ST	DEVON ST	VICTORIA ST S	3.533	3.605	D	3.613	D	3.609	D	213.025	0.719
53875	5876	JUBILEE DR	THERESA ST	PARK ST	4.051	4.014	D	4.174	D	4.094	D	95.395	1.104
57351	5869	JUBILEE DR	HEINS AVE	THERESA ST	4.253	4.174	D	4.253	E	4.213	D	80.559	1.271
53876	5870	JUBILEE DR	WATER ST S	HEINS AVE	4.165	4.104	D	4.220	D	4.162	D	42.083	1.194
53877	5873	JUBILEE DR	WATER ST S	WATER ST S	3.891	3.888	D	4.102	D	3.995	D	126.616	0.995
53879	5868	JUBILEE DR	DAVID ST	WATER ST S	3.877	3.877	D	4.095	D	3.986	D	189.390	0.986
55368	6728	COURTLAND AVE W	COURTLAND AVE E	DAVID ST	4.491	4.361	D	4.710	E	4.536	E	137.592	2.154
54809	9169	COURTLAND AVE E	QUEEN ST S	CLEMENS LANE	4.201	4.133	D	3.776	D	3.954	D	71.349	0.956
55930	9180	COURTLAND AVE E	CLEMENS LANE	BENTON ST	4.811	4.614	E	3.995	D	4.304	E	70.945	1.438
58811	6610	COURTLAND AVE E	BENTON ST	HEBEL PL	4.449	4.328	D	3.918	D	4.123	D	114.546	1.140
55929	11293	COURTLAND AVE E	HEBEL PL	PETER ST	4.445	4.325	D	3.916	D	4.121	D	114.991	1.137
55928	6647	COURTLAND AVE E	PETER ST	CEDAR ST S	5.117	4.856	E	4.048	D	4.452	E	201.694	1.824
53521	6650	COURTLAND AVE E	CEDAR ST S	MADISON AVE S	5.285	4.988	E	4.087	D	4.538	E	128.286	2.164
59075	11607	COURTLAND AVE E	MADISON AVE S	STIRLING AVE S	3.906	3.899	D	3.660	D	3.780	D	140.245	0.819
57661	11390	COURTLAND AVE E	STIRLING AVE S	STIRLING AVE S	4.914	4.696	E	3.929	D	4.312	E	51.616	1.454
58881	11382	COURTLAND AVE E	STIRLING AVE S	VERNON AVE	4.801	4.606	E	3.992	D	4.299	E	102.949	1.427
58927	11373	COURTLAND AVE E	VERNON AVE	PALMER AVE	4.775	4.586	E	3.985	D	4.285	E	94.348	1.399
57861	11661	COURTLAND AVE E	PALMER AVE	KENT AVE	4.749	4.565	E	3.977	D	4.271	E	177.065	1.372
57024	6899	COURTLAND AVE E	KENT AVE	BORDEN AVE S	4.705	4.530	E	3.965	D	4.248	D	189.170	1.329
56817	6894	COURTLAND AVE E	BORDEN AVE S	GRENVILLE AVE	4.633	4.474	E	3.944	D	4.209	D	96.932	1.264
56850	6888	COURTLAND AVE E	GRENVILLE AVE	OTTAWA ST S	4.431	4.314	D	3.912	D	4.113	D	91.063	1.127
56864	6886	OTTAWA ST S	COURTLAND AVE E	LILAC ST	5.105	4.846	E	4.045	D	4.446	E	86.996	1.804
54548	6890	OTTAWA ST S	LILAC ST	ACACIA ST	5.067	4.816	E	4.035	D	4.426	E	137.164	1.742
55624	10901	OTTAWA ST S	ACACIA ST	MILL ST	4.731	4.551	E	4.026	D	4.289	E	81.430	1.406
58131	11457	OTTAWA ST S	MILL ST	MILL ST	4.204	4.134	D	3.777	D	3.956	D	43.410	0.958
58130	11449	OTTAWA ST S	MILL ST	PATTANDON AVE	4.490	4.361	D	3.838	D	4.099	D	52.690	1.110
55914	10877	OTTAWA ST S	PATTANDON AVE	HOFFMAN ST	4.226	4.152	D	3.817	D	3.985	D	211.713	0.985
57499	11743	OTTAWA ST S	HOFFMAN ST	KEHL ST	4.228	4.153	D	3.785	D	3.969	D	294.531	0.970
58491	11639	OTTAWA ST S	KEHL ST	IMPERIAL DR	4.103	4.055	D	3.740	D	3.898	D	76.425	0.907
54058	11747	OTTAWA ST S	IMPERIAL DR	C_PKY WAT ONRAMP	4.944	4.719	E	3.937	D	4.328	E	159.119	1.488
54059	11761	OTTAWA ST S	C_PKY WAT ONRAMP	HOMER WATSON BLVD	4.510	4.376	D	3.796	D	4.086	D	76.108	1.094
55964	10839	OTTAWA ST S	HOMER WATSON BLVD	ALPINE RD	5.224	4.940	E	4.355	E	4.648	E	134.788	2.839
58492	11628	OTTAWA ST S	ALPINE RD	STRASBURG RD	4.470	4.345	D	3.784	D	4.064	D	428.425	1.069

Zone 1 - Zone 3													
Route-Level QOS Score	4.300												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
58640	8767	VICTORIA ST S	PARK ST	HENRY ST	4.659	4.494	E	3.888	D	4.191	D	83.478	1.236
58912	8763	VICTORIA ST S	HENRY ST	WALNUT ST	5.300	5.000	F	4.235	D	4.618	E	98.012	2.615
55566	8536	VICTORIA ST S	WALNUT ST	STRANGE ST	4.630	4.471	E	3.879	D	4.175	D	222.224	1.212
56381	8689	VICTORIA ST S	STRANGE ST	PATRICIA AVE	4.613	4.458	E	3.875	D	4.166	D	295.170	1.199
57039	8684	VICTORIA ST S	PATRICIA AVE	BELMONT AVE W	4.170	4.108	D	3.799	D	3.954	D	271.864	0.956
56433	1717	VICTORIA ST S	BELMONT AVE W	LAWRENCE AVE	5.300	5.000	F	4.188	D	4.594	E	246.471	2.464
56774	1720	VICTORIA ST S	LAWRENCE AVE	ALICE AVE	4.582	4.433	E	3.866	D	4.149	D	120.907	1.176
54564	8631	VICTORIA ST S	ALICE AVE	PAULANDER DR	4.548	4.407	E	3.856	D	4.131	D	205.677	1.151
57303	8515	VICTORIA ST S	PAULANDER DR	WEICHEL ST	4.634	4.475	E	3.881	D	4.178	D	164.245	1.216
56584	1726	VICTORIA ST S	WEICHEL ST	WESTMOUNT RD W	4.972	4.741	E	3.944	D	4.343	E	115.434	1.522

Zone 1 - Zone 4													
Route-Level QOS Score	4.269												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
55695	5879	PARK ST	DEVON ST	VICTORIA ST S	3.533	3.605	D	3.613	D	3.609	D	213.025	0.719
53875	5876	JUBILEE DR	THERESA ST	PARK ST	4.051	4.014	D	4.174	D	4.094	D	95.395	1.104
57351	5869	JUBILEE DR	HEINS AVE	THERESA ST	4.253	4.174	D	4.253	E	4.213	D	80.559	1.271
53876	5870	JUBILEE DR	WATER ST S	HEINS AVE	4.165	4.104	D	4.220	D	4.162	D	42.083	1.194
53877	5873	JUBILEE DR	WATER ST S	WATER ST S	3.891	3.888	D	4.102	D	3.995	D	126.616	0.995
53879	5868	JUBILEE DR	DAVID ST	WATER ST S	3.877	3.877	D	4.095	D	3.986	D	189.390	0.986
55368	6728	COURTLAND AVE W	COURTLAND AVE E	DAVID ST	4.491	4.361	E	4.710	E	4.536	E	137.592	2.154
54809	9169	COURTLAND AVE E	QUEEN ST S	CLEMENS LANE	4.201	4.133	D	3.776	D	3.954	D	71.349	0.956
55930	9180	COURTLAND AVE E	CLEMENS LANE	BENTON ST	4.811	4.614	E	3.995	D	4.304	E	70.945	1.438
58811	6610	COURTLAND AVE E	BENTON ST	HEBEL PL	4.449	4.328	E	3.918	D	4.123	D	114.546	1.140
55929	11293	COURTLAND AVE E	HEBEL PL	PETER ST	4.445	4.325	E	3.916	D	4.121	D	114.991	1.137
55928	6647	COURTLAND AVE E	PETER ST	CEDAR ST S	5.117	4.856	E	4.048	D	4.452	E	201.694	1.824
53521	6650	COURTLAND AVE E	CEDAR ST S	MADISON AVE S	5.285	4.988	E	4.087	D	4.538	E	128.286	2.164
59075	11607	COURTLAND AVE E	MADISON AVE S	STIRLING AVE S	3.906	3.899	D	3.660	D	3.780	D	140.245	0.819
57661	11390	COURTLAND AVE E	STIRLING AVE S	STIRLING AVE S	4.914	4.696	E	3.929	D	4.312	E	51.616	1.454
58881	11382	COURTLAND AVE E	STIRLING AVE S	VERNON AVE	4.801	4.606	E	3.992	D	4.299	E	102.949	1.427
58927	11373	COURTLAND AVE E	VERNON AVE	PALMER AVE	4.775	4.586	E	3.985	D	4.285	E	94.348	1.399
57861	11661	COURTLAND AVE E	PALMER AVE	KENT AVE	4.749	4.565	E	3.977	D	4.271	E	177.065	1.372
57024	6899	COURTLAND AVE E	KENT AVE	BORDEN AVE S	4.705	4.530	E	3.965	D	4.248	D	189.170	1.329
56817	6894	COURTLAND AVE E	BORDEN AVE S	GRENVILLE AVE	4.633	4.474	E	3.944	D	4.209	D	96.932	1.264
56850	6888	COURTLAND AVE E	GRENVILLE AVE	OTTAWA ST S	4.431	4.314	E	3.912	D	4.113	D	91.063	1.127
56818	9373	COURTLAND AVE E	OTTAWA ST S	SYDNEY ST S	4.253	4.174	D	3.851	D	4.013	D	196.764	1.013
54547	9387	COURTLAND AVE E	SYDNEY ST S	BEDFORD RD	4.315	4.223	D	3.873	D	4.048	D	207.368	1.050
56862	11454	COURTLAND AVE E	BEDFORD RD	MILL ST	5.300	5.000	F	4.143	D	4.571	E	9.514	2.333
52893	11451	COURTLAND AVE E	MILL ST	CARWOOD AVE	4.230	4.155	D	3.786	D	3.970	D	204.267	0.971
57498	11450	COURTLAND AVE E	CARWOOD AVE	C_PKY STR OFFRAMP	4.199	4.131	D	3.775	D	3.953	D	180.954	0.955
57610	11521	COURTLAND AVE E	C_PKY STR OFFRAMP	C_PKY STR ONRAMP	4.788	4.596	E	3.922	D	4.259	E	15.566	1.350
53958	11445	COURTLAND AVE E	C_PKY STR ONRAMP	C_PKY STR OFFRAMP	4.654	4.490	E	3.886	D	4.188	D	97.423	1.231
53025	10886	COURTLAND AVE E	C_PKY WAT OFFRAMP	OVERLAND DR	4.654	4.490	E	3.886	D	4.188	D	118.477	1.231
54897	10863	COURTLAND AVE E	OVERLAND DR	WALTON AVE	4.458	4.335	E	3.809	D	4.072	D	235.245	1.078
58701	10747	COURTLAND AVE E	WALTON AVE	HAYWARD AVE	5.056	4.807	E	3.965	D	4.386	E	117.600	1.629
59136	9416	COURTLAND AVE E	HAYWARD AVE	HILLMOUNT ST	5.126	4.863	E	3.981	D	4.422	E	385.603	1.730
54077	103944	COURTLAND AVE E	HILLMOUNT ST	BLOCK LINE RD	5.300	5.000	F	4.134	D	4.567	E	187.219	2.309
54075	10093	COURTLAND AVE E	BLOCK LINE RD	SHELLEY DR	4.498	4.367	E	3.792	D	4.080	D	256.802	1.086
53709	10103	COURTLAND AVE E	SHELLEY DR	SIEBERT AVE	5.212	4.931	E	4.001	D	4.466	E	145.186	1.873
54896	10099	COURTLAND AVE E	SIEBERT AVE	BALZER RD	5.300	5.000	F	4.120	D	4.560	E	249.149	2.272
58368	21835	COURTLAND AVE E	BALZER RD	MANITOU DR	4.781	4.590	E	3.843	D	4.217	D	143.351	1.276

Zone 1 - Zone 5													
Route-Level QOS Score	4.298												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
58640	8767	VICTORIA ST S	PARK ST	HENRY ST	4.659	4.494	E	3.888	D	4.191	D	83.478	1.236
58912	8763	VICTORIA ST S	HENRY ST	WALNUT ST	5.300	5.000	F	4.235	D	4.618	E	98.012	2.615
55566	8536	VICTORIA ST S	WALNUT ST	STRANGE ST	4.630	4.471	E	3.879	D	4.175	D	222.224	1.212
56381	8689	VICTORIA ST S	STRANGE ST	PATRICIA AVE	4.613	4.458	E	3.875	D	4.166	D	295.170	1.199
57039	8684	VICTORIA ST S	PATRICIA AVE	BELMONT AVE W	4.170	4.108	D	3.799	D	3.954	D	271.864	0.956
56433	1717	VICTORIA ST S	BELMONT AVE W	LAWRENCE AVE	5.300	5.000	F	4.188	D	4.594	E	246.471	2.464
56774	1720	VICTORIA ST S	LAWRENCE AVE	ALICE AVE	4.582	4.433	E	3.866	D	4.149	D	120.907	1.176
54564	8631	VICTORIA ST S	ALICE AVE	PAULANDER DR	4.548	4.407	E	3.856	D	4.131	D	205.677	1.151
57303	8515	VICTORIA ST S	PAULANDER DR	WEICHEL ST	4.634	4.475	E	3.881	D	4.178	D	164.245	1.216
56584	1726	VICTORIA ST S	WEICHEL ST	WESTMOUNT RD W	4.972	4.741	E	3.944	D	4.343	E	115.434	1.522
58396	1724	VICTORIA ST S	WESTMOUNT RD W	VICMOUNT DR	4.553	4.410	E	3.857	D	4.134	D	213.129	1.154
58343	1729	VICTORIA ST S	VICMOUNT DR	HAZELGLEN DR	4.690	4.518	E	3.896	D	4.207	D	48.243	1.262
54362	6098	VICTORIA ST S	HAZELGLEN DR	MONTE CARLO ST	4.524	4.388	E	3.849	D	4.118	D	205.860	1.134
57388	20631	VICTORIA ST S	MONTE CARLO ST	FISCHER HALLMAN RD	4.459	4.336	E	3.828	D	4.082	D	264.743	1.090
57387	20652	FISCHER HALLMAN RD	VICTORIA ST S	BANKSIDE DR	4.666	4.499	E	3.877	D	4.188	D	354.000	1.232
59115	20736	FISCHER HALLMAN RD	BANKSIDE DR	HIGHLAND RD W	4.842	4.639	E	3.977	D	4.308	E	246.037	1.445
59114	5601	FISCHER HALLMAN RD	HIGHLAND RD W	QUEENS BLVD	5.003	4.766	E	3.952	D	4.359	E	363.091	1.559
58397	6174	FISCHER HALLMAN RD	QUEENS BLVD	SUMMIT AVE	5.132	4.868	E	4.027	D	4.447	E	187.597	1.810
54565	6180	FISCHER HALLMAN RD	SUMMIT AVE	FOREST HILL DR	4.682	4.512	E	3.894	D	4.203	D	331.539	1.255
58085	6137	FISCHER HALLMAN RD	FOREST HILL DR	MCGARRY DR	5.220	4.937	E	4.003	D	4.470	E	173.881	1.885
53820	6143	FISCHER HALLMAN RD	MCGARRY DR	C_PKY STR ONRAMP	5.300	5.000	F	4.085	D	4.543	E	414.094	2.187
52961	6296	FISCHER HALLMAN RD	C_PKY WAT ONRAMP	C_PKY WAT ONRAMP	5.300	5.000	F	4.060	D	4.530	E	94.310	2.127
55076	6149	FISCHER HALLMAN RD	C_PKY STR ONRAMP	C_PKY STR OFFRAMP	4.320	4.226	D	3.738	D	3.982	D	9.411	0.982
58603	6303	FISCHER HALLMAN RD	C_PKY WAT OFFRAMP	OTTAWA ST S	5.300	5.000	F	4.045	D	4.522	E	176.744	2.094
55753	9503	OTTAWA ST S	FISCHER HALLMAN RD	INTERNATIONAL PL	3.959	3.941	D	3.683	D	3.812	D	630.408	0.842

Zone 1 - Zone 6													
Route-Level QOS Score	4.117												
Route-Level QOS	D												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
54345	8774	VICTORIA ST S	THERESA ST	PARK ST	4.675	4.507	E	3.892	D	4.199	D	73.971	1.249
58148	8793	VICTORIA ST S	BRAMM ST	THERESA ST	4.690	4.518	E	3.896	D	4.207	D	69.628	1.262
58149	8791	VICTORIA ST S	MICHAEL ST	BRAMM ST	4.704	4.530	E	3.900	D	4.215	D	16.729	1.274
58342	1691	VICTORIA ST S	GARMENT ST	MICHAEL ST	4.721	4.543	E	3.905	D	4.224	D	62.456	1.288
78084	604291	VICTORIA ST S	OAK ST	GARMENT ST	2.740	2.979	C	0.697	A	1.838	A	43.232	0.316
58150	8798	VICTORIA ST S	ARTHUR PL	OAK ST	4.736	4.554	E	3.909	D	4.232	D	26.468	1.301
53719	8788	VICTORIA ST S	JOSEPH ST	ARTHUR PL	4.750	4.566	E	3.913	D	4.239	D	78.125	1.314
59091	8787	VICTORIA ST S	CHARLES ST W	JOSEPH ST	4.748	4.564	E	3.912	D	4.238	D	128.650	1.312
59243	8923	VICTORIA ST S	HALLS LANE W	CHARLES ST W	4.587	4.437	E	3.867	D	4.152	D	55.411	1.179
55534	9033	VICTORIA ST S	KING ST W	HALLS LANE W	4.228	4.154	D	3.818	D	3.986	D	58.907	0.986
57312	5898	VICTORIA ST N	KING ST W	DUKE ST W	4.081	4.037	D	3.732	D	3.885	D	251.991	0.897
52996	7052	VICTORIA ST N	DUKE ST W	WEBER ST W	4.733	4.552	E	3.908	D	4.230	D	179.751	1.299

Zone 1 - Zone 7													
Route-Level QOS Score	4.089												
Route-Level QOS	D												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
54345	8774	VICTORIA ST S	THERESA ST	PARK ST	4.675	4.507	E	3.892	D	4.199	D	73.971	1.249
58148	8793	VICTORIA ST S	BRAMM ST	THERESA ST	4.690	4.518	E	3.896	D	4.207	D	69.628	1.262
58149	8791	VICTORIA ST S	MICHAEL ST	BRAMM ST	4.704	4.530	E	3.900	D	4.215	D	16.729	1.274
58342	1691	VICTORIA ST S	GARMENT ST	MICHAEL ST	4.721	4.543	E	3.905	D	4.224	D	62.456	1.288
78084	604291	VICTORIA ST S	OAK ST	GARMENT ST	2.740	2.979	C	0.697	A	1.838	A	43.232	0.316
58150	8798	VICTORIA ST S	ARTHUR PL	OAK ST	4.736	4.554	E	3.909	D	4.232	D	26.468	1.301
53719	8788	VICTORIA ST S	JOSEPH ST	ARTHUR PL	4.750	4.566	E	3.913	D	4.239	D	78.125	1.314
59091	8787	VICTORIA ST S	CHARLES ST W	JOSEPH ST	4.748	4.564	E	3.912	D	4.238	D	128.650	1.312
59243	8923	VICTORIA ST S	HALLS LANE W	CHARLES ST W	4.587	4.437	E	3.867	D	4.152	D	55.411	1.179
55534	9033	VICTORIA ST S	KING ST W	HALLS LANE W	4.228	4.154	D	3.818	D	3.986	D	58.907	0.986
57312	5898	VICTORIA ST N	KING ST W	DUKE ST W	4.081	4.037	D	3.732	D	3.885	D	251.991	0.897
52996	7052	VICTORIA ST N	DUKE ST W	WEBER ST W	4.733	4.552	E	3.908	D	4.230	D	179.751	1.299
53264	7053	WEBER ST W	HEIT LANE	VICTORIA ST N	4.520	4.384	D	3.847	D	4.116	D	64.895	1.131
53260	7055	WEBER ST W	WATER ST N	HEIT LANE	4.536	4.397	D	3.852	D	4.124	D	31.741	1.142
55369	6666	WEBER ST W	COLLEGE ST	WATER ST N	4.644	4.482	E	3.883	D	4.183	D	105.647	1.224
58989	6492	WEBER ST W	YOUNG ST	COLLEGE ST	4.623	4.465	E	3.877	D	4.171	D	111.870	1.207
57525	6479	WEBER ST W	ONTARIO ST N	YOUNG ST	4.603	4.450	E	3.872	D	4.161	D	168.674	1.192
58596	6766	WEBER ST W	QUEEN ST N	ONTARIO ST N	4.584	4.435	E	3.866	D	4.150	D	121.795	1.177
58222	6770	WEBER ST E	QUEEN ST N	FREDERICK ST	4.563	4.418	E	3.860	D	4.139	D	125.407	1.161
58598	6759	WEBER ST E	FREDERICK ST	SCOTT ST	4.543	4.403	E	3.854	D	4.128	D	155.076	1.147
58990	6879	WEBER ST E	SCOTT ST	KRUG ST	4.522	4.386	D	3.848	D	4.117	D	270.698	1.132
58615	6885	WEBER ST E	KRUG ST	MADISON AVE N	4.502	4.370	D	3.842	D	4.106	D	127.385	1.119
53939	6863	WEBER ST E	MADISON AVE N	CAMERON ST N	4.481	4.354	D	3.835	D	4.094	D	125.207	1.104
53940	6859	WEBER ST E	CAMERON ST N	BETZNER AVE N	4.462	4.338	D	3.829	D	4.084	D	98.276	1.091
56893	6846	WEBER ST E	BETZNER AVE N	PANDORA AVE N	4.240	4.163	D	3.822	D	3.993	D	86.975	0.993
58299	9859	WEBER ST E	PANDORA AVE N	FAIRVIEW AVE	4.221	4.148	D	3.816	D	3.982	D	90.581	0.983
58672	9846	WEBER ST E	FAIRVIEW AVE	STIRLING AVE N	4.202	4.133	D	3.810	D	3.971	D	88.304	0.972
58298	10164	WEBER ST E	STIRLING AVE N	SIMEON ST	4.180	4.116	D	3.803	D	3.960	D	172.143	0.961
52824	10165	WEBER ST E	SIMEON ST	BORDEN AVE N	4.100	4.053	D	3.739	D	3.896	D	175.103	0.906
58297	10178	WEBER ST E	BORDEN AVE N	ONWARD AVE	4.266	4.183	D	3.798	D	3.991	D	96.569	0.991
58614	10185	WEBER ST E	ONWARD AVE	EAST AVE	4.170	4.108	D	3.799	D	3.954	D	222.535	0.956
52828	10189	WEBER ST E	EAST AVE	EAST AVE	4.176	4.112	D	3.801	D	3.957	D	32.610	0.959
57524	10182	WEBER ST E	EAST AVE	OTTAWA ST N	4.176	4.112	D	3.801	D	3.957	D	20.287	0.959
56571	11704	WEBER ST E	OTTAWA ST N	SYDNEY ST N	4.180	4.116	D	3.803	D	3.960	D	122.042	0.961
59120	11705	WEBER ST E	SYDNEY ST N	SHELDON AVE N	4.185	4.120	D	3.805	D	3.962	D	129.245	0.964
56572	10143	WEBER ST E	SHELDON AVE N	RAYMOND RD	4.190	4.124	D	3.806	D	3.965	D	107.369	0.966
56568	10142	WEBER ST E	RAYMOND RD	EDMUND RD	4.195	4.127	D	3.808	D	3.968	D	101.117	0.969
56569	11675	WEBER ST E	EDMUND RD	JACKSON AVE	4.200	4.131	D	3.809	D	3.970	D	101.306	0.971
52829	10015	WEBER ST E	JACKSON AVE	MONTGOMERY RD	4.204	4.135	D	3.811	D	3.973	D	431.494	0.974
58483	13270	WEBER ST E	MONTGOMERY RD	SHANTZ LANE	4.256	4.176	D	3.795	D	3.985	D	225.136	0.985
57049	10030	WEBER ST E	SHANTZ LANE	ROSS AVE	4.211	4.140	D	3.779	D	3.960	D	91.685	0.961
53646	13158	WEBER ST E	ROSS AVE	WILFRED AVE	4.167	4.106	D	3.764	D	3.935	D	139.461	0.939
58568	13156	WEBER ST E	WILFRED AVE	EMERALD AVE	4.122	4.070	D	3.748	D	3.909	D	91.609	0.916
54369	10038	WEBER ST E	EMERALD AVE	DELLROY AVE	4.078	4.036	D	3.731	D	3.883	D	89.440	0.895
54370	13146	WEBER ST E	DELLROY AVE	EULER AVE	4.093	4.047	D	3.737	D	3.892	D	89.029	0.903
54371	13145	WEBER ST E	EULER AVE	BROADVIEW AVE	4.110	4.061	D	3.743	D	3.902	D	88.270	0.911
59056	10993	WEBER ST E	BROADVIEW AVE	FRANKLIN ST N	4.126	4.073	D	3.749	D	3.911	D	144.193	0.918
53289	10963	WEBER ST E	FRANKLIN ST N	PINECREST DR	4.680	4.511	E	3.893	D	4.202	D	86.260	1.253
56776	13144	WEBER ST E	PINECREST DR	ARLINGTON BLVD	4.700	4.526	E	3.899	D	4.212	D	87.505	1.270
53742	10991	WEBER ST E	ARLINGTON BLVD	FERGUS AVE	4.719	4.541	E	3.904	D	4.223	D	342.363	1.286
57349	22350	WEBER ST E	FERGUS AVE	KINZIE AVE	5.032	4.789	E	3.959	D	4.374	E	325.599	1.597
54310	22330	WEBER ST E	KINZIE AVE	KING ST E	4.680	4.511	E	3.894	D	4.202	D	231.651	1.254
54047	12115	KING ST E	KING ST BYPASS OFFRAMP	KINGSBURY DR	4.489	4.360	D	3.818	D	4.089	D	150.463	1.097
55917	12119	KING ST E	KINGSBURY DR	MORGAN AVE	5.248	4.959	E	4.009	D	4.484	E	32.821	1.938
56673	12116	KING ST E	MORGAN AVE	FAIRWAY RD N	4.308	4.217	D	3.734	D	3.976	D	178.839	0.976

Zone 1 - Zone 8													
Route-Level QOS Score	4.289												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
54345	8774	VICTORIA ST S	THERESA ST	PARK ST	4.675	4.507	E	3.892	D	4.199	D	73.971	1.249
58148	8793	VICTORIA ST S	BRAMM ST	THERESA ST	4.690	4.518	E	3.896	D	4.207	D	69.628	1.262
58149	8791	VICTORIA ST S	MICHAEL ST	BRAMM ST	4.704	4.530	E	3.900	D	4.215	D	16.729	1.274
58342	1691	VICTORIA ST S	GARMENT ST	MICHAEL ST	4.721	4.543	E	3.905	D	4.224	D	62.456	1.288
78084	604291	VICTORIA ST S	OAK ST	GARMENT ST	2.740	2.979	C	0.697	A	1.838	A	43.232	0.316
58150	8798	VICTORIA ST S	ARTHUR PL	OAK ST	4.736	4.554	E	3.909	D	4.232	D	26.468	1.301
53719	8788	VICTORIA ST S	JOSEPH ST	ARTHUR PL	4.750	4.566	E	3.913	D	4.239	D	78.125	1.314
59091	8787	VICTORIA ST S	CHARLES ST W	JOSEPH ST	4.748	4.564	E	3.912	D	4.238	D	128.650	1.312
59243	8923	VICTORIA ST S	HALLS LANE W	CHARLES ST W	4.587	4.437	E	3.867	D	4.152	D	55.411	1.179
55534	9033	VICTORIA ST S	KING ST W	HALLS LANE W	4.228	4.154	D	3.818	D	3.986	D	58.907	0.986
57312	5898	VICTORIA ST N	KING ST W	DUKE ST W	4.081	4.037	D	3.732	D	3.885	D	251.991	0.897
52996	7052	VICTORIA ST N	DUKE ST W	WEBER ST W	4.733	4.552	E	3.908	D	4.230	D	179.751	1.299
54494	11079	VICTORIA ST N	WEBER ST W	WATER ST N	4.059	4.020	D	3.724	D	3.872	D	162.896	0.887
54028	40174	VICTORIA ST N	WATER ST N	AHRENS ST W	4.059	4.020	D	3.724	D	3.872	D	13.631	0.887
58951	6659	VICTORIA ST N	AHRENS ST W	AHRENS ST W	4.893	4.679	E	3.924	D	4.301	E	31.798	1.431
54554	6662	VICTORIA ST N	AHRENS ST W	MARGARET AVE	4.910	4.692	E	3.928	D	4.310	E	211.878	1.449
58457	6780	VICTORIA ST N	MARGARET AVE	ELLEN ST W	5.037	4.792	E	3.960	D	4.376	E	140.463	1.603
57443	6787	VICTORIA ST N	ELLEN ST W	ST LEGER ST	4.996	4.760	E	3.950	D	4.355	E	159.880	1.550
56553	6958	VICTORIA ST N	ST LEGER ST	HERMIE PL	4.932	4.709	E	3.934	D	4.322	E	213.228	1.474
57219	6968	VICTORIA ST N	HERMIE PL	LANCASTER ST W	5.040	4.794	E	3.961	D	4.378	E	65.179	1.607
59066	7046	LANCASTER ST W	VICTORIA ST N	BREITHAUPT ST	4.021	3.990	D	3.708	D	3.849	D	147.268	0.869
59065	11114	LANCASTER ST W	BREITHAUPT ST	BREITHAUPT ST	4.240	4.163	D	3.822	D	3.993	D	51.847	0.993
53634	7042	LANCASTER ST W	BREITHAUPT ST	WELLINGTON ST N	4.218	4.146	D	3.815	D	3.981	D	71.093	0.981
58564	7036	LANCASTER ST W	WELLINGTON ST N	LOUISA ST	5.300	5.000	F	4.176	D	4.588	E	123.127	2.428
58038	7041	LANCASTER ST W	LOUISA ST	HILLVIEW ST	5.300	5.000	F	4.093	D	4.546	E	96.374	2.205
53099	6961	LANCASTER ST W	HILLVIEW ST	HILL ST	5.289	4.991	E	4.088	D	4.540	E	132.055	2.173
53098	12646	LANCASTER ST W	HILL ST	GUELPH ST	5.267	4.974	E	4.083	D	4.529	E	171.802	2.122
56041	10483	LANCASTER ST W	GUELPH ST	ARNOLD ST	4.851	4.646	E	4.005	D	4.326	E	253.614	1.483
53096	10485	LANCASTER ST W	ARNOLD ST	ELIZABETH ST	4.877	4.666	E	4.012	D	4.339	E	69.323	1.513
57080	10487	LANCASTER ST W	ELIZABETH ST	CLIFTON RD	4.837	4.635	E	4.002	D	4.318	E	27.858	1.467
58331	10389	LANCASTER ST W	CLIFTON RD	ASH ST	5.183	4.908	E	4.064	D	4.486	E	56.418	1.945
57143	10381	LANCASTER ST W	ASH ST	UNION ST	5.161	4.890	E	4.058	D	4.474	E	221.163	1.903
55683	6953	LANCASTER ST W	UNION ST	C_PKY STR OFFRAMP	4.143	4.087	D	3.755	D	3.921	D	98.787	0.927
56965	6985	LANCASTER ST W	C_PKY WAT ONRAMP	C_PKY STR OFFRAMP	5.061	4.811	E	3.966	D	4.388	E	188.289	1.635
54972	12419	LANCASTER ST W	C_PKY WAT ONRAMP	HAMEL AVE	4.249	4.170	D	3.793	D	3.981	D	175.651	0.982
54971	12415	LANCASTER ST W	HAMEL AVE	BRIDGEPORT RD	3.817	3.829	D	3.620	D	3.724	D	150.168	0.784

Zone 1 - Zone 9													
Route-Level QOS Score	4.423												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
55695	5879	PARK ST	DEVON ST	VICTORIA ST S	3.533	3.605	D	3.613	D	3.609	D	213.025	0.719
53875	5876	JUBILEE DR	THERESA ST	PARK ST	4.051	4.014	D	4.174	D	4.094	D	95.395	1.104
57351	5869	JUBILEE DR	HEINS AVE	THERESA ST	4.253	4.174	D	4.253	E	4.213	D	80.559	1.271
53876	5870	JUBILEE DR	WATER ST S	HEINS AVE	4.165	4.104	D	4.220	D	4.162	D	42.083	1.194
53877	5873	JUBILEE DR	WATER ST S	WATER ST S	3.891	3.888	D	4.102	D	3.995	D	126.616	0.995
53879	5868	JUBILEE DR	DAVID ST	WATER ST S	3.877	3.877	D	4.095	D	3.986	D	189.390	0.986
55368	6728	COURTLAND AVE W	COURTLAND AVE E	DAVID ST	4.491	4.361	D	4.710	E	4.536	E	137.592	2.154
54809	9169	COURTLAND AVE E	QUEEN ST S	CLEMENS LANE	4.201	4.133	D	3.776	D	3.954	D	71.349	0.956
55930	9180	COURTLAND AVE E	CLEMENS LANE	BENTON ST	4.811	4.614	E	3.995	D	4.304	E	70.945	1.438
58811	6610	COURTLAND AVE E	BENTON ST	HEBEL PL	4.449	4.328	D	3.918	D	4.123	D	114.546	1.140
55929	11293	COURTLAND AVE E	HEBEL PL	PETER ST	4.445	4.325	D	3.916	D	4.121	D	114.991	1.137
55928	6647	COURTLAND AVE E	PETER ST	CEDAR ST S	5.117	4.856	E	4.048	D	4.452	E	201.694	1.824
53521	6650	COURTLAND AVE E	CEDAR ST S	MADISON AVE S	5.285	4.988	E	4.087	D	4.538	E	128.286	2.164
59075	11607	COURTLAND AVE E	MADISON AVE S	STIRLING AVE S	3.906	3.899	D	3.660	D	3.780	D	140.245	0.819
57661	11390	COURTLAND AVE E	STIRLING AVE S	STIRLING AVE S	4.914	4.696	E	3.929	D	4.312	E	51.616	1.454
58881	11382	COURTLAND AVE E	STIRLING AVE S	VERNON AVE	4.801	4.606	E	3.992	D	4.299	E	102.949	1.427
58927	11373	COURTLAND AVE E	VERNON AVE	PALMER AVE	4.775	4.586	E	3.985	D	4.285	E	94.348	1.399
57861	11661	COURTLAND AVE E	PALMER AVE	KENT AVE	4.749	4.565	E	3.977	D	4.271	E	177.065	1.372
57024	6899	COURTLAND AVE E	KENT AVE	BORDEN AVE S	4.705	4.530	E	3.965	D	4.248	D	189.170	1.329
56817	6894	COURTLAND AVE E	BORDEN AVE S	GRENVILLE AVE	4.633	4.474	E	3.944	D	4.209	D	96.932	1.264
56850	6888	COURTLAND AVE E	GRENVILLE AVE	OTTAWA ST S	4.431	4.314	D	3.912	D	4.113	D	91.063	1.127
56864	6886	OTTAWA ST S	COURTLAND AVE E	LILAC ST	5.105	4.846	E	4.045	D	4.446	E	86.996	1.804
54548	6890	OTTAWA ST S	LILAC ST	ACACIA ST	5.067	4.816	E	4.035	D	4.426	E	137.164	1.742
55624	10901	OTTAWA ST S	ACACIA ST	MILL ST	4.731	4.551	E	4.026	D	4.289	E	81.430	1.406
58131	11457	OTTAWA ST S	MILL ST	MILL ST	4.204	4.134	D	3.777	D	3.956	D	43.410	0.958
58130	11449	OTTAWA ST S	MILL ST	PATTANDON AVE	4.490	4.361	D	3.838	D	4.099	D	52.690	1.110
55914	10877	OTTAWA ST S	PATTANDON AVE	HOFFMAN ST	4.226	4.152	D	3.817	D	3.985	D	211.713	0.985
57499	11743	OTTAWA ST S	HOFFMAN ST	KEHL ST	4.228	4.153	D	3.785	D	3.969	D	294.531	0.970
58491	11639	OTTAWA ST S	KEHL ST	IMPERIAL DR	4.103	4.055	D	3.740	D	3.898	D	76.425	0.907
54058	11747	OTTAWA ST S	IMPERIAL DR	C_PKY WAT ONRAMP	4.944	4.719	E	3.937	D	4.328	E	159.119	1.488
54059	11761	OTTAWA ST S	C_PKY WAT ONRAMP	HOMER WATSON BLVD	4.510	4.376	D	3.796	D	4.086	D	76.108	1.094
59070	10766	HOMER WATSON BLVD	OTTAWA ST S	HANSON AVE	5.300	5.000	F	4.336	E	4.668	E	608.822	3.014
54229	10944	HOMER WATSON BLVD	HANSON AVE	BLOCK LINE RD	5.300	5.000	F	4.040	D	4.520	E	695.316	2.084
54230	9611	HOMER WATSON BLVD	BLOCK LINE RD	BLEAMS RD	5.300	5.000	F	4.196	D	4.598	E	1178.693	2.486
59041	21862	HOMER WATSON BLVD	BLEAMS RD	BEASLEY DR	4.836	4.633	E	3.930	D	4.282	E	548.731	1.393
59042	21808	HOMER WATSON BLVD	BEASLEY DR	HOMER WATSON OFFRAMP	4.872	4.662	E	3.941	D	4.302	E	193.438	1.432
59043	25666	HOMER WATSON BLVD	HOMER WATSON OFFRAMP	HOMER WATSON ONRAMP	5.300	5.000	F	4.236	D	4.618	E	602.619	2.619
59044	21992	HOMER WATSON BLVD	HOMER WATSON ONRAMP	DOON VILLAGE RD	4.900	4.684	E	3.950	D	4.317	E	232.906	1.464
55821	21996	DOON VILLAGE RD	HOMER WATSON BLVD	MILLWOOD CRES	4.000	3.974	D	3.735	D	3.854	D	124.549	0.873
56337	21937	DOON VILLAGE RD	MILLWOOD CRES	UPPER CANADA DR	4.000	3.974	D	3.735	D	3.854	D	92.566	0.873
56085	22006	DOON VILLAGE RD	UPPER CANADA DR	MILLWOOD CRES	3.578	3.640	D	3.545	D	3.592	D	58.011	0.710
55823	21939	DOON VILLAGE RD	MILLWOOD CRES	PIONEER DR	3.729	3.760	D	3.622	D	3.691	D	166.822	0.764

Zone 1 - Zone 10													
Route-Level QOS Score	4.135												
Route-Level QOS	D												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
58640	8767	VICTORIA ST S	PARK ST	HENRY ST	4.659	4.494	E	3.888	D	4.191	D	83.478	1.236
58912	8763	VICTORIA ST S	HENRY ST	WALNUT ST	5.300	5.000	F	4.235	D	4.618	E	98.012	2.615
55566	8536	VICTORIA ST S	WALNUT ST	STRANGE ST	4.630	4.471	E	3.879	D	4.175	D	222.224	1.212
56381	8689	VICTORIA ST S	STRANGE ST	PATRICIA AVE	4.613	4.458	E	3.875	D	4.166	D	295.170	1.199
57039	8684	VICTORIA ST S	PATRICIA AVE	BELMONT AVE W	4.170	4.108	D	3.799	D	3.954	D	271.864	0.956
53653	1696	BELMONT AVE W	JACK AVE	VICTORIA ST S	3.649	3.697	D	3.534	D	3.615	D	117.374	0.722
54864	8518	BELMONT AVE W	EDGEWOOD DR	JACK AVE	3.649	3.697	D	3.534	D	3.615	D	28.968	0.722
56546	8651	BELMONT AVE W	SANDRA AVE	EDGEWOOD DR	3.304	3.425	D	3.373	C	3.399	C	66.790	0.624
54772	8649	BELMONT AVE W	METZLOFF DR	SANDRA AVE	3.649	3.697	D	3.534	D	3.615	D	97.272	0.722
58127	8635	BELMONT AVE W	BURN PL	METZLOFF DR	3.324	3.440	D	3.387	C	3.413	C	91.926	0.630
56466	8755	BELMONT AVE W	HIGHLAND RD W	BURN PL	3.649	3.697	D	3.534	D	3.615	D	112.563	0.722
54452	8663	HIGHLAND RD W	BELMONT AVE W	ROXBOROUGH AVE	4.503	4.371	D	3.842	D	4.106	D	111.849	1.119
54453	20988	HIGHLAND RD W	ROXBOROUGH AVE	LAWRENCE AVE	4.893	4.679	E	3.924	D	4.301	E	151.146	1.431
56094	20964	HIGHLAND RD W	LAWRENCE AVE	BUTLER LANE	4.908	4.690	E	3.928	D	4.309	E	115.480	1.447
56093	20994	HIGHLAND RD W	BUTLER LANE	WESTMOUNT RD W	4.685	4.515	E	3.895	D	4.205	D	298.898	1.258
54157	20719	HIGHLAND RD W	WESTMOUNT RD W	HIGHLAND CRES	4.296	4.207	D	3.752	D	3.980	D	168.450	0.980
57540	20717	HIGHLAND RD W	HIGHLAND CRES	FIELDGATE ST	4.246	4.168	D	3.811	D	3.989	D	338.280	0.989
59064	20702	HIGHLAND RD W	FIELDGATE ST	EAGEN DR	4.241	4.164	D	3.808	D	3.986	D	172.606	0.986
58669	20757	HIGHLAND RD W	EAGEN DR	HIGHLAND CRES	4.234	4.158	D	3.806	D	3.982	D	163.551	0.983
57798	6104	HIGHLAND RD W	HIGHLAND CRES	FISCHER HALLMAN RD	3.929	3.918	D	3.588	D	3.753	D	184.851	0.802
58037	20737	HIGHLAND RD W	FISCHER HALLMAN RD	WESTHEIGHTS DR	4.584	4.434	E	4.298	E	4.366	E	536.632	1.578

Zone 2 - Zone 3													
Route-Level QOS Score	4.159												
Route-Level QOS	D												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
90562	605989	OTTAWA ST S	STRASBURG RD	HUNTSWORTH AVE	2.740	2.979	C	0.697	A	1.838	A	267.184	0.316
53064	6586	OTTAWA ST S	HUNTSWORTH AVE	ELMSDALE DR	4.632	4.473	E	3.880	D	4.176	D	276.007	1.214
58706	6388	OTTAWA ST S	ELMSDALE DR	HOWLAND DR	4.637	4.477	E	3.882	D	4.179	D	276.702	1.218
57326	6377	OTTAWA ST S	HOWLAND DR	MOWAT BLVD	4.498	4.367	D	3.841	D	4.104	D	96.443	1.116
54176	6376	OTTAWA ST S	MOWAT BLVD	WESTMOUNT RD E	4.570	4.424	E	3.862	D	4.143	D	276.205	1.167
56624	6390	WESTMOUNT RD E	GILMOUR CRES	OTTAWA ST S	4.625	4.467	E	3.878	D	4.172	D	423.900	1.208
54417	6605	WESTMOUNT RD E	GILMOUR CRES	GILMOUR CRES	4.613	4.458	E	3.875	D	4.166	D	86.809	1.199
57507	6565	WESTMOUNT RD E	STONYBROOK DR	GILMOUR CRES	4.601	4.448	E	3.871	D	4.160	D	111.863	1.190
55514	6560	WESTMOUNT RD E	VILLAGE RD	STONYBROOK DR	4.700	4.526	E	3.899	D	4.212	D	259.782	1.270
53818	6493	WESTMOUNT RD E	GREENBROOK DR	VILLAGE RD	4.232	4.157	D	3.787	D	3.972	D	96.805	0.973
53817	6506	WESTMOUNT RD E	EVERGREEN CRES	GREENBROOK DR	4.502	4.370	D	3.842	D	4.106	D	87.806	1.119
53787	6508	WESTMOUNT RD E	FOREST HILL DR	EVERGREEN CRES	4.577	4.429	E	3.864	D	4.147	D	270.400	1.172
57945	20900	WESTMOUNT RD E	GATEWOOD RD	FOREST HILL DR	4.654	4.490	E	3.886	D	4.188	D	87.764	1.231
55915	21000	WESTMOUNT RD E	QUEENS BLVD	GATEWOOD RD	4.728	4.549	E	3.907	D	4.228	D	188.056	1.295
54562	6277	WESTMOUNT RD W	QUEENS BLVD	OVERLEA DR	5.166	4.895	E	3.990	D	4.443	E	338.380	1.794
56095	20991	WESTMOUNT RD W	OVERLEA DR	HIGHLAND RD W	4.378	4.272	D	3.756	D	4.014	D	120.110	1.014
55630	20989	WESTMOUNT RD W	HIGHLAND RD W	VICMOUNT DR	4.503	4.371	D	3.825	D	4.098	D	531.551	1.109
55704	6168	WESTMOUNT RD W	VICMOUNT DR	VICTORIA ST S	4.977	4.745	E	4.014	D	4.379	E	167.835	1.612

Zone 2 - Zone 4													
Route-Level QOS Score	3.873												
Route-Level QOS	D												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
55912	10824	STRASBURG RD	OTTAWA ST S	KINGSWOOD DR	3.484	3.566	D	3.491	C	3.528	D	246.602	0.680
57358	10836	STRASBURG RD	KINGSWOOD DR	BARWOOD CRES	3.549	3.618	D	3.529	D	3.574	D	28.224	0.701
57359	10825	STRASBURG RD	BARWOOD CRES	BARWOOD CRES	3.585	3.646	D	3.549	D	3.598	D	188.857	0.713
55918	10834	STRASBURG RD	BARWOOD CRES	SELKIRK DR	3.571	3.635	D	3.541	D	3.588	D	187.137	0.708
55916	10815	STRASBURG RD	SELKIRK DR	BLACKHORNE DR	3.578	3.640	D	3.545	D	3.592	D	192.727	0.710
55913	10812	STRASBURG RD	BLACKHORNE DR	BLOCK LINE RD	3.518	3.593	D	3.511	D	3.552	D	143.435	0.691
58018	10915	BLOCK LINE RD	STRASBURG RD	COUNTRY HILL DR	3.590	3.650	D	3.552	D	3.601	D	374.928	0.715
57304	10918	BLOCK LINE RD	COUNTRY HILL DR	KINGSWOOD DR	3.669	3.713	D	3.593	D	3.653	D	215.069	0.742
55689	10928	BLOCK LINE RD	KINGSWOOD DR	HOMER WATSON BLVD	4.489	4.360	D	3.956	D	4.158	D	178.442	1.188
55690	600353	BLOCK LINE RD	HOMER WATSON BLVD	FALLOWFIELD DR	3.030	3.208	C	3.093	C	3.150	C	183.180	0.541
55631	600915	BLOCK LINE RD	FALLOWFIELD DR	LENNOX LEWIS WAY	3.031	3.209	C	3.094	C	3.151	C	358.988	0.541
55632	103019	BLOCK LINE RD	LENNOX LEWIS WAY	COURTLAND AVE E	2.654	2.911	C	-1.737	A	0.587	A	270.826	0.227
54075	10093	COURTLAND AVE E	BLOCK LINE RD	SHELLEY DR	4.498	4.367	E	3.792	D	4.080	D	256.802	1.086
53709	10103	COURTLAND AVE E	SHELLEY DR	SIEBERT AVE	5.212	4.931	E	4.001	D	4.466	E	145.186	1.873
54896	10099	COURTLAND AVE E	SIEBERT AVE	BALZER RD	5.300	5.000	F	4.120	D	4.560	E	249.149	2.272
58368	21835	COURTLAND AVE E	BALZER RD	MANITOU DR	4.781	4.590	E	3.843	D	4.217	D	143.351	1.276

Zone 2 - Zone 5													
Route-Level QOS Score	4.047												
Route-Level QOS	D												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
90562	605989	OTTAWA ST S	STRASBURG RD	HUNTSWORTH AVE	2.740	2.979	C	0.697	A	1.838	A	267.184	0.316
53064	6586	OTTAWA ST S	HUNTSWORTH AVE	ELMSDALE DR	4.632	4.473	E	3.880	D	4.176	D	276.007	1.214
58706	6388	OTTAWA ST S	ELMSDALE DR	HOWLAND DR	4.637	4.477	E	3.882	D	4.179	D	276.702	1.218
57326	6377	OTTAWA ST S	HOWLAND DR	MOWAT BLVD	4.498	4.367	D	3.841	D	4.104	D	96.443	1.116
54176	6376	OTTAWA ST S	MOWAT BLVD	WESTMOUNT RD E	4.570	4.424	E	3.862	D	4.143	D	276.205	1.167
58431	6389	OTTAWA ST S	WESTMOUNT RD E	PINEDALE DR	4.702	4.528	E	3.900	D	4.214	D	213.367	1.272
58430	6399	OTTAWA ST S	PINEDALE DR	HOWE DR	4.656	4.492	E	3.887	D	4.189	D	137.890	1.233
53026	6256	OTTAWA ST S	HOWE DR	WILLIAMSBURG RD	4.737	4.556	E	3.946	D	4.251	E	188.681	1.335
57088	6292	OTTAWA ST S	WILLIAMSBURG RD	VALLEYVIEW RD	4.701	4.527	E	3.935	D	4.231	D	164.702	1.301
57087	6306	OTTAWA ST S	VALLEYVIEW RD	NINE PINES RD	4.919	4.699	E	3.999	D	4.349	E	79.165	1.536
58900	6410	OTTAWA ST S	NINE PINES RD	FISCHER HALLMAN RD	4.246	4.168	D	3.733	D	3.950	D	102.591	0.953
55753	9503	OTTAWA ST S	FISCHER HALLMAN RD	INTERNATIONAL PL	3.959	3.941	D	3.683	D	3.812	D	630.408	0.842

Zone 2 - Zone 6													
Route-Level QOS Score	4.276												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
58492	11628	OTTAWA ST S	ALPINE RD	STRASBURG RD	4.470	4.345	D	3.784	D	4.064	D	428.425	1.069
55964	10839	OTTAWA ST S	HOMER WATSON BLVD	ALPINE RD	5.224	4.940	E	4.355	E	4.648	E	134.788	2.839
56216	11763	HOMER WATSON BLVD	C_PKY STR ONRAMP	OTTAWA ST S	5.300	5.000	F	4.592	E	4.796	E	310.133	4.904
57186	40083	HOMER WATSON BLVD	C_PKY STR OFFRAMP	C_PKY STR ONRAMP	4.418	4.304	D	3.875	D	4.089	D	220.505	1.098
53460	40082	HOMER WATSON BLVD	HOFFMAN ST	C_PKY STR OFFRAMP	4.708	4.533	E	3.937	D	4.235	D	64.600	1.307
53613	11424	HOFFMAN ST	HIGHLAND RD E	HOMER WATSON BLVD	3.795	3.812	D	3.702	D	3.757	D	176.649	0.805
53612	11419	HIGHLAND RD E	HEIMAN ST	HOFFMAN ST	3.869	3.870	D	3.737	D	3.804	D	354.803	0.836
57180	11340	HIGHLAND RD E	MAUSSER AVE	HEIMAN ST	3.793	3.810	D	3.701	D	3.756	D	258.645	0.804
56272	6314	HIGHLAND RD E	STIRLING AVE S	MAUSSER AVE	3.799	3.815	D	3.704	D	3.760	D	108.733	0.806
57181	6719	HIGHLAND RD E	DELAWARE AVE	STIRLING AVE S	3.943	3.929	D	3.810	D	3.869	D	188.568	0.885
56032	6723	HIGHLAND RD E	SPADINA RD E	DELAWARE AVE	3.805	3.820	D	3.707	D	3.763	D	141.347	0.809
56033	6433	HIGHLAND RD E	RUBY ST	SPADINA RD E	4.401	4.290	D	3.902	D	4.096	D	294.330	1.107
57377	5722	HIGHLAND RD E	WINSLOW DR	RUBY ST	4.699	4.526	E	4.018	D	4.272	E	78.565	1.373
56214	5729	HIGHLAND RD E	QUEENS BLVD	WINSLOW DR	4.699	4.526	E	4.018	D	4.272	E	96.764	1.373
59214	5725	HIGHLAND RD W	QUEENS BLVD	GARDEN AVE	5.300	5.000	F	4.095	D	4.548	E	141.924	2.210
58889	8664	HIGHLAND RD W	GARDEN AVE	WEST AVE	5.300	5.000	F	4.187	D	4.594	E	178.913	2.462
52854	1702	WEST AVE	HIGHLAND RD W	BROCK ST	3.235	3.370	C	3.404	C	3.387	C	81.466	0.620
54502	1701	WEST AVE	BROCK ST	HOMEWOOD AVE	3.207	3.348	C	3.379	C	3.364	C	154.383	0.611
57222	8534	WEST AVE	HOMEWOOD AVE	VICTORIA ST S	3.229	3.365	C	3.399	C	3.382	C	345.477	0.618
55566	8536	VICTORIA ST S	WALNUT ST	STRANGE ST	4.630	4.471	E	3.879	D	4.175	D	222.224	1.212
58912	8763	VICTORIA ST S	HENRY ST	WALNUT ST	5.300	5.000	F	4.235	D	4.618	E	98.012	2.615
58640	8767	VICTORIA ST S	PARK ST	HENRY ST	4.659	4.494	E	3.888	D	4.191	D	83.478	1.236
54345	8774	VICTORIA ST S	THERESA ST	PARK ST	4.675	4.507	E	3.892	D	4.199	D	73.971	1.249
58148	8793	VICTORIA ST S	BRAMM ST	THERESA ST	4.690	4.518	E	3.896	D	4.207	D	69.628	1.262
58149	8791	VICTORIA ST S	MICHAEL ST	BRAMM ST	4.704	4.530	E	3.900	D	4.215	D	16.729	1.274
58342	1691	VICTORIA ST S	GARMENT ST	MICHAEL ST	4.721	4.543	E	3.905	D	4.224	D	62.456	1.288
78084	604291	VICTORIA ST S	OAK ST	GARMENT ST	2.740	2.979	C	0.697	A	1.838	A	43.232	0.316
58150	8798	VICTORIA ST S	ARTHUR PL	OAK ST	4.736	4.554	E	3.909	D	4.232	D	26.468	1.301
53719	8788	VICTORIA ST S	JOSEPH ST	ARTHUR PL	4.750	4.566	E	3.913	D	4.239	D	78.125	1.314
59091	8787	VICTORIA ST S	CHARLES ST W	JOSEPH ST	4.748	4.564	E	3.912	D	4.238	D	128.650	1.312
59243	8923	VICTORIA ST S	HALLS LANE W	CHARLES ST W	4.587	4.437	E	3.867	D	4.152	D	55.411	1.179
55534	9033	VICTORIA ST S	KING ST W	HALLS LANE W	4.228	4.154	D	3.818	D	3.986	D	58.907	0.986
57312	5898	VICTORIA ST N	KING ST W	DUKE ST W	4.081	4.037	D	3.732	D	3.885	D	251.991	0.897
52996	7052	VICTORIA ST N	DUKE ST W	WEBER ST W	4.733	4.552	E	3.908	D	4.230	D	179.751	1.299

Zone 2 - Zone 7													
Route-Level QOS Score	4.265												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
55912	10824	STRASBURG RD	OTTAWA ST S	KINGSWOOD DR	3.484	3.566	D	3.491	C	3.528	D	246.602	0.680
57358	10836	STRASBURG RD	KINGSWOOD DR	BARWOOD CRES	3.549	3.618	D	3.529	D	3.574	D	28.224	0.701
57359	10825	STRASBURG RD	BARWOOD CRES	BARWOOD CRES	3.585	3.646	D	3.549	D	3.598	D	188.857	0.713
55918	10834	STRASBURG RD	BARWOOD CRES	SELKIRK DR	3.571	3.635	D	3.541	D	3.588	D	187.137	0.708
55916	10815	STRASBURG RD	SELKIRK DR	BLACKHORNE DR	3.578	3.640	D	3.545	D	3.592	D	192.727	0.710
55913	10812	STRASBURG RD	BLACKHORNE DR	BLOCK LINE RD	3.518	3.593	D	3.511	D	3.552	D	143.435	0.691
58018	10915	BLOCK LINE RD	STRASBURG RD	COUNTRY HILL DR	3.590	3.650	D	3.552	D	3.601	D	374.928	0.715
57304	10918	BLOCK LINE RD	COUNTRY HILL DR	KINGSWOOD DR	3.669	3.713	D	3.593	D	3.653	D	215.069	0.742
55689	10928	BLOCK LINE RD	KINGSWOOD DR	HOMER WATSON BLVD	4.489	4.360	D	3.956	D	4.158	D	178.442	1.188
55690	600353	BLOCK LINE RD	HOMER WATSON BLVD	FALLOWFIELD DR	3.030	3.208	C	3.093	C	3.150	C	183.180	0.541
55631	600915	BLOCK LINE RD	FALLOWFIELD DR	LENNOX LEWIS WAY	3.031	3.209	C	3.094	C	3.151	C	358.988	0.541
55632	103019	BLOCK LINE RD	LENNOX LEWIS WAY	COURTLAND AVE E	2.654	2.911	C	-1.737	A	0.587	A	270.826	0.227
54075	10093	COURTLAND AVE E	BLOCK LINE RD	SHELLEY DR	4.498	4.367	E	3.792	D	4.080	D	256.802	1.086
53709	10103	COURTLAND AVE E	SHELLEY DR	SIEBERT AVE	5.212	4.931	E	4.001	D	4.466	E	145.186	1.873
54896	10099	COURTLAND AVE E	SIEBERT AVE	BALZER RD	5.300	5.000	F	4.120	D	4.560	E	249.149	2.272
58368	21835	COURTLAND AVE E	BALZER RD	MANITOU DR	4.781	4.590	E	3.843	D	4.217	D	143.351	1.276
53770	10714	FAIRWAY RD S	WILSON AVE	MANITOU DR	5.300	5.000	F	4.196	D	4.598	E	908.648	2.488
55327	600416	FAIRWAY RD S	WABANAKI DR	WILSON AVE	4.859	4.652	E	3.863	D	4.257	E	482.211	1.346
55326	22103	FAIRWAY RD S	KING ST BYPASS OFFRAMP	WABANAKI DR	5.242	4.954	E	4.002	D	4.478	E	294.788	1.916
53241	22107	FAIRWAY RD S	KING ST BYPASS ONRAMP	KING ST BYPASS OFFRAMP	5.300	5.000	F	4.363	D	4.681	E	16.876	3.137
58635	22324	FAIRWAY RD S	FAIRWAY RD N	KING ST BYPASS ONRAMP	5.300	5.000	F	4.062	D	4.531	E	489.939	2.132

Zone 2 - Zone 9													
Route-Level QOS Score	4.346												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
55912	10824	STRASBURG RD	OTTAWA ST S	KINGSWOOD DR	3.484	3.566	D	3.491	C	3.528	D	246.602	0.680
57358	10836	STRASBURG RD	KINGSWOOD DR	BARWOOD CRES	3.549	3.618	D	3.529	D	3.574	D	28.224	0.701
57359	10825	STRASBURG RD	BARWOOD CRES	BARWOOD CRES	3.585	3.646	D	3.549	D	3.598	D	188.857	0.713
55918	10834	STRASBURG RD	BARWOOD CRES	SELKIRK DR	3.571	3.635	D	3.541	D	3.588	D	187.137	0.708
55916	10815	STRASBURG RD	SELKIRK DR	BLACKHORNE DR	3.578	3.640	D	3.545	D	3.592	D	192.727	0.710
55913	10812	STRASBURG RD	BLACKHORNE DR	BLOCK LINE RD	3.518	3.593	D	3.511	D	3.552	D	143.435	0.691
58018	10915	BLOCK LINE RD	STRASBURG RD	COUNTRY HILL DR	3.590	3.650	D	3.552	D	3.601	D	374.928	0.715
57304	10918	BLOCK LINE RD	COUNTRY HILL DR	KINGSWOOD DR	3.669	3.713	D	3.593	D	3.653	D	215.069	0.742
55689	10928	BLOCK LINE RD	KINGSWOOD DR	HOMER WATSON BLVD	4.489	4.360	D	3.956	D	4.158	D	178.442	1.188
54230	9611	HOMER WATSON BLVD	BLOCK LINE RD	BLEAMS RD	5.300	5.000	F	4.196	D	4.598	E	1178.693	2.486
59041	21862	HOMER WATSON BLVD	BLEAMS RD	BEASLEY DR	4.836	4.633	E	3.930	D	4.282	E	548.731	1.393
59042	21808	HOMER WATSON BLVD	BEASLEY DR	HOMER WATSON OFFRAMP	4.872	4.662	E	3.941	D	4.302	E	193.438	1.432
59043	25666	HOMER WATSON BLVD	HOMER WATSON OFFRAMP	HOMER WATSON ONRAMP	5.300	5.000	F	4.236	D	4.618	E	602.619	2.619
59044	21992	HOMER WATSON BLVD	HOMER WATSON ONRAMP	DOON VILLAGE RD	4.900	4.684	E	3.950	D	4.317	E	232.906	1.464
55821	21996	DOON VILLAGE RD	HOMER WATSON BLVD	MILLWOOD CRES	4.000	3.974	D	3.735	D	3.854	D	124.549	0.873
56337	21937	DOON VILLAGE RD	MILLWOOD CRES	UPPER CANADA DR	4.000	3.974	D	3.735	D	3.854	D	92.566	0.873
56085	22006	DOON VILLAGE RD	UPPER CANADA DR	MILLWOOD CRES	3.578	3.640	D	3.545	D	3.592	D	58.011	0.710
55823	21939	DOON VILLAGE RD	MILLWOOD CRES	PIONEER DR	3.729	3.760	D	3.622	D	3.691	D	166.822	0.764

Zone 2 - Zone 8													
Route-Level QOS Score	4.194												
Route-Level QOS	D												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
58492	11628	OTTAWA ST S	ALPINE RD	STRASBURG RD	4.470	4.345	D	3.784	D	4.064	D	428.425	1.069
55964	10839	OTTAWA ST S	HOMER WATSON BLVD	ALPINE RD	5.224	4.940	E	4.355	E	4.648	E	134.788	2.839
54059	11761	OTTAWA ST S	C_PKY WAT ONRAMP	HOMER WATSON BLVD	4.510	4.376	D	3.796	D	4.086	D	76.108	1.094
54058	11747	OTTAWA ST S	IMPERIAL DR	C_PKY WAT ONRAMP	4.944	4.719	E	3.937	D	4.328	E	159.119	1.488
58491	11639	OTTAWA ST S	KEHL ST	IMPERIAL DR	4.103	4.055	D	3.740	D	3.898	D	76.425	0.907
57499	11743	OTTAWA ST S	HOFFMAN ST	KEHL ST	4.228	4.153	D	3.785	D	3.969	D	294.531	0.970
55914	10877	OTTAWA ST S	PATTANDON AVE	HOFFMAN ST	4.226	4.152	D	3.817	D	3.985	D	211.713	0.985
58130	11449	OTTAWA ST S	MILL ST	PATTANDON AVE	4.490	4.361	D	3.838	D	4.099	D	52.690	1.110
58131	11457	OTTAWA ST S	MILL ST	MILL ST	4.204	4.134	D	3.777	D	3.956	D	43.410	0.958
55624	10901	OTTAWA ST S	ACACIA ST	MILL ST	4.731	4.551	E	4.026	D	4.289	E	81.430	1.406
54548	6890	OTTAWA ST S	LILAC ST	ACACIA ST	5.067	4.816	E	4.035	D	4.426	E	137.164	1.742
56864	6886	OTTAWA ST S	COURTLAND AVE E	LILAC ST	5.105	4.846	E	4.045	D	4.446	E	86.996	1.804
56850	6888	COURTLAND AVE E	GRENVILLE AVE	OTTAWA ST S	4.431	4.314	D	3.912	D	4.113	D	91.063	1.127
56817	6894	COURTLAND AVE E	BORDEN AVE S	GRENVILLE AVE	4.633	4.474	E	3.944	D	4.209	D	96.932	1.264
57024	6899	COURTLAND AVE E	KENT AVE	BORDEN AVE S	4.705	4.530	E	3.965	D	4.248	D	189.170	1.329
57861	11661	COURTLAND AVE E	PALMER AVE	KENT AVE	4.749	4.565	E	3.977	D	4.271	E	177.065	1.372
58927	11373	COURTLAND AVE E	VERNON AVE	PALMER AVE	4.775	4.586	E	3.985	D	4.285	E	94.348	1.399
58881	11382	COURTLAND AVE E	STIRLING AVE S	VERNON AVE	4.801	4.606	E	3.992	D	4.299	E	102.949	1.427
57661	11390	COURTLAND AVE E	STIRLING AVE S	STIRLING AVE S	4.914	4.696	E	3.929	D	4.312	E	51.616	1.454
59075	11607	COURTLAND AVE E	MADISON AVE S	STIRLING AVE S	3.906	3.899	D	3.660	D	3.780	D	140.245	0.819
53521	6650	COURTLAND AVE E	CEDAR ST S	MADISON AVE S	5.285	4.988	E	4.087	D	4.538	E	128.286	2.164
55928	6647	COURTLAND AVE E	PETER ST	CEDAR ST S	5.117	4.856	E	4.048	D	4.452	E	201.694	1.824
55929	11293	COURTLAND AVE E	HEBEL PL	PETER ST	4.445	4.325	D	3.916	D	4.121	D	114.991	1.137
58811	6610	COURTLAND AVE E	BENTON ST	HEBEL PL	4.449	4.328	D	3.918	D	4.123	D	114.546	1.140
58055	6608	BENTON ST	ST GEORGE ST	COURTLAND AVE E	3.352	3.462	D	3.408	C	3.435	C	197.430	0.639
58101	6707	BENTON ST	CHURCH ST	ST GEORGE ST	3.007	3.190	C	3.066	C	3.128	C	131.789	0.534
58102	11314	BENTON ST	CHARLES ST E	CHURCH ST	3.355	3.464	D	3.410	C	3.437	C	93.833	0.640
57764	11322	BENTON ST	HALLS LANE E	CHARLES ST E	3.333	3.447	D	3.394	C	3.420	C	38.729	0.633
57765	11320	BENTON ST	KING ST E	HALLS LANE E	3.618	3.672	D	3.515	D	3.593	D	66.080	0.711
53625	6801	FREDERICK ST	KING ST E	GOUDIES LANE	3.582	3.644	D	3.494	C	3.569	D	60.625	0.699
53626	6802	FREDERICK ST	GOUDIES LANE	DUKE ST E	3.355	3.464	D	3.410	C	3.437	C	78.411	0.640
56682	6744	FREDERICK ST	DUKE ST E	WEBER ST E	3.412	3.510	D	3.450	C	3.480	C	133.442	0.658
54055	6776	FREDERICK ST	WEBER ST E	SPETZ ST	3.788	3.807	D	3.606	D	3.707	D	105.202	0.773
54033	6754	FREDERICK ST	SPETZ ST	IRVIN ST	3.798	3.814	D	3.611	D	3.713	D	113.431	0.777
57867	6788	FREDERICK ST	IRVIN ST	OTTO ST	3.675	3.717	D	3.548	D	3.632	D	74.124	0.731
57868	6750	FREDERICK ST	OTTO ST	LANCASTER ST E	3.817	3.829	D	3.620	D	3.724	D	141.813	0.784
56156	11153	LANCASTER ST E	MIEHM PL	FREDERICK ST	3.549	3.618	D	3.622	D	3.620	D	74.995	0.724
56608	11136	LANCASTER ST E	CLARENCE PL	MIEHM PL	3.549	3.618	D	3.622	D	3.620	D	35.822	0.724
56053	11133	LANCASTER ST E	MANSION ST	CLARENCE PL	3.461	3.548	D	3.569	D	3.559	D	179.664	0.694
56054	602203	LANCASTER ST E	MANSION ST	MANSION ST	3.807	3.821	D	3.749	D	3.785	D	18.011	0.823
56966	11160	LANCASTER ST E	LUELLA ST	MANSION ST	3.519	3.594	D	3.604	D	3.599	D	80.346	0.714
56837	6971	LANCASTER ST E	QUEEN ST N	LUELLA ST	3.583	3.645	D	3.640	D	3.643	D	96.615	0.737
56212	6970	LANCASTER ST W	QUEEN ST N	VICTORIA ST N	3.506	3.583	D	3.504	D	3.543	D	63.726	0.687
59066	7046	LANCASTER ST W	VICTORIA ST N	BREITHAUPT ST	4.021	3.990	D	3.708	D	3.849	D	147.268	0.869
59065	11114	LANCASTER ST W	BREITHAUPT ST	BREITHAUPT ST	4.240	4.163	D	3.822	D	3.993	D	51.847	0.993
53634	7042	LANCASTER ST W	BREITHAUPT ST	WELLINGTON ST N	4.218	4.146	D	3.815	D	3.981	D	71.093	0.981
58564	7036	LANCASTER ST W	WELLINGTON ST N	LOUISA ST	5.300	5.000	F	4.176	D	4.588	E	123.127	2.428
58038	7041	LANCASTER ST W	LOUISA ST	HILLVIEW ST	5.300	5.000	F	4.093	D	4.546	E	96.374	2.205
53099	6961	LANCASTER ST W	HILLVIEW ST	HILL ST	5.289	4.991	E	4.088	D	4.540	E	132.055	2.173
53098	12646	LANCASTER ST W	HILL ST	GUELPH ST	5.267	4.974	E	4.083	D	4.529	E	171.802	2.122
56041	10483	LANCASTER ST W	GUELPH ST	ARNOLD ST	4.851	4.646	E	4.005	D	4.326	E	253.614	1.483
53096	10485	LANCASTER ST W	ARNOLD ST	ELIZABETH ST	4.877	4.666	E	4.012	D	4.339	E	69.323	1.513
57080	10487	LANCASTER ST W	ELIZABETH ST	CLIFTON RD	4.837	4.635	E	4.002	D	4.318	E	27.858	1.467
58331	10389	LANCASTER ST W	CLIFTON RD	ASH ST	5.183	4.908	E	4.064	D	4.486	E	56.418	1.945
57143	10381	LANCASTER ST W	ASH ST	UNION ST	5.161	4.890	E	4.058	D	4.474	E	221.163	1.903
55683	6953	LANCASTER ST W	UNION ST	C_PKY STR OFFRAMP	4.143	4.087	D	3.755	D	3.921	D	98.787	0.927
56965	6985	LANCASTER ST W	C_PKY WAT ONRAMP	C_PKY STR OFFRAMP	5.061	4.811	E	3.966	D	4.388	E	188.289	1.635
54972	12419	LANCASTER ST W	C_PKY WAT ONRAMP	HAMEL AVE	4.249	4.170	D	3.793	D	3.981	D	175.651	0.982
54971	12415	LANCASTER ST W	HAMEL AVE	BRIDGEPORT RD	3.817	3.829	D	3.620	D	3.724	D	150.168	0.784

Zone 2 - Zone 10													
Route-Level QOS Score	3.883												
Route-Level QOS	D												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
90562	605989	OTTAWA ST S	STRASBURG RD	HUNTSWORTH AVE	2.740	2.979	C	0.697	A	1.838	A	267.184	0.316
53064	6586	OTTAWA ST S	HUNTSWORTH AVE	ELMSDALE DR	4.632	4.473	E	3.880	D	4.176	D	276.007	1.214
58706	6388	OTTAWA ST S	ELMSDALE DR	HOWLAND DR	4.637	4.477	E	3.882	D	4.179	D	276.702	1.218
57326	6377	OTTAWA ST S	HOWLAND DR	MOWAT BLVD	4.498	4.367	D	3.841	D	4.104	D	96.443	1.116
54176	6376	OTTAWA ST S	MOWAT BLVD	WESTMOUNT RD E	4.570	4.424	E	3.862	D	4.143	D	276.205	1.167
56624	6390	WESTMOUNT RD E	GILMOUR CRES	OTTAWA ST S	4.625	4.467	E	3.878	D	4.172	D	423.900	1.208
54417	6605	WESTMOUNT RD E	GILMOUR CRES	GILMOUR CRES	4.613	4.458	E	3.875	D	4.166	D	86.809	1.199
57507	6565	WESTMOUNT RD E	STONYBROOK DR	GILMOUR CRES	4.601	4.448	E	3.871	D	4.160	D	111.863	1.190
55514	6560	WESTMOUNT RD E	VILLAGE RD	STONYBROOK DR	4.700	4.526	E	3.899	D	4.212	D	259.782	1.270
53818	6493	WESTMOUNT RD E	GREENBROOK DR	VILLAGE RD	4.232	4.157	D	3.787	D	3.972	D	96.805	0.973
53817	6506	WESTMOUNT RD E	EVERGREEN CRES	GREENBROOK DR	4.502	4.370	D	3.842	D	4.106	D	87.806	1.119
53787	6508	WESTMOUNT RD E	FOREST HILL DR	EVERGREEN CRES	4.577	4.429	E	3.864	D	4.147	D	270.400	1.172
57945	20900	WESTMOUNT RD E	GATEWOOD RD	FOREST HILL DR	4.654	4.490	E	3.886	D	4.188	D	87.764	1.231
55915	21000	WESTMOUNT RD E	QUEENS BLVD	GATEWOOD RD	4.728	4.549	E	3.907	D	4.228	D	188.056	1.295
57189	21006	QUEENS BLVD	WESTMOUNT RD E	CECILE DR	3.333	3.447	D	3.390	C	3.419	C	395.922	0.632
57188	20720	QUEENS BLVD	CECILE DR	WARREN RD	3.110	3.271	C	3.188	C	3.230	C	113.549	0.565
53611	20995	QUEENS BLVD	WARREN RD	KELLY DR	3.429	3.523	D	3.456	C	3.489	C	141.917	0.662
57187	20739	QUEENS BLVD	KELLY DR	SILVERSPRING CRES	3.381	3.485	D	3.424	C	3.454	C	36.630	0.647
56081	6187	QUEENS BLVD	SILVERSPRING CRES	EAGEN DR	3.024	3.203	C	3.136	C	3.170	C	179.391	0.546
53621	6177	QUEENS BLVD	EAGEN DR	BONFAIR CRT	3.119	3.278	C	3.199	C	3.239	C	136.299	0.568
53620	6170	QUEENS BLVD	BONFAIR CRT	OVERLEA DR	3.415	3.512	D	3.447	C	3.479	C	49.689	0.658
53619	5602	QUEENS BLVD	OVERLEA DR	FISCHER HALLMAN RD	3.525	3.599	D	3.515	D	3.557	D	166.644	0.693
57634	5603	QUEENS BLVD	FISCHER HALLMAN RD	ELM RIDGE DR	3.201	3.343	C	3.280	C	3.312	C	385.325	0.592
59248	5425	QUEENS BLVD	ELM RIDGE DR	WESTHEIGHTS DR	3.247	3.379	C	3.322	C	3.350	C	166.980	0.606
58831	20732	WESTHEIGHTS DR	BLACKWELL DR	QUEENS BLVD	3.036	3.212	C	3.101	C	3.156	C	134.162	0.542
57835	20807	WESTHEIGHTS DR	HIGHLAND RD W	BLACKWELL DR	3.144	3.298	C	3.225	C	3.262	C	209.666	0.575

Zone 3 - Zone 4													
Route-Level QOS Score	4.331												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
55704	6168	WESTMOUNT RD W	VICMOUNT DR	VICTORIA ST S	4.977	4.745	E	4.014	D	4.379	E	167.835	1.612
55630	20989	WESTMOUNT RD W	HIGHLAND RD W	VICMOUNT DR	4.503	4.371	D	3.825	D	4.098	D	531.551	1.109
56095	20991	WESTMOUNT RD W	OVERLEA DR	HIGHLAND RD W	4.378	4.272	D	3.756	D	4.014	D	120.110	1.014
54562	6277	WESTMOUNT RD W	QUEENS BLVD	OVERLEA DR	5.166	4.895	E	3.990	D	4.443	E	338.380	1.794
55915	21000	WESTMOUNT RD E	QUEENS BLVD	GATEWOOD RD	4.728	4.549	E	3.907	D	4.228	D	188.056	1.295
57945	20900	WESTMOUNT RD E	GATEWOOD RD	FOREST HILL DR	4.654	4.490	E	3.886	D	4.188	D	87.764	1.231
53787	6508	WESTMOUNT RD E	FOREST HILL DR	EVERGREEN CRES	4.577	4.429	E	3.864	D	4.147	D	270.400	1.172
53817	6506	WESTMOUNT RD E	EVERGREEN CRES	GREENBROOK DR	4.502	4.370	D	3.842	D	4.106	D	87.806	1.119
54241	6573	GREENBROOK DR	FARMBROOK PL	WESTMOUNT RD E	3.277	3.403	D	3.439	C	3.421	C	277.682	0.633
52982	6249	GREENBROOK DR	FOREST HILL DR	FARMBROOK PL	3.461	3.548	D	3.569	D	3.559	D	98.224	0.694
55458	6346	GREENBROOK DR	LAKESIDE DR	FOREST HILL DR	3.515	3.591	D	3.602	D	3.597	D	279.998	0.713
58772	6456	GREENBROOK DR	STIRLING AVE S	LAKESIDE DR	3.535	3.607	D	3.614	D	3.610	D	212.156	0.720
54795	6591	STIRLING AVE S	HOMER WATSON BLVD	GREENBROOK DR	3.819	3.831	D	3.755	D	3.793	D	188.201	0.828
57562	6590	HOMER WATSON BLVD	STIRLING AVE S	HOFFMAN ST	4.006	3.979	D	3.747	D	3.863	D	640.857	0.879
53460	40082	HOMER WATSON BLVD	HOFFMAN ST	C_PKY STR OFFRAMP	4.708	4.533	E	3.937	D	4.235	D	64.600	1.307
57186	40083	HOMER WATSON BLVD	C_PKY STR OFFRAMP	C_PKY STR ONRAMP	4.418	4.304	D	3.875	D	4.089	D	220.505	1.098
56216	11763	HOMER WATSON BLVD	C_PKY STR ONRAMP	OTTAWA ST S	5.300	5.000	E	4.592	E	4.796	E	310.133	4.904
59070	10766	HOMER WATSON BLVD	OTTAWA ST S	HANSON AVE	5.300	5.000	F	4.336	E	4.668	E	608.822	3.014
54229	10944	HOMER WATSON BLVD	HANSON AVE	BLOCK LINE RD	5.300	5.000	F	4.040	D	4.520	E	695.316	2.084
55690	600353	BLOCK LINE RD	HOMER WATSON BLVD	FALLOWFIELD DR	3.030	3.208	C	3.093	C	3.150	C	183.180	0.541
55631	600915	BLOCK LINE RD	FALLOWFIELD DR	LENNOX LEWIS WAY	3.031	3.209	C	3.094	C	3.151	C	358.988	0.541
55632	103019	BLOCK LINE RD	LENNOX LEWIS WAY	COURTLAND AVE E	2.654	2.911	C	-1.737	A	0.587	A	270.826	0.227
54075	10093	COURTLAND AVE E	BLOCK LINE RD	SHELLEY DR	4.498	4.367	E	3.792	D	4.080	D	256.802	1.086
53709	10103	COURTLAND AVE E	SHELLEY DR	SIEBERT AVE	5.212	4.931	E	4.001	D	4.466	E	145.186	1.873
54896	10099	COURTLAND AVE E	SIEBERT AVE	BALZER RD	5.300	5.000	F	4.120	D	4.560	E	249.149	2.272
58368	21835	COURTLAND AVE E	BALZER RD	MANITOU DR	4.781	4.590	E	3.843	D	4.217	D	143.351	1.276

Zone 3 - Zone 5													
Route-Level QOS Score	4.254												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
55704	6168	WESTMOUNT RD W	VICMOUNT DR	VICTORIA ST S	4.977	4.745	E	4.014	D	4.379	E	167.835	1.612
55630	20989	WESTMOUNT RD W	HIGHLAND RD W	VICMOUNT DR	4.503	4.371	D	3.825	D	4.098	D	531.551	1.109
54157	20719	HIGHLAND RD W	WESTMOUNT RD W	HIGHLAND CRES	4.296	4.207	D	3.752	D	3.980	D	168.450	0.980
57540	20717	HIGHLAND RD W	HIGHLAND CRES	FIELDGATE ST	4.246	4.168	D	3.811	D	3.989	D	338.280	0.989
59064	20702	HIGHLAND RD W	FIELDGATE ST	EAGEN DR	4.241	4.164	D	3.808	D	3.986	D	172.606	0.986
58669	20757	HIGHLAND RD W	EAGEN DR	HIGHLAND CRES	4.234	4.158	D	3.806	D	3.982	D	163.551	0.983
57798	6104	HIGHLAND RD W	HIGHLAND CRES	FISCHER HALLMAN RD	3.929	3.918	D	3.588	D	3.753	D	184.851	0.802
59114	5601	FISCHER HALLMAN RD	HIGHLAND RD W	QUEENS BLVD	5.003	4.766	E	3.952	D	4.359	E	363.091	1.559
58397	6174	FISCHER HALLMAN RD	QUEENS BLVD	SUMMIT AVE	5.132	4.868	E	4.027	D	4.447	E	187.597	1.810
54565	6180	FISCHER HALLMAN RD	SUMMIT AVE	FOREST HILL DR	4.682	4.512	E	3.894	D	4.203	D	331.539	1.255
58085	6137	FISCHER HALLMAN RD	FOREST HILL DR	MCGARRY DR	5.220	4.937	E	4.003	D	4.470	E	173.881	1.885
53820	6143	FISCHER HALLMAN RD	MCGARRY DR	C_PKY STR ONRAMP	5.300	5.000	F	4.085	D	4.543	E	414.094	2.187
52961	6296	FISCHER HALLMAN RD	C_PKY WAT ONRAMP	C_PKY WAT ONRAMP	5.300	5.000	F	4.060	D	4.530	E	94.310	2.127
55076	6149	FISCHER HALLMAN RD	C_PKY STR ONRAMP	C_PKY STR OFFRAMP	4.320	4.226	D	3.738	D	3.982	D	9.411	0.982
58603	6303	FISCHER HALLMAN RD	C_PKY WAT OFFRAMP	OTTAWA ST S	5.300	5.000	F	4.045	D	4.522	E	176.744	2.094
55753	9503	OTTAWA ST S	FISCHER HALLMAN RD	INTERNATIONAL PL	3.959	3.941	D	3.683	D	3.812	D	630.408	0.842

Zone 3 - Zone 6													
Route-Level QOS Score	4.243												
Route-Level QOS	D												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
56584	1726	VICTORIA ST S	WEICHEL ST	WESTMOUNT RD W	4.972	4.741	E	3.944	D	4.343	E	115.434	1.522
57303	8515	VICTORIA ST S	PAULANDER DR	WEICHEL ST	4.634	4.475	E	3.881	D	4.178	D	164.245	1.216
54564	8631	VICTORIA ST S	ALICE AVE	PAULANDER DR	4.548	4.407	E	3.856	D	4.131	D	205.677	1.151
56774	1720	VICTORIA ST S	LAWRENCE AVE	ALICE AVE	4.582	4.433	E	3.866	D	4.149	D	120.907	1.176
56433	1717	VICTORIA ST S	BELMONT AVE W	LAWRENCE AVE	5.300	5.000	F	4.188	D	4.594	E	246.471	2.464
57039	8684	VICTORIA ST S	PATRICIA AVE	BELMONT AVE W	4.170	4.108	D	3.799	D	3.954	D	271.864	0.956
56381	8689	VICTORIA ST S	STRANGE ST	PATRICIA AVE	4.613	4.458	E	3.875	D	4.166	D	295.170	1.199
55566	8536	VICTORIA ST S	WALNUT ST	STRANGE ST	4.630	4.471	E	3.879	D	4.175	D	222.224	1.212
58912	8763	VICTORIA ST S	HENRY ST	WALNUT ST	5.300	5.000	F	4.235	D	4.618	E	98.012	2.615
58640	8767	VICTORIA ST S	PARK ST	HENRY ST	4.659	4.494	E	3.888	D	4.191	D	83.478	1.236
54345	8774	VICTORIA ST S	THERESA ST	PARK ST	4.675	4.507	E	3.892	D	4.199	D	73.971	1.249
58148	8793	VICTORIA ST S	BRAMM ST	THERESA ST	4.690	4.518	E	3.896	D	4.207	D	69.628	1.262
58149	8791	VICTORIA ST S	MICHAEL ST	BRAMM ST	4.704	4.530	E	3.900	D	4.215	D	16.729	1.274
58342	1691	VICTORIA ST S	GARMENT ST	MICHAEL ST	4.721	4.543	E	3.905	D	4.224	D	62.456	1.288
78084	604291	VICTORIA ST S	OAK ST	GARMENT ST	2.740	2.979	C	0.697	A	1.838	A	43.232	0.316
58150	8798	VICTORIA ST S	ARTHUR PL	OAK ST	4.736	4.554	E	3.909	D	4.232	D	26.468	1.301
53719	8788	VICTORIA ST S	JOSEPH ST	ARTHUR PL	4.750	4.566	E	3.913	D	4.239	D	78.125	1.314
59091	8787	VICTORIA ST S	CHARLES ST W	JOSEPH ST	4.748	4.564	E	3.912	D	4.238	D	128.650	1.312
59243	8923	VICTORIA ST S	HALLS LANE W	CHARLES ST W	4.587	4.437	E	3.867	D	4.152	D	55.411	1.179
55534	9033	VICTORIA ST S	KING ST W	HALLS LANE W	4.228	4.154	D	3.818	D	3.986	D	58.907	0.986
57312	5898	VICTORIA ST N	KING ST W	DUKE ST W	4.081	4.037	D	3.732	D	3.885	D	251.991	0.897
52996	7052	VICTORIA ST N	DUKE ST W	WEBER ST W	4.733	4.552	E	3.908	D	4.230	D	179.751	1.299

Zone 3 - Zone 7													
Route-Level QOS Score	4.389												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
55704	6168	WESTMOUNT RD W	VICMOUNT DR	VICTORIA ST S	4.977	4.745	E	4.014	D	4.379	E	167.835	1.612
55630	20989	WESTMOUNT RD W	HIGHLAND RD W	VICMOUNT DR	4.503	4.371	D	3.825	D	4.098	D	531.551	1.109
56095	20991	WESTMOUNT RD W	OVERLEA DR	HIGHLAND RD W	4.378	4.272	D	3.756	D	4.014	D	120.110	1.014
54562	6277	WESTMOUNT RD W	QUEENS BLVD	OVERLEA DR	5.166	4.895	E	3.990	D	4.443	E	338.380	1.794
55915	21000	WESTMOUNT RD E	QUEENS BLVD	GATEWOOD RD	4.728	4.549	E	3.907	D	4.228	D	188.056	1.295
57945	20900	WESTMOUNT RD E	GATEWOOD RD	FOREST HILL DR	4.654	4.490	E	3.886	D	4.188	D	87.764	1.231
53787	6508	WESTMOUNT RD E	FOREST HILL DR	EVERGREEN CRES	4.577	4.429	E	3.864	D	4.147	D	270.400	1.172
53817	6506	WESTMOUNT RD E	EVERGREEN CRES	GREENBROOK DR	4.502	4.370	D	3.842	D	4.106	D	87.806	1.119
54241	6573	GREENBROOK DR	FARMBROOK PL	WESTMOUNT RD E	3.277	3.403	D	3.439	C	3.421	C	277.682	0.633
52982	6249	GREENBROOK DR	FOREST HILL DR	FARMBROOK PL	3.461	3.548	D	3.569	D	3.559	D	98.224	0.694
55458	6346	GREENBROOK DR	LAKESIDE DR	FOREST HILL DR	3.515	3.591	D	3.602	D	3.597	D	279.998	0.713
58772	6456	GREENBROOK DR	STIRLING AVE S	LAKESIDE DR	3.535	3.607	D	3.614	D	3.610	D	212.156	0.720
54795	6591	STIRLING AVE S	HOMER WATSON BLVD	GREENBROOK DR	3.819	3.831	D	3.755	D	3.793	D	188.201	0.828
57562	6590	HOMER WATSON BLVD	STIRLING AVE S	HOFFMAN ST	4.006	3.979	D	3.747	D	3.863	D	640.857	0.879
53460	40082	HOMER WATSON BLVD	HOFFMAN ST	C_PKY STR OFFRAMP	4.708	4.533	E	3.937	D	4.235	D	64.600	1.307
57186	40083	HOMER WATSON BLVD	C_PKY STR OFFRAMP	C_PKY STR ONRAMP	4.418	4.304	D	3.875	D	4.089	D	220.505	1.098
56216	11763	HOMER WATSON BLVD	C_PKY STR ONRAMP	OTTAWA ST S	5.300	5.000	E	4.592	E	4.796	E	310.133	4.904
59070	10766	HOMER WATSON BLVD	OTTAWA ST S	HANSON AVE	5.300	5.000	E	4.336	E	4.668	E	608.822	3.014
54229	10944	HOMER WATSON BLVD	HANSON AVE	BLOCK LINE RD	5.300	5.000	E	4.040	D	4.520	E	695.316	2.084
55690	600353	BLOCK LINE RD	HOMER WATSON BLVD	FALLOWFIELD DR	3.030	3.208	C	3.093	C	3.150	C	183.180	0.541
55631	600915	BLOCK LINE RD	FALLOWFIELD DR	LENNOX LEWIS WAY	3.031	3.209	C	3.094	C	3.151	C	358.988	0.541
55632	103019	BLOCK LINE RD	LENNOX LEWIS WAY	COURTLAND AVE E	2.654	2.911	C	-1.737	A	0.587	A	270.826	0.227
54075	10093	COURTLAND AVE E	BLOCK LINE RD	SHELLEY DR	4.498	4.367	E	3.792	D	4.080	D	256.802	1.086
53709	10103	COURTLAND AVE E	SHELLEY DR	SIEBERT AVE	5.212	4.931	E	4.001	D	4.466	E	145.186	1.873
54896	10099	COURTLAND AVE E	SIEBERT AVE	BALZER RD	5.300	5.000	F	4.120	D	4.560	E	249.149	2.272
58368	21835	COURTLAND AVE E	BALZER RD	MANITOU DR	4.781	4.590	E	3.843	D	4.217	D	143.351	1.276
53770	10714	FAIRWAY RD S	WILSON AVE	MANITOU DR	5.300	5.000	F	4.196	D	4.598	E	908.648	2.488
55327	600416	FAIRWAY RD S	WABANAKI DR	WILSON AVE	4.859	4.652	E	3.863	D	4.257	E	482.211	1.346
55326	22103	FAIRWAY RD S	KING ST BYPASS OFFRAMP	WABANAKI DR	5.242	4.954	E	4.002	D	4.478	E	294.788	1.916
53241	22107	FAIRWAY RD S	KING ST BYPASS ONRAMP	KING ST BYPASS OFFRAMP	5.300	5.000	F	4.363	D	4.681	E	16.876	3.137
58635	22324	FAIRWAY RD S	FAIRWAY RD N	KING ST BYPASS ONRAMP	5.300	5.000	F	4.062	D	4.531	E	489.939	2.132

Zone 3 - Zone 8													
Route-Level QOS Score	4.147												
Route-Level QOS	D												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
53572	1725	WESTMOUNT RD W	VICTORIA ST S	KARN ST	5.214	4.932	E	4.050	D	4.491	E	317.024	1.964
56036	1310	WESTMOUNT RD W	KARN ST	CHOPIN DR	5.271	4.977	E	4.063	D	4.520	E	142.488	2.085
56035	1307	WESTMOUNT RD W	CHOPIN DR	GAGE AVE	5.173	4.900	E	4.039	D	4.469	E	183.503	1.884
56034	1258	WESTMOUNT RD W	GAGE AVE	WESTWOOD DR	5.166	4.894	E	4.038	D	4.466	E	170.058	1.872
53051	8722	WESTMOUNT RD W	WESTWOOD DR	GLASGOW ST	4.891	4.677	E	3.991	D	4.334	E	333.883	1.501
57301	1243	GLASGOW ST	DUNBAR RD	WESTMOUNT RD W	3.443	3.534	D	3.498	C	3.516	D	281.893	0.674
53864	1298	GLASGOW ST	AVONDALE AVE	DUNBAR RD	3.627	3.679	D	3.664	D	3.672	D	92.510	0.753
54328	1322	GLASGOW ST	MARINA RD	AVONDALE AVE	3.929	3.918	D	3.697	D	3.807	D	36.536	0.838
55237	1304	GLASGOW ST	EARL ST	MARINA RD	3.929	3.918	D	3.697	D	3.807	D	57.581	0.838
53582	1266	GLASGOW ST	BELMONT AVE W	EARL ST	3.929	3.918	D	3.697	D	3.807	D	140.479	0.838
53581	1252	GLASGOW ST	EDEN AVE	BELMONT AVE W	5.115	4.854	E	4.112	D	4.483	E	146.695	1.934
59132	1249	GLASGOW ST	YORK ST	EDEN AVE	3.681	3.722	D	3.691	D	3.707	D	194.556	0.773
53426	8576	GLASGOW ST	PARK ST	YORK ST	3.817	3.829	D	3.754	D	3.792	D	258.201	0.828
56723	8866	GLASGOW ST	GRUHN ST	PARK ST	3.399	3.499	D	3.529	D	3.514	D	76.528	0.673
56495	40031	GLASGOW ST	WALTER ST	GRUHN ST	3.029	3.207	C	3.185	C	3.196	C	94.658	0.554
56432	8865	WALTER ST	AGNES ST	GLASGOW ST	3.029	3.207	C	3.185	C	3.196	C	238.563	0.554
54842	8899	WALTER ST	WELLINGTON ST S	AGNES ST	3.215	3.354	C	3.387	C	3.370	C	178.019	0.614
56013	40013	WELLINGTON ST S	KING ST W	WALTER ST	3.093	3.258	C	3.263	C	3.261	C	121.246	0.575
52939	8900	WELLINGTON ST N	KING ST W	MOORE AVE	3.827	3.837	D	3.717	D	3.777	D	154.952	0.818
58344	8835	WELLINGTON ST N	MOORE AVE	WATERLOO ST	3.115	3.275	C	3.292	C	3.284	C	181.975	0.583
59184	8832	WELLINGTON ST N	WATERLOO ST	DUKE ST W	3.631	3.683	D	3.616	D	3.649	D	183.375	0.740
55104	8830	WELLINGTON ST N	DUKE ST W	WEBER ST W	3.167	3.316	C	3.346	C	3.331	C	165.855	0.599
56280	6676	WELLINGTON ST N	WEBER ST W	AHRENS ST W	3.535	3.607	D	3.557	D	3.582	D	189.213	0.705
52950	6682	WELLINGTON ST N	AHRENS ST W	MARGARET AVE	3.267	3.395	C	3.435	C	3.415	C	243.264	0.631
53788	7019	WELLINGTON ST N	MARGARET AVE	ST LEGER ST	3.493	3.574	D	3.529	D	3.552	D	302.103	0.690
53668	11111	WELLINGTON ST N	ST LEGER ST	MAJOR ST	3.601	3.659	D	3.598	D	3.629	D	215.975	0.729
55999	7043	WELLINGTON ST N	MAJOR ST	LANCASTER ST W	3.587	3.648	D	3.590	D	3.619	D	112.247	0.724
58564	7036	LANCASTER ST W	WELLINGTON ST N	LOUISA ST	5.300	5.000	F	4.176	D	4.588	E	123.127	2.428
58038	7041	LANCASTER ST W	LOUISA ST	HILLVIEW ST	5.300	5.000	F	4.093	D	4.546	E	96.374	2.205
53099	6961	LANCASTER ST W	HILLVIEW ST	HILL ST	5.289	4.991	E	4.088	D	4.540	E	132.055	2.173
53098	12646	LANCASTER ST W	HILL ST	GUELPH ST	5.267	4.974	E	4.083	D	4.529	E	171.802	2.122
56041	10483	LANCASTER ST W	GUELPH ST	ARNOLD ST	4.851	4.646	E	4.005	D	4.326	E	253.614	1.483
53096	10485	LANCASTER ST W	ARNOLD ST	ELIZABETH ST	4.877	4.666	E	4.012	D	4.339	E	69.323	1.513
57080	10487	LANCASTER ST W	ELIZABETH ST	CLIFTON RD	4.837	4.635	E	4.002	D	4.318	E	27.858	1.467
58331	10389	LANCASTER ST W	CLIFTON RD	ASH ST	5.183	4.908	E	4.064	D	4.486	E	56.418	1.945
57143	10381	LANCASTER ST W	ASH ST	UNION ST	5.161	4.890	E	4.058	D	4.474	E	221.163	1.903
55683	6953	LANCASTER ST W	UNION ST	C_PKY STR OFFRAMP	4.143	4.087	D	3.755	D	3.921	D	98.787	0.927
56965	6985	LANCASTER ST W	C_PKY WAT ONRAMP	C_PKY STR OFFRAMP	5.061	4.811	E	3.966	D	4.388	E	188.289	1.635
54972	12419	LANCASTER ST W	C_PKY WAT ONRAMP	HAMEL AVE	4.249	4.170	D	3.793	D	3.981	D	175.651	0.982
54971	12415	LANCASTER ST W	HAMEL AVE	BRIDGEPORT RD	3.817	3.829	D	3.620	D	3.724	D	150.168	0.784

Zone 3 - Zone 9													
Route-Level QOS Score	4.364												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
55704	6168	WESTMOUNT RD W	VICMOUNT DR	VICTORIA ST S	4.977	4.745	E	4.014	D	4.379	E	167.835	1.612
55630	20989	WESTMOUNT RD W	HIGHLAND RD W	VICMOUNT DR	4.503	4.371	D	3.825	D	4.098	D	531.551	1.109
56095	20991	WESTMOUNT RD W	OVERLEA DR	HIGHLAND RD W	4.378	4.272	D	3.756	D	4.014	D	120.110	1.014
54562	6277	WESTMOUNT RD W	QUEENS BLVD	OVERLEA DR	5.166	4.895	E	3.990	D	4.443	E	338.380	1.794
55915	21000	WESTMOUNT RD E	QUEENS BLVD	GATEWOOD RD	4.728	4.549	E	3.907	D	4.228	D	188.056	1.295
57945	20900	WESTMOUNT RD E	GATEWOOD RD	FOREST HILL DR	4.654	4.490	E	3.886	D	4.188	D	87.764	1.231
53787	6508	WESTMOUNT RD E	FOREST HILL DR	EVERGREEN CRES	4.577	4.429	E	3.864	D	4.147	D	270.400	1.172
53817	6506	WESTMOUNT RD E	EVERGREEN CRES	GREENBROOK DR	4.502	4.370	D	3.842	D	4.106	D	87.806	1.119
54241	6573	GREENBROOK DR	FARMBROOK PL	WESTMOUNT RD E	3.277	3.403	D	3.439	C	3.421	C	277.682	0.633
52982	6249	GREENBROOK DR	FOREST HILL DR	FARMBROOK PL	3.461	3.548	D	3.569	D	3.559	D	98.224	0.694
55458	6346	GREENBROOK DR	LAKESIDE DR	FOREST HILL DR	3.515	3.591	D	3.602	D	3.597	D	279.998	0.713
58772	6456	GREENBROOK DR	STIRLING AVE S	LAKESIDE DR	3.535	3.607	D	3.614	D	3.610	D	212.156	0.720
54795	6591	STIRLING AVE S	HOMER WATSON BLVD	GREENBROOK DR	3.819	3.831	D	3.755	D	3.793	D	188.201	0.828
57562	6590	HOMER WATSON BLVD	STIRLING AVE S	HOFFMAN ST	4.006	3.979	D	3.747	D	3.863	D	640.857	0.879
53460	40082	HOMER WATSON BLVD	HOFFMAN ST	C_PKY STR OFFRAMP	4.708	4.533	E	3.937	D	4.235	D	64.600	1.307
57186	40083	HOMER WATSON BLVD	C_PKY STR OFFRAMP	C_PKY STR ONRAMP	4.418	4.304	D	3.875	D	4.089	D	220.505	1.098
56216	11763	HOMER WATSON BLVD	C_PKY STR ONRAMP	OTTAWA ST S	5.300	5.000	E	4.592	E	4.796	E	310.133	4.904
59070	10766	HOMER WATSON BLVD	OTTAWA ST S	HANSON AVE	5.300	5.000	F	4.336	E	4.668	E	608.822	3.014
54229	10944	HOMER WATSON BLVD	HANSON AVE	BLOCK LINE RD	5.300	5.000	F	4.040	D	4.520	E	695.316	2.084
55821	21996	DOON VILLAGE RD	HOMER WATSON BLVD	MILLWOOD CRES	4.000	3.974	D	3.735	D	3.854	D	124.549	0.873
56337	21937	DOON VILLAGE RD	MILLWOOD CRES	UPPER CANADA DR	4.000	3.974	D	3.735	D	3.854	D	92.566	0.873
56085	22006	DOON VILLAGE RD	UPPER CANADA DR	MILLWOOD CRES	3.578	3.640	D	3.545	D	3.592	D	58.011	0.710
55823	21939	DOON VILLAGE RD	MILLWOOD CRES	PIONEER DR	3.729	3.760	D	3.622	D	3.691	D	166.822	0.764

Zone 3 - Zone 10													
Route-Level QOS Score	3.818												
Route-Level QOS	D												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
58396	1724	VICTORIA ST S	WESTMOUNT RD W	VICMOUNT DR	4.553	4.410	E	3.857	D	4.134	D	213.129	1.154
58343	1729	VICTORIA ST S	VICMOUNT DR	HAZELGLEN DR	4.690	4.518	E	3.896	D	4.207	D	48.243	1.262
54362	6098	VICTORIA ST S	HAZELGLEN DR	MONTE CARLO ST	4.524	4.388	E	3.849	D	4.118	D	205.860	1.134
57388	20631	VICTORIA ST S	MONTE CARLO ST	FISCHER HALLMAN RD	4.459	4.336	E	3.828	D	4.082	D	264.743	1.090
58645	20800	VICTORIA ST S	FISCHER HALLMAN RD	OPRINGTON DR	4.043	4.007	D	4.098	D	4.053	D	350.141	1.056
52907	20844	OPRINGTON DR	VICTORIA ST S	BENESFORT DR	3.073	3.242	C	3.240	C	3.241	C	137.593	0.569
57381	20839	OPRINGTON DR	BENESFORT DR	OPRINGTON CRT	2.901	3.106	C	2.086	B	2.596	B	160.632	0.416
56996	20521	OPRINGTON DR	OPRINGTON CRT	BANKSIDE DR	2.897	3.103	C	2.050	B	2.577	B	83.950	0.413
56502	20517	BANKSIDE DR	OPRINGTON DR	EASTFOREST TRAIL	2.827	3.048	C	1.361	A	2.204	B	147.937	0.358
59235	20501	EASTFOREST TRAIL	HIGHLAND RD W	BANKSIDE DR	3.105	3.267	C	3.277	C	3.272	C	249.610	0.579

Zone 4 - Zone 5													
Route-Level QOS Score	4.330												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
58368	21835	COURTLAND AVE E	BALZER RD	MANITOU DR	4.781	4.590	E	3.843	D	4.217	D	143.351	1.276
54896	10099	COURTLAND AVE E	SIEBERT AVE	BALZER RD	5.300	5.000	F	4.120	D	4.560	E	249.149	2.272
53709	10103	COURTLAND AVE E	SHELLEY DR	SIEBERT AVE	5.212	4.931	E	4.001	D	4.466	E	145.186	1.873
54075	10093	COURTLAND AVE E	BLOCK LINE RD	SHELLEY DR	4.498	4.367	E	3.792	D	4.080	D	256.802	1.086
55632	103019	BLOCK LINE RD	LENNOX LEWIS WAY	COURTLAND AVE E	2.654	2.911	C	-1.737	A	0.587	A	270.826	0.227
55631	600915	BLOCK LINE RD	FALLOWFIELD DR	LENNOX LEWIS WAY	3.031	3.209	C	3.094	C	3.151	C	358.988	0.541
55690	600353	BLOCK LINE RD	HOMER WATSON BLVD	FALLOWFIELD DR	3.030	3.208	C	3.093	C	3.150	C	183.180	0.541
54229	10944	HOMER WATSON BLVD	HANSON AVE	BLOCK LINE RD	5.300	5.000	F	4.040	D	4.520	E	695.316	2.084
59070	10766	HOMER WATSON BLVD	OTTAWA ST S	HANSON AVE	5.300	5.000	F	4.336	E	4.668	E	608.822	3.014
55964	10839	OTTAWA ST S	HOMER WATSON BLVD	ALPINE RD	5.224	4.940	E	4.355	E	4.648	E	134.788	2.839
58492	11628	OTTAWA ST S	ALPINE RD	STRASBURG RD	4.470	4.345	D	3.784	D	4.064	D	428.425	1.069
90562	605989	OTTAWA ST S	STRASBURG RD	HUNTSWORTH AVE	2.740	2.979	C	0.697	A	1.838	A	267.184	0.316
53064	6586	OTTAWA ST S	HUNTSWORTH AVE	ELMSDALE DR	4.632	4.473	E	3.880	D	4.176	D	276.007	1.214
58706	6388	OTTAWA ST S	ELMSDALE DR	HOWLAND DR	4.637	4.477	E	3.882	D	4.179	D	276.702	1.218
57326	6377	OTTAWA ST S	HOWLAND DR	MOWAT BLVD	4.498	4.367	D	3.841	D	4.104	D	96.443	1.116
54176	6376	OTTAWA ST S	MOWAT BLVD	WESTMOUNT RD E	4.570	4.424	E	3.862	D	4.143	D	276.205	1.167

Zone 4 - Zone 6													
Route-Level QOS Score	4.168												
Route-Level QOS	D												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
53770	10714	FAIRWAY RD S	WILSON AVE	MANITOU DR	5.300	5.000	F	4.196	D	4.598	E	908.648	2.488
55406	10709	WILSON AVE	KINGSWAY DR	FAIRWAY RD S	3.686	3.725	D	3.600	D	3.663	D	165.282	0.748
53302	10728	KINGSWAY DR	GREENFIELD AVE	WILSON AVE	4.125	4.073	D	3.872	D	3.972	D	304.463	0.973
58097	10973	KINGSWAY DR	CEDARWOODS CRES	GREENFIELD AVE	3.563	3.629	D	3.629	D	3.629	D	315.068	0.729
53551	22334	KINGSWAY DR	ST JEROME AVE	CEDARWOODS CRES	3.973	3.953	D	4.156	D	4.055	D	846.018	1.058
56077	22354	KINGSWAY DR	NINTH AVE	ST JEROME AVE	4.849	4.644	E	4.051	D	4.348	E	241.471	1.533
57678	10962	KINGSWAY DR	EIGHTH AVE	NINTH AVE	4.849	4.644	E	4.051	D	4.348	E	100.417	1.533
57677	10850	KINGSWAY DR	FRANKLIN ST S	EIGHTH AVE	4.645	4.483	E	3.999	D	4.241	D	90.496	1.318
56578	10846	FRANKLIN ST S	KINGSWAY DR	FRANKLIN ST N	4.885	4.673	E	4.060	D	4.366	E	54.639	1.578
57679	10781	FRANKLIN ST N	WEBER ST E	FRANKLIN ST S	3.421	3.517	D	3.544	D	3.530	D	179.767	0.680
59056	10993	WEBER ST E	BROADVIEW AVE	FRANKLIN ST N	4.126	4.073	D	3.749	D	3.911	D	144.193	0.918
54371	13145	WEBER ST E	EULER AVE	BROADVIEW AVE	4.110	4.061	D	3.743	D	3.902	D	88.270	0.911
54370	13146	WEBER ST E	DELLROY AVE	EULER AVE	4.093	4.047	D	3.737	D	3.892	D	89.029	0.903
54369	10038	WEBER ST E	EMERALD AVE	DELLROY AVE	4.078	4.036	D	3.731	D	3.883	D	89.440	0.895
58568	13156	WEBER ST E	WILFRED AVE	EMERALD AVE	4.122	4.070	D	3.748	D	3.909	D	91.609	0.916
53646	13158	WEBER ST E	ROSS AVE	WILFRED AVE	4.167	4.106	D	3.764	D	3.935	D	139.461	0.939
57049	10030	WEBER ST E	SHANTZ LANE	ROSS AVE	4.211	4.140	D	3.779	D	3.960	D	91.685	0.961
58483	13270	WEBER ST E	MONTGOMERY RD	SHANTZ LANE	4.256	4.176	D	3.795	D	3.985	D	225.136	0.985
52829	10015	WEBER ST E	JACKSON AVE	MONTGOMERY RD	4.204	4.135	D	3.811	D	3.973	D	431.494	0.974
56569	11675	WEBER ST E	EDMUND RD	JACKSON AVE	4.200	4.131	D	3.809	D	3.970	D	101.306	0.971
56568	10142	WEBER ST E	RAYMOND RD	EDMUND RD	4.195	4.127	D	3.808	D	3.968	D	101.117	0.969
56572	10143	WEBER ST E	SHELDON AVE N	RAYMOND RD	4.190	4.124	D	3.806	D	3.965	D	107.369	0.966
59120	11705	WEBER ST E	SYDNEY ST N	SHELDON AVE N	4.185	4.120	D	3.805	D	3.962	D	129.245	0.964
56571	11704	WEBER ST E	OTTAWA ST N	SYDNEY ST N	4.180	4.116	D	3.803	D	3.960	D	122.042	0.961
57524	10182	WEBER ST E	EAST AVE	OTTAWA ST N	4.176	4.112	D	3.801	D	3.957	D	20.287	0.959
52828	10189	WEBER ST E	EAST AVE	EAST AVE	4.176	4.112	D	3.801	D	3.957	D	32.610	0.959
58614	10185	WEBER ST E	ONWARD AVE	EAST AVE	4.170	4.108	D	3.799	D	3.954	D	222.535	0.956
58297	10178	WEBER ST E	BORDEN AVE N	ONWARD AVE	4.266	4.183	D	3.798	D	3.991	D	96.569	0.991
52824	10165	WEBER ST E	SIMEON ST	BORDEN AVE N	4.100	4.053	D	3.739	D	3.896	D	175.103	0.906
58298	10164	WEBER ST E	STIRLING AVE N	SIMEON ST	4.180	4.116	D	3.803	D	3.960	D	172.143	0.961
58672	9846	WEBER ST E	FAIRVIEW AVE	STIRLING AVE N	4.202	4.133	D	3.810	D	3.971	D	88.304	0.972
58299	9859	WEBER ST E	PANDORA AVE N	FAIRVIEW AVE	4.221	4.148	D	3.816	D	3.982	D	90.581	0.983
56893	6846	WEBER ST E	BETZNER AVE N	PANDORA AVE N	4.240	4.163	D	3.822	D	3.993	D	86.975	0.993
53940	6859	WEBER ST E	CAMERON ST N	BETZNER AVE N	4.462	4.338	D	3.829	D	4.084	D	98.276	1.091
53939	6863	WEBER ST E	MADISON AVE N	CAMERON ST N	4.481	4.354	D	3.835	D	4.094	D	125.207	1.104
58615	6885	WEBER ST E	KRUG ST	MADISON AVE N	4.502	4.370	D	3.842	D	4.106	D	127.385	1.119
58990	6879	WEBER ST E	SCOTT ST	KRUG ST	4.522	4.386	D	3.848	D	4.117	D	270.698	1.132
58598	6759	WEBER ST E	FREDERICK ST	SCOTT ST	4.543	4.403	E	3.854	D	4.128	D	155.076	1.147
58222	6770	WEBER ST E	QUEEN ST N	FREDERICK ST	4.563	4.418	E	3.860	D	4.139	D	125.407	1.161
58596	6766	WEBER ST W	QUEEN ST N	ONTARIO ST N	4.584	4.435	E	3.866	D	4.150	D	121.795	1.177
57525	6479	WEBER ST W	ONTARIO ST N	YOUNG ST	4.603	4.450	E	3.872	D	4.161	D	168.674	1.192
58989	6492	WEBER ST W	YOUNG ST	COLLEGE ST	4.623	4.465	E	3.877	D	4.171	D	111.870	1.207
55369	6666	WEBER ST W	COLLEGE ST	WATER ST N	4.644	4.482	E	3.883	D	4.183	D	105.647	1.224
53260	7055	WEBER ST W	WATER ST N	HEIT LANE	4.536	4.397	D	3.852	D	4.124	D	31.741	1.142
53264	7053	WEBER ST W	HEIT LANE	VICTORIA ST N	4.520	4.384	D	3.847	D	4.116	D	64.895	1.131

Zone 4 - Zone 7													
Route-Level QOS Score	4.521												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
53770	10714	FAIRWAY RD S	WILSON AVE	MANITOU DR	5.300	5.000	F	4.196	D	4.598	E	908.648	2.488
55327	600416	FAIRWAY RD S	WABANAKI DR	WILSON AVE	4.859	4.652	E	3.863	D	4.257	E	482.211	1.346
55326	22103	FAIRWAY RD S	KING ST BYPASS OFFRAMP	WABANAKI DR	5.242	4.954	E	4.002	D	4.478	E	294.788	1.916
53241	22107	FAIRWAY RD S	KING ST BYPASS ONRAMP	KING ST BYPASS OFFRAMP	5.300	5.000	F	4.363	D	4.681	E	16.876	3.137
58635	22324	FAIRWAY RD S	FAIRWAY RD N	KING ST BYPASS ONRAMP	5.300	5.000	F	4.062	D	4.531	E	489.939	2.132

Zone 4 - Zone 8														
Route-Level QOS Score	4.186													
Route-Level QOS	D													
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)	
53770	10714	FAIRWAY RD S	WILSON AVE	MANITOU DR	5.300	5.000	F	4.196	D	4.598	E	908.648	2.488	
55406	10709	WILSON AVE	KINGSWAY DR	FAIRWAY RD S	3.686	3.725	D	3.600	D	3.663	D	165.282	0.748	
53302	10728	KINGSWAY DR	GREENFIELD AVE	WILSON AVE	4.125	4.073	D	3.872	D	3.972	D	304.463	0.973	
58097	10973	KINGSWAY DR	CEDARWOODS CRES	GREENFIELD AVE	3.563	3.629	D	3.629	D	3.629	D	315.068	0.729	
53551	22334	KINGSWAY DR	ST JEROME AVE	CEDARWOODS CRES	3.973	3.953	D	4.156	D	4.055	D	846.018	1.058	
56077	22354	KINGSWAY DR	NINTH AVE	ST JEROME AVE	4.849	4.644	E	4.051	D	4.348	E	241.471	1.533	
57678	10962	KINGSWAY DR	EIGHTH AVE	NINTH AVE	4.849	4.644	E	4.051	D	4.348	E	100.417	1.533	
57677	10850	KINGSWAY DR	FRANKLIN ST S	EIGHTH AVE	4.645	4.483	E	3.999	D	4.241	D	90.496	1.318	
56578	10846	FRANKLIN ST S	KINGSWAY DR	FRANKLIN ST N	4.885	4.673	E	4.060	D	4.366	E	54.639	1.578	
57679	10781	FRANKLIN ST N	WEBER ST E	FRANKLIN ST S	3.421	3.517	D	3.544	D	3.530	D	179.767	0.680	
59056	10993	WEBER ST E	BROADVIEW AVE	FRANKLIN ST N	4.126	4.073	D	3.749	D	3.911	D	144.193	0.918	
54371	13145	WEBER ST E	EULER AVE	BROADVIEW AVE	4.110	4.061	D	3.743	D	3.902	D	88.270	0.911	
54370	13146	WEBER ST E	DELLROY AVE	EULER AVE	4.093	4.047	D	3.737	D	3.892	D	89.029	0.903	
54369	10038	WEBER ST E	EMERALD AVE	DELLROY AVE	4.078	4.036	D	3.731	D	3.883	D	89.440	0.895	
58568	13156	WEBER ST E	WILFRED AVE	EMERALD AVE	4.122	4.070	D	3.748	D	3.909	D	91.609	0.916	
53646	13158	WEBER ST E	ROSS AVE	WILFRED AVE	4.167	4.106	D	3.764	D	3.935	D	139.461	0.939	
57049	10030	WEBER ST E	SHANTZ LANE	ROSS AVE	4.211	4.140	D	3.779	D	3.960	D	91.685	0.961	
58483	13270	WEBER ST E	MONTGOMERY RD	SHANTZ LANE	4.256	4.176	D	3.795	D	3.985	D	225.136	0.985	
52829	10015	WEBER ST E	JACKSON AVE	MONTGOMERY RD	4.204	4.135	D	3.811	D	3.973	D	431.494	0.974	
56569	11675	WEBER ST E	EDMUND RD	JACKSON AVE	4.200	4.131	D	3.809	D	3.970	D	101.306	0.971	
56568	10142	WEBER ST E	RAYMOND RD	EDMUND RD	4.195	4.127	D	3.808	D	3.968	D	101.117	0.969	
56572	10143	WEBER ST E	SHELDON AVE N	RAYMOND RD	4.190	4.124	D	3.806	D	3.965	D	107.369	0.966	
59120	11705	WEBER ST E	SYDNEY ST N	SHELDON AVE N	4.185	4.120	D	3.805	D	3.962	D	129.245	0.964	
56571	11704	WEBER ST E	OTTAWA ST N	SYDNEY ST N	4.180	4.116	D	3.803	D	3.960	D	122.042	0.961	
57524	10182	WEBER ST E	EAST AVE	OTTAWA ST N	4.176	4.112	D	3.801	D	3.957	D	20.287	0.959	
52828	10189	WEBER ST E	EAST AVE	EAST AVE	4.176	4.112	D	3.801	D	3.957	D	32.610	0.959	
58614	10185	WEBER ST E	ONWARD AVE	EAST AVE	4.170	4.108	D	3.799	D	3.954	D	222.535	0.956	
58297	10178	WEBER ST E	BORDEN AVE N	ONWARD AVE	4.266	4.183	D	3.798	D	3.991	D	96.569	0.991	
52824	10165	WEBER ST E	SIMEON ST	BORDEN AVE N	4.100	4.053	D	3.739	D	3.896	D	175.103	0.906	
58298	10164	WEBER ST E	STIRLING AVE N	SIMEON ST	4.180	4.116	D	3.803	D	3.960	D	172.143	0.961	
58672	9846	WEBER ST E	FAIRVIEW AVE	STIRLING AVE N	4.202	4.133	D	3.810	D	3.971	D	88.304	0.972	
58299	9859	WEBER ST E	PANDORA AVE N	FAIRVIEW AVE	4.221	4.148	D	3.816	D	3.982	D	90.581	0.983	
56893	6846	WEBER ST E	BETZNER AVE N	PANDORA AVE N	4.240	4.163	D	3.822	D	3.993	D	86.975	0.993	
53940	6859	WEBER ST E	CAMERON ST N	BETZNER AVE N	4.462	4.338	D	3.829	D	4.084	D	98.276	1.091	
53939	6863	WEBER ST E	MADISON AVE N	CAMERON ST N	4.481	4.354	D	3.835	D	4.094	D	125.207	1.104	
58615	6885	WEBER ST E	KRUG ST	MADISON AVE N	4.502	4.370	D	3.842	D	4.106	D	127.385	1.119	
58990	6879	WEBER ST E	SCOTT ST	KRUG ST	4.522	4.386	D	3.848	D	4.117	D	270.698	1.132	
58598	6759	WEBER ST E	FREDERICK ST	SCOTT ST	4.543	4.403	E	3.854	D	4.128	D	155.076	1.147	
54055	6776	FREDERICK ST	WEBER ST E	SPETZ ST	3.788	3.807	D	3.606	D	3.707	D	105.202	0.773	
54033	6754	FREDERICK ST	SPETZ ST	IRVIN ST	3.798	3.814	D	3.611	D	3.713	D	113.431	0.777	
57867	6788	FREDERICK ST	IRVIN ST	OTTO ST	3.675	3.717	D	3.548	D	3.632	D	74.124	0.731	
57868	6750	FREDERICK ST	OTTO ST	LANCASTER ST E	3.817	3.829	D	3.620	D	3.724	D	141.813	0.784	
56156	11153	LANCASTER ST E	MIEHM PL	FREDERICK ST	3.549	3.618	D	3.622	D	3.620	D	74.995	0.724	
56608	11136	LANCASTER ST E	CLARENCE PL	MIEHM PL	3.549	3.618	D	3.622	D	3.620	D	35.822	0.724	
56053	11133	LANCASTER ST E	MANSION ST	CLARENCE PL	3.461	3.548	D	3.569	D	3.559	D	179.664	0.694	
56054	602203	LANCASTER ST E	MANSION ST	MANSION ST	3.807	3.821	D	3.749	D	3.785	D	18.011	0.823	
56966	11160	LANCASTER ST E	LUELLA ST	MANSION ST	3.519	3.594	D	3.604	D	3.599	D	80.346	0.714	
56837	6971	LANCASTER ST E	QUEEN ST N	LUELLA ST	3.583	3.645	D	3.640	D	3.643	D	96.615	0.737	
56212	6970	LANCASTER ST W	QUEEN ST N	VICTORIA ST N	3.506	3.583	D	3.504	D	3.543	D	63.726	0.687	
59066	7046	LANCASTER ST W	VICTORIA ST N	BREITHAUPT ST	4.021	3.990	D	3.708	D	3.849	D	147.268	0.869	
59065	11114	LANCASTER ST W	BREITHAUPT ST	BREITHAUPT ST	4.240	4.163	D	3.822	D	3.993	D	51.847	0.993	
53634	7042	LANCASTER ST W	BREITHAUPT ST	WELLINGTON ST N	4.218	4.146	D	3.815	D	3.981	D	71.093	0.981	
58564	7036	LANCASTER ST W	WELLINGTON ST N	LOUISA ST	5.300	5.000	F	4.176	D	4.588	E	123.127	2.428	
58038	7041	LANCASTER ST W	LOUISA ST	HILLVIEW ST	5.300	5.000	F	4.093	D	4.546	E	96.374	2.205	
53099	6961	LANCASTER ST W	HILLVIEW ST	HILL ST	5.289	4.991	E	4.088	D	4.540	E	132.055	2.173	
53098	12646	LANCASTER ST W	HILL ST	GUELPH ST	5.267	4.974	E	4.083	D	4.529	E	171.802	2.122	
56041	10483	LANCASTER ST W	GUELPH ST	ARNOLD ST	4.851	4.646	E	4.005	D	4.326	E	253.614	1.483	
53096	10485	LANCASTER ST W	ARNOLD ST	ELIZABETH ST	4.877	4.666	E	4.012	D	4.339	E	69.323	1.513	
57080	10487	LANCASTER ST W	ELIZABETH ST	CLIFTON RD	4.837	4.635	E	4.002	D	4.318	E	27.858	1.467	
58331	10389	LANCASTER ST W	CLIFTON RD	ASH ST	5.183	4.908	E	4.064	D	4.486	E	56.418	1.945	
57143	10381	LANCASTER ST W	ASH ST	UNION ST	5.161	4.890	E	4.058	D	4.474	E	221.163	1.903	
55683	6953	LANCASTER ST W	UNION ST	C_PKY STR OFFRAMP	4.143	4.087	D	3.755	D	3.921	D	98.787	0.927	
56965	6985	LANCASTER ST W	C_PKY WAT ONRAMP	C_PKY STR OFFRAMP	5.061	4.811	E	3.966	D	4.388	E	188.289	1.635	
54972	12419	LANCASTER ST W	C_PKY WAT ONRAMP	HAMEL AVE	4.249	4.170	D	3.793	D	3.981	D	175.651	0.982	
54971	12415	LANCASTER ST W	HAMEL AVE	BRIDGEPORT RD	3.817	3.829	D	3.620	D	3.724	D	150.168	0.784	

Zone 4 - Zone 9													
Route-Level QOS Score	4.680												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
53771	10703	MANITOU DR	COURTLAND AVE E	WEBSTER RD	5.300	5.000	E	4.162	D	4.581	E	379.030	2.387
58595	21855	MANITOU DR	WEBSTER RD	CRESS LANE	5.300	5.000	E	4.608	E	4.804	E	46.328	5.097
75843	603990	MANITOU DR	CRESS LANE	CONNOR ST	3.127	3.285	C	2.325	B	2.805	C	39.798	0.455
58238	21854	MANITOU DR	CONNOR ST	BLEAMS RD	5.300	5.000	E	4.636	E	4.818	E	367.777	5.492
54192	21804	MANITOU DR	BLEAMS RD	WABANAKI DR	4.725	4.546	E	4.351	E	4.448	E	479.675	1.812
54193	21823	MANITOU DR	WABANAKI DR	SASAGA DR	5.300	5.000	E	4.555	E	4.778	E	149.250	4.499
58239	21821	MANITOU DR	SASAGA DR	CAYUGA DR	5.300	5.000	E	4.592	E	4.796	E	616.201	4.908
58704	21903	MANITOU DR	CAYUGA DR	HOMER WATSON BLVD	4.972	4.741	E	4.383	E	4.562	E	256.935	2.285
55821	21996	DOON VILLAGE RD	HOMER WATSON BLVD	MILLWOOD CRES	4.000	3.974	D	3.735	D	3.854	D	124.549	0.873
56337	21937	DOON VILLAGE RD	MILLWOOD CRES	UPPER CANADA DR	4.000	3.974	D	3.735	D	3.854	D	92.566	0.873
56085	22006	DOON VILLAGE RD	UPPER CANADA DR	MILLWOOD CRES	3.578	3.640	D	3.545	D	3.592	D	58.011	0.710
55823	21939	DOON VILLAGE RD	MILLWOOD CRES	PIONEER DR	3.729	3.760	D	3.622	D	3.691	D	166.822	0.764

Zone 4 - Zone 10													
Route-Level QOS Score	4.517												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
53771	10703	MANITOU DR	COURTLAND AVE E	WEBSTER RD	5.300	5.000	E	4.162	D	4.581	E	379.030	2.387
58595	21855	MANITOU DR	WEBSTER RD	CRESS LANE	5.300	5.000	E	4.608	E	4.804	E	46.328	5.097
75843	603990	MANITOU DR	CRESS LANE	CONNOR ST	3.127	3.285	C	2.325	B	2.805	C	39.798	0.455
58238	21854	MANITOU DR	CONNOR ST	BLEAMS RD	5.300	5.000	E	4.636	E	4.818	E	367.777	5.492
55310	21852	BLEAMS RD	MANITOU DR	OTONABEE DR	3.976	3.955	D	3.726	D	3.841	D	214.377	0.863
57607	601242	BLEAMS RD	OTONABEE DR	FALLOWFIELD DR	4.171	4.109	D	3.795	D	3.952	D	438.529	0.954
57608	21984	BLEAMS RD	FALLOWFIELD DR	HOMER WATSON BLVD	4.146	4.089	D	3.787	D	3.938	D	331.386	0.942
58428	9612	BLEAMS RD	HOMER WATSON BLVD	CENTURY HILL DR	4.446	4.326	D	3.918	D	4.122	D	419.164	1.139
58834	9679	BLEAMS RD	CENTURY HILL DR	STRASBURG RD	4.370	4.266	D	3.858	D	4.062	D	745.741	1.066
55498	9665	BLEAMS RD	STRASBURG RD	COLONY DR	4.292	4.204	D	3.829	D	4.016	D	362.732	1.017
55313	9671	BLEAMS RD	COLONY DR	TRILLIUM DR	5.300	5.000	E	4.656	E	4.828	E	534.862	5.807
55493	9724	BLEAMS RD	TRILLIUM DR	WASHBURN DR	5.300	5.000	E	4.643	E	4.821	E	589.471	5.599
55312	9723	BLEAMS RD	WASHBURN DR	FISCHER HALLMAN RD	4.706	4.531	E	4.344	E	4.437	E	357.564	1.777
56861	9756	FISCHER HALLMAN RD	ROCKWOOD RD	BLEAMS RD	5.245	4.956	E	4.481	E	4.719	E	240.828	3.557
52885	40196	FISCHER HALLMAN RD	WESTMOUNT RD E	ROCKWOOD RD	4.493	4.363	D	4.168	D	4.266	E	321.932	1.362
55325	600405	FISCHER HALLMAN RD	COTTON GRASS ST	WESTMOUNT RD E	3.875	3.875	D	3.569	D	3.722	D	278.474	0.782
55324	40063	FISCHER HALLMAN RD	ACTIVA AVE	COTTON GRASS ST	4.539	4.399	D	4.263	E	4.331	E	804.674	1.495
56099	21754	FISCHER HALLMAN RD	OTTAWA ST S	ACTIVA AVE	4.440	4.321	D	3.775	D	4.048	D	434.870	1.050
58603	6303	FISCHER HALLMAN RD	C_PKY WAT OFFRAMP	OTTAWA ST S	5.300	5.000	E	4.045	D	4.522	E	176.744	2.094
52889	6302	FISCHER HALLMAN RD	C_PKY WAT ONRAMP	C_PKY WAT OFFRAMP	4.994	4.758	E	3.895	D	4.327	E	10.338	1.485
55076	6149	FISCHER HALLMAN RD	C_PKY STR ONRAMP	C_PKY STR OFFRAMP	4.320	4.226	D	3.738	D	3.982	D	9.411	0.982
52961	6296	FISCHER HALLMAN RD	C_PKY WAT ONRAMP	C_PKY WAT ONRAMP	5.300	5.000	E	4.060	D	4.530	E	94.310	2.127
53820	6143	FISCHER HALLMAN RD	MCGARRY DR	C_PKY STR ONRAMP	5.300	5.000	E	4.085	D	4.543	E	414.094	2.187
58085	6137	FISCHER HALLMAN RD	FOREST HILL DR	MCGARRY DR	5.220	4.937	E	4.003	D	4.470	E	173.881	1.885
54565	6180	FISCHER HALLMAN RD	SUMMIT AVE	FOREST HILL DR	4.682	4.512	E	3.894	D	4.203	D	331.539	1.255
58397	6174	FISCHER HALLMAN RD	QUEENS BLVD	SUMMIT AVE	5.132	4.868	E	4.027	D	4.447	E	187.597	1.810
57634	5603	QUEENS BLVD	FISCHER HALLMAN RD	ELM RIDGE DR	3.201	3.343	C	3.280	C	3.312	C	385.325	0.592
59248	5425	QUEENS BLVD	ELM RIDGE DR	WESTHEIGHTS DR	3.247	3.379	C	3.322	C	3.350	C	166.980	0.606
58831	20732	WESTHEIGHTS DR	BLACKWELL DR	QUEENS BLVD	3.036	3.212	C	3.101	C	3.156	C	134.162	0.542
57835	20807	WESTHEIGHTS DR	HIGHLAND RD W	BLACKWELL DR	3.144	3.298	C	3.225	C	3.262	C	209.666	0.575

Zone 5 - Zone 6													
Route-Level QOS Score	4.046												
Route-Level QOS	D												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
55753	9503	OTTAWA ST S	FISCHER HALLMAN RD	INTERNATIONAL PL	3.959	3.941	D	3.683	D	3.812	D	630.408	0.842
58900	6410	OTTAWA ST S	NINE PINES RD	FISCHER HALLMAN RD	4.246	4.168	D	3.733	D	3.950	D	102.591	0.953
57087	6306	OTTAWA ST S	VALLEYVIEW RD	NINE PINES RD	4.919	4.699	E	3.999	D	4.349	E	79.165	1.536
57088	6292	OTTAWA ST S	WILLIAMSBURG RD	VALLEYVIEW RD	4.701	4.527	E	3.935	D	4.231	D	164.702	1.301
53026	6256	OTTAWA ST S	HOWE DR	WILLIAMSBURG RD	4.737	4.556	E	3.946	D	4.251	E	188.681	1.335
58430	6399	OTTAWA ST S	PINEDALE DR	HOWE DR	4.656	4.492	E	3.887	D	4.189	D	137.890	1.233
58431	6389	OTTAWA ST S	WESTMOUNT RD E	PINEDALE DR	4.702	4.528	E	3.900	D	4.214	D	213.367	1.272
56624	6390	WESTMOUNT RD E	GILMOUR CRES	OTTAWA ST S	4.625	4.467	E	3.878	D	4.172	D	423.900	1.208
54417	6605	WESTMOUNT RD E	GILMOUR CRES	GILMOUR CRES	4.613	4.458	E	3.875	D	4.166	D	86.809	1.199
57507	6565	WESTMOUNT RD E	STONYBROOK DR	GILMOUR CRES	4.601	4.448	E	3.871	D	4.160	D	111.863	1.190
55514	6560	WESTMOUNT RD E	VILLAGE RD	STONYBROOK DR	4.700	4.526	E	3.899	D	4.212	D	259.782	1.270
53818	6493	WESTMOUNT RD E	GREENBROOK DR	VILLAGE RD	4.232	4.157	D	3.787	D	3.972	D	96.805	0.973
53817	6506	WESTMOUNT RD E	EVERGREEN CRES	GREENBROOK DR	4.502	4.370	D	3.842	D	4.106	D	87.806	1.119
53787	6508	WESTMOUNT RD E	FOREST HILL DR	EVERGREEN CRES	4.577	4.429	E	3.864	D	4.147	D	270.400	1.172
57945	20900	WESTMOUNT RD E	GATEWOOD RD	FOREST HILL DR	4.654	4.490	E	3.886	D	4.188	D	87.764	1.231
55915	21000	WESTMOUNT RD E	QUEENS BLVD	GATEWOOD RD	4.728	4.549	E	3.907	D	4.228	D	188.056	1.295
54523	20924	QUEENS BLVD	HAHN PL	WESTMOUNT RD E	3.763	3.786	D	3.637	D	3.712	D	151.677	0.776
54525	20681	QUEENS BLVD	BLUERIDGE AVE	HAHN PL	3.535	3.606	D	3.521	D	3.564	D	35.405	0.696
57363	6341	QUEENS BLVD	BELMONT AVE E	BLUERIDGE AVE	3.384	3.487	D	3.426	C	3.457	C	444.039	0.648
55321	20946	BELMONT AVE W	QUEENS BLVD	SPADINA RD W	3.235	3.370	C	3.404	C	3.387	C	72.111	0.620
53711	20954	BELMONT AVE W	SPADINA RD W	FARNHAM AVE	3.065	3.236	C	3.230	C	3.233	C	107.080	0.566
53888	20958	BELMONT AVE W	FARNHAM AVE	MARLBOROUGH AVE	3.093	3.258	C	3.263	C	3.261	C	203.624	0.575
57556	8662	BELMONT AVE W	MARLBOROUGH AVE	HIGHLAND RD W	3.235	3.370	C	3.404	C	3.387	C	94.171	0.620
56466	8755	BELMONT AVE W	HIGHLAND RD W	BURN PL	3.649	3.697	D	3.534	D	3.615	D	112.563	0.722
58127	8635	BELMONT AVE W	BURN PL	METZLOFF DR	3.324	3.440	D	3.387	C	3.413	C	91.926	0.630
54772	8649	BELMONT AVE W	METZLOFF DR	SANDRA AVE	3.649	3.697	D	3.534	D	3.615	D	97.272	0.722
56546	8651	BELMONT AVE W	SANDRA AVE	EDGEWOOD DR	3.304	3.425	D	3.373	C	3.399	C	66.790	0.624
54864	8518	BELMONT AVE W	EDGEWOOD DR	JACK AVE	3.649	3.697	D	3.534	D	3.615	D	28.968	0.722
53653	1696	BELMONT AVE W	JACK AVE	VICTORIA ST S	3.649	3.697	D	3.534	D	3.615	D	117.374	0.722
57039	8684	VICTORIA ST S	PATRICIA AVE	BELMONT AVE W	4.170	4.108	D	3.799	D	3.954	D	271.864	0.956
56381	8689	VICTORIA ST S	STRANGE ST	PATRICIA AVE	4.613	4.458	E	3.875	D	4.166	D	295.170	1.199
55566	8536	VICTORIA ST S	WALNUT ST	STRANGE ST	4.630	4.471	E	3.879	D	4.175	D	222.224	1.212
58912	8763	VICTORIA ST S	HENRY ST	WALNUT ST	5.300	5.000	F	4.235	D	4.618	E	98.012	2.615
58640	8767	VICTORIA ST S	PARK ST	HENRY ST	4.659	4.494	E	3.888	D	4.191	D	83.478	1.236
54345	8774	VICTORIA ST S	THERESA ST	PARK ST	4.675	4.507	E	3.892	D	4.199	D	73.971	1.249
58148	8793	VICTORIA ST S	BRAMM ST	THERESA ST	4.690	4.518	E	3.896	D	4.207	D	69.628	1.262
58149	8791	VICTORIA ST S	MICHAEL ST	BRAMM ST	4.704	4.530	E	3.900	D	4.215	D	16.729	1.274
58342	1691	VICTORIA ST S	GARMENT ST	MICHAEL ST	4.721	4.543	E	3.905	D	4.224	D	62.456	1.288
78084	604291	VICTORIA ST S	OAK ST	GARMENT ST	2.740	2.979	C	0.697	A	1.838	A	43.232	0.316
58150	8798	VICTORIA ST S	ARTHUR PL	OAK ST	4.736	4.554	E	3.909	D	4.232	D	26.468	1.301
53719	8788	VICTORIA ST S	JOSEPH ST	ARTHUR PL	4.750	4.566	E	3.913	D	4.239	D	78.125	1.314
59091	8787	VICTORIA ST S	CHARLES ST W	JOSEPH ST	4.748	4.564	E	3.912	D	4.238	D	128.650	1.312
59243	8923	VICTORIA ST S	HALLS LANE W	CHARLES ST W	4.587	4.437	E	3.867	D	4.152	D	55.411	1.179
55534	9033	VICTORIA ST S	KING ST W	HALLS LANE W	4.228	4.154	D	3.818	D	3.986	D	58.907	0.986
57312	5898	VICTORIA ST N	KING ST W	DUKE ST W	4.081	4.037	D	3.732	D	3.885	D	251.991	0.897
52996	7052	VICTORIA ST N	DUKE ST W	WEBER ST W	4.733	4.552	E	3.908	D	4.230	D	179.751	1.299

Zone 5 - Zone 7													
Route-Level QOS Score	4.365												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
55753	9503	OTTAWA ST S	FISCHER HALLMAN RD	INTERNATIONAL PL	3.959	3.941	D	3.683	D	3.812	D	630.408	0.842
58900	6410	OTTAWA ST S	NINE PINES RD	FISCHER HALLMAN RD	4.246	4.168	D	3.733	D	3.950	D	102.591	0.953
57087	6306	OTTAWA ST S	VALLEYVIEW RD	NINE PINES RD	4.919	4.699	E	3.999	D	4.349	E	79.165	1.536
57088	6292	OTTAWA ST S	WILLIAMSBURG RD	VALLEYVIEW RD	4.701	4.527	E	3.935	D	4.231	D	164.702	1.301
53026	6256	OTTAWA ST S	HOWE DR	WILLIAMSBURG RD	4.737	4.556	E	3.946	D	4.251	E	188.681	1.335
58430	6399	OTTAWA ST S	PINEDALE DR	HOWE DR	4.656	4.492	E	3.887	D	4.189	D	137.890	1.233
58431	6389	OTTAWA ST S	WESTMOUNT RD E	PINEDALE DR	4.702	4.528	E	3.900	D	4.214	D	213.367	1.272
54176	6376	OTTAWA ST S	MOWAT BLVD	WESTMOUNT RD E	4.570	4.424	E	3.862	D	4.143	D	276.205	1.167
57326	6377	OTTAWA ST S	HOWLAND DR	MOWAT BLVD	4.498	4.367	D	3.841	D	4.104	D	96.443	1.116
58706	6388	OTTAWA ST S	ELMSDALE DR	HOWLAND DR	4.637	4.477	E	3.882	D	4.179	D	276.702	1.218
53064	6586	OTTAWA ST S	HUNTSWORTH AVE	ELMSDALE DR	4.632	4.473	E	3.880	D	4.176	D	276.007	1.214
90562	605989	OTTAWA ST S	STRASBURG RD	HUNTSWORTH AVE	2.740	2.979	C	0.697	A	1.838	A	267.184	0.316
58492	11628	OTTAWA ST S	ALPINE RD	STRASBURG RD	4.470	4.345	D	3.784	D	4.064	D	428.425	1.069
55964	10839	OTTAWA ST S	HOMER WATSON BLVD	ALPINE RD	5.224	4.940	E	4.355	E	4.648	E	134.788	2.839
59070	10766	HOMER WATSON BLVD	OTTAWA ST S	HANSON AVE	5.300	5.000	E	4.336	E	4.668	E	608.822	3.014
54229	10944	HOMER WATSON BLVD	HANSON AVE	BLOCK LINE RD	5.300	5.000	E	4.040	D	4.520	E	695.316	2.084
55690	600353	BLOCK LINE RD	HOMER WATSON BLVD	FALLOWFIELD DR	3.030	3.208	C	3.093	C	3.150	C	183.180	0.541
55631	600915	BLOCK LINE RD	FALLOWFIELD DR	LENNOX LEWIS WAY	3.031	3.209	C	3.094	C	3.151	C	358.988	0.541
55632	103019	BLOCK LINE RD	LENNOX LEWIS WAY	COURTLAND AVE E	2.654	2.911	C	-1.737	A	0.587	A	270.826	0.227
54075	10093	COURTLAND AVE E	BLOCK LINE RD	SHELLEY DR	4.498	4.367	E	3.792	D	4.080	D	256.802	1.086
53709	10103	COURTLAND AVE E	SHELLEY DR	SIEBERT AVE	5.212	4.931	E	4.001	D	4.466	E	145.186	1.873
54896	10099	COURTLAND AVE E	SIEBERT AVE	BALZER RD	5.300	5.000	F	4.120	D	4.560	E	249.149	2.272
58368	21835	COURTLAND AVE E	BALZER RD	MANITOU DR	4.781	4.590	E	3.843	D	4.217	D	143.351	1.276
53770	10714	FAIRWAY RD S	WILSON AVE	MANITOU DR	5.300	5.000	F	4.196	D	4.598	E	908.648	2.488
55327	600416	FAIRWAY RD S	WABANAKI DR	WILSON AVE	4.859	4.652	E	3.863	D	4.257	E	482.211	1.346
55326	22103	FAIRWAY RD S	KING ST BYPASS OFFRAMP	WABANAKI DR	5.242	4.954	E	4.002	D	4.478	E	294.788	1.916
53241	22107	FAIRWAY RD S	KING ST BYPASS ONRAMP	KING ST BYPASS OFFRAMP	5.300	5.000	F	4.363	D	4.681	E	16.876	3.137
58635	22324	FAIRWAY RD S	FAIRWAY RD N	KING ST BYPASS ONRAMP	5.300	5.000	F	4.062	D	4.531	E	489.939	2.132

Zone 5 - Zone 8													
Route-Level QOS Score	4.154												
Route-Level QOS	D												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
55753	9503	OTTAWA ST S	FISCHER HALLMAN RD	INTERNATIONAL PL	3.959	3.941	D	3.683	D	3.812	D	630.408	0.842
58900	6410	OTTAWA ST S	NINE PINES RD	FISCHER HALLMAN RD	4.246	4.168	D	3.733	D	3.950	D	102.591	0.953
57087	6306	OTTAWA ST S	VALLEYVIEW RD	NINE PINES RD	4.919	4.699	E	3.999	D	4.349	E	79.165	1.536
57088	6292	OTTAWA ST S	WILLIAMSBURG RD	VALLEYVIEW RD	4.701	4.527	E	3.935	D	4.231	D	164.702	1.301
53026	6256	OTTAWA ST S	HOWE DR	WILLIAMSBURG RD	4.737	4.556	E	3.946	D	4.251	E	188.681	1.335
58430	6399	OTTAWA ST S	PINEDALE DR	HOWE DR	4.656	4.492	E	3.887	D	4.189	D	137.890	1.233
58431	6389	OTTAWA ST S	WESTMOUNT RD E	PINEDALE DR	4.702	4.528	E	3.900	D	4.214	D	213.367	1.272
56624	6390	WESTMOUNT RD E	GILMOUR CRES	OTTAWA ST S	4.625	4.467	E	3.878	D	4.172	D	423.900	1.208
54417	6605	WESTMOUNT RD E	GILMOUR CRES	GILMOUR CRES	4.613	4.458	E	3.875	D	4.166	D	86.809	1.199
57507	6565	WESTMOUNT RD E	STONYBROOK DR	GILMOUR CRES	4.601	4.448	E	3.871	D	4.160	D	111.863	1.190
55514	6560	WESTMOUNT RD E	VILLAGE RD	STONYBROOK DR	4.700	4.526	E	3.899	D	4.212	D	259.782	1.270
53818	6493	WESTMOUNT RD E	GREENBROOK DR	VILLAGE RD	4.232	4.157	D	3.787	D	3.972	D	96.805	0.973
53817	6506	WESTMOUNT RD E	EVERGREEN CRES	GREENBROOK DR	4.502	4.370	D	3.842	D	4.106	D	87.806	1.119
53787	6508	WESTMOUNT RD E	FOREST HILL DR	EVERGREEN CRES	4.577	4.429	E	3.864	D	4.147	D	270.400	1.172
57945	20900	WESTMOUNT RD E	GATEWOOD RD	FOREST HILL DR	4.654	4.490	E	3.886	D	4.188	D	87.764	1.231
55915	21000	WESTMOUNT RD E	QUEENS BLVD	GATEWOOD RD	4.728	4.549	E	3.907	D	4.228	D	188.056	1.295
54523	20924	QUEENS BLVD	HAHN PL	WESTMOUNT RD E	3.763	3.786	D	3.637	D	3.712	D	151.677	0.776
54525	20681	QUEENS BLVD	BLUERIDGE AVE	HAHN PL	3.535	3.606	D	3.521	D	3.564	D	35.405	0.696
57363	6341	QUEENS BLVD	BELMONT AVE E	BLUERIDGE AVE	3.384	3.487	D	3.426	C	3.457	C	444.039	0.648
57378	20684	QUEENS BLVD	QUEENS BLVD	BELMONT AVE E	3.595	3.654	D	3.554	D	3.604	D	46.265	0.716
56390	40134	QUEENS BLVD	SOUTH DR	QUEENS BLVD	3.939	3.926	D	3.804	D	3.865	D	20.520	0.881
56090	20948	QUEENS BLVD	BARCLAY AVE	SOUTH DR	3.629	3.681	D	3.665	D	3.673	D	92.147	0.754
55969	20940	QUEENS BLVD	PLEASANT AVE	BARCLAY AVE	3.609	3.665	D	3.654	D	3.660	D	73.491	0.746
55968	20977	QUEENS BLVD	QUEENS BLVD	PLEASANT AVE	3.591	3.651	D	3.645	D	3.648	D	74.342	0.740
54373	1689	QUEENS BLVD	REX DR	QUEENS BLVD	3.573	3.637	D	3.635	D	3.636	D	29.523	0.733
54375	1686	QUEENS BLVD	SPADINA RD E	REX DR	3.955	3.938	D	3.810	D	3.874	D	93.239	0.888
53614	5716	QUEENS BLVD	HIGHLAND RD E	SPADINA RD E	3.799	3.815	D	3.746	D	3.781	D	217.926	0.820
57132	5730	QUEEN ST S	BROCK ST	HIGHLAND RD W	4.167	4.106	D	3.764	D	3.935	D	99.380	0.939
56907	5734	QUEEN ST S	WOODSIDE AVE	BROCK ST	5.300	5.000	E	4.131	D	4.566	E	54.671	2.302
57664	5735	QUEEN ST S	HOMEWOOD AVE	WOODSIDE AVE	5.300	5.000	E	4.146	D	4.573	E	29.676	2.343
57946	5739	QUEEN ST S	MILL ST	HOMEWOOD AVE	5.300	5.000	E	4.161	D	4.581	E	254.215	2.384
59247	8707	QUEEN ST S	SCHNEIDER AVE	MILL ST	5.300	5.000	E	4.167	D	4.583	E	21.829	2.400
59196	9168	QUEEN ST S	MITCHELL ST	SCHNEIDER AVE	5.300	5.000	E	4.176	D	4.588	E	82.795	2.427
58961	6727	QUEEN ST S	COURTLAND AVE E	MITCHELL ST	5.300	5.000	E	4.190	D	4.595	E	165.978	2.468
56602	6729	QUEEN ST S	ST GEORGE ST	COURTLAND AVE E	2.751	2.988	C	0.442	A	1.715	A	198.331	0.304
56603	6476	QUEEN ST S	JOSEPH ST	ST GEORGE ST	4.579	4.431	E	3.981	D	4.206	D	57.563	1.260
56605	6477	QUEEN ST S	CHURCH ST	JOSEPH ST	4.075	4.033	D	3.855	D	3.944	D	74.802	0.947
56606	6478	QUEEN ST S	CHARLES ST W	CHURCH ST	3.235	3.370	C	3.404	C	3.387	C	58.458	0.620
56777	6612	QUEEN ST S	HALLS LANE W	CHARLES ST W	3.989	3.965	D	3.823	D	3.894	D	58.394	0.904
56111	6690	QUEEN ST S	KING ST E	HALLS LANE E	3.167	3.316	C	3.342	C	3.329	C	54.064	0.598
56593	6740	QUEEN ST N	GOUDIES LANE	GOUDIES LANE	3.913	3.905	D	3.794	D	3.850	D	10.095	0.869
56778	6741	QUEEN ST N	GOUDIES LANE	DUKE ST W	3.155	3.307	C	3.330	C	3.318	C	61.124	0.595
56662	6769	QUEEN ST N	DUKE ST W	WEBER ST W	3.155	3.307	C	3.330	C	3.318	C	136.843	0.595
56597	6765	QUEEN ST N	WEBER ST W	ROY ST	3.107	3.269	C	3.279	C	3.274	C	99.376	0.579
56549	6738	QUEEN ST N	ROY ST	AHRENS ST E	3.843	3.850	D	3.765	D	3.807	D	77.434	0.839
56594	6737	QUEEN ST N	AHRENS ST E	MARGARET AVE	3.875	3.875	D	3.778	D	3.827	D	153.254	0.852
56595	11147	QUEEN ST N	MARGARET AVE	ELLEN ST W	3.665	3.709	D	3.683	D	3.696	D	114.522	0.767
56477	11146	QUEEN ST N	ELLEN ST W	ST LEGER ST	3.023	3.203	C	3.176	C	3.189	C	131.990	0.552
56607	6969	QUEEN ST N	ST LEGER ST	LANCASTER ST W	3.329	3.444	D	3.480	C	3.462	C	220.540	0.650
56212	6970	LANCASTER ST W	QUEEN ST N	VICTORIA ST N	3.506	3.583	D	3.504	D	3.543	D	63.726	0.687
59066	7046	LANCASTER ST W	VICTORIA ST N	BREITHAUPT ST	4.021	3.990	D	3.708	D	3.849	D	147.268	0.869
59065	11114	LANCASTER ST W	BREITHAUPT ST	BREITHAUPT ST	4.240	4.163	D	3.822	D	3.993	D	51.847	0.993
53634	7042	LANCASTER ST W	BREITHAUPT ST	WELLINGTON ST N	4.218	4.146	D	3.815	D	3.981	D	71.093	0.981
58564	7036	LANCASTER ST W	WELLINGTON ST N	LOUISA ST	5.300	5.000	F	4.176	D	4.588	E	123.127	2.428
58038	7041	LANCASTER ST W	LOUISA ST	HILLVIEW ST	5.300	5.000	F	4.093	D	4.546	E	96.374	2.205
53099	6961	LANCASTER ST W	HILLVIEW ST	HILL ST	5.289	4.991	E	4.088	D	4.540	E	132.055	2.173
53098	12646	LANCASTER ST W	HILL ST	GUELPH ST	5.267	4.974	E	4.083	D	4.529	E	171.802	2.122
56041	10483	LANCASTER ST W	GUELPH ST	ARNOLD ST	4.851	4.646	E	4.005	D	4.326	E	253.614	1.483
53096	10485	LANCASTER ST W	ARNOLD ST	ELIZABETH ST	4.877	4.666	E	4.012	D	4.339	E	69.323	1.513
57080	10487	LANCASTER ST W	ELIZABETH ST	CLIFTON RD	4.837	4.635	E	4.002	D	4.318	E	27.858	1.467
58331	10389	LANCASTER ST W	CLIFTON RD	ASH ST	5.183	4.908	E	4.064	D	4.486	E	56.418	1.945
57143	10381	LANCASTER ST W	ASH ST	UNION ST	5.161	4.890	E	4.058	D	4.474	E	221.163	1.903
55683	6953	LANCASTER ST W	UNION ST	C_PKY STR OFFRAMP	4.143	4.087	D	3.755	D	3.921	D	98.787	0.927
56965	6985	LANCASTER ST W	C_PKY WAT ONRAMP	C_PKY STR OFFRAMP	5.061	4.811	E	3.966	D	4.388	E	188.289	1.635
54972	12419	LANCASTER ST W	C_PKY WAT ONRAMP	HAMEL AVE	4.249	4.170	D	3.793	D	3.981	D	175.651	0.982
54971	12415	LANCASTER ST W	HAMEL AVE	BRIDGEPORT RD	3.817	3.829	D	3.620	D	3.724	D	150.168	0.784

Zone 5 - Zone 9													
Route-Level QOS Score	4.508												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
56970	25354	WILDERNESS DR	OTTAWA ST S	GREY FOX DR	3.877	3.877	D	4.347	E	4.112	D	109.987	1.126
54484	25338	GREY FOX DR	QUEEN CHARLOTTE CRES	WILDERNESS DR	3.431	3.525	D	3.033	C	3.279	C	215.210	0.581
55553	25339	GREY FOX DR	ORCHID CRES	QUEEN CHARLOTTE CRES	3.403	3.503	D	2.822	C	3.162	C	191.390	0.544
54485	25340	GREY FOX DR	WOODPOPPY CRT	ORCHID CRES	3.337	3.450	D	2.112	B	2.781	C	88.937	0.451
54309	40059	GREY FOX DR	ACTIVA AVE	WOODPOPPY CRT	3.359	3.468	D	2.400	B	2.934	C	105.696	0.484
55255	40058	ACTIVA AVE	FISCHER HALLMAN RD	GREY FOX DR	2.957	3.150	C	2.557	B	2.854	C	95.986	0.466
55324	40063	FISCHER HALLMAN RD	ACTIVA AVE	COTTON GRASS ST	4.539	4.399	D	4.263	E	4.331	E	804.674	1.495
55325	600405	FISCHER HALLMAN RD	COTTON GRASS ST	WESTMOUNT RD E	3.875	3.875	D	3.569	D	3.722	D	278.474	0.782
52885	40196	FISCHER HALLMAN RD	WESTMOUNT RD E	ROCKWOOD RD	4.493	4.363	D	4.168	D	4.266	E	321.932	1.362
56861	9756	FISCHER HALLMAN RD	ROCKWOOD RD	BLEAMS RD	5.245	4.956	E	4.481	E	4.719	E	240.828	3.557
55312	9723	BLEAMS RD	WASHBURN DR	FISCHER HALLMAN RD	4.706	4.531	E	4.344	E	4.437	E	357.564	1.777
55493	9724	BLEAMS RD	TRILLIUM DR	WASHBURN DR	5.300	5.000	E	4.643	E	4.821	E	589.471	5.599
55313	9671	BLEAMS RD	COLONY DR	TRILLIUM DR	5.300	5.000	E	4.656	E	4.828	E	534.862	5.807
55498	9665	BLEAMS RD	STRASBURG RD	COLONY DR	4.292	4.204	D	3.829	D	4.016	D	362.732	1.017
58834	9679	BLEAMS RD	CENTURY HILL DR	STRASBURG RD	4.370	4.266	D	3.858	D	4.062	D	745.741	1.066
58428	9612	BLEAMS RD	HOMER WATSON BLVD	CENTURY HILL DR	4.446	4.326	D	3.918	D	4.122	D	419.164	1.139
59041	21862	HOMER WATSON BLVD	BLEAMS RD	BEASLEY DR	4.836	4.633	E	3.930	D	4.282	E	548.731	1.393
59042	21808	HOMER WATSON BLVD	BEASLEY DR	HOMER WATSON OFFRAMP	4.872	4.662	E	3.941	D	4.302	E	193.438	1.432
59043	25666	HOMER WATSON BLVD	HOMER WATSON OFFRAMP	HOMER WATSON ONRAMP	5.300	5.000	F	4.236	D	4.618	E	602.619	2.619
59044	21992	HOMER WATSON BLVD	HOMER WATSON ONRAMP	DOON VILLAGE RD	4.900	4.684	E	3.950	D	4.317	E	232.906	1.464
55821	21996	DOON VILLAGE RD	HOMER WATSON BLVD	MILLWOOD CRES	4.000	3.974	D	3.735	D	3.854	D	124.549	0.873
56337	21937	DOON VILLAGE RD	MILLWOOD CRES	UPPER CANADA DR	4.000	3.974	D	3.735	D	3.854	D	92.566	0.873
56085	22006	DOON VILLAGE RD	UPPER CANADA DR	MILLWOOD CRES	3.578	3.640	D	3.545	D	3.592	D	58.011	0.710
55823	21939	DOON VILLAGE RD	MILLWOOD CRES	PIONEER DR	3.729	3.760	D	3.622	D	3.691	D	166.822	0.764

Zone 5 - Zone 10													
Route-Level QOS Score	4.196												
Route-Level QOS	D												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
55753	9503	OTTAWA ST S	FISCHER HALLMAN RD	INTERNATIONAL PL	3.959	3.941	D	3.683	D	3.812	D	630.408	0.842
58603	6303	FISCHER HALLMAN RD	C_PKY WAT OFFRAMP	OTTAWA ST S	5.300	5.000	E	4.045	D	4.522	E	176.744	2.094
52889	6302	FISCHER HALLMAN RD	C_PKY WAT ONRAMP	C_PKY WAT OFFRAMP	4.994	4.758	E	3.895	D	4.327	E	10.338	1.485
52961	6296	FISCHER HALLMAN RD	C_PKY WAT ONRAMP	C_PKY WAT ONRAMP	5.300	5.000	E	4.060	D	4.530	E	94.310	2.127
55076	6149	FISCHER HALLMAN RD	C_PKY STR ONRAMP	C_PKY STR OFFRAMP	4.320	4.226	D	3.738	D	3.982	D	9.411	0.982
53820	6143	FISCHER HALLMAN RD	MCGARRY DR	C_PKY STR ONRAMP	5.300	5.000	E	4.085	D	4.543	E	414.094	2.187
58085	6137	FISCHER HALLMAN RD	FOREST HILL DR	MCGARRY DR	5.220	4.937	E	4.003	D	4.470	E	173.881	1.885
54565	6180	FISCHER HALLMAN RD	SUMMIT AVE	FOREST HILL DR	4.682	4.512	E	3.894	D	4.203	D	331.539	1.255
58397	6174	FISCHER HALLMAN RD	QUEENS BLVD	SUMMIT AVE	5.132	4.868	E	4.027	D	4.447	E	187.597	1.810
57634	5603	QUEENS BLVD	FISCHER HALLMAN RD	ELM RIDGE DR	3.201	3.343	C	3.280	C	3.312	C	385.325	0.592
59248	5425	QUEENS BLVD	ELM RIDGE DR	WESTHEIGHTS DR	3.247	3.379	C	3.322	C	3.350	C	166.980	0.606
58831	20732	WESTHEIGHTS DR	BLACKWELL DR	QUEENS BLVD	3.036	3.212	C	3.101	C	3.156	C	134.162	0.542
57835	20807	WESTHEIGHTS DR	HIGHLAND RD W	BLACKWELL DR	3.144	3.298	C	3.225	C	3.262	C	209.666	0.575

Zone 6 - Zone 7													
Route-Level QOS Score	4.084												
Route-Level QOS	D												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
53264	7053	WEBER ST W	HEIT LANE	VICTORIA ST N	4.520	4.384	D	3.847	D	4.116	D	64.895	1.131
53260	7055	WEBER ST W	WATER ST N	HEIT LANE	4.536	4.397	D	3.852	D	4.124	D	31.741	1.142
55369	6666	WEBER ST W	COLLEGE ST	WATER ST N	4.644	4.482	E	3.883	D	4.183	D	105.647	1.224
58989	6492	WEBER ST W	YOUNG ST	COLLEGE ST	4.623	4.465	E	3.877	D	4.171	D	111.870	1.207
57525	6479	WEBER ST W	ONTARIO ST N	YOUNG ST	4.603	4.450	E	3.872	D	4.161	D	168.674	1.192
58596	6766	WEBER ST W	QUEEN ST N	ONTARIO ST N	4.584	4.435	E	3.866	D	4.150	D	121.795	1.177
58222	6770	WEBER ST E	QUEEN ST N	FREDERICK ST	4.563	4.418	E	3.860	D	4.139	D	125.407	1.161
58598	6759	WEBER ST E	FREDERICK ST	SCOTT ST	4.543	4.403	E	3.854	D	4.128	D	155.076	1.147
58990	6879	WEBER ST E	SCOTT ST	KRUG ST	4.522	4.386	D	3.848	D	4.117	D	270.698	1.132
58615	6885	WEBER ST E	KRUG ST	MADISON AVE N	4.502	4.370	D	3.842	D	4.106	D	127.385	1.119
53939	6863	WEBER ST E	MADISON AVE N	CAMERON ST N	4.481	4.354	D	3.835	D	4.094	D	125.207	1.104
53940	6859	WEBER ST E	CAMERON ST N	BETZNER AVE N	4.462	4.338	D	3.829	D	4.084	D	98.276	1.091
56893	6846	WEBER ST E	BETZNER AVE N	PANDORA AVE N	4.240	4.163	D	3.822	D	3.993	D	86.975	0.993
58299	9859	WEBER ST E	PANDORA AVE N	FAIRVIEW AVE	4.221	4.148	D	3.816	D	3.982	D	90.581	0.983
58672	9846	WEBER ST E	FAIRVIEW AVE	STIRLING AVE N	4.202	4.133	D	3.810	D	3.971	D	88.304	0.972
58298	10164	WEBER ST E	STIRLING AVE N	SIMEON ST	4.180	4.116	D	3.803	D	3.960	D	172.143	0.961
52824	10165	WEBER ST E	SIMEON ST	BORDEN AVE N	4.100	4.053	D	3.739	D	3.896	D	175.103	0.906
58297	10178	WEBER ST E	BORDEN AVE N	ONWARD AVE	4.266	4.183	D	3.798	D	3.991	D	96.569	0.991
58614	10185	WEBER ST E	ONWARD AVE	EAST AVE	4.170	4.108	D	3.799	D	3.954	D	222.535	0.956
57524	10182	WEBER ST E	EAST AVE	OTTAWA ST N	4.176	4.112	D	3.801	D	3.957	D	20.287	0.959
56571	11704	WEBER ST E	OTTAWA ST N	SYDNEY ST N	4.180	4.116	D	3.803	D	3.960	D	122.042	0.961
59120	11705	WEBER ST E	SYDNEY ST N	SHELDON AVE N	4.185	4.120	D	3.805	D	3.962	D	129.245	0.964
56572	10143	WEBER ST E	SHELDON AVE N	RAYMOND RD	4.190	4.124	D	3.806	D	3.965	D	107.369	0.966
56568	10142	WEBER ST E	RAYMOND RD	EDMUND RD	4.195	4.127	D	3.808	D	3.968	D	101.117	0.969
56569	11675	WEBER ST E	EDMUND RD	JACKSON AVE	4.200	4.131	D	3.809	D	3.970	D	101.306	0.971
52829	10015	WEBER ST E	JACKSON AVE	MONTGOMERY RD	4.204	4.135	D	3.811	D	3.973	D	431.494	0.974
58483	13270	WEBER ST E	MONTGOMERY RD	SHANTZ LANE	4.256	4.176	D	3.795	D	3.985	D	225.136	0.985
57049	10030	WEBER ST E	SHANTZ LANE	ROSS AVE	4.211	4.140	D	3.779	D	3.960	D	91.685	0.961
53646	13158	WEBER ST E	ROSS AVE	WILFRED AVE	4.167	4.106	D	3.764	D	3.935	D	139.461	0.939
58568	13156	WEBER ST E	WILFRED AVE	EMERALD AVE	4.122	4.070	D	3.748	D	3.909	D	91.609	0.916
54369	10038	WEBER ST E	EMERALD AVE	DELLROY AVE	4.078	4.036	D	3.731	D	3.883	D	89.440	0.895
54370	13146	WEBER ST E	DELLROY AVE	EULER AVE	4.093	4.047	D	3.737	D	3.892	D	89.029	0.903
54371	13145	WEBER ST E	EULER AVE	BROADVIEW AVE	4.110	4.061	D	3.743	D	3.902	D	88.270	0.911
59056	10993	WEBER ST E	BROADVIEW AVE	FRANKLIN ST N	4.126	4.073	D	3.749	D	3.911	D	144.193	0.918
53289	10963	WEBER ST E	FRANKLIN ST N	PINECREST DR	4.680	4.511	E	3.893	D	4.202	D	86.260	1.253
56776	13144	WEBER ST E	PINECREST DR	ARLINGTON BLVD	4.700	4.526	E	3.899	D	4.212	D	87.505	1.270
53742	10991	WEBER ST E	ARLINGTON BLVD	FERGUS AVE	4.719	4.541	E	3.904	D	4.223	D	342.363	1.286
57349	22350	WEBER ST E	FERGUS AVE	KINZIE AVE	5.032	4.789	E	3.959	D	4.374	E	325.599	1.597
54310	22330	WEBER ST E	KINZIE AVE	KING ST E	4.680	4.511	E	3.894	D	4.202	D	231.651	1.254
54047	12115	KING ST E	KING ST BYPASS OFFRAMP	KINGSBURY DR	4.489	4.360	D	3.818	D	4.089	D	150.463	1.097
55917	12119	KING ST E	KINGSBURY DR	MORGAN AVE	5.248	4.959	E	4.009	D	4.484	E	32.821	1.938
56673	12116	KING ST E	MORGAN AVE	FAIRWAY RD N	4.308	4.217	D	3.734	D	3.976	D	178.839	0.976

Zone 6 - Zone 8													
Route-Level QOS Score	4.334												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
54494	11079	VICTORIA ST N	WEBER ST W	WATER ST N	4.059	4.020	D	3.724	D	3.872	D	162.896	0.887
54028	40174	VICTORIA ST N	WATER ST N	AHRENS ST W	4.059	4.020	D	3.724	D	3.872	D	13.631	0.887
58951	6659	VICTORIA ST N	AHRENS ST W	AHRENS ST W	4.893	4.679	E	3.924	D	4.301	E	31.798	1.431
54554	6662	VICTORIA ST N	AHRENS ST W	MARGARET AVE	4.910	4.692	E	3.928	D	4.310	E	211.878	1.449
58457	6780	VICTORIA ST N	MARGARET AVE	ELLEN ST W	5.037	4.792	E	3.960	D	4.376	E	140.463	1.603
57443	6787	VICTORIA ST N	ELLEN ST W	ST LEGER ST	4.996	4.760	E	3.950	D	4.355	E	159.880	1.550
56553	6958	VICTORIA ST N	ST LEGER ST	HERMIE PL	4.932	4.709	E	3.934	D	4.322	E	213.228	1.474
57219	6968	VICTORIA ST N	HERMIE PL	LANCASTER ST W	5.040	4.794	E	3.961	D	4.378	E	65.179	1.607
59066	7046	LANCASTER ST W	VICTORIA ST N	BREITHAUPT ST	4.021	3.990	D	3.708	D	3.849	D	147.268	0.869
59065	11114	LANCASTER ST W	BREITHAUPT ST	BREITHAUPT ST	4.240	4.163	D	3.822	D	3.993	D	51.847	0.993
53634	7042	LANCASTER ST W	BREITHAUPT ST	WELLINGTON ST N	4.218	4.146	D	3.815	D	3.981	D	71.093	0.981
58564	7036	LANCASTER ST W	WELLINGTON ST N	LOUISA ST	5.300	5.000	F	4.176	D	4.588	E	123.127	2.428
58038	7041	LANCASTER ST W	LOUISA ST	HILLVIEW ST	5.300	5.000	F	4.093	D	4.546	E	96.374	2.205
53099	6961	LANCASTER ST W	HILLVIEW ST	HILL ST	5.289	4.991	E	4.088	D	4.540	E	132.055	2.173
53098	12646	LANCASTER ST W	HILL ST	GUELPH ST	5.267	4.974	E	4.083	D	4.529	E	171.802	2.122
56041	10483	LANCASTER ST W	GUELPH ST	ARNOLD ST	4.851	4.646	E	4.005	D	4.326	E	253.614	1.483
53096	10485	LANCASTER ST W	ARNOLD ST	ELIZABETH ST	4.877	4.666	E	4.012	D	4.339	E	69.323	1.513
57080	10487	LANCASTER ST W	ELIZABETH ST	CLIFTON RD	4.837	4.635	E	4.002	D	4.318	E	27.858	1.467
58331	10389	LANCASTER ST W	CLIFTON RD	ASH ST	5.183	4.908	E	4.064	D	4.486	E	56.418	1.945
57143	10381	LANCASTER ST W	ASH ST	UNION ST	5.161	4.890	E	4.058	D	4.474	E	221.163	1.903
55683	6953	LANCASTER ST W	UNION ST	C_PKY STR OFFRAMP	4.143	4.087	D	3.755	D	3.921	D	98.787	0.927
56965	6985	LANCASTER ST W	C_PKY WAT ONRAMP	C_PKY STR OFFRAMP	5.061	4.811	E	3.966	D	4.388	E	188.289	1.635
54972	12419	LANCASTER ST W	C_PKY WAT ONRAMP	HAMEL AVE	4.249	4.170	D	3.793	D	3.981	D	175.651	0.982
54971	12415	LANCASTER ST W	HAMEL AVE	BRIDGEPORT RD	3.817	3.829	D	3.620	D	3.724	D	150.168	0.784

Zone 6 - Zone 9													
Route-Level QOS Score	4.303												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
53264	7053	WEBER ST W	HEIT LANE	VICTORIA ST N	4.520	4.384	D	3.847	D	4.116	D	64.895	1.131
53260	7055	WEBER ST W	WATER ST N	HEIT LANE	4.536	4.397	D	3.852	D	4.124	D	31.741	1.142
55369	6666	WEBER ST W	COLLEGE ST	WATER ST N	4.644	4.482	E	3.883	D	4.183	D	105.647	1.224
58989	6492	WEBER ST W	YOUNG ST	COLLEGE ST	4.623	4.465	E	3.877	D	4.171	D	111.870	1.207
57525	6479	WEBER ST W	ONTARIO ST N	YOUNG ST	4.603	4.450	E	3.872	D	4.161	D	168.674	1.192
58596	6766	WEBER ST W	QUEEN ST N	ONTARIO ST N	4.584	4.435	E	3.866	D	4.150	D	121.795	1.177
58222	6770	WEBER ST E	QUEEN ST N	FREDERICK ST	4.563	4.418	E	3.860	D	4.139	D	125.407	1.161
56682	6744	FREDERICK ST	DUKE ST E	WEBER ST E	3.412	3.510	D	3.450	C	3.480	C	133.442	0.658
53626	6802	FREDERICK ST	GOUDIES LANE	DUKE ST E	3.355	3.464	D	3.410	C	3.437	C	78.411	0.640
53625	6801	FREDERICK ST	KING ST E	GOUDIES LANE	3.582	3.644	D	3.494	C	3.569	D	60.625	0.699
57765	11320	BENTON ST	KING ST E	HALLS LANE E	3.618	3.672	D	3.515	D	3.593	D	66.080	0.711
57764	11322	BENTON ST	HALLS LANE E	CHARLES ST E	3.333	3.447	D	3.394	C	3.420	C	38.729	0.633
58102	11314	BENTON ST	CHARLES ST E	CHURCH ST	3.355	3.464	D	3.410	C	3.437	C	93.833	0.640
58101	6707	BENTON ST	CHURCH ST	ST GEORGE ST	3.007	3.190	C	3.066	C	3.128	C	131.789	0.534
58055	6608	BENTON ST	ST GEORGE ST	COURTLAND AVE E	3.352	3.462	D	3.408	C	3.435	C	197.430	0.639
58811	6610	COURTLAND AVE E	BENTON ST	HEBEL PL	4.449	4.328	D	3.918	D	4.123	D	114.546	1.140
55929	11293	COURTLAND AVE E	HEBEL PL	PETER ST	4.445	4.325	D	3.916	D	4.121	D	114.991	1.137
55928	6647	COURTLAND AVE E	PETER ST	CEDAR ST S	5.117	4.856	E	4.048	D	4.452	E	201.694	1.824
53521	6650	COURTLAND AVE E	CEDAR ST S	MADISON AVE S	5.285	4.988	E	4.087	D	4.538	E	128.286	2.164
59075	11607	COURTLAND AVE E	MADISON AVE S	STIRLING AVE S	3.906	3.899	D	3.660	D	3.780	D	140.245	0.819
57661	11390	COURTLAND AVE E	STIRLING AVE S	STIRLING AVE S	4.914	4.696	E	3.929	D	4.312	E	51.616	1.454
58881	11382	COURTLAND AVE E	STIRLING AVE S	VERNON AVE	4.801	4.606	E	3.992	D	4.299	E	102.949	1.427
58927	11373	COURTLAND AVE E	VERNON AVE	PALMER AVE	4.775	4.586	E	3.985	D	4.285	E	94.348	1.399
57861	11661	COURTLAND AVE E	PALMER AVE	KENT AVE	4.749	4.565	E	3.977	D	4.271	E	177.065	1.372
57024	6899	COURTLAND AVE E	KENT AVE	BORDEN AVE S	4.705	4.530	E	3.965	D	4.248	D	189.170	1.329
56817	6894	COURTLAND AVE E	BORDEN AVE S	GRENVILLE AVE	4.633	4.474	E	3.944	D	4.209	D	96.932	1.264
56850	6888	COURTLAND AVE E	GRENVILLE AVE	OTTAWA ST S	4.431	4.314	D	3.912	D	4.113	D	91.063	1.127
56864	6886	OTTAWA ST S	COURTLAND AVE E	LILAC ST	5.105	4.846	E	4.045	D	4.446	E	86.996	1.804
54548	6890	OTTAWA ST S	LILAC ST	ACACIA ST	5.067	4.816	E	4.035	D	4.426	E	137.164	1.742
55624	10901	OTTAWA ST S	ACACIA ST	MILL ST	4.731	4.551	E	4.026	D	4.289	E	81.430	1.406
58131	11457	OTTAWA ST S	MILL ST	MILL ST	4.204	4.134	D	3.777	D	3.956	D	43.410	0.958
58130	11449	OTTAWA ST S	MILL ST	PATTANDON AVE	4.490	4.361	D	3.838	D	4.099	D	52.690	1.110
55914	10877	OTTAWA ST S	PATTANDON AVE	HOFFMAN ST	4.226	4.152	D	3.817	D	3.985	D	211.713	0.985
57499	11743	OTTAWA ST S	HOFFMAN ST	KEHL ST	4.228	4.153	D	3.785	D	3.969	D	294.531	0.970
58491	11639	OTTAWA ST S	KEHL ST	IMPERIAL DR	4.103	4.055	D	3.740	D	3.898	D	76.425	0.907
54058	11747	OTTAWA ST S	IMPERIAL DR	C_PKY WAT ONRAMP	4.944	4.719	E	3.937	D	4.328	E	159.119	1.488
54059	11761	OTTAWA ST S	C_PKY WAT ONRAMP	HOMER WATSON BLVD	4.510	4.376	D	3.796	D	4.086	D	76.108	1.094
59070	10766	HOMER WATSON BLVD	OTTAWA ST S	HANSON AVE	5.300	5.000	F	4.336	E	4.668	E	608.822	3.014
54229	10944	HOMER WATSON BLVD	HANSON AVE	BLOCK LINE RD	5.300	5.000	F	4.040	D	4.520	E	695.316	2.084
55821	21996	DOON VILLAGE RD	HOMER WATSON BLVD	MILLWOOD CRES	4.000	3.974	D	3.735	D	3.854	D	124.549	0.873
56337	21937	DOON VILLAGE RD	MILLWOOD CRES	UPPER CANADA DR	4.000	3.974	D	3.735	D	3.854	D	92.566	0.873
56085	22006	DOON VILLAGE RD	UPPER CANADA DR	MILLWOOD CRES	3.578	3.640	D	3.545	D	3.592	D	58.011	0.710
55823	21939	DOON VILLAGE RD	MILLWOOD CRES	PIONEER DR	3.729	3.760	D	3.622	D	3.691	D	166.822	0.764

Zone 6 - Zone 10													
Route-Level QOS Score	4.131												
Route-Level QOS	D												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
52996	7052	VICTORIA ST N	DUKE ST W	WEBER ST W	4.733	4.552	E	3.908	D	4.230	D	179.751	1.299
57312	5898	VICTORIA ST N	KING ST W	DUKE ST W	4.081	4.037	D	3.732	D	3.885	D	251.991	0.897
55534	9033	VICTORIA ST S	KING ST W	HALLS LANE W	4.228	4.154	D	3.818	D	3.986	D	58.907	0.986
59243	8923	VICTORIA ST S	HALLS LANE W	CHARLES ST W	4.587	4.437	E	3.867	D	4.152	D	55.411	1.179
59091	8787	VICTORIA ST S	CHARLES ST W	JOSEPH ST	4.748	4.564	E	3.912	D	4.238	D	128.650	1.312
53719	8788	VICTORIA ST S	JOSEPH ST	ARTHUR PL	4.750	4.566	E	3.913	D	4.239	D	78.125	1.314
58150	8798	VICTORIA ST S	ARTHUR PL	OAK ST	4.736	4.554	E	3.909	D	4.232	D	26.468	1.301
78084	604291	VICTORIA ST S	OAK ST	GARMENT ST	2.740	2.979	C	0.697	A	1.838	A	43.232	0.316
58342	1691	VICTORIA ST S	GARMENT ST	MICHAEL ST	4.721	4.543	E	3.905	D	4.224	D	62.456	1.288
58149	8791	VICTORIA ST S	MICHAEL ST	BRAMM ST	4.704	4.530	E	3.900	D	4.215	D	16.729	1.274
58148	8793	VICTORIA ST S	BRAMM ST	THERESA ST	4.690	4.518	E	3.896	D	4.207	D	69.628	1.262
54345	8774	VICTORIA ST S	THERESA ST	PARK ST	4.675	4.507	E	3.892	D	4.199	D	73.971	1.249
58640	8767	VICTORIA ST S	PARK ST	HENRY ST	4.659	4.494	E	3.888	D	4.191	D	83.478	1.236
58912	8763	VICTORIA ST S	HENRY ST	WALNUT ST	5.300	5.000	E	4.235	D	4.618	E	98.012	2.615
55566	8536	VICTORIA ST S	WALNUT ST	STRANGE ST	4.630	4.471	E	3.879	D	4.175	D	222.224	1.212
56381	8689	VICTORIA ST S	STRANGE ST	PATRICIA AVE	4.613	4.458	E	3.875	D	4.166	D	295.170	1.199
57039	8684	VICTORIA ST S	PATRICIA AVE	BELMONT AVE W	4.170	4.108	D	3.799	D	3.954	D	271.864	0.956
53653	1696	BELMONT AVE W	JACK AVE	VICTORIA ST S	3.649	3.697	D	3.534	D	3.615	D	117.374	0.722
54864	8518	BELMONT AVE W	EDGEWOOD DR	JACK AVE	3.649	3.697	D	3.534	D	3.615	D	28.968	0.722
56546	8651	BELMONT AVE W	SANDRA AVE	EDGEWOOD DR	3.304	3.425	D	3.373	C	3.399	C	66.790	0.624
54772	8649	BELMONT AVE W	METZLOFF DR	SANDRA AVE	3.649	3.697	D	3.534	D	3.615	D	97.272	0.722
58127	8635	BELMONT AVE W	BURN PL	METZLOFF DR	3.324	3.440	D	3.387	C	3.413	C	91.926	0.630
56466	8755	BELMONT AVE W	HIGHLAND RD W	BURN PL	3.649	3.697	D	3.534	D	3.615	D	112.563	0.722
54452	8663	HIGHLAND RD W	BELMONT AVE W	ROXBOROUGH AVE	4.503	4.371	D	3.842	D	4.106	D	111.849	1.119
54453	20988	HIGHLAND RD W	ROXBOROUGH AVE	LAWRENCE AVE	4.893	4.679	E	3.924	D	4.301	E	151.146	1.431
56094	20964	HIGHLAND RD W	LAWRENCE AVE	BUTLER LANE	4.908	4.690	E	3.928	D	4.309	E	115.480	1.447
56093	20994	HIGHLAND RD W	BUTLER LANE	WESTMOUNT RD W	4.685	4.515	E	3.895	D	4.205	D	298.898	1.258
54157	20719	HIGHLAND RD W	WESTMOUNT RD W	HIGHLAND CRES	4.296	4.207	D	3.752	D	3.980	D	168.450	0.980
57540	20717	HIGHLAND RD W	HIGHLAND CRES	FIELDGATE ST	4.246	4.168	D	3.811	D	3.989	D	338.280	0.989
59064	20702	HIGHLAND RD W	FIELDGATE ST	EAGEN DR	4.241	4.164	D	3.808	D	3.986	D	172.606	0.986
58669	20757	HIGHLAND RD W	EAGEN DR	HIGHLAND CRES	4.234	4.158	D	3.806	D	3.982	D	163.551	0.983
57798	6104	HIGHLAND RD W	HIGHLAND CRES	FISCHER HALLMAN RD	3.929	3.918	D	3.588	D	3.753	D	184.851	0.802
58037	20737	HIGHLAND RD W	FISCHER HALLMAN RD	WESTHEIGHTS DR	4.584	4.434	E	4.298	E	4.366	E	536.632	1.578

Zone 7 - Zone 8														
Route-Level QOS Score	4.135													
Route-Level QOS	D													
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)	
56673	12116	KING ST E	MORGAN AVE	FAIRWAY RD N	4.308	4.217	D	3.734	D	3.976	D	178.839	0.976	
55917	12119	KING ST E	KINGSBURY DR	MORGAN AVE	5.248	4.959	E	4.009	D	4.484	E	32.821	1.938	
54047	12115	KING ST E	KING ST BYPASS OFFRAMP	KINGSBURY DR	4.489	4.360	D	3.818	D	4.089	D	150.463	1.097	
54310	22330	WEBER ST E	KINZIE AVE	KING ST E	4.680	4.511	E	3.894	D	4.202	D	231.651	1.254	
57349	22350	WEBER ST E	FERGUS AVE	KINZIE AVE	5.032	4.789	E	3.959	D	4.374	E	325.599	1.597	
53742	10991	WEBER ST E	ARLINGTON BLVD	FERGUS AVE	4.719	4.541	E	3.904	D	4.223	D	342.363	1.286	
56776	13144	WEBER ST E	PINECREST DR	ARLINGTON BLVD	4.700	4.526	E	3.899	D	4.212	D	87.505	1.270	
53289	10963	WEBER ST E	FRANKLIN ST N	PINECREST DR	4.680	4.511	E	3.893	D	4.202	D	86.260	1.253	
53289	10963	WEBER ST E	FRANKLIN ST N	PINECREST DR	4.680	4.511	E	3.893	D	4.202	D	86.260	1.253	
59056	10993	WEBER ST E	BROADVIEW AVE	FRANKLIN ST N	4.126	4.073	D	3.749	D	3.911	D	144.193	0.918	
54371	13145	WEBER ST E	EULER AVE	BROADVIEW AVE	4.110	4.061	D	3.743	D	3.902	D	88.270	0.911	
54370	13146	WEBER ST E	DELLROY AVE	EULER AVE	4.093	4.047	D	3.737	D	3.892	D	89.029	0.903	
54369	10038	WEBER ST E	EMERALD AVE	DELLROY AVE	4.078	4.036	D	3.731	D	3.883	D	89.440	0.895	
58568	13156	WEBER ST E	WILFRED AVE	EMERALD AVE	4.122	4.070	D	3.748	D	3.909	D	91.609	0.916	
53646	13158	WEBER ST E	ROSS AVE	WILFRED AVE	4.167	4.106	D	3.764	D	3.935	D	139.461	0.939	
57049	10030	WEBER ST E	SHANTZ LANE	ROSS AVE	4.211	4.140	D	3.779	D	3.960	D	91.685	0.961	
58483	13270	WEBER ST E	MONTGOMERY RD	SHANTZ LANE	4.256	4.176	D	3.795	D	3.985	D	225.136	0.985	
52829	10015	WEBER ST E	JACKSON AVE	MONTGOMERY RD	4.204	4.135	D	3.811	D	3.973	D	431.494	0.974	
56569	11675	WEBER ST E	EDMUND RD	JACKSON AVE	4.200	4.131	D	3.809	D	3.970	D	101.306	0.971	
56568	10142	WEBER ST E	RAYMOND RD	EDMUND RD	4.195	4.127	D	3.808	D	3.968	D	101.117	0.969	
56572	10143	WEBER ST E	SHELDON AVE N	RAYMOND RD	4.190	4.124	D	3.806	D	3.965	D	107.369	0.966	
59120	11705	WEBER ST E	SYDNEY ST N	SHELDON AVE N	4.185	4.120	D	3.805	D	3.962	D	129.245	0.964	
56571	11704	WEBER ST E	OTTAWA ST N	SYDNEY ST N	4.180	4.116	D	3.803	D	3.960	D	122.042	0.961	
57524	10182	WEBER ST E	EAST AVE	OTTAWA ST N	4.176	4.112	D	3.801	D	3.957	D	20.287	0.959	
58614	10185	WEBER ST E	ONWARD AVE	EAST AVE	4.170	4.108	D	3.799	D	3.954	D	222.535	0.956	
58297	10178	WEBER ST E	BORDEN AVE N	ONWARD AVE	4.266	4.183	D	3.798	D	3.991	D	96.569	0.991	
52824	10165	WEBER ST E	SIMEON ST	BORDEN AVE N	4.100	4.053	D	3.739	D	3.896	D	175.103	0.906	
58298	10164	WEBER ST E	STIRLING AVE N	SIMEON ST	4.180	4.116	D	3.803	D	3.960	D	172.143	0.961	
58672	9846	WEBER ST E	FAIRVIEW AVE	STIRLING AVE N	4.202	4.133	D	3.810	D	3.971	D	88.304	0.972	
58299	9859	WEBER ST E	PANDORA AVE N	FAIRVIEW AVE	4.221	4.148	D	3.816	D	3.982	D	90.581	0.983	
56893	6846	WEBER ST E	BETZNER AVE N	PANDORA AVE N	4.240	4.163	D	3.822	D	3.993	D	86.975	0.993	
53940	6859	WEBER ST E	CAMERON ST N	BETZNER AVE N	4.462	4.338	D	3.829	D	4.084	D	98.276	1.091	
53939	6863	WEBER ST E	MADISON AVE N	CAMERON ST N	4.481	4.354	D	3.835	D	4.094	D	125.207	1.104	
58615	6885	WEBER ST E	KRUG ST	MADISON AVE N	4.502	4.370	D	3.842	D	4.106	D	127.385	1.119	
58990	6879	WEBER ST E	SCOTT ST	KRUG ST	4.522	4.386	D	3.848	D	4.117	D	270.698	1.132	
58598	6759	WEBER ST E	FREDERICK ST	SCOTT ST	4.543	4.403	E	3.854	D	4.128	D	155.076	1.147	
54055	6776	FREDERICK ST	WEBER ST E	SPETZ ST	3.788	3.807	D	3.606	D	3.707	D	105.202	0.773	
54033	6754	FREDERICK ST	SPETZ ST	IRVIN ST	3.798	3.814	D	3.611	D	3.713	D	113.431	0.777	
57867	6788	FREDERICK ST	IRVIN ST	OTTO ST	3.675	3.717	D	3.548	D	3.632	D	74.124	0.731	
57868	6750	FREDERICK ST	OTTO ST	LANCASTER ST E	3.817	3.829	D	3.620	D	3.724	D	141.813	0.784	
56156	11153	LANCASTER ST E	MIEHM PL	FREDERICK ST	3.549	3.618	D	3.622	D	3.620	D	74.995	0.724	
56608	11136	LANCASTER ST E	CLARENCE PL	MIEHM PL	3.549	3.618	D	3.622	D	3.620	D	35.822	0.724	
56053	11133	LANCASTER ST E	MANSION ST	CLARENCE PL	3.461	3.548	D	3.569	D	3.559	D	179.664	0.694	
56054	602203	LANCASTER ST E	MANSION ST	MANSION ST	3.807	3.821	D	3.749	D	3.785	D	18.011	0.823	
56966	11160	LANCASTER ST E	LUELLA ST	MANSION ST	3.519	3.594	D	3.604	D	3.599	D	80.346	0.714	
56837	6971	LANCASTER ST E	QUEEN ST N	LUELLA ST	3.583	3.645	D	3.640	D	3.643	D	96.615	0.737	
56212	6970	LANCASTER ST W	QUEEN ST N	VICTORIA ST N	3.506	3.583	D	3.504	D	3.543	D	63.726	0.687	
59066	7046	LANCASTER ST W	VICTORIA ST N	BREITHAUPT ST	4.021	3.990	D	3.708	D	3.849	D	147.268	0.869	
59065	11114	LANCASTER ST W	BREITHAUPT ST	BREITHAUPT ST	4.240	4.163	D	3.822	D	3.993	D	51.847	0.993	
53634	7042	LANCASTER ST W	BREITHAUPT ST	WELLINGTON ST N	4.218	4.146	D	3.815	D	3.981	D	71.093	0.981	
58564	7036	LANCASTER ST W	WELLINGTON ST N	LOUISA ST	5.300	5.000	F	4.176	D	4.588	E	123.127	2.428	
58038	7041	LANCASTER ST W	LOUISA ST	HILLVIEW ST	5.300	5.000	F	4.093	D	4.546	E	96.374	2.205	
53099	6961	LANCASTER ST W	HILLVIEW ST	HILL ST	5.289	4.991	E	4.088	D	4.540	E	132.055	2.173	
53098	12646	LANCASTER ST W	HILL ST	GUELPH ST	5.267	4.974	E	4.083	D	4.529	E	171.802	2.122	
56041	10483	LANCASTER ST W	GUELPH ST	ARNOLD ST	4.851	4.646	E	4.005	D	4.326	E	253.614	1.483	
53096	10485	LANCASTER ST W	ARNOLD ST	ELIZABETH ST	4.877	4.666	E	4.012	D	4.339	E	69.323	1.513	
57080	10487	LANCASTER ST W	ELIZABETH ST	CLIFTON RD	4.837	4.635	E	4.002	D	4.318	E	27.858	1.467	
58331	10389	LANCASTER ST W	CLIFTON RD	ASH ST	5.183	4.908	E	4.064	D	4.486	E	56.418	1.945	
57143	10381	LANCASTER ST W	ASH ST	UNION ST	5.161	4.890	E	4.058	D	4.474	E	221.163	1.903	
55683	6953	LANCASTER ST W	UNION ST	C_PKY STR OFFRAMP	4.143	4.087	D	3.755	D	3.921	D	98.787	0.927	
56965	6985	LANCASTER ST W	C_PKY WAT ONRAMP	C_PKY STR OFFRAMP	5.061	4.811	E	3.966	D	4.388	E	188.289	1.635	
54972	12419	LANCASTER ST W	C_PKY WAT ONRAMP	HAMEL AVE	4.249	4.170	D	3.793	D	3.981	D	175.651	0.982	
54971	12415	LANCASTER ST W	HAMEL AVE	BRIDGEPORT RD	3.817	3.829	D	3.620	D	3.724	D	150.168	0.784	

Zone 7 - Zone 9													
Route-Level QOS Score	4.424												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
58635	22324	FAIRWAY RD S	FAIRWAY RD N	KING ST BYPASS ONRAMP	5.300	5.000	E	4.062	D	4.531	E	489.939	2.132
53241	22107	FAIRWAY RD S	KING ST BYPASS ONRAMP	KING ST BYPASS OFFRAMP	5.300	5.000	E	4.363	D	4.681	E	16.876	3.137
55326	22103	FAIRWAY RD S	KING ST BYPASS OFFRAMP	WABANAKI DR	5.242	4.954	E	4.002	D	4.478	E	294.788	1.916
55327	600416	FAIRWAY RD S	WABANAKI DR	WILSON AVE	4.859	4.652	E	3.863	D	4.257	E	482.211	1.346
57032	22093	WILSON AVE	FAIRWAY RD S	WEBSTER RD	3.429	3.523	D	3.456	C	3.489	C	495.057	0.662
58688	21891	WILSON AVE	WEBSTER RD	GOODRICH DR	3.830	3.839	D	3.667	D	3.753	D	116.412	0.802
57627	22091	WILSON AVE	GOODRICH DR	WABANAKI DR	3.510	3.587	D	3.506	D	3.547	D	717.610	0.688
56071	21906	WABANAKI DR	KEVCO PL	WILSON AVE	3.415	3.512	D	3.447	C	3.479	C	114.415	0.658
54775	21897	WABANAKI DR	MANITOU DR	KEVCO PL	3.043	3.218	C	3.110	C	3.164	C	553.647	0.545
54193	21823	MANITOU DR	WABANAKI DR	SASAGA DR	5.300	5.000	E	4.555	E	4.778	E	149.250	4.499
58239	21821	MANITOU DR	SASAGA DR	CAYUGA DR	5.300	5.000	E	4.592	E	4.796	E	616.201	4.908
58704	21903	MANITOU DR	CAYUGA DR	HOMER WATSON BLVD	4.972	4.741	E	4.383	E	4.562	E	256.935	2.285
55821	21996	DOON VILLAGE RD	HOMER WATSON BLVD	MILLWOOD CRES	4.000	3.974	D	3.735	D	3.854	D	124.549	0.873
56337	21937	DOON VILLAGE RD	MILLWOOD CRES	UPPER CANADA DR	4.000	3.974	D	3.735	D	3.854	D	92.566	0.873
56085	22006	DOON VILLAGE RD	UPPER CANADA DR	MILLWOOD CRES	3.578	3.640	D	3.545	D	3.592	D	58.011	0.710
55823	21939	DOON VILLAGE RD	MILLWOOD CRES	PIONEER DR	3.729	3.760	D	3.622	D	3.691	D	166.822	0.764

Zone 7 - Zone 10													
Route-Level QOS Score	4.282												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
58635	22324	FAIRWAY RD S	FAIRWAY RD N	KING ST BYPASS ONRAMP	5.300	5.000	E	4.062	D	4.531	E	489.939	2.132
53241	22107	FAIRWAY RD S	KING ST BYPASS ONRAMP	KING ST BYPASS OFFRAMP	5.300	5.000	E	4.363	D	4.681	E	16.876	3.137
55326	22103	FAIRWAY RD S	KING ST BYPASS OFFRAMP	WABANAKI DR	5.242	4.954	E	4.002	D	4.478	E	294.788	1.916
55327	600416	FAIRWAY RD S	WABANAKI DR	WILSON AVE	4.859	4.652	E	3.863	D	4.257	E	482.211	1.346
53770	10714	FAIRWAY RD S	WILSON AVE	MANITOU DR	5.300	5.000	E	4.196	D	4.598	E	908.648	2.488
58368	21835	COURTLAND AVE E	BALZER RD	MANITOU DR	4.781	4.590	E	3.843	D	4.217	D	143.351	1.276
54896	10099	COURTLAND AVE E	SIEBERT AVE	BALZER RD	5.300	5.000	E	4.120	D	4.560	E	249.149	2.272
53709	10103	COURTLAND AVE E	SHELLEY DR	SIEBERT AVE	5.212	4.931	E	4.001	D	4.466	E	145.186	1.873
54075	10093	COURTLAND AVE E	BLOCK LINE RD	SHELLEY DR	4.498	4.367	D	3.792	D	4.080	D	256.802	1.086
55632	103019	BLOCK LINE RD	LENNOX LEWIS WAY	COURTLAND AVE E	2.654	2.911	C	-1.737	A	0.587	A	270.826	0.227
55631	600915	BLOCK LINE RD	FALLOWFIELD DR	LENNOX LEWIS WAY	3.031	3.209	C	3.094	C	3.151	C	358.988	0.541
55690	600353	BLOCK LINE RD	HOMER WATSON BLVD	FALLOWFIELD DR	3.030	3.208	C	3.093	C	3.150	C	183.180	0.541
54229	10944	HOMER WATSON BLVD	HANSON AVE	BLOCK LINE RD	5.300	5.000	E	4.040	D	4.520	E	695.316	2.084
59070	10766	HOMER WATSON BLVD	OTTAWA ST S	HANSON AVE	5.300	5.000	E	4.336	E	4.668	E	608.822	3.014
55964	10839	OTTAWA ST S	HOMER WATSON BLVD	ALPINE RD	5.224	4.940	E	4.355	E	4.648	E	134.788	2.839
58492	11628	OTTAWA ST S	ALPINE RD	STRASBURG RD	4.470	4.345	D	3.784	D	4.064	D	428.425	1.069
90562	605989	OTTAWA ST S	STRASBURG RD	HUNTSWORTH AVE	2.740	2.979	C	0.697	A	1.838	A	267.184	0.316
53064	6586	OTTAWA ST S	HUNTSWORTH AVE	ELMSDALE DR	4.632	4.473	E	3.880	D	4.176	D	276.007	1.214
58706	6388	OTTAWA ST S	ELMSDALE DR	HOWLAND DR	4.637	4.477	E	3.882	D	4.179	D	276.702	1.218
57326	6377	OTTAWA ST S	HOWLAND DR	MOWAT BLVD	4.498	4.367	D	3.841	D	4.104	D	96.443	1.116
54176	6376	OTTAWA ST S	MOWAT BLVD	WESTMOUNT RD E	4.570	4.424	E	3.862	D	4.143	D	276.205	1.167
56624	6390	WESTMOUNT RD E	GILMOUR CRES	OTTAWA ST S	4.625	4.467	E	3.878	D	4.172	D	423.900	1.208
54417	6605	WESTMOUNT RD E	GILMOUR CRES	GILMOUR CRES	4.613	4.458	E	3.875	D	4.166	D	86.809	1.199
57507	6565	WESTMOUNT RD E	STONYBROOK DR	GILMOUR CRES	4.601	4.448	E	3.871	D	4.160	D	111.863	1.190
55514	6560	WESTMOUNT RD E	VILLAGE RD	STONYBROOK DR	4.700	4.526	E	3.899	D	4.212	D	259.782	1.270
53818	6493	WESTMOUNT RD E	GREENBROOK DR	VILLAGE RD	4.232	4.157	D	3.787	D	3.972	D	96.805	0.973
53817	6506	WESTMOUNT RD E	EVERGREEN CRES	GREENBROOK DR	4.502	4.370	D	3.842	D	4.106	D	87.806	1.119
53787	6508	WESTMOUNT RD E	FOREST HILL DR	EVERGREEN CRES	4.577	4.429	E	3.864	D	4.147	D	270.400	1.172
57945	20900	WESTMOUNT RD E	GATEWOOD RD	FOREST HILL DR	4.654	4.490	E	3.886	D	4.188	D	87.764	1.231
55915	21000	WESTMOUNT RD E	QUEENS BLVD	GATEWOOD RD	4.728	4.549	E	3.907	D	4.228	D	188.056	1.295
57189	21006	QUEENS BLVD	WESTMOUNT RD E	CECILE DR	3.333	3.447	D	3.390	C	3.419	C	395.922	0.632
57188	20720	QUEENS BLVD	CECILE DR	WARREN RD	3.110	3.271	C	3.188	C	3.230	C	113.549	0.565
53611	20995	QUEENS BLVD	WARREN RD	KELLY DR	3.429	3.523	D	3.456	C	3.489	C	141.917	0.662
57187	20739	QUEENS BLVD	KELLY DR	SILVERSPRING CRES	3.381	3.485	D	3.424	C	3.454	C	36.630	0.647
56081	6187	QUEENS BLVD	SILVERSPRING CRES	EAGEN DR	3.024	3.203	C	3.136	C	3.170	C	179.391	0.546
53621	6177	QUEENS BLVD	EAGEN DR	BONFAIR CRT	3.119	3.278	C	3.199	C	3.239	C	136.299	0.568
53620	6170	QUEENS BLVD	BONFAIR CRT	OVERLEA DR	3.415	3.512	D	3.447	C	3.479	C	49.689	0.658
53619	5602	QUEENS BLVD	OVERLEA DR	FISCHER HALLMAN RD	3.525	3.599	D	3.515	D	3.557	D	166.644	0.693
57634	5603	QUEENS BLVD	FISCHER HALLMAN RD	ELM RIDGE DR	3.201	3.343	C	3.280	C	3.312	C	385.325	0.592
59248	5425	QUEENS BLVD	ELM RIDGE DR	WESTHEIGHTS DR	3.247	3.379	C	3.322	C	3.350	C	166.980	0.606
58831	20732	WESTHEIGHTS DR	BLACKWELL DR	QUEENS BLVD	3.036	3.212	C	3.101	C	3.156	C	134.162	0.542
57835	20807	WESTHEIGHTS DR	HIGHLAND RD W	BLACKWELL DR	3.144	3.298	C	3.225	C	3.262	C	209.666	0.575

Zone 8 - Zone 9														
Route-Level QOS Score	4.287													
Route-Level QOS	E													
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)	
54971	12415	LANCASTER ST W	HAMEL AVE	BRIDGEPORT RD	3.817	3.829	D	3.620	D	3.724	D	150.168	0.784	
54972	12419	LANCASTER ST W	C_PKY WAT ONRAMP	HAMEL AVE	4.249	4.170	D	3.793	D	3.981	D	175.651	0.982	
56965	6985	LANCASTER ST W	C_PKY WAT ONRAMP	C_PKY STR OFFRAMP	5.061	4.811	E	3.966	D	4.388	E	188.289	1.635	
55683	6953	LANCASTER ST W	UNION ST	C_PKY STR OFFRAMP	4.143	4.087	D	3.755	D	3.921	D	98.787	0.927	
57143	10381	LANCASTER ST W	ASH ST	UNION ST	5.161	4.890	E	4.058	D	4.474	E	221.163	1.903	
58331	10389	LANCASTER ST W	CLIFTON RD	ASH ST	5.183	4.908	E	4.064	D	4.486	E	56.418	1.945	
57080	10487	LANCASTER ST W	ELIZABETH ST	CLIFTON RD	4.837	4.635	E	4.002	D	4.318	E	27.858	1.467	
53096	10485	LANCASTER ST W	ARNOLD ST	ELIZABETH ST	4.877	4.666	E	4.012	D	4.339	E	69.323	1.513	
56041	10483	LANCASTER ST W	GUELPH ST	ARNOLD ST	4.851	4.646	E	4.005	D	4.326	E	253.614	1.483	
53098	12646	LANCASTER ST W	HILL ST	GUELPH ST	5.267	4.974	E	4.083	D	4.529	E	171.802	2.122	
53099	6961	LANCASTER ST W	HILLVIEW ST	HILL ST	5.289	4.991	E	4.088	D	4.540	E	132.055	2.173	
58038	7041	LANCASTER ST W	LOUISA ST	HILLVIEW ST	5.300	5.000	F	4.093	D	4.546	E	96.374	2.205	
58564	7036	LANCASTER ST W	WELLINGTON ST N	LOUISA ST	5.300	5.000	F	4.176	D	4.588	E	123.127	2.428	
53634	7042	LANCASTER ST W	BREITHAUPT ST	WELLINGTON ST N	4.218	4.146	D	3.815	D	3.981	D	71.093	0.981	
59065	11114	LANCASTER ST W	BREITHAUPT ST	BREITHAUPT ST	4.240	4.163	D	3.822	D	3.993	D	51.847	0.993	
59066	7046	LANCASTER ST W	VICTORIA ST N	BREITHAUPT ST	4.021	3.990	D	3.708	D	3.849	D	147.268	0.869	
56212	6970	LANCASTER ST W	QUEEN ST N	VICTORIA ST N	3.506	3.583	D	3.504	D	3.543	D	63.726	0.687	
56837	6971	LANCASTER ST E	QUEEN ST N	LUELLA ST	3.583	3.645	D	3.640	D	3.643	D	96.615	0.737	
56966	11160	LANCASTER ST E	LUELLA ST	MANSION ST	3.519	3.594	D	3.604	D	3.599	D	80.346	0.714	
56054	602203	LANCASTER ST E	MANSION ST	MANSION ST	3.807	3.821	D	3.749	D	3.785	D	18.011	0.823	
56053	11133	LANCASTER ST E	MANSION ST	CLARENCE PL	3.461	3.548	D	3.569	D	3.559	D	179.664	0.694	
56608	11136	LANCASTER ST E	CLARENCE PL	MIEHM PL	3.549	3.618	D	3.622	D	3.620	D	35.822	0.724	
56156	11153	LANCASTER ST E	MIEHM PL	FREDERICK ST	3.549	3.618	D	3.622	D	3.620	D	74.995	0.724	
57868	6750	FREDERICK ST	OTTO ST	LANCASTER ST E	3.817	3.829	D	3.620	D	3.724	D	141.813	0.784	
57867	6788	FREDERICK ST	IRVIN ST	OTTO ST	3.675	3.717	D	3.548	D	3.632	D	74.124	0.731	
54033	6754	FREDERICK ST	SPETZ ST	IRVIN ST	3.798	3.814	D	3.611	D	3.713	D	113.431	0.777	
54055	6776	FREDERICK ST	WEBER ST E	SPETZ ST	3.788	3.807	D	3.606	D	3.707	D	105.202	0.773	
56682	6744	FREDERICK ST	DUKE ST E	WEBER ST E	3.412	3.510	D	3.450	C	3.480	C	133.442	0.658	
53626	6802	FREDERICK ST	GOUDIES LANE	DUKE ST E	3.355	3.464	D	3.410	C	3.437	C	78.411	0.640	
53625	6801	FREDERICK ST	KING ST E	GOUDIES LANE	3.582	3.644	D	3.494	C	3.569	D	60.625	0.699	
57765	11320	BENTON ST	KING ST E	HALLS LANE E	3.618	3.672	D	3.515	D	3.593	D	66.080	0.711	
57764	11322	BENTON ST	HALLS LANE E	CHARLES ST E	3.333	3.447	D	3.394	C	3.420	C	38.729	0.633	
58102	11314	BENTON ST	CHARLES ST E	CHURCH ST	3.355	3.464	D	3.410	C	3.437	C	93.833	0.640	
58101	6707	BENTON ST	CHURCH ST	ST GEORGE ST	3.007	3.190	C	3.066	C	3.128	C	131.789	0.534	
58055	6608	BENTON ST	ST GEORGE ST	COURTLAND AVE E	3.352	3.462	D	3.408	C	3.435	C	197.430	0.639	
58811	6610	COURTLAND AVE E	BENTON ST	HEBEL PL	4.449	4.328	D	3.918	D	4.123	D	114.546	1.140	
55929	11293	COURTLAND AVE E	HEBEL PL	PETER ST	4.445	4.325	D	3.916	D	4.121	D	114.991	1.137	
55928	6647	COURTLAND AVE E	PETER ST	CEDAR ST S	5.117	4.856	E	4.048	D	4.452	E	201.694	1.824	
53521	6650	COURTLAND AVE E	CEDAR ST S	MADISON AVE S	5.285	4.988	E	4.087	D	4.538	E	128.286	2.164	
59075	11607	COURTLAND AVE E	MADISON AVE S	STIRLING AVE S	3.906	3.899	D	3.660	D	3.780	D	140.245	0.819	
57661	11390	COURTLAND AVE E	STIRLING AVE S	STIRLING AVE S	4.914	4.696	E	3.929	D	4.312	E	51.616	1.454	
58881	11382	COURTLAND AVE E	STIRLING AVE S	VERNON AVE	4.801	4.606	E	3.992	D	4.299	E	102.949	1.427	
58927	11373	COURTLAND AVE E	VERNON AVE	PALMER AVE	4.775	4.586	E	3.985	D	4.285	E	94.348	1.399	
57861	11661	COURTLAND AVE E	PALMER AVE	KENT AVE	4.749	4.565	E	3.977	D	4.271	E	177.065	1.372	
57024	6899	COURTLAND AVE E	KENT AVE	BORDEN AVE S	4.705	4.530	E	3.965	D	4.248	D	189.170	1.329	
56817	6894	COURTLAND AVE E	BORDEN AVE S	GRENVILLE AVE	4.633	4.474	E	3.944	D	4.209	D	96.932	1.264	
56850	6888	COURTLAND AVE E	GRENVILLE AVE	OTTAWA ST S	4.431	4.314	D	3.912	D	4.113	D	91.063	1.127	
56864	6886	OTTAWA ST S	COURTLAND AVE E	LILAC ST	5.105	4.846	E	4.045	D	4.446	E	86.996	1.804	
54548	6890	OTTAWA ST S	LILAC ST	ACACIA ST	5.067	4.816	E	4.035	D	4.426	E	137.164	1.742	
55624	10901	OTTAWA ST S	ACACIA ST	MILL ST	4.731	4.551	E	4.026	D	4.289	E	81.430	1.406	
58131	11457	OTTAWA ST S	MILL ST	MILL ST	4.204	4.134	D	3.777	D	3.956	D	43.410	0.958	
58130	11449	OTTAWA ST S	MILL ST	PATTANDON AVE	4.490	4.361	D	3.838	D	4.099	D	52.690	1.110	
55914	10877	OTTAWA ST S	PATTANDON AVE	HOFFMAN ST	4.226	4.152	D	3.817	D	3.985	D	211.713	0.985	
57499	11743	OTTAWA ST S	HOFFMAN ST	KEHL ST	4.228	4.153	D	3.785	D	3.969	D	294.531	0.970	
58491	11639	OTTAWA ST S	KEHL ST	IMPERIAL DR	4.103	4.055	D	3.740	D	3.898	D	76.425	0.907	
54058	11747	OTTAWA ST S	IMPERIAL DR	C_PKY WAT ONRAMP	4.944	4.719	E	3.937	D	4.328	E	159.119	1.488	
54059	11761	OTTAWA ST S	C_PKY WAT ONRAMP	HOMER WATSON BLVD	4.510	4.376	D	3.796	D	4.086	D	76.108	1.094	
59070	10766	HOMER WATSON BLVD	OTTAWA ST S	HANSON AVE	5.300	5.000	F	4.336	E	4.668	E	608.822	3.014	
54229	10944	HOMER WATSON BLVD	HANSON AVE	BLOCK LINE RD	5.300	5.000	F	4.040	D	4.520	E	695.316	2.084	
55821	21996	DOON VILLAGE RD	HOMER WATSON BLVD	MILLWOOD CRES	4.000	3.974	D	3.735	D	3.854	D	124.549	0.873	
56337	21937	DOON VILLAGE RD	MILLWOOD CRES	UPPER CANADA DR	4.000	3.974	D	3.735	D	3.854	D	92.566	0.873	
56085	22006	DOON VILLAGE RD	UPPER CANADA DR	MILLWOOD CRES	3.578	3.640	D	3.545	D	3.592	D	58.011	0.710	
55823	21939	DOON VILLAGE RD	MILLWOOD CRES	PIONEER DR	3.729	3.760	D	3.622	D	3.691	D	166.822	0.764	

Zone 8 - Zone 10													
Route-Level QOS Score	4.223												
Route-Level QOS	D												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
54971	12415	LANCASTER ST W	HAMEL AVE	BRIDGEPORT RD	3.817	3.829	D	3.620	D	3.724	D	150.168	0.784
54972	12419	LANCASTER ST W	C_PKY WAT ONRAMP	HAMEL AVE	4.249	4.170	D	3.793	D	3.981	D	175.651	0.982
56965	6985	LANCASTER ST W	C_PKY WAT ONRAMP	C_PKY STR OFFRAMP	5.061	4.811	E	3.966	D	4.388	E	188.289	1.635
55683	6953	LANCASTER ST W	UNION ST	C_PKY STR OFFRAMP	4.143	4.087	D	3.755	D	3.921	D	98.787	0.927
57143	10381	LANCASTER ST W	ASH ST	UNION ST	5.161	4.890	E	4.058	D	4.474	E	221.163	1.903
58331	10389	LANCASTER ST W	CLIFTON RD	ASH ST	5.183	4.908	E	4.064	D	4.486	E	56.418	1.945
57080	10487	LANCASTER ST W	ELIZABETH ST	CLIFTON RD	4.837	4.635	E	4.002	D	4.318	E	27.858	1.467
53096	10485	LANCASTER ST W	ARNOLD ST	ELIZABETH ST	4.877	4.666	E	4.012	D	4.339	E	69.323	1.513
56041	10483	LANCASTER ST W	GUELPH ST	ARNOLD ST	4.851	4.646	E	4.005	D	4.326	E	253.614	1.483
53098	12646	LANCASTER ST W	HILL ST	GUELPH ST	5.267	4.974	E	4.083	D	4.529	E	171.802	2.122
53099	6961	LANCASTER ST W	HILLVIEW ST	HILL ST	5.289	4.991	E	4.088	D	4.540	E	132.055	2.173
58038	7041	LANCASTER ST W	LOUISA ST	HILLVIEW ST	5.300	5.000	F	4.093	D	4.546	E	96.374	2.205
58564	7036	LANCASTER ST W	WELLINGTON ST N	LOUISA ST	5.300	5.000	F	4.176	D	4.588	E	123.127	2.428
53634	7042	LANCASTER ST W	BREITHAUPT ST	WELLINGTON ST N	4.218	4.146	D	3.815	D	3.981	D	71.093	0.981
59065	11114	LANCASTER ST W	BREITHAUPT ST	BREITHAUPT ST	4.240	4.163	D	3.822	D	3.993	D	51.847	0.993
59066	7046	LANCASTER ST W	VICTORIA ST N	BREITHAUPT ST	4.021	3.990	D	3.708	D	3.849	D	147.268	0.869
57219	6968	VICTORIA ST N	HERMIE PL	LANCASTER ST W	5.040	4.794	E	3.961	D	4.378	E	65.179	1.607
56553	6958	VICTORIA ST N	ST LEGER ST	HERMIE PL	4.932	4.709	E	3.934	D	4.322	E	213.228	1.474
57443	6787	VICTORIA ST N	ELLEN ST W	ST LEGER ST	4.996	4.760	E	3.950	D	4.355	E	159.880	1.550
58457	6780	VICTORIA ST N	MARGARET AVE	ELLEN ST W	5.037	4.792	E	3.960	D	4.376	E	140.463	1.603
54554	6662	VICTORIA ST N	AHRENS ST W	MARGARET AVE	4.910	4.692	E	3.928	D	4.310	E	211.878	1.449
58951	6659	VICTORIA ST N	AHRENS ST W	AHRENS ST W	4.893	4.679	E	3.924	D	4.301	E	31.798	1.431
54028	40174	VICTORIA ST N	WATER ST N	AHRENS ST W	4.059	4.020	D	3.724	D	3.872	D	13.631	0.887
54494	11079	VICTORIA ST N	WEBER ST W	WATER ST N	4.059	4.020	D	3.724	D	3.872	D	162.896	0.887
52996	7052	VICTORIA ST N	DUKE ST W	WEBER ST W	4.733	4.552	E	3.908	D	4.230	D	179.751	1.299
57312	5898	VICTORIA ST N	KING ST W	DUKE ST W	4.081	4.037	D	3.732	D	3.885	D	251.991	0.897
55534	9033	VICTORIA ST S	KING ST W	HALLS LANE W	4.228	4.154	D	3.818	D	3.986	D	58.907	0.986
59243	8923	VICTORIA ST S	HALLS LANE W	CHARLES ST W	4.587	4.437	E	3.867	D	4.152	D	55.411	1.179
59091	8787	VICTORIA ST S	CHARLES ST W	JOSEPH ST	4.748	4.564	E	3.912	D	4.238	D	128.650	1.312
53719	8788	VICTORIA ST S	JOSEPH ST	ARTHUR PL	4.750	4.566	E	3.913	D	4.239	D	78.125	1.314
58150	8798	VICTORIA ST S	ARTHUR PL	OAK ST	4.736	4.554	E	3.909	D	4.232	D	26.468	1.301
78084	604291	VICTORIA ST S	OAK ST	GARMENT ST	2.740	2.979	C	0.697	A	1.838	A	43.232	0.316
58342	1691	VICTORIA ST S	GARMENT ST	MICHAEL ST	4.721	4.543	E	3.905	D	4.224	D	62.456	1.288
58149	8791	VICTORIA ST S	MICHAEL ST	BRAMM ST	4.704	4.530	E	3.900	D	4.215	D	16.729	1.274
58148	8793	VICTORIA ST S	BRAMM ST	THERESA ST	4.690	4.518	E	3.896	D	4.207	D	69.628	1.262
54345	8774	VICTORIA ST S	THERESA ST	PARK ST	4.675	4.507	E	3.892	D	4.199	D	73.971	1.249
58640	8767	VICTORIA ST S	PARK ST	HENRY ST	4.659	4.494	E	3.888	D	4.191	D	83.478	1.236
58912	8763	VICTORIA ST S	HENRY ST	WALNUT ST	5.300	5.000	F	4.235	D	4.618	E	98.012	2.615
55566	8536	VICTORIA ST S	WALNUT ST	STRANGE ST	4.630	4.471	E	3.879	D	4.175	D	222.224	1.212
56381	8689	VICTORIA ST S	STRANGE ST	PATRICIA AVE	4.613	4.458	E	3.875	D	4.166	D	295.170	1.199
57039	8684	VICTORIA ST S	PATRICIA AVE	BELMONT AVE W	4.170	4.108	D	3.799	D	3.954	D	271.864	0.956
53653	1696	BELMONT AVE W	JACK AVE	VICTORIA ST S	3.649	3.697	D	3.534	D	3.615	D	117.374	0.722
54864	8518	BELMONT AVE W	EDGEWOOD DR	JACK AVE	3.649	3.697	D	3.534	D	3.615	D	28.968	0.722
56546	8651	BELMONT AVE W	SANDRA AVE	EDGEWOOD DR	3.304	3.425	D	3.373	C	3.399	C	66.790	0.624
54772	8649	BELMONT AVE W	METZLOFF DR	SANDRA AVE	3.649	3.697	D	3.534	D	3.615	D	97.272	0.722
58127	8635	BELMONT AVE W	BURN PL	METZLOFF DR	3.324	3.440	D	3.387	C	3.413	C	91.926	0.630
56466	8755	BELMONT AVE W	HIGHLAND RD W	BURN PL	3.649	3.697	D	3.534	D	3.615	D	112.563	0.722
54452	8663	HIGHLAND RD W	BELMONT AVE W	ROXBOROUGH AVE	4.503	4.371	D	3.842	D	4.106	D	111.849	1.119
54453	20988	HIGHLAND RD W	ROXBOROUGH AVE	LAWRENCE AVE	4.893	4.679	E	3.924	D	4.301	E	151.146	1.431
56094	20964	HIGHLAND RD W	LAWRENCE AVE	BUTLER LANE	4.908	4.690	E	3.928	D	4.309	E	115.480	1.447
56093	20994	HIGHLAND RD W	BUTLER LANE	WESTMOUNT RD W	4.685	4.515	E	3.895	D	4.205	D	298.898	1.258
54157	20719	HIGHLAND RD W	WESTMOUNT RD W	HIGHLAND CRES	4.296	4.207	D	3.752	D	3.980	D	168.450	0.980
57540	20717	HIGHLAND RD W	HIGHLAND CRES	FIELDGATE ST	4.246	4.168	D	3.811	D	3.989	D	338.280	0.989
59064	20702	HIGHLAND RD W	FIELDGATE ST	EAGEN DR	4.241	4.164	D	3.808	D	3.986	D	172.606	0.986
58669	20757	HIGHLAND RD W	EAGEN DR	HIGHLAND CRES	4.234	4.158	D	3.806	D	3.982	D	163.551	0.983
57798	6104	HIGHLAND RD W	HIGHLAND CRES	FISCHER HALLMAN RD	3.929	3.918	D	3.588	D	3.753	D	184.851	0.802
58037	20737	HIGHLAND RD W	FISCHER HALLMAN RD	WESTHEIGHTS DR	4.584	4.434	E	4.298	E	4.366	E	536.632	1.578

Zone 9 - Zone 10													
Route-Level QOS Score	4.486												
Route-Level QOS	E												
Object ID	Road Segment ID	Street	From_Street	To_Street	BCI Sore	Adjusted BCI Score	BCI	BLOS Score	BLOS	Link-Level QOS Score	Link-Level QOS	Shape Length	β (with α=1)
55823	21939	DOON VILLAGE RD	MILLWOOD CRES	PIONEER DR	3.729	3.760	D	3.622	D	3.691	D	166.822	0.764
56085	22006	DOON VILLAGE RD	UPPER CANADA DR	MILLWOOD CRES	3.578	3.640	D	3.545	D	3.592	D	58.011	0.710
56337	21937	DOON VILLAGE RD	MILLWOOD CRES	UPPER CANADA DR	4.000	3.974	D	3.735	D	3.854	D	92.566	0.873
55821	21996	DOON VILLAGE RD	HOMER WATSON BLVD	MILLWOOD CRES	4.000	3.974	D	3.735	D	3.854	D	124.549	0.873
59044	21992	HOMER WATSON BLVD	HOMER WATSON ONRAMP	DOON VILLAGE RD	4.900	4.684	E	3.950	D	4.317	E	232.906	1.464
59043	25666	HOMER WATSON BLVD	HOMER WATSON OFFRAMP	HOMER WATSON ONRAMP	5.300	5.000	F	4.236	D	4.618	E	602.619	2.619
59042	21808	HOMER WATSON BLVD	BEASLEY DR	HOMER WATSON OFFRAMP	4.872	4.662	E	3.941	D	4.302	E	193.438	1.432
59041	21862	HOMER WATSON BLVD	BLEAMS RD	BEASLEY DR	4.836	4.633	E	3.930	D	4.282	E	548.731	1.393
58428	9612	BLEAMS RD	HOMER WATSON BLVD	CENTURY HILL DR	4.446	4.326	D	3.918	D	4.122	D	419.164	1.139
58834	9679	BLEAMS RD	CENTURY HILL DR	STRASBURG RD	4.370	4.266	D	3.858	D	4.062	D	745.741	1.066
55498	9665	BLEAMS RD	STRASBURG RD	COLONY DR	4.292	4.204	D	3.829	D	4.016	D	362.732	1.017
55313	9671	BLEAMS RD	COLONY DR	TRILLIUM DR	5.300	5.000	E	4.656	E	4.828	E	534.862	5.807
55493	9724	BLEAMS RD	TRILLIUM DR	WASHBURN DR	5.300	5.000	E	4.643	E	4.821	E	589.471	5.599
55312	9723	BLEAMS RD	WASHBURN DR	FISCHER HALLMAN RD	4.706	4.531	E	4.344	E	4.437	E	357.564	1.777
56861	9756	FISCHER HALLMAN RD	ROCKWOOD RD	BLEAMS RD	5.245	4.956	E	4.481	E	4.719	E	240.828	3.557
52885	40196	FISCHER HALLMAN RD	WESTMOUNT RD E	ROCKWOOD RD	4.493	4.363	D	4.168	D	4.266	E	321.932	1.362
55325	600405	FISCHER HALLMAN RD	COTTON GRASS ST	WESTMOUNT RD E	3.875	3.875	D	3.569	D	3.722	D	278.474	0.782
55324	40063	FISCHER HALLMAN RD	ACTIVA AVE	COTTON GRASS ST	4.539	4.399	D	4.263	E	4.331	E	804.674	1.495
56099	21754	FISCHER HALLMAN RD	OTTAWA ST S	ACTIVA AVE	4.440	4.321	D	3.775	D	4.048	D	434.870	1.050
58603	6303	FISCHER HALLMAN RD	C_PKY WAT OFFRAMP	OTTAWA ST S	5.300	5.000	E	4.045	D	4.522	E	176.744	2.094
52889	6302	FISCHER HALLMAN RD	C_PKY WAT ONRAMP	C_PKY WAT OFFRAMP	4.994	4.758	E	3.895	D	4.327	E	10.338	1.485
55076	6149	FISCHER HALLMAN RD	C_PKY STR ONRAMP	C_PKY STR OFFRAMP	4.320	4.226	D	3.738	D	3.982	D	9.411	0.982
52961	6296	FISCHER HALLMAN RD	C_PKY WAT ONRAMP	C_PKY WAT ONRAMP	5.300	5.000	E	4.060	D	4.530	E	94.310	2.127
53820	6143	FISCHER HALLMAN RD	MCGARRY DR	C_PKY STR ONRAMP	5.300	5.000	E	4.085	D	4.543	E	414.094	2.187
58085	6137	FISCHER HALLMAN RD	FOREST HILL DR	MCGARRY DR	5.220	4.937	E	4.003	D	4.470	E	173.881	1.885
54565	6180	FISCHER HALLMAN RD	SUMMIT AVE	FOREST HILL DR	4.682	4.512	E	3.894	D	4.203	D	331.539	1.255
58397	6174	FISCHER HALLMAN RD	QUEENS BLVD	SUMMIT AVE	5.132	4.868	E	4.027	D	4.447	E	187.597	1.810
57634	5603	QUEENS BLVD	FISCHER HALLMAN RD	ELM RIDGE DR	3.201	3.343	C	3.280	C	3.312	C	385.325	0.592
59248	5425	QUEENS BLVD	ELM RIDGE DR	WESTHEIGHTS DR	3.247	3.379	C	3.322	C	3.350	C	166.980	0.606
58831	20732	WESTHEIGHTS DR	BLACKWELL DR	QUEENS BLVD	3.036	3.212	C	3.101	C	3.156	C	134.162	0.542
57835	20807	WESTHEIGHTS DR	HIGHLAND RD W	BLACKWELL DR	3.144	3.298	C	3.225	C	3.262	C	209.666	0.575

Appendix E

Network-Level Application: Travel Demand Data

O\D	1	2	3	4	5	6	7	8	9	10	Total
1	-	1,214	1,390	1,204	1,487	1,574	1,619	1,272	1,334	1,257	12,351
2	1,180	-	1,047	906	1,119	1,185	1,219	957	1,004	946	9,563
3	1,371	1,062	-	1,053	1,300	1,376	1,416	1,112	1,166	1,099	10,955
4	1,170	906	1,037	-	1,109	1,174	1,208	949	995	937	9,485
5	1,477	1,144	1,310	1,134	-	1,483	1,525	1,198	1,257	1,184	11,712
6	1,575	1,220	1,397	1,210	1,494	-	1,626	1,278	1,340	1,263	12,403
7	1,626	1,259	1,442	1,248	1,542	1,632	-	1,319	1,383	1,303	12,754
8	1,242	962	1,101	954	1,178	1,247	1,282	-	1,057	995	10,018
9	1,309	1,014	1,161	1,005	1,242	1,314	1,352	1,062	-	1,049	10,508
10	1,226	949	1,087	941	1,163	1,231	1,266	994	1,043	-	9,900
Total	12,176	9,730	10,972	9,655	11,634	12,216	12,513	10,141	10,579	10,033	109,649

Appendix F

Network-Level Application: Improvements Made to Network-Level QOS Score based on Route-Level Improvements

Improved Route	Initial Route-Level QOS Score	Changed Route-Level QOS Score	Changed Network-Level QOS Score	Percent Change	Length of Improvement (m)	Percent Change per Meter (%/m)
1 - 2	4.233	2.645	4.212	-0.82411	4,312.657	-0.000191
1 - 3	4.300	2.431	4.200	-1.10666	1,823.483	-0.000607
1 - 4	4.269	2.592	4.210	-0.87120	5,280.347	-0.000165
1 - 5	4.298	2.424	4.196	-1.20085	5,536.569	-0.000217
1 - 6	4.117	2.225	4.193	-1.27149	1,045.319	-0.001216
1 - 7	4.089	2.201	4.191	-1.31858	6,923.995	-0.000190
1 - 8	4.289	2.373	4.203	-1.03603	4,079.109	-0.000254
1 - 9	4.423	2.717	4.206	-0.96539	8,251.918	-0.000117
1 - 10	4.135	2.471	4.209	-0.89475	3,727.387	-0.000240
2 - 3	4.159	2.212	4.209	-0.89475	3,963.603	-0.000226
2 - 4	3.873	1.803	4.212	-0.82411	3,362.902	-0.000245
2 - 5	4.047	2.067	4.206	-0.96539	2,709.345	-0.000356
2 - 6	4.276	2.546	4.209	-0.89475	5,208.050	-0.000172
2 - 7	4.265	2.285	4.202	-1.05957	5,555.364	-0.000191
2 - 8	4.194	2.277	4.213	-0.80057	7,104.629	-0.000113
2 - 9	4.346	2.419	4.211	-0.84766	4,953.756	-0.000171
2 - 10	3.883	1.886	4.212	-0.82411	4,921.900	-0.000167
3 - 4	4.331	2.521	4.212	-0.82411	6,995.879	-0.000118
3 - 5	4.254	2.360	4.202	-1.05957	4,108.199	-0.000258
3 - 6	4.243	2.359	4.199	-1.13021	2,868.802	-0.000394
3 - 7	4.389	2.592	4.200	-1.10666	9,188.341	-0.000120
3 - 8	4.147	2.130	4.206	-0.96539	6,578.010	-0.000147
3 - 9	4.364	2.629	4.210	-0.87120	5,830.345	-0.000149
3 - 10	3.818	2.187	4.214	-0.77702	1,861.836	-0.000417
4 - 5	4.330	2.433	4.208	-0.91830	4,667.375	-0.000197
4 - 6	4.168	2.419	4.209	-0.89475	7,649.445	-0.000117
4 - 7	4.521	2.795	4.208	-0.91830	2,192.462	-0.000419
4 - 8	4.186	2.379	4.215	-0.75347	9,938.003	-0.000076
4 - 9	4.680	3.726	4.229	-0.42383	2,776.942	-0.000153
4 - 10	4.517	3.175	4.224	-0.54156	9,201.583	-0.000059
5 - 6	4.046	2.125	4.195	-1.22439	6,769.057	-0.000181
5 - 7	4.365	2.500	4.195	-1.22439	8,376.641	-0.000146
5 - 8	4.154	2.194	4.204	-1.01248	8,722.458	-0.000116
5 - 9	4.508	3.179	4.216	-0.72993	7,482.290	-0.000098
5 - 10	4.196	2.228	4.205	-0.98893	2,924.455	-0.000338
6 - 7	4.084	2.197	4.191	-1.31858	5,846.066	-0.000226
6 - 8	4.334	2.420	4.203	-1.03603	3,033.790	-0.000341
6 - 9	4.303	2.428	4.201	-1.08312	5,998.945	-0.000181
6 - 10	4.131	2.421	4.208	-0.91830	4,772.706	-0.000192
7 - 8	4.135	2.210	4.201	-1.08312	8,220.884	-0.000132
7 - 9	4.424	2.905	4.209	-0.89475	4,745.288	-0.000189
7 - 10	4.282	2.358	4.202	-1.05957	10,589.196	-0.000100
8 - 9	4.287	2.378	4.210	-0.87120	8,287.503	-0.000105
8 - 10	4.223	2.421	4.214	-0.77702	7,806.496	-0.000100
9 - 10	4.486	3.053	4.219	-0.65929	9,404.000	-0.000070

Appendix G

Network-Level Application: Hypothetical Travel Demand Data

O\D	1	2	3	4	5	6	7	8	9	10	Total
1	-	1,214	1,390	1,204	1,487	3,148	1,619	1,272	1,334	1,257	13,925
2	2,360	-	1,047	906	1,119	2,370	1,219	957	1,004	946	11,928
3	2,742	1,062	-	1,053	1,300	2,752	1,416	1,112	1,166	1,099	13,702
4	2,340	906	1,037	-	1,109	2,348	1,208	949	995	937	11,829
5	2,954	1,144	1,310	1,134	-	2,966	1,525	1,198	1,257	1,184	14,672
6	3,150	1,220	1,397	1,210	1,494	-	1,626	1,278	1,340	1,263	13,978
7	3,252	1,259	1,442	1,248	1,542	3,264	-	1,319	1,383	1,303	16,012
8	2,484	962	1,101	954	1,178	2,494	1,282	-	1,057	995	12,507
9	2,618	1,014	1,161	1,005	1,242	2,628	1,352	1,062	-	1,049	13,131
10	2,452	949	1,087	941	1,163	2,462	1,266	994	1,043	-	12,357
Total	24,352	9,730	10,972	9,655	11,634	24,432	12,513	10,141	10,579	10,033	134,041