

APPENDIX N: NEW WHATCOM REDEVELOPMENT TRANSPORTATION DISCIPLINE REPORT

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Prepared for:

Port of Bellingham and City of Bellingham

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Chapter 1: Introduction

The Transportation Discipline Report is an integral part of the New Whatcom Redevelopment Project Environmental Impact Statement (EIS) and describes the transportation related impacts of the EIS Alternatives for the site. It identifies and compares the transportation impacts associated with each alternative and outlines suggested mitigation strategies to meet City of Bellingham operational standards and accommodate the projected growth in travel demand from each Alternative.

The New Whatcom Redevelopment planning process was initiated in 2003 by the City and Port of Bellingham with an 18-month community visioning effort led by a citizen's committee. The City and Port signed an Interlocal Agreement in 2004 that defines specific steps each will take to bring the redevelopment vision to reality. In February 2006, the *Draft Waterfront Advisory Group Recommendation – New Whatcom Implementation Strategies Integrated with Waterfront Futures Group Guiding Principles for City Center* was adopted. This document provided guidance for the master planning process. The *Draft Framework Plan* was published in September 2006 outlining the scenarios for the 2016 and 2026 phases of development.

Feasible alternatives are required to undergo environmental review prior to legislative decision making. Consequently, the Port and City have published this project EIS to provide information to decision makers, agencies and interested citizens. The project EIS evaluates the specific impacts of the EIS Alternatives.

The EIS presents the background and analyses of environmental impacts of three “Action” Alternatives that include land use and infrastructure changes associated with the New Whatcom Redevelopment project, and one “No-Action” Alternative which includes continued industrial use of the site.

Report Organization

The Transportation Discipline Report comprises the following chapters:

- **Chapter 2: Methodology** describes the analysis methods used to determine the impacts of each Alternative.
- **Chapter 3: Affected Environment** discusses the existing transportation conditions both on and off site for each of the major transportation modes.
- **Chapter 4: Impacts and Alternatives Comparison** describes the future impacts of each Alternative on different components of the transportation system.
- **Chapter 5: Mitigation Measures** presents the required mitigation measures and suggested strategies to help address the identified impacts, while also highlighting the significant and unavoidable adverse impacts.

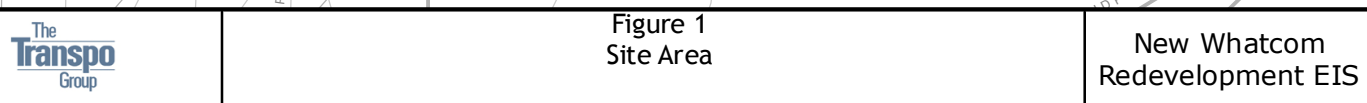
Study Area

The study area was developed in conjunction with City and Port staff and represents the locations most likely to be impacted by development of the New Whatcom site. Specific study locations were selected based on travel patterns to and from the site. The locations represent areas where the site would contribute a significant amount of traffic, and likely worsen traffic operations. Bellingham is located in Whatcom County, Washington and is the last major city on the I-5 Corridor before the Canadian border. The proposed New Whatcom Redevelopment project is located immediately south of downtown along Bellingham Bay. The project would be integrated into the City's core downtown providing public access to the waterfront and mixed-use development including residential, commercial, and industrial uses as described in detail in a subsequent section.

As illustrated in Figure 1, the project area is described according to ten redevelopment areas. They are: redevelopment area 1 bounded from the north by Roeder Avenue and from the south, east, and west by Bellingham Bay; and redevelopment areas 2 through 10 bounded from the north by Chestnut Street, from the east by Cornwall Street, and from the south and west by Bellingham Bay. This EIS focuses on the area in the immediate vicinity of the New Whatcom site. However, major corridors in Bellingham outside the immediate vicinity of the site, which serve as access to the project area, were also evaluated to illustrate interconnections and impacts throughout the City. These major corridors include: Roeder Avenue/Chestnut Street, State Street, Forest Street, 12th Street, Broadway Street, Holly Street, and three I-5 interchanges likely to serve the project traffic.

Alternatives Evaluated

Four Alternatives address a range of possible land use changes, from 2.2 million square feet to 7.5 million square feet of development, with different implications for the amount of future growth and roadway infrastructure. The No-Action Alternative, which would include a total of 2.2 million square feet, is the basis to which the other three Alternatives are compared. It analyzes the potential impacts of what may happen with future growth and development if the site retains its industrial zoning. The other three Alternatives, which range in development from 7.5 million square feet down to 4.0 million square feet, are: High Density Alternative (Alternative 1), Medium Density Alternative (Alternative 2), and Low Density Alternative (Alternative 3). Alternative 2A is a sub-alternative of Alternative 2 which evaluates a different on-site roadway infrastructure option for the Alternative 2 land use. The Action Alternatives are evaluated for two horizon years, 2016 and 2026 (buildout). For each Alternative, the EIS includes assessment of land use and roadway improvements for each phase at horizon years 2016 and 2026. The following sections provide a brief description of the Alternatives. A summary and comparison of the transportation system for each Alternative is provided in Chapter 4.



No-Action Alternative

Under the No-Action Alternative, no changes would be made to the sites existing industrial zoning and regulations. Vacant and under-utilized parcels would be redeveloped consistent with the industrial zoning and the marina would be redeveloped for recreational use, providing an additional 1.1 million square feet of industrial/marina uses for a total of 2.2 million square feet of development on the site. This Alternative assumes that the 1.1 million square-feet of existing industrial space on the site would be re-used in the future. The Puget Sound Energy Encogen facility would remain in place and the Georgia Pacific (GP) Tissue Mill would be closed¹.

The Burlington Northern Santa Fe (BNSF) railroad corridor would remain in its current location with an at-grade crossing at Laurel Street. A marina, boat launch, and supporting infrastructure would be developed under the No-Action Alternative. Redevelopment area 1 would provide a limited amount of public parks and shoreline trails along Bellingham Bay.

The site would be accessed via existing street connections including Hilton Avenue, F Street, C Street, Central Avenue, Cornwall Avenue, and Wharf Street. Within redevelopment area 1, Hilton Avenue, F Street and C Street, would be upgraded to meet City standards and linkage roads would be constructed among these three access points to provide internal circulation. Within redevelopment areas 2 through 10, Laurel Street would be upgraded likely as a port or private industrial road.

Alternative 1: High Density Alternative

Alternative 1 would develop the site to its maximum density potential or 7.5 million square feet of mixed-use development. Approximately 3.4 million square feet of development would be institutional, office, light industrial, and marina uses; about 3.7 million square feet would be multi-family residential development; and about 445,000 square feet of development would be retail or restaurant uses. The Puget Sound Energy Encogen facility would operate until 2016 and the Georgia Pacific (GP) Tissue Mill would be closed.

This Alternative would provide approximately 33 acres of public parks, trails, and open space. Major pedestrian connections include a new pedestrian bridge over Whatcom Waterway, a trail along Wharf Street, and a bridge from Hilton Avenue over Roeder Avenue and the railroad to Broadway Street. Similar to the No-Action Alternative, trails would be provided along the waterfront within redevelopment area 1. In addition, a short trail would be provided along C Street to Roeder Avenue. A substantial park and trail system would be developed within redevelopment areas 2 through 10.

On-site circulation would be provided via extensions of Maple Street and Chestnut Street within redevelopment area 1 and extensions of Central Avenue, Cornwall Avenue,

¹ Based on Port of Bellingham Press release on September 5, 2007, the Georgia Pacific Tissue Mill would be closed December 31, 2007.

Bay Street, Commercial Street and Laurel Street, within the other redevelopment areas. The site would be accessed via Hilton Avenue, F Street and C Street, Central Avenue, and Cornwall Street as well as new bridges at Bay Street, Commercial Street, Laurel Street, and Wharf Street.

Alternative 1 includes relocation of the BNSF railroad corridor by 2016.

Alternative 2: Medium Density Alternative

Alternative 2 would develop the site with 6.0 million square feet of mixed-use development. Approximately 2.8 million square feet of development would be institutional, office, light industrial, and marina uses; about 2.8 million square feet would be multi-family residential development; and about 375,000 square feet of development would be retail or restaurant uses. The Puget Sound Energy Encogen facility would operate until 2016 and the Georgia Pacific (GP) Tissue Mill would be closed.

This Alternative would provide approximately 19 acres of public parks, trails, and open space. Major pedestrian connections would include a new pedestrian bridge over Whatcom Waterway in 2026 and a trail along Wharf Street. Similar to Alternative 1, a parks and trails system would be developed along Bellingham Bay and a short trail would be constructed along C Street to Roeder Avenue.

On-site circulation would be provided via extensions of Maple Street and Chestnut Street within redevelopment area 1 and extensions of Central Avenue, Bay Street, Commercial Street, and Laurel Street within the other redevelopment areas. The site would be accessed via Hilton Avenue, F Street and C Street, and Central Avenue as well as new bridges at Bay Street, Commercial Street, and Laurel Street.

Alternative 2 also includes relocation of the BNSF railroad corridor by 2016.

Alternative 2A: Medium Density Alternative with Delay of Railroad Relocation and Modified Roadway System

Alternative 2A would develop the same amount of land use and similar roadway infrastructure as Alternative 2. The difference between Alternatives 2 and 2A is the BNSF railroad corridor would not be relocated until 2026. Therefore, construction of the new bridges at Laurel Street and Commercial Street would be delayed until the railroad relocation and are not included in the 2016 analysis.

Alternative 3: Low Density Alternative

Alternative 3 would develop 4.0 million square feet of mixed-use development. Approximately 2.2 million square feet of development would be institutional, office, light industrial, and marina uses; about 1.6 million square feet would be multi-family residential development; and about 260,000 square feet of development would be retail or restaurant uses. The Puget Sound Energy Encogen facility would operate until 2016 and the Georgia Pacific (GP) Tissue Mill would be closed. The BNSF railroad corridor would not be relocated.

This Alternative would provide approximately 11 acres of public parks, trails, and open space. Similar to the other Action Alternatives, parks would be provided along Bellingham Bay in redevelopment area 1. A more limited park and trail system would be developed within redeveloped areas 2 through 10.

On-site circulation would be provided via extensions of Maple Street and Chestnut Street within redevelopment area 1 and the extension of Central Avenue, Cornwall Avenue, Bay Street and Laurel Street within the other redevelopment areas. The site would be accessed via Hilton Avenue, F Street and C Street, and Central Avenue as well as a new bridge at Bay Street.

Marina

The proposed marina was previously evaluated as part of the *Comprehensive Strategy for Bellingham Bay EIS (Final EIS, 2000)*; this EIS was recently updated by the *Whatcom Waterway Supplemental Final EIS*, September 2007. All of the Alternatives include evaluation of the proposed marina which would provide approximately 400 to 600 boat slips. As part of the New Whatcom redevelopment, features incorporated into the planned marina would complement future mixed-use development including the configuration of the boat slips, public walkways, and parks and trails around the perimeter of the marina.

Transportation impacts of proposed marina use are incorporated into the overall New Whatcom site evaluation for the No-Action and Action Alternatives. This analysis focuses on the weekday conditions when transportation impacts for the overall site are expected to be greatest. However, marina trip generation, for both vehicular and non-motorized modes, is likely to be highest during the weekends. Therefore, the parking areas and street system for the marina use would need to be designed to accommodate weekend traffic conditions.

Chapter 2: Methodology

This chapter summarizes the overall approach to evaluating the transportation system, and describes the transportation data that were collected and the measures used to assess the performance of each of the major transportation system components under each Alternative.

Approach to Alternatives Evaluation

The evaluation of the transportation system and identification of transportation impacts generally followed typical transportation analyses that include an evaluation of traffic volumes, operations, pedestrians, bicycle, transit, rail and parking. The Alternatives were evaluated for both the 2016 and 2026 horizon years. This analysis focuses on weekday conditions when the New Whatcom site is likely to have most impacts on the transportation system. This study included the collection of transportation data, evaluation of the existing transportation system conditions, development of travel forecasts, and an assessment of projected future conditions. The evaluation of the transportation system included a number of transportation-related performance measures grouped by area of focus (street system, non-motorized, transit, rail, and parking). Each of these specific elements is described in detail below.

Year 2016 and 2026 travel forecasts were estimated and evaluated to gauge the performance and functionality of the study area transportation system. The 2016 and 2026 No-Action Alternatives were developed to represent the future transportation system operations assuming no mixed-use development. This Alternative serves as a future baseline against which each of the three Action Alternatives is compared. The same performance measures evaluated for existing conditions were again assessed for each of the 2016 and 2026 Alternatives.

Data Collection Summary

The evaluation included the collection and assimilation of data for each of the major transportation elements. The data were provided by several agencies including City of Bellingham, WSDOT, Whatcom County Transit Authority, and Port of Bellingham. The existing data were supplemented by data collected in the field such as traffic counts, vehicle classification counts, parking utilization and supply surveys, and general windshield surveys. A summary of the data collection activities is provided below.

Street System

Traffic data were collected for major intersections and arterials in the study area. The turning movement counts (TMC) were collected during the weekday PM peak hour as well as the weekday AM peak hour for a subset of the intersections. The TMCs also included heavy vehicle (truck) counts at all intersections and pedestrian counts at a subset of intersections. Data were collected for two hours in each of the AM and PM peak periods over 15-minute intervals in order to capture the peak hour traffic. Counts were conducted on a Tuesday or Wednesday. Mondays, Fridays, and weekends were

excluded since traffic volumes are typically lower and also reduced immediately prior to, or following, weekends. No counts were conducted on holidays or immediately prior to or following holidays. The AM counts were conducted between 7:00 and 9:00 am while the PM counts were conducted between 4:00 and 6:00 pm.

Most of the traffic data collection occurred in April 2007. However, some traffic volumes obtained from the *City of Bellingham City Center Master Plan: Circulation Element* (January 2006) and other recent studies were conducted over the past two to five years. Where applicable, these counts were factored to 2007 volumes assuming a 1 percent annual growth rate, based on historical traffic counts.

Signal timing and phasing data were obtained from the City of Bellingham in the form of intersection time cards, while intersection geometry was derived from aerial images and recent studies, and was verified during the windshield surveys.

Daily counts were also conducted along F Street, C Street, Central Avenue, and Pine Street/Wharf Street. The tube counts were performed to estimate the current traffic on-site. These were performed on similar days as the TMCs.

Traffic accident records at the study intersection were obtained from the City of Bellingham for 2004-2006. These records represent the most recent three-year period for which complete accident data are available.

The AM peak hour traffic volumes are less than the PM peak hour traffic volumes by about 40 to 60 percent; therefore, this study focuses on the PM peak hour which presents a conservative estimate of traffic impacts. A detailed comparison of AM and PM peak hour traffic volumes and justification for studying only the PM peak hour is provided in Chapter 3.

Non-Motorized

Pedestrian and bicycle usage within the study area was observed through windshield surveys. In addition, PM peak hour pedestrian counts were conducted at the Chestnut Street/Railroad Avenue intersection to provide an understanding of the downtown pedestrian volumes. The City provided GIS data that included sidewalks, bicycle routes, and multi-use trails.

Transit

Transit information related to service coverage and frequency for bus routes within the study area were identified through published schedules provided by Whatcom County Transit Authority (WTA). Transit ridership data for 2007 were provided by WTA and included downtown average daily boarding data for each bus route serving the study area. The City provided GIS data that included each bus stop and route location within the study area.

Rail

Passenger and freight rail information related to service and frequency for the Burlington Northern Santa Fe (BNSF) Railway in the vicinity of the site was obtained from published schedules provided by Amtrak and discussions with BNSF staff. At-grade crossings and locations with gates were verified during the windshield surveys.

Parking

On-street and off-street parking supply and utilization for downtown was obtained from the *City of Bellingham City Center Master Plan: Parking Element* (January 2006). The data were expanded with an April 2007 mid-day parking survey of on-street supply and utilization within the Lettered Streets Neighborhood and Cornwall Avenue in the vicinity of the site. Please note the Lettered Streets Neighborhood is located northeast of the site and is bounded by Roeder Avenue from the southwest, Broadway Street from the northwest, North Street from the north, Cornwall Avenue from the east, and downtown from the southeast. The study considers parking within a ¼-mile on-the-ground walking distance from the site access locations which includes locations within downtown, the Lettered Streets Neighborhood, and along Cornwall Avenue². Proposed on-site parking supply assumptions were provided by Collins Woerman for each Alternative. Chapter 4 discusses the methodology used to calculate proposed parking supply.

Development of Travel Forecasts

The most recent version (2002) of the City of Bellingham's travel demand model was used for this study. The City's model includes all of Whatcom County but has been refined in the City of Bellingham and its urban growth area (UGA). Outside the City, the model is consistent with the land use and external assumptions used in developing the Whatcom Council of Government's model.

The model has a 2002 base year and a 2022 future horizon year. It runs on a TransCAD platform and uses the four-step model process that includes trip generation, trip distribution, mode choice, and trip assignment. The model assists in developing traffic forecasts based on anticipated changes in land use and the transportation system. The model replicates conditions for the base year and estimates future traffic volumes based on the 2022 land use projections, the City of Bellingham's *Six-Year Transportation Improvement Program* (TIP), and its 20-year project list contained in the *2005 Comprehensive Plan*. The model forecasts weekday PM peak hour traffic volumes for all major roadways within and outside the City.

The 2016 and 2026 horizon year models were developed by decreasing and increasing the number of dwelling units and employment within the 2022 model using a straight line interpolation to determine the growth applicable to these years. The street system improvements outside of the redevelopment area were assumed to be consistent with 2022 for both the 2016 and 2026 horizon years. The 2016 and 2026 land use data was

² Transportation research shows that ¼-mile is typically considered the furthest distance people are willing to walk from their parked vehicle to their destination.

updated for each Alternative to assist in evaluating changes in travel behavior resulting from the proposed land use modifications.

The model was used to evaluate the Action Alternatives by comparing them to the No-Action Alternative. It was also used to develop 2016 and 2026 forecast traffic volumes along major roadways within the study area.

Identification of Performance Measures

Performance measures were identified and evaluated for existing conditions, 2016 and 2026 No-Action Alternatives, and under each of the Action Alternatives. The measures characterize the relative differences in performance between each of the Alternatives and establish transportation impacts that could be expected. The measures address each of the modes of travel.

Street System

The performance measures used for analyzing and assessing the street system are focused on roadway volume-to-capacity (v/c) and intersection delay-based level of service, (LOS) as well as traffic safety for major intersections within the study area. Roadway LOS, intersection LOS, and safety are useful measurements to depict traffic conditions at intersections and along corridors. The *Highway Capacity Manual* (HCM) Transportation Research Board³, 2000 presents clear guidelines on quantifying roadway as well as signalized and unsignalized intersection LOS. Table 1 summarizes the HCM roadway and intersection LOS definitions.

³ The Transportation Research Board is a division of the National Research Council, which serves as an independent adviser to the federal government and others on scientific and technical questions related to transportation. This organization sets many transportation industry standards including those used to evaluate operations of street systems.

Table 1. Qualitative Description of Level of Service

Level of Service	Description
A	Describes primarily free-flow operations with motorist traveling at average travel speeds. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. All drivers are generally served by one green signal phase at signalized intersections. At stop-controlled approaches, drivers experience little or no conflicting traffic.
B	Describes reasonably unimpeded operations at average travel speeds. The ability to maneuver within the traffic stream is only slightly restricted. Drivers experience only slight delays and are generally served by one green signal phase at signalized intersections. At stop-controlled approaches, there are fewer available gaps to enter the traffic stream.
C	Describes stable operations; however, the ability to maneuver and change lanes is more restricted than LOS B, and longer queues, adverse signal coordination, or both may contribute to lower average travel speeds. Occasionally, drivers do not clear signalized intersections in one green phase. At stop-controlled intersections, drivers experience delay as they wait for available gaps.
D	Describes operations which are approaching unstable flow and small increases in flow may cause substantial increases in delay and decrease in travel speed. LOS D may be due to adverse signal progression, inappropriate signal timing, high volumes, or a combination of these factors. The ability to maneuver and change lanes within the traffic stream is difficult. Multiple drivers wait through more than one green phase at signalized intersections. Drivers experience queuing due to a reduction in available gaps at stop-controlled approaches.
E	Describes unstable flow with intolerable delay. Such operations are caused by a combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections, and inappropriate signal timing. Travel speed is substantially reduced, brief periods of stop-and-go traffic may occur, and lane changes are minimal. Long vehicle queues form at signalized intersections and drivers wait through several green phases. At stop-controlled approaches, drivers may make high-risk or unexpected maneuvers rather than wait for an acceptable gap.
F	Describes forced flow or stop-and-go conditions. Traffic flow is constrained and lane changes are minimal. Drivers at signalized intersections may wait through several green phases to be served. Drivers at stop-controlled approaches experience insufficient gaps to cross safely through the major traffic stream and often rely on courteous drivers to yield in order to cross.

Source: The Transpo Group (interpreted from 2000 *Highway Capacity Manual*)

Roadways

The volume-to-capacity (v/c) ratio for roadway segments is calculated and used to determine the operating roadway LOS. Roadway segment traffic volumes were based on existing traffic counts and the City's travel demand model. Arterial capacities were assumed consistent with the City's Concurrency Management Program and Concurrency Evaluation Tracking Tool (CETT)⁴.

⁴ CETT is a spreadsheet-based tool which is used to evaluate traffic impacts from proposed development, compare it to current traffic volumes and the established capacity of arterial streets, and determine whether adequate transportation facilities are available concurrent with proposed development.

The City has adopted LOS E as its arterial standard. This standard is based on the directional PM peak hour v/c ratio. The v/c ratio represents directional PM peak roadway volumes divided by the directional roadway capacity. The calculated v/c ratio shows the general congestion level of the transportation facility. This PM peak hour directional v/c ratio is used to determine the roadway's operating LOS. Table 2 summarizes descriptions that characterize the v/c ratio as it relates to the roadway LOS.

Table 2. Level of Service Criteria for Roadways and Intersections

Level of Service	Roadway V/C Ratio	Intersection Average Control Delay (seconds/vehicle)	
		Signalized	Unsignalized
A	≤0.60	≤10	≤10
B	>0.60 - 0.70	>10 - 20	>10 - 15
C	>0.70 - 0.80	>20 - 35	>15 - 25
D	>0.80 - 0.90	>35 - 55	>25 - 35
E	>0.90 - 1.00	>55 - 80	>35 - 50
F	>1.00	>80	>50

Source: *Highway Capacity Manual*, Transportation Research Board, 2000

LOS standards are outlined in the Transportation Element of the City's Comprehensive Plan. The most recent Transportation Element retains the 1995 LOS policy adopted by City Council. The City's policy per TP-12 in the 2005 Transportation Element is:

To further support the Urban Village and infill strategy of the Land Use Element, the Bellingham City Council has adopted Peak Hour LOS standard E at the PM peak hour, and where specific circumstances warrant, Alternative Peak Hour LOS standard F (v/c 1.01 – 1.25) for transportation arterials where mitigation is difficult. The Council may, on a case-by-case basis, consider adopting Peak Hour LOS standard F (1.01 – 1.25), for other arterials as follows:

1. On local arterials within designated Urban Villages;
2. On local arterials that enter/exit the City; and
3. On local arterials where mitigation is not feasible.

Based on the 2005 Transportation Element, the following arterials within the study area are allowed to function at Alternative PM Peak Hour LOS F due to difficulties of implementing mitigation measures to maintain LOS E:

- Meridian Street between Broadway Street and East Maplewood Avenue
- King Street between Ohio Street and Iowa Street
- Boulevard Street between State Street and Finnegan Street
- 12th Street between Old Fairhaven Parkway and Hawthorn
- Lincoln Street between Meador and Lakeway Drive

- Lakeway Drive between Lakeway Drive/King Street and Lakeway Drive/Lincoln Street intersections
- Ohio Street at the Ohio Street/James Street intersection
- Northwest Avenue between Bakerview Road and Interstate 5
- Lakeway Drive between Electric Avenue and Birch Street

In addition, the Comprehensive Plan recommends considering adoption of the Alternative Peak Hour LOS F standard at the following locations, if widening the roadways or providing other capacity improvements is not feasible:

- Roeder Avenue between Bay Street and Squalicum Parkway
- Holly Street from Bay Street to Eldridge
- Dupont Street between Broadway and Prospect
- Girard Street between Broadway and Grand
- Lakeway Drive from Ellis Street to Lincoln

Intersections

The average delay in vehicles-per-second at intersections is measured against free-flow intersection operations and used to determine the operating intersection LOS. Vehicle delay is a method of quantifying several intangible factors, including driver discomfort, frustration, and lost travel time. The intersection operations are dependent on many variables including intersection traffic control, signal phasing (i.e., progression of movements through the intersection), signal cycle length, and traffic volumes with respect to intersection capacity. Signalized and all-way, stop-controlled intersection operations are defined in terms of the average total vehicle delay of all movements through an intersection. Two-way, stop-controlled intersection LOS is defined in terms of the average vehicle delay of an individual movement(s). This is because the performance of a two-way, stop-controlled intersection is more closely reflected in terms of its individual movements, rather than its performance overall. Table 2 summarizes descriptions that characterize delay based on LOS at intersections.

Intersections were evaluated using the Synchro 6.0 software using the HCM methodology to determine delay and LOS. There are no improvements within downtown or at the other study intersections that include additional capacity or major modifications to the intersections. Therefore, no changes were assumed to the intersection geometrics. However, signal phasing and cycle length were optimized because these are typically adjusted to serve the needs of changing travel patterns and volumes. In addition, factors input to the Synchro software such as peak hour factor (PHF) were adjusted to assume 0.95 for 2016 and 1.00 for 2026. PHF is used in the HCM methodology to account for the variation in traffic volumes during the peak hour. It is a measure of traffic demand fluctuation and represents the hourly traffic volume over the hour divided by the peak 15-minute flow rate within the peak hour. Urban areas

typically have a higher PHF because traffic volumes are more consistent throughout the peak hour.

Intersection operations were evaluated because they are more reflective of the urban environment than roadway segment operations, as an urban setting has closely spaced intersections impacting operations of the streets. Intersections constrain capacity along an arterial, and typically operational problems show up where arterial intersect before they present themselves along roadway segments. Therefore, analysis of intersections presents a full picture of the operational issues vehicular traffic may experience within the downtown. Roadway and intersection LOS and v/c ratios are not directly comparable because they are determined using different methodologies. Intersection LOS is based on delay, whereas roadway LOS is based on v/c ratios. In addition, the v/c ratio for an intersection takes into consideration characteristics of signalized intersections such as signal timing and phasing.

The City's adopted policy is for arterials; however, for this study, the LOS E policy was also applied to intersections providing access to/from the site to identify potential operational deficiencies. Per the City's policy, the intersection analysis was used to identify mitigation measures for these site access intersections; however off-site mitigation locations were primarily based on the roadway segment evaluation. Future updates to the City's Transportation Concurrency Management Program might consider revising the LOS methodology to include an average intersection LOS by subarea. This would result in greater flexibility in operating capacities through the more dense urban neighborhood allowing the City (i.e., downtown) and the waterfront to successfully implement the infill land use strategies adopted in the Bellingham Comprehensive Plan.

Existing traffic safety issues were determined by reviewing three years of accident records. Typically, intersections with collision rates greater than 1.0 collision per million entering vehicles (MEV) are earmarked for continued evaluation and potential safety improvements. The proposed street system for each Alternative was evaluated in terms of potential safety impacts of the design.

Non-Motorized

Performance measures used for pedestrians and bicycles were qualitatively assessed. They were evaluated to give a general overview of the impacts the Alternatives may have on the pedestrian and bicycle facilities throughout the study area. The performance measures are as follows:

- **Facilities:** How well the current facilities would serve the new pedestrian and bicycle population.
- **Major Attractors:** How accessible existing major pedestrian attractors would be to the new and existing pedestrian and bicycle users.
- **Conflicts:** How pedestrian and bicyclists would be affected by growth in traffic volumes from new development.

Transit

Performance measures reflect the quality of the transit service by evaluating its operational aspects. The Whatcom Transportation Authority (WTA) *Six-Year Strategic Service Plan* (September 2004) identified a wide range of factors that would affect the quality of service. Based on the available data, passenger loading was chosen to measure transit performance. This measurement was evaluated on an area-wide basis for downtown.

- **Passenger Loading:** An indicator of the utilization of a transit corridor based on an identified service capacity. Its value is expressed as the ratio of passengers to seated capacity. This parameter is an important measure that provides insight into passenger comfort, both in terms of finding a seat and crowding levels on the transit vehicle.

WTA allows this factor to exceed 1.00 for short distances where passengers can stand on the bus. For local trips, the WTA passenger loading standard is 1.25.

Rail

The existing railroad would be relocated for some of the Action Alternatives. The rail analysis focuses on evaluating at-grade crossings and an Alternatives' plan to decrease and increase at-grade crossings. Safety and operational impacts of these crossings are identified based on the projected number of trains utilizing the at-grade crossing during the PM peak hours. Potential conflicts with vehicles, pedestrians, and bicyclists are evaluated.

Parking

The parking analysis focused on proposed on-site parking as well as existing off-site parking within 1/4-mile walking distance of the site. The performance measures included estimation of each Alternative's parking demand and recommended parking supply. Recommended parking supply was compared to the proposed parking supply to determine if the parking demand could be accommodated by available on-site and off-site parking. Chapter 4 discusses the methodology used to calculate parking demand as well as recommended and proposed parking supply.

Chapter 3: Affected Environment

This section describes the street system, non-motorized, transit, rail and parking components of the existing transportation system in the vicinity of the New Whatcom Redevelopment area. First, the on-site transportation conditions are described and then off-site conditions are discussed.

On-Site

This section summarizes the existing on-site conditions. Figure 2 shows the existing site. The study area, which was determined in consultation with City and Port staff, consists of the transportation system on-site as well as the site access locations. The site is zoned for industrial uses. The site consists of approximately 1.2 million square feet of existing space; however, many of the existing buildings are vacant. The existing traffic is considered as traffic from uses currently operating on-site. For discussion purposes, the site is broken into ten redevelopment areas (see Figure 1). This is only for analysis and does not relate to internal division of buildings or parcels. Redevelopment areas 1, 2, 6, and 9 are currently in use. This analysis includes the existing GP tissue mill located in redevelopment area 2 which will be closed in 2007.

Street System

This section summarizes the street facilities in the study area and includes existing traffic generated by the on-site uses. The performance measures related to the street system focus on the evaluation of existing roadway and intersection LOS and safety.

Access and Circulation

Major corridors providing access to the site include Roeder Avenue, Chestnut Street, and Cornwall Avenue. All the access locations are side-street stop-controlled except the F Street/Roeder Avenue intersection which is signalized. As shown in Figure 2, access to redevelopment area 1 is provided by Hilton Avenue, F Street, and C Street via Roeder Avenue, and access to redevelopment areas 2 through 10 is provided by Roeder Avenue/Central and Chestnut Street/Cornwall Avenue. Public vehicle access to the site is limited due to the industrial uses including the Georgia Tissue Mill, and the existing railroad right-of-way.

Trip Generation

There are approximately 645⁵ employees on-site. AM and PM peak hour trip generation for the existing site was estimated based on average trip rates for employees published by the Institute of Transportation Engineers (ITE) in *Trip Generation* (7th Edition, 2003) for General Light Industrial (Land Use No. 110), Warehousing (Land Use No. 150), and General Office Building (Land Use No. 710). Existing trip generation estimates are summarized in Table 3. Not all areas within the site are in use; therefore, the table only shows redevelopment areas 1, 2, 6, and 9 which currently have uses in operation.

⁵ Based on data provided by the Port of Bellingham in May 2007.

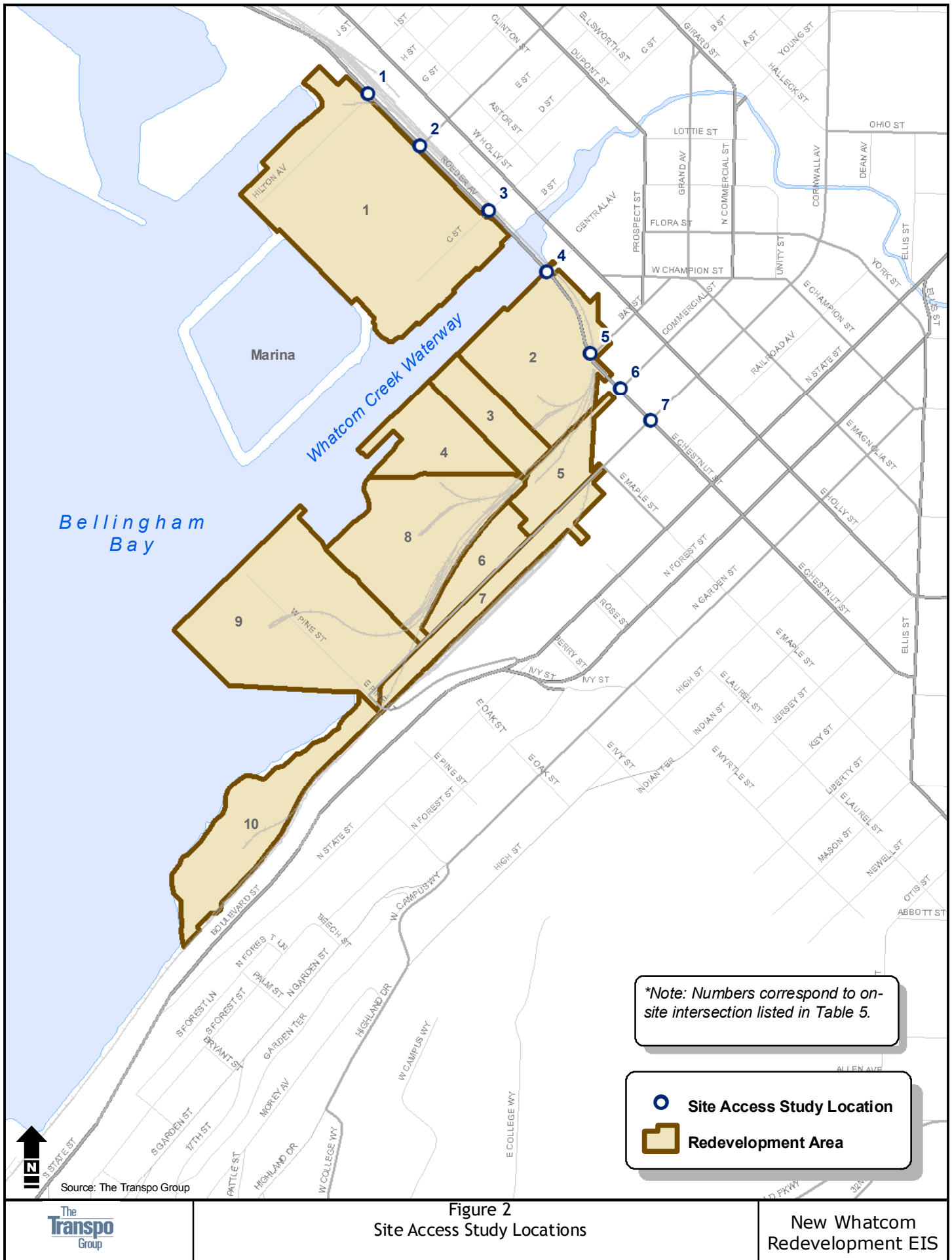


Table 3. Existing Trip Generation

Land Use	Size ¹	AM Peak Hour Site trips ²			PM Peak Hour Site trips ²		
		Total	In	Out	Total	In	Out
<u>Redevelopment Area 1</u>							
Light Industrial (#110)	353 employees	155	129	26	148	31	117
<u>Redevelopment Area 2³</u>							
Light Industrial (#110)	230 employees	101	84	17	97	20	77
<u>Redevelopment Area 6</u>							
Light Industrial (#110)	20 employees	9	7	2	8	2	6
<u>Redevelopment Area 9</u>							
Warehousing (#150)	25 employees	13	9	4	15	5	10
Office (#710)	17 employees	<u>8</u>	<u>7</u>	<u>1</u>	<u>8</u>	<u>1</u>	<u>7</u>
Subtotal		21	16	5	23	6	17
Total Existing Trips		286	236	50	276	59	217

Source: The Transpo Group (August 2007)

1. Current employment in New Whatcom Planning Area, Port of Bellingham, May 2007.

2. Vehicle trip rates from ITE *Trip Generation*, 7th Edition.

3. Based on Port of Bellingham Press release on September 5, 2007, the Georgia Pacific Tissue Mill would be closed December 31, 2007.

As shown in the table, the existing uses generate approximately 286 AM peak hour trips and 276 PM peak hour trips. This is substantially less peak hour trips than when the site's space is at full occupancy. The site has the potential to generate about 60 to 70 percent more trips with full occupancy of the existing 1.2 million square feet. Table 4 shows the potential trip generation of the site with full occupancy.

Table 4. Potential Site Trip Generation

		AM Peak Hour Site trips ²			PM Peak Hour Site trips ²		
Land Use	Size ¹	Total	In	Out	Total	In	Out
<u>Redevelopment Area 1</u>							
Light Industrial (#110)	370,858 sf	341	300	41	363	44	319
<u>Redevelopment Area 2</u>							
Light Industrial (#110)	236,809 sf	218	192	26	232	28	204
<u>Redevelopment Area 3</u>							
Warehousing (#150)	107,800 sf	99	87	12	106	13	93
<u>Redevelopment Area 4</u>							
Light Industrial (#110)	107,200 sf	99	87	12	105	13	92
<u>Redevelopment Area 5</u>							
Light Industrial (#110)	51,870 sf	48	42	6	51	6	45
Office (#710)	5,800 sf	<u>9</u>	<u>8</u>	<u>1</u>	<u>9</u>	<u>2</u>	<u>7</u>
Subtotal	105,216 sf	57	50	7	60	8	52
<u>Redevelopment Area 6</u>							
Light Industrial (#110) Encogen Facility	60,356 sf	56	49	7	59	7	52
<u>Redevelopment Area 7</u>							
Warehousing (#150)	48,000 sf	22	16	6	23	6	17
<u>Redevelopment Area 9</u>							
Warehousing (#150)	86,581 sf	39	32	7	41	14	27
Office (#710)	18,635 sf	<u>29</u>	<u>26</u>	<u>3</u>	<u>28</u>	<u>5</u>	<u>23</u>
Subtotal	105,216 sf	68	58	10	69	19	50
<u>Redevelopment Area 10</u>							
Light Industrial (#110)	61,149 sf	56	49	7	60	7	53
Total Trips with Full Occupancy		1,016	888	128	1,077	145	932
Existing Trips		<u>286</u>	<u>236</u>	<u>50</u>	<u>276</u>	<u>59</u>	<u>217</u>
Net New Trips with Full Occupancy		730	652	78	801	86	715

Source: The Transpo Group (August 2007)

Note: Redevelopment area 8 has no existing development and/or potential development.

1. Existing conditions, Collins Woerman, July 2007.

2. Vehicle trip rates from ITE *Trip Generation*, 7th Edition.

As shown in Table 4, the site has the potential to generate approximately 730 additional AM peak hour trips and 800 additional PM peak hour trips with full occupancy of existing space. Traffic studies typically evaluate project impacts in terms of net new peak hour trips that the project would add to facilities. For this analysis, net new peak hour trips is determined by subtracting the actual existing trips from the total Alternative trips rather than the potential existing trips with full occupancy. This method gives a more accurate measure of the amount of new site trips that will be added to the transportation system and represents a more conservative, reasonable worst-case scenario.

Operations and Safety

Limited connectivity is provided between the existing industrial uses on-site and many of the areas are gated and/or have restricted access. In addition, many of the existing roadways have been abandoned and are in disrepair because a large portion of the site is vacant. Therefore, the on-site operations analysis focuses on site-access locations.

The on-site roadway and intersection operations for access locations along Roeder Avenue, Chestnut Street, and Cornwall Avenue corridors were evaluated. It should be noted that this evaluation is based on the existing trip generation (i.e., 276 PM peak hour trips) and not the potential site trip generation. Appendix N-1 contains the results of the roadway and intersection analysis. As discussed previously, the City's standard is LOS E; therefore, this report focuses on roadways and intersections operating at LOS E or worse. Table 5 provides a summary of roadway operations for locations that would operate at LOS E or worse for one or more of the New Whatcom site Alternatives.

The evaluation, see Appendix N-1 for a complete summary, shows that currently all on-site roadways operate better than the City's LOS E standard for both directions during the PM peak hour. The roadway operations analysis shows there is available capacity on-site to accommodate additional traffic volumes during the PM peak hour. The maximum v/c ratio for the on-site roadway analysis is 0.55 which is found along Roeder Avenue between C Street and Central Avenue. The v/c ratio along all other on-site and access roadways is lower than 0.55.

Tables 5 and 6 show the on-site intersection operations and accident summary.

Table 5. Existing 2007 PM Peak Hour On-Site Roadway and Intersection Operations

Roadway ¹	2007 Existing		
	LOS ²	Volumes	V/C ³
Roeder Avenue – Broadway Street to F Street (SEB)	A	515	0.55
Roeder Avenue – Broadway Street to F Street (NWB)	A	360	0.38
Roeder Avenue – F street to C Street (SEB)	A	470	0.50
Roeder Avenue – F street to C Street (NWB)	A	240	0.26
Roeder Avenue – C Street to Central Avenue (SEB)	A	515	0.55
Roeder Avenue – C Street to Central Avenue (NWB)	A	215	0.23
Roeder Avenue –Central Avenue to Bay Street (SEB)	A	520	0.55
Roeder Avenue – Central Avenue to Bay Street (NWB)	A	190	0.20
Central Avenue – Laurel Street to Roeder Avenue (NEB)	-	-	-
Commercial Street – Laurel Street to Maple Street (NEB)	-	-	-
Cornwall Avenue – Wharf Street to Maple Street (NEB)	A	270	0.33
Cornwall Avenue –Maple Street to Chestnut Street (NEB)	A	270	0.33
Intersection ¹	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶
1. Roeder Avenue/Hilton Avenue	C	16	NB
2. Roeder Avenue/F Street	B	17	0.32
3. Roeder Avenue/C Street	C	16	SB
4. Roeder Avenue/Central Avenue	C	16	NB
5. West Chestnut Street/Bay Street/Roeder Avenue	E	40	SBL
7. East Chestnut Street/Cornwall Avenue	B	14	0.57

Source: The Transpo Group (August 2007)

- Operations are shown for locations which operate at LOS E or worse for one more of the New Whatcom Site Alternatives (see Appendix N-1 for a complete summary).
- Level of service, based on 2000 *Highway Capacity Manual* methodology.
- Volume-to-capacity ratio for roadway segments.
- Average delay in seconds per vehicle.
- Volume-to-capacity ratio reported for signalized intersections.
- Worst movement reported for unsignalized intersections.

As shown in Table 5, West Chestnut Street/Bay Street/Roeder Avenue currently operates at LOS E. All other intersections currently operate better than LOS E. This is consistent with field observations which show minimal traffic delays in the vicinity of the site. Table 6 shows that average accidents per MEV at the intersections are not greater than 1.0, which indicates there are no existing traffic safety issues at the on-site study intersections.

Table 6. Existing 2007 On-Site Accident Summary

Intersection	Number of Reported Accidents			Annual Average	Accidents per MEV ¹
	2004	2005	2006		
1. Roeder Avenue/Hilton Avenue	1	0	0	0.3	0.10
2. Roeder Avenue/F Street	1	1	1	1.0	0.26
3. Roeder Avenue/C Street	1	1	1	1.0	0.34
4. Roeder Avenue/Central Avenue	1	2	1	1.3	0.48
5. West Chestnut Street/Bay Street/Roeder Avenue	2	0	2	1.3	0.35
6. West Chestnut Street/Commercial Street	0	1	2	1.0	0.24
7. East Chestnut Street/Cornwall Avenue	4	8	3	5.0	1.00

Source: City of Bellingham (April 2007)

1. MEV = million entering vehicles

Non-Motorized and Transit

As discussed previously, public access is limited to the site due to the industrial uses. There are currently no formal pedestrian or bicycle facilities. In addition, no transit service is provided on-site. There are transit stops planned along Roeder Avenue which are discussed in more detail in the off-site section below.

Rail

The Burlington Northern Santa Fe (BNSF) Railway runs parallel to Cornwall Avenue and Roeder Avenue along the site frontage. The railroad enters the site at redevelopment area 8. The railroad runs at-grade within the site creating at-grade crossings with Laurel Street and Pine Street/Wharf Street. There are also at-grade crossings along the site frontage and at the site-access locations including F Street, C Street, Cornwall Avenue, and Central Avenue. The rail crossings at F Street, Laurel Street, Central Avenue, Cornwall Avenue, and Wharf Street/Pine Street are controlled by gates; however, no gate is provided at C Street. The railway serves both passenger and freight trains. Operations of the railway are discussed in more detail in the off-site section below. Most of the railroad operations are outside the PM peak hour; therefore, off-peak traffic conditions are subjected to impacts by rail operations. As rail passes through the at-grade crossings on-site, vehicles can experience long delays and queues at certain intersections. In addition, access to/from the New Whatcom site is limited by the rail crossing which can also cause emergency response delays.

Parking

Existing users of the site currently park on-site in surface parking lots area near buildings in use, or along Cornwall Avenue where there is on-street parking along the site

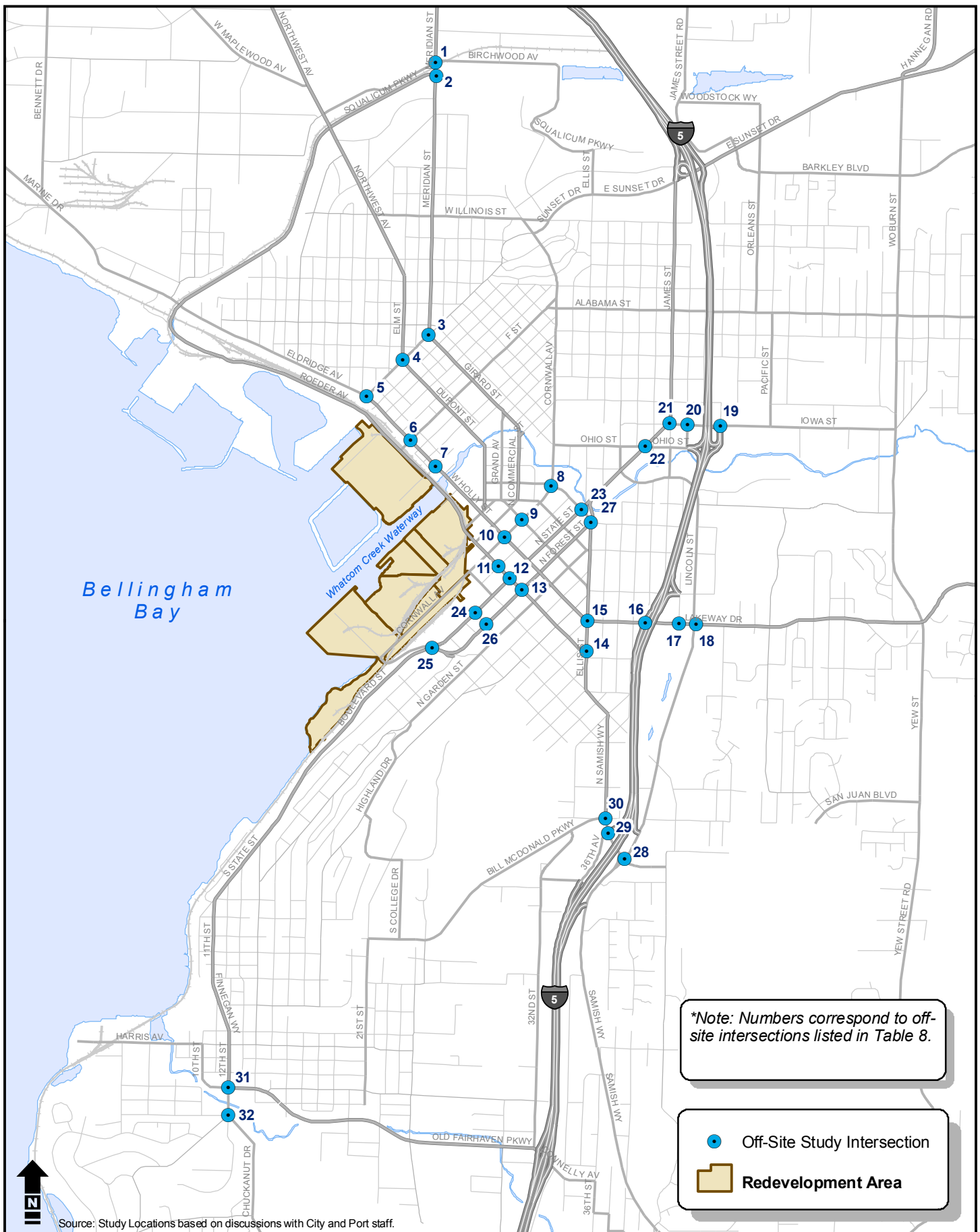
frontage. There are approximately 1,000 parking spaces on-site; however, many of these spaces are not in use since the site is not fully occupied. The parking supply and utilization for the Cornwall Avenue are part of the off-site discussion.

Off-Site

The off-site study area primarily focuses on the local facilities within six to eight blocks of the proposed New Whatcom site and the Interstate 5 (I-5) interchanges serving regional traffic. As discussed previously, major corridors evaluated in this study include Roeder Avenue/Chestnut Street, State Street, Forest Street, 12th Street, Broadway Street, Holly Street, and I-5 interchanges likely to serve the project traffic. Figure 3 shows the study locations.

Street System

This section summarizes the street facilities in the off-site study area and includes an inventory of major corridors and existing traffic volumes. The performance measures related to the street system focus on the evaluation of existing intersection levels of service and safety. Other transportation facilities and modes are described in later sections.



**Note: Numbers correspond to off-site intersections listed in Table 8.*

● Off-Site Study Intersection

■ Redevelopment Area

Source: Study Locations based on discussions with City and Port staff.

Major Corridors

Figure 4 illustrates the street functional classification and traffic signals within the study area. The following describes the major regional and local roadways in the vicinity of the site. These corridors are described because they are considered key facilities which the New Whatcom redevelopment is most likely to impact.

I-5 is a north-south freeway which extends through the western United States from the Mexico border into Canada. This freeway bisects the City of Bellingham. Within the study area, I-5 has two lanes per direction with a posted speed limit of 60 miles per hour (mph).

State Street is a principal arterial which runs in the northeast-southwest direction from Iowa Street to 11th Street. Two to four lanes and sidewalks are provided throughout this roadway. The portion from Wharf Street to Iowa Street is a truck route and mostly serves commercial development. From Boulevard Street to Ellis Street, State Street forms a one-way couplet with North Forest Street, accommodating southbound traffic.

Forest Street is a principal arterial which runs in the northeast-southwest direction from Boulevard Street to Ellis Street. This roadway forms a one-way couplet with State Street and accommodates northbound traffic. Three to four lanes are provided with sidewalks, and parking on both sides of this roadway throughout its entire length.

Cornwall Avenue is a two-lane northeast-southwest/north-south secondary arterial which extends from south of Wharf Street to Illinois Street. This roadway primarily provides access to commercial and industrial development and includes parking and sidewalks on both sides. In addition, turn lanes are provided at the intersections within downtown.

Roeder Avenue/Chestnut Street is a two-lane northwest-southeast primary arterial. Roeder Avenue is a 35 mph truck route which extends along the Port of Bellingham properties from Squaticum Way to Bay Street where it turns into Chestnut Street. Sidewalks and parking are provided on the south side of Roeder Avenue. Chestnut Street extends from Bay Street to Ellis Street and provides access to commercial and industrial development. Sidewalks and parking are provided on most sections of Chestnut Street.

Holly Street is a two-lane northwest-southeast primary arterial which extends from Broadway to Ellis Street where it turns into Lakeway Drive. Sidewalks and parking are provided on both sides of this roadway. From Bay Street to Ellis Street this roadway is one-way and serves the downtown area.

F Street is a two-lane northeast-southwest primary arterial which extends from south of Roeder Avenue to Cornwall Avenue. This roadway provides access to the site.

Magnolia Street is a northwest-southeast secondary arterial with two to three lanes. It is a one-way street with parking in locations where there are two lanes. There are sidewalks on both sides of this roadway.

Commercial Street is a northeast-southwest secondary arterial between Chestnut Street and Champion Street, and a north-south principal arterial between Champion Street and Girard Street. Two lanes are provided along the entire length with parking and sidewalks on both sides of this roadway.

Champion Street is a secondary arterial running east-west between Holly Street and Unity Street and southeast-northwest between Unity Street and Ellis Street. It is a one-way street between Ellis Street and Grand Avenue and a two-way street from Grand Avenue to Holly Street. It has two lanes with turn lanes provided at the major intersections. Parking is provided throughout most of the roadway and sidewalks are provided on both sides.

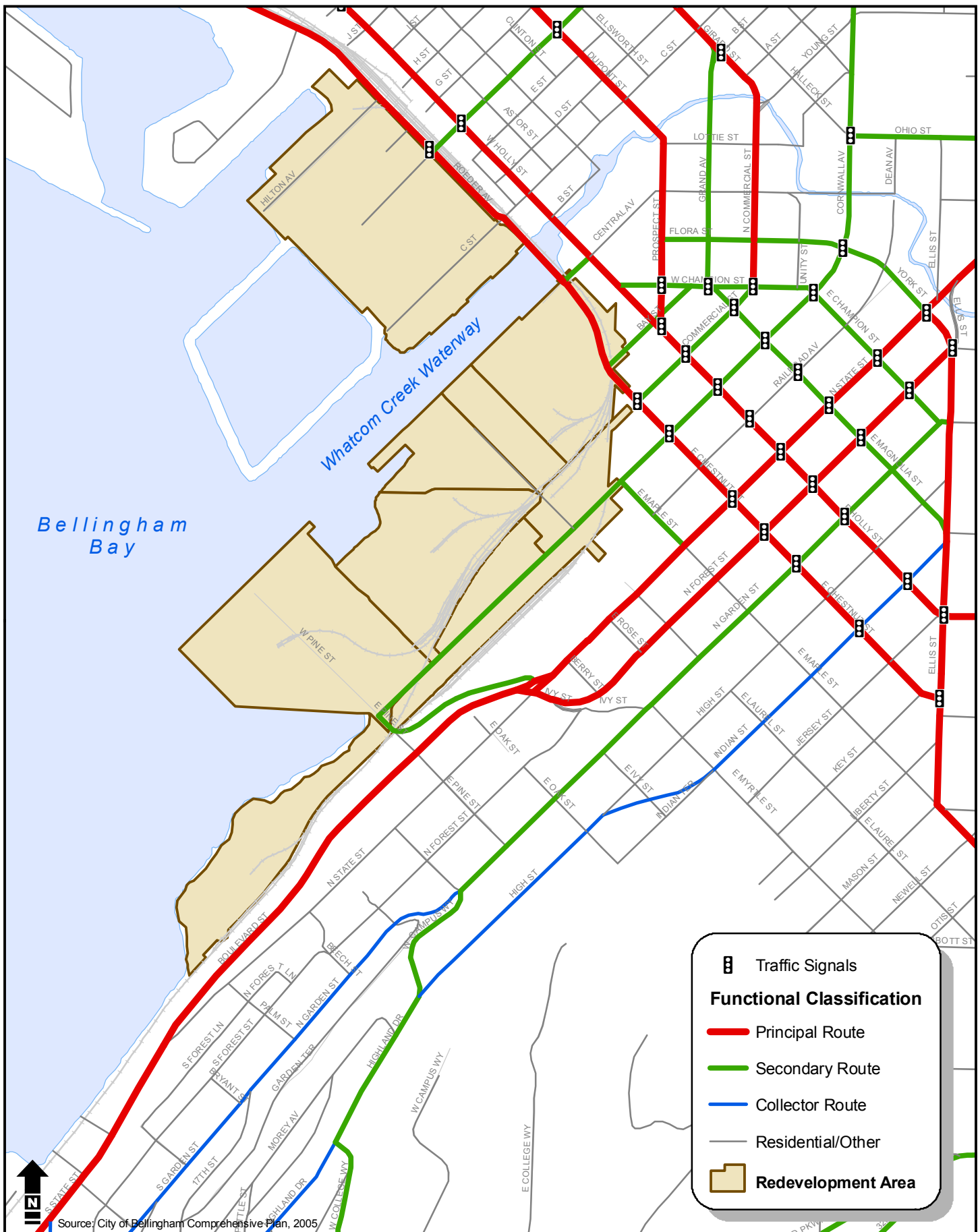


Figure 4
Existing Street Functional Classification & Traffic Signals

New Whatcom
Redevelopment EIS

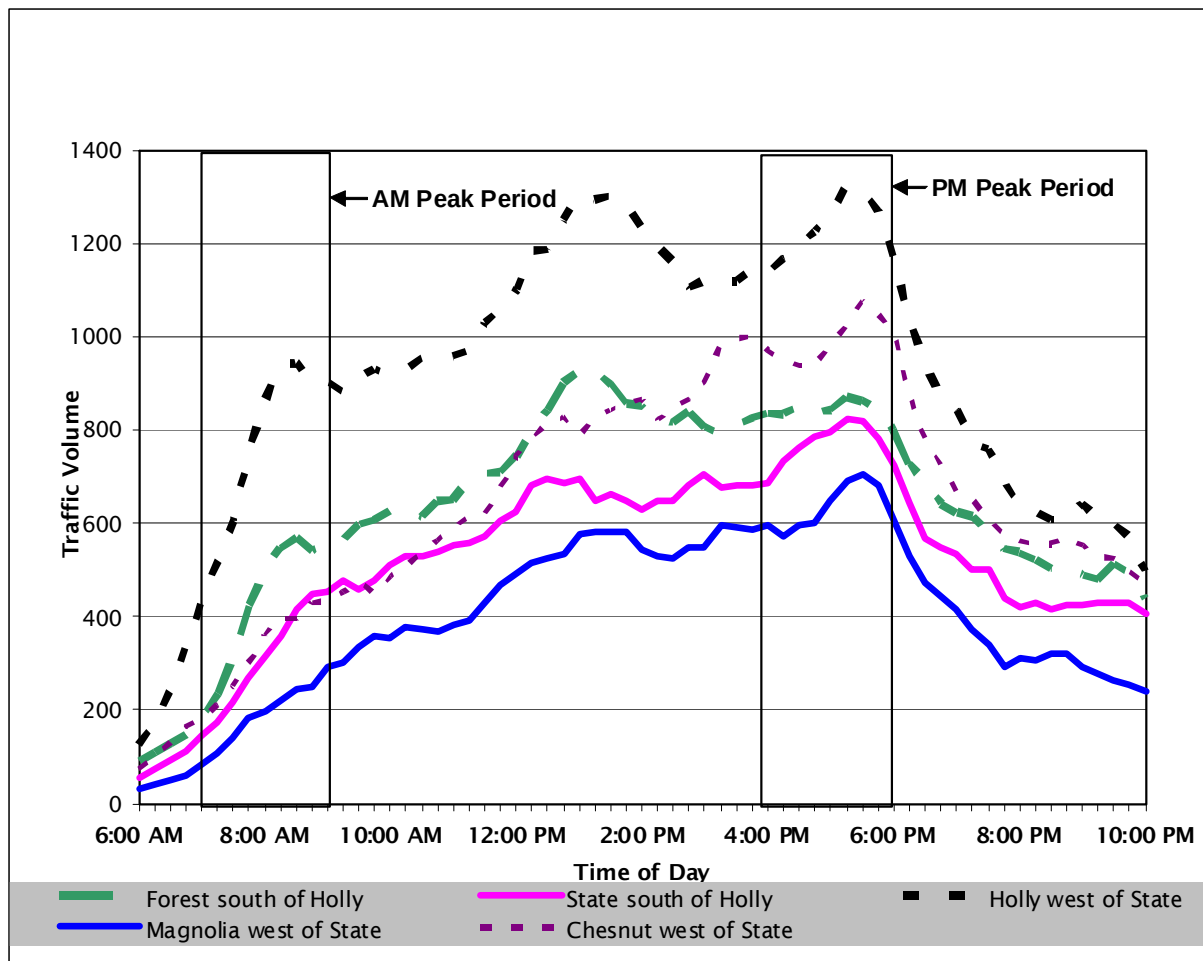
Daily Traffic Volumes

The existing weekday daily traffic volumes shown in Figure 5 are based on traffic counts collected during the spring of 2003. These daily traffic counts are used for illustrative purposes only and not for the analysis of street system conditions. Although the traffic counts are from 2003 and growth has within the City, it is likely the general travel patterns within the City and the relative changes in the hourly traffic volumes are consistent with those observed today since historical traffic counts indicate a small annual growth in traffic volumes of 1 percent per year. The corridors shown include Forest Street, Magnolia Street, Holly Street, Chestnut Street, and State Street. The counts were collected within a two-block vicinity of the Holly Street/State Street intersection.

The highest daily volumes are found along Holly Street, followed by Chestnut Street and Forest Street. Figure 5 displays the total vehicles by time of day for each corridor. The shaded area indicates the AM (7:00 to 9:00 am) and PM (4:00 to 6:00 pm) peak commute periods. General trends in daily volumes include major peaks during both the lunch hour (12:30 to 1:30 pm) and the PM peak hour. AM peak hour volumes generally were half as high as the PM peak hour volumes.

In general, most of the corridors had the highest number of vehicles during the PM peak hour. However, for some of the corridors, the mid-day peak hour has nearly the same traffic volume as the PM peak hour. Forest Street was the only exception with the highest peak in vehicular volume found during the lunch hour. Since the New Whatcom Redevelopment would generate fewer trips during the mid-day peak hour than the PM peak hour, the mid-day peak hour was not considered as it generally does not represent the worst-case traffic conditions.

Figure 5. Daily Traffic Volumes Along Key Corridors



Peak Hour Traffic Volumes

Traffic volume data were collected for the study area to evaluate existing weekday traffic conditions during the peak hour. The analysis focuses on the peak hour with the highest traffic volumes and levels of congestion in the study area. Both AM and PM peak-hour traffic data were collected to determine which time period would be the focus of the study. Turning movement counts were conducted at the following study locations:

1. Meridian Street/Birchwood Avenue
2. Meridian Street/Squalicum Way
3. Broadway/Meridian Street/Girard Street
4. Broadway/Elm Street/Dupont Street.
5. Broadway/Eldridge Avenue/West Holly Street
6. West Holly Street/F Street
7. West Holly Street/ C Street
8. Cornwall Avenue/Flora Street/York Street
9. Cornwall Avenue/East Magnolia Street
10. East Holly Street/Cornwall Avenue
11. East Chestnut Street/Railroad Avenue

12. East Chestnut Street/North State Street	24. North State Street/East Laurel Street
13. East Chestnut Street/North Forest Street	25. North Forest Street/ North State Street/Boulevard Street/Wharf Street5
14. East Chestnut Street/Ellis Street	26. North Forest Street/East Laurel Street
15. Lakeway Drive/Ellis Street/Jersey Street/East Holly Street	27. North Forest Street/Ellis Street/York Street
16. Lakeway Drive/I-5 Southbound Ramps	28. South Samish Way/Elwood Avenue/Lincoln Street
17. Lakeway Drive/King Street	29. South Samish Way/I-5 Southbound Off-Ramp/36th Street
18. Lakeway Drive/Lincoln Street	30. North Samish Way/Bill McDonald Parkway
19. Iowa Street/Moore Street/I-5 Northbound Ramps	31. 12th Street/Old Fairhaven Parkway
20. Iowa Street/King Street	32. 12th Street/Hawthorn Road/Parkridge Road
21. North State Street/James Street/Iowa Street	
22. North State Street/Ohio Street	
23. North State Street/York Street	

Morning (7:00 to 9:00 am) peak-period turning movement counts were conducted at the intersection numbers 12 through 15 as well as on-site intersections F Street/Roeder Avenue and Cornwall Avenue/East Street and evening (4:00 to 6:00 pm) peak-period turning movement counts were conducted at all study intersection. Figure 5 shows the location of the study intersections. Appendix N-2 includes a summary of the traffic counts.

AM Peak Hour Traffic Volumes

Table 7 shows a comparison of AM and PM peak hour traffic volumes at the study intersections where AM peak hour traffic counts were conducted, as indicated above. As shown in Table 7, the AM peak-hour traffic volumes are lower than the PM peak hour traffic volumes. The AM peak-hour traffic volumes are about 40 to 60 percent of the PM peak hour traffic volumes. This conclusion is similar to what was found with the daily traffic volume data where the AM peak-hour volumes were about half of the PM peak-hour volumes.

Table 7. Comparison of AM and PM Peak Hour Intersection Traffic Volumes

Intersection	AM Peak Hour Traffic Volume	PM Peak Hour Traffic Volume	AM Volume as a % of PM Volume
<u>Off-Site Intersections</u>			
12. East Chestnut Street/North State Street	880	1,900	46%
13. East Chestnut Street/North Forest Street	930	1,630	57%
14. Ellis Street/East Chestnut Street	780	1,900	41%
15. Ellis Street/Jersey Street/East Holly Street/Lakeway Drive	1,790	2,800	64%
<u>On-Site Intersections</u>			
2. F Street/Roeder Avenue	670	1,080	62%
7. Cornwall Avenue/East Chestnut Street	640	1,360	47%

Source: All Traffic Data Services, Inc. (April 2007) and The Transpo Group (May 2007)

PM Peak Hour Traffic Volumes

The PM peak hour generally occurs between 4:30 and 5:30 pm in the downtown area. During the PM peak hour, the highest traffic volumes were found along Lakeway Drive, which carries more than 2,000 vehicles per hour (vph) between Ellis Street, King Street and Iowa Street. Iowa Street carries more than 1,800 vph between King Street and I-5. Adjacent to the site, during the PM peak hour, Roeder Avenue/Chestnut Street carries approximately 700 to 1,000 vph and Cornwall Avenue carries approximately 400 vph. Figure 6 displays the 2007 PM peak-hour traffic volumes in the vicinity of the site. Traffic volumes for all of the study locations are provided in Appendix N-2.

Roadway Operations

Existing v/c ratios were calculated for roadway segments in the vicinity of the site. Appendix N-1 contains the resulting v/c ratios for all off-site roadways. Table 8 shows existing roadway operations for locations that operate at LOS E or worse for one or more of the New Whatcom site Alternatives (see Appendix N-1 for a complete summary). The evaluation shows that currently all off-site roadways operate better than the City's standard for both directions during the PM peak hour. This analysis shows there is available capacity off-site to accommodate additional traffic volumes during the PM peak hour. The highest existing v/c ratio for the off-site roadway analysis is 0.73 which is found along Holly Street between F Street and Champion Street. The v/c ratio along all other off-site roadways is lower than 0.73.

Intersection Operations

Based on HCM methodology, existing levels of service, delays, and v/c ratios were calculated at the study intersections. Appendix N-3 contains detailed LOS worksheets for existing peak-hour conditions. Table 8 shows the existing intersection operations for off-site locations operating only at LOS E or worse. Appendix N-1 provides a summary of existing LOS for every study area intersection.

Generally, the study area intersections are operating at LOS E or better. Most of the major intersections are operating at or above LOS C, which suggests there is still available capacity in downtown as well as the study area outside of downtown. The only location operating at LOS F is the North State Street/James Street/Iowa Street intersection. This intersection has five legs making it difficult to serve vehicles from two approaches at once. This necessitates the use of split signal phasing which is generally a much less efficient signal phasing plan than what would ordinarily be used. Split phasing at traffic signals is when opposite approaches have separate green times and do not travel within the intersection at the same time. Vehicles may have to wait longer at this intersection while each approach is served. With nearly 2,000 vehicles entering this intersection during the PM peak hour as well as the inefficiency of split signal phasing, the delay per vehicle at this intersection is over 100 seconds per vehicle and the service level is LOS F.

Table 8. Existing (2007) PM Peak Hour Off-Site Roadway and Intersection Operations

Roadway ¹	LOS ²	Volumes	V/C ³
Holly Street – Broadway Street to F Street (SEB)	A	310	0.38
Holly Street – Broadway Street to F Street (NWB)	B	540	0.66
Holly Street – F Street to Central Avenue (SEB)	A	275	0.34
Holly Street – F Street to Central Avenue (NWB)	C	590	0.73
Holly Street – Central Avenue to Champion Street (SEB)	A	275	0.34
Holly Street – Central Avenue to Champion Street (NWB)	C	590	0.73
Cornwall Avenue –Chestnut Street to Holly Street (NEB)	A	125	0.15

Intersection ¹	LOS ²	Delay ³	V/C ⁴ or WM ⁵
1. Meridian Street/Birchwood Avenue	D	40	0.72
6. West Holly Street/F Street	B	13	0.50
7. West Holly Street/ C Street	C	18	SB
8. Cornwall Avenue/Flora Street/York Street	B	13	0.68
11. East Chestnut Street/Railroad Avenue	E	44	SB
15. Lakeway Drive/Ellis Street/Jersey Street/East Holly Street	C	24	0.68
16. Lakeway Drive/I-5 Southbound Ramps	C	23	0.82
17. Lakeway Drive/King Street	D	39	0.73
18. Lakeway Drive/Lincoln Street	D	38	0.91
19. Iowa Street/Moore Street/I-5 Northbound Ramps	C	33	0.89
20. Iowa Street/King Street	B	17	0.62
21. North State Street/James Street/Iowa Street	F	114	1.63
22. North State Street/Ohio Street	C	20	0.65
24. North State Street/East Laurel Street	B	11	WBL
25. North Forest Street/ North State Street/Boulevard Street/Wharf Street ⁶			
a. North Forest Street/North State Street/Boulevard Street	C	17	SBL
b. North State Street/Wharf Street	B	14	EB
26. North Forest Street/East Laurel Street	B	14	EB
28. South Samish Way/Elwood Avenue/Lincoln Street	B	18	0.64

Source: The Transpo Group (May 2007)

- Operations are shown for locations which operate at LOS E or worse for one more of the New Whatcom Site Alternatives (see Appendix N-1 for a complete summary).
- Level of service, based on 2000 *Highway Capacity Manual* methodology.
- Average delay in seconds per vehicle.
- Volume-to-capacity ratio reported for signalized intersections.
- Worst movement for unsignalized intersections. This is not applicable (NA) to all-way stop controlled intersections.
- This intersection operates as two separate intersections in the field; therefore, the analysis was conducted as such.

Intersection Safety

Traffic accident records at the study intersection were obtained from the City of Bellingham for 2004-2006. These records represent the most recent three-year period for which complete accident data are available. Accident records at the study intersections are summarized in Table 9.

Table 9. Existing (2007) Off-Site Accident Summary

Intersection	Number of Reported Accidents			Annual Average	Accidents per MEV ¹
	2004	2005	2006		
1. Meridian Street/Birchwood Avenue	6	7	8	7.0	0.71
2. Meridian Street/Squalicum Way	3	3	0	2.0	0.36
3. Broadway/Meridian Street/Girard Street	3	1	2	2.0	0.47
4. Broadway/Elm Street/Dupont Street.	2	2	1	1.7	0.38
5. Broadway/Eldridge Avenue/West Holly Street	1	0	2	1.0	0.25
6. West Holly Street/F Street	2	3	5	3.3	0.66
7. West Holly Street/ C Street	0	2	2	1.3	0.4
8. Cornwall Avenue/Flora Street/York Street	0	1	1	0.7	0.13
9. Cornwall Avenue/East Magnolia Street	6	10	4	6.7	1.64
10. East Holly Street/Cornwall Avenue	10	8	4	7.3	1.42
11. East Chestnut Street/Railroad Avenue	6	6	4	5.3	1.18
12. East Chestnut Street/North State Street	7	4	5	5.3	0.77
13. East Chestnut Street/North Forest Street	9	4	10	7.7	1.29
14. East Chestnut Street/Ellis Street	2	5	4	3.7	0.53
15. Lakeway Drive/Ellis Street/Jersey Street/East Holly Street	9	14	9	10.7	1.04
16. Lakeway Drive/I-5 Southbound Ramps	6	5	5	5.3	0.54
17. Lakeway Drive/King Street	6	8	12	8.7	0.87
18. Lakeway Drive/Lincoln Street	18	15	11	14.7	1.37
19. Iowa Street/Moore Street/I-5 Northbound Ramps	6	4	1	3.7	0.41
20. Iowa Street/King Street	7	5	10	7.3	0.95
21. North State Street/James Street/Iowa Street	9	3	6	6.0	0.85
22. North State Street/Ohio Street	1	3	3	2.3	0.28
23. North State Street/York Street	4	4	1	3.0	0.53
24. North State Street/East Laurel Street	1	3	3	2.3	0.70
25. North Forest Street/ North State Street/Boulevard Street/Wharf Street	1	2	0	1.0	0.19
26. North Forest Street/East Laurel Street	0	1	2	1	0.38
27. North Forest Street/Ellis Street/York Street	4	4	1	3	0.53
28. South Samish Way/Elwood Avenue/Lincoln Street	9	5	8	7.3	0.89
29. South Samish Way/I-5 Southbound Off-Ramp/36 th Street	3	1	8	4	0.44
30. North Samish Way/Bill McDonald Parkway-3	9	5	11	8.3	1.13
1. MEV = million entering vehicles					

Based on the performance measures discussed in Chapter 2, seven off-site intersections have more than 1.0 accident per MEVs:

- East Chestnut Street/North Forest Street
- East Chestnut Street/Railroad Avenue
- East Holly Street/Cornwall Avenue
- Cornwall Avenue/East Magnolia Street
- Lakeway Drive/Ellis Street/Jersey Street/East Holly Street

- Lakeway Drive/Lincoln Drive
- North Samish Way/Bill McDonald Parkway

In addition to the total number of accidents, the City provided data on accident type. The most common type of collision in the study area was rear-end collisions with a total of 167 accidents for the study intersections within the three-year period. These collisions are likely caused by congestion, frequent stop-and-go traffic during the peak hours or vehicles stopped along the roadway waiting to complete a left-turn. The next most common accident types were: approach-turn collisions with 108 reported accidents, right-angle collisions with 104 reported accidents, and sideswipes with 103 reported accidents. These accidents are likely caused by the many angled intersections in Bellingham, driver confusion at large, numerous five-legged intersections, and poor sight distance. Accidents in the downtown area were predominately sideswipes which were most likely a result of the angled street pattern. Accidents near the freeway intersections were generally rear-end collisions which are common more at signalized intersections like those at freeway ramp junctions in Bellingham.

Non-Motorized

Pedestrian and bicycle facilities were assessed in the study area to determine connectivity and to identify existing issues or deficiencies. With an estimated 7 percent of the City of Bellingham workers over 16 walking or using bicycle as their primary source of transportation (based on United States 2005 American Community Survey), non-motorized facilities are in demand within the community. In addition, since 1995 Western Washington University (located southeast of the site) has supported alternatives modes to automobile commuting, by encouraging students, faculty and staff to walk and bike to campus. A 2003 student survey and 2005 employee survey indicate about 43 percent of the students and 11 percent of the employees walk or bike to campus.

The development site has been primarily used for industrial purposes with limited public access and no formal pedestrian or bicycle facilities. In addition, access between the site and downtown is restricted to a few roads and existing recreational trails. The City of Bellingham Comprehensive Plan, adopted in 2005, addresses the need for future development of pedestrian and bicycle facilities throughout the City in its 20-year plan. The Plan cites numerous studies and other plans including the 2004 Bicycle Pedestrian Advisory Committee work. The emphasis in all of these documents, as described in the Transportation Element of the Comprehensive Plan is to,

“...develop neighborhood commercial centers and urban villages and locate higher density housing convenient to jobs and services to ensure pedestrian and bicycle access to transit lines, sidewalks, trails and bicycle routes and to encourage bicycle, pedestrian and transit commute trips.” (p. T-30)

The Comprehensive Plan Transportation Element also notes under a section on Travel Mode Choices (p. T-20) according to the 2004 *Federal Transit Authority (FTA) Social Data Study for Bellingham*, that trips of under one-half of a mile were 45 percent pedestrian and 6 percent bicycling within the City. Bicycle use ranged from 4 to 6 percent up to 3 miles travel distance. These distances correspond well with the physical size of the New

Whatcom Redevelopment site so proposed pedestrian and bicycle facilities should exceed, or at least match, existing usage off-site. Enhanced pedestrian and bicycle use within the site is a high priority and access to and from the site with these modes is included in the Alternatives.

Bicycle Facilities

Figure 7 shows the existing bicycle facilities. According to the Transportation Chapter of the *Bellingham Comprehensive Plan*, 2005, the City has three classifications of bicycle facilities: on-street marked bicycle lanes, on-street unmarked bicycle routes, and off-street marked bicycle trails. Unmarked bicycle routes are provided along Roeder Avenue, Holly Street, and Cornwall Avenue. In addition, North State Street has both marked bicycle lanes and unmarked bicycle routes. Multi-use trails and paths are provided in the vicinity of the waterfront and downtown. These multi-use paths/trails include:

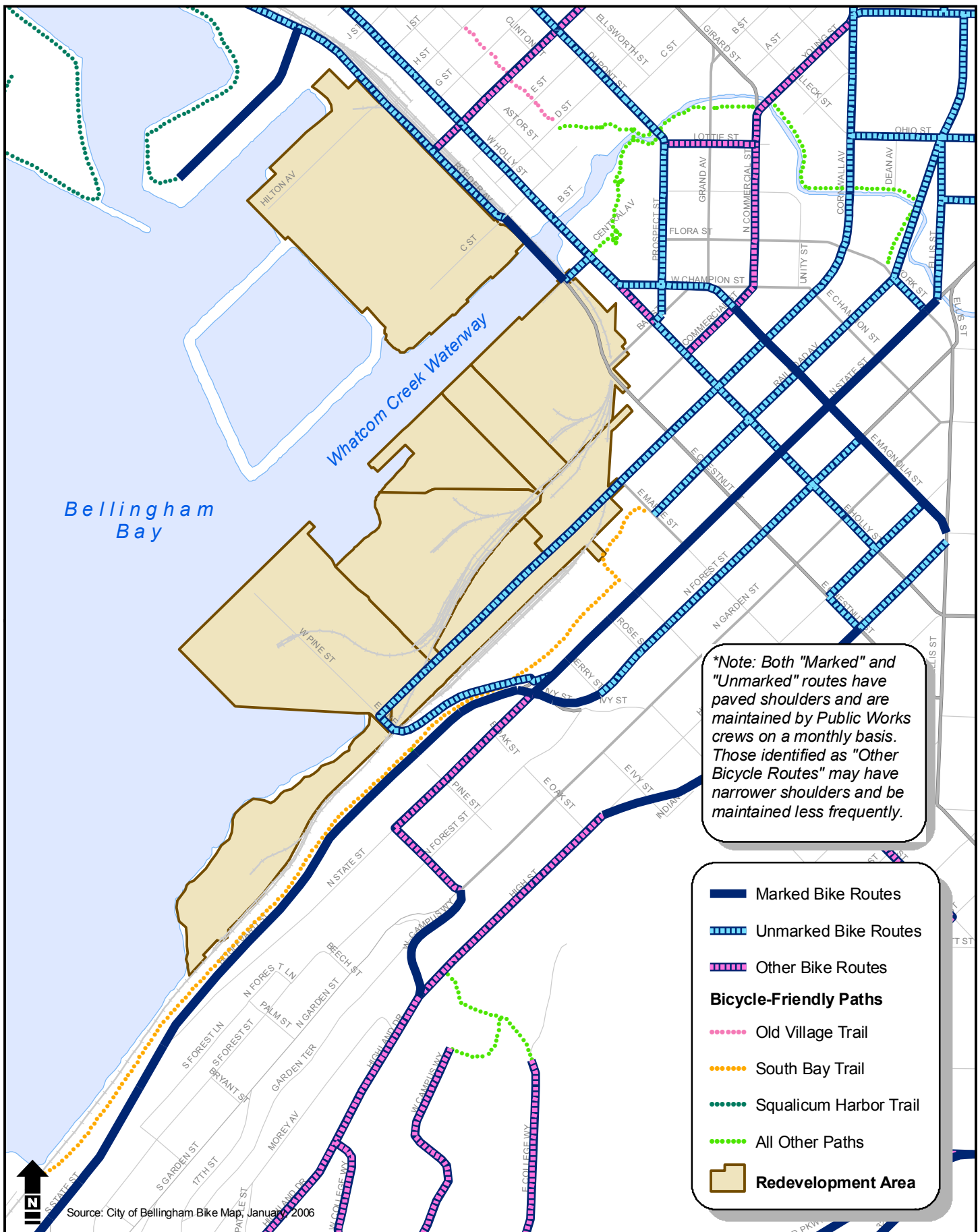
Old Village Trail connects the Lettered Streets Neighborhood to Old Town and Elizabeth Park. It shares the right-of-way with the streets within the Lettered Streets Neighborhood. The trail is 1/2-mile long with access beginning at Broadway and ending at Maritime Heritage Park.

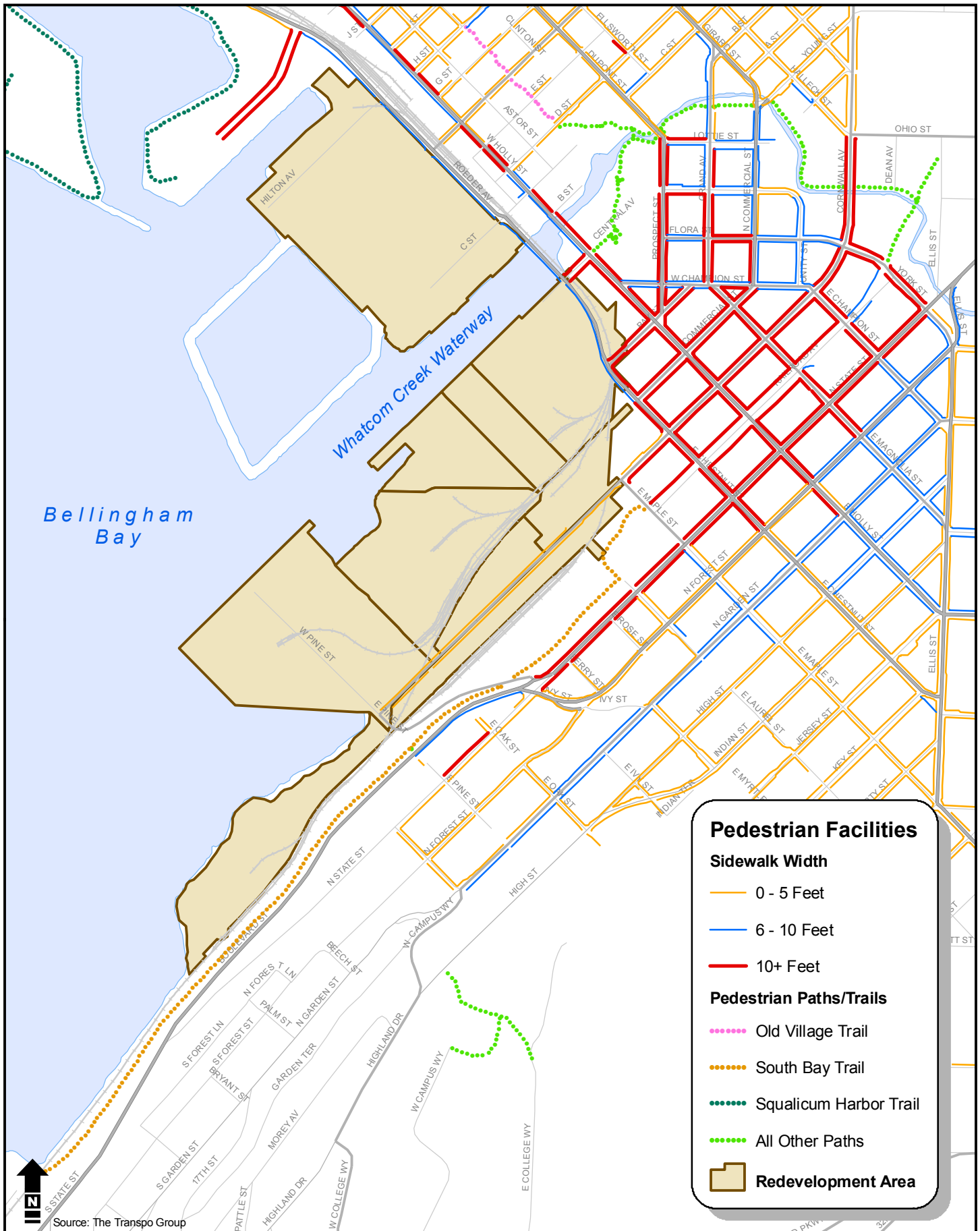
Squalicum Harbor Trail is maintained by the Port of Bellingham. It starts at the Bellwether Waterfront area located on Bellwether Way on the bay and follows the Squalicum Harbor shoreline for about 1.5 miles.

South Bay Trail runs along Bellingham Bay from Railroad Avenue at Maple Street to the Fairhaven Village Green at Mill Street. The trail is about 2.3 miles long. Access is provided at Boulevard Park, on South State Street, Rail Avenue at Maple Street, and 10th Street at Mill Street.

Pedestrians

Figure 8 shows the existing sidewalks and paths in the vicinity of the site. Sidewalks are provided on both sides of most of the roadways within the off-site study area. Wider sidewalks (10 feet or more) are generally provided in the downtown area and narrower sidewalks (less than 6 feet) are located toward the outer edges of downtown in the residential areas. The lettered streets neighborhood does not have sidewalks. There are some walking paths in downtown, particularly around parks, public buildings, open spaces, and along the waterfront. The multi-use trails in the vicinity of the site discussed supplement pedestrian access and mobility.





Source: The Transpo Group

Figure 8
Existing Pedestrian Facilities

Transit

Public transit service in the City of Bellingham is provided by Whatcom Transportation Authority (WTA). WTA services include fixed-route, paratransit, dial-a-ride, “flex” service, vanpool, community use vans, rideshare assistance, and park-and-ride lots. In addition, WTA operates a transit center in downtown next to State Street between Magnolia Street and Champion Street. The transit center, major transit corridors, and study area bus stop locations are shown on Figure 9.

Current Service

There are 32 bus routes serving Bellingham with 24 routes serving the downtown transit center directly. A majority of the routes from all across Whatcom County service downtown Bellingham. A list of weekday bus routes serving downtown Bellingham and the site as well as their typical weekday boarding are shown in Table 10. The four routes serving the New Whatcom Redevelopment site directly are discussed below:

Route 3 and Route 4 create a loop in the northwest portion of the City. Route 3 runs in the clockwise direction and Route 4 runs in the counterclockwise direction. Roadways where service is provided include Holly Street, Maplewood Avenue, Meridian Street, and Cornwall Avenue. Major stops include the downtown Bellingham Transit Center, Bellingham Technical College, and Saint Joseph Hospital. Weekday service is provided from approximately 7:00 am to 7:00 pm with 60-minute headways. Service is also provided on Saturdays from about 9:00 am to 6:30 pm with 60-minute headways.

Route 10 provides service on Holly Street, Eldridge, Bennett Drive, Cottonwood Avenue, and Pinewood Avenue. Weekday service is provided from approximately 7:00 am to 6:00 pm with 60-minute headways. Service is also provided on Saturdays from about 10:00 am to 6:00 pm with 60-minute headways.

Route 401 runs from downtown Bellingham to the Fairhaven Business District along North State Street, North Forest Street, Boulevard Street, 12th Street, and Harris Avenue. Service is provided from about 6:00 am to 11:00 pm with 15 to 30-minute headways on weekdays. Saturday service is provided from approximately 9:00 am to 11:00 pm with 15- to 30-minute headways. Sunday service is provided from approximately 9:00 am to 7:30 pm with 30-minute headways.

No transit service is provided on Roeder Avenue/Chestnut Street and Cornwall Avenue along the site frontage; however, WTA’s *Six-Year Strategic Service Plan*, September 2004 and the City’s Comprehensive Plan shows future service along Roeder Avenue/Chestnut Street in anticipation of the New Whatcom redevelopment.

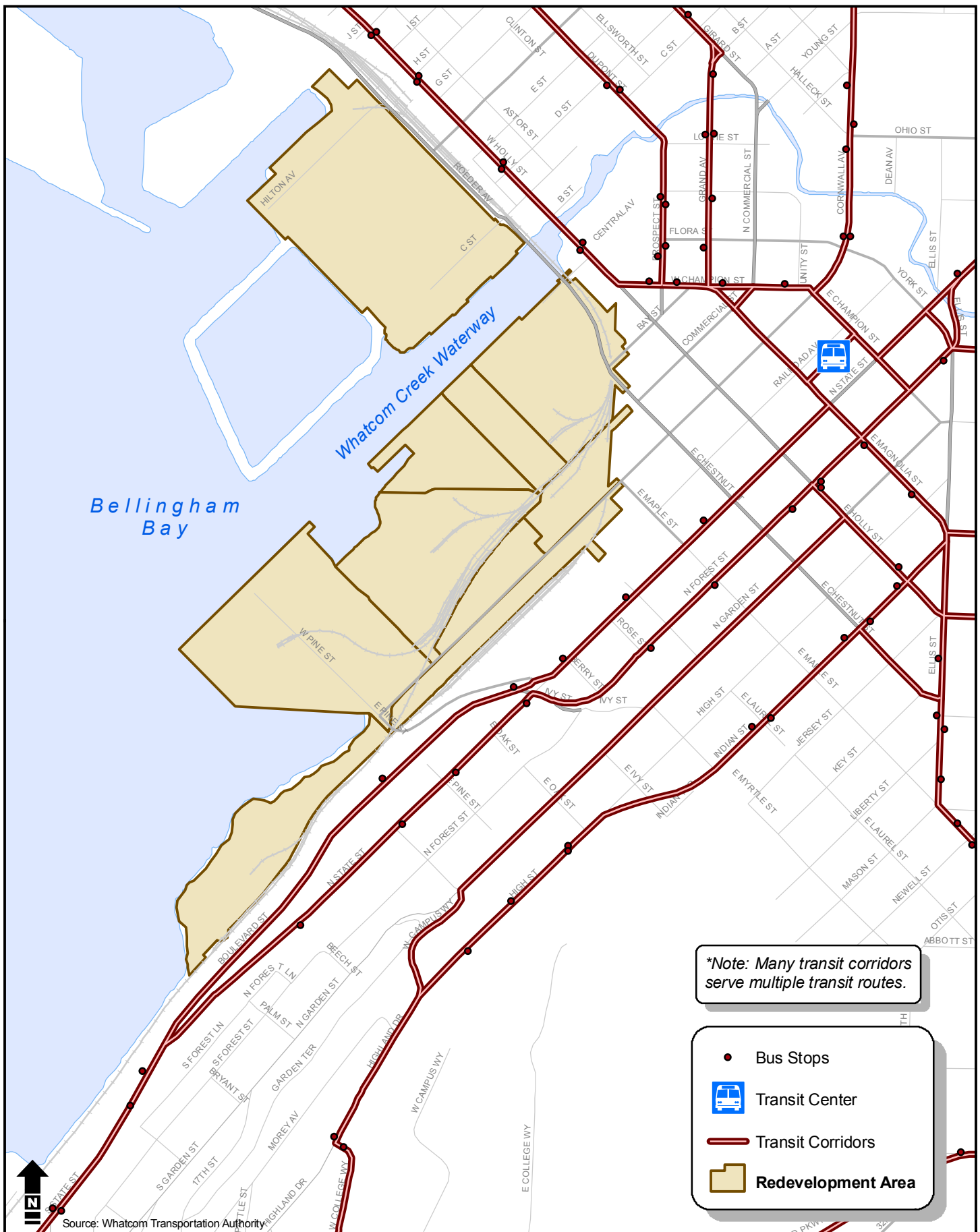


Table 10. 2007 Weekday Transit Service Characteristics for Bellingham

Route	Name	Peak Headways (in minutes)	Off-Peak Headway (in minutes)	Weekday Boarding
3	Maplewood	60	60	145
4	Hospital	60	60	137
9	Hospital/Downtown	60	60	87
10	Birchwood/Downtown	60	60	138
11	Lakeway/Downtown	30	60	510
12	Sudden Valley/Lakeway	60	60	157
15	Cordata Station/WCC Downtown	30	60	675
16	WWU/Lincoln	n/a	60	63
23	Deemer	60	60	24
24	Cordata	30	60	202
26	Lynden/Cordata Station/WCC	60	60	259
27	Ferndale/Cordata Station/WCC	60	60	246
43/44	Yew St. AM/Yew St PM	60	60	172
50	Gooseberry Pt/Downtown	8 trips/day	8 trips/day	149
55	Cordata/WCC Blaine/Birch Bay	2 trips/day	2 trips/day	31
70X	Blaine/Bellingham	4 trips/day	4 trips/day	136
71X	Everson/Nooksack/Sumas/Bellingham	4.5 trips/day	4.5 trips/day	55
72X	Kendall/Bellingham	5.5 trips/day	5.5 trips/day	121
80X ¹	Bellingham/Mt Vernon	8 trips/day	8 trips/day	220
105	Fairhaven/Downtown	60	60	696
107	WWU	30	30	530
108	Samish Way	60	60	253
114	Fairhaven Downtown	30	40	917
190	Lincoln Creek/Downtown	30	30	1,070
232	Downtown/Cordata Station	15	30-60	1,244
331	Cordata Station/WCC/Downtown	30	60	947
340	Silver Beach	60	60	284
341	Sunset Square	60	60	302
401	Fairhaven/Downtown	15	30	<u>629</u>
Total				10,399

Source: Whatcom Transportation Authority, May 2007.

1. Half of the route is operated by Whatcom Transit and the other portion is operated by Skagit Transit.

As shown in the table, weekday boarding ranges from 20 to 1,200 persons per day. For routes serving the site area (i.e., 3, 4, 10, and 401), boarding ranges from about 150 to 630 persons per day. The total weekday boarding downtown is approximately 10,400 persons per day. Based on information provided by WTA, the annual boarding seating capacity is about 3.8 million or about 10,400 per day which translates into a passenger load ratio of 1.00. Therefore, the downtown transit system is currently at capacity.

Each year WTA evaluates existing seating capacity to determine if an increase is needed to accommodate existing and anticipated ridership. In January 2008, WTA plans to increase the annual seating capacity to 4.2 million which translates into about 11,500

seating capacity per day or an increase of about 1,500 seating capacity per day⁶. In the long term the downtown transit system capacity is likely to increase beyond the January 2008 capacity. WTA indicated in a communication to Transpo that transit seating capacity has increased consistently by about 7 to 10 percent per year over the last several years; however, as a conservative estimate, WTA expects downtown seating capacity to increase by about 4 percent per year.

Additional service to downtown is also provided on weekdays, when Western Washington University (WWU) is in session, by other routes not listed in Table 10. The WWU routes typically have about 1,500 to 2,000 boardings per day.

Downtown Transit Center

The focal point for downtown Bellingham transit service is the Downtown Transit Center. It is about a 1/4-mile walking distance from portions of the New Whatcom site closest to downtown. The Transit Center includes ten bays with multiple routes having stops at each bay. This allows for buses in all directions to pull into a station and permit transit riders to transfer between bus routes. The most recent ridership data from WTA indicate there are about 9,500 boardings at the Transit Center on a typical weekday which represents about 90 percent of all downtown boardings. The existing routes into and out of the Transit Center provide good accessibility to the various facilities in the greater downtown area. Prominent destinations in downtown that are served by transit include the Library, City Hall, the Senior Center, the Whatcom Museum, the Federal Building, Bellingham High School, Whatcom Middle School, and the County Court House. The Transit Center receives significant activity as a hub between different routes that converge on downtown Bellingham.

Rail

BNSF Railway operating in Bellingham runs from the Canadian border south to Oregon. As discussed previously, the railway runs along Cornwall Avenue and Roeder Avenue and turns into the site at redevelopment area 8. It has at-grade crossings at F Street, C Street, Central Avenue, Laurel Street, Cornwall Avenue, and Wharf Street/Pine Street. The railway serves both passenger and freight trains.

Freight

Freight trains along the BNSF railway serve the local industrial uses on-site as well as businesses within the City. Table 11 shows the daily operations of the trains in the vicinity of the site based on information provided by the local Bellingham BNSF staff as well as Amtrak Cascades data discussed below. The table shows for freight operations there are four daily roundtrips to/from Canada, three local trips serving businesses within the City of Bellingham, and one night freight train from Bellingham to Everett. This is a total of seven freight trains in the vicinity of the site. Considering freight and passenger trains, a total of ten trains would cross the railroad in the vicinity of the site.

⁶ WTA seating capacities and expected increases in seating capacities by Rick Nicholson, Director of Development Services, in August 2007.

Table 11. Number of Trains in the Vicinity of Site

Service	Daily Roundtrips
Freight to/from Canada	4
Freight with local Bellingham Service	3
Freight Bellingham to Everett ¹	1
Amtrak Cascades Northbound Service ²	2
Total Freight and Passenger Trains	10

Source: Burlington Northern Santa Fe Railway (May 2007)

1. Bellingham to Everett freight is one night train.

2. Only northbound service would cross the railroad in the vicinity of the site since the Harris Avenue station is location south of the site.

Passenger

Amtrak Cascades is a partnership between WSDOT, Amtrak, and Oregon Department of Transportation. It provides intercity passenger rail service for longer distance travel between cities along the I-5 corridor. The corridor runs 156 miles from Vancouver, British Columbia south to Seattle, Washington, continuing 310 miles south to Portland and Eugene, Oregon. Total Amtrak Cascades ridership for 2006 was 630,000 which was down 7,000 riders from 2005 but higher than 603,000 passengers reported in 2004. Amtrak Cascades service on the Seattle-Portland routes began in 1993. In 2007, there were four trips from Bellingham. Trains heading southbound towards Seattle depart Bellingham at 8:30 am and 7:40 pm. Trains heading northbound to Vancouver depart Bellingham at 9:45 am and 9:05 pm. The trains heading southbound would not cross the railroad in the vicinity of the site because, as described below, the Harris Avenue Station is located south of the site.

Amtrak Cascades in Bellingham is accessed via the Harris Avenue Station which is located south of the site in the Fairhaven district of Bellingham. Harris Avenue Station is an intermodal center which provides connections to Amtrak as well as WTA and Greyhound buses, taxis, and the San Juan Island Commuter, a ferry service to San Juan Island. The station is open between 8:00 am and 9:00 pm on both weekdays and weekends with ticketing hours are from 7:30 am to 12:15 pm and 1:00 pm to 3:30 pm. The station has an enclosed waiting area for passengers as well as a parking lot north of the station which can accommodate over 200 vehicles.

The number of travelers riding via the Harris Station follows the same pattern as the overall Amtrak Cascades system with 52,000 riders in 2006 which is down from 56,000 riders in 2005. As shown in Table 12, passengers from the Bellingham station represent 8 to 10 percent of the total Amtrak Cascades ridership.

Table 12. Harris Avenue Station – Bellingham Amtrak Passenger Ridership

Year	Bellingham Passengers	Total Amtrak Cascades Ridership	% to/from Bellingham
2000	53,227	530,218	10%
2001	44,661	560,381	8%
2002	44,576	584,346	8%
2003	48,573	589,743	8%
2004	55,031	603,059	9%
2005	56,086	636,892	9%
2006	52,302	629,996	8%

Source: Amtrak Cascades Ridership and Station On-Off Information, Amtrak Cascades and WSDOT, March 2007.

Parking

Available on- and off-street parking was surveyed within ¼-mile on-the-ground walking distance from the site access locations (see Figure 10). This parking study area was selected because transportation industry research shows that ¼-mile is typically the maximum distance patrons are willing to walk from their parked vehicle to their destination. Parking in the vicinity of the site is located within downtown, the lettered streets neighborhood, and along Cornwall Avenue.

On-Street Parking

On-street parking in the study area generally has a low utilization during the weekdays, though certain areas of downtown are highly utilized. On-street parking consists mainly of either unrestricted or hourly parking as described below.

- *Unrestricted Parking* – spaces that the public does not pay for and for which there are no time restrictions. This accounts for the majority of the parking within the site vicinity.
- *Hourly Parking* – public spaces with hourly time restrictions, which may be metered. On-street parking spaces within downtown are mostly metered while spaces along the site frontage have hourly restrictions of mainly 2 or 8-hours.

There are approximately 1,100 on-street parking spaces within ¼-mile on-the-ground walking distance from the site access locations. Within the downtown area, there are approximately 500 on-street parking spaces. The Lettered Streets Neighborhood contains about 470 on-street parking spaces and Cornwall Avenue has about 110 on-street parking spaces.

Based on the April 2007 field survey, about 50 percent or less of the parking within the Lettered Streets Neighborhood is utilized during the mid-day. The parking in this neighborhood is generally unrestricted. In addition, there is less than 50 percent utilization of the on-street unrestricted parking located along Roeder Avenue in the vicinity of Hilton Avenue and Bellwether Way. The City's *City Center Master Plan: Parking Element* (January 2006) shows that over 50 percent of the on-street parking is utilized during mid-day along portions of Holly Street and Prospect Street. In most of the other areas downtown, over 75 percent of the on-street parking is utilized. The type of parking in this area is mainly hourly parking, with time limitations of one to six hours. The eight-

hour parking along Cornwall is underutilized with less than 50 percent of the spaces occupied during the mid-day.

Off-Street Parking

Off-street parking within the study area is located downtown. There are ten public parking lots within one-quarter of a mile of the site with a total of 230 parking spaces. The parking lots are located along Bay Street, Commercial Street, Chestnut Street, and Prospect Street. The City's *Parking Element* shows that 50 percent of the off-street parking spaces are utilized along Bay Street, Commercial Street, Chestnut Street, and Prospect Street during mid-day. In addition, the parking lot south of Champion Street and east of Bay Street has a utilization of over 75 percent during mid-day.

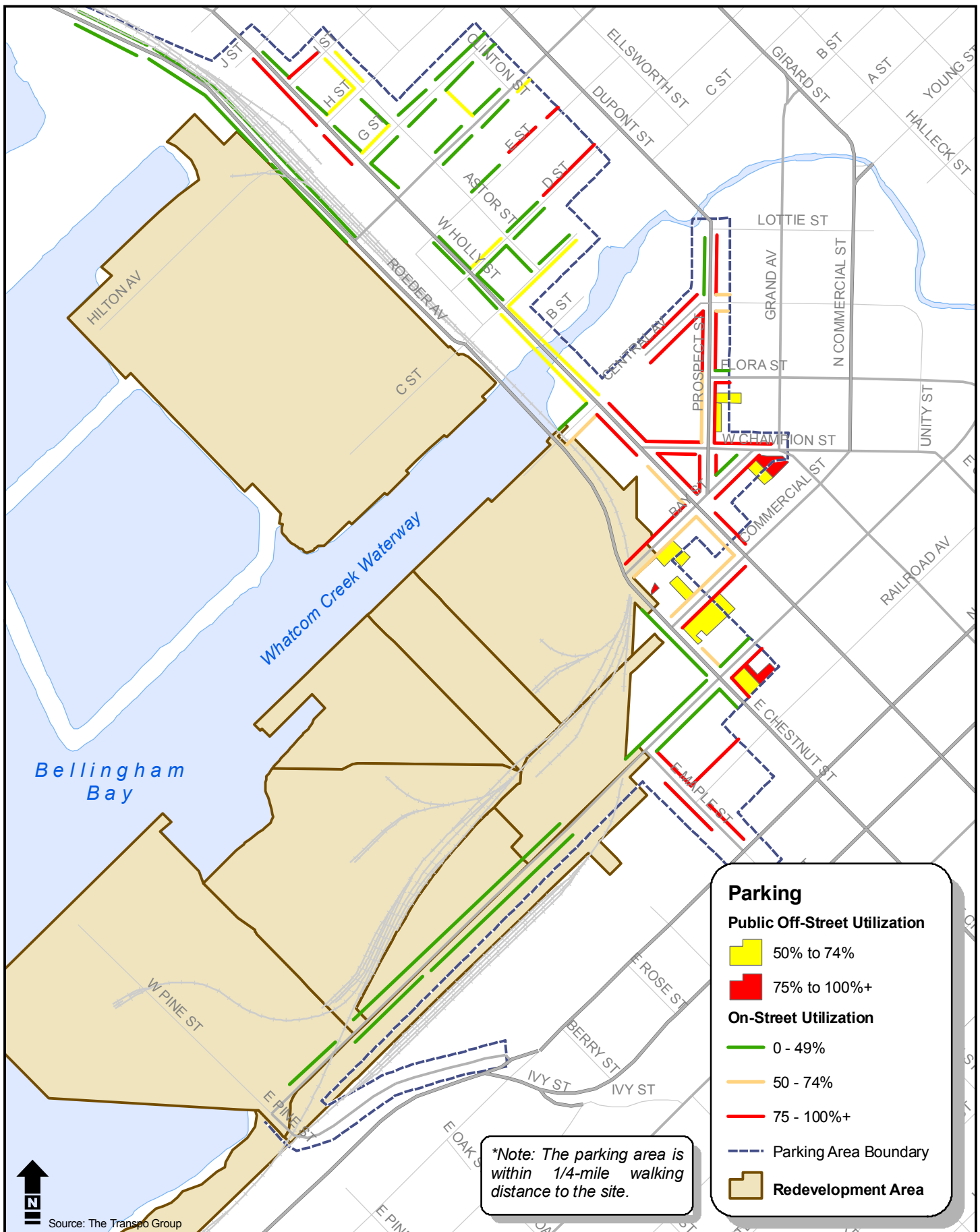


Figure 10
Parking Utilization

Chapter 4: Impacts and Alternatives Comparison

This chapter describes future 2016 and 2026 conditions for the transportation systems within the study area under the No-Action and Action Alternatives. The future transportation system conditions were established based on forecasts consistent with regional planning including the Whatcom Council of Governments and the City of Bellingham. The No-Action Alternative establishes the baseline information for system performance against which the Action Alternatives are compared. For each of the Alternatives, a set of off-site new transportation facilities and services were assumed to be in place by 2016 and 2026 and accounted for in the development of the travel forecasts. Analyses of the Alternatives were evaluated based on a set of performance measures for each of the main modal components, as described previously.

Alternatives Overview

A total of four land use Alternatives have been evaluated, including a No-Action Alternative. The No-Action and Action Alternatives are described in Chapter 1. The No-Action Alternative, which is always discussed first, includes increased industrial and marina uses on the site in compliance with current zoning. The Action Alternatives, which are then discussed from high to low density, include mixed-use redevelopment to include residential, office, industrial, marina, and retail uses as follows:

- Alternative 1 High Density developing 7.5 million square feet of mixed use
- Alternative 2 Medium Density developing 6.0 million square feet of mixed use
- Alternative 3 Low Density developing 4 million square feet of mixed use

Table 13 provides a summary of the land use assumptions under each Alternative by land use type. Detailed information on the land use assumptions for each redevelopment area is provided in Appendix N-4.

No-Action Alternative

The No-Action Alternative assumes that the Proposed Action would not be approved and the site would be used for industrial purposes, consistent with the existing zoning. Additional industrial uses would be developed to provide a total of about 2.2 million square feet of industrial use and a marina with up to 600 berths. Support street system facilities constructed would be limited to upgrading F Street, Hilton Avenue, C Street, and Laurel Street on-site and providing connector streets within redevelopment area 1 to increase circulation. The marina would be open to the public, and limited pedestrian/bicycle facilities would be provided on-site with connections to off-site sidewalks and trails.

Table 13. Land Use Summary by Alternative

Land Use	No-Action Alternative ¹	Alternative 1 (High Density)	Alternative 2/2A (Medium Density)	Alternative 3 (Low Density)
<i>2016 Horizon Year</i>				
Office	-	691,000 sf	488,500 sf	263,000 sf
Institutional	-	285,000 sf	285,000 sf	285,000 sf
Industrial ²	1,097,529 sf	310,000 sf	310,000 sf	310,000 sf
Boat Launch	600 boat slips	460 boat slips	460 boat slips	460 boat slips
Low-Rise Residential	-	153 du	488 du	595 du
Mid-Rise Residential	-	1,456 du	746 du	63 du
High-Rise Residential	-	-	-	0
Retail	-	117,500 sf	86,000 sf	62,400 sf
Restaurant	-	42,500 sf	39,500 sf	17,850 sf
<i>Total</i>				
Commercial³	1,097,529 sf	1,437,000 sf	1,209,000 sf	938,250 sf
Marina	600 boat slips	460 boat slips	460 boat slips	460 boat slips
Residential	-	1,610 du	1,234 du	658 du
<i>2026 Horizon Year</i>				
Office	-	2,345,000 sf	1,785,000 sf	1,130,000 sf
Institutional	-	570,000 sf	570,000 sf	570,000 sf
Industrial ²	2,195,058 sf	450,000 sf	450,000 sf	450,000 sf
Boat Launch	600 boat slips	460 boat slips	460 boat slips	460 boat slips
Low-Rise Residential	-	153 du	500 du	1,067 du
Mid-Rise Residential	-	2,422 du	1,392 du	258 du
High-Rise Residential	-	500 du	458 du	0
Retail	-	355,000 sf	310,000 sf	214,500 sf
Restaurant	-	90,000 sf	65,000 sf	45,500 sf
<i>Total</i>				
Commercial³	2,195,058 sf	3,360,000 sf	3,180,000 sf	2,410,000 sf
Marina	600 boat slips	460 boat slips	460 boat slips	460 boat slips
Residential	-	3,075 du	2,350 du	1,325 du

Source: Collins Woerman (August 2007)

sf = square feet and du = dwelling units

1. The No-Action Alternative land use includes existing support office uses.

2. Includes warehouse, light industrial, marine industrial, and support office uses.

3. Commercial includes office, industrial, retail, and restaurant uses.

Alternative 1: High Density

Alternative 1 provides high-density development of 7.5 million square feet of mixed-use. The high-density development provides more public parks and non-motorized facilities as well as a more extensive transportation system. The more intense development would have a higher traffic demand requiring a more extensive street system to facilitate circulation to/from and within the site.

Alternative 2: Medium Density

Alternative 2 is similar to Alternative 1 except it would develop 6.0 million square feet of mixed-use. Slightly fewer parks and non-motorized facilities would be constructed. The street system would be similar to Alternative 1.

Alternative 3: Low Density

Alternative 3 provides low-density development consisting of 4.0 million square feet of mixed-use. With the comparatively smaller development, parks and non-motorized facilities would be more limited and the street system would be less extensive relative to the other Action Alternatives.

Programmed and Planned Transportation Improvements

The evaluation of the Alternatives includes transportation improvements to both the on-site and off-site study area. This section discusses the improvements that are proposed on-site as part of each Alternative as well as specific off-site improvements which are included in the forecasting assumptions.

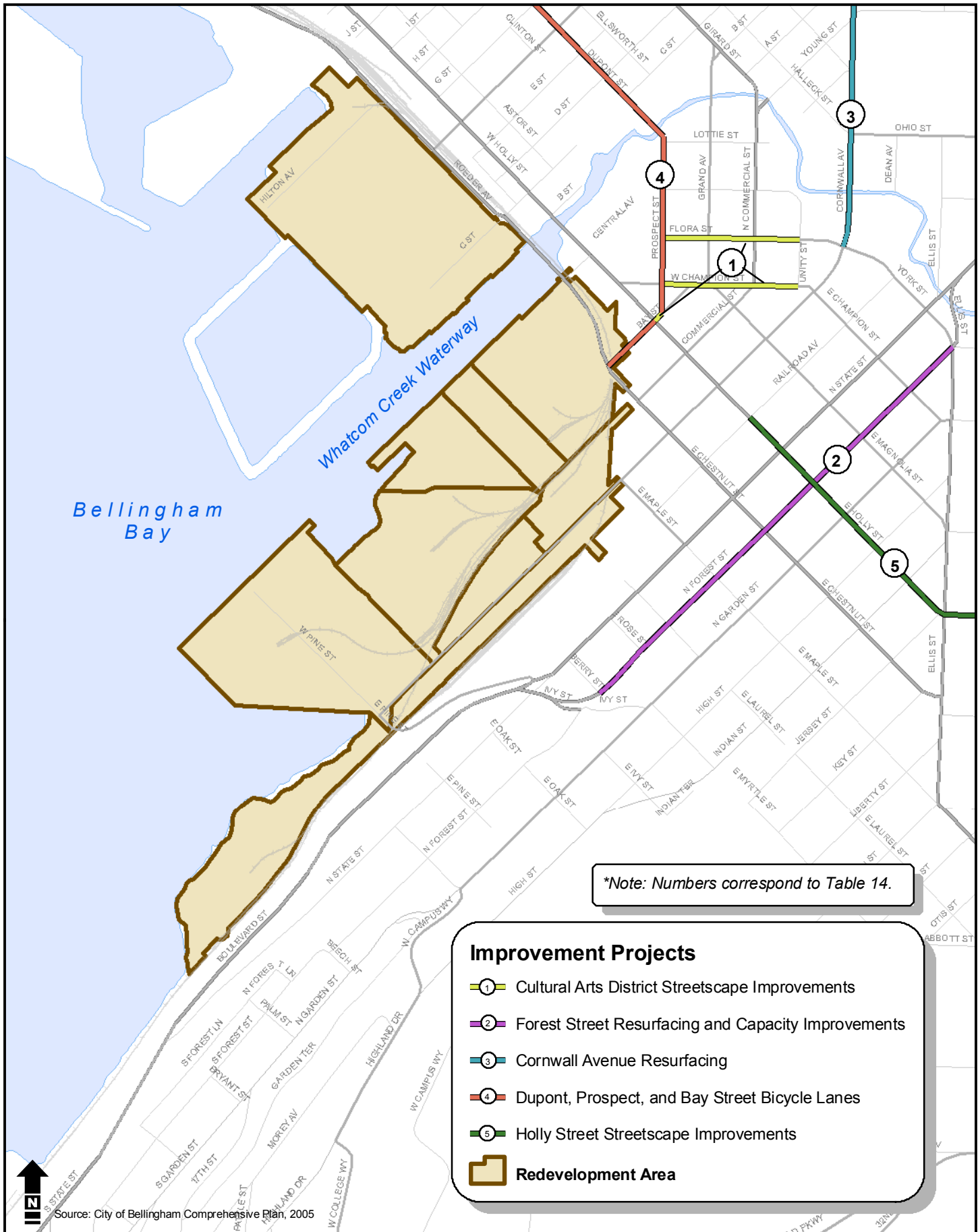
Off-Site

The 2016 and 2026 forecasts for No-Action and Action Alternatives assume a specific set of off-site transportation capital facilities and service improvements that will be completed over the next 11 to 19 years based on the City of Bellingham's 2005 *Comprehensive Plan*. The 2022 travel demand model includes those projects identified in the City's TIP and its 2005 *Comprehensive Plan* which contains a 20-year project list. The new transportation capital facilities and service improvements for the off-site study area are listed in Table 14 and shown in Figure 11.

Table 14. Programmed and Planned Transportation Improvements Assumed to be Complete by 2016 and 2026

Map ID ¹	Improvement	Description	Source	Modes Affected
1	Cultural Arts District Streetscape Improvements (West Champion Street, Bay Street/Holly Street, Flora Street)	Spot sidewalk improvements along Flora Street, on the north side of W. Champion Street, and at the intersection of Bay Street & W. Holly Street.	2008-2013 TIP	Pedestrian Bicycle
2	Forest Street Resurfacing and Capacity Improvement	Resurfacing of roadway, capacity changed to two lanes, installation of bicycle lane, and added pedestrian crossing in high-demand locations.	2008-2013 TIP	Vehicle Pedestrian Bicycle
3	Cornwall Avenue Resurfacing	Resurfacing of Cornwall Avenue between York Street and East North Street.	2008-2013 TIP	Vehicle
4	Dupont Street, Prospect Street, Bay Street Bicycle Lanes	Potential bicycle lane on one side of the roadway and pedestrian enhancements.	Comprehensive Plan 20-Year Project List	Pedestrian Bicycle
5	Holly Street Streetscape Improvements	Design and construct streetscape improvements along Holly Street between Lakeway Drive and Railroad Avenue.	Comprehensive Plan 20-Year Project List	Vehicle Pedestrian Bicycle

Source: City of Bellingham 2008 – 2013 Transportation Improvement Plan and 2005 Comprehensive Plan
1. Numbers correspond to Figure 11.



The City's 20-year project list also includes the following projects:

- Rehabilitation of Holly Street between Broadway Street and Lakeway Drive including safety and efficiency improvements for all modes.
- Consideration of shoulders on Wharf Street between State Street and Cornwall Avenue.
- Completion of the Coast Millennium Trail connecting to South Bay Trail, Railroad Avenue, Chestnut Street, and Roeder Avenue via bike lanes and signs.
- Completion of bike lanes and multi-use trail on Railroad Avenue to connect the South Bay Trail and Whatcom Creek Bridge/Ellis Street trail.
- Improvement of bicycle safety and efficiency on Ohio Street between Cornwall Avenue and I-5 including bike lanes and shoulders.
- Maintaining and enhancing WTA high-frequency transit routes throughout the City of Bellingham.
- Provision of bicycle lanes along Cornwall Avenue between York Street and Illinois Street.
- Improving bicycle safety and efficiency at Lakeway Drive/I-5 and Samish Way/I-5 interchanges
- Provision of transit service along Roeder Avenue/Chestnut Street.

In addition to the projects outlined above, the City TIP includes annual improvements including the pavement resurfacing program, downtown street and sidewalk improvements, and pedestrian crosswalk enhancements. These improvements maintain and enhance existing facilities to ensure adequate driving surface, enhanced multi-modal travel, and a more pedestrian-friendly environment.

On-Site

Infrastructure improvements assumed for each of the Alternatives were developed in coordination with the City, Port, and project team. The street systems proposed with the Alternatives would improve connections to the off-site transportation system as well as access and circulation to and through the site. All of the EIS Alternatives would upgrade the existing Hilton Avenue, F Street, and C Street, as well as provide new connector streets (Maple Street and Chestnut Street) within redevelopment area 1 to serve traffic. In addition, all of the redevelopment Alternatives (1 through 3) would upgrade Laurel Street on-site from Central Avenue to Cornwall Avenue and Cornwall Avenue would be extended into redevelopment area 10 with Alternatives 1, 2, and 3. Table 15 shows the project access and roadway system assumed for each Alternative and Figure 12 illustrates the locations. The numbers in the table and the descriptions below correspond to the figure. The following provides a general description of the assumed roadway infrastructure for the Alternatives:

Redevelopment Area 1

- **Hilton Avenue, F Street, and C Street (1, 2, 3)** – For the No-Action and Action Alternatives, this roadway would be upgraded to provide 8-foot sidewalks on both sides and an 8-foot parking lane on one side. Two 14-foot travel lanes would be provided in each direction which would accommodate both vehicular and bicycle travel. The total right-of-way for these roadways would be 60-feet.
- **Maple Street and Chestnut Street (4)** – For the No-Action and Action Alternatives, this roadway would be built as a connector street within redevelopment area 1. Eight-foot sidewalks on both sides as well as an 8-foot parking lane on one side would be provided on Maple Street. Two 14-foot travel lanes would be provided in each direction which would accommodate both vehicular and bicycle travel. The total right-of-way for these roadways would be 60-feet.

Redevelopment Area 2 through 10

- **Central Avenue (5)** – Alternatives 1 and 2/2A by 2016, and Alternative 3 by 2026, this roadway would be upgraded and extended to Laurel Street. Eight-foot sidewalks on both sides as well as an 8-foot parking lane on one side would be provided. Two 14-foot travel lanes would be provided in each direction which would accommodate both vehicular and bicycle travel. The total right-of-way for this roadway would be 60-feet.
- **Bay Street (6)** – Alternatives 1 and 2/2A by 2016, and Alternative 3 by 2026, the Bay Street Bridge would be constructed and this roadway would extend to Laurel Street. In addition, all Action Alternatives by 2026 would extend this roadway from Laurel Street to Oak Street. This extension would be called Log Pond Road. Eight-foot sidewalks on both sides as well as an 8-foot parking lane on one side would be provided on Bay Street/Log Pond Road. Two 14-foot travel lanes would be provided in each direction which would accommodate both vehicular and bicycle travel. The total right-of-way for this roadway would be 60-feet.
- **Cornwall Avenue/Cornwall Bridge (7, 8)** – The No-Action and Action Alternatives would extend this roadway to redevelopment area 10 to provide access. For Alternative 1 by 2016 and Alternative 2A by 2026, the Cornwall Avenue Bridge would be reconstructed to meet with the Laurel Street Bridge. Alternative 2 would abandon this roadway from Maple Street to Oak Street. However, the No-Action Alternative and Alternative 3 would make no change to this roadway configuration. The ultimate cross-section of Cornwall Avenue with the Action Alternatives would be four lanes (80-foot right-of-way) with room to accommodate bicyclists and sidewalks on both sides just south of Laurel Street and two-lanes (60-foot right-of-way) with sidewalks and room to accommodate bicyclists from south of Laurel Street to redevelopment area 10.
- **Laurel Street/Laurel Street Bridge (9, 10)** – For the No-Action and Action Alternatives, this roadway would be upgraded from Cornwall Avenue

to Whatcom Waterway. The No-Action Alternative would upgrade Laurel Street to a private or Port industrial roadway. The Action Alternative would upgrade this roadway to meet City standards. The ultimate cross-section of Laurel Street with the Action Alternatives would be four lanes (100-foot right-of-way) with room to accommodate bicyclists and sidewalks on both sides. The Laurel Street Bridge would be constructed from Railroad Avenue to the site for Alternative 1 by 2016, Alternative 2 by 2016, and Alternative 2A by 2026. The Laurel Street Bridge would provide two lanes with sidewalks and bicycle lanes on both sides.

It should be noted that when the Laurel Street bridge is constructed, Laurel Street would be approximately 20-feet above the ground at Cornwall Avenue which would influence the applicable street standards, roadway costs (i.e., elevated structures are typically more costly than at-grade roadways), the location of the railroad crossing, and roadway connections. In order to provide a connection between Cornwall Avenue and Laurel Street, Cornwall Avenue would need to be reconstructed to connect with Laurel Street at this higher elevation.

- **Maple Street (12)** – By 2026, Maple Street would be constructed as a connector street within redevelopment area 2 for the Action Alternatives. It would extend from Central Avenue to Commercial Street for Alternatives 1, 2, and 2A and from Central Avenue to Bay Street for Alternative 3. Eight-foot sidewalks on both sides as well as an 8-foot parking lane on one side would be provided on Maple Street. Two 14-foot travel lanes would be provided in each direction which would accommodate both vehicular and bicycle travel. Maple Street will likely be an above grade connection at Bay Street and Commercial Street since these two bridges would not be at-grade until beyond this location. The total right-of-way for this roadway would be 60-feet.
- **Commercial Street (14)** – This roadway currently terminates at Chestnut Street. Alternatives 1, 2, and 2A by 2026 would construct the Commercial Street Bridge into the site and extend this roadway to Oak Street. Eight-foot sidewalks on both sides as well as an 8-foot parking lane on one side would be provided on Maple Street. Two 14-foot travel lanes would be provided in each direction which would accommodate both vehicular and bicycle travel. The total right-of-way for this roadway would be 60-feet.
- **Laurel Street/Commercial Street/Long Pond Road Intersection (13)** – Alternatives 1, 2 and 2A would construct a five-legged intersection by 2026 where Laurel Street, Commercial Street, and Long Pond Road intersect. This intersection is assumed to be controlled by a roundabout with one entering lane and one receiving lane on each approach as well as one circulating lane. Laurel Street would neck down on the southbound approach from two lanes in each direction to one lane in each direction.

This intersection configuration is based on the New Whatcom site *Draft Framework Plan* which did not take into consideration the railroad crossing and Laurel Street being above grade at the Laurel Street/Commercial Street/Log Pond Road intersection. This above grade section would

influence the applicable street standard and roadway costs (i.e., elevated structures are typically more costly than at-grade roadways).

- **Wharf Street/State Street (15)** – Alternative 1 would reconfigure the Wharf Street/State Street intersection, and construct the Wharf Street flyover into the site. The Wharf Street/State Street intersection currently operates as two intersections, this improvement would create one intersection controlled by a roundabout.
- **Oak Street (16)** – This new connector street would be constructed from Bay Street to Cornwall Avenue with the Action Alternatives by 2026. Eight-foot sidewalks on both sides as well as an 8-foot parking lane on one side would be provided on Maple Street. Two 14-foot travel lanes would be provided in each direction which would accommodate both vehicular and bicycle travel. The total right-of-way for this roadway would be 60-feet.

The conceptual street system was developed in coordination with City of Bellingham Public Works staff as well as Port of Bellingham staff. The topography of the site as it relates to upland connections were partially taken into consideration; however, a detailed evaluation was not performed. Therefore, through the master planning process, final concepts for the street standards and general layout of the primary on-site roadways will be designed. Final concepts will take into consideration items such as topography, urban form and traffic calming.

Table 15. 2016 and 2026 Roadway Infrastructure Improvements by Alternative

Map ID ¹	No-Action	Alternative 1 (High Density)	Alternative 2 (Medium Density)	Alternative 2A (Medium Density)	Alternative 3 (Low Density)
2016 Improvements by Alternative					
1		Hilton Avenue – Upgrade			
2		F Street – Upgrade			
3		C Street Upgrade			
4		Maple Street / Chestnut Street – Build connector in redevelopment area 1 ²			
5	Central Avenue – No change	Central Avenue – Upgrade roadway and extend to Laurel Street			Central Avenue – No change
6	Bay Street – No change	Bay Street – Provide bridge and extend roadway to Laurel Street			Bay Street – No change
7	Cornwall Avenue Bridge – No change	Cornwall Avenue Bridge – Reconstruct bridge to meet with Laurel Street bridge	Cornwall Avenue Bridge – Close roadway at railroad between Maple Street and Oak Street	Cornwall Avenue Bridge – No change	Cornwall Avenue Bridge – No change
8	Cornwall Avenue South of Oak Road – No change	Cornwall Avenue South of Oak Road –extend to redevelopment area 10			
9	Laurel Street – Upgrade to Private or Port industrial roadway for Cornwall Avenue to Whatcom Waterway	Laurel Street – Upgrade for Cornwall Avenue to Whatcom Waterway			
10	Laurel Street Bridge – No bridge constructed	Laurel Street Bridge –Build bridge		Laurel Street Bridge – No bridge constructed	
11	Railroad – No change	Relocate railroad		Railroad – No change	

Map ID ¹	No-Action	Alternative 1 (High Density)	Alternative 2 (Medium Density)	Alternative 2A (Medium Density)	Alternative 3 (Low Density)
2026 Improvements by Alternative					
5	Central Avenue – Same as 2016				Central Avenue – Upgrade roadway and extend to Laurel Street
6	Bay Street – Same as 2016				Bay Street – Provide bridge and extend roadway to Laurel Street
7	Cornwall Avenue Bridge – Same as 2016			Cornwall Avenue Bridge – Reconstruct bridge to meet with Laurel Street bridge	Cornwall Avenue Bridge – Same as 2016
8	Cornwall Avenue South of Oak Street – Same as 2016				Cornwall Avenue South of Oak Street –Realign rail-crossing near Wharf Street/Oak Street intersection
10	Laurel Street Bridge – No bridge constructed	Laurel Street Bridge – Same as 2016		Laurel Street Bridge – Build bridge	Laurel Street Bridge – No bridge constructed
11	Railroad – Same as 2016	Railroad – Same as 2016		Relocate railroad	Railroad – Same as 2016
12	Maple Street – Same as 2016	Maple Street – Construct through redevelopment area 2 between Commercial Street and Central Avenue			
13	Bay Street – Same as 2016	Bay Street/Log Pond Road – Extend roadway from Laurel Street to Oak Street			
14	Commercial Street – Same as 2016	Commercial Street – Build bridge and extend roadway to Oak Street			Commercial Street – Same as 2016
15	Wharf Street – Same as 2016	Wharf Street/State Street – Improved intersection and construct flyover	Wharf Street – Same as 2016		
16	Oak Street – Does not exist	Oak Street – Construct from Bay Street to Cornwall Avenue			

Source: Collins Woerman (August 2007)

Note: Information in blue indicates no change in roadway system and information in yellow is a change in the roadway system. .

1. Numbers correspond to Figure 12.

2. Roads do not connect to Maple Street and Chestnut Street off-site.

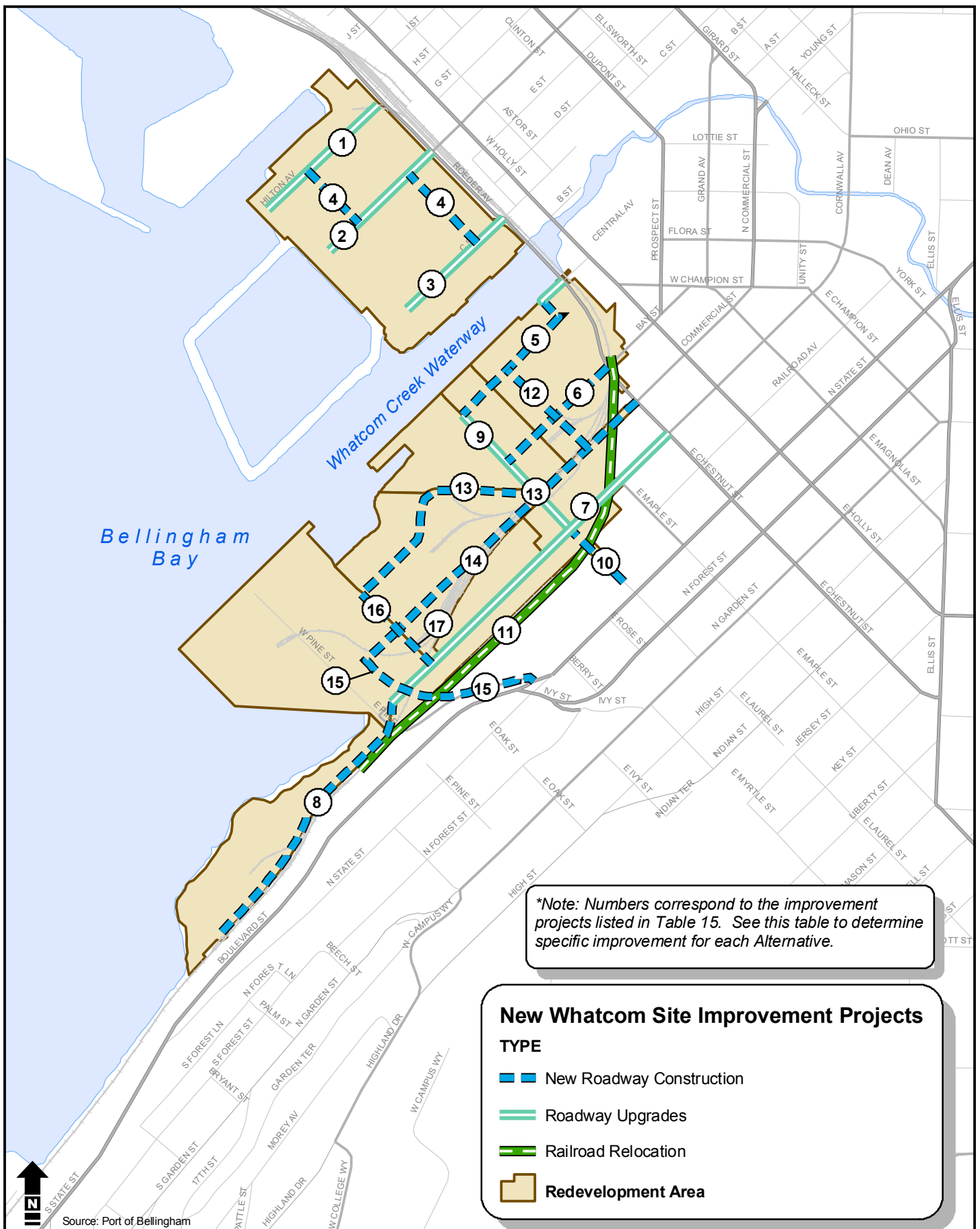


Figure 12
On-Site Infrastructure Improvements

Travel Forecasts

The No-Action and Action Alternatives were evaluated for 2016 and 2026 travel conditions. These conditions assume an increase in travel as a result of forecasted increases in the number of dwelling units and employment in the study area and throughout the region. Consideration was given to planned projects in the New Whatcom study area including Bellwether Phase 2, Bay View Tower, and the Morse Hardware Site Redevelopment. The background travel forecasts are estimated based on the expected number of vehicle trips during the PM peak hour generated by future land use. This information is calculated using the City of Bellingham travel demand model. The model was utilized to forecast the number of vehicles trips in the study area for the No-Action and Action Alternatives based on the 2016 and 2026 horizon years. The resulting forecasts include the improvements listed in Table 14.

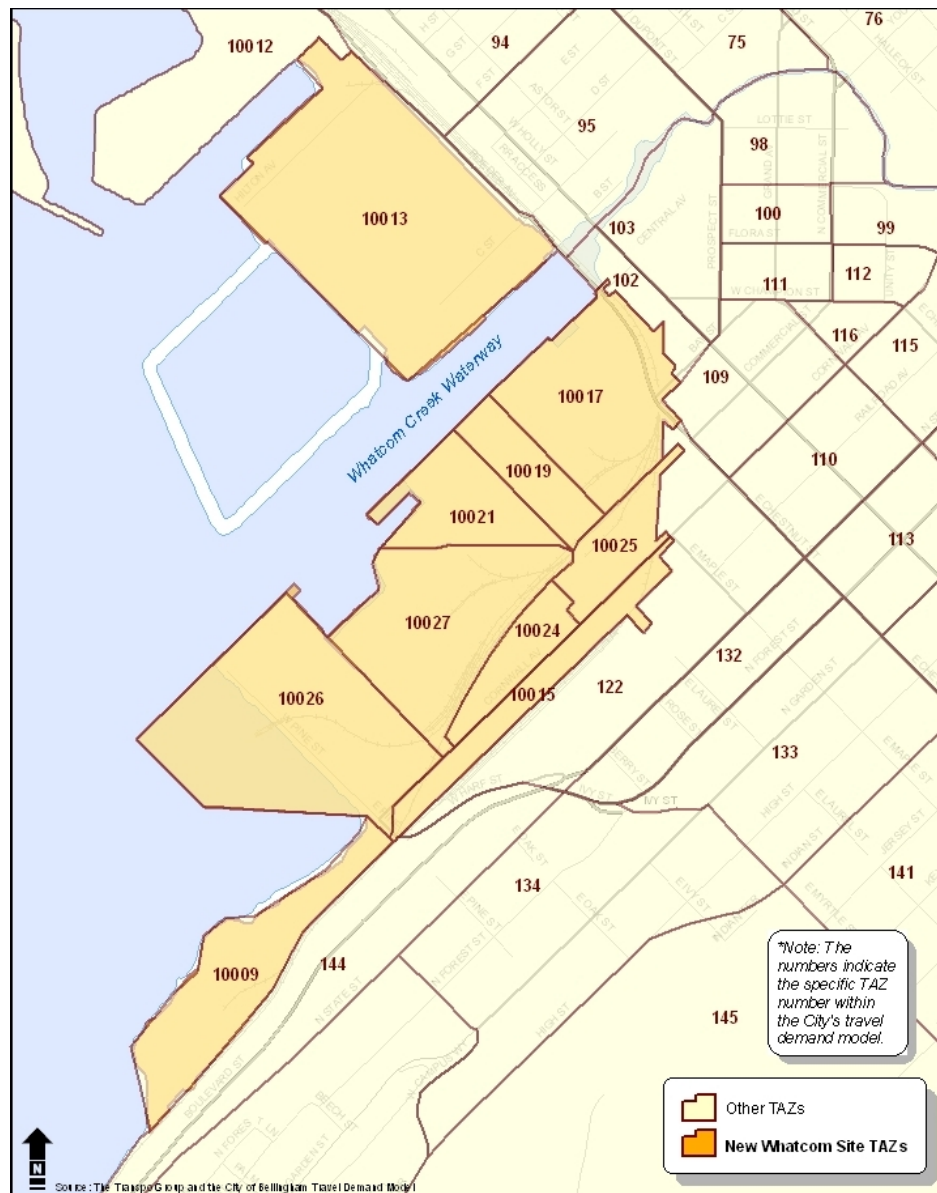
The City of Bellingham model structure and transportation analysis zones (TAZs) were refined in the downtown area to evaluate and consider the New Whatcom Redevelopment Project. Figure 13 provides the approximate boundaries and locations of the respective TAZs. As shown in the figure, the TAZ boundaries are similar to the boundaries of the redevelopment areas. The travel forecasts were developed using the City of Bellingham 2022 travel model and then performing a straight line interpolation to scale dwelling units and employment projections back 6 years for 2016 and forward 4 years for 2026. Once the assumptions for on-site land use were confirmed, the model was run for the No-Action and Action Alternatives. The only modifications to the model for each of the Alternatives included revisions to the on-site land uses and roadway system to reflect the different Alternatives. No other modifications to the model were made under each Alternative.

The City of Bellingham travel demand model is used for forecasting vehicular traffic volumes, and is not sensitive to alternative mode splits including transit, walking, and biking. Therefore, trip generation accounting for mode split was developed outside of the City's model and then introduced into the model.

Trip Generation

Trip generation was calculated for both the weekday AM and PM peak hours for each Alternative. Traffic generated by each Alternative was distributed and assigned to the study area using the City's travel demand model. The following discusses the process for estimating trip generation. First, the No-Action Alternative is discussed, and then the Action Alternatives are discussed. Appendix N-4 provides detailed trip generation calculations.

Figure 13. Study Area Transportation Analysis Zones (TAZ)



No-Action Alternative

The land use for the No-Action Alternative is primarily industrial with marina uses located in redevelopment area 1. The majority of the trips associated with No-Action would be by vehicle since industrial land use is not typically supported by pedestrian, bicycle, and transit modes and improvements. AM and PM peak hour trip generation for the No-Action Alternative was estimated based on average trip rates for size published by the ITE in *Trip Generation* (7th Edition, 2003) for General Light Industrial (Land Use No. 110), Warehousing (Land Use No. 150), and General Office Building (Land Use No. 710). Table 16 shows the estimated No-Action Alternative (2016 and 2026) AM and PM

peak hour vehicle trip generation. Detailed trip generation calculations are provided in Appendix N-4.

Table 16. Estimated No-Action Alternative Vehicle Trip Generation Summary

Scenario	AM Peak Hour Net New Vehicle Trips ¹			PM Peak Hour Net New Vehicle Trips ¹		
	Total	In	Out	Total	In	Out
<i>No-Action 2016</i>						
Total Vehicle Trips ¹	997	847	150	1,120	204	916
Existing Vehicle Trips ^{2,3}	286	236	50	276	59	217
Net New No-Action Trips	711	611	100	844	145	699
<i>No-Action 2026</i>						
Total Vehicle Trips ¹	1,933	1,665	268	2,115	338	1,777
Existing Vehicle Trips ^{2,3}	286	236	50	276	59	217
Net New No-Action Trips	1,647	1,429	218	1,839	279	1,560

Source: The Transpo Group (July 2007)

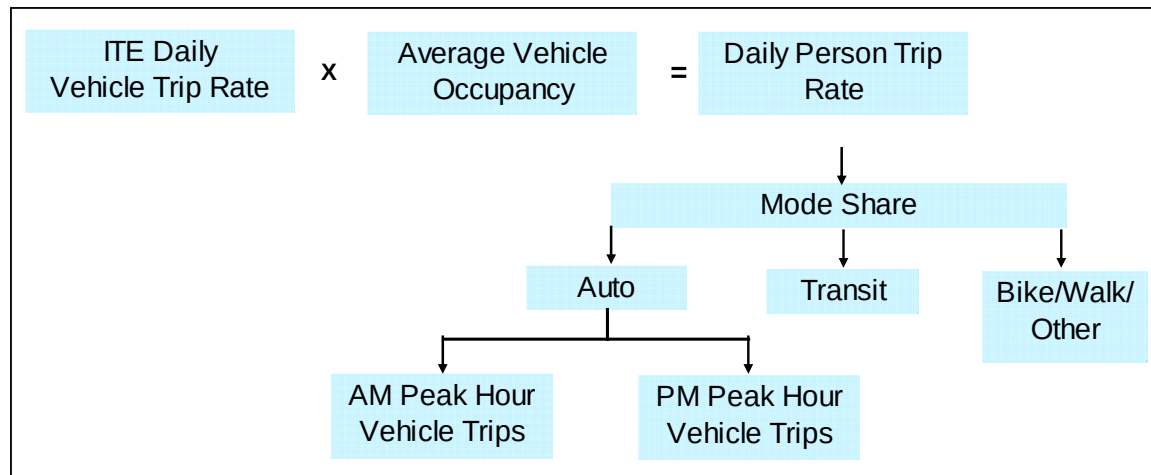
1. Trips based on ITE rates from *Trip Generation*, 7th Edition using size of use in 1,000 square feet.
2. Trips based on ITE rates from *Trip Generation*, 7th Edition using employee information provided by the Port of Bellingham.
3. The existing trips include the Georgia Pacific (GP) Tissue Mill which is expected to be closed in 2007; therefore, the existing site trip generation would likely decrease after the GP closure.

As shown in the table, the No-Action Alternative would generate approximately 700 net new AM peak hour trips and approximately 800 net new PM peak hour trips in 2016. In 2026, the vehicular trip generation is expected to nearly double with about 1,600 net new AM peak hour trips and about 1,800 net new PM peak hour trips. In both 2016 and 2026, the No-Action PM peak hour vehicular trip generation would generate about 200 more net new trips than the AM peak hour.

Action Alternatives

Trip generation for the Action Alternatives was based on calculating person trips and then estimating the portion of person trips that would be vehicle trips. Most ITE trip generation rates used are for suburban locations and may over-predict the number of vehicle trips in a downtown environment. Typically in a downtown environment, a larger portion of trips can be served by other modes such as walking and transit given a mix of development and level of transit service. The Action Alternatives would create an urban environment; therefore, for purposes of this analysis, the trip generation considers alternative modes. The number of vehicle trips generated by each Alternative was calculated by converting daily person trips to peak hour person trips and then separating the person trips into various modes of travel (auto, transit, and walk/other). Figure 14 provides a flow chart illustrating the trip generation process which is described in detail below.

Figure 14. Trip Generation Process



Daily person trip rates were developed based on ITE's *Trip Generation* and average vehicle occupancy. Average vehicle occupancy was based on ITE's *Trip Generation* as well as the City of Bellingham's 2000 US Census journey to work data. The census data indicate an average vehicle occupancy of 1.08 during the work commute periods. The daily vehicle-trip rate was multiplied by the average vehicle occupancy for each land use to determine the daily person-trip rate. Table 17 summarizes the assumptions and daily person trip-rates for each land use category.

Table 17. Assumptions for Calculating Daily Person Trip Generation Rate

Land Use	Generation Rate Units (Trips Per)	ITE Daily Vehicle-Trip Rate ¹	Average Vehicle Occupancy ²	Calculated Daily Person-Trip Rate
Office (#710)	1,000 square feet	11.01	1.10	12.11
Institutional / Research & Development (#760)	1,000 square feet	8.11	1.10	8.92
Light Industrial (#110)	1,000 square feet	6.97	1.30	8.36
Residential (#220)	per dwelling unit	6.72	1.20	8.06
Retail (#820)	1,000 square feet	42.94	1.20	51.53
Restaurant (#932)	1,000 square feet	127.15	1.52	193.27
Marina (#420) ³	boat slip	2.96	1.50	4.44

Source: The Transpo Group (July 2007)

1. Trips rates from ITE *Trip Generation*, 7th Edition.

2. Average vehicle occupancy based on ITE *Trip Generation*, 7th Edition and 2000 United States Census.

3. Marina includes boat launch and transient moorage.

Daily person trips for each mode were determined based on the daily person-trip rates shown in the table as well as the land use sizes and an estimated mode share. The mode share for each Alternative was based on a review of the 2000 US Census journey to work data, *Bellingham Travel Mobility Behavior Study* (Federal Transit Administration, 2004), Washington State Department of Transportation (WSDOT) Commute Trip Reduction Surveys updated January 2006, as well as 2015 and 2022 mode share goals from the *Bellingham Comprehensive Plan*. These sources indicate that the existing citywide mode share for automobile ranges from about 84 to 87 percent while transit ranges from about 2 to

4 percent and bicycle/walk/other ranges from about 10 to 12 percent. The City's mode share goals are to reduce the automobile share over the next 20 years. For 2015, the City's goal is 80 percent automobile use, 4 percent transit use, and 16 percent bicycle/walk/other use. For 2022, the City's goal is 75 percent automobile use, 6 percent transit use, and 19 percent bicycle/walk/other. Table 18 shows the mode share assumptions for each land use for both 2016 and 2026 conditions.

Table 18. Daily Mode Share Assumptions

Land Use	Automobile ¹	Transit ¹	Bicycle/Walk/ Other ¹
2016			
Office / Institutional	82%	4%	14%
Light Industrial	82%	4%	14%
Marina	92%	2%	6%
Residential	77%	5%	15%
Retail	77%	5%	15%
Restaurant	77%	5%	15%
2026			
Office / Institutional	80%	5%	15%
Light Industrial	80%	5%	15%
Marina	90%	5%	5%
Residential	75%	6%	19%
Retail	75%	5%	20%
Restaurant	75%	5%	20%

Source: The Transpo Group (July 2007)

1. Based on 2000 United States Census journey to work data, Federal Transit Administration's 2004 *Bellingham Travel Mobility Behavior Study*, WSDOT's 2006 Commute Trip Reduction Surveys and mode share goals for 2015 and 2022 in *Bellingham Comprehensive Plan*.

As shown in the table, the mode share assumed for each use is within the range of the existing data and the City's comprehensive plan goals.

Evaluation of transit and pedestrian/bicycle operations is based on daily person trips; however, the street system analysis is based on peak hour vehicle trips. Daily person trips were converted to AM and PM peak-hour vehicle trips using the ratio between the ITE daily trip and peak-hour trip rates for each land use. Table 19 summarizes the percent of daily trips during the AM and PM peak hours.

Table 19. Percent of Daily Trips during Peak Hours

Land Use	AM Peak Hour	PM Peak Hour
Office (#710)	14%	14%
Institutional / Research & Development (#760)	15%	13%
Light Industrial (#110)	13%	14%
Residential (#220)	8%	9%
Retail (#820)	2%	9%
Restaurant (#932)	9%	9%
Marina (#420)	3%	6%

Source: The Transpo Group (July 2007) calculated from ITE *Trip Generation*, 7th Edition

As shown in the table, the AM peak hour is about 2 to 15 percent of the daily trips and the PM peak hour is about 6 to 14 percent.

Consideration was also given to internal trips that would occur between uses within the site. Due to the layout of the site and the difficulty of driving between certain on-site areas, it was assumed that a portion of the internal trips would be by walking, bicycling, or other alternative modes that would not generate additional vehicular traffic. The internal non-vehicular trip reduction was based on ITE's *Trip Generation Handbook* (June 2004) and *Trip Generation for Mixed-Use Development* (ITE Journal, February 1987, Colorado-Wyoming Section Technical Committee-Trip Generation). ITE's methodology shows internal trips would account for approximately 10 percent of the total vehicle traffic generated by each Alternative while the ITE Journal article shows about 25 percent internal trips for mixed-uses. Based on this information, an internal trip reduction of about 10 percent during the AM peak hour and 15 percent during the PM peak hour was assumed. This is a conservative estimate due to the site's proximity to downtown and its size. With large mixed-use projects such as this one there are more opportunities for people to live/work on-site as well as use many of the other amenities rather than driving off-site.

The street system analysis focuses on the weekday peak hour. For the purposes of this analysis, peak hour trips to and from the public parks were assumed to be walking, bicycling or via other alternative modes that would not generate additional vehicular traffic. It is likely the public parks would have the highest trip generation during weekday off-peak hours or on weekends.

A summary of estimated AM and PM peak hour vehicle trip generation for each Action Alternative is shown in Table 20. Detailed trip generation calculations are provided in Appendix N-4.

Table 20. Estimated Action Alternatives Vehicle Trip Generation Summary

Scenario	AM Peak Hour Net New Vehicle Trips ¹			PM Peak Hour Net New Vehicle Trips ¹		
	Total	In	Out	Total	In	Out
<i>Alternative 1 – High Density</i>						
Net New Trips 2016 ²	1,959	1,201	758	2,212	878	1,334
Net New Trips 2026 ²	5,033	3,481	1,551	5,713	1,967	3,746
<i>Alternative 2/2A – Medium Density</i>						
Net New Trips 2016 ²	1,551	946	604	1,746	704	1,042
Net New Trips 2026 ²	3,940	2,751	1,188	4,538	1,541	2,997
<i>Alternative 3 – Low Density</i>						
Net New Trips 2016 ²	905	581	324	1,055	390	665
Net New Trips 2026 ²	3,352	2,361	991	3,887	1,319	2,568

Source: The Transpo Group (July 2007)

1. Vehicle trips were estimated based on person trips for each land use.
2. The net new trips account for the existing trips on-site including the Georgia Pacific (GP) Tissue Mill which is expected to be closed in 2007. With the GP closure, the existing site trip generation would likely decrease.

As shown in the table, the proposed Action Alternatives generate between 900 and 2,200 net new peak-hour vehicle trips at the 2016 horizon year and between 3,400 and 5,700 net new peak-hour vehicle trips at the 2026 horizon year. The 2016 horizon year would generate about 20 to 40 percent of the net new peak-hour vehicle trips projected for 2026.

When comparing the AM and PM peak-hour trip generation, all the Alternatives generate fewer net new trips during the AM peak hour. The AM peak hour generates about 85 to 90 percent of the PM peak hour net new vehicle trips. This is different from the existing industrial uses where the AM and PM peak hour generate approximately the same amount of vehicle trips. Due to the fact that the AM peak-hour traffic generation for all Alternatives (i.e., No-Action and Action Alternatives) is less than the PM peak-hour traffic generation and a comparison of the existing traffic volumes indicates this as well, this study focuses on the PM peak-hour projections which present a conservative estimate of traffic impacts.

Trip Distribution and Assignment

The allocation or distribution of trips among the various TAZs in the model was estimated using the destination choice mode (gravity model) which allocates trips based on impedances between the TAZs. The travel characteristics within the study area under 2016 and 2026 conditions are similar to the 2022 horizon year. For site trips generated during the PM peak hour under 2016 conditions, approximately 35 percent of the trips are heading to the north, 20 percent to the south, 5 percent to the east, and 40 percent are within the downtown and Western Washington University areas. Figure 15 shows the general trip distribution pattern for 2016. For site trips generated during the PM peak hour under 2026 conditions, approximately 45 percent of the trips are heading to the north, 15 percent to the south, 10 percent to the east, and 30 percent are within the downtown and Western Washington University areas. Figure 16 shows the general trip distribution pattern for 2026. Travel patterns between 2016 and 2026 change slightly due to the future growth anticipated in the City of Bellingham and Whatcom County. Most of the future development, within the City, is anticipated north of the site; therefore, as these areas develop, more vehicle trips would originate or be destined for north of the site.

The trip assignment model estimates the volume of trips on the City's transportation system. Intersection turning movements at the study intersections are extracted from the model, and where necessary, adjustments were made to the traffic volumes to account for balancing and appropriate shifts in traffic volumes.

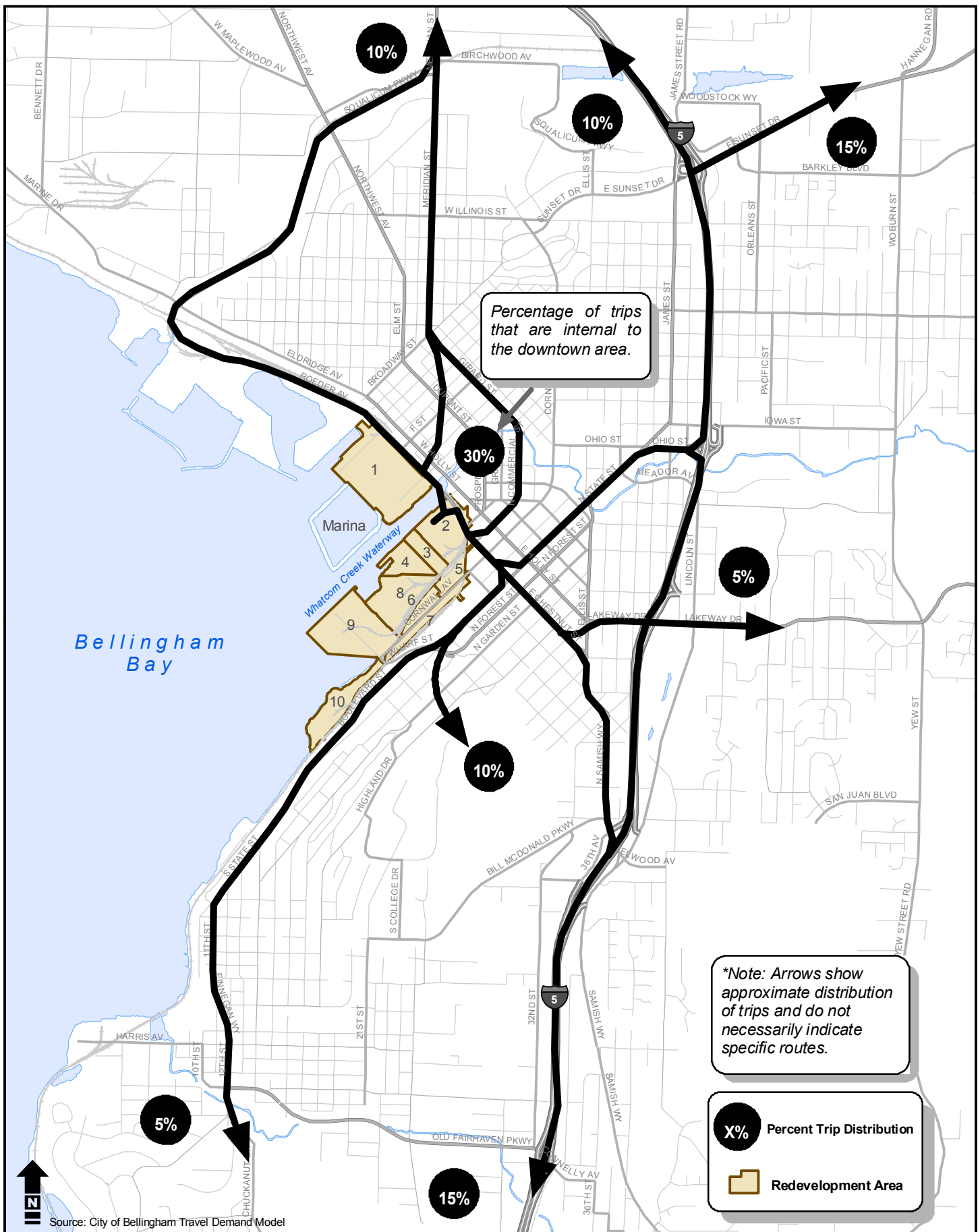
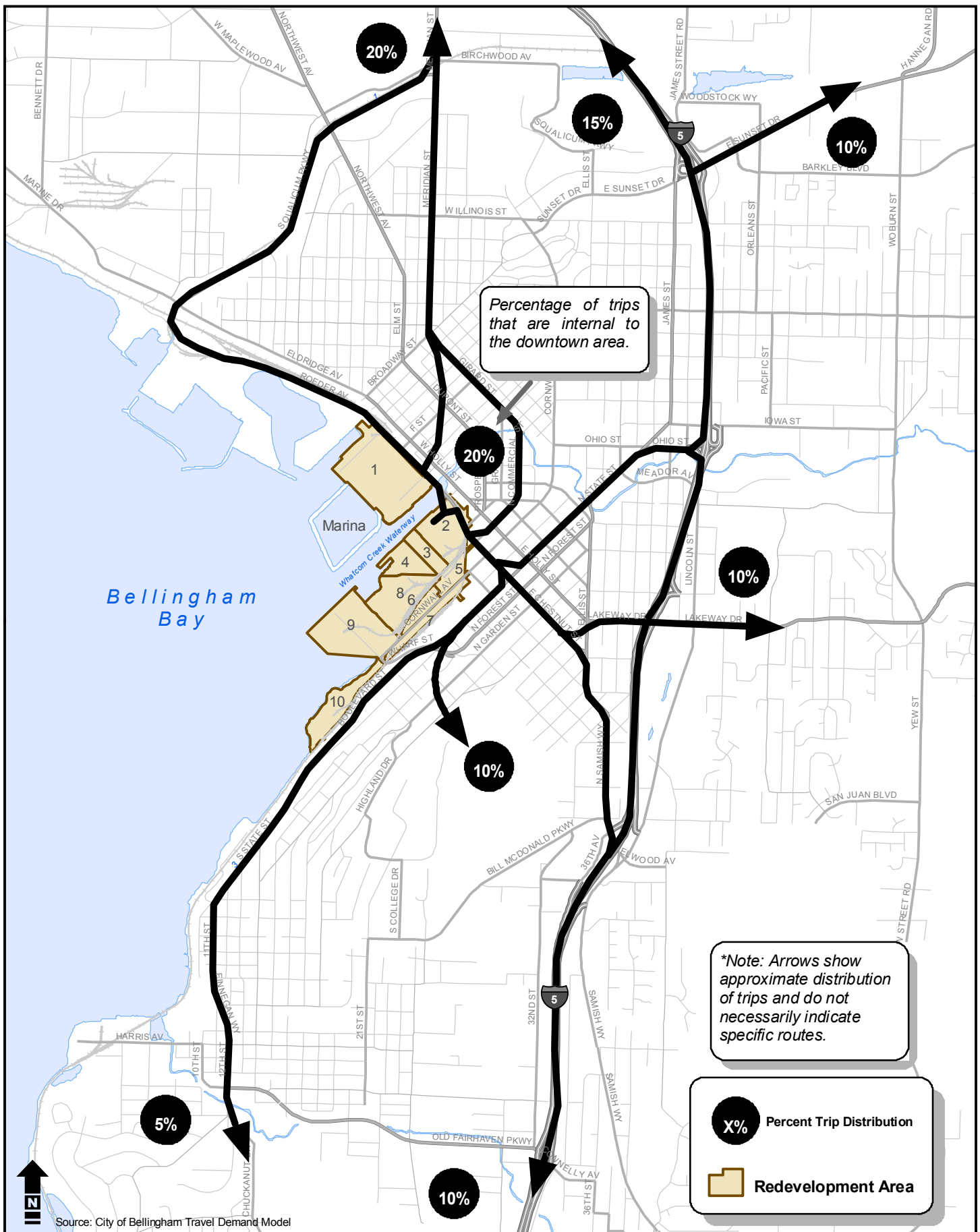


Figure 15
2016 Site Trip Distribution



Parking

The proposed redevelopment is intended to be an extension of Bellingham's downtown which, based on *City of Bellingham Municipal Code Chapter 20.12.010 Parking*, has no parking requirements. Therefore, this study determined the peak parking demand and recommended supply and then compared it to the proposed parking supply to determine if each Alternative would accommodate its expected parking demand. This same procedure was used for both the No-Action and Action Alternatives.

Due to the size of the site, parking was analyzed in parking sub-areas to take into account shared parking that might occur between different redevelopment areas and acknowledge that shared parking would not likely occur between redevelopment areas that are not easily accessible by walking (i.e., persons might drive to another area of the site and park again). The five parking sub-areas evaluated were redevelopment area 1; redevelopment areas 2, 3, and 5; redevelopment areas 4, 6, 7, and 8; redevelopment area 9; and redevelopment area 10. Redevelopment area 1 takes into account the marina use. It should be noted that these parking sub-areas are artificial boundaries and persons may be willing to walk further between the site and other destinations. Transportation industry research indicates that typically persons are willing to walk up to 1/4-mile.

The parking demand and supply calculations are discussed below. The discussion on parking supply focuses on both proposed and recommended supply.

Demand

To determine the weekday parking demand from the five parking sub-areas, first the peak hour parking demand was calculated for each land use within the sub-area and then the hourly (6:00 am to 12:00 am) parking demand was estimated for each land use. Weekday peak parking demand typically occurs mid-day for the proposed land uses except for the residential uses where peak parking demand would occur at about 6:00 am and 10:00 pm. The parking analysis focuses on the period between 6:00 am and 12:00 am which ensures that the peak parking demand is captured for all proposed land uses. By determining the hourly parking demand for each individual land use within the sub-area, the hour of the day with the highest parking demand for the entire parking sub-area is found. The highest parking demand for the entire parking sub-area plus a design safety factor is considered the recommended parking supply which the site should accommodate. The following section discusses how the peak-hour and hourly parking demand were calculated.

Peak-hour and hourly parking demand were calculated for each Alternative using Institute of Transportation Engineers' (ITE) *Parking Generation* (3rd Edition) and Urban Land Institute's (ULI) *Shared Parking* (2nd Edition). It was assumed that there were no restrictions and parking was available to fully share among all uses except for residential uses. For residential uses, one parking space per residential unit was assumed to be reserved and the remaining spaces per residential unit (i.e., approximately 0.5 spaces per unit) were assumed to be available for sharing. This translates into 70 percent of the

residential parking being reserved and 30 percent of the residential parking being available for sharing.

ITE parking rates were used to calculate the peak parking demand for each individual land use. Parking rates for urban locations were used when available since the site would be integrated within the downtown. Key assumptions in estimating peak parking demand included:

- The institutional parking rate is based on the office land use because the facility is assumed to be used for research. This is conservative estimate of peak parking demand because classroom uses would generate less parking demand.
- The restaurant parking rate is based on the average of the Quality Restaurant (#931) and High Turnover Sit Down Restaurant (#932) parking rates.

Table 21 summarizes the peak hour parking rates by land use.

Table 21. Peak Parking Demand Rates

Land Use	Rate ¹
Office (#701)	2.40 vehicles per square foot
Institutional (#701) ²	2.40 vehicles per square foot
Industrial / Warehouse (#110)	0.75 vehicles per square foot
Residential (#230)	1.46 vehicles per dwelling unit
Retail (#820)	2.65 vehicles per square foot
Restaurant (#931 and #932) ³	10.48 vehicles per square foot
Marina (#420) ⁴	0.27 vehicles per slip

Source: ITE *Parking Generation*, 3rd Edition.

1. Parking rates are for weekday, non-December, urban locations where available.

2. Based on office land use (#701) because institutional use will be a research facility.

3. Based on average of Quality Restaurant (#931) High Turnover Sit Down Restaurant (#932) parking rates.

4. Marina contains a boat launch with five to eight lanes and transient moorage.

The hourly parking demand (i.e., percent of the peak parking demand per hour) from 6:00 am to 12:00 am was estimated for each land use using ITE *Parking Generation* 3rd Edition as well as ULI's *Shared Parking* and site specific surveys when ITE data were not available. These sources typically provide hourly parking demand from about 6:00 am to 12:00 am; however, there are cases where ITE does not provide hourly parking demand or only has information for a limited time period. ULI's *Shared Parking* and site-specific surveys were used to supplement the ITE data. Key assumptions for the hourly parking demand include:

- **Industrial Use:** No hourly parking demand for industrial uses is provided in ULI's *Shared Parking* and ITE data is limited to 7:00 am to 4:00 pm. Therefore, the percent of peak parking demand at 6:00 am was assumed to be the same as 7:00 am and from 5:00 pm to 12:00 am it was assumed to be the same as ITE's office (#701) land use. This is a conservative estimate of parking demand since it is likely that the parking demand at 6:00 am would be less than the demand at 7:00 am. In addition, it is likely that the industrial use parking demand from 5:00 pm to 12:00 am would be less than or about the same as the office parking demand.

- **Residential Use:** ITE does not provide hourly parking demand from 9:00 am to 3:00 pm for residential uses. The percent of peak hour parking demand from 6:00 am to 8:00 am and 3:00 pm to 12:00 am was derived based on the general trends from ULI's *Shared Parking*. Both ITE and ULI hourly parking demand from data 9:00 am to 3:00 pm were compared and then straight line interpolation was used to determine what the hourly demand would be between 6:00 am to 8:00 am and 3:00 pm to 12:00 am.
- **Restaurant Use:** The hourly parking demand for restaurant is based on ITE's High Turnover Sit Down Restaurant (#932).
- **Marina Use:** ITE does not provide hourly parking demand for marina use and there is limited survey data. Therefore, the hourly parking demand for the marina is based on available data from *Transportation Impact Analysis Kenmore (Boat Launch) Access Redevelopment Kenmore, WA* prepared by The Transpo Group in September 2003. Although the facility is smaller than the proposed marina, it is a similar use and provides a good basis for hourly parking demand.

Consideration was also given to internal trips which would not require an additional parking space. Due to the layout of the site it is likely that users would park once and walk, bicycle, or use other alternative modes between land uses. For example, an office worker is likely to park in the morning and walk to the restaurants and retail uses during breaks. As discussed previously, ITE's *Trip Generation Handbook* methodology estimates about 10 percent of the site trips would be internal. Therefore, hourly parking demand for the retail and restaurant uses were reduced by 10 percent to account for patrons walking, bicycling, or using other Alternative modes. This is a conservative estimate of the potential number of internal trips since other sources indicate it could be as high as 25 percent.

Using the assumptions above and the calculated peak hour parking demand, the hourly parking demand from 6:00 am to 12:00 am was calculated for each land use. After calculating the hourly parking demand for each individual land use, a total parking demand per hour for the entire sub-area is determined by summing the hourly parking demand for each individual land use. The one-hour between 6:00 am to 12:00 am with the highest hourly parking demand is considered the peak hour of the entire sub-area and is the parking demand which the proposed parking supply should accommodate. Detailed parking calculations are provided in Appendix N-5.

Supply

This section discusses both proposed and recommended parking supply. The proposed parking supply is the number of parking spaces that would be provided on-site while the recommended parking supply is the calculated number of parking spaces needed to serve the peak demand.

Proposed Supply

The proposed parking supply was developed by Collins Woerman in coordination with the project team including The Transpo Group. The proposed supply was calculated by

multiplying the size of each proposed land use component by number of spaces allocated per 1,000 square feet. Table 22 shows proposed parking supply allocation rates by land use type. As shown in the table, depending on the land use type, 1 to 3 spaces are recommended per 1,000 square feet of development. A total of 368 parking spaces would be provided for the marina including 280 spaces for marina users and 88 spaces for boat trailers.

Table 22. Proposed Parking Supply Allocation Rates

Land Use	Allocation Rate ¹
Office	3 spaces per 1,000 square feet
Institutional	2 spaces per 1,000 square feet
Industrial / Warehouse	1 spaces per 1,000 square feet
Residential	1.5 spaces per 1,000 square feet
Retail	3 spaces per 1,000 square feet
Restaurant	3 spaces per 1,000 square feet
Marina	368 spaces per marina

Source: Collins Woerman (August 2007)

The proposed parking supply is for planning and analysis purposes. It represents parking rates the City and the Port could adopt for the New Whatcom area. However, based on the conclusions of this analysis, it is assumed that the City and the Port would adjust the parking rates to ensure the proposed parking supply meets the needs of the New Whatcom site.

Recommended Supply

The recommended parking supply or practical capacity is determined by applying a design safety factor to the hour with the highest parking demand. This safety factor allows for some reserve spaces to ensure vehicles circulating the parking area can find a space. It also accounts for peak surges and vehicles leaving parking spaces.

Recommended parking supply was calculated assuming a safety factor of 10 to 15 percent applied to the parking demand for each land use. Ten to fifteen percent is industry standard based on Robert A. Weant and Herbert S. Levinson, *Parking* (reprinted 2003). Therefore, if the proposed parking supply for each parking sub-area is within the recommended parking supply range then the Alternative is considered to have adequate parking. Parking demand and supply for each Alternative are discussed in detail in the operational impacts section.

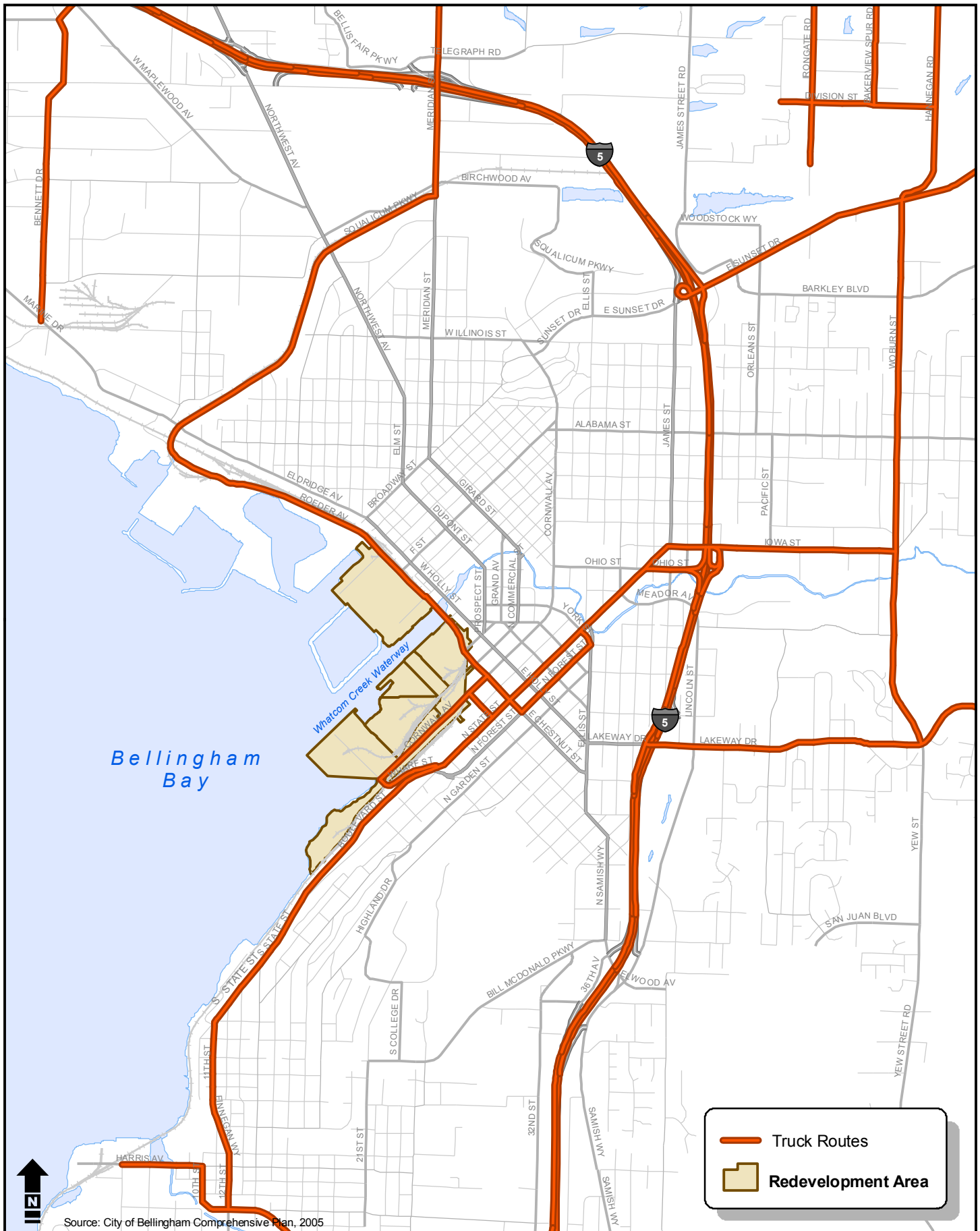
Construction Impacts

The New Whatcom redevelopment would be constructed over a 20 year period with an interim phase in 2016 and full build-out by 2026. Fill and other materials as well as equipment would be brought to the site via barge and/or truck. The likely scenario would be that much of the material would be brought via barges. However as a conservative estimate, this study assumes construction traffic would use the street system and consist of trucks bringing and removing equipment and materials as well as construction employees coming to and from the site. As a result, there would be a substantial amount of truck traffic bringing dirt/fill material to the site during some

periods. Construction traffic may be intermittently heavy during construction but overall would be less than traffic generated by build-out of the site.

David Evans and Associates provided information on the estimated cubic yards of cut and fill that would be transported to and from the site. This information shows that there would not be a substantial difference between the cut and fill for the No-Action and Action Alternatives in terms of the number of trucks required for hauling the material. Up to 700,000 cubic yards of material would be hauled to and from the site. Assuming this material is hauled evenly over the 20-year construction period and the site operates 5 days per week, about 34 daily truck trips (17 inbound and 17 outbound) are expected. If the site operates with 10 hour construction shifts, and trucks are distributed evenly over the shift then there would be about 3 truck trips during the PM peak hour. The number of construction workers is unknown at this time; however, the workers would generate substantially less traffic than the projected 1,800 to 5,700 net new PM peak hour trips expected with the Alternatives. Therefore, impacts of construction traffic are expected to be the less than the impacts of the Alternatives.

Truck traffic associated with the construction would use the City's existing truck routes shown in Figure 17. Truck routes are provided along major corridors within the City including I-5, Squalicum Parkway, State Street, Forest Street, Iowa Street, and Lakeway Drive. Along the site frontage, truck routes are provided on Roeder Avenue, Chestnut Street, and Cornwall Avenue. Based on the City's existing truck routes, the recommended haul route to the site would be via the I-5/Iowa Street interchange, State Street/Forest Street, and either Roeder Avenue or Cornwall to enter/exit the site. The trucks using these routes would temporarily increase conflicts between truck traffic and other travel modes during the construction period. Chapter 5 will discuss strategies for mitigating impacts of construction traffic.



Source: City of Bellingham Comprehensive Plan, 2005

Figure 17
Existing Truck Routes

Operations Impacts

This section discusses the operations for the No-Action and Action Alternatives for both 2016 and 2026 conditions. Both on-site and off-site operations are discussed relative to the transportation system including the street system, non-motorized facilities, transit, rail, and parking. These impacts are evaluated using the methodologies described in Chapter 2 and elaborated on above. First the No-Action operations are discussed and then the Action Alternative operations are discussed and compared to the No-Action Alternative to determine if there are significant operational impacts.

No-Action

The No-Action Alternative assumes development of approximately 1.1 million square feet of industrial and supporting uses in 2016 and an additional 1.1 million square feet of development in 2026, for a total of 2.2 million square feet of development. The site would remain with its current industrial zoning and improvements to the transportation system would mostly concentrate within redevelopment area 1 where a 600 boat slip marina would be developed. The No-Action Alternative would generate approximately 800 net new PM peak hour vehicle trips in 2016 and an additional 1,000 net new PM peak hour vehicle trips in 2026, for a total of 1,800 vehicle trips. This section first discusses 2016 No-Action on-site and off-site operations and then 2026 No-Action on-site and off-site operations.

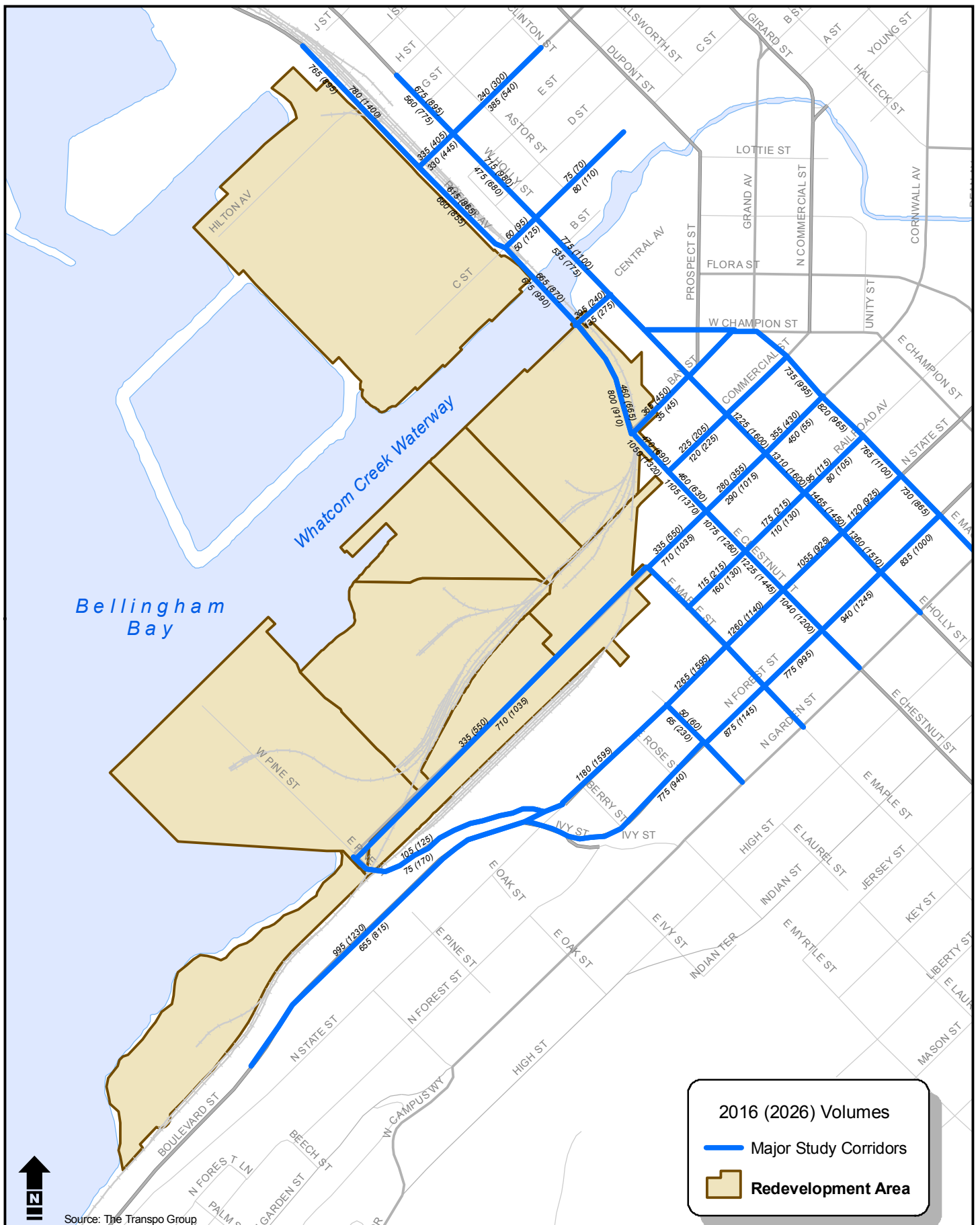
2016

The evaluation of 2016 No-Action operations for each mode illustrates how the transportation system would operate if the redevelopment areas' zoning remained industrial and the site continued with industrial use and the planned marina. The No-Action 2016 conditions are the baseline against which the 2016 Action Alternatives are measured.

As discussed previously, transportation improvements consistent with the City of Bellingham's 2008-2013 TIP and 2005 *Comprehensive Plan* were incorporated into the City's travel demand model used to determine the forecasts for all the Alternatives. In addition, the No-Action 2016 on-site transportation system would remain the same as existing except that connector streets called Maple Street and Chestnut Street would be provided in redevelopment area 1 to facilitate circulation. Other existing on-site roadways would be upgraded to standards adopted as part of the master planning process.

Street System

The No-Action 2016 PM peak-hour travel forecasts were used to evaluate roadways and intersections to gain an understanding of how the street system would operate. Figure 18 presents traffic volumes for the street system on-site and within the downtown for the No-Action 2016 conditions. As discussed previously, impacts to the street system is measured by determining roadway and intersection LOS.



Source: The Transpo Group

Figure 18
No Action PM Peak Hour Traffic Volumes

Roadway and intersection levels of service were calculated for the No-Action 2016 conditions. These calculations used the same variables (e.g., number of lanes, traffic control) as were used in evaluating existing conditions. Tables 23 and 24 summarize the No-Action 2016 on-site and off-site roadway and intersection operations. The tables present analyses for locations which were identified to operate at LOS E or worse under one or more of the alternatives (see Appendix N-1 for evaluation of all locations). Appendix N-3 contains detailed LOS worksheets for No-Action 2016 peak hour conditions.

Table 23. No-Action PM Peak Hour On-Site Roadway and Intersection Operations

Roadways ¹	No-Action 2016			No-Action 2026		
	LOS ²	Volume	V/C ³	LOS ¹	Volume	V/C ³
Roeder Avenue – Broadway Street to F Street (SEB)	D	765	0.82	E	895	0.95
Roeder Avenue – Broadway Street to F Street (NWB)	D	780	0.83	F	1,400	1.49
Roeder Avenue – F Street to C Street (SEB)	C	680	0.72	E	855	0.91
Roeder Avenue – F Street to C Street (NWB)	B	615	0.66	E	865	0.92
Roeder Avenue – C Street to Central Avenue (SEB)	C	675	0.72	F	990	1.06
Roeder Avenue – C Street to Central Avenue (NWB)	C	665	0.71	E	870	0.93
Roeder Avenue – Central Avenue to Bay Street (SEB)	D	800	0.85	E	910	0.97
Roeder Avenue – Central Avenue to Bay Street (NWB)	A	460	0.49	C	665	0.71
Central Avenue – Laurel Street to Roeder Avenue (NEB)	-	-	-	-	-	-
Commercial Street – Laurel Street to Maple Street (NEB)	-	-	-	-	-	-
Cornwall Avenue – Wharf Street to Maple Street (NEB)	D	710	0.87	F	1,035	1.27
Cornwall Avenue – Maple Street to Chestnut Street (NEB)	D	710	0.87	F	1,035	1.27
Intersections ¹	LOS ²	Delay ⁴	V/C ⁵ or	LOS ²	Delay ⁴	V/C ⁵ or
			WM ⁶			WM ⁶
1. Roeder Avenue/Hilton Avenue	F	84	NB	F	>200	NB
2. Roeder Avenue/F Street	D	48	0.69	F	100	0.90
3. Roeder Avenue/C Street	F	114	NB/SB	F	>200	NB/SB
4. Roeder Avenue/Central Avenue	F	>200	NB/SB	F	>200	NB/SB
5. West Chestnut Street/Bay Street/Roeder Avenue	F	>200	SBL	F	>200	SBL
7. East Chestnut Street/Cornwall Avenue	E	57	1.09	F	>200	1.47

Source: The Transpo Group (August 2007)

Notes: **Bold:** Indicates locations operating below existing LOS standards. SEB = southeastbound; NWB = northwestbound; NEB = northeastbound

- Operations are shown for locations which operate at LOS E or worse for one more of the New Whatcom Site Alternatives (see Appendix N-1 for a complete summary).
- Level of service, based on 2000 *Highway Capacity Manual* methodology.
- Volume-to-capacity ratio reported for roadway segments per direction.
- Average delay in seconds per vehicle.
- Volume-to-capacity ratio reported for signalized intersections.
- Worst movement for unsignalized intersections. This is not applicable (NA) to all-way stop controlled intersections.

The Bay Street and Commercial Street intersections would not provide direct access to the site for No-Action 2016 conditions; however, these would provide access to the site with Action Alternatives so they are included in the on-site analysis. As shown in Table 23, all of the roadway segments providing access to the site operate better than the City's LOS E standard in 2016. However most of the site access intersections along Chestnut Street and Roeder Avenue would operate at LOS F for the No-Action 2016 conditions.

Table 24. No-Action PM Peak Hour Off-Site Roadway and Intersection Operations

Roadways ¹	No-Action 2016			No-Action 2026		
	LOS ²	Volume	V/C ³	LOS ¹	Volume	V/C ³
Holly Street – Broadway Street to F Street (SEB)	B	560	0.69	E	775	0.95
Holly Street – Broadway Street to F Street (NWB)	D	675	0.83	F	895	1.10
Holly Street – F Street to Central Avenue (SEB)	A	475	0.58	D	680	0.84
Holly Street – F Street to Central Avenue (NWB)	D	715	0.88	F	980	1.21
Holly Street – Central Avenue to Champion Street (SEB)	B	535	0.66	E	775	0.95
Holly Street – Central Avenue to Champion Street (NWB)	E	775	0.95	F	1,100	1.35
Cornwall Avenue – Chestnut Street to Holly Street (NEB)	A	290	0.36	F	1,015	1.25

Intersections ¹	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶
1. Meridian Street/Birchwood Avenue	E	65	0.87	F	128	1.01
2. Meridian Street/Squalicum Way	D	42	0.63	D	53	0.73
6. West Holly Street/F Street	C	25	0.67	C	33	0.89
7. West Holly Street/ C Street	F	127	SB	F	>200	NB/SB
8. Cornwall Avenue/Flora Street/York Street	C	21	0.75	D	41	0.93
11. East Chestnut Street/Railroad Avenue	F	168	SB	F	>200	SB
15. Lakeway Drive/Ellis Street/Jersey Street/East Holly Street	D	37	0.85	D	55	0.96
16. Lakeway Drive/I-5 Southbound Ramps	D	38	0.93	F	98	1.16
17. Lakeway Drive/King Street	D	47	0.78	E	69	0.84
18. Lakeway Drive/Lincoln Street	D	47	0.90	E	68	1.07
19. Iowa Street/Moore Street/I-5 Northbound Ramps	D	47	0.99	E	74	1.11
21. North State Street/James Street/Iowa Street	F	>200	2.59	F	>200	2.98
22. North State Street/Ohio Street	D	37	0.85	E	67	1.03
24. North State Street/East Laurel Street	D	27	EB	F	81	WB
25. North Forest Street/ North State Street/Boulevard Street/Wharf Street ⁷						
a. North Forest Street/North State Street/Boulevard Street	D	28	SBL	F	51	SBL
b. North State Street/Wharf Street	C	21	EB	E	39	EB
26. North Forest Street/East Laurel Street	C	20	EB	F	95	EB
28. South Samish Way/Elwood Avenue/Lincoln Street	C	34	0.85	E	64	1.07

Source: The Transpo Group (August 2007)

Notes: **Bold:** Indicates locations operating below existing LOS standards. SEB = southeastbound; NWB = northwestbound; NEB = northeastbound

- Operations are shown for locations which operate at LOS E or worse for one more of the New Whatcom Site Alternatives (see Appendix N-1 for a complete summary).
- Level of service, based on 2000 *Highway Capacity Manual* methodology.
- Volume-to-capacity ratio reported for roadway segments per direction.
- Average delay in seconds per vehicle.
- Volume-to-capacity ratio reported for intersections.
- Worst movement for unsignalized intersections. This is not applicable (NA) to all-way stop controlled intersections.
- This intersection operates as two separate intersections in the field; therefore, the analysis was conducted as such.

For the off-site street system, Table 24 shows the following for No-Action 2016 conditions:

- All off-site roadway segments would operate at LOS E or better.
- Holly Street/C Street and Chestnut Street/Railroad Avenue intersections currently operate at LOS E or better; however, with future No-Action 2016 growth these intersections would operate at LOS F.
- The State Street/James Street/Iowa Street intersection would continue to operate poorly for No-Action 2016 conditions.

Non-Motorized

Sidewalks are provided along the site frontage on Roeder Avenue, Chestnut Street, and portions of Cornwall Avenue; these would provide access for pedestrians and bicyclists between the site and the downtown area. On-site a limited amount of sidewalks, crosswalks, and trails would support pedestrian and bicycle travel within the development. However, the pedestrian and bicycle facilities would mostly be concentrated around improving access to the proposed marina and no substantial facilities are planned within redevelopment areas 2 through 10.

Future sidewalk and crossing improvements as well as bicycle lanes and route enhancements are planned as part of the City's 2008-2013 TIP and *2005 Comprehensive Plan*. In the vicinity of the site, these include sidewalk and safety improvements along Roeder Avenue as well as other pedestrian and bicycle improvements in downtown. The City is also planning a pedestrian bridge from redevelopment area 10 to Boulevard Park, as a separate action, which would provide pedestrian access from the site to the South Bay Trail.

The site would not be very conducive to pedestrian and bicycle travel except where improvements are provided to improve access to the marina. Industrial areas are not likely to have as much pedestrian and bicycle activity coming to and departing from the site except for employees who might access downtown for shopping and/or lunch.

Transit

The evaluation focuses on the expected growth in transit ridership and the impacts on the local bus routes under each of the Alternatives. Transit stops are currently planned along Roeder Avenue in the vicinity of the site as part of the WTA *Six-Year Strategic Service Plan*. There are no planned transit stops on-site.

It is unknown how much the total ridership and seating capacity of WTA would increase in the future. The City's goal is to encourage the use of alternative transportation modes, where possible. This will help reduce the need for costly capacity improvements to the street system required by high automobile use. According to the City's *2005 Comprehensive Plan*, over the next 20-years the City aims to increase the transit mode share by 4 percent; however, WTA's *Six-Year Strategic Service Plan* anticipates ridership will grow faster than the population. Studies have already shown that from 2001 to 2002, transit ridership for fixed-route services increased by 6 percent per year. In addition, WTA seating capacity in January 2008 will be increased from 10,400 to 11,500 seats per day which is a 10 percent per-year increase from 2007 to 2008. (WTA indicated in a communication to Transpo that transit seating capacity has increased consistently by about 7 to 10 percent per year

over the last several years; however, as a conservative estimate, WTA expects downtown seating capacity to increase by about 4 percent per year.) This study assumes that the growth in transit ridership includes development of the No-Action Alternative since redevelopment of the New Whatcom site is part of the City's *2005 Comprehensive Plan*.

Assuming WTA ridership will increase by 6 percent per year, as it did from 2001-2002, the existing downtown boardings per day of 10,400 per day would increase to about 17,600 boardings per day by 2016 including riders generated by development of the No-Action Alternative. Seating capacity for 2016 is estimated by assuming a conservative increase of 4 percent per year. Therefore, by 2016 the seating capacity would be about 15,600 seats per day. The passenger loading ratio would be about 1.13 (17,600 boardings per day divided by 15,600 seats per day) for No-Action 2016 which meets WTA's standard of 1.25 for seating capacity.

Rail

The evaluation of rail focuses on at-grade crossings and the safety and operations of these crossings. At-grade crossings are intersections where a roadway crosses railroad tracks at the same level or grade. Currently there are eight freight trains and four passenger trains which use the BNSF railway running within the site. These trains currently do not operate during the PM peak hour; however, the off-peak hours are impacted by rail operations. It is likely the number of trains operating on this railway would increase as freight and passenger demand increase in the future; however, the number of trains that would operate in the future is unknown. BNSF typically adds one or two trains every five to ten years⁷. Therefore, the increased usage of the rail would increase the instances when intersections experience long delays and queues as the rail passes through the intersections. In addition, access to/from the New Whatcom site would be limited at certain times of the day potentially causing additional delays to emergency response vehicles.

For No-Action 2016 conditions, five at-grade crossings would remain—one would be located internal to the site at Laurel Street and four would be located at the site accesses at F Street, C Street, Central Avenue, Cornwall Avenue and Wharf Street/Pine Street. Currently the C Street crossing does not have a gate, which is a potential safety issue for vehicles, pedestrians, and bicyclists. The No-Action Alternative would maintain controlled gates at the Laurel Street rail crossing.

At both gated and non-gated locations as vehicular, pedestrian, and bicycle traffic crossing the railroad is increased, the chances of conflicts and potential safety issues with trains are also increased. At-grade crossings also increase delays to vehicular traffic that must stop as trains pass through intersections.

Parking

The majority of parking for the No-Action Alternative would be located on-site. For each Alternative the proposed parking supply is evaluated to determine if it can accommodate the parking demand. The No-Action Alternative would provide 1,454

⁷ Based on conversations with Burlington Northern Santa Fe Railway in May 2007.

parking spaces in 2016. Detailed parking calculations are provided in Appendix N-5. Table 25 summarizes the parking demand and supply for No-Action 2016.

Table 25. No-Action 2016 Alternative Parking Demand and Supply

Parking Sub-Area	Hourly Parking Demand ¹	Proposed Parking	Recommended Supply Range ²		Parking Surplus Range	
1	287	547	316	330	232	217
2, 3, 5	292	352	321	336	31	16
4, 6, 7, 8	263	350	289	302	61	48
9	147	174	162	169	12	5
10	<u>23</u>	<u>31</u>	<u>25</u>	<u>26</u>	<u>5</u>	<u>4</u>
Total	1,012	1,454	1,113	1,164	341	290

Source: Collins Woerman and The Transpo Group (August 2007)

1. Hourly parking demand represents the maximum hourly demand within the parking sub-area.

2. Recommended supply is 10 to 15 percent more than the parking demand to reduce vehicles re-circulating through the parking areas.

As shown in the table, the parking demand for the No-Action Alternative is about 1,000 vehicles which can be accommodated by the 1,454 proposed parking spaces. As discussed earlier, the hourly parking demand is increased by a safety factor to estimate the recommended supply that would accommodate peak surges and vehicles leaving parking spaces. The recommended parking supply for the No-Action Alternative by 2016 is between approximately 1,100 to 1,200 parking spaces. The proposed parking supply provides about 290 to 340 more spaces than the recommended parking supply.

The New Whatcom site would be developed to accommodate the site's parking demand. However, it is likely that some users of the site would park off-site when visiting multiple destinations in the area. Based on the parking utilization survey, there are currently about 570 available off-site parking spaces within ¼-mile of the site. Since a majority of the vehicles would park on-site there would be minimal impacts to off-site parking.

2026

The evaluation of 2026 No-Action operations for each mode illustrates how the transportation system would operate if the redevelopment areas industrial zoning remained unchanged and the site continued with industrial and marina uses only. The No-Action 2026 conditions form the baseline against which the 2026 Action Alternatives are measured.

This section discusses No-Action 2026 conditions both on-site and off-site for the different modes. For ease of understanding the analysis, the discussion focuses on how No-Action 2026 conditions would be different than No-Action 2016. The No-Action 2026 off-site on-site transportation system would be the same as No-Action 2016 conditions.

Street System

The No-Action 2026 PM peak hour travel forecasts were used to evaluate roadways and intersections to gain an understanding of how the on-site street system would operate.

Figure 18 presents traffic volumes for the street system on-site and in the vicinity of the site for the No-Action 2026 conditions. As discussed previously, impacts to the street system is measured by determining roadway and intersection LOS.

Tables 23 and 24, shown previously, present a summary of the No-Action 2026 roadway and intersection operations. Appendix N-3 contains detailed intersection LOS worksheets for future without-project peak hour conditions. The entire roadway segment analysis is presented in Appendix N-1.

With the increase in vehicular trips in 2026 due to future growth and development of the site, the No-Action Alternative would degrade the following roadways and intersections to LOS F:

- Roeder Avenue between Broadway Street and F Street in the north-westbound direction
- Roeder Avenue between C Street and Central Avenue in the south-eastbound direction
- Cornwall Avenue between Wharf Street and Chestnut Street in the north-eastbound direction
- Holly Street between Broadway Street and Champion Street in the north-westbound direction
- Cornwall Avenue between Chestnut Street and Holly Street in the north-eastbound direction
- Roeder Avenue/F Street
- Chestnut Street/Cornwall Avenue
- Meridian Street/Birchwood Avenue
- Lakeway Drive/I-5 Southbound Ramps
- State Street/Laurel Street
- State Street/Forest Street/Boulevard Street
- Forest Street/Laurel Street

All other roadway and intersections would have similar operations to No-Action 2016 conditions.

It should be noted that with or without the No-Action Alternative in both 2016 and 2026 some roadways and intersections currently operating at LOS E or better would degrade to LOS F due to future growth in the study area. In addition, the No-Action Alternative would degrade some locations to LOS F because additional development is proposed on-site, beyond what exist, and no roadway improvements are proposed.

Non-Motorized

The No-Action Alternative in 2026 would generate additional pedestrian and bicycle travel with the increase in New Whatcom development as well as future growth within the study area. No additional pedestrian or bicycle facilities would be constructed by 2026 beyond those discussed for the No-Action 2016 conditions. Therefore, No-Action 2026 non-motorized impacts may be worse than No-Action 2016 since conflicts with pedestrians and bicyclists would increase proportionally as vehicular traffic volumes increase, and the ability to walk and bike between the site and downtown would remain limited.

Transit

As discussed previously, the evaluation focuses on the expected growth in transit ridership and the impacts on the local bus routes under each of the Alternatives. Based on the methodology discussed previously to forecast transit ridership and seating capacity, there would be approximately 31,500 boardings per day and 23,100 seats per day by 2026. The passenger loading ratio would be about 1.36 (31,500 boardings per day divided by 23,100 seats per day) for No-Action 2026 which exceeds WTA's current standard of 1.25. Therefore, it is likely that WTA would increase the seating capacity to meet the transit demand. However, for the purposes of this analysis, the Action Alternatives in 2026 are considered to impact the transit system if conditions would require more transit capacity than the No-Action Alternative.

Rail

Rail operations on-site under the No-Action 2026 conditions would be similar to the No-Action 2016 conditions because no additional at-grade crossings would be constructed. However, as discussed previously, as vehicular, pedestrian, and bicycle traffic crossing the railroad is increased, the chances of conflicts and potential safety issues with trains are also increased.

Parking

The No-Action Alternative would provide 2,517 parking spaces by 2026. Detailed parking calculations are provided in Appendix N-5. Table 26 summarizes the parking demand and supply for the No-Action Alternative.

Table 26. No-Action 2026 Alternative Parking Demand and Supply

Parking Sub-Area	Hourly Parking Demand ¹	Proposed Parking	Recommended Supply Range ²		Parking Surplus Range	
1	433	764	476	498	270	248
2, 3, 5	604	746	664	695	82	52
4, 6, 7, 8	481	641	529	553	111	87
9	260	305	286	299	19	6
10	58	77	64	67	13	11
Total	1,836	2,517	2,020	2,111	493	401

Source: Collins Woerman and The Transpo Group (August 2007)

1. Hourly parking demand represents the maximum hourly demand within the parking sub-area.

2. Recommended supply is 10 to 15 percent more than the parking demand to reduce vehicles re-circulating through the parking areas.

As shown in the table, the parking demand for the No-Action Alternative is about 1,800 vehicles which can be accommodated by the proposed parking supply. The recommended parking supply for the No-Action Alternative is between about 2,000 to 2,100 parking spaces. The proposed parking supply provides about 400 to 493 more spaces than required by the recommended parking supply. As noted previously, the project would provide parking to accommodate the parking demand and the impacts to off-site parking would be minimal.

Alternative 1 High Density

Alternative 1 would develop approximately 3.4 million square feet of mixed-use development in 2016 and an additional 4.1 million square feet of development in 2026, for a total of 7.5 million square feet of development. Alternative 1 would generate approximately 2,200 net new PM peak hour vehicle trips in 2016 and an additional 3,500 net new PM peak hour vehicle trips in 2026, for a total of 5,700 vehicle trips. This section first discusses 2016 Alternative 1 on-site and off-site operations and then 2026 Alternative 1 on-site and off-site operations. Operations are compared to the No-Action Alternative to determine the impacts of Alternative 1.

2016

The evaluation of Alternative 1 2016 operations and comparison to the No-Action 2016 conditions illustrates the expected transportation environment with Alternative 1 as well as how the transportation system would operate relative to No-Action conditions. For the 2016 phase of the project, Alternative 1 would generate approximately 2,200 net new PM peak hour vehicle trips which is approximately 1,400 more net new PM peak hour vehicle trips than the No-Action Alternative by 2016.

As discussed previously and shown in Table 15, Alternative 1 would provide substantial improvements to the on-site transportation system within all redevelopment areas to support its expected trip generation. Key roadway infrastructure improvements by 2016 would include those discussed for the No-Action 2016 conditions as well as:

- Upgrading Central Avenue and extending it to Laurel Street

- Constructing the Bay Street Bridge and extending this roadway to Laurel Street
- Upgrading Laurel Street and constructing a bridge into the site
- Reconstructing the Cornwall Avenue Bridge to meet with the Laurel Street Bridge
- Extending Cornwall Avenue to redevelopment area 10
- Relocation of the railroad

The site would provide a substantial park and trail system as well as sidewalks, crosswalks, and accommodations for bicyclists within the street right-of-way. The off-site transportation system for Alternative 1 by 2016 would be the same as the No-Action Alternative transportation system.

Street System

Figure 19 presents traffic volumes for the street system on-site and in the vicinity of the site for Alternative 1 2016 conditions. Alternative 1 2016 PM peak-hour travel forecasts were used to evaluate on- and off-site roadways and intersections to gain an understanding of how the street system would operate. The major infrastructure improvement, discussed above, provide additional access to the site to support the increase in vehicle trips.

Impacts to the street system are measured by determining roadway and intersection LOS. Tables 27 and 28 provide a comparison of No-Action and Alternative 1 2016 on-site and off-site roadway and intersection operations⁸. With the roadway improvements provided with Alternative 1 2016, there would be additional intersections on-site along Laurel Street and Cornwall Avenue which would not be constructed under the No-Action 2016 Alternative.

⁸ Appendix B provides detailed intersection LOS worksheets for Alternative 1 2016 PM peak hour conditions. Appendix E provides the entire roadway segment analysis.

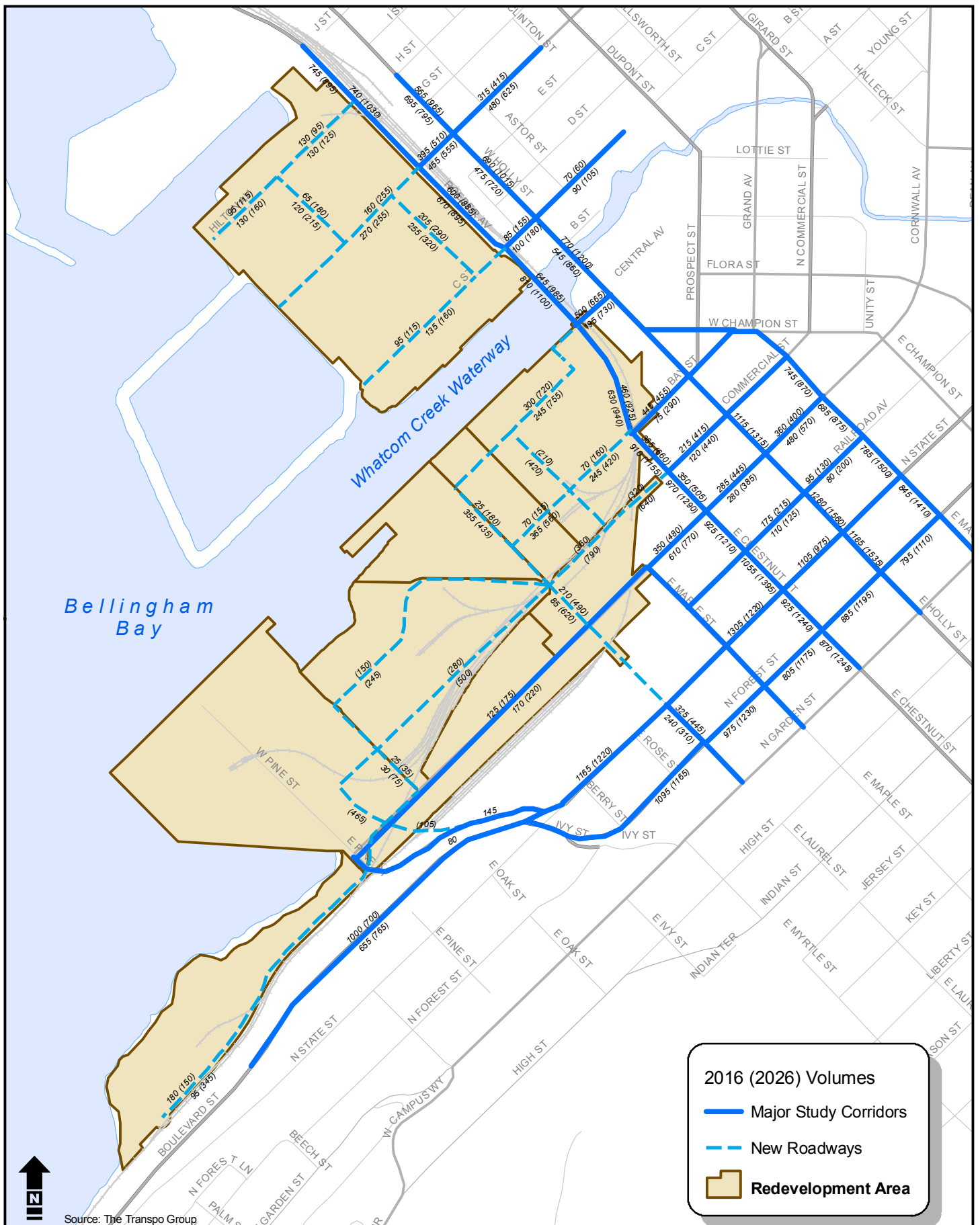


Figure 19
Alternative 1 PM Peak Hour Traffic Volumes

New Whatcom
Redevelopment EIS

Table 27. 2016 No-Action and Alternative 1—PM Peak Hour On-Site Roadway and Intersection Operations

Roadways ¹	No-Action			Alternative 1		
	LOS ²	Volume	V/C ³	LOS ²	Volume	V/C ³
Roeder Avenue – Broadway Street to F Street (SEB)	D	765	0.82	C	745	0.79
Roeder Avenue – Broadway Street to F Street (NWB)	D	780	0.83	C	740	0.79
Roeder Avenue – F Street to C Street (SEB)	C	680	0.72	C	670	0.71
Roeder Avenue – F Street to C Street (NWB)	B	615	0.66	B	600	0.64
Roeder Avenue – C Street to Central Avenue (SEB)	C	675	0.72	D	810	0.86
Roeder Avenue – C Street to Central Avenue (NWB)	C	665	0.71	C	645	0.69
Roeder Avenue – Central Avenue to Bay Street (SEB)	D	800	0.85	B	630	0.67
Roeder Avenue – Central Avenue to Bay Street (NWB)	A	460	0.49	A	460	0.49
Central Avenue – Laurel Street to Roeder Avenue (NEB)	-	-	-	A	245	0.30
Commercial Street – Laurel Street to Maple Street (NEB)	-	-	-	-	-	-
Cornwall Avenue – Wharf Street to Maple Street (NEB)	D	710	0.87	A	170	0.21
Cornwall Avenue – Maple Street to Chestnut Street (NEB)	D	710	0.87	C	610	0.75

Intersections ¹	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶
1. Roeder Avenue/Hilton Avenue	F	84	NB	F	>200	NB
2. Roeder Avenue/F Street	D	48	0.69	D	50	0.79
3. Roeder Avenue/C Street	F	114	NB/SB	F	>200	SB
4. Roeder Avenue/Central Avenue	F	>200	NB/SB	F	>200	NB
5. West Chestnut Street/Bay Street/Roeder Avenue	F	>200	SBL	F	>200	SBL
7. East Chestnut Street/Cornwall Avenue	E	57	1.09	C	28	0.93

Source: The Transpo Group (August 2007)

Notes: SEB = south-eastbound; NWB = north-westbound; NEB = north-eastbound

1. Operations are shown for locations which operate at LOS E or worse for one more of the New Whatcom Site Alternatives (see Appendix N-1 for a complete summary).

2. Level of service, based on 2000 *Highway Capacity Manual* methodology.

3. Volume-to-capacity ratio reported for roadway segments.

4. Average delay in seconds per vehicle.

5. Volume-to-capacity ratio reported for signalized intersections.

6. Worst movement for unsignalized intersections. This is not applicable (NA) to all-way stop controlled intersections.

As shown in the table, all of the roadway segments would operate better than the City's LOS E standard. Some of the roadway operations would improve slightly as compared to the No-Action scenario because additional access improvements are provided with Alternative 1 2016, and therefore, travel patterns in the vicinity of the site would change. Several of the site access intersections along Chestnut Street and Roeder Avenue would continue to operate at LOS F with the addition of Alternative 1 2016 traffic. These intersections, listed below, would be impacted by Alternative 1 2016 traffic:

- Roeder Avenue/Hilton Avenue
- Roeder Avenue/C Street
- Roeder Avenue/Central Avenue
- West Chestnut Street/Bay Street/Roeder Avenue

Laurel Street and Cornwall Avenue are assumed to be one lane per direction. This analysis presents a conservative estimate of Laurel Street and Cornwall Avenue intersection operations since these roadways would ultimately be planned as two lanes per direction. Table 27 shows the on-site intersections along these corridors would operate at LOS B or better which means that two lanes per direction would not be required to support Alternative 1 2016 traffic generation.

Table 28. 2016 No-Action and Alternative 1—PM Peak Hour Off-Site Roadway and Intersection Operations

Roadways ¹	No-Action			Alternative 1		
	LOS ²	Volume	V/C ³	LOS ²	Volume	V/C ³
Holly Street – Broadway Street to F Street (SEB)	B	560	0.69	D	695	0.85
Holly Street – Broadway Street to F Street (NWB)	D	675	0.83	B	565	0.69
Holly Street – F Street to Central Avenue (SEB)	A	475	0.58	A	475	0.58
Holly Street – F Street to Central Avenue (NWB)	D	715	0.88	D	690	0.85
Holly Street – Central Avenue to Champion Street (SEB)	B	535	0.66	B	545	0.67
Holly Street – Central Avenue to Champion Street (NWB)	E	775	0.95	E	770	0.95
Cornwall Avenue –Chestnut Street to Holly Street (NEB)	A	290	0.36	A	280	0.34

Intersections ¹	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶
1. Meridian Street/Birchwood Avenue	E	65	0.87	E	66	0.87
2. Meridian Street/Squalicum Way	D	42	0.63	D	44	0.65
6. West Holly Street/F Street	C	25	0.67	C	52	0.84
7. West Holly Street/ C Street	F	127	SB	F	198	SB
8. Cornwall Avenue/Flora Street/York Street	C	21	0.75	C	22	0.78
11. East Chestnut Street/Railroad Avenue	F	168	SB	F	70	SB
15. Lakeway Drive/Ellis Street/Jersey Street/East Holly Street	D	37	0.85	D	37	0.85
16. Lakeway Drive/I-5 Southbound Ramps	D	38	0.93	C	35	0.91
17. Lakeway Drive/King Street	D	47	0.78	D	49	0.77
18. Lakeway Drive/Lincoln Street	D	47	0.90	D	47	0.91
19. Iowa Street/Moore Street/I-5 Northbound Ramps	D	47	0.99	D	46	0.98
21. North State Street/James Street/Iowa Street	F	>200	2.59	F	>200	2.78
22. North State Street/Ohio Street	D	37	0.85	D	38	0.89
24. North State Street/East Laurel Street	D	27	EB	F	>200	WB
25. North Forest Street/ North State Street/Boulevard Street/Wharf Street ⁷						
a. North Forest Street/North State Street/Boulevard Street	D	28	SBL	D	28	SBL
b. North State Street/Wharf Street	C	21	EB	C	22	EB
26. North Forest Street/East Laurel Street	C	20	EB	F	>200	EB
28. South Samish Way/Elwood Avenue/Lincoln Street	C	34	0.85	D	38	0.89

Source: The Transpo Group (August 2007)

Notes: SEB = south-eastbound; NWB = north-westbound; NEB = north-eastbound

1. Operations are shown for locations which operate at LOS E or worse for one more of the New Whatcom Site Alternatives (see Appendix N-1 for a complete summary).

2. Level of service, based on 2000 *Highway Capacity Manual* methodology.

3. Volume-to-capacity ratio reported for roadway segments.

4. Average delay in seconds per vehicle.

5. Volume-to-capacity ratio reported for signalized intersections.

6. Worst movement for unsignalized intersections. This is not applicable (NA) to all-way stop controlled intersections.

7. This intersection operates as two separate intersections in the field; therefore, the analysis was conducted as such.

Similar to the on-site analysis, all of the off-site roadway segments would operate within the City's LOS E standard. Some of the roadway operations would improve slightly because additional access is provided to the site with Alternative 1 2016, and therefore, travel patterns in the vicinity of the site would change. Table 28 shows Alternative 1 2016 would cause LOS F operations at two additional intersections. Intersections, listed below, and would be impacted by Alternative 1 2016 traffic:

- North Forest Street/Laurel Street which would degrade from LOS C to LOS F during the PM peak hour with the addition of Alternative 1 trips.
- North State Street/Laurel Street which would degrade from LOS D to LOS F during the PM peak hour with the addition of Alternative 1 trips.

This change in intersection operations is due to the newly-built Laurel Street Bridge which would provide direct access to the site and add more traffic through both the Forest Street and State Street intersections.

In addition to the two locations discussed above, Alternative 1 2016 traffic would impact the following intersections by worsening LOS F operations:

- Holly Street/C Street
- Chestnut Street/Railroad Avenue
- State Street/James Street/Iowa Street

It should be noted that implementation of the Laurel Street and Cornwall Avenue bridges by 2016 may not be possible from a construction and scheduling standpoint relative to the railroad relocation. Therefore, a sensitivity analysis was conducted to determine if site impacts would change without the Cornwall Avenue Bridge in 2016. This evaluation shows that the on-site and off-site roadway and intersection operations would be similar to those with both the Laurel Street and Cornwall Avenue bridges. No additional street system impacts would be expected if the Cornwall Avenue Bridge is not constructed by 2016.

Non-Motorized

Alternative 1 2016 is projected to generate about 6,800 daily pedestrian/bicycle trips. This is most likely greater than the No-Action Alternative pedestrian/bicycle trips since the land uses for Alternative 1 2016 (i.e., residential, office, and retail) typically produce more non-motorized traffic than industrial uses. In addition, Alternative 1 would encourage walking/biking between land uses on and off-site with development of an extensive sidewalk, trail system and two new connections (i.e., Bay Street and Laurel Street) between the site and downtown.

As part of Alternative 1 2016, a substantial trail system including a pedestrian bridge over the Whatcom Waterway from redevelopment area 1 to redevelopment areas 2 through 10 would be constructed. The pedestrian bridge would connect to the proposed on-site trail system within the redevelopment areas and facilitate walking and biking within the

site. In addition, Alternative 1 2016 would construct a pedestrian bridge from Hilton Avenue over Roeder Avenue and the railroad tracks connecting to Broadway Street. This pedestrian bridge would complete the connection between the on-site trail system along Hilton Avenue and the existing Squalicum Harbor Trail. As part of a separate project, the City plans to construct a pedestrian bridge between redevelopment area 10 and Boulevard Park to the southeast of area 10. The trail provides an additional link to the South Bay Trail system.

Similar to downtown, the development would include wide sidewalks and pedestrian crossings to create a pedestrian-friendly environment. Access to downtown, WWU, and other off-site locations would be facilitated by five connections including Central Avenue, Bay Street, Cornwall Avenue, Laurel Street, and Wharf Street. All locations would provide sidewalks and pedestrian crossings.

Future development and the consequent increase in vehicular volumes is expected to proportionally increase observed conflicts with pedestrians and bicyclists that exist today. Alternative 1 2016 conflicts would likely be greater than those expected with No-Action since pedestrian/bicycle trips for Alternative 1 are likely to be greater. While conflicts between motorized and non-motorized transport can be expected to increase where motorized transport increases, it is clear from the description of the pedestrian and bicycle site components discussed above the Port and the City envision a development plan that strives to minimize these conflicts. The New Whatcom Project would enhance pedestrian and bicycle usage on and around the site as part of its overall development plan. The City also has planned improvements such as pedestrian and safety enhancements along Roeder Avenue, and pedestrian and bicycle improvements downtown. Therefore, Alternative 1 2016 non-motorized impacts are expected to be minimal.

Transit

Alternative 1 2016 is expected to generate about 1,900 daily transit trips. These transit trips are assumed to be in addition to the No-Action transit trips already incorporated into the WTA's ridership and seating capacity projections⁹. Therefore, with the addition of Alternative 1 2016 daily transit trips, ridership is projected to be 19,500 boardings per day (i.e., No-Action 2016 ridership of 17,600 boardings per day plus Alternative 1 2016 additional ridership of 1,900 boardings per day). The passenger loading ratio would be about 1.25 for Alternative 1 2016 which is WTA's standard for seating capacity¹⁰.

The No-Action 2016 passenger loading ratio would be 1.13 which is less than the 1.25 ratio projected for Alternative 1 2016 conditions. Because Alternative 1 2016 meets WTA's 1.25 standard, the increase in passenger loading ratio is not considered an impact. However, the transit system would need to be modified to incorporate stops and service on-site to support the future development.

⁹ This is a conservative estimate of Alternative 1 2016 transit ridership. The City's *2005 Comprehensive Plan* and WTA's *Six-Year Strategic Service Plan* assumes some level of development on the New Whatcom site; therefore, this method may overestimate a portion of the Action Alternatives' ridership.

¹⁰ Passenger loading ratio is calculated in the same manner as the No-Action Alternative. Seating capacity, 15,600 seats per day, remains the same for the evaluation of 2016 conditions.

Rail

The evaluation of rail focuses on at-grade crossings and the safety and operations of these crossings. For Alternative 1 2016 conditions, the Laurel Street and Cornwall Avenue at-grade crossings would be eliminated because the railroad would be moved to the eastern boundary of the site. Four at-grade crossings would remain including Wharf Street/Pine Street, and at the site accesses—F Street, C Street, and Central Avenue where the railway runs parallel to Roeder Avenue. The C Street crossing does not have a gate which is a potential safety issue for vehicles, pedestrians, and bicyclists.

Alternative 1 2016 would generate more vehicular and non-motorized trips than the No-Action 2016 conditions; therefore, the chances of conflicts and potential safety issues with trains at at-grade rail crossings are greater. At-grade crossings also increase delays to vehicular traffic that must stop as trains pass through intersections. The elimination of the BNSF railway on-site creates safer rail conditions and is an improvement over the No-Action Alternative. The provision of the Bay Street and Laurel Street bridges in 2016 would provide emergency access to redevelopment areas 2 through 10 as these new intersections would not be blocked by rail operations. Within redevelopment area 1, all at-grade crossings would remain, potentially delaying direct emergency response when trains pass through the intersections since they would need to access Roeder Avenue at Bay Street or another location without an at-grade railroad crossing.

Parking

The majority of parking for the proposed project would be located on-site. Alternative 1 would provide 6,671 parking spaces in 2016. Table 29 summarizes the parking demand and supply for the Alternative 1 2016 conditions¹¹.

Table 29. Alternative 1 2016 Parking Demand and Supply

Parking Sub-Area	Hourly Parking Demand ¹	Proposed Parking	Recommended Supply Range ²		Parking Surplus/Deficiency Range	
1	2,526	3,530	2,779	2,905	751	625
2, 3, 5	852	1,109	937	980	171	129
4, 6, 7, 8	936	894	1,030	1,076	-136	-182
9	283	359	311	325	47	33
10	642	780	706	738	74	42
Total	5,239	6,671	5,763	6,025	908	646

Source: Collins Woerman and The Transpo Group (August 2007)

1. Hourly parking demand represents the maximum hourly demand within the parking sub-area.

2. Recommended supply is 10 to 15 percent more than the parking demand to reduce vehicles re-circulating through the parking areas.

As shown in the table, the hourly parking demand for Alternative 1 in 2016 is about 5,200 vehicles which can be accommodated by the overall proposed parking supply. Based on the recommended parking supply for the redevelopment areas 4, 6, 7, and 8 parking sub-area, there is a deficiency of 140 to 180 parking spaces. However, there is a surplus in all other parking areas so this deficiency could be accommodated on-site. This is not considered an impact because as the master plan for the New Whatcom site is

¹¹ Detailed parking calculations are provided in Appendix D.

developed it is assumed that parking supply and adopted standards will require that each future redevelopment project will accommodate that project's parking demand.

Similar to No-Action 2016 conditions, it is likely that some users of the site would park off-site when visiting multiple destinations in the area. Based on the parking utilization survey, there are currently about 570 available off-site parking spaces within ¼-mile of the site. Since a majority of the vehicles would park on-site there would be minimal impacts to off-site parking.

2026

The evaluation of Alternative 1 2026 operations and comparison to the No-Action 2026 conditions provides an understanding of the expected transportation environment with Alternative 1 2026 as well as how the transportation system would operate relative to No-Action 2026 conditions. With completion of the second phase of development in 2026, Alternative 1 2026 would generate about 5,700 net new PM peak hour vehicle trips which is about 3,900 more net new PM peak hour vehicle trips than the No-Action Alternative.

In addition to the on-site transportation infrastructure improvements completed by 2016, Alternative 1 2026 would:

- Construct Maple Street through redevelopment area 2 between Commercial Street and Central Avenue
- Extend Bay Street as Log Pond Road from Laurel Street to Oak Street creating a five leg intersections at Laurel Street/Commercial Street/Log Pond Road.
- Construct the Commercial Street Bridge and extend this roadway to Oak Street
- Provide the Wharf Street flyover and improve the Wharf Street/State Street off-site intersection
- Construct Oak Street from Log Pond Road to Cornwall Avenue

Street System

Alternative 1 2026 PM peak-hour travel forecasts were used to evaluate roadways and intersections to gain an understanding of how the on-site street system would operate. Figure 19 presents traffic volumes for the street system on-site and in the vicinity of the site for Alternative 1 2026 conditions. Impacts to the street system are measured by determining roadway and intersection LOS. Tables 30 and 31 present a comparison of the No-Action and Alternative 1 2026 on-site and off-site roadway and intersection operations¹².

¹² Appendix B contains detailed LOS worksheets for future without-project peak hour conditions.

Traffic signals are assumed at the Maple Street/Bay Street and Maple Street/Commercial Street intersections, and all-way stop control is assumed at the Laurel Street/Bay Street intersection.

Table 30. 2026 No-Action and Alternative 1—PM Peak Hour On-Site Roadway and Intersection Operations

Roadways ¹	No-Action			Alternative 1		
	LOS ²	Volume	V/C ³	LOS ²	Volume	V/C ³
Roeder Avenue – Broadway Street to F Street (SEB)	E	895	0.95	E	895	0.95
Roeder Avenue – Broadway Street to F Street (NWB)	F	1,400	1.49	F	1,030	1.10
Roeder Avenue – F Street to C Street (SEB)	E	855	0.91	E	895	0.95
Roeder Avenue – F Street to C Street (NWB)	E	865	0.92	E	885	0.94
Roeder Avenue – C Street to Central Avenue (SEB)	F	990	1.06	F	1,100	1.17
Roeder Avenue – C Street to Central Avenue (NWB)	E	870	0.93	F	985	1.05
Roeder Avenue – Central Avenue to Bay Street (SEB)	E	910	0.97	E	940	1.00
Roeder Avenue – Central Avenue to Bay Street (NWB)	C	665	0.71	E	925	0.99
Central Avenue – Laurel Street to Roeder Avenue (NEB)	-	-	-	E	755	0.93
Commercial Street – Laurel Street to Maple Street (NEB)	-	-	-	E	790	0.97
Cornwall Avenue – Wharf Street to Maple Street (NEB)	F	1,035	1.27	A	220	0.27
Cornwall Avenue – Maple Street to Chestnut Street (NEB)	F	1,035	1.27	E	770	0.95
Intersections ¹	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶
1. Roeder Avenue/Hilton Avenue	F	>200	NB	F	>200	NB
2. Roeder Avenue/F Street	F	100	0.90	F	105	1.09
3. Roeder Avenue/C Street	F	>200	NB/SB	F	>200	NB/SB
4. Roeder Avenue/Central Avenue	F	>200	NB/SB	F	>200	NB/SB
5. West Chestnut Street/Bay Street/Roeder Avenue	F	>200	SBL	F	>200	NB/SBL
7. East Chestnut Street/Cornwall Avenue	F	>200	1.47	F	94	1.17

Source: The Transpo Group (August 2007)

Notes: **Bold:** Indicates locations operating below existing LOS standards. SEB = south-eastbound; NWB = north-westbound; NEB = north-eastbound

- Operations are shown for locations which operate at LOS E or worse for one more of the New Whatcom Site Alternatives (see Appendix N-1 for a complete summary).
- Level of service, based on 2000 *Highway Capacity Manual* methodology.
- Volume-to-capacity ratio reported for roadway segments.
- Average delay in seconds per vehicle.
- Volume-to-capacity ratio reported for signalized intersections.
- Worst movement for unsignalized intersections. This is not applicable (NA) to all-way stop and roundabout controlled intersections.

Table 30 shows that Alternative 1 2026 would degrade the following roadway segments to LOS F or worsen LOS F operations, which does not meet the City's existing standard:

- Roeder Avenue between Broadway Street and F Street in the north-westbound direction
- Roeder Avenue between C Street and Central Avenue in the south-eastbound and north-westbound direction

Roadway operations would improve at some locations due to additional access improvements provided to the site.

Development of the site under Alternative 1 2026 would not cause existing site access intersections to degrade to LOS F but it would worsen LOS F operations. The locations where Alternative 1 2026 would impact operations by worsening LOS conditions include:

- Roeder Avenue/Hilton Avenue
- Roeder Avenue/F Street
- Roeder Avenue/C Street
- Roeder Avenue/Central Avenue
- West Chestnut Street/Bay Street/Roeder Avenue
- East Chestnut Street/Cornwall Avenue

Operations of the East Chestnut Street/ Cornwall Avenue intersection would improve slightly due to additional site access locations provided with Alternative 1 2026.

The on-site one lane roundabout at the Laurel Street/Commercial Street/Log Pond Road intersection would operate at LOS C (see Appendix N-1 for LOS and average intersection delay). However, the 95th percentile queue at this intersection is anticipated to be about 775 feet on the northbound Commercial Street approach and 525 feet on the eastbound Laurel Street approach. These long vehicle queues would spillback into adjacent intersections and impact their operations. It should be noted that the intersection analysis is for isolated locations and does not account for the interaction of intersections and queue spillback into adjacent intersections. Although Laurel Street/Bay Street intersection would operate at LOS B as an isolated intersection, if the queue spillback from the Laurel Street/Commercial Street/Log Pond Road intersection is considered, operations would likely be much worse.

The proposed street network routes a majority of the traffic within the development through this intersection. Having a majority of the site's traffic using one intersection increases the potential conflicts and safety issues between vehicles, pedestrians, and bicyclists. In addition, intersections with five legs typically have the potential for more frequent safety and operational issues than standard intersections because users are less familiar with five leg intersections and may have difficulty maneuvering through them.

As shown in Table 31, Alternative 1 2026 would improve roadway operations along Cornwall Avenue between Chestnut Street and Holly Street due to additional access improvements provided to the site which would change travel patterns to and from the site. In addition, intersection operations at the North Forest Street/North State Street/Boulevard Street/Wharf Street would improve with the installation of roundabout control¹³. However, Alternative 1 2026 would degrade operations to LOS F at the following locations:

- Holly Street between Central Avenue and Champion Street in the south-eastbound direction.

¹³ Based on the City and Port of Bellingham New Whatcom Draft Framework Plan 2026, September 2006.

- Lakeway Drive/King Street
- North State Street/Ohio Street

In addition to the locations discussed above, Alternative 1 2016 traffic would impact the following locations by worsening LOS F operations:

- Holly Street between Broadway Street and Champion Street in the north-westbound direction
- Meridian Street/Birchwood Avenue
- Holly Street/C Street
- Chestnut Street/Railroad Avenue
- Lakeway Drive/I-5 Southbound Ramps
- State Street/James Street/Iowa Street
- State Street/Laurel Street
- Forest Street/Laurel Street

This change in roadway and intersection operations is due to the increase in traffic volumes with the addition of Alternative 1 2026 traffic.

Table 31. 2026 No-Action and Alternative 1—PM Peak Hour Off-Site Roadway and Intersection Operations

Roadways ¹	No-Action			Alternative 1		
	LOS ²	Volume	V/C ³	LOS ²	Volume	V/C ³
Holly Street – Broadway Street to F Street (SEB)	E	775	0.95	E	795	0.98
Holly Street – Broadway Street to F Street (NWB)	F	895	1.10	F	965	1.19
Holly Street – F Street to Central Avenue (SEB)	D	680	0.84	D	720	0.89
Holly Street – F Street to Central Avenue (NWB)	F	980	1.21	F	1,015	1.25
Holly Street – Central Avenue to Champion Street (SEB)	E	775	0.95	F	860	1.06
Holly Street – Central Avenue to Champion Street (NWB)	F	1,100	1.35	F	1,200	1.48
Cornwall Avenue –Chestnut Street to Holly Street (NEB)	F	1,015	1.25	A	385	0.47

Intersections ¹	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶
1. Meridian Street/Birchwood Avenue	F	128	1.01	F	132	1.03
2. Meridian Street/Squalicum Way	D	53	0.73	E	63	0.77
6. West Holly Street/F Street	C	33	0.89	E	73	1.09
7. West Holly Street/ C Street	F	>200	NB/SB	F	>200	NB/SB
8. Cornwall Avenue/Flora Street/York Street	D	41	0.93	E	68	1.02
11. East Chestnut Street/Railroad Avenue	F	>200	SB	F	>200	SB
15. Lakeway Drive/Ellis Street/Jersey Street/East Holly Street	D	55	0.96	E	64	0.99
16. Lakeway Drive/I-5 Southbound Ramps	F	98	1.16	F	108	1.20
17. Lakeway Drive/King Street	E	69	0.84	F	85	0.84
18. Lakeway Drive/Lincoln Street	E	68	1.07	E	67	1.02
19. Iowa Street/Moore Street/I-5 Northbound Ramps	E	74	1.11	E	78	1.11
21. North State Street/James Street/Iowa Street	F	>200	2.98	F	>200	3.21
22. North State Street/Ohio Street	E	67	1.03	F	94	1.13
24. North State Street/East Laurel Street	F	81	WB	F	>200	WB
25. North Forest Street/ North State Street/ Boulevard Street/Wharf Street ⁷				B	13	NA
a. North Forest Street/North State Street/Boulevard Street	F	51	SBL	Controlled by a roundabout, see operations above.		
b. North State Street/Wharf Street	E	39	EB			
26. North Forest Street/East Laurel Street	F	95	EB	F	>200	EB
28. South Samish Way/Elwood Avenue/Lincoln Street	E	64	1.07	E	57	1.05

Source: The Transpo Group (August 2007)

Notes: **Bold:** Indicates locations operating below existing LOS standards. SEB = south-eastbound; NWB = north-westbound; NEB = north-eastbound

- Operations are shown for locations which operate at LOS E or worse for one more of the New Whatcom Site Alternatives (see Appendix N-1 for a complete summary).
- Level of service, based on 2000 *Highway Capacity Manual* methodology.
- Volume-to-capacity ratio reported for roadway segments.
- Average delay in seconds per vehicle.
- Volume-to-capacity ratio reported for signalized intersections.
- Worst movement for unsignalized intersections. This is not applicable (NA) to all-way stop controlled intersections.
- This intersection operates as two separate intersections in the field; therefore, the No-Action analysis was conducted as such. For Alternative 1 2026, it is analyzed as a two-lane roundabout.

Non-Motorized

Alternative 1 2026 is projected to generate about 17,500 daily pedestrian/bicycle trips. This is most likely greater than the No-Action Alternative pedestrian/bicycle trips since the land uses for Alternative 1 2026 (i.e., residential, office, and retail) typically produce more non-motorized traffic than industrial uses. Alternative 1 would encourage walking/biking within the development and between land uses off-site by providing an extensive sidewalk and trail system as well as new connections to existing transportation system including Bay Street, Commercial Street, and Laurel Street.

Although Alternative 1 2026 non-motorized and vehicular conflicts are expected to be greater than No-Action 2026, a substantial pedestrian and bicycle network would be developed to minimize impacts to non-motorized impacts. The site would be developed as a pedestrian-friendly environment with wide sidewalks and crosswalks, and bicyclists would be accommodated within the street right-of-way. In addition, as discussed for 2016 conditions, pedestrian bridges would be constructed over the Whatcom Waterway and from Hilton Avenue to Broadway Street. As part of separate projects, the City plans to construct a pedestrian bridge between redevelopment area 10 and Boulevard Park to the southeast of area 10 as well as provide pedestrian and bicycle improvements along Roeder Avenue and downtown.

Transit

Alternative 1 2016 is expected to generate about 5,200 daily transit trips. With the addition of Alternative 1 2026 daily transit trips, ridership is projected to be 36,700 boardings per day. The passenger loading ratio would be about 1.59 for Alternative 1 2026 which exceeds WTA's 1.25 standard for seating capacity¹⁴. In addition, the Alternative 1 2026 passenger loading ratio of 1.59 is greater than the No-Action 2026 passenger loading ratio of 1.36. Because Alternative 1 2026 would exceed WTA's standard and the anticipated passenger loading ratio would be greater than the No-Action 2026 conditions, it would impact the transit system. An increase in transit service in the vicinity of the site as well as service and stops on-site would be required to support future growth and transit demand.

Rail

The location of rail crossings for Alternative 1 2026 would be the same as Alternative 1 2016. Alternative 1 2026 would generate more vehicular and non-motorized trips than the No-Action 2026 conditions; therefore, the chances of conflicts and potential safety issues with trains at at-grade rail crossings are greater. At-grade crossings also increase delays to vehicular traffic that must stop as trains pass through intersections. The elimination of the BNSF railway on-site creates safer rail conditions and is an improvement over the No-Action Alternative. Construction of bridges over the railroad would provide emergency access to redevelopment areas 2 through 10, as certain intersections would not be blocked by rail operations. As discussed previously, within redevelopment area 1, all at-grade crossings would remain and emergency access to the

¹⁴ Passenger loading ratio is calculated in the same manner as the No-Action Alternative. Seating capacity, 23,100 seats per day, remains the same for the evaluation of 2016 conditions.

site would be blocked when trains pass through the site access locations since they would need to access Roeder Avenue at Bay Street or another location without an at-grade railroad crossing.

Parking

The majority of parking for the redevelopment would be located on-site. Alternative 1 2026 would provide 15,563 parking spaces in 2026. Table 32 summarizes the parking demand and supply for Alternative 1 2026 conditions¹⁵.

Table 32. Alternative 1 2026 Parking Demand and Supply

Parking Sub-Area	Hourly Parking Demand ¹	Proposed Parking	Recommended Supply Range ²		Parking Surplus/Deficiency Range	
1	3,034	4,153	3,337	3,489	816	664
2, 3, 5	3,743	4,935	4,117	4,304	818	631
4, 6, 7, 8	3,644	4,050	4,008	4,191	42	-141
9	1,542	1,945	1,696	1,773	249	172
10	642	780	706	738	74	42
Total	12,605	15,863	13,866	14,496	1,998	1,367

Source: Collins Woerman and The Transpo Group (August 2007)

1. Hourly parking demand represents the maximum hourly demand within the redevelopment area.

2. Recommended supply is 10 to 15 percent more than the parking demand to reduce vehicles re-circulating through the parking areas.

As shown in the table, the hourly parking demand for Alternative 1 in 2016 is about 12,600 vehicles which can be accommodated by the overall proposed parking supply. Based on the recommended parking supply for the redevelopment areas 4, 6, 7, and 8 parking sub-area, there is a deficiency of approximately 140 parking spaces. However, there is a surplus in all other parking areas so this deficiency could be accommodated on-site. This is not considered an impact because as the master plan for the New Whatcom site is developed it is assumed that parking supply and adopted standards will require that each future redevelopment project will accommodate that project's parking demand.

Similar to No-Action 2026 conditions, it is likely that some users of the site would park off-site when visiting multiple destinations in the area. Based on the parking utilization survey, there are currently about 570 available off-site parking spaces within ¼-mile of the site. Since a majority of the vehicles would park on-site there would be minimal impacts to off-site parking.

Alternative 2 Medium Density

Alternative 2 would develop approximately 2.2 million square feet of mixed-use development in 2016 and an additional 3.3 million square feet of development in 2026, for a total of 6.0 million square feet of development. Alternative 2 would generate approximately 1,700 net new PM peak hour vehicle trips in 2016 and an additional 2,800 net new PM peak hour vehicle trips in 2026, for a total of about 4,500 trips. This section first discusses 2016 Alternative 2 on-site and off-site operations and then 2026

¹⁵ Detailed parking calculations are provided in Appendix D.

Alternative 2 on-site and off-site operations. Operations are compared to the No-Action Alternative to determine the impacts of Alternative 2.

2016

The evaluation of Alternative 2 2016 operations and comparison to the No-Action 2016 conditions illustrates the expected transportation environment with Alternative 2 as well as how the transportation system would operate relative to No-Action conditions. For the 2016 phase of the project, Alternative 2 would generate approximately 1,700 net new PM peak hour vehicle trips which is about 900 more net new PM peak hour vehicle trips than the No-Action Alternative by 2016.

As discussed previously and shown in Table 15, Alternative 2 would provide substantial improvements to the on-site transportation system within all redevelopment areas to support its expected trip generation. Key roadway infrastructure improvements by 2016 would include those discussed for the No-Action 2016 conditions as well as:

- Upgrading Central Avenue and extending it to Laurel Street
- Constructing the Bay Street Bridge and extending this roadway to Laurel Street
- Upgrading Laurel Street and constructing a bridge into the site
- Close the Cornwall Avenue Bridge
- Extending Cornwall Avenue to redevelopment area 10
- Relocation of the railroad

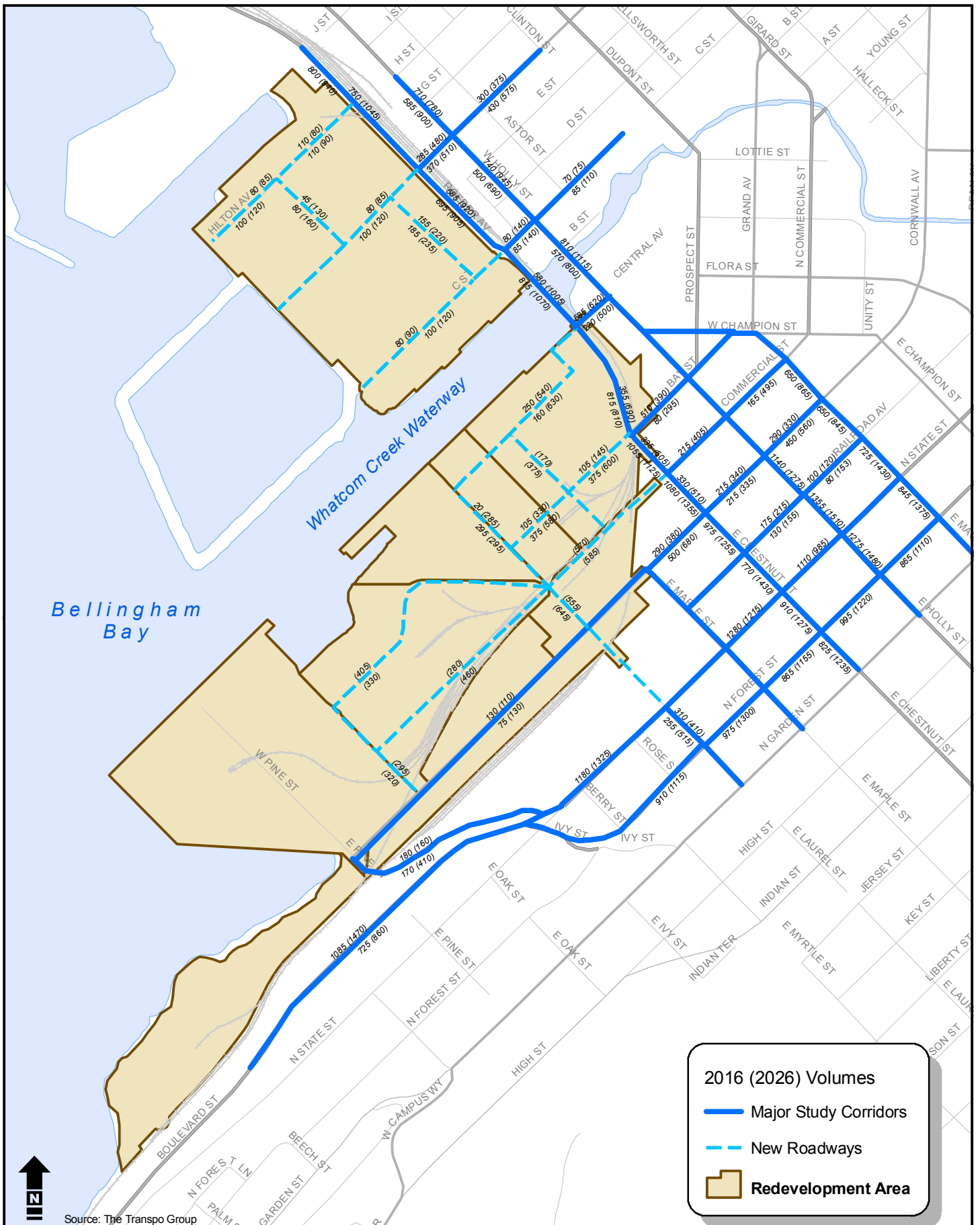
The site would provide a substantial park and trail system as well as sidewalks, crosswalks, and accommodations for bicyclists within the street right-of-way. The off-site transportation system for Alternative 2 by 2016 would be the same as the No-Action Alternative transportation system.

Street System

Alternative 2 2016 PM peak hour travel forecasts were used to evaluate roadways and intersections to gain an understanding of how the street system would operate. Figure 20 presents traffic volumes for the street system on-site and in the vicinity of the site for Alternative 2 2016 conditions.

Impacts to the street system are measured by determining roadway and intersection LOS. Tables 33 and 34 provide a comparison of No-Action and Alternative 2 2016 on-site and off-site roadway and intersection operations¹⁶. With the roadway improvements provided with Alternative 2 2016, there would be additional intersections on-site along Laurel Street and Cornwall Avenue which would not be constructed under the No-Action 2016 Alternative.

¹⁶ Appendix B provides detailed intersection LOS worksheets for Alternative 1 2016 PM peak hour conditions. Appendix E provides the entire roadway segment analysis.



Source: The Transpo Group

Figure 20
Alternative 2 PM Peak Hour Traffic Volumes

Table 33. 2016 No-Action and Alternative 2—PM Peak Hour On-Site Roadway and Intersection Operations

Roadways ¹	No-Action			Alternative 2		
	LOS ²	Volume	V/C ³	LOS ²	Volume	V/C ³
Roeder Avenue – Broadway Street to F Street (SEB)	D	765	0.82	D	800	0.85
Roeder Avenue – Broadway Street to F Street (NWB)	D	780	0.83	D	750	0.80
Roeder Avenue – F Street to C Street (SEB)	C	680	0.72	C	695	0.74
Roeder Avenue – F Street to C Street (NWB)	B	615	0.66	B	585	0.62
Roeder Avenue – C Street to Central Avenue (SEB)	C	675	0.72	D	815	0.87
Roeder Avenue – C Street to Central Avenue (NWB)	C	665	0.71	B	580	0.62
Roeder Avenue – Central Avenue to Bay Street (SEB)	D	800	0.85	D	815	0.87
Roeder Avenue – Central Avenue to Bay Street (NWB)	A	460	0.49	A	355	0.38
Central Avenue – Laurel Street to Roeder Avenue (NEB)	-	-	-	A	160	0.20
Commercial Street – Laurel Street to Maple Street (NEB)	-	-	-	-	-	-
Cornwall Avenue – Wharf Street to Maple Street (NEB)	D	710	0.87	A	75	0.09
Cornwall Avenue – Maple Street to Chestnut Street (NEB)	D	710	0.87	B	500	0.62

Intersections ¹	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶
1. Roeder Avenue/Hilton Avenue	F	84	NB	F	>200	NB
2. Roeder Avenue/F Street	D	48	0.69	D	49	0.74
3. Roeder Avenue/C Street	F	114	NB/SB	F	>200	SB
4. Roeder Avenue/Central Avenue	F	>200	NB/SB	F	>200	NB
5. West Chestnut Street/Bay Street/Roeder Avenue	F	>200	SBL	F	>200	SBL
7. East Chestnut Street/Cornwall Avenue	E	57	1.09	C	21	0.82

Source: The Transpo Group (August 2007)

Notes: SEB = south-eastbound; NWB = north-westbound; NEB = north-eastbound

1. Operations are shown for locations which operate at LOS E or worse for one more of the New Whatcom Site Alternatives (see Appendix N-1 for a complete summary).

2. Level of service, based on 2000 *Highway Capacity Manual* methodology.

3. Volume-to-capacity ratio reported for roadway segments,

4. Average delay in seconds per vehicle.

5. Volume-to-capacity ratio reported for signalized intersections,

6. Worst movement for unsignalized intersections. This is not applicable (NA) to all-way stop controlled intersections.

As shown in the table, with the addition of Alternative 2 2016 traffic, all of the on-site roadways would continue to meet the City's LOS E standard. Operations along some of the roadway segments would improve as compared to the No-Action Alternative due to additional access improvements provided by Alternative 2 2016. Several of the site access locations along Chestnut Street and Roeder Avenue would continue to operate at LOS F with the addition of Alternative 2 2016 traffic. These intersections, listed below, would be impacted by Alternative 2 2016 traffic:

- Roeder Avenue/Hilton Avenue
- Roeder Avenue/C Street
- Roeder Avenue/Central Avenue
- West Chestnut Street/Bay Street/Roeder Avenue

Laurel Street and Cornwall Avenue are assumed to be one lane per direction. This analysis presents a conservative estimate Laurel Street and Cornwall Avenue intersection operations since these roadways would ultimately be two lanes per direction. Table 33 shows the on-site intersections along these corridors would operate at LOS B or better which means that two lanes per direction would not be required to support Alternative 2 2016 traffic generation.

The most significant change in 2016 between No-Action and Alternative 2 is that operations would improve at the East Chestnut Street/Cornwall Avenue intersection due to the closure of Cornwall Avenue from Maple Street to Oak Street which eliminates Cornwall Avenue site access and diverts traffic to the Bay Street and Laurel Street site access locations.

Table 34. 2016 No-Action and Alternative 2—PM Peak Hour Off-Site Roadway and Intersection Operations

Roadways ¹	No-Action			Alternative 2		
	LOS ²	Volume	V/C ³	LOS ²	Volume	V/C ³
Holly Street – Broadway Street to F Street (SEB)	B	560	0.69	C	585	0.72
Holly Street – Broadway Street to F Street (NWB)	D	675	0.83	D	710	0.87
Holly Street – F Street to Central Avenue (SEB)	A	475	0.58	A	475	0.58
Holly Street – F Street to Central Avenue (NWB)	D	715	0.88	E	740	0.91
Holly Street – Central Avenue to Champion Street (SEB)	B	535	0.66	B	570	0.70
Holly Street – Central Avenue to Champion Street (NWB)	E	775	0.95	E	810	1.00
Cornwall Avenue –Chestnut Street to Holly Street (NEB)	A	290	0.36	A	215	0.26

Intersections ¹	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶
1. Meridian Street/Birchwood Avenue	E	65	0.87	E	63	0.87
2. Meridian Street/Squalicum Way	D	42	0.63	D	40	0.63
6. West Holly Street/F Street	C	25	0.67	C	27	0.74
7. West Holly Street/ C Street	F	127	SB	F	>200	SB
8. Cornwall Avenue/Flora Street/York Street	C	21	0.75	B	20	0.73
11. East Chestnut Street/Railroad Avenue	F	168	SB	F	98	SB
15. Lakeway Drive/Ellis Street/Jersey Street/ East Holly Street	D	37	0.85	D	37	0.85
16. Lakeway Drive/I-5 Southbound Ramps	D	38	0.93	D	43	0.96
17. Lakeway Drive/King Street	D	47	0.78	D	46	0.77
18. Lakeway Drive/Lincoln Street	D	47	0.90	D	46	0.89
19. Iowa Street/Moore Street/I-5 Northbound Ramps	D	47	0.99	D	46	0.98
21. North State Street/James Street/Iowa Street	F	>200	2.59	F	>200	2.79
22. North State Street/Ohio Street	D	37	0.85	D	40	0.91
24. North State Street/East Laurel Street	D	27	EB	F	>200	WB
25. North Forest Street/ North State Street/ Boulevard Street/Wharf Street ⁶						
a. North Forest Street/North State Street/ Boulevard Street	D	28	SBL	D	34	SBL
b. North State Street/Wharf Street	C	21	EB	E	36	EB
26. North Forest Street/East Laurel Street	C	20	EB	F	>200	EB
28. South Samish Way/Elwood Avenue/Lincoln Street	C	34	0.85	D	38	0.88

Source: The Transpo Group (August 2007)

Notes: SEB = south-eastbound; NWB = north-westbound; NEB = north-eastbound

1. Operations are shown for locations which operate at LOS E or worse for one more of the New Whatcom Site

Alternatives (see Appendix N-1 for a complete summary).

2. Level of service, based on 2000 *Highway Capacity Manual* methodology.

3. Volume-to-capacity ratio reported for roadway segments.

4. Average delay in seconds per vehicle.

5. Volume-to-capacity ratio reported for signalized intersections.

6. Worst movement for unsignalized intersections. This is not applicable (NA) to all-way stop controlled intersections.

7. This intersection operates as two separate intersections in the field; therefore, the analysis was conducted as such.

As shown in the table, all of the off-site roadways would continue to meet the City's LOS E standard. Similar to Alternative 1 2016, Table 34 shows Alternative 2 2016 would cause LOS F operations at two additional intersections. These intersections, listed below, would be impacted by Alternative 2 2016 traffic:

- North Forest Street/Laurel

- North State Street/Laurel Street .

This change in intersection operations is due to the newly-built Laurel Street Bridge which would provide direct access to the site and add more traffic through both the Forest Street and State Street intersections.

In addition to the two locations discussed above, Alternative 2 2016 traffic would impact the following intersections by worsening LOS F operations:

- Holly Street/C Street
- Chestnut Street/Railroad Avenue
- State Street/James Street/Iowa Street

Some roadways and intersections would improve slightly with Alternative 2 2016 because travel patterns to and from the site would be different due to the additional site access locations.

Non-Motorized

Alternative 2 2016 is projected to generate about 5,600 daily pedestrian/bicycle trips. Alternative 2 would encourage walking/biking within the development and between land uses off-site by providing an extensive sidewalk and trail system as well as new connections to existing transportation system including Bay Street and Laurel Street.

As part of Alternative 2 2016, a substantial trail system would be developed on-site. Similar to downtown, the development would include wide sidewalks and pedestrian crossings to create a pedestrian-friendly environment. Access to downtown, WWU, and other off-site locations would be facilitated by four connections including Central Avenue, Bay Street, Laurel Street, and Wharf Street. All locations would provide sidewalks and pedestrian crossings. As part of a separate project, the City plans to construct a pedestrian bridge between redevelopment area 10 and Boulevard Park to the southeast of area 10. The trail provides an additional link to the South Bay Trail system.

Future development and the consequent increase in vehicular volumes is expected to proportionally increase observed conflicts with pedestrians and bicyclists that exist today. Alternative 2 2016 conflicts would likely be greater than those expected with No-Action since pedestrian/bicycle trips for Alternative 2 are likely to be greater. However, Alternative 2 conflicts would be less than Alternative 1 since Alternative 2 generates fewer pedestrian/bicycle trips. While conflicts between motorized and non-motorized transport can be expected to increase where motorized transport increases, it is clear from the description of the pedestrian and bicycle site components discussed above the Port and the City envision a development plan that strives to minimize these conflicts. The New Whatcom Project would enhance pedestrian and bicycle usage on and around the site as part of its overall development plan. The City also has planned improvements such as pedestrian and safety enhancements along Roeder Avenue, and pedestrian and bicycle improvements downtown. Therefore, Alternative 2 2016 non-motorized impacts are expected to be minimal.

Transit

Alternative 2 is expected to generate about 1,600 daily transit trips. These transit trips are assumed to be in addition to the No-Action transit trips already incorporated into the WTA's ridership and seating capacity projections¹⁷. Therefore, with the addition of Alternative 2 2016 daily transit trips, ridership is projected to be 19,200 boardings per day. The passenger loading ratio would be about 1.23 for Alternative 2 2016 which is less than WTA's 1.25 standard for seating capacity¹⁸.

The No-Action 2016 passenger loading ratio would be 1.13 which is less than the 1.23 ratio projected for Alternative 2 2016 conditions. Because Alternative 2 2016 meets WTA's 1.25 standard, the increase in passenger loading ratio is not considered an impact. However, the transit system would need to be modified to incorporate stops and service on-site to support the future development.

Rail

The Laurel Street and Cornwall Avenue at-grade crossings would be eliminated by 2016 for Alternative 2 because the railroad would be moved to the eastern boundary of the site. Four at-grade crossings would remain including Wharf Street/Pine Street, and at the site accesses—F Street, C Street, and Central Avenue where the railway runs parallel to Roeder Avenue. The C Street crossing does not have a gate which is a potential safety issue for vehicles, pedestrians, and bicyclist.

Alternative 2 2016 would generate more vehicular and non-motorized trips than the No-Action 2016 conditions; therefore, the chances of conflicts and potential safety issues with trains at at-grade rail crossings are greater. At-grade crossings also increase delays to vehicular traffic that must stop as trains pass through intersections. The elimination of the BNSF railway on-site creates safer rail conditions and is an improvement over the No-Action Alternative. Construction of the Bay Street and Laurel Street bridges over the railroad would provide emergency access to redevelopment area 2 through 10, as these new intersections would not be blocked by rail operations. As discussed previously, within redevelopment area 1, all at-grade crossings would remain, potentially delaying emergency access when trains cross through the site access locations since they would need to access Roeder Avenue at Bay Street or another location without an at-grade railroad crossing.

Parking

The majority of parking for the proposed project would be located on-site. Alternative 2 would provide 5,311 parking spaces in 2016. Table 35 summarizes the parking demand and supply for Alternative 2 2016 conditions. Detailed parking calculations are provided in Appendix N-5.

¹⁷ This is a conservative estimate of Alternative 2 2016 transit ridership. The City's *2005 Comprehensive Plan* and WTA's *Six-Year Strategic Service Plan* assumes some level of development on the New Whatcom site; therefore, this method may overestimate a portion of the Action Alternatives' ridership.

¹⁸ Passenger loading ratio is calculated in the same manner as the No-Action Alternative. Seating capacity, 15,600 seats per day, remains the same for the evaluation of 2016 conditions.

Table 35. Alternative 2 2016 Parking Demand and Supply

Parking Sub-Area	Hourly Parking Demand ¹	Proposed Parking	Recommended Supply Range ²		Parking Surplus/Deficiency Range	
1	1,996	2,774	2,196	2,295	578	479
2, 3, 5	711	899	782	818	117	82
4, 6, 7, 8	875	812	963	1,006	-151	-195
9	204	265	224	235	41	30
10	455	561	501	523	60	38
Total	4,241	5,311	4,665	4,877	646	434

Source: Collins Woerman and The Transpo Group (August 2007)

1. Hourly parking demand represents the maximum hourly demand within the parking sub-area.

2. Recommended supply is 10 to 15 percent more than the parking demand to reduce vehicles re-circulating through the parking areas.

As shown in the table, the hourly parking demand for Alternative 2 in 2016 is about 4,200 vehicles, which can be accommodated by the overall proposed parking supply. However, based on the recommended parking supply for the redevelopment areas 4, 6, 7, and 8 parking sub-area, there is a deficiency of 150 to 200 parking spaces. However, there is a surplus in all other parking areas so this deficiency could be accommodated on-site. This is not considered an impact because as the master plan for the New Whatcom site is developed it is assumed that parking supply and adopted standards will require that each future redevelopment project will accommodate that project's parking demand.

Similar to No-Action 2026 conditions, it is likely that some users of the site would park off-site when visiting multiple destinations in the area. Based on the parking utilization survey, there are currently about 570 available off-site parking spaces within ¼-mile of the site. Since a majority of the vehicles would park on-site there would be minimal impacts to off-site parking.

2026

The evaluation of Alternative 2 2026 operations and comparison to No-Action 2026 conditions provides an understanding of the expected transportation environment with Alternative 2 as well as how the transportation system would operate relative to No-Action conditions. With completion of the second phase of development in 2026, Alternative 2 would add about 4,500 net new PM peak-hour vehicle trips which is about 2,800 more net new PM peak hour vehicle trips than the No-Action Alternative.

In addition to the roadway infrastructure provided by 2016, Alternative 2 2026 would provide the following improvements:

- Construction of Maple Street through redevelopment area 2 between Commercial Street and Central Avenue
- Extension Bay Street as Log Pond Road from Laurel Street to Oak Street creating a five leg intersections at Laurel Street/Commercial Street/Log Pond Road.
- Provision of the Commercial Street Bridge and extension of this street to Oak Street.

- Construction of Oak Street from Log Pond Road to Cornwall Avenue

The site would provide a substantial park and trail system as well as sidewalks, crosswalks, and accommodations for bicyclists within the street right-of-way. The off-site transportation system for Alternative 2 by 2026 would be the same as the No-Action Alternative transportation system.

Street System

Alternative 2 2026 PM peak hour travel forecasts were used to evaluate roadways and intersections to gain an understanding of how the street system would operate. Figure 20 presents traffic volumes for the street system on-site and in the vicinity of the site for Alternative 2 2026 conditions.

Impacts to the street system are measured by determining roadway and intersection LOS. Tables 36 and 37 provide a comparison of No-Action and Alternative 2 2016 on-site and off-site roadway and intersection operations¹⁹. With the roadway improvements provided with Alternative 2 2026, there would be additional intersections on-site along Laurel Street, Maple Street, and Cornwall Avenue which would not be constructed under the No-Action 2026 Alternative.

All-way stop control is assumed at the Laurel Street/Bay Street intersections and traffic signals at the Maple Street/Bay Street intersection.

¹⁹ Appendix B provides detailed LOS worksheets for Alternative 1 2016 PM peak hour conditions.

Table 36. 2026 No-Action and Alternative 2—PM Peak Hour On-Site Roadway and Intersection Operations

Roadways ¹	No-Action			Alternative 2		
	LOS ²	Volume	V/C ³	LOS ²	Volume	V/C ³
Roeder Avenue – Broadway Street to F Street (SEB)	E	895	0.95	E	940	1.00
Roeder Avenue – Broadway Street to F Street (NWB)	F	1,400	1.49	F	1,045	1.11
Roeder Avenue – F Street to C Street (SEB)	E	855	0.91	E	905	0.96
Roeder Avenue – F Street to C Street (NWB)	E	865	0.92	E	920	0.98
Roeder Avenue – C Street to Central Avenue (SEB)	F	990	1.06	F	1,070	1.14
Roeder Avenue – C Street to Central Avenue (NWB)	E	870	0.93	F	1,005	1.07
Roeder Avenue – Central Avenue to Bay Street (SEB)	E	910	0.97	D	810	0.86
Roeder Avenue – Central Avenue to Bay Street (NWB)	C	665	0.71	C	690	0.74
Central Avenue – Laurel Street to Roeder Avenue (NEB)	-	-	-	C	630	0.77
Commercial Street – Laurel Street to Maple Street (NEB)	-	-	-	C	585	0.72
Cornwall Avenue – Wharf Street to Maple Street (NEB)	F	1,035	1.27	A	130	0.16
Cornwall Avenue – Maple Street to Chestnut Street (NEB)	F	1,035	1.27	D	680	0.84

Intersections ¹	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶
1.Roeder Avenue/Hilton Avenue	F	>200	NB	F	>200	NB
2.Roeder Avenue/F Street	F	100	0.90	F	100	1.01
3.Roeder Avenue/C Street	F	>200	NB/SB	F	>200	NB/SB
4.Roeder Avenue/Central Avenue	F	>200	NB/SB	F	>200	NB/SB
5.West Chestnut Street/Bay Street/Roeder Avenue	F	>200	SBL	F	>200	NB/SB
7.East Chestnut Street/Cornwall Avenue	F	>200	1.47	E	68	1.10

Source: The Transpo Group (August 2007)

Notes: **Bold:** Indicates locations operating below existing LOS standards. SEB = south-eastbound; NWB = north-westbound; NEB = north-eastbound

- Operations are shown for locations which operate at LOS E or worse for one more of the New Whatcom Site Alternatives (see Appendix N-1 for a complete summary).
- Level of service, based on 2000 *Highway Capacity Manual* methodology.
- Volume-to-capacity ratio reported for roadway segments.
- Average delay in seconds per vehicle.
- Volume-to-capacity ratio reported for signalized intersections.
- Worst movement reported for unsignalized intersections. This is not applicable (NA) to all-way stop and roundabout controlled intersections.

Table 36 shows that Alternative 2 2026 would worsen LOS conditions at the following on-site locations:

- Roeder Avenue between Broadway Street and F Street in the north-westbound direction
- Roeder Avenue between C Street and Central Avenue in the south-eastbound direction
- Roeder Avenue/Hilton Avenue
- Roeder Avenue/F Street
- Roeder Avenue/C Street
- Roeder Avenue/Central Avenue

- West Chestnut Street/Bay Street/Roeder Avenue

In addition, roadway operations would degrade from LOS E to LOS F along:

- Roeder Avenue between C Street and Central Avenue in the north-westbound direction

Operations of the East Chestnut Street/Cornwall Avenue intersection as well as roadway operations along Roeder Avenue between Central Avenue and Bay Street south-eastbound and Cornwall Avenue between Wharf Street and Chestnut Street north-eastbound would improve due to additional site access locations provided with Alternative 2 2026.

The on-site one lane roundabout at the Laurel Street/Commercial Street/Log Pond Road intersection would operate at LOS D (see Appendix N-1 for LOS and average intersection delay). However, the Commercial Street approach would operate at LOS F which represents gridlock conditions where drivers would have difficulty entering and moving through the roundabout. In addition, the 95th percentile queue at this intersection is anticipated to be about 800 feet on the northbound Commercial Street approach and 725 feet on the eastbound Laurel Street approach. These long vehicle queues would spillback into adjacent intersections and impact their operations. It should be noted that the intersection analysis is for isolated locations and does not account for the interaction of intersections and queue spillback into adjacent intersections. Although the Laurel Street/ Bay Street intersection would operate at LOS C as an isolated intersection, if the queue spillback from the Laurel Street/Commercial Street/Log Pond Road intersection is considered, operations would likely be much worse.

The proposed Alternative 2 street network would route more traffic through the Laurel Street/Commercial Street/Log Pond Road intersection than with Alternative 1 because the Cornwall Avenue access would be closed. Having a majority of the site's traffic using one intersection increases the potential conflicts and safety issues between vehicles, pedestrians, and bicyclists. In addition, intersections with five legs typically have the potential for more frequent safety and operational issues than standard intersections because users are less familiar with five leg intersections and may have difficulty maneuvering through them.

As shown in Table 37, Alternative 2 2026 would impact the following off-site locations by degrading operations from LOS E to LOS F:

- Holly Street between Broadway Street and F Street south-eastbound
- Meridian Street/Birchwood Avenue
- North State Street/Ohio Street
- North State Street/Wharf Street

In addition to the location discussed above, Alternative 2 2026 traffic would impact the following roadways and intersections by worsening LOS F operations:

- Holly Street between F Street and Champion street north-westbound
- West Holly Street/C Street
- East Chestnut Street/Railroad Avenue
- Lakeway Drive/I-5 Southbound Ramps
- North State Street/James Street/Iowa Street
- North State Street/East Laurel Street
- North Forest Street/North Street/Boulevard Street
- North Forest Street/East Laurel Street

This change in roadway and intersection operations is due to the increase in traffic volume at these locations with the addition of Alternative 2 2026 traffic.

Roadway operations would improve at some locations due to additional access provided by Alternative 2 2026.

Table 37. 2026 No-Action and Alternative 2—PM Peak Hour Off-Site Roadway and Intersection Operations

Roadways ¹	No-Action			Alternative 2		
	LOS ²	Volume	V/C ³	LOS ²	Volume	V/C ³
Holly Street – Broadway Street to F Street (SEB)	E	775	0.95	F	900	1.11
Holly Street – Broadway Street to F Street (NWB)	F	895	1.10	E	780	0.96
Holly Street – F Street to Central Avenue (SEB)	D	680	0.84	D	690	0.85
Holly Street – F Street to Central Avenue (NWB)	F	980	1.21	F	945	1.16
Holly Street – Central Avenue to Champion Street (SEB)	E	775	0.95	E	800	0.98
Holly Street – Central Avenue to Champion Street (NWB)	F	1,100	1.35	F	1,115	1.37
Cornwall Avenue –Chestnut Street to Holly Street (NEB)	F	1,015	1.25	A	335	0.41
Intersections ¹	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶
1. Meridian Street/Birchwood Avenue	F	128	1.01	F	109	1.02
2. Meridian Street/Squalicum Way	D	53	0.73	E	75	0.79
6. West Holly Street/F Street	C	33	0.89	D	54	0.96
7. West Holly Street/ C Street	F	>200	NB/SB	F	>200	NB/SB
8. Cornwall Avenue/Flora Street/York Street	D	41	0.93	D	46	1.01
11. East Chestnut Street/Railroad Avenue	F	>200	SB	F	>200	SB
15. Lakeway Drive/Ellis Street/Jersey Street/East Holly Street	D	55	0.96	E	64	0.98
16. Lakeway Drive/I-5 Southbound Ramps	F	98	1.16	F	88	1.17
17. Lakeway Drive/King Street	E	69	0.84	E	66	0.87
18. Lakeway Drive/Lincoln Street	E	68	1.07	E	65	1.04
19. Iowa Street/Moore Street/I-5 Northbound Ramps	E	74	1.11	E	79	1.10
21. North State Street/James Street/Iowa Street	F	>200	2.98	F	>200	3.12
22. North State Street/Ohio Street	E	67	1.03	F	110	1.13
24. North State Street/East Laurel Street	F	81	WB	F	>200	WB
25. North Forest Street/ North State Street/Boulevard Street/Wharf Street ⁷						
a. North Forest Street/North State Street/Boulevard Street	F	51	SBL	F	54	SBL
b. North State Street/Wharf Street	E	39	EB	F	>200	EB
26. North Forest Street/East Laurel Street	F	95	EB	F	>200	EB
28. South Samish Way/Elwood Avenue/Lincoln Street	E	64	1.07	E	68	1.10

Source: The Transpo Group (August 2007)

Notes: **Bold:** Indicates locations operating below existing LOS standards. SEB = south-eastbound; NWB = north-westbound; NEB = north-eastbound

- Operations are shown for locations which operate at LOS E or worse for one more of the New Whatcom Site Alternatives (see Appendix N-1 for a complete summary).
- Level of service, based on 2000 *Highway Capacity Manual* methodology.
- Volume-to-capacity ratio reported for roadway segments.
- Average delay in seconds per vehicle.
- Volume-to-capacity ratio reported for signalized intersections.
- Worst movement for unsignalized intersections. This is not applicable (NA) to all-way stop controlled intersections.
- This intersection operates as two separate intersections in the field; therefore, the analysis was conducted as such.

Non-Motorized

Alternative 2 2026 is projected to generate about 14,000 daily pedestrian/bicycle trips. This is most likely greater than the No-Action Alternative pedestrian/bicycle trips since the land uses for Alternative 2 (i.e., residential, office, and retail) typically attract more non-motorized traffic than industrial uses. In addition, Alternative 2 would encourage walking/biking between land uses on and off-site with development of an extensive

sidewalk, trail system and provision of four connections (i.e., Central Avenue, Bay Street, Commercial Street and Laurel Street) between the site and downtown.

Similar to Alternative 1, Alternative 2 2026 would provide a substantial trail system including a pedestrian bridge over the Whatcom Waterway from redevelopment area 1 to redevelopment areas 2 through 10 would be constructed. The pedestrian bridge would connect to the proposed on-site trail system within the redevelopment areas and facilitate walking and biking within the site. As part of a separate project, the City plans to construct a pedestrian bridge between redevelopment area 10 and Boulevard Park to the southeast of area 10. The trail provides an additional link to the South Bay Trail system.

The development would include wide sidewalks and pedestrian crossings to create a pedestrian-friendly environment. Access to downtown, WWU, and other off-site locations would be facilitated by five connections including Central Avenue, Bay Street, Commercial Street, Laurel Street, and Wharf Street. All locations would provide sidewalks and pedestrian crossings.

Future development and the consequent increase in vehicular volumes is expected to proportionally increase observed conflicts with pedestrians and bicyclists that exist today. Alternative 2 2026 conflicts would likely be greater than those expected with No-Action since pedestrian/bicycle trips for Alternative 2 are likely to be greater. While conflicts between motorized and non-motorized transport can be expected to increase where motorized transport increases, it is clear from the description of the pedestrian and bicycle site components discussed above the Port and the City envision a development plan that strives to minimize these conflicts. The New Whatcom Project would enhance pedestrian and bicycle usage on and around the site as part of its overall development plan. The City also has planned improvements such as pedestrian and safety enhancements along Roeder Avenue, and pedestrian and bicycle improvements downtown. Therefore, Alternative 2 2026 non-motorized impacts are expected to be minimal.

Transit

Alternative 2 is expected to generate about 4,200 daily transit trips by 2026. Therefore, with the addition of Alternative 2 2026 daily transit trips, ridership is projected to be 35,700 boardings per day. The passenger loading ratio would be about 1.55 for Alternative 2 2026 which exceeds WTA's 1.25 standard for seating capacity²⁰. In addition, the Alternative 2 2026 passenger loading ratio of 1.55 is greater than the No-Action 2026 passenger loading ratio of 1.36. Because Alternative 2 2026 would exceed WTA's standard and the anticipated passenger loading ratio would be greater than the No-Action 2026 conditions, it would impact the transit system. An increase in transit service in the vicinity of the site as well as service and stops on-site would be required to support future growth and transit demand.

²⁰ Passenger loading ratio is calculated in the same manner as the No-Action Alternative. Seating capacity, 23,100 seats per day, remains the same for the evaluation of 2016 conditions.

Rail

The location of rail crossings for Alternative 2 2026 would be the same as Alternative 2 2016. Alternative 2 2026 would generate more vehicular and non-motorized trips than the No-Action 2026 conditions; therefore, the chances of conflicts and potential safety issues with trains at at-grade rail crossings are greater. At-grade crossings also increase delays to vehicular traffic that must stop as trains pass through intersections. The elimination of the BNSF railway on-site creates safer rail conditions and is an improvement over the No-Action Alternative. Construction of the bridges over the railroad would provide emergency access to redevelopment area 2 through 10, as certain intersection would not be blocked by rail operations. As discussed previously, within redevelopment area 1, all at-grade crossings would remain, potentially delaying entry of emergency vehicles during the passage of trains since they would need to access Roeder Avenue at Bay Street or another location without an at-grade railroad crossing.

Parking

The majority of parking for the proposed project would be located on-site. Alternative 2 would provide 12,668 parking spaces in 2026. Detailed parking calculations are provided in Appendix N-5. Table 38 summarizes the parking demand and supply for Alternative 2 2026 conditions.

Table 38. Alternative 2 2026 Parking Demand and Supply

Parking Sub-Area	Hourly Parking Demand ¹	Proposed Parking	Recommended Supply Range ²		Parking Surplus/Deficiency Range	
1	2,280	3,208	2,508	2,622	700	586
2, 3, 5	2,852	3,795	3,137	3,280	658	515
4, 6, 7, 8	3,282	3,534	3,610	3,774	-76	-240
9	1,238	1,570	1,362	1,424	208	146
10	<u>455</u>	<u>561</u>	<u>501</u>	<u>523</u>	<u>60</u>	<u>38</u>
Total	10,107	12,668	11,118	11,623	1,550	1,045

Source: Collins Woerman and The Transpo Group (August 2007)

1. Hourly parking demand represents the maximum hourly demand within the redevelopment area.

2. Recommended supply is 10 to 15 percent more than the parking demand to reduce vehicles re-circulating through the parking areas.

As shown in the table, the hourly parking demand for Alternative 2 in 2026 is approximately 10,100 vehicles, which can be accommodated by the overall proposed parking supply. However, based on the recommended parking supply for the redevelopment areas 4, 6, 7, and 8 parking sub-area, there is a deficiency of 80 to 240 parking spaces. However, there is a surplus in all other parking areas so this deficiency could be accommodated on-site. This is not considered an impact because as the master plan for the New Whatcom site is developed it is assumed that parking supply and adopted standards will require that each future redevelopment project will accommodate that project's parking demand.

Similar to No-Action 2026 conditions, it is likely that some users of the site would park off-site when visiting multiple destinations in the area. Based on the parking utilization survey, there are currently about 570 available off-site parking spaces within ¼-mile of

the site. Since a majority of the vehicles would park on-site there would be minimal impacts to off-site parking.

Alternative 2A Medium Density, Delayed Relocation of Railroad

Alternative 2A would develop the same medium density land uses, and ultimately similar infrastructure improvements as Alternative 2. However, the key difference between Alternative 2A and Alternative 2 is the phasing of on-site infrastructure improvements and the relocation of the railroad within redevelopment areas 2 through 10. Therefore, since the land uses are the same for the two alternatives, and the on-site infrastructure is the same within redevelopment area 1, impacts for all modes within redevelopment area 1 are expected to be the same. In addition, the non-motorized, transit, and parking impacts as well as off-site impacts for all modes are expected to be the same. The evaluation of Alternative 2A impacts focuses on the on-site operations for the street system and rail within redevelopment areas 2 through 10. The off-site impacts are expected to be the same as Alternative 2.

2016

The evaluation of Alternative 2A 2016 operations and comparison to the No-Action and Alternative 2 2016 illustrates the expected transportation environment with Alternative 2A as well as how the transportation system would operate relative to No-Action and Alternative 2 conditions. The roadway infrastructure for Alternative 2A would be similar to Alternative 2 by 2016 with the following exceptions:

- The Cornwall Avenue Bridge would remain open.
- The Laurel Street Bridge would not be constructed.
- The railroad would not be relocated.

Street System

Alternative 2A 2016 PM peak hour travel forecasts were used to evaluate on-site roadways and intersections to gain an understanding of how the street system would operate. Figure 21 presents traffic volumes for the street system on-site for Alternative 2A 2016 conditions. Performance of the street system is measured by determining intersection LOS and safety.

Impacts to the street system are measured by determining roadway and intersection LOS. Table 39 provides a comparison of No-Action, Alternative 2, and Alternative 2A 2016 on-site roadway and intersection operations²¹.

²¹ Appendix B provides detailed intersection LOS worksheets for Alternative 1 2016 PM peak hour conditions. Appendix E provides the entire roadway segment analysis.

Table 39. 2016 No-Action, Alternative 2, Alternative 2A—PM Peak Hour On-Site Roadway and Intersection Operations

Roadways ¹	No-Action			Alternative 2			Alternative 2A		
	LOS ²	Volume	V/C ³	LOS ²	Volume	V/C ³	LOS ²	Volume	V/C ³
Roeder Avenue – Broadway Street to F Street (SEB)	D	765	0.82	D	800	0.85	D	800	0.85
Roeder Avenue – Broadway Street to F Street (NWB)	D	780	0.83	D	750	0.80	D	750	0.80
Roeder Avenue – F Street to C Street (SEB)	C	680	0.72	C	695	0.74	C	695	0.74
Roeder Avenue – F Street to C Street (NWB)	B	615	0.66	B	585	0.62	B	585	0.62
Roeder Avenue – C Street to Central Avenue (SEB)	C	675	0.72	D	815	0.87	D	815	0.87
Roeder Avenue – C Street to Central Avenue (NWB)	C	665	0.71	B	580	0.62	B	580	0.62
Roeder Avenue – Central Avenue to Bay Street (SEB)	D	800	0.85	D	815	0.87	D	815	0.87
Roeder Avenue – Central Avenue to Bay Street (NWB)	A	460	0.49	A	355	0.38	A	355	0.38
Central Avenue – Laurel Street to Roeder Avenue (NEB)	-	-	-	A	160	0.20	A	160	0.20
Commercial Street – Laurel Street to Maple Street (NEB)	-	-	-	-	-	-	-	-	-
Cornwall Avenue – Wharf Street to Maple Street (NEB)	D	710	0.87	A	75	0.09	A	155	0.19
Cornwall Avenue – Maple Street to Chestnut Street (NEB)	D	710	0.87	B	500	0.62	C	585	0.72
Intersections ^{1,7}	LOS ²	V/C ⁵		LOS ²	V/C ⁵		LOS ²	V/C ⁵	
		Delay ⁴	or WM ⁶		Delay ⁴	or WM ⁶		Delay ⁴	or WM ⁶
4. Roeder Avenue/Central Avenue	F	>200	NB/SB	F	>200	NB	F	>200	NB
5. West Chestnut Street/Bay Street/Roeder Avenue	F	>200	SBL	F	>200	SBL	F	>200	SBL
7. East Chestnut Street/Cornwall Avenue	E	57	1.09	C	21	0.82	C	31	0.96

Source: The Transpo Group (August 2007)

Notes: SEB = south-eastbound; NWB = north-westbound; NEB = north-eastbound

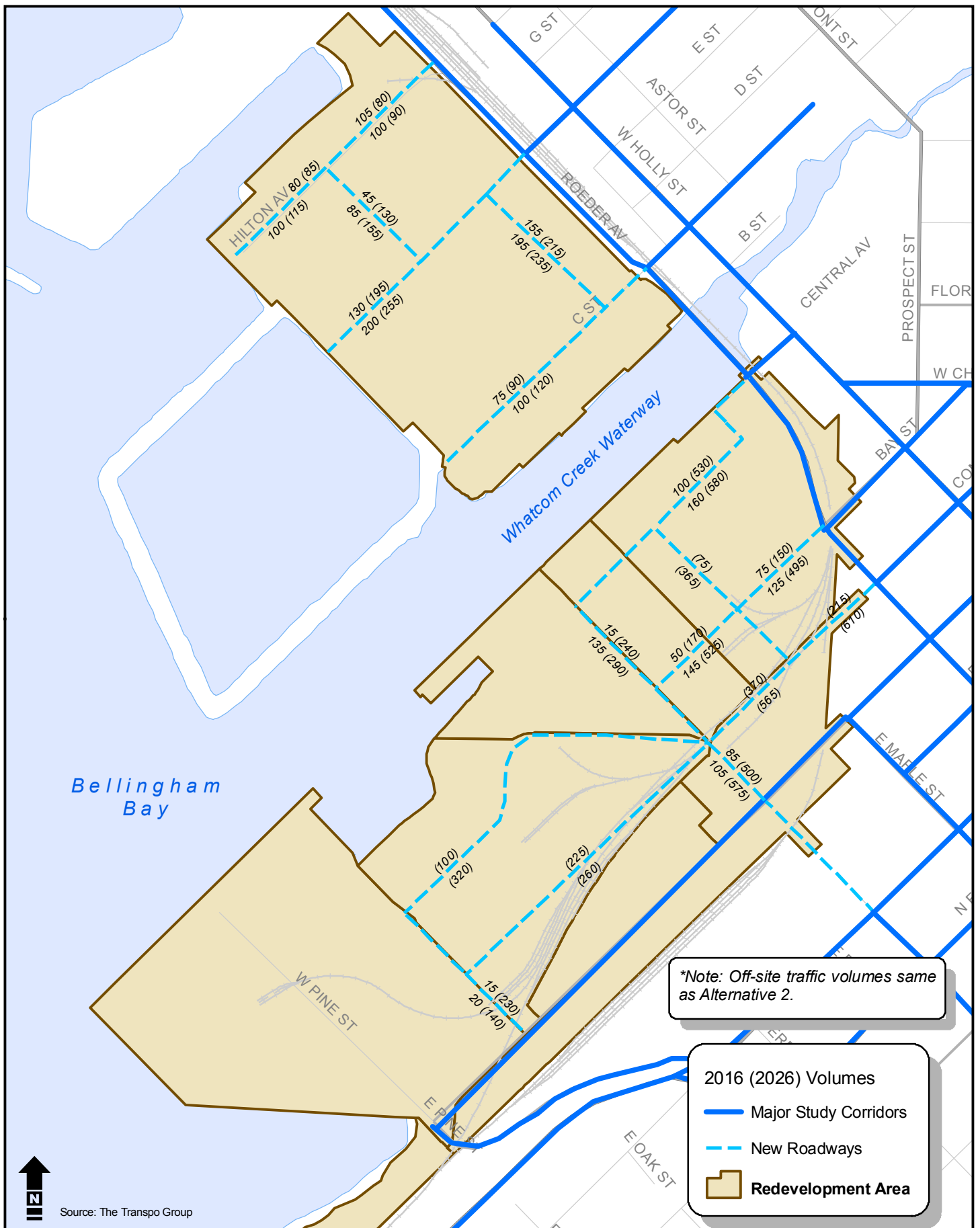
- Operations are shown for locations which operate at LOS E or worse for one more of the New Whatcom Site Alternatives (see Appendix N-1 for a complete summary).
- Level of service, based on 2000 *Highway Capacity Manual* methodology.
- Volume-to-capacity ratio reported for roadway segments.
- Average delay in seconds per vehicle.
- Volume-to-capacity ratio reported for signalized intersections.
- Worst movement for unsignalized intersections. This is not applicable (NA) to all-way stop controlled intersections.
- The on-site intersection operations for Alternatives 2 and 2A for intersection numbers 1, 2, and 3 are the same and therefore not shown.

As shown in the table, on-site roadway and intersection operations would be about the same for No-Action, Alternative 2, and Alternative 2A 2016 conditions. Similar to Alternative 2, Alternative 2A would impact the following intersections by worsening LOS F conditions:

- Roeder Avenue/Central Avenue
- West Chestnut Street/Bay Street/Roeder Avenue

Both Alternative 2 and Alternative 2A would improve operations at the East Chestnut Street/Cornwall Avenue intersection from LOS E to LOS C conditions due to additional access to the site. This intersection would operate slightly better with Alternative 2 conditions because this Alternative provides additional access to the site with construction of the Laurel Street Bridge. In addition, traffic volumes along Laurel Street would decrease with Alternative 2A because the bridge would not be constructed so travel patterns within the development would be different. This decrease in traffic volumes would improve intersection operations along Laurel Street within the site.

The on-site street system analysis of Alternative 2A 2016 shows that the new Laurel Street Bridge would not be necessary to support development of the first phase of development since intersection operations are similar for both Alternative 2 and 2A. Although the Laurel Street Bridge would provide some congestion relief to site access locations along Chestnut Street, improvements would still be required at the Central Avenue and Bay Street site access locations.



Source: The Transpo Group

Figure 21
Alternative 2A PM Peak Hour Traffic Volumes

Rail

The railroad would not be relocated for Alternative 2A 2016. Similar to the No-Action 2016 conditions, under Alternative 2A 2016 conditions, six at-grade crossings would remain—one would be located internal to the site at Laurel Street and five would be located at the site accesses at F Street, C Street, Central Avenue, Cornwall Avenue and Wharf Street/Pine Street. Currently the C Street crossing does not have a gate which is a potential safety issue for vehicles, pedestrians, and bicyclist. Since Alternative 2A 2016 would have more rail crossings than Alternative 2, its impacts are likely greater.

Alternative 2A 2016 would generate more vehicular and non-motorized trips than the No-Action 2016 conditions; therefore, the chances of conflicts and potential safety issues with trains at at-grade rail crossings are greater. At-grade crossings also increase delays to vehicular traffic that must stop as trains pass through intersections. The elimination of the BNSF railway on-site creates safer rail conditions and is an improvement over the No-Action Alternative. Construction of the Bay Street Bridge over the railroad would provide emergency access to redevelopment area 2 through 10, as certain intersections would not be blocked by rail operations. Similar to Alternative 2 2016, all at-grade crossings would remain within area 1 potentially delaying emergency response to this area when trains cross the site access locations since they would need to access Roeder Avenue at Bay Street or another location without an at-grade railroad crossing.

2026

The evaluation of Alternative 2A 2026 operations and comparison to Alternative 2 and No-Action 2026 conditions provides an understanding of the expected transportation environment with Alternative 2A as well as how the transportation system would operate relative to Alternative 2 and No-Action conditions. The roadway infrastructure for Alternative 2A would be similar to Alternative 2 by 2026 with the following exceptions:

- The railroad would be relocated by 2026.
- The Laurel Street Bridge would be constructed by 2026.
- The Cornwall Avenue Bridge would be reconstructed to meet with the Laurel Street Bridge.

Street System

Alternative 2A 2026 PM peak hour travel forecasts were used to evaluate on-site roadways and intersections to gain an understanding of how the on-site street system would operate. Figure 21 presents traffic volumes for the street system on-site for Alternative 2A 2026 conditions.

Impacts to the street system are measured by determining roadway and intersection LOS. Table 40 provides a comparison of No-Action, Alternative 2, and Alternative 2A 2026 on-site roadway and intersection operations²².

Table 40. 2026 No-Action, Alternative 2, Alternative 2A—PM Peak Hour On-Site Roadway and Intersection Operations

Roadways ¹	No-Action			Alternative 2			Alternative 2A		
	LOS ²	Volume	V/C ³	LOS ²	Volume	V/C ³	LOS ²	Volume	V/C ³
Roeder Avenue – Broadway Street to F Street (SEB)	E	895	0.95	E	940	1.00	E	940	1.00
Roeder Avenue – Broadway Street to F Street (NWB)	F	1,400	1.49	F	1,045	1.11	F	1,045	1.11
Roeder Avenue – F Street to C Street (SEB)	E	855	0.91	E	905	0.96	E	905	0.96
Roeder Avenue – F Street to C Street (NWB)	E	865	0.92	E	920	0.98	E	920	0.98
Roeder Avenue – C Street to Central Avenue (SEB)	F	990	1.06	F	1,070	1.14	F	1,070	1.14
Roeder Avenue – C Street to Central Avenue (NWB)	E	870	0.93	F	1,005	1.07	F	1,005	1.07
Roeder Avenue – Central Avenue to Bay Street (SEB)	E	910	0.97	D	810	0.86	D	840	0.90
Roeder Avenue – Central Avenue to Bay Street (NWB)	C	665	0.71	C	690	0.74	C	675	0.72
Central Avenue – Laurel Street to Roeder Avenue (NEB)	-	-	-	C	630	0.77	C	580	0.71
Commercial Street – Laurel Street to Maple Street (NEB)	-	-	-	C	585	0.72	B	565	0.69
Cornwall Avenue – Wharf Street to Maple Street (NEB)	F	1,035	1.27	A	130	0.16	A	315	0.39
Cornwall Avenue – Maple Street to Chestnut Street (NEB)	F	1,035	1.27	D	680	0.84	E	800	0.98
Intersections ^{1,7}	V/C ⁵ or WM ⁶			V/C ⁵ or WM ⁶			V/C ⁵ or WM ⁶		
	LOS ²	Delay ⁴		LOS ²	Delay ⁴		LOS ²	Delay ⁴	
4. Roeder Avenue/Central Avenue	F	>200	NB/SB	F	>200	NB/SB	F	>200	NB/SB
5. West Chestnut Street/Bay Street/Roeder Avenue	F	>200	SBL	F	>200	NB/SB	F	>200	NBL/SBL
6. West Chestnut Street/Commercial Street	B	16	0.70	D	52	1.08	D	39	0.85
7. East Chestnut Street/Cornwall Avenue	F	>200	1.47	E	68	1.10	F	92	1.21

Source: The Transpo Group (August 2007)

Notes: **Bold:** Indicates locations operating below existing LOS standards. SEB = south-eastbound; NWB = north-westbound; NEB = north-eastbound

- Operations are shown for locations which operate at LOS E or worse for one more of the New Whatcom Site Alternatives (see Appendix N-1 for a complete summary).
- Level of service, based on 2000 *Highway Capacity Manual* methodology.
- Volume-to-capacity ratio reported for roadway segments.
- Average delay in seconds per vehicle.
- Volume-to-capacity ratio reported for signalized intersections.
- Worst movement for unsignalized intersections. This is not applicable (NA) to all-way stop and roundabout controlled intersections.
- The on-site intersection operations for Alternatives 2 and 2A for intersection numbers 1, 2, and 3 are the same and therefore not shown.

²² Appendix B provides detailed intersection LOS worksheets for Alternative 1 2016 PM peak hour conditions. Appendix E provides the entire roadway segment analysis.

Alternative 2 and 2A 2026 roadway operations would be the same. As shown in the table, relative to No-Action, Alternative 2A would impact the following roadways and intersections by worsening LOS F conditions or degrading operations to LOS F:

- Roeder Avenue between C Street and Central Avenue in the north-westbound and south-eastbound directions
- Roeder Avenue/Central Avenue
- West Chestnut Street/Bay Street/Roeder Avenue
- East Chestnut Street/Cornwall Avenue

In addition, as shown in Appendix N-1, relative to Alternative 2, Alternative 2A would improve intersection operations at the following locations:

- West Chestnut Street/Commercial Street
- Maple Street/Central Avenue
- Maple Street/Bay Street
- Laurel Street/Bay Street
- Laurel Street/Commercial Street/Log Pond Road

This improvement is due to the additional access provided with providing the Cornwall Avenue Bridge.

The on-site one lane roundabout at the Laurel Street/Commercial Street/Log Pond Road intersection would operate at LOS B (see Appendix N-1 for LOS and average intersection delay). The 95th percentile queue at this intersection is anticipated to be 400 feet on the eastbound Laurel Street approach. This long vehicle queues would spillback into the adjacent Laurel Street/Bay Street intersection and impact its operation. It should be noted that the intersection analysis is for isolated locations and does not account for the interaction of intersections and queue spillback into adjacent intersections. Although Laurel Street/ Bay Street intersection would operate at LOS B as for Alternative 2A an isolated intersection, if the queue spillback from the Laurel Street/Commercial Street/Log Pond Road intersection is considered, operations would likely be much worse.

The roundabout for Alternative 2A would improve because the proposed street network would route less traffic through this intersection than with Alternative 2 because the Cornwall Avenue Bridge would be provided. Even with the Cornwall Avenue Bridge, a majority of the site's traffic would be routed through this intersection which increases the potential conflicts and safety issues between vehicles, pedestrians, and bicyclists. In addition, intersections with five legs typically have the potential for more frequent safety and operational issues than standard intersections because users are less familiar with five leg intersections and may have difficulty maneuvering through them.

Rail

Alternative 2A would eliminate the Laurel Street and Cornwall Avenue at-grade crossings with relocation of the railroad by 2026. Three at-grade crossings would remain at the site accesses—Hilton Avenue, F Street, C Street, and Central Avenue where the railway runs parallel to Roeder Avenue. The C Street crossing does not have a gate which is an unsafe condition for vehicles, pedestrians, and bicyclist. Rail impacts for Alternative 2A 2026 would be the same as Alternative 2 2026. Alternative 2/2A 2026 would generate more vehicular and non-motorized trips than the No-Action 2026 conditions; therefore, the chances of conflicts and potential safety issues with trains at at-grade rail crossings are greater. At-grade crossings also increase delays to vehicular traffic that must stop as trains pass through intersections. The elimination of the BNSF railway on-site creates safer rail conditions and is an improvement over the No-Action Alternative. Construction of bridges over the railroad would provide emergency access to redevelopment area 2 through 10, as certain intersections would not be blocked by rail operations. As discussed previously, within redevelopment area 1, all at-grade crossings would remain, potentially delaying entry of emergency vehicles with the passage of trains since they would need to access Roeder Avenue at Bay Street or another location without an at-grade railroad crossing.

Alternative 3

Alternative 3 would develop approximately 1.7 million square feet of mixed-use development in 2016 and an additional 2.3 million square feet of development in 2026, for a total of 4.0 million square feet of development. This Alternative would require a change in the current site zoning from industrial to industrial/waterfront mixed-use. Alternative 3 would generate approximately 1,100 net new PM peak hour vehicle trips in 2016 and an additional 2,000 net new PM peak hour vehicle trips in 2026, for a total of about 3,100 vehicle trips. This section first discusses 2016 Alternative 3 on-site and off-site operations and then 2026 Alternative 3 on-site and off-site operations. Operations are compared to the No-Action Alternative to determine the impacts of Alternative 3.

2016

The evaluation of Alternative 3 2016 operations and comparison to the No-Action 2016 conditions provides an understanding of the expected transportation environment with Alternative 3 as well as how the transportation system would operate relative to No-Action conditions. For the 2016 phase of the project, Alternative 3 would generate approximately 1,100 net new PM peak hour vehicle trips which is about 300 more net new PM peak hour vehicle trips than the No-Action Alternative.

As discussed previously, the Alternative 3 on-site transportation system would remain the same as existing with the exceptions of the following improvement:

- Cornwall Avenue would be extended to redevelopment area 10 to provide access to that area.

The site would provide a limit park and trail system as well as sidewalks, crosswalks, and accommodations for bicyclists within the street right-of-way. The off-site transportation system for Alternative 3 by 2016 would be the same as the No-Action Alternative transportation system.

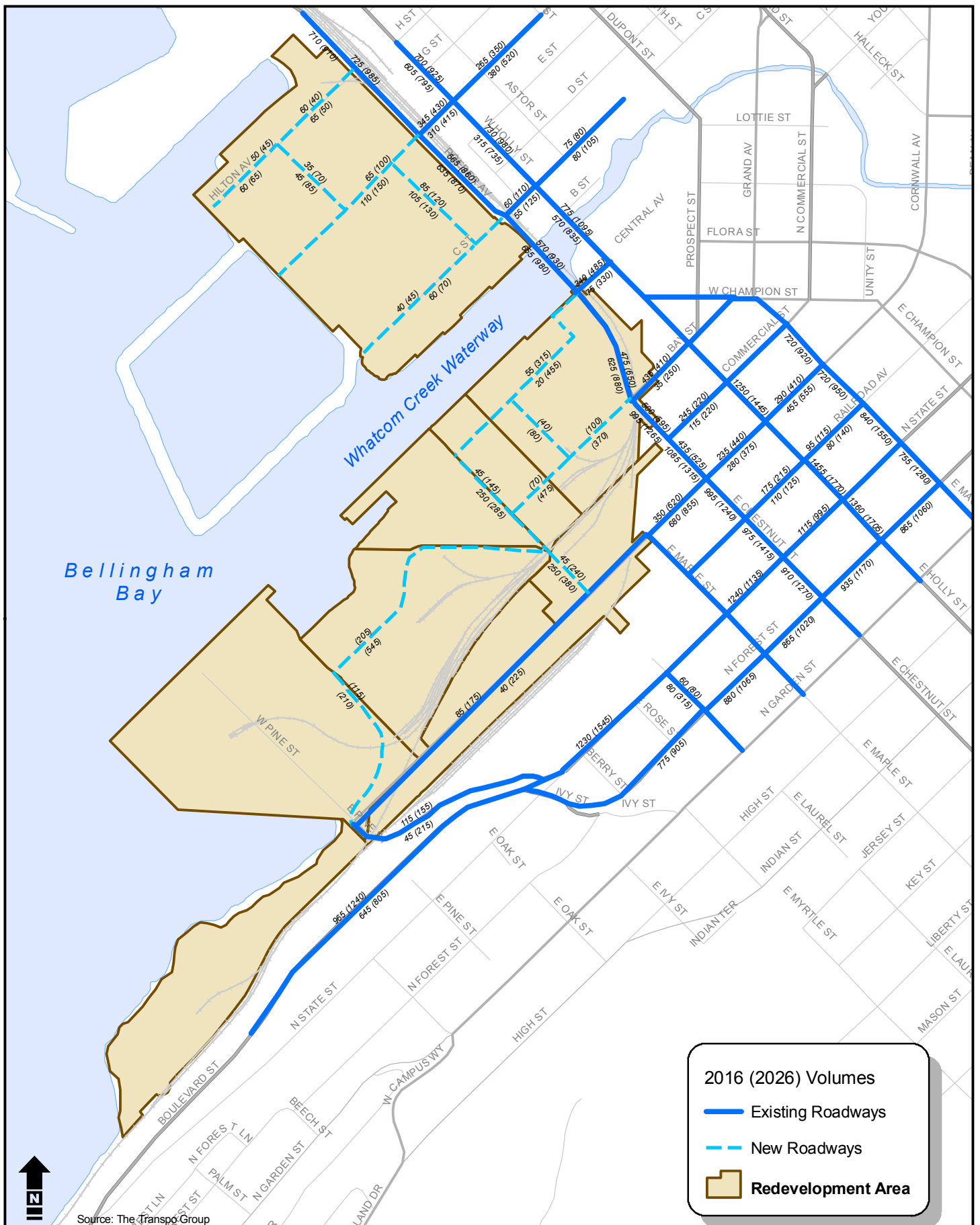


Figure 22
Alternative 3 PM Peak Hour Traffic Volumes

New Whatcom
Redevelopment EIS

Street System

Alternative 3 2016 PM peak hour travel forecasts were used to evaluate on- and off-site roadways and intersections to gain an understanding of how the street system would operate. Figure 22 presents link volumes for the street system on-site and in the vicinity of the site for Alternative 3 2016 conditions. Impacts to the street system are measured by determining roadway and intersection LOS. Tables 41 and 42 provide a comparison of No-Action and Alternative 3 2016 on-site and off-site roadway and intersection operations²³.

Table 41. 2016 No-Action and Alternative 3—PM Peak Hour On-Site Roadway and Intersection Operations

Roadways ¹	No-Action			Alternative 3		
	LOS ²	Volume	V/C ³	LOS ²	Volume	V/C ³
Roeder Avenue – Broadway Street to F Street (SEB)	D	765	0.82	C	710	0.76
Roeder Avenue – Broadway Street to F Street (NWB)	D	780	0.83	C	725	0.77
Roeder Avenue – F Street to C Street (SEB)	C	680	0.72	B	635	0.68
Roeder Avenue – F Street to C Street (NWB)	B	615	0.66	A	565	0.60
Roeder Avenue – C Street to Central Avenue (SEB)	C	675	0.72	B	655	0.70
Roeder Avenue – C Street to Central Avenue (NWB)	C	665	0.71	B	570	0.61
Roeder Avenue – Central Avenue to Bay Street (SEB)	D	800	0.85	B	625	0.67
Roeder Avenue – Central Avenue to Bay Street (NWB)	A	460	0.49	A	475	0.51
Central Avenue – Laurel Street to Roeder Avenue (NEB)	-	-	-	A	20	0.02
Commercial Street – Laurel Street to Maple Street (NEB)	-	-	-	-	-	-
Cornwall Avenue – Wharf Street to Maple Street (NEB)	D	710	0.87	A	40	0.05
Cornwall Avenue – Maple Street to Chestnut Street (NEB)	D	710	0.87	D	680	0.84

Intersections ¹	LOS ²	Delay ⁴	V/C ³ or WM ⁶	LOS ²	Delay ⁴	V/C ³ or WM ⁶
1. Roeder Avenue/Hilton Avenue	F	84	NB	F	86	NB
2. Roeder Avenue/F Street	D	48	0.69	D	44	0.66
3. Roeder Avenue/C Street	F	114	NB/SB	F	174	SB
4. Roeder Avenue/Central Avenue	F	>200	NB/SB	F	>200	SB
5. West Chestnut Street/Bay Street/Roeder Avenue	F	>200	SBL	F	>200	SB
7. East Chestnut Street/Cornwall Avenue	E	57	1.09	D	43	1.03

Source: The Transpo Group (August 2007)

Notes: SEB = south-eastbound; NWB = north-westbound; NEB = north-eastbound

1. Operations are shown for locations which operate at LOS E or worse for one more of the New Whatcom Site Alternatives (see Appendix N-1 for a complete summary).

2. Level of service, based on 2000 *Highway Capacity Manual* methodology.

3. Volume-to-capacity ratio reported for roadway segments.

4. Average delay in seconds per vehicle.

5. Volume-to-capacity ratio reported for signalized intersections.

6. Worst movement for unsignalized intersections. This is not applicable (NA) to all-way stop controlled intersections.

As shown in the table, all on-site roadways would meet the City's LOS E standard. Several of the site access intersections along Chestnut Street and Roeder Avenue would

²³ Appendix B provides detailed intersection LOS worksheets for Alternative 1 2016 PM peak hour conditions. Appendix E provides the entire roadway segment analysis.

continue to operate at LOS F with the addition of Alternative 2 2016 traffic. These intersections, listed below, would be impacted by Alternative 3 2016 traffic:

- Roeder Avenue/Hilton Avenue
- Roeder Avenue/C Street
- Roeder Avenue/Central Avenue
- West Chestnut Street/Bay Street/Roeder Avenue

The most significant change in 2016 between No-Action and Alternative 3 is that operations would improve along some of the roadway segments and at the East Chestnut Street/Cornwall Avenue intersection. This is because the No-Action Alternative would generate slightly more vehicle trips than Alternative 3 within redevelopment areas 2 through 10 by 2016.

Table 42. 2016 No-Action and Alternative 3—PM Peak Hour Off-Site Roadway and Intersection Operations

Roadways ¹	No-Action			Alternative 3		
	LOS ²	Volume	V/C ³	LOS ²	Volume	V/C ³
Holly Street – Broadway Street to F Street (SEB)	B	560	0.69	C	605	0.74
Holly Street – Broadway Street to F Street (NWB)	D	675	0.83	D	700	0.86
Holly Street – F Street to Central Avenue (SEB)	A	475	0.58	A	315	0.39
Holly Street – F Street to Central Avenue (NWB)	D	715	0.88	D	730	0.90
Holly Street – Central Avenue to Champion Street (SEB)	B	535	0.66	B	570	0.70
Holly Street – Central Avenue to Champion Street (NWB)	E	775	0.95	E	775	0.95
Cornwall Avenue – Chestnut Street to Holly Street (NEB)	A	290	0.36	A	280	0.34

Intersections ¹	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶
1. Meridian Street/Birchwood Avenue	E	65	0.87	E	63	0.86
2. Meridian Street/Squalicum Way	D	42	0.63	D	40	0.63
6. West Holly Street/F Street	C	25	0.67	C	24	0.69
7. West Holly Street/ C Street	F	127	SB	F	166	SB
8. Cornwall Avenue/Flora Street/York Street	C	21	0.75	C	20	0.74
11. East Chestnut Street/Railroad Avenue	F	168	SB	F	87	SB
15. Lakeway Drive/Ellis Street/Jersey Street/East Holly Street	D	37	0.85	D	37	0.85
16. Lakeway Drive/I-5 Southbound Ramps	D	38	0.93	D	46	0.99
17. Lakeway Drive/King Street	D	47	0.78	D	46	0.78
18. Lakeway Drive/Lincoln Street	D	47	0.90	D	45	0.89
19. Iowa Street/Moore Street/I-5 Northbound Ramps	D	47	0.99	D	43	0.96
21. North State Street/James Street/Iowa Street	F	>200	2.59	F	>200	2.81
22. North State Street/Ohio Street	D	37	0.85	D	37	0.89
24. North State Street/East Laurel Street	D	27	EB	D	27	EB
25. North Forest Street/ North State Street/Boulevard Street/Wharf Street ⁶						
a. North Forest Street/North State Street/Boulevard Street	D	28	SBL	D	28	SBL
b. North State Street/Wharf Street	C	21	EB	C	19	EB
26. North Forest Street/East Laurel Street	C	20	EB	C	22	EB
28. South Samish Way/Elwood Avenue/Lincoln Street	C	34	0.85	D	38	0.88

Source: The Transpo Group (August 2007)

Notes: SEB = south-eastbound; NWB = north-westbound; NEB = north-eastbound

1. Operations are shown for locations which operate at LOS E or worse for one more of the New Whatcom Site Alternatives (see Appendix N-1 for a complete summary).

2. Level of service, based on 2000 *Highway Capacity Manual* methodology.

3. Average delay in seconds per vehicle.

4. Volume-to-capacity ratio reported for roadway segments and signalized intersections.

5. Worst movement for unsignalized intersections. This is not applicable (NA) to all-way stop controlled intersections.

6. This intersection operates as two separate intersections in the field; therefore, the analysis was conducted as such.

Alternative 3 2016 off-site roadway and intersection operations would be similar to the No-Action Alternative. All off-site roadways are expected to meet the City's LOS E standard with the addition of Alternative 3 2016 traffic. Alternative 3 would not cause

any LOS F intersection operations. As shown in Table 42, Alternative 3 2016 would impact the following intersections by worsening LOS F operations:

- West Holly Street/C Street
- North State Street/James Street/Iowa Street

This change in intersection operations is due to the increase in traffic volume with the addition of Alternative 3 2016 traffic. The East Chestnut Street/Railroad Avenue intersection would improve slightly because Alternative 3 2016 would generate slightly less traffic than the No-Action Alternative by 2016.

Non-Motorized

Alternative 3 2016 is projected to generate about 3,500 daily pedestrian/bicycle trips. This is most likely greater than the No-Action Alternative pedestrian/bicycle trips since the land uses for Alternative 3 (i.e., residential, office, and retail) typically produce more non-motorized traffic than industrial uses.

Alternative 3 would provide a more limited sidewalk and trail system on-site as compared to Alternatives 1 and 2. Similar to downtown, the development would include wide sidewalks and pedestrian crossings to create a pedestrian-friendly environment. In 2016, access to downtown, WWU, and other off-site locations would be limited to the existing connections including Cornwall Avenue and Central Avenue. As part of a separate project, the City plans to construct a pedestrian bridge between redevelopment area 10 and Boulevard Park to the southeast of area 10. The trail provides an additional link to the South Bay Trail system.

Future development and the consequent increase in vehicular volumes is expected to proportionally increase observed conflicts with pedestrians and bicyclists that exist today. Alternative 3 2016 conflicts would likely be greater than those expected with No-Action since pedestrian/bicycle trips for Alternative 3 are likely to be greater. The New Whatcom Project would enhance pedestrian and bicycle usage on and around the site as part of its overall development plan; however, with Alternative 3 the enhancements would be less than the other Action Alternatives. The City also has planned improvements such as pedestrian and safety enhancements along Roeder Avenue, and pedestrian and bicycle improvements downtown. Alternative 3 2016 non-motorized impacts are expected to be less than the No-Action Alternative.

Transit

Alternative 3 is expected to generate about 1,000 daily transit trips. These transit trips are assumed to be in addition to the No-Action transit trips already incorporated into the WTA's ridership and seating capacity projections²⁴. Therefore, with the addition of Alternative 3 2016 daily transit trips, ridership is projected to be 18,600 boardings per

²⁴ This is a conservative estimate of Alternative 3 2016 transit ridership. The City's *2005 Comprehensive Plan* and WTA's *Six-Year Strategic Service Plan* assumes some level of development on the New Whatcom site; therefore, this method may overestimate a portion of the Action Alternatives' ridership.

day. The passenger loading ratio would be about 1.19 for Alternative 3 2016 which is less than WTA's 1.25 standard for seating capacity²⁵.

The No-Action 2016 passenger loading ratio would be 1.13 which is less than the 1.19 ratio projected for Alternative 3 2016 conditions. Because Alternative 3 2016 meets WTA's 1.25 standard, the increase in passenger loading ratio is not considered an impact. However, the transit system would need to be modified to incorporate stops and service on-site to support the future development.

Rail

Similar to No-Action conditions, six at-grade crossings would remain—one would be located internal to the site at Laurel Street and five would be located at the site accesses at F Street, C Street, Central Avenue, Cornwall Avenue and Wharf Street/Pine Street. Currently the C Street crossing does not have a gate which is a potential safety issue for vehicles, pedestrians, and bicyclists.

Alternative 3 2016 would generate slightly more vehicular and non-motorized trips than the No-Action 2016 conditions; therefore, the chances of conflicts and potential safety issues with trains at at-grade rail crossings are greater. At-grade crossings also increase delays to vehicular traffic that must stop as trains pass through intersections. Similar to the No-Action Alternative, emergency access to/from the New Whatcom would potentially be delayed during the passage of trains since all site access locations would have at-grade crossings.

Parking

The majority of parking for the proposed project would be located on-site. Alternative 3 would provide 3,461 parking spaces in 2016. Table 43 summarizes the parking demand and supply for Alternative 3 2016 conditions. Detailed parking calculations are provided in Appendix N-5.

Table 43. Alternative 3 2016 Parking Demand and Supply

Parking Sub-Area	Hourly Parking Demand ¹	Proposed Parking	Recommended Supply Range ²		Parking Surplus/Deficiency Range	
1	1,121	1,682	1,233	1,289	449	393
2, 3, 5	414	533	455	476	78	57
4, 6, 7, 8	815	734	897	937	-162	-203
9	129	171	142	148	29	23
10	<u>276</u>	<u>341</u>	<u>304</u>	<u>317</u>	<u>37</u>	<u>23</u>
Total	2,755	3,461	3,031	3,168	431	293

Source: The Transpo Group (August 2007)

1. Hourly parking demand represents the maximum hourly demand within the parking sub-area.

2. Recommended supply is 10 to 15 percent more than the parking demand to reduce vehicles re-circulating through the parking areas.

²⁵ Passenger loading ratio is calculated in the same manner as the No-Action Alternative. Seating capacity, 15,600 seats per day, remains the same for the evaluation of 2016 conditions.

As shown in the table, the hourly parking demand for Alternative 3 by 2016 is approximately 2,800 vehicles, which can be accommodated by the overall proposed parking supply. However, based on the recommended parking supply for the redevelopment areas 4, 6, 7, and 8 parking sub-area, there is a deficiency of 160 to 200 parking spaces. However, there is a surplus in all other parking areas so this deficiency could be accommodated on-site. This is not considered an impact because as the master plan for the New Whatcom site is developed it is assumed that parking supply and adopted standards will require that each future redevelopment project will accommodate that project's parking demand.

Similar to No-Action 2016 conditions, it is likely that some users of the site would park off-site when visiting multiple destinations in the area. Based on the parking utilization survey, there are currently about 570 available off-site parking spaces within ¼-mile of the site. Since a majority of the vehicles would park on-site there would be minimal impacts to off-site parking.

2026

The evaluation of Alternative 3 2026 operations and comparison to No-Action 2026 provides an understanding of the expected transportation environment with Alternative 3 as well as how the transportation system would operate relative to No-Action conditions. With completion of the second phase of development in 2026, Alternative 3 would generate about 3,100 net new PM peak hour vehicle trips which is about 1,300 more net new PM peak hour vehicle trips than the No-Action Alternative.

As discussed previously and shown in Table 15, Alternative 3 would provide additional improvements to the on-site transportation by 2026 including:

- Upgrading Central Avenue and extending it to Laurel Street
- Constructing the Bay Street Bridge and extending this roadway to Laurel Street
- Realigning Cornwall Avenue rail-crossing near the Wharf Street/Oak Street intersection
- Constructing Maple Street through redevelopment area 2 between Bay Street and Central Avenue
- Providing Oak Street between Bay Street and Cornwall Avenue

The site would provide a more limited park and trail system than Alternatives 1 and 2 as well as sidewalks, crosswalks, and accommodations for bicyclists within the street right-of-way. The off-site transportation system for Alternative 3 by 2036 would be the same as the No-Action Alternative transportation system.

Street System

Alternative 3 2026 PM peak hour travel forecasts were used to evaluate on- and off-site roadways and intersections to gain an understanding of how the street system would operate. Figure 22 presents link volumes for the street system on-site and in the vicinity

of the site for Alternative 3 2026 conditions. Impacts to the street system are measured by determining roadway and intersection LOS. Tables 44 and 45 provide a comparison of No-Action and Alternative 3 2026 on-site and off-site roadway and intersection operations²⁶.

Laurel Street is assumed to be two lanes per direction under Alternative 3 2026 and all-way stop control is assumed at the Laurel Street/Bay Street intersections.

Roadway operations would slightly improve in comparing the No-Action and Alternative 3 2026 conditions because additional site access would be provided with Alternative 3, which would change travel patterns. As shown in the table, several of the site access intersections along Chestnut Street and Roeder Avenue would continue to operate at LOS F with the addition of Alternative 3 2026 traffic. These intersections, listed below would be impacted by Alternative 3 2026 traffic:

- Roeder Avenue/Hilton Avenue
- Roeder Avenue/F Street
- Roeder Avenue/C Street
- Roeder Avenue/Central Avenue
- West Chestnut Street/Bay Street/Roeder Avenue
- East Chestnut Street/Cornwall Avenue

²⁶ Appendix B provides detailed intersection LOS worksheets for Alternative 1 2016 PM peak hour conditions. Appendix E provides the entire roadway segment analysis.

Table 44. 2026 No-Action and Alternative 3—PM Peak Hour On-Site Roadway and Intersection Operations

Roadways ¹	No-Action			Alternative 3		
	LOS ²	Volume	V/C ³	LOS ²	Volume	V/C ³
Roeder Avenue – Broadway Street to F Street (SEB)	E	895	0.95	E	870	0.93
Roeder Avenue – Broadway Street to F Street (NWB)	F	1,400	1.49	F	985	1.05
Roeder Avenue – F Street to C Street (SEB)	E	855	0.91	E	870	0.93
Roeder Avenue – F Street to C Street (NWB)	E	865	0.92	E	860	0.92
Roeder Avenue – C Street to Central Avenue (SEB)	F	990	1.06	F	980	1.04
Roeder Avenue – C Street to Central Avenue (NWB)	E	870	0.93	E	930	0.99
Roeder Avenue – Central Avenue to Bay Street (SEB)	E	910	0.97	E	880	0.94
Roeder Avenue – Central Avenue to Bay Street (NWB)	C	665	0.71	B	650	0.69
Central Avenue – Laurel Street to Roeder Avenue (NEB)	-	-	-	A	455	0.56
Commercial Street – Laurel Street to Maple Street (NEB)	-	-	-	-	-	-
Cornwall Avenue – Wharf Street to Maple Street (NEB)	F	1,035	1.27	A	225	0.28
Cornwall Avenue – Maple Street to Chestnut Street (NEB)	F	1,035	1.27	F	855	1.05
Intersections ¹	LOS ²	Delay ⁴	V/C ³ or WM ⁶	LOS ²	Delay ⁴	V/C ³ or WM ⁶
1. Roeder Avenue/Hilton Avenue	F	>200	NB	F	>200	NB
2. Roeder Avenue/F Street	F	100	0.90	F	101	0.92
3. Roeder Avenue/C Street	F	>200	NB/SB	F	>200	NB/SB
4. Roeder Avenue/Central Avenue	F	>200	NB/SB	F	>200	NB/SB
5. West Chestnut Street/Bay Street/Roeder Avenue	F	>200	SBL	F	>200	SBL
7. East Chestnut Street/Cornwall Avenue	F	>200	1.47	F	154	1.34

Source: The Transpo Group (August 2007)

Notes: **Bold:** Indicates locations operating below existing LOS standards. SEB = south-eastbound; NWB = north-westbound; NEB = north-eastbound

- Operations are shown for locations which operate at LOS E or worse for one more of the New Whatcom Site Alternatives (see Appendix N-1 for a complete summary).
- Level of service, based on 2000 *Highway Capacity Manual* methodology.
- Volume-to-capacity ratio reported for roadway segments.
- Average delay in seconds per vehicle.
- Volume-to-capacity ratio reported for signalized intersections.
- Worst movement reported for unsignalized intersections. This is not applicable (NA) to all-way stop controlled intersections.

Table 45. 2026 No-Action and Alternative 3—PM Peak Hour Off-Site Roadway and Intersection Operations

Roadways ¹	No-Action			Alternative 3		
	LOS ²	Volume	V/C ³	LOS ²	Volume	V/C ³
Holly Street – Broadway Street to F Street (SEB)	E	775	0.95	E	795	0.98
Holly Street – Broadway Street to F Street (NWB)	F	895	1.10	F	925	1.14
Holly Street – F Street to Central Avenue (SEB)	D	680	0.84	D	735	0.90
Holly Street – F Street to Central Avenue (NWB)	F	980	1.21	F	980	1.21
Holly Street – Central Avenue to Champion Street (SEB)	E	775	0.95	F	835	1.03
Holly Street – Central Avenue to Champion Street (NWB)	F	1100	1.35	F	1095	1.35
Cornwall Avenue –Chestnut Street to Holly Street (NEB)	F	1015	1.25	A	375	0.46

Intersections ¹	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶	LOS ²	Delay ⁴	V/C ⁵ or WM ⁶
1.Meridian Street/Birchwood Avenue	F	128	1.01	F	128	1.01
2.Meridian Street/Squalicum Way	D	53	0.73	D	53	0.73
6.West Holly Street/F Street	C	33	0.89	C	34	0.89
7.West Holly Street/ C Street	F	>200	NB/SB	F	>200	NB/SB
8.Cornwall Avenue/Flora Street/York Street	D	41	0.93	D	40	0.92
11.East Chestnut Street/Railroad Avenue	F	>200	SB	F	>200	SB
15.Lakeway Drive/Ellis Street/Jersey Street/East Holly Street	D	55	0.96	E	57	0.97
16.Lakeway Drive/I-5 Southbound Ramps	F	98	1.16	F	102	1.17
17.Lakeway Drive/King Street	E	69	0.84	E	74	0.81
18.Lakeway Drive/Lincoln Street	E	68	1.07	E	63	0.96
19.Iowa Street/Moore Street/I-5 Northbound Ramps	E	74	1.11	E	78	1.11
21.North State Street/James Street/Iowa Street	F	>200	2.98	F	>200	2.92
22.North State Street/Ohio Street	E	67	1.03	E	69	1.04
24.North State Street/East Laurel Street	F	81	WB	F	>200	WB
25.North Forest Street/ North State Street/Boulevard Street/Wharf Street ⁶						
a. North Forest Street/North State Street/Boulevard Street	F	51	SBL	D	33	SBL
b. North State Street/Wharf Street	E	39	EB	F	54	EB
26.North Forest Street/East Laurel Street	F	95	EB	F	172	EB
28.South Samish Way/Elwood Avenue/Lincoln Street	E	64	1.07	E	66	1.08

Source: The Transpo Group (August 2007)

Notes: **Bold:** Indicates locations operating below existing LOS standards. SEB = south-eastbound; NWB = north-westbound; NEB = north-eastbound

1. Operations are shown for locations which operate at LOS E or worse for one more of the New Whatcom Site Alternatives (see Appendix N-1 for a complete summary).

2. Level of service, based on 2000 *Highway Capacity Manual* methodology.

3. Average delay in seconds per vehicle.

4. Volume-to-capacity ratio reported for roadway segments and signalized intersections.

5. Worst movement for unsignalized intersections.

6. This intersection operates as two separate intersections in the field; therefore, the analysis was conducted as such.

As shown in Table 45, Alternative 3 2026 would impact the following off-site locations by degrading operations from LOS E to LOS F:

- Holly Street between F Street and Champion Street in the south-eastbound direction
- North State Street/Wharf Street

In addition to the locations discussed above, Alternative 3 2026 traffic would impact the following roadways and intersections by worsening LOS F operations:

- Holly Street between Broadway Street and Champion Street in the north-westbound direction
- Meridian Street/Birchwood Avenue
- West Holly Street/C Street
- East Chestnut Street/Railroad Avenue
- Lakeway Drive/I-5 Southbound Ramps
- North State Street/James Street/Iowa Street
- North State Street/East Laurel Street
- North Forest Street/East Laurel Street

This change in roadway and intersection operations is due to the increase in traffic volume at all intersections with the addition of Alternative 3 2026 traffic.

Non-Motorized

Alternative 3 2026 is projected to generate about 9,500 daily pedestrian/bicycle trips. This is most likely greater than the No-Action Alternative pedestrian/bicycle trips since the land uses for Alternative 3 (i.e., residential, office, and retail) typically attract more non-motorized traffic than industrial uses.

As discussed previously, Alternative 3 would provide a more limited sidewalk and trail system on-site as compared to Alternatives 1 and 2. Similar to downtown, the development would include wide sidewalks and pedestrian crossings to create a pedestrian-friendly environment. Access to downtown, WWU, and other off-site locations would be improved by 2026 with the upgrade of Central Avenue and construction of the Bay Street Bridge. As part of a separate project, the City plans to construct a pedestrian bridge between redevelopment area 10 and Boulevard Park to the southeast of area 10. The trail provides an additional link to the South Bay Trail system.

Future development and the consequent increase in vehicular volumes is expected to proportionally increase observed conflicts with pedestrians and bicyclists that exist today. Alternative 3 2026 conflicts would likely be greater than those expected with No-Action since pedestrian/bicycle trips for Alternative 3 are likely to be greater. The New Whatcom Project would enhance pedestrian and bicycle usage on and around the site as part of its overall development plan; however, with Alternative 3 the enhancements would be less than the other Action Alternatives. The City also has planned improvements such as pedestrian and safety enhancements along Roeder Avenue, and

pedestrian and bicycle improvements downtown. Alternative 3 2026 non-motorized impacts are expected to be less than the No-Action Alternative.

Transit

Alternative 3 is expected to generate about 2,900 daily transit trips. With the addition of Alternative 3 2016 daily transit trips, ridership is projected to be 34,400 boardings per day. The passenger loading ratio would be about 1.49 for Alternative 3 2026 which exceeds WTA's 1.25 standard for seating capacity²⁷. In addition, the Alternative 3 2026 passenger loading ratio of 1.49 is greater than the No-Action 2026 passenger loading ratio of 1.36. Because Alternative 3 2026 would exceed WTA's standard and the anticipated passenger loading ratio would be greater than the No-Action 2026 conditions, it would impact the transit system. An increase in transit service in the vicinity of the site as well as service and stops on-site would be required to support future growth and transit demand.

Rail

Alternative 3 would not relocate the railroad on-site; therefore, rail impacts for Alternative 3 2026 conditions are expected to be the same as 2016 conditions in terms of the number of at-grade crossings.

Alternative 3 2026 would generate more vehicular and non-motorized trips than the No-Action 2026 conditions; therefore, the chances of conflicts and potential safety issues with trains at at-grade rail crossings are greater. At-grade crossings also increase delays to vehicular traffic that must stop as trains pass through intersections. Construction of the Bay Street Bridge over the railroad would provide emergency access to redevelopment area 2 through 10, as certain intersections would not be blocked by rail operations. As discussed previously, within redevelopment area 1, all at-grade crossings would remain, potentially blocking entry of emergency vehicles as trains cross the site access locations since they would need to access Roeder Avenue at Bay Street or another location without an at-grade railroad crossing.

Parking

The majority of parking for the proposed project would be located on-site. Alternative 3 would provide 8,513 parking spaces in 2026. Table 46 summarizes the parking demand and supply for Alternative 3 2026 conditions. Detailed parking calculations are provided in Appendix N-5.

²⁷ Passenger loading ratio is calculated in the same manner as the No-Action Alternative. Seating capacity, 23,100 seats per day, remains the same for the evaluation of 2016 conditions.

Table 46. Alternative 3 2026 Parking Demand and Supply

Parking Sub-Area	Hourly Parking Demand ¹	Proposed Parking	Recommended Supply Range ²		Parking Surplus/Deficiency Range	
1	1,241	1,843	1,365	1,427	478	416
2, 3, 5	1,803	2,363	1,983	2,073	379	289
4, 6, 7, 8	2,699	2,772	2,969	3,104	-197	-332
9	932	1,195	1,025	1,072	170	123
10	276	341	304	317	37	23
Total	6,951	8,513	7,646	7,994	867	519

Source: Collins Woerman and The Transpo Group (August 2007)

1. Hourly parking demand represents the maximum hourly demand within the redevelopment area.

2. Recommended supply is 10 to 15 percent more than the parking demand to reduce vehicles re-circulating through the parking areas.

As shown in the table, the hourly parking demand for Alternative 3 by 2026 is approximately 7,000 vehicles, which can be accommodated by the overall proposed parking supply. However, based on the recommended parking supply for the redevelopment areas 4, 6, 7, and 8 parking sub-area, there is a deficiency of 200 to 330 parking spaces. However, there is a surplus in all other parking areas so this deficiency could be accommodated on-site. This is not considered an impact because as the master plan for the New Whatcom site is developed it is assumed that parking supply and adopted standards will require that each future redevelopment project will accommodate that project's parking demand.

Similar to No-Action 2026 conditions, it is likely that some users of the site would park off-site when visiting multiple destinations in the area. Based on the parking utilization survey, there are currently about 570 available off-site parking spaces within ¼-mile of the site. Since a majority of the vehicles would park on-site there would be minimal impacts to off-site parking.

Chapter 5: Mitigation Measures

This section presents mitigation measures to eliminate or reduce the impacts of the New Whatcom site as well as mitigation strategies the City could implement to better accommodate anticipated growth throughout the Downtown area with or without the New Whatcom Redevelopment. Specific mitigation measures which the New Whatcom site could be responsible for include roadway and intersection improvements, eliminating gaps in the pedestrian and bicycle network, provision of transit and non-motorized facilities on-site, as well as implementation of strategies to reduce the number of vehicles traveling to and from the site. Mitigation strategies conceptually include approaches such as reduction in travel demand, implementation of additional funding mechanisms, construction of physical improvements, and parking management policies.

As was apparent in the disclosure of No-Action conditions, due to the growth in regional and local traffic and continued industrial development on the New Whatcom site, congestion and delay will occur; conditions in this area would benefit from implementation of many of the mitigation strategies described in this section. There are likely to be impacts to travel within the study area by 2016 and 2026 with or without the New Whatcom Redevelopment. The City of Bellingham is undergoing substantial growth with an increase in population of about 6 percent from 2000 to 2003²⁸. This increase in population results in a growth in vehicle trips as well as trips for other modes, which results in increased delays for all users of the City's transportation system. As shown in the City's *2006 Comprehensive Plan*, Bellingham has planned, and will continue to plan for future growth by adopting policies and identifying improvements required to support urban infill development. The New Whatcom transportation impacts are typical of growing urban environments.

Tables 47 and 48 summarize the impacts and mitigation measures for each Alternative. The impacts and mitigation measures are divided into the following three categories:

- On-Site Access and Circulation Improvements
- Off-Site Capital Improvements
- Operation and Management Strategies

In addition to the mitigation measures outlined in this chapter, future New Whatcom developers may be responsible for paying the City's Transportation Impact Fee (TIF). The City of Bellingham Municipal Code (Chapter 19.06.030) establishes a Transportation Impact Fee (TIF) for development that produces one or more peak-hour site trips. The TIF establishes a method to share in the cost of developing system improvements or program enhancements to address the need for increased mobility within the City. This fee is based on dwelling units for residential development and number of square feet for commercial development. The City requires that developers pay the TIF prior to issuance of building permits. This TIF may be reduced if development decreases PM peak hour traffic volumes as a result of mitigation strategies or other incentives. In

²⁸ Based on US Census Bureau State and County Quick Facts.

addition, credit may be given for any improvements, dedication of right-of-way, or new construction of street system improvements provided by the developer which are part of the Six-Year TIP. The City updates their TIF yearly which means these fees are likely to change in the future. As part of the overall development agreement, the City and the Port would address how improvements would be financed which may include payment of TIF.

Aside from migration measures, it should also be noted that the City is considering changing their transportation concurrency methodology and management policies to promote the infill land use strategies adopted in the Bellingham Comprehensive Plan. Future updates to the City's Transportation Concurrency Management Program may consider revising LOS methodology and standards to include an average intersection LOS by subarea, to better implement the infill land use strategies.

The remainder of this chapter discusses the improvements identified in Tables 47 and 48 as well as expands on the suggested mitigation measures. Figure 23 indicates the location of the mitigation measures. It should be noted that the New Whatcom Redevelopment would be constructed over a 20-year period and mitigation measures would be phased over this period. The timing of infrastructure improvements relates to the New Whatcom site trip generation and would be implemented as additional infrastructure is required to support the movement within and through the site. The New Whatcom project may not be responsible for these full improvements which could be implemented by other site developers or the City. The details of implementation and timing would be determined as part of the development agreement between the City and the Port.

On-Site Access and Circulation Improvements

As discussed previously, as part of the New Whatcom Redevelopment Project, the Action Alternatives would provide a pedestrian and bicycle system as well as other improvements to the on-site transportation system. The level of transportation improvements identified with each Alternative varies depending on the size of the development; however, these improvements are meant to support the expected pedestrian, bicycle, and vehicular activity on-site. Through the evaluation of the identified site transportation system (see Impacts and Alternatives Comparison Chapter), it was found that additional improvements would be needed to support the expected transportation activity on-site. The on-site access and circulation mitigation measures identified below and in Table 47 are in addition to what is already assumed for each Alternative as defined in Table 15 and the previous chapters.

Impacts for the on-site access and circulation system consider the transportation system within the New Whatcom development as well as the site access locations. The majority of the impacts are related to the street system since the site would provide expanded non-motorized facilities for each Alternative as well as parking to meet the future parking demand. Widening of some roadways and improved traffic control and additional turn lanes at some intersections are required to provide appropriate levels of access and circulation within and to/from the site. For example, the widening of Roeder Avenue and Cornwall Avenue would be required under some EIS alternatives based on

the City's existing LOS standards and concurrency methodology. The major on-site improvements are summarized below:

Roeder Avenue/Chestnut Street Corridor

A majority of the transportation impacts would be located along the Roeder Avenue/Chestnut Street corridor due to future growth in the area as well as development of the site. Widening of Roeder Avenue and Chestnut Street between Hilton Avenue and Cornwall Avenue to 4 lanes and with turn lanes at major intersections will be needed to accommodate the increase in traffic expected under each of the alternatives, including the No-Action Alternative. The corridor is close to existing capacity today, and will exceed capacity in the future. Additional lanes need to be provided to avoid vehicle queuing along the side streets, accommodate safe and efficient flow of vehicles across the railroad tracks, and allow for access into and out of the site at Cornwall Avenue, Bay Street, Central Avenue, C Street, F Street, and Hilton Avenue. There are several constraints to widening the corridor such as the railroad tracks to the east and crossing of the Whatcom Creek Waterway, in addition to the elevated structure south of Central Avenue.

Major site access points will need additional traffic control improvements and turn lanes to provide acceptable operations at the intersections. New traffic control such as traffic signals should be constructed at the intersections with Bay Street, Central Avenue, C Street, and Hilton Avenue. Additional turn lanes will be needed at the F Street intersection by 2026 to provide acceptable operations at that location along with the F Street/Holly Street intersection, since both operate as a system to prevent vehicle queues across the railroad tracks. Similar traffic signal systems will be needed at C Street and Central Avenue. Other locations in need of turn lanes include Central Avenue, Bay Street, and Cornwall Avenue.

C Street Corridor

Automated railroad crossing gates need to be installed at C Street to accommodate the increase in traffic using this corridor as a primary access point to the site. There are currently no railroad gates between Roeder Avenue and Holly Street, with the crossing being controlled by a stop sign.

Laurel Street Corridor

Alternatives 1 and 2/2A assume a five-legged intersection at Commercial Street as part of the Action Alternatives. The on-site street system will need to be reconfigured to remove the diagonal 5th leg to allow for improved intersection operations and reduce the conflicts with pedestrians and bicyclists. Alternative roadway layouts would be considered that provide more direct access to and from the Bay Street corridor to the rest of the site. One strategy would be to extend Bay Street across the entire site and not end at Laurel Street.

Cornwall Avenue Corridor

Alternative 2 assumes the Cornwall Avenue corridor will be closed at Laurel Street. Under this alternative, a bike path or alternative bike route should be provided under the Laurel Street bridge to allow for continued access along the Cornwall Avenue corridor for bicyclists. In addition, the No-Action Alternative and Action Alternative 3 in 2026 would have poor operations along Cornwall Avenue between Wharf Street and Chestnut Street due to a lack of alternative routes into the site. Cornwall Avenue would require two-lanes per direction from Wharf Street to Chestnut Street to meet the City's LOS standard. This improvement is based on the results of the existing City current LOS methodology based on roadway segment v/c ratios.

Table 47. Transportation Impacts and Mitigation Measures

Map ID¹	Location	Impact	Mitigation Measure²	No Action		Alternative 1		Alternative 2		Alternative 2A		Alternative 3		Mitigation Challenges	Notes
				2016	2026	2016	2026	2016	2026	2016	2026	2016	2026		
On-Site Access and Circulation²³															
1	Roeder Avenue/ Chestnut Street	Street System	Widen and improve roadway to 4/5 lanes to provide additional capacity.	X	X	X	X	X	X	X	X	X	X	The railroad tracks and the Whatcom Waterway make widening Roeder Avenue very difficult and potentially financially challenging.	Provide two-lanes per direction from Hilton Avenue to Cornwall Avenue with turn lanes at major intersections, including sidewalks and bicycle lanes. This improvement is based on the results of the existing City LOS methodology and standards for roadway segment v/c ratios.
2	Roeder Avenue/ Hilton Avenue	Intersection	Intersection improvements to include traffic signal and turn lanes.	X	X	X	X	X	X	X	X	-	-		
3	Roeder Avenue/ F Street	Intersection	Provide an exclusive southbound left-turn lane on the F Street approach.	-	X	-	X	-	X	-	X	-	X	This would likely require additional right-of-way.	
4	Roeder Avenue/ C Street	Intersection	Intersection improvements to include traffic signal and turn lanes on both C Street approaches.	X	X	X	X	X	X	X	X	X	X		
5	Roeder Avenue/ Central Avenue	Intersection	Intersection improvements to include traffic signal and an exclusive left-turn lane on both Central Street approaches.	X	X	X	X	X	X	X	X	X	X		
6	Chestnut Street/ Bay Street	Intersection	Intersection improvements to include traffic signal and an exclusive left-turn lane on both Bay Street approaches.	X	X	X	X	X	X	X	X	-	X	This would require a rebuild of the existing elevated structure.	
7	Chestnut Street/ Cornwall Avenue	Intersection	Provide an additional northbound left-turn lane on Cornwall Avenue from the site.	-	X	-	X	-	X	-	X	-	X	The existing right-of-way does not allow for an additional lane and obtaining additional right-of-way would require building demolition.	This mitigation measure is dependent on widening of Roeder Avenue/Chestnut Street since two receiving lanes would be needed for the left-turn lanes.
8	C Street	Rail	Provide railroad crossing gates on C Street between Holly Street and Roeder Avenue.	X	X	X	X	X	X	X	X	X	X		
9	Laurel Street On-site Street Grid and Laurel Street/ Commercial Street/ Log Pond Road Intersection	Street System	Reconfigure the street system to create a four-leg intersection and consider an alternate internal street system to reduce the amount of traffic through the Laurel Street/ Commercial Street intersection (e.g., extending Bay Street to Oak Street).	-	-	-	X	-	X	-	X	-	-	The 5-leg intersection would be above grade creating construction issues that may make the location of the intersection both physically and financially challenging.	Although the overall LOS of the roundabout for all scenarios would be LOS D or better, vehicle queues would impact adjacent intersections.
10	Cornwall Avenue	Non-motorized	Provide a bike path that allows continued access along the Cornwall Avenue corridor or provide an alternative route.	-	-	-	-	X	X	-	-	-	-		Cornwall Avenue would be closed with Alternative 2. This closure would sever an unmarked bicycle route.
11	Cornwall Avenue	Street System	Widen and improve roadway to 4 lanes to provide additional capacity.	-	X	-	-	-	-	-	-	-	X	Would likely require additional right-of-way and/or removal of on-street parking.	Provide two-lanes per direction from Wharf Street to Chestnut Street. This improvement is based on the results of the existing City LOS methodology and standards for roadway segment v/c ratios.

Map ID¹	Location	Impact	Mitigation Measure²	No Action		Alternative 1		Alternative 2		Alternative 2A		Alternative 3		Mitigation Challenges	Notes
				2016	2026	2016	2026	2016	2026	2016	2026	2016	2026		
Off-Site Capital Improvements⁴															
12	Holly Street	Street System	Widen roadway by an additional lane to provide additional capacity in the northbound direction from Broadway Street to Champion Street.	-	X	-	X	X	X	X	X	-	X	This would require removal of on-street parking.	This improvement is based on the results of the existing City LOS methodology and standards for roadway segment v/c ratios.
13	Holly Street/ F Street	Intersection	Provide a northbound left-turn lane on F Street.	X	X	X	X	X	X	X	X	X	X	This would likely require additional right-of-way.	This is an impact because queues spillback into Roeder Avenue/F Street. Alternatively, C Street could be upgraded to a collector arterial to divert some of the traffic from F Street to C Street and improve operations.
14	Holly Street/ C Street	Intersection	Intersection improvements to include traffic signal and turn lanes.	X	X	X	X	X	X	X	X	X	X	The existing right-of-way does not allow for an additional lane and obtaining additional right-of-way would require building demolition.	
15	Holly Street/ Central Avenue	Intersection	Intersection improvements to include traffic signal and turn lanes.	X	X	X	X	X	X	X	X	X	X	The existing right-of-way does not allow for an additional lane and obtaining additional right-of-way would require building demolition.	
16	Chestnut Street/ Railroad Avenue	Intersection/ Non-motorized	Intersection improvements to include traffic signal.	X	X	X	X	X	X	X	X	X	X		
	State Street/ Forest Street														
17	State Street/ Laurel Street	Intersection	Intersection improvements to include traffic signal and turn lanes	-	-	X	X	X	X	X	X	-	X	This would likely require additional right-of-way.	
18	State Street/ Wharf Street/ Forest Street/ Boulevard Street	Intersection	Realign intersection. Intersection improvements to include traffic signal or roundabout control.	-	X	X	X	-	X	-	X	-	X		Alternative 1 assumes completion of this improvement in the analysis.
19	Forest Street/ Laurel Street	Intersection	Intersection improvements to include traffic signal and turn lanes.	-	-	X	X	X	X	X	X	-	X	This would likely require additional right-of-way.	
20	Bay Street between Champion Street and Chestnut Street	Non-motorized	Provide bicycle lanes as well as enhance the pedestrian facilities to facilitate walking and biking between the site and downtown.	-	-	X	X	X	X	X	X	X	X		Bicycle and pedestrian facilities would be provided within the redevelopment area along this roadway as part of the redevelopment Alternatives.
21	Central Avenue between Chestnut Street and Holly Street	Non-motorized	Upgrade bicycle route to provide bicycle lanes to accommodate bicycle travel between the site and downtown.	-	-	X	X	X	X	X	X	X	X		Bicycle and pedestrian facilities would be provided within the redevelopment area along this roadway as part of the redevelopment Alternatives.
22	Wharf Street between Cornwall Avenue and State Street	Non-motorized / Street System	Improve Wharf Street to provide wide shoulders or bicycle lanes and sidewalks.	-	-	X	-	X	X	X	X	X	X		
23	Laurel Street between Cornwall Avenue and Garden Street	Non-motorized / Street System	Provide bicycle lanes as well as enhance the pedestrian facilities to facilitate walking and biking between the site and WWU.	-	-	X	X	X	X	-	X	-	-		Bicycle and pedestrian facilities would be provided within the redevelopment area along this roadway as part of the redevelopment Alternatives.

Map ID¹	Location	Impact	Mitigation Measure²	No Action		Alternative 1		Alternative 2		Alternative 2A		Alternative 3		Mitigation Challenges	Notes
				2016	2026	2016	2026	2016	2026	2016	2026	2016	2026		
24	Maple Street between Cornwall Avenue and Forest Street	Non-motorized / Street System	Provide bicycle lanes or shoulders as well as enhance the pedestrian facilities to facilitate walking and biking between the site and WWU. Provide turn lanes at intersections.	-	-	-	-	-	-	X	-	X	X		
NA	Off-Site Street System	Street system / Construction	Provide designated truck routes to be used by all construction traffic to minimize impacts to the street system.	X	X	X	X	X	X	X	X	X	X		This is a temporary impact during the physical construction of the development.

Source: The Transpo Group (November 2007)
Note: NA = Not applicable, location not identified on map.

1.

Numbers correspond to Figure 23.

2.

Mitigation measures will be phased over the 20-year build-out period of the redevelopment project. Implementation of the mitigation measures would be determined in the development agreement between the Port and the City.

3.

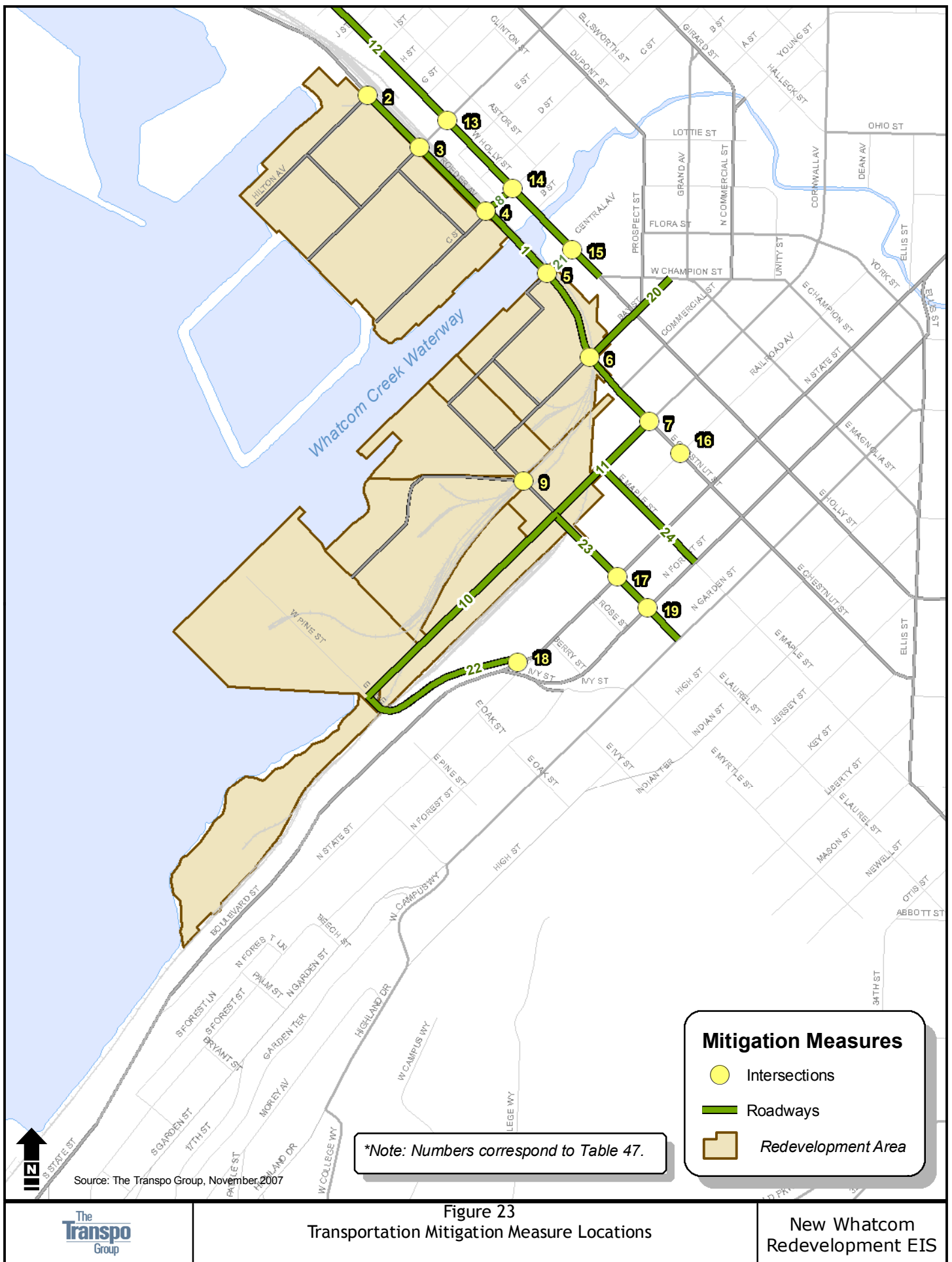
X indicates that the Alternative creates an on-site impact. On-site access and circulation mitigation measures provide physical improvements to the transportation infrastructure.

4.

- indicates that the Alternative does not impact the location.

5.

X indicates that the Alternative creates an off-site impact. The New Whatcom Redevelopment Project would contribute to the cost of these improvements.



Off-Site Capital Improvements

Development of the New Whatcom site would also impact the off-site street system and non-motorized facilities in the vicinity of the project site. Table 47 outlines specific transportation mitigation measures to address the identified deficiencies. Improved traffic control and additional turn lanes at some intersections are required to provide appropriate levels of access and circulation to/from the site. In addition, some roadways providing access to the site should be upgraded to handle the level of traffic and number of non-motorized users anticipated under the alternatives, including the No-Action Alternative.

The major corridors where intersection and roadway improvements would be needed include Holly Street, State Street, and Forest Street. The widening of Holly Street would also be required under some alternatives based on the City's existing LOS standards and concurrency methodology. Improvements to pedestrian and bicycle facilities are needed along corridors such as Central Avenue, Bay Street, Wharf Street, Laurel Street, and Maple Street to provide connections to the site and downtown or WWU. The major off-site capital improvements are summarized below:

Holly Street Corridor

The Holly Street corridor provides access to the site from the I-5/Lakeway Drive interchange. Provision of an additional lane along Holly Street would be needed from Broadway Street to Champion Street for all Alternatives, including the No-Action Alternative, in 2026 as well as with Alternatives 2/2A in 2016. The need for the additional lane along Holly Street is based on the results of the existing City LOS methodology for roadway segment v/c ratios. This would require removal of on-street parking. Traffic control improvements such as new traffic signals as well as turn lanes will be needed at C Street and Central Avenue to provide for acceptable traffic operations. The new traffic control will need to be coordinated with traffic control improvements along Roeder Avenue and the automated railroad crossing gates.

Chestnut Street Corridor

The intersection with Railroad Avenue should be signalized to improve traffic operations while also allowing for pedestrians to more easily cross the corridor.

State Street/Forest Street/Laurel Street Corridors

A number of improvements are needed along the State and Forest Street corridors to accommodate the future traffic volumes as part of the Alternatives since site access improvements to Laurel Street and Wharf Street will connect to these major arterials. The Laurel Street corridor will be a future access point to the site. Traffic volumes, along with pedestrian and bicycle trips, are expected to increase significantly in the future requiring the need for traffic control at the intersections with State and Forest Streets. The Wharf Street intersection will also need to be redesigned to accommodate full access to the site from both State and Forest Streets. This intersection appears to be a feasible

location for a roundabout. The improvement will be needed by 2026 under each of the alternatives, and has already been assumed under Alternative 1.

Non-Motorized Improvements

Several corridors will provide important pedestrian and bicycle links between the site and downtown or WWU. Facilities along these corridors will need to be improved to accommodate the increase in pedestrian and bicycle traffic. Improvements would include the addition of bicycle lanes or wider shoulders, along with new or wider sidewalks. The corridors include Bay Street, Central Avenue, Wharf Street, Laurel Street, and Maple Street.

Designated Truck Route

Development of the New Whatcom would require importing and exporting of materials and equipment to and from the site. Although barges would likely be used to transport a majority of the material and equipment some trucks and employee vehicles would enter and exit the site via the local street system. A designated truck route should be determined, and this route should be used by all construction traffic to minimize impacts to the local street system. This impact would be temporary, occurring during the phased construction of the development.

Operation and Management Strategies

In order to reduce future impacts to the transportation system, a series of mitigation strategies should be implemented over time as development occurs. Table 48 provides an overview of the operation and management strategies the Port and the City would consider. These strategies are not specific to the New Whatcom Redevelopment project and could be implemented by the City for other future developments and/or citywide.

While some strategies can improve mobility for multiple modes of travel, other mitigation strategies might improve one mode of travel but have negative effects on another mode. Table 49 outlines the possible mitigation strategies that could be implemented and identifies whether each strategy has a positive or negative impact on the five major components that were evaluated. It should be noted that although a strategy might have a negative impact on one of the components it does not mean that the strategy should not be implemented. Table 49 is meant to show the trade-offs, both positive and negative, for each of the operation and management strategies to help the Port and the City make informed decisions in the future and balance the needs of the different modes. Each strategy is then discussed in greater detail below.

Table 48. Operation and Management Strategies¹

Impact	Mitigation Strategies	Notes
Street System and Parking	Implement a Transportation Demand Management (TDM) Program.	A TDM program would reduce the number of single-occupancy vehicles coming to and from the site and therefore, decrease impacts to the street system as well as parking impacts. Strategies to consider include: • Carpooling, car sharing, vanpools • Discounted transit passes • Increased telecommuting • Encouraging alternative travel modes • Discontinuing parking subsidies • Guaranteed ride home program
Street System	Create and contribute to a Transportation Benefit Area (TBA) for the site.	A TBA could allow for the City to collect additional transportation impact fees from development to pay for improvements needed on-site.
Street System	Upgrade traffic signal equipment at intersections in the vicinity of the site.	Consider replacing pre-timed signals in the area with actuated signals and/or implementing Intelligent Transportation Systems (ITS). Provide coordinated systems along major corridors such as Roeder Avenue. Monitor and update signal timing plans and phasing to improve intersection and overall corridor operations.
Non-motorized	Ensure adequate pedestrian crossings and linkage to transit and land uses on-site, and create a pedestrian friendly environment.	The redevelopment Alternatives would create a pedestrian friendly environment similar to downtown with wide sidewalks. As part of future development, the Port should review the overall pedestrian network to eliminate missing gaps and ensure connectivity to transit and other transportation facilities as well as access to recreational and other land uses on-site.
Non-motorized	Provide bicycle amenities to encourage biking to, from, and within the site.	The redevelopment Alternative would provide bicycle lanes and trails; however, other amenities such as route maps and information to navigate the site, showers and lockers in employment centers, and bicycle parking could be provided.
Transit	Work with WTA to determine the required transit facilities and amenities as well as potential transit routes on-site.	Transit amenities may include bus shelters, bus turnouts, layover areas, and transit kiosks. Potential corridors for transit service and stops include Roeder Avenue/Chestnut Street, Central Avenue, Bay Street, Commercial Street, Laurel Street, and Cornwall Avenue.
Transit	Implement systems and/or facilities to improve transit performance.	Potential transit strategies that improve performance include transit signal priority, and bus bulbs.
Rail	Install rail crossing gates and improve rail crossing gates at existing locations.	To increase safety at rail crossings consider long-arm gates, medians, four quadrant gates, and photo enforcement.
Parking	Employ parking demand management strategies.	Parking demand management strategies would reduce the overall parking demand, and therefore, decrease parking impacts on and off-site. Strategies include reducing parking demand, parking management, dynamic parking signage, curb lane management, short-term/time restricted parking, and pay stations

Source: The Transpo Group (November 2007)

1. These strategies are not specific to the New Whatcom Redevelopment Project and could be consider for other developments and/or citywide.

Table 49. Mitigation Strategies and Impacts to Other Modes

Strategy	Affected Modes				
	Streets	Transit	Rail	Parking	Non-Motorized
LEGEND					
++	Greatest Positive Impact				
+	Positive Impact				
blank	No Impact				
-	Negative Impact				
--	Most Negative Impact				
Transportation Demand Management	++	-	+	++	-
Transportation Benefit Area	++	+			+
Street System					
Regularly optimize signal timing & phasing	+	+			
Remove on-street parking/Implement additional time of day restrictions	++	+		--	+
Non-Motorized					
Enhance pedestrian crossings and linkages	-	+			++
Improve lighting and pedestrian scale facilities		+		+	+
Provide bicycle facilities and amenities	-	-			++
Transit					
Increase/expand local bus service frequency and span of service	+	++		+	-
Install transit signal priority technology for priority corridors	-	+			
Provide bus bulbs and inline stops	--	++		-	+
Provide transit kiosks and other improved amenities		+			+
Rail					
Introduce technologies at gates for safety	+		++	-	+
Parking					
Reduce parking demand through aggressive TDM programs	+	+		++	
Expand parking management measures/locations	+	+		+	
Dynamic parking signage for off-street locations				+	
Curb lane management (loading/unloading in alleys)		+		+	
Install pay stations				+	

Source: Based on a review of likely impacts to each mode from a qualitative perspective.

Transportation Demand Management

The transportation system consists of two basic components: the supply side, which is usually the road infrastructure and transit system, and the demand side, or, travelers using the system. Due to right-of-way limitations, expansion of the roadway system alone would not mitigate all of the Action Alternative impacts. Therefore, some of the mitigation strategies are more focused on reducing the number of single-occupancy vehicles entering the study area rather than increasing roadway capacity. The City has implemented some transportation demand management strategies (TDM) through their City Center Planning efforts. These strategies include parking as well as pedestrian and bicycle facilities. The following strategies should be promoted throughout the site:

- Carpooling or car sharing
- Discounted transit passes
- Incorporation of flex-car with subsidies
- Use of vanpools
- Increased telecommuting

- Encouraging alternative travel modes like walking and biking
- Preferential parking for carpools and vanpools
- Parking restrictions
- Required Commute Trip Reduction participation
- Discontinuing parking subsidies
- Guaranteed ride home program
- Provide more incentives for using alternative modes such as covered bicycle parking and bus passes

Transportation Benefit Area

For on-site and off-site improvements, not included in the TIP, the City or Port could develop a program which would require new development in the area to share in the cost of developing system improvements or program enhancements to address the need for increased mobility within and to/from the site. This may be most important to fund future street system improvements since the City's TIP places a high emphasis on non-motorized projects, and thus, would not be responsive to the street system impacts created by New Whatcom and other future growth. A transportation mitigation program would define the process where developers would contribute their fair share in costs of their identified impacts. This could take the form of a transportation impact fee program or a local improvement district (L.I.D.). A mitigation program should be multi-modal and include additional transit, pedestrian, bicycle, and freight programs or strategies to promote these travel modes. Such a program could provide developers more certainty of what mitigation fees will be, and provides an appropriate funding source for needed improvements.

Street System Strategies

This section describes mitigation strategies that reduce impacts to intersection traffic operations, and facilitate mobility for all users of the street system. Policy-oriented measures or programs to help maintain good circulation are identified. These are in addition to specific mitigation measures that were identified in the previous two sections discussing on-site access and circulation and off-site capital improvements.

Signal Timing Optimization & Phasing

Monitoring and continuous updating of signal plans is a vital aspect to improving arterial and intersection operations. As traffic volumes shift or grow due to new development and increasing through traffic, the periodic re-timing or synchronizing of traffic signals is critical. Movements into and out of the City during the AM and PM peak periods would be accommodated by providing more signal green time and longer signal cycle lengths that respond to peak directional flow. The mitigation program could provide additional funding that would allow for more frequent updates to signal timing, while also paying for investments in traffic signal equipment and Intelligent Transportation Systems (ITS) for improved coordination and management.

On-Street Parking Removal/Additional Time of Day Restrictions

To improve capacity at off-site intersections, the City could consider removal of on-street parking along the minor street approaches to intersections with key arterials to allow for additional turn lanes or vehicle queuing storage space. New turn lanes on the minor street approach would allow the City to consider providing longer signal cycle lengths and more green time to the intersecting major arterial by allowing for greater vehicle queuing storage capacity, while also separating turn movements to increase efficiency. These issues would have to be studied on a case-by-case basis taking into consideration the impacts of these measures on parking supply, pedestrians, and transit. Possible locations would be along Roeder Avenue/Chestnut Street, Holly Street, State Street, and Forest Street. Time of day restrictions can also be imposed on existing zones in order to avoid peak hour capacity reductions.

Non-Motorized Strategies

All of the Alternatives would generate increased pedestrian and bicycle activity throughout the study area, with the Action Alternatives contributing a higher proportion of pedestrians and bicyclists than under the No-Action Alternative. Pedestrian and bicycles impacts could be addressed with the following strategies.

Pedestrian Crossings & Linkages

Work to enhance pedestrian linkages to the waterfront and adjoining neighborhoods. Some enhancements may include:

- Provide crosswalks at intersections and sidewalks along major routes throughout the development.
- Locate transit stops close to buildings such that they are easily accessible and accessed by the shortest route possible.
- Ensure a safe environment for pedestrian by providing adequate illumination.
- Provide guide signs to direct pedestrians to major attractions such as the marina, parks, and trails.
- Provide crossing treatments such as colored or textured pavement, pedestrian island refuges or in-roadway lighting to enhance visibility of pedestrians.

Pedestrian Scale Facilities

Improve the pedestrian environment with decorative lighting, more landscaping treatments, and street furniture, such as benches, throughout the neighborhoods. Allow for increased sidewalk width to accommodate these facilities. Provide convenient pedestrian passage through the site. These facilities would encourage increased pedestrian travel by enhancing safety and comfort.

Bicycle Facilities

Mitigation measures to accommodate bicyclists are already included in the proposed on-site roadway cross-sections. Additional bicycle enhancements to consider include:

- Provide bicycle maps and information to bicyclists to navigate the site safely.
- Provide showers and lockers at offices and other employment centers for those that bicycle to work.
- Install bicycle parking such as racks and lockers throughout the development.

Transit Strategies

This section describes the mitigation strategies to reduce impacts to the transit system, and provide more people-moving capacity throughout the study area, often at the expense of vehicles. Transit mitigation could be grouped into three categories focusing on service, travel time, and passenger comfort and convenience. The most significant measures would improve transit speed and reliability along existing and future transit corridors to encourage a greater transit use.

Local Bus Service

Work with WTA to increase the level and availability of transit service to the site. WTA should increase service system-wide to meet future transit demand with or without the proposed redevelopment. Service should be provided within the redevelopment areas via the site-access points and roadways constructed by the project. Making bus service accessible from within the development would encourage use of transit and decrease private automobile use. WTA already pro-actively monitors service demands and makes needed adjustments.

Transit Signal Priority

Introduce transit signal priority technology to improve transit mobility on City streets. Invest in technologies to better facilitate transit vehicles along WTA corridors and within downtown. Queue bypass lanes could be installed in locations where buses have to often wait through multiple signal cycles, and complemented by transit signal priority treatments.

On-Site Bus Bulbs/Inline Stops

Bus bulbs or inline stops extend the sidewalk/bus stop area into parking lane such that buses do not maneuver in and out of the travel lane to pick-up/drop-off riders. The bus bulb is typically the width of the parking lane. Bus bulbs at transit stops provide for easier and faster arrival, access, and departure. This measure is site specific and applied on corridors with at least two lanes per direction. The bus bulbs also would allow for additional space to provide more room on sidewalks to build shelters at stops and other transit amenities. In-line bus stops would likely increase delays along the corridor for other vehicles and freight, so should only be explored for locations that minimize

impacts to other modes of travel. Note that the bulb-outs may reduce some on-street parking if located in parking lanes, due to needed tapers.

Real-time Information & Transit Amenities

Provide transit kiosks at major transit stops, along with improved transit shelters and benches, to increase passenger comfort and convenience. Dedicate right-of-way for wider sidewalks where these facilities are located.

Rail Strategies

Impacts to rail are expected under the No-Action and Action Alternatives due to on-site at-grade rail crossings. The most direct mitigation measures to improve rail operations, and decrease street system delay and safety conflict with other modes would be to reduce the number of at-grade crossings. This is being proposed for several of the Action Alternatives but it is expensive and not feasible at all locations. Ultimately, Alternatives 1, 2 and 2A would minimize on-site rail impacts by relocating the railway to the eastern boundary of the site. The No-Action Alternative and Alternative 3 would not relocate the railway. Any railroad corridor relocation would be subject to a specific permitting and environmental review process that would be undertaken by the Washington State Department of Transportation (WSDOT) in conjunction with BNSF.

Rail Gate Crossing Improvements

These strategies would reduce delay and safety conflicts at the rail crossings. One strategy would be to minimize the number of trains along the railway during peak periods when traffic volumes are highest. This strategy would reduce the number of vehicles that would be delayed by trains crossing the street system as well as decrease the vehicle conflicts with the trains. Another strategy would be to introduce technologies that improve at-grade crossing safety such as²⁹:

- **Long-Arm Gates** – Typically gate arms extend to the centerline of the road. Longer gate arm systems, which cover at least $\frac{3}{4}$ of the roadway, are an effective means of discouraging drivers from driving around the gate.
- **Medians** – Mountable medians on the roadway centerline with channelization devices impede crossing to the opposite traffic lane so drivers cannot drive around the gate.
- **Four Quadrant Gate System** – These gates consist of a series automatic flashing-light signals and gates where the gates extend across both the approach and departure lanes. Four-quadrant gates provide additional visual constraint and inhibit nearly all traffic movements from crossing the gates when they are lowered.

²⁹ Cooper, Douglas L. and David R. Ragland, *Driver Behavior at Rail Crossings: Cost-Effective Improvements to Increase Driver Safety at Public At-Grade Rail-Highway Crossings in California*, Institute of Transportation Studies UC Berkeley Traffic Safety Center, April 2007.

- **Photo Enforcement** – While this method does not provide a direct barrier, it can be a deterrent for vehicles driving around the gates.

On-Site Parking Strategies

All Alternatives, including the No-Action Alternative, would provide parking on-site. As the master plan for the New Whatcom site is developed it is assumed that each future redevelopment project will accommodate that project's parking demand. However overall parking needs could be addressed by two approaches: reducing demand or managing the supply. These strategies would assist in dealing with the large parking supply needed for on-site as well as reduce some of the vehicles on-site which would decrease impacts on other modes such as the street system.

Reduce Parking Demand

Several factors can reduce parking demand including limited parking supply, high parking prices, extensive transit coverage, free-ride transit zone, bicycle services, pedestrian connections and TDM requirements of larger employers or newer buildings. In some ways, reduced parking supply would contribute to more people shifting modes as parking may be more difficult to find and would become more expensive as the demand for the limited resource grows. Any such changes would need to take into account accessibility and additional walking or bicycling distances. Incorporating flex-cars as part of TDM measures also would reduce resident dependency on individual cars.

Parking Management and Short-Term Parking

Time limitations and metered parking could be instituted for parking, where appropriate. This would increase parking turnover as well as support commercial businesses by provided more parking for customers. Enforcement would be needed to make this effective. Time restrictions and special restricted parking zones could be needed to discourage the spread of displaced parking demand to the surrounding neighborhoods or the downtown area.

Dynamic Parking Signage

Install variable message signs that indicate the location of available off-street public parking. Signs could be located at major access locations to help drivers navigate vehicles towards public parking areas. This strategy could also reduce excess circulation associated with searching for parking.

Curb Lane Management

This strategy would aim at establishing standards for new developments whereby loading zones are located in alleys or side streets rather than on major streets. This would allow for additional space for on-street parking or eliminate additional on-street parking from being removed as a result of new development.

Pay Stations

Integrate pay stations rather than parking meters for on-street parking located within the site. This allows greater flexibility in the form of payment, and makes it easier to collect and manage revenues.

Significant Unavoidable Adverse Impacts

The No-Action and Action Alternatives would accommodate additional amounts of future development within the site which would contribute to travel demands and congestion along the on-site and off-site street system. The additional development would also increase traffic access and circulation in the area. This added congestion would contribute to measurably poorer performance of the transportation network, in terms of increased delays along several of the corridors and at some specific intersections. The increase in traffic and higher volumes of pedestrian and bicycles would result in more conflict points and increased hazards to safety.

Appendix N-1: Roadway and Intersection Operations

Roadway Operations

								Existing			No Action			Alternative 1			Alternative 2			Alternative 2A			Alternative 3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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								LOS	Volumes ¹	V/C Ratio	LOS	Volumes	V/C Ratio	LOS	Volumes	V/C Ratio	LOS	Volumes	V/C Ratio	LOS	Volumes	V/C Ratio	LOS	Volumes	V/C Ratio	LOS	Volumes	V/C Ratio	LOS	Volumes	V/C Ratio	LOS	Volumes	V/C Ratio																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Roadway	X/O	Junction	X/O	Junction	Travel Direction	Roadway Capacity ²	V/C Std ³																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											

Intersection Operations

Study Intersection	Existing			No Action						Alternative 1						Alternative 2						Alternative 2A ⁵						Alternative 3					
	2007			2016			2026			2016			2026			2016			2026			2016			2026			2016			2026		
	LOS ¹	Delay ²	V/C ³ or WM ⁴	LOS	Delay	V/C or WM	LOS	Delay	V/C or WM	LOS	Delay	V/C or WM	LOS	Delay	V/C or WM	LOS	Delay	V/C or WM	LOS	Delay	V/C or WM	LOS	Delay	V/C or WM	LOS	Delay	V/C or WM	LOS	Delay	V/C or WM			
On-Site																																	
1. Roeder Avenue/Hilton Avenue	C	16	NB	F	84	NB	F	>200	NB	F	>200	NB	F	>200	NB	F	>200	NB	F	>200	NB	-	-	-	-	-	-	F	86	NB	F	>200	NB
2. Roeder Avenue/F Street	B	17	0.32	D	48	0.69	F	100	0.9	D	50	0.79	F	105	1.09	D	49	0.74	F	100	1.01	-	-	-	-	-	-	D	44	0.66	F	101	0.92
3. Roeder Avenue/C Street	C	16	SB	F	114	NB/SB	F	>200	NB/SB	F	>200	SB	F	>200	NB/SB	F	>200	SB	F	>200	NB/SB	-	-	-	-	-	-	F	174	SB	F	>200	NB/SB
4. Roeder Avenue/Central Avenue	C	16	NB	F	>200	NB/SB	F	>200	NB/SB	F	>200	NB	F	>200	NB/SB	F	>200	NB	F	>200	NB/SB	F	>200	NB	F	>200	NB/SB	F	>200	SB	F	>200	NB/SB
5. West Chestnut Street/Bay Street/Roeder Avenue	E	40	SBL	F	>200	SBL	F	>200	SBL	F	>200	NB/SBL	F	>200	NB/SBL	F	>200	SBL	F	>200	NB/SB	F	>200	SBL	F	>200	NBL/-	F	>200	SB	F	>200	SB
6. West Chestnut Street/Commercial Street	B	11	0.39	B	15	0.55	B	16	0.7	B	14	0.49	D	45	0.81	B	14	0.56	D	52	1.08	B	15	0.56	D	39	0.85	B	15	0.55	B	15	0.65
7. East Chestnut Street/Cornwall Avenue	B	14	0.57	E	57	1.09	F	>200	1.47	C	28	0.93	F	94	1.17	C	21	0.82	E	68	1.1	C	31	0.96	F	92	1.21	D	43	1.03	F	154	1.34
8. Maple Street/Central Avenue	-	-	-	-	-	-	-	-	-	-	-	-	C	20	WB	-	-	-	B	13	WB	-	-	-	B	13	WB	-	-	-	B	11	WB
9. Maple Street/Bay Street	-	-	-	-	-	-	-	-	-	-	-	-	C	26	0.75	-	-	-	B	12	0.54	-	-	-	A	9	0.6	-	-	-	B	13	EB
10. Maple Street/Commercial Street	-	-	-	-	-	-	-	-	-	-	-	-	A	9	0.45	-	-	-	C	19	EB	-	-	-	C	21	EB	-	-	-	-	-	-
11. Laurel Street/Bay Street	-	-	-	-	-	-	-	-	-	B	11	NA	B	14	NA	B	10	NA	C	24	NA	A	8	NA	B	14	NA	-	-	-	B	11	NA
12. Laurel Street/Commercial Street/Log Pond Road	-	-	-	-	-	-	-	-	-	-	-	-	D	51	1.05	-	-	-	D	37	NA	-	-	-	B	17	NA	-	-	-	C	19	NA
13. Cornwall Avenue/Oak Street/Wharf Street	-	-	-	-	-	-	-	-	-	-	-	-	B	11	EB	-	-	-	A	9	NA	-	-	-	A	9	NA	-	-	-	-	-	-
14. Cornwall Avenue/Wharf Street	-	-	-	-	-	-	-	-	-	A	9	NA	D	34	NB	B	13	SB	D	35	SB	B	14	SB	D	26	SB	B	11	NB/SB	B	14	SB
Off-Site																																	
1.Meridian Street/Birchwood Avenue	D	40	0.72	E	65	0.87	F	128	1.01	E	66	0.87	F	132	1.03	E	63	0.87	F	109	1.02	-	-	-	-	-	-	E	63	0.86	F	128	1.01
2.Meridian Street/Squalicum Way	C	28	0.49	D	42	0.63	D	53	0.73	D	44	0.65	E	63	0.77	D	40	0.63	E	75	0.79	-	-	-	-	-	-	D	40	0.63	D	53	0.73
3.Broadway/Meridian Street/Girard Street	B	18	0.5	C	24	0.61	C	28	0.7	C	24	0.6	C	29	0.68	B	20	0.55	C	28	0.62	-	-	-	-	-	-	C	23	0.51	C	28	0.7
4.Broadway/Elm Street/Dupont Street.	A	8	0.5	B	16	0.59	C	22	0.67	B	18	0.68	C	25	0.72	B	17	0.59	C	21	0.66	-	-	-	-	-	-	B	17	0.6	C	25	0.72
5.Broadway/Eldridge Avenue/West Holly Street	A	8	0.58	A	9	0.64	B	14	0.8	A	9	0.65	B	15	0.82	A	9	0.66	B	14	0.81	-	-	-	-	-	-	A	9	0.65	B	14	0.81
6.West Holly Street/F Street	B	13	0.5	C	25	0.67	C	33	0.89	C	52	0.84	E	73	1.09	C	27	0.74	D	54	0.96	-	-	-	-	-	-	C	24	0.69	C	34	0.89
7.West Holly Street/ C Street	C	18	SB	F	127	SB	F	>200	NB/SB	F	198	SB	F	>200	NB/SB	F	>200	SB	F	>200	NB/SB	-	-	-	-	-	-	F	166	SB	F	>200	NB/SB
8.Cornwall Avenue/Flora Street/York Street	B	13	0.68	C	21	0.75	D	41	0.93	C	22	0.78	E	68	1.02	B	20	0.73	D	46	1.01	-	-	-	-	-	-	C	20	0.74	D	40	0.92
9.Cornwall Avenue/East Magnolia Street	B	12	0.52	B	17	0.58	C	30	0.84	B	18	0.63	C	28	0.83	B	16	0.56	C	25	0.82	-	-	-	-	-	-	B	17	0.6	C	29	0.85
10.East Holly Street/Cornwall Avenue	B	16	0.53	B	17	0.73	D	52	1.05	B	16	0.67	C	32	0.88	B	16	0.65	B	19	0.8	-	-	-	-	-	-	B	17	0.73	D	45	0.8
11.East Chestnut Street/Railroad Avenue	E	44	SB	F	168	SB	F	>200	SB	F	70	SB	F	>200	SB	F	98	SB	F	>200	SB	-	-	-	-	-	-	F	87	SB	F	>200	SB
12.East Chestnut Street/North State Street	B	13	0.53	B	17	0.59	C	27	0.53	B	16	0.58	C	27	0.57	B	16	0.56	B	17	0.59	-	-	-	-	-	-	B	16	0.55	C	27	0.55
13.East Chestnut Street/North Forest Street	A	7	0.39	B	11	0.51	B	17	0.59	B	11	0.5	B	19	0.65	B	12	51	B	16	0.68	-	-	-	-	-	-	B	12	0.52	B	17	0.61
14.East Chestnut Street/Ellis Street	A	10	0.42	B	11	0.47	B	15	0.71	B	11	0.49	C	21	0.82	B	11	0.47	B	18	0.78	-	-	-	-	-	-	B	10	0.46	B	15	0.73
15.Lakeway Drive/Ellis Street/Jersey Street/East Holly Street	C	24	0.68	D	37	0.85	D	55	0.96	D	37	0.85	E	64	0.99	D	37	0.85	E	64	0.98	-	-	-	-	-	-	D	37	0.85	E	57	0.97
16.Lakeway Drive/I-5 Southbound Ramps	C	23	0.82	D	38	0.93	F	98	1.16	C	35	0.91	F	108	1.2	D	43	0.96	F	88	1.17	-	-	-	-	-	-	D	46	0.99	F	102	1.17
17.Lakeway Drive/King Street	D	39	0.73	D	47	0.78	E	69	0.84	D	49	0.77	F	85	0.84	D	46	0.77	E	66	0.87	-	-	-	-	-	-	D	46	0.78	E	74	0.81
18.Lakeway Drive/Lincoln Street	D	38	0.91	D	47	0.9	E	68	1.07	D	47	0.91	E	67	1.02	D	46	0.89	E	65	1.04	-	-	-	-	-	-	D	45	0.89	E	63	0.96
19.Iowa Street/Moore Street/I-5 Northbound Ramps	C	33	0.89	D	47	0.99	E	74	1.11	D	46	0.98	E	78	1.11	D	46	0.98	E	79	1.1	-	-	-	-	-	-	D	43	0.96	E	78	1.11
20.Iowa Street/King Street	B	17	0.62	C	22	0.8																											

Appendix N-2: Existing Intersection Turning Movement Counts

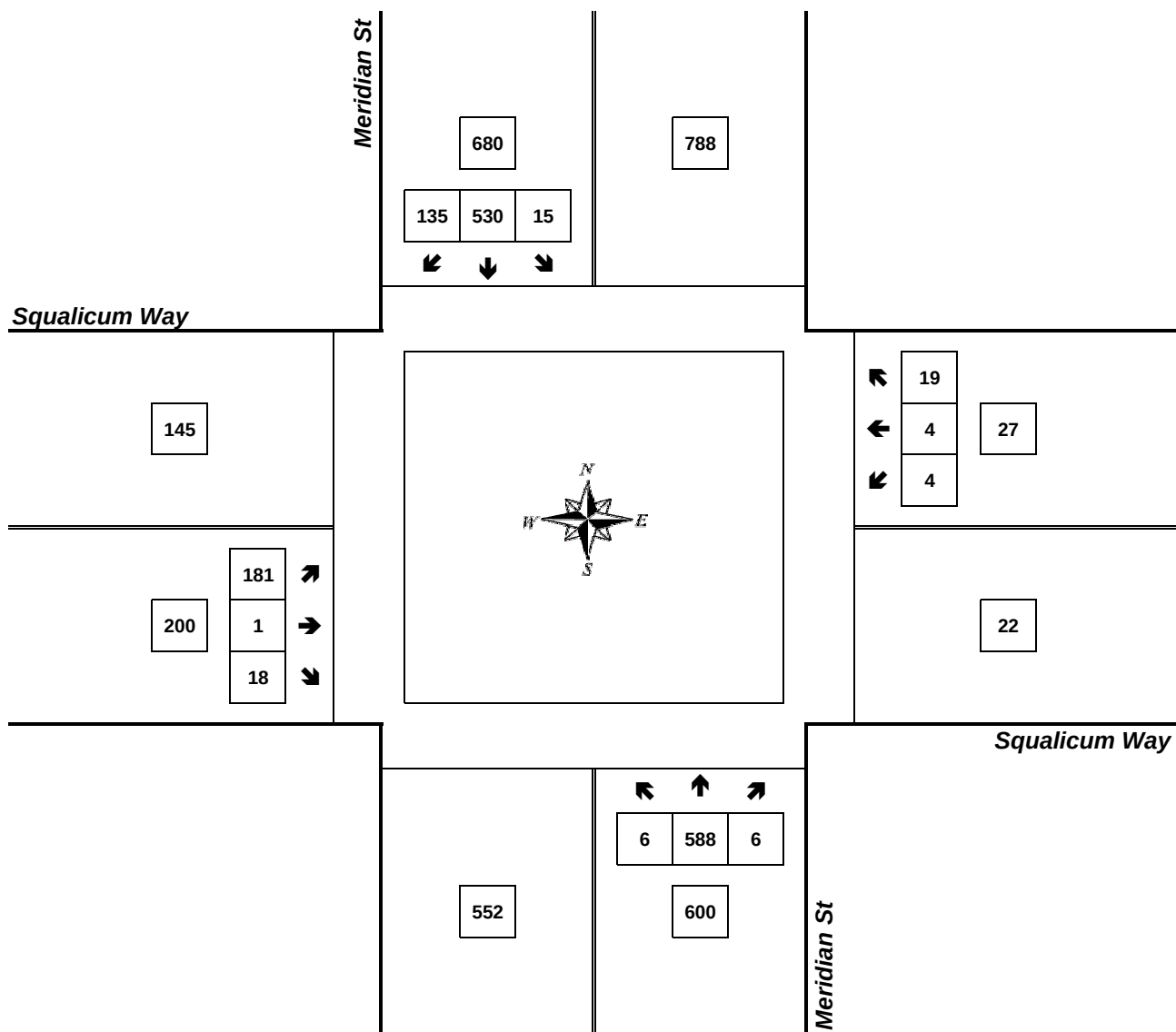
Peak Hour Summary



Mark Skaggs
(206) 251-0300

Meridian St & Squalicum Way

4:45 PM to 5:45 PM
Wednesday, April 11, 2007



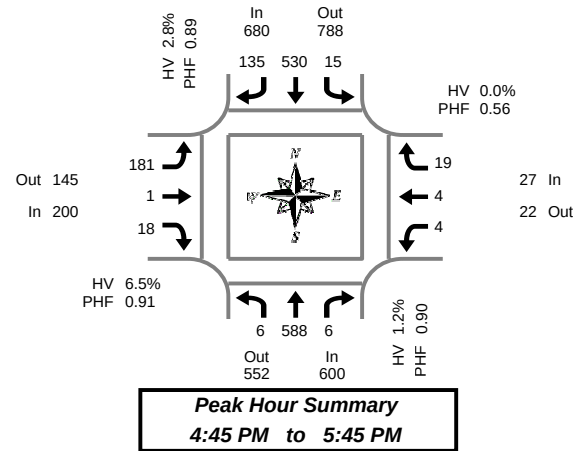
Approach	PHF	HV%	Volume
EB	0.91	6.5%	200
WB	0.56	0.0%	27
NB	0.90	1.2%	600
SB	0.89	2.8%	680
Intersection	0.91	2.6%	1,507

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



Meridian St & Squalicum Way

Wednesday, April 11, 2007

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Meridian St				Southbound Meridian St				Eastbound Squalicum Way				Westbound Squalicum Way				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	5	134	0	1	4	129	25	8	44	0	5	3	5	2	8	0	361
4:15 PM	2	123	1	3	1	151	42	6	31	0	5	5	0	0	5	0	361
4:30 PM	0	106	1	4	3	135	29	1	47	0	5	3	1	0	6	0	333
4:45 PM	2	129	0	1	4	151	35	7	37	1	4	4	2	2	7	0	374
5:00 PM	1	159	1	3	3	121	38	3	48	0	7	3	2	0	1	0	381
5:15 PM	2	162	3	1	5	138	37	8	51	0	4	3	0	2	10	0	414
5:30 PM	1	138	2	2	3	120	25	1	45	0	3	3	0	0	1	0	338
5:45 PM	3	108	1	2	2	115	35	2	27	0	2	0	1	0	3	0	297
Total Survey	16	1,059	9	17	25	1,060	266	36	330	1	35	24	11	6	41	0	2,859

Peak Hour Summary

4:45 PM to 5:45 PM

By Approach	Northbound Meridian St				Southbound Meridian St				Eastbound Squalicum Way				Westbound Squalicum Way				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	600	552	1,152	7	680	788	1,468	19	200	145	345	13	27	22	49	0	1,507
%HV	1.2%				2.8%				6.5%				0.0%				2.6%
PHF	0.90				0.89				0.91				0.56				0.91

By Movement	Northbound Meridian St				Southbound Meridian St				Eastbound Squalicum Way				Westbound Squalicum Way				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	6	588	6	600	15	530	135	680	181	1	18	200	4	4	19	27	1,507
PHF	0.75	0.91	0.50	0.90	0.75	0.88	0.89	0.89	0.89	0.25	0.64	0.91	0.50	0.50	0.48	0.56	0.91

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Meridian St				Southbound Meridian St				Eastbound Squalicum Way				Westbound Squalicum Way				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	9	492	2	9	12	566	131	22	159	1	19	15	8	4	26	0	1,429
4:15 PM	5	517	3	11	11	558	144	17	163	1	21	15	5	2	19	0	1,449
4:30 PM	5	556	5	9	15	545	139	19	183	1	20	13	5	4	24	0	1,502
4:45 PM	6	588	6	7	15	530	135	19	181	1	18	13	4	4	19	0	1,507
5:00 PM	7	567	7	8	13	494	135	14	171	0	16	9	3	2	15	0	1,430

Peak Hour Summary

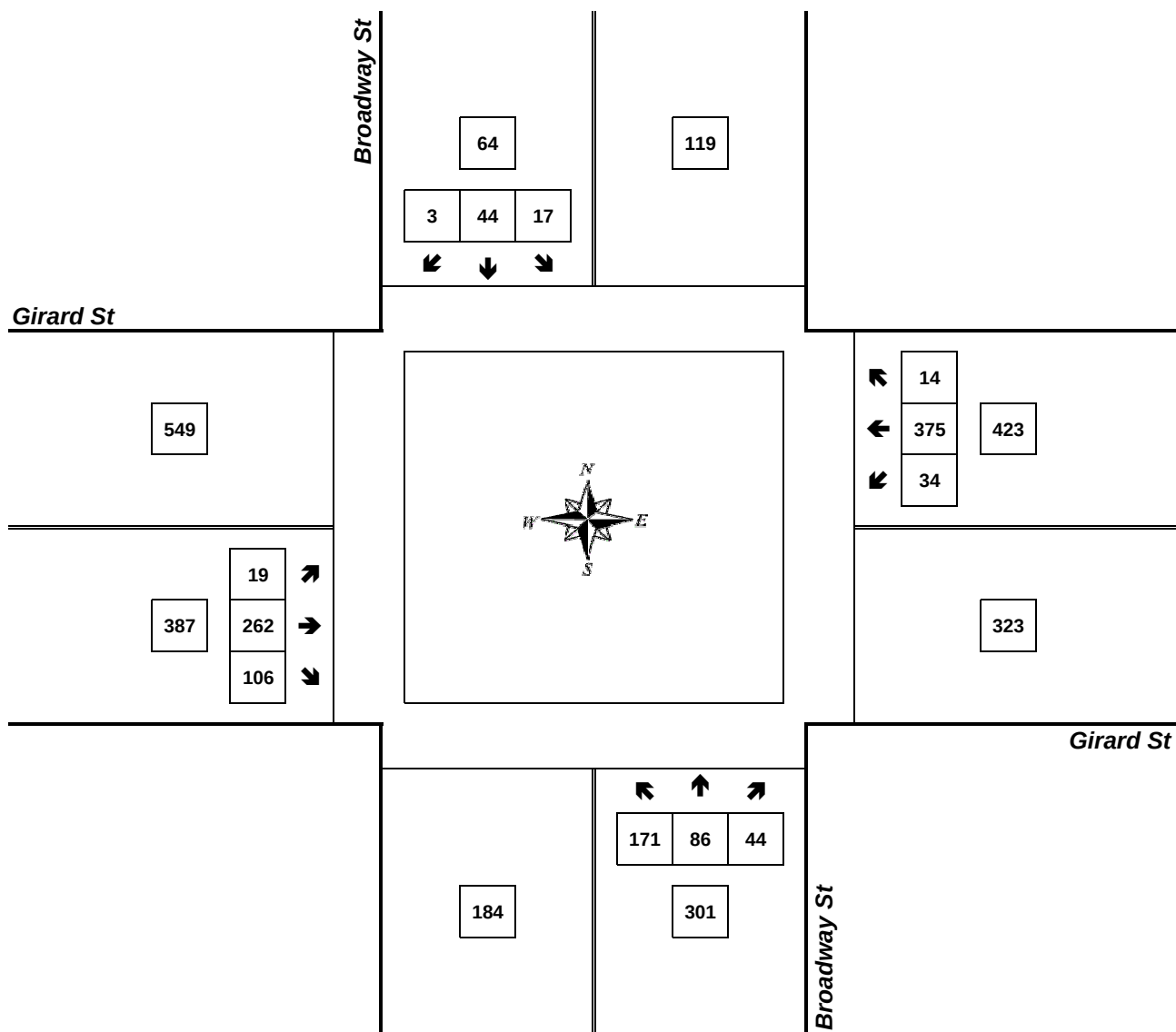


Mark Skaggs
(206) 251-0300

Broadway St & Girard St

4:45 PM to 5:45 PM

Tuesday, April 10, 2007



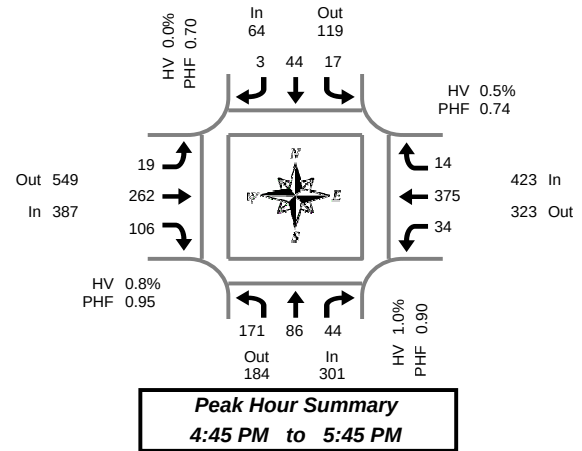
Approach	PHF	HV%	Volume
EB	0.95	0.8%	387
WB	0.74	0.5%	423
NB	0.90	1.0%	301
SB	0.70	0.0%	64
Intersection	0.91	0.7%	1,175

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



Broadway St & Girard St

Tuesday, April 10, 2007
4:00 PM to 6:00 PM

15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Broadway St				Southbound Broadway St				Eastbound Girard St				Westbound Girard St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	28	19	7	1	2	10	6	0	3	67	28	1	6	79	4	1	259
4:15 PM	36	10	5	0	2	9	0	1	3	77	37	1	8	74	4	2	265
4:30 PM	20	22	10	1	8	13	0	0	2	56	34	1	11	80	3	1	259
4:45 PM	38	20	11	2	1	7	1	0	7	67	25	1	9	94	3	0	283
5:00 PM	50	17	9	0	4	11	0	0	3	57	28	0	11	123	9	1	322
5:15 PM	46	28	10	1	7	15	1	0	7	70	21	1	8	90	2	0	305
5:30 PM	37	21	14	0	5	11	1	0	2	68	32	1	6	68	0	1	265
5:45 PM	31	13	2	0	9	9	1	0	6	63	17	1	8	54	2	0	215
Total Survey	286	150	68	5	38	85	10	1	33	525	222	7	67	662	27	6	2,173

Peak Hour Summary 4:45 PM to 5:45 PM

By Approach	Northbound Broadway St				Southbound Broadway St				Eastbound Girard St				Westbound Girard St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	301	184	485	3	64	119	183	0	387	549	936	3	423	323	746	2	1,175
%HV	1.0%				0.0%				0.8%				0.5%				0.7%
PHF	0.90				0.70				0.95				0.74				0.91

By Movement	Northbound Broadway St				Southbound Broadway St				Eastbound Girard St				Westbound Girard St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	171	86	44	301	17	44	3	64	19	262	106	387	34	375	14	423	1,175
PHF	0.86	0.77	0.79	0.90	0.61	0.73	0.75	0.70	0.68	0.94	0.83	0.95	0.77	0.76	0.39	0.74	0.91

Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Broadway St				Southbound Broadway St				Eastbound Girard St				Westbound Girard St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	122	71	33	4	13	39	7	1	15	267	124	4	34	327	14	4	1,066
4:15 PM	144	69	35	3	15	40	1	1	15	257	124	3	39	371	19	4	1,129
4:30 PM	154	87	40	4	20	46	2	0	19	250	108	3	39	387	17	2	1,169
4:45 PM	171	86	44	3	17	44	3	0	19	262	106	3	34	375	14	2	1,175
5:00 PM	164	79	35	1	25	46	3	0	18	258	98	3	33	335	13	2	1,107

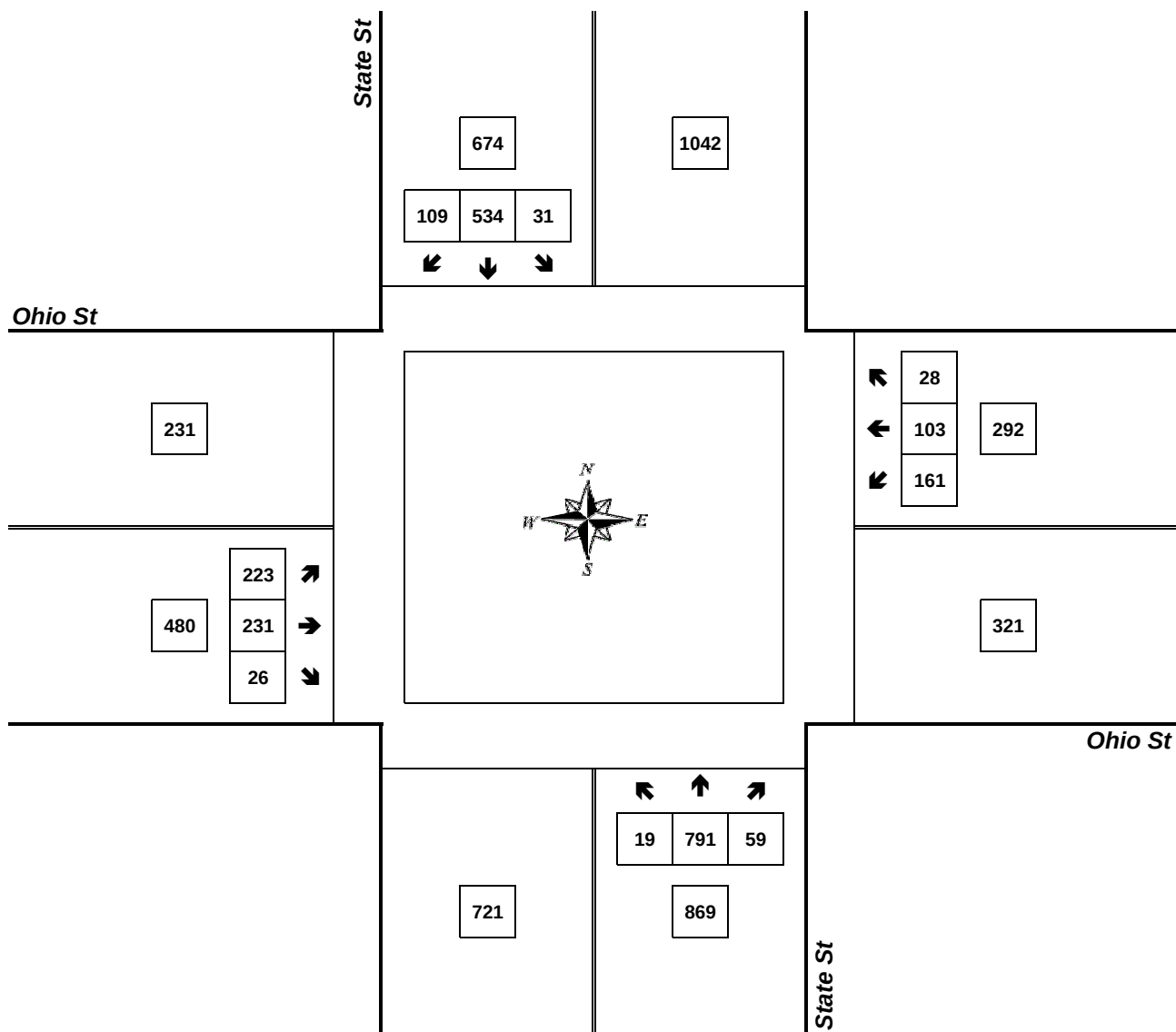
Peak Hour Summary



Mark Skaggs
(206) 251-0300

State St & Ohio St

4:30 PM to 5:30 PM
Wednesday, April 11, 2007



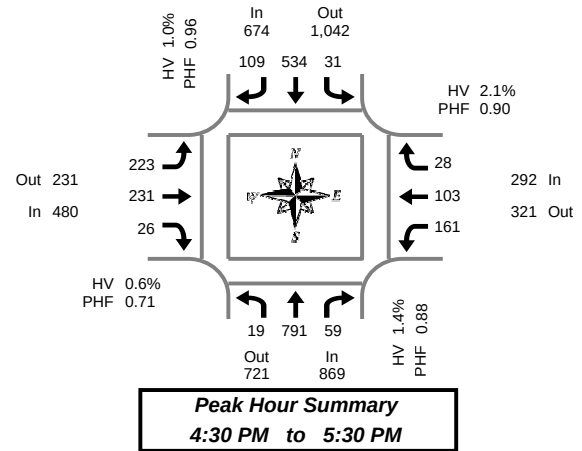
Approach	PHF	HV%	Volume
EB	0.71	0.6%	480
WB	0.90	2.1%	292
NB	0.88	1.4%	869
SB	0.96	1.0%	674
Intersection	0.91	1.2%	2,315

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



State St & Ohio St

Wednesday, April 11, 2007
4:00 PM to 6:00 PM

15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound State St				Southbound State St				Eastbound Ohio St				Westbound Ohio St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	3	140	8	3	5	136	29	2	43	41	4	9	32	33	4	1	478
4:15 PM	2	176	16	6	10	133	33	4	54	47	2	2	40	27	6	1	546
4:30 PM	4	178	16	1	3	133	34	2	53	50	4	1	32	24	6	2	537
4:45 PM	4	182	12	6	9	145	22	1	45	56	4	1	38	34	9	2	560
5:00 PM	7	200	18	1	10	127	27	4	82	73	13	0	48	22	9	2	636
5:15 PM	4	231	13	4	9	129	26	0	43	52	5	1	43	23	4	0	582
5:30 PM	2	190	13	0	7	120	38	5	42	38	4	2	31	31	2	1	518
5:45 PM	3	147	18	3	4	109	15	2	40	44	3	1	41	23	2	0	449
Total Survey	29	1,444	114	24	57	1,032	224	20	402	401	39	17	305	217	42	9	4,306

Peak Hour Summary 4:30 PM to 5:30 PM

By Approach	Northbound State St				Southbound State St				Eastbound Ohio St				Westbound Ohio St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	869	721	1,590	12	674	1,042	1,716	7	480	231	711	3	292	321	613	6	2,315
%HV	1.4%				1.0%				0.6%				2.1%				1.2%
PHF	0.88				0.96				0.71				0.90				0.91

By Movement	Northbound State St				Southbound State St				Eastbound Ohio St				Westbound Ohio St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	19	791	59	869	31	534	109	674	223	231	26	480	161	103	28	292	2,315
PHF	0.68	0.86	0.82	0.88	0.78	0.92	0.80	0.96	0.68	0.79	0.50	0.71	0.84	0.76	0.78	0.90	0.91

Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound State St				Southbound State St				Eastbound Ohio St				Westbound Ohio St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	13	676	52	16	27	547	118	9	195	194	14	13	142	118	25	6	2,121
4:15 PM	17	736	62	14	32	538	116	11	234	226	23	4	158	107	30	7	2,279
4:30 PM	19	791	59	12	31	534	109	7	223	231	26	3	161	103	28	6	2,315
4:45 PM	17	803	56	11	35	521	113	10	212	219	26	4	160	110	24	5	2,296
5:00 PM	16	768	62	8	30	485	106	11	207	207	25	4	163	99	17	3	2,185

Peak Hour Summary



Mark Skaggs
(206) 251-0300

James St & Iowa St & State St

4:00 PM to 5:00 PM
Wednesday, April 11, 2007

James St

In					Out
557					477
7	354	76	120		
R	BR	T	L		
←	↙	↓	→		

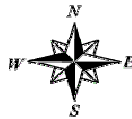
Out
40

0	L	↑
0	T	→
9	R	↓
0	HR	↙

In
9

↑	R	104	In
←	T	28	461
↙	BL	328	
↓	L	1	

Out
645



State St

Out
682

5	HL	←
373	BL	↑
525	BR	→
7	HR	↓
In	910	

Out
93

↙	←	↑	→
HL	L	T	R
0	0	0	0

In
0

James St

	Intersection	NB	SB	EB	WB	NEB
Volume	1,937	0	557	9	461	910
HV%	1.2%	0.0%	1.1%	0.0%	1.1%	1.4%
PHF	0.96	0.00	0.92	0.56	0.85	0.91

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300

James St & Iowa St & State St

Wednesday, April 11, 2007

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound James St				Southbound James St					Eastbound Iowa St					Westbound Iowa St					Northeastbound State St					Interval Total
	HL	L	R	HV	L	T	BR	R	HV	L	T	R	HR	HV	L	BL	T	R	HV	HL	BL	BR	HR	HV	
16:00	0	0	0	0	30	21	83	2	1	0	0	1	0	0	0	86	6	28	3	5	94	148	3	2	507
16:15	0	0	0	0	34	20	94	3	1	0	0	4	0	0	1	101	5	29	2	0	84	119	2	6	496
16:30	0	0	0	0	37	18	77	1	3	0	0	0	0	0	0	81	7	18	0	0	102	139	2	4	482
16:45	0	0	0	0	19	17	100	1	1	0	0	4	0	0	0	60	10	29	0	0	93	119	0	1	452
17:00	0	0	0	0	37	15	71	1	1	0	0	1	0	0	1	70	8	24	0	0	108	153	4	2	493
17:15	0	0	0	0	36	16	92	2	0	0	0	1	0	0	0	54	5	21	0	0	112	140	1	5	480
17:30	0	0	0	0	25	18	70	1	2	0	0	1	0	0	0	74	8	24	1	0	69	147	1	0	438
17:45	0	0	0	0	14	10	75	0	1	0	0	2	0	0	0	55	4	22	1	1	88	124	0	4	395
Total Survey	0	0	0	0	232	135	662	11	10	0	0	14	0	0	2	581	53	195	7	6	750	1,089	13	24	3,743

Peak Hour Summary

4:00 PM to 5:00 PM

By Approach	Northbound James St		Southbound James St		Eastbound Iowa St		Westbound Iowa St		Northeastbound State St		Total
	Approach	HV	Approach	HV	Approach	HV	Approach	HV	Approach	HV	
In	0	0	557	6	9	0	461	5	910	13	1,937
Out	93		477		40		645		682		
Total	93		1,034		49		1,106		1,592		
%HV	0.0%		1.1%		0.0%		1.1%		1.4%		1.2%
PHF	0.00		0.92		0.56		0.85		0.91		0.96

By Movement	North James St				Southbound James St					Eastbound Iowa St					Westbound Iowa St					Northeastbound State St					Total
	HL	L	R	Total	L	T	BR	R	Total	L	T	R	HR	Total	L	BL	T	R	Total	HL	BL	BR	HR	Total	
Volume	0	0	0	0	120	76	354	7	557	0	0	9	0	9	1	328	28	104	461	5	373	525	7	910	1,937
PHF	0.00	0.00	0.00	0.00	0.81	0.90	0.89	0.58	0.92	0.00	0.00	0.56	0.00	0.56	0.25	0.81	0.70	0.90	0.85	0.25	0.91	0.89	0.58	0.91	0.96

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound James St				Southbound James St					Eastbound Iowa St					Westbound Iowa St					Northeastbound State St					Interval Total
	HL	L	R	HV	L	T	BR	R	HV	L	T	R	HR	HV	L	BL	T	R	HV	HL	BL	BR	HR	HV	
16:00	0	0	0	0	120	76	354	7	6	0	0	9	0	0	1	328	28	104	5	5	373	525	7	13	1,937
16:15	0	0	0	0	127	70	342	6	6	0	0	9	0	0	2	312	30	100	2	0	387	530	8	13	1,923
16:30	0	0	0	0	129	66	340	5	5	0	0	6	0	0	1	265	30	92	0	0	415	551	7	12	1,907
16:45	0	0	0	0	117	66	333	5	4	0	0	7	0	0	1	258	31	98	1	0	382	559	6	8	1,863
17:00	0	0	0	0	112	59	308	4	4	0	0	5	0	0	1	253	25	91	2	1	377	564	6	11	1,806

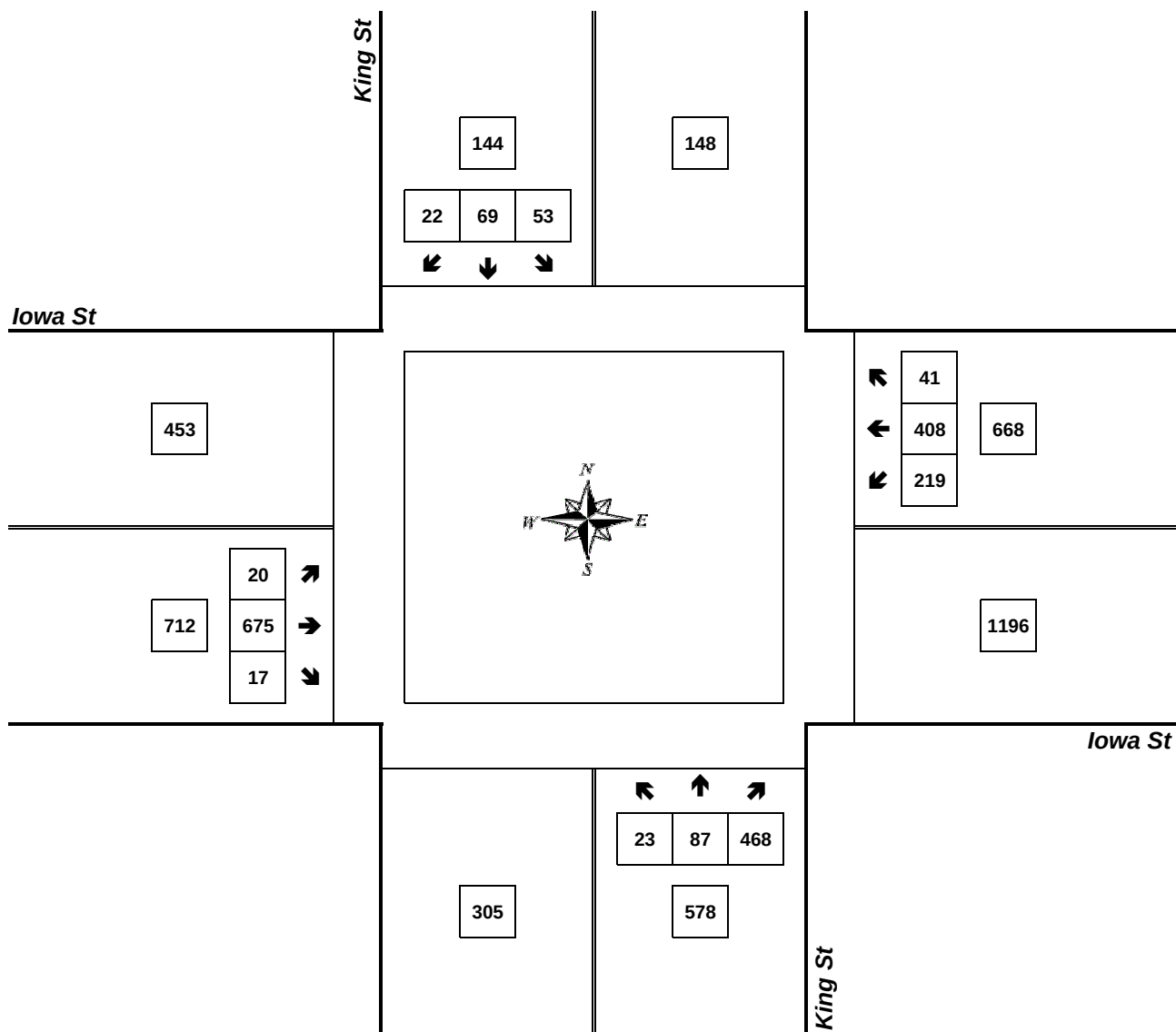
Peak Hour Summary



Mark Skaggs
(206) 251-0300

King St & Iowa St

4:30 PM to 5:30 PM
Wednesday, April 11, 2007



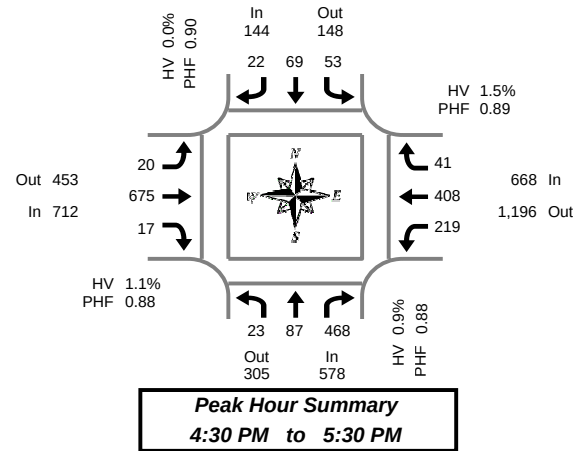
Approach	PHF	HV%	Volume
EB	0.88	1.1%	712
WB	0.89	1.5%	668
NB	0.88	0.9%	578
SB	0.90	0.0%	144
Intersection	0.88	1.1%	2,102

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



King St & Iowa St

Wednesday, April 11, 2007
4:00 PM to 6:00 PM

15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound King St				Southbound King St				Eastbound Iowa St				Westbound Iowa St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	12	17	86	2	14	18	8	0	7	120	13	8	53	94	13	2	455
4:15 PM	6	14	108	1	11	15	10	1	6	156	8	6	41	90	19	3	484
4:30 PM	7	18	103	2	13	17	3	0	3	142	2	2	46	104	13	2	471
4:45 PM	2	29	89	0	9	19	3	0	8	160	3	3	46	105	8	2	481
5:00 PM	8	18	139	1	18	14	8	0	5	188	9	1	67	110	10	4	594
5:15 PM	6	22	137	2	13	19	8	0	4	185	3	2	60	89	10	2	556
5:30 PM	9	12	97	1	9	15	5	0	9	138	3	3	65	87	7	1	456
5:45 PM	7	10	88	0	14	19	8	0	7	118	8	2	48	58	8	2	393
Total Survey	57	140	847	9	101	136	53	1	49	1,207	49	27	426	737	88	18	3,890

Peak Hour Summary 4:30 PM to 5:30 PM

By Approach	Northbound King St				Southbound King St				Eastbound Iowa St				Westbound Iowa St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	578	305	883	5	144	148	292	0	712	453	1,165	8	668	1,196	1,864	10	2,102
%HV	0.9%				0.0%				1.1%				1.5%				1.1%
PHF	0.88				0.90				0.88				0.89				0.88

By Movement	Northbound King St				Southbound King St				Eastbound Iowa St				Westbound Iowa St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	23	87	468	578	53	69	22	144	20	675	17	712	219	408	41	668	2,102
PHF	0.72	0.75	0.84	0.88	0.74	0.91	0.69	0.90	0.63	0.90	0.47	0.88	0.82	0.93	0.79	0.89	0.88

Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound King St				Southbound King St				Eastbound Iowa St				Westbound Iowa St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	27	78	386	5	47	69	24	1	24	578	26	19	186	393	53	9	1,891
4:15 PM	23	79	439	4	51	65	24	1	22	646	22	12	200	409	50	11	2,030
4:30 PM	23	87	468	5	53	69	22	0	20	675	17	8	219	408	41	10	2,102
4:45 PM	25	81	462	4	49	67	24	0	26	671	18	9	238	391	35	9	2,087
5:00 PM	30	62	461	4	54	67	29	0	25	629	23	8	240	344	35	9	1,999

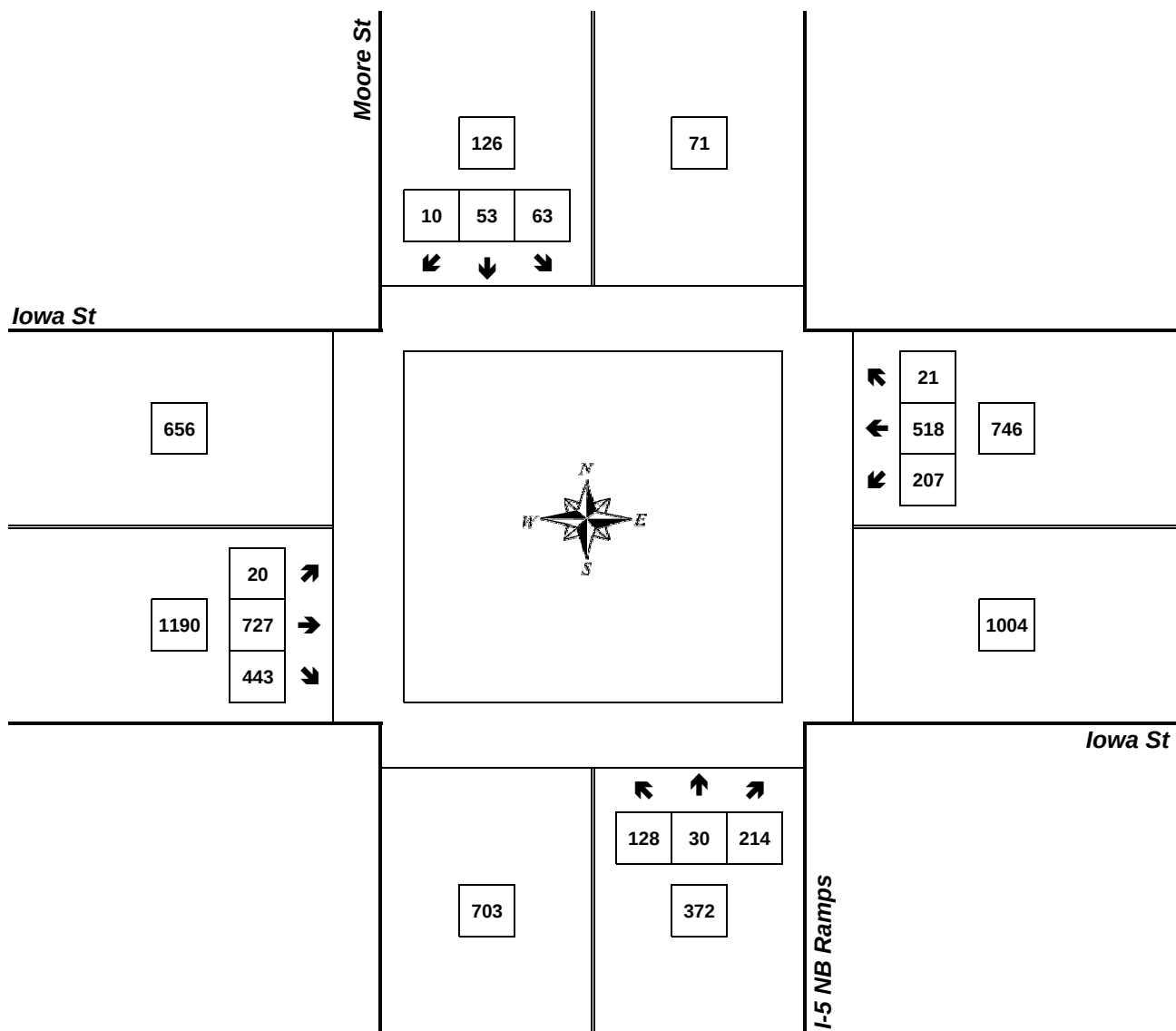
Peak Hour Summary



Mark Skaggs
(206) 251-0300

Moore St & Iowa St

4:30 PM to 5:30 PM
Wednesday, April 11, 2007



Approach	PHF	HV%	Volume
EB	0.83	1.4%	1,190
WB	0.92	1.5%	746
NB	0.93	3.5%	372
SB	0.93	5.6%	126
Intersection	0.90	2.0%	2,434

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

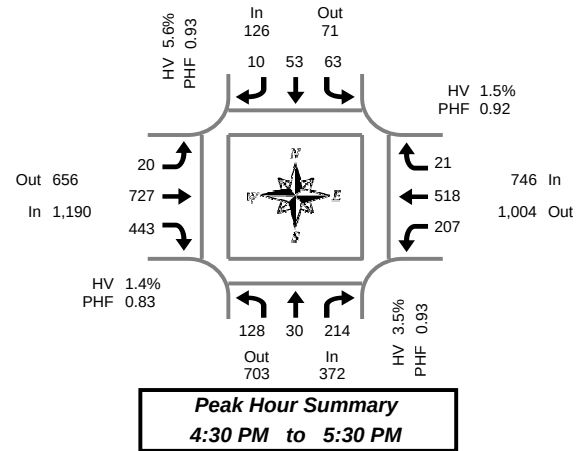


Mark Skaggs
(206) 251-0300

Moore St & Iowa St

Wednesday, April 11, 2007

4:00 PM to 6:00 PM



15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound I-5 NB Ramps				Southbound Moore St				Eastbound Iowa St				Westbound Iowa St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	34	8	39	3	13	6	5	3	2	136	71	13	53	134	4	8	505
4:15 PM	38	9	54	3	13	5	5	2	7	185	94	5	44	106	9	6	569
4:30 PM	27	6	60	3	19	8	3	0	6	137	98	5	48	127	8	4	547
4:45 PM	31	10	54	4	11	18	2	3	4	175	95	5	46	120	2	1	568
5:00 PM	32	8	60	2	19	11	4	2	3	181	131	4	51	134	7	4	641
5:15 PM	38	6	40	4	14	16	1	2	7	234	119	3	62	137	4	2	678
5:30 PM	27	4	47	2	8	7	2	0	3	163	84	2	50	124	10	0	529
5:45 PM	24	5	55	2	8	12	1	0	2	131	87	1	36	99	8	2	468
Total Survey	251	56	409	23	105	83	23	12	34	1,342	779	38	390	981	52	27	4,505

Peak Hour Summary

4:30 PM to 5:30 PM

By Approach	Northbound I-5 NB Ramps				Southbound Moore St				Eastbound Iowa St				Westbound Iowa St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	372	703	1,075	13	126	71	197	7	1,190	656	1,846	17	746	1,004	1,750	11	2,434
%HV	3.5%				5.6%				1.4%				1.5%				2.0%
PHF	0.93				0.93				0.83				0.92				0.90

By Movement	Northbound I-5 NB Ramps				Southbound Moore St				Eastbound Iowa St				Westbound Iowa St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	128	30	214	372	63	53	10	126	20	727	443	1,190	207	518	21	746	2,434
PHF	0.84	0.75	0.89	0.93	0.83	0.74	0.63	0.93	0.71	0.78	0.85	0.83	0.83	0.95	0.66	0.92	0.90

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound I-5 NB Ramps				Southbound Moore St				Eastbound Iowa St				Westbound Iowa St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	130	33	207	13	56	37	15	8	19	633	358	28	191	487	23	19	2,189
4:15 PM	128	33	228	12	62	42	14	7	20	678	418	19	189	487	26	15	2,325
4:30 PM	128	30	214	13	63	53	10	7	20	727	443	17	207	518	21	11	2,434
4:45 PM	128	28	201	12	52	52	9	7	17	753	429	14	209	515	23	7	2,416
5:00 PM	121	23	202	10	49	46	8	4	15	709	421	10	199	494	29	8	2,316

Peak Hour Summary

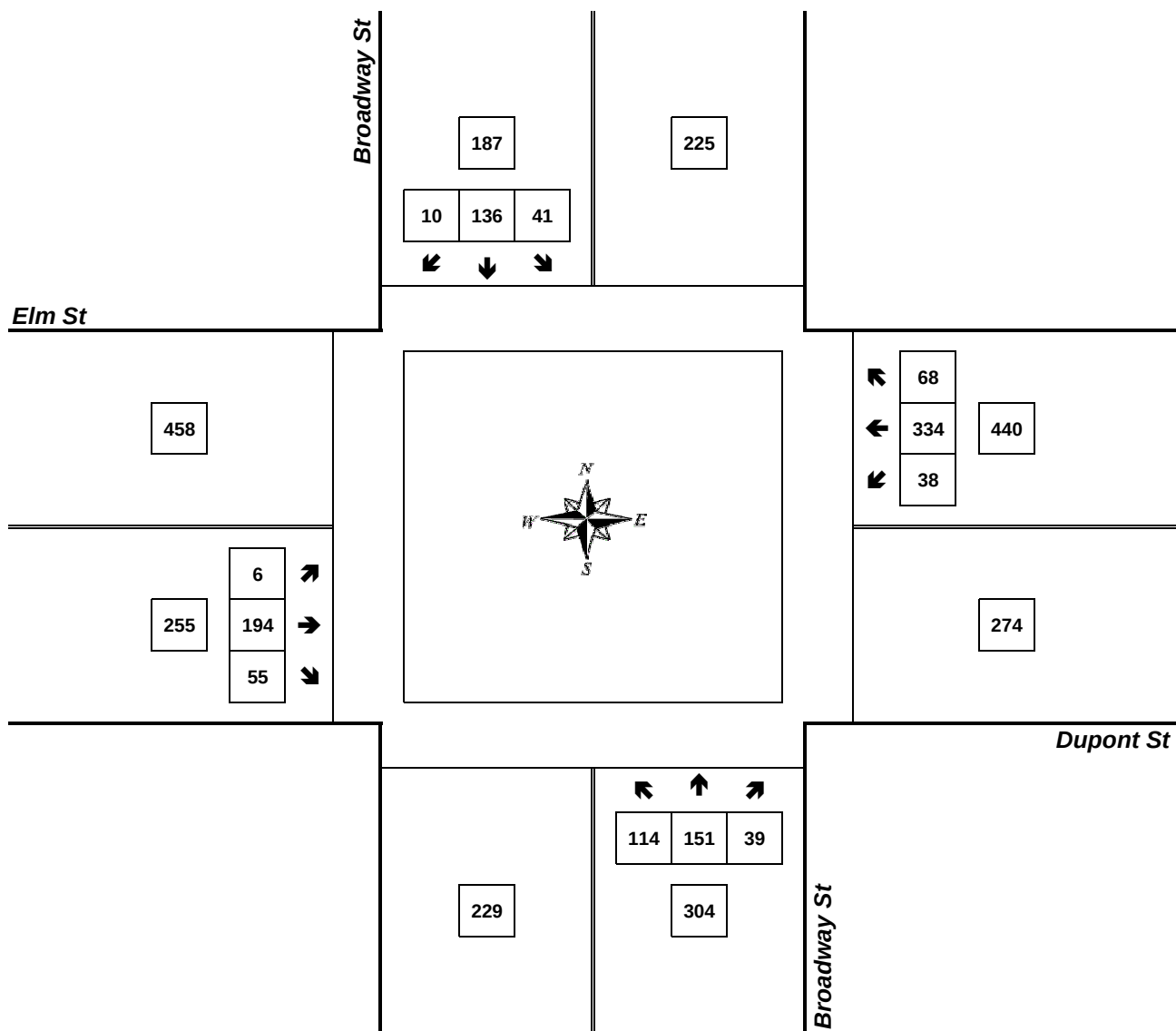


Mark Skaggs
(206) 251-0300

Broadway St & Dupont St

4:30 PM to 5:30 PM

Tuesday, April 10, 2007



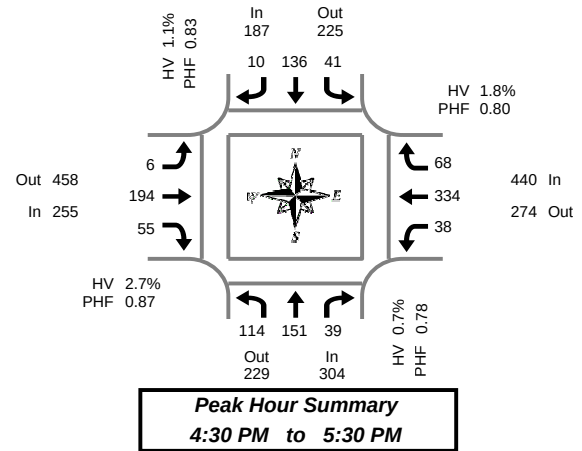
Approach	PHF	HV%	Volume
EB	0.87	2.7%	255
WB	0.80	1.8%	440
NB	0.78	0.7%	304
SB	0.83	1.1%	187
Intersection	0.89	1.6%	1,186

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



Broadway St & Dupont St

Tuesday, April 10, 2007

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Broadway St				Southbound Broadway St				Eastbound Elm St				Westbound Dupont St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	21	36	7	1	10	34	1	1	2	49	15	1	6	61	18	1	260
4:15 PM	23	44	8	1	11	37	1	1	4	51	14	1	7	55	18	1	273
4:30 PM	29	34	9	0	9	44	3	1	0	52	13	1	6	81	19	2	299
4:45 PM	26	37	10	1	9	27	2	0	3	60	10	2	8	66	22	2	280
5:00 PM	31	53	13	0	8	28	3	0	2	40	17	2	18	108	12	2	333
5:15 PM	28	27	7	1	15	37	2	1	1	42	15	2	6	79	15	2	274
5:30 PM	24	28	6	2	15	35	1	1	3	50	19	2	6	63	20	3	270
5:45 PM	22	34	5	0	3	35	1	1	2	34	18	1	4	47	18	0	223
Total Survey	204	293	65	6	80	277	14	6	17	378	121	12	61	560	142	13	2,212

Peak Hour Summary

4:30 PM to 5:30 PM

By Approach	Northbound Broadway St				Southbound Broadway St				Eastbound Elm St				Westbound Dupont St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	304	229	533	2	187	225	412	2	255	458	713	7	440	274	714	8	1,186
%HV	0.7%				1.1%				2.7%				1.8%				1.6%
PHF	0.78				0.83				0.87				0.80				0.89

By Movement	Northbound Broadway St				Southbound Broadway St				Eastbound Elm St				Westbound Dupont St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	114	151	39	304	41	136	10	187	6	194	55	255	38	334	68	440	1,186
PHF	0.92	0.71	0.75	0.78	0.68	0.77	0.83	0.83	0.50	0.81	0.81	0.87	0.53	0.77	0.77	0.80	0.89

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Broadway St				Southbound Broadway St				Eastbound Elm St				Westbound Dupont St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	99	151	34	3	39	142	7	3	9	212	52	5	27	263	77	6	1,112
4:15 PM	109	168	40	2	37	136	9	2	9	203	54	6	39	310	71	7	1,185
4:30 PM	114	151	39	2	41	136	10	2	6	194	55	7	38	334	68	8	1,186
4:45 PM	109	145	36	4	47	127	8	2	9	192	61	8	38	316	69	9	1,157
5:00 PM	105	142	31	3	41	135	7	3	8	166	69	7	34	297	65	7	1,100

Peak Hour Summary

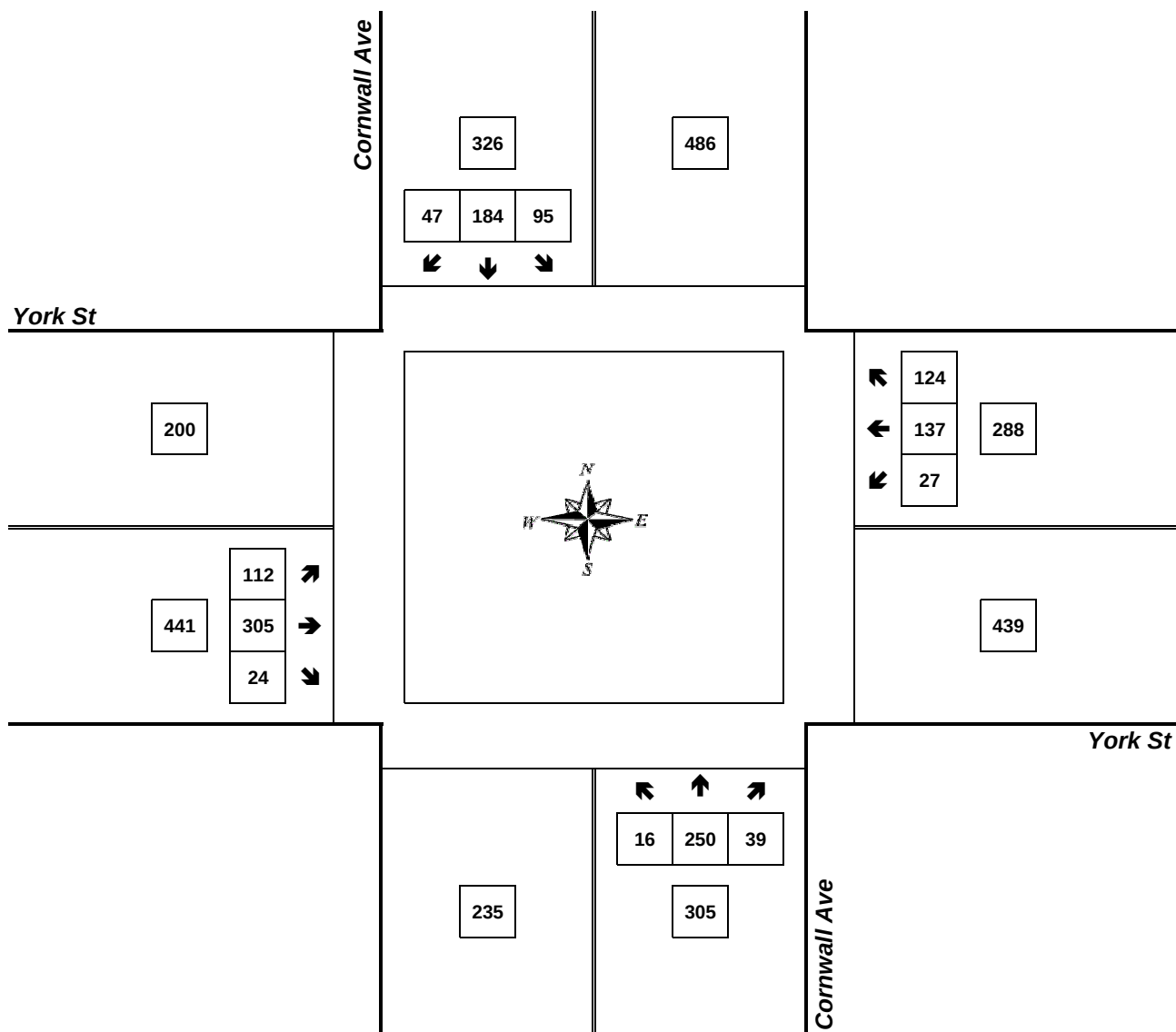


Mark Skaggs
(206) 251-0300

Cornwall Ave & York St

4:30 PM to 5:30 PM

Tuesday, April 10, 2007



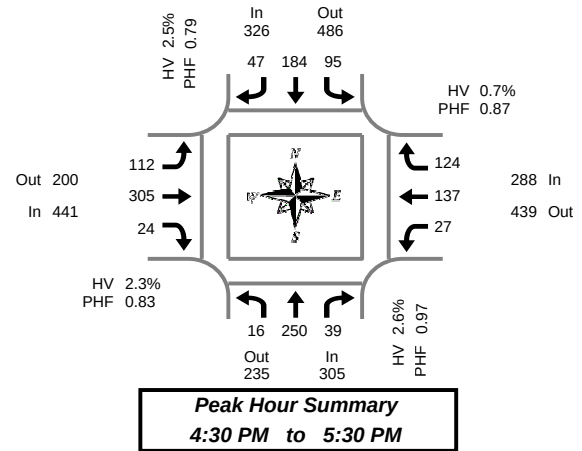
Approach	PHF	HV%	Volume
EB	0.83	2.3%	441
WB	0.87	0.7%	288
NB	0.97	2.6%	305
SB	0.79	2.5%	326
Intersection	0.85	2.1%	1,360

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



Cornwall Ave & York St

Tuesday, April 10, 2007

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound York St				Westbound York St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	4	73	8	5	23	51	10	5	23	80	10	4	10	34	21	0	347
4:15 PM	4	59	17	3	33	46	11	1	12	80	5	1	12	28	28	1	335
4:30 PM	3	65	9	4	16	35	9	2	30	70	4	4	6	34	30	2	311
4:45 PM	4	56	11	1	19	48	6	3	19	71	8	3	6	23	36	0	307
5:00 PM	3	67	9	2	34	51	18	1	36	89	8	2	8	46	29	0	398
5:15 PM	6	62	10	1	26	50	14	2	27	75	4	1	7	34	29	0	344
5:30 PM	7	57	3	3	18	46	4	2	15	42	3	3	8	22	26	1	251
5:45 PM	6	57	5	2	17	38	5	1	12	37	3	0	5	24	22	0	231
Total Survey	37	496	72	21	186	365	77	17	174	544	45	18	62	245	221	4	2,524

Peak Hour Summary

4:30 PM to 5:30 PM

By Approach	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound York St				Westbound York St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	305	235	540	8	326	486	812	8	441	200	641	10	288	439	727	2	1,360
%HV	2.6%				2.5%				2.3%				0.7%				2.1%
PHF	0.97				0.79				0.83				0.87				0.85

By Movement	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound York St				Westbound York St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	16	250	39	305	95	184	47	326	112	305	24	441	27	137	124	288	1,360
PHF	0.67	0.93	0.89	0.97	0.70	0.90	0.65	0.79	0.78	0.86	0.75	0.83	0.84	0.74	0.86	0.87	0.85

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound York St				Westbound York St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	15	253	45	13	91	180	36	11	84	301	27	12	34	119	115	3	1,300
4:15 PM	14	247	46	10	102	180	44	7	97	310	25	10	32	131	123	3	1,351
4:30 PM	16	250	39	8	95	184	47	8	112	305	24	10	27	137	124	2	1,360
4:45 PM	20	242	33	7	97	195	42	8	97	277	23	9	29	125	120	1	1,300
5:00 PM	22	243	27	8	95	185	41	6	90	243	18	6	28	126	106	1	1,224

Peak Hour Summary

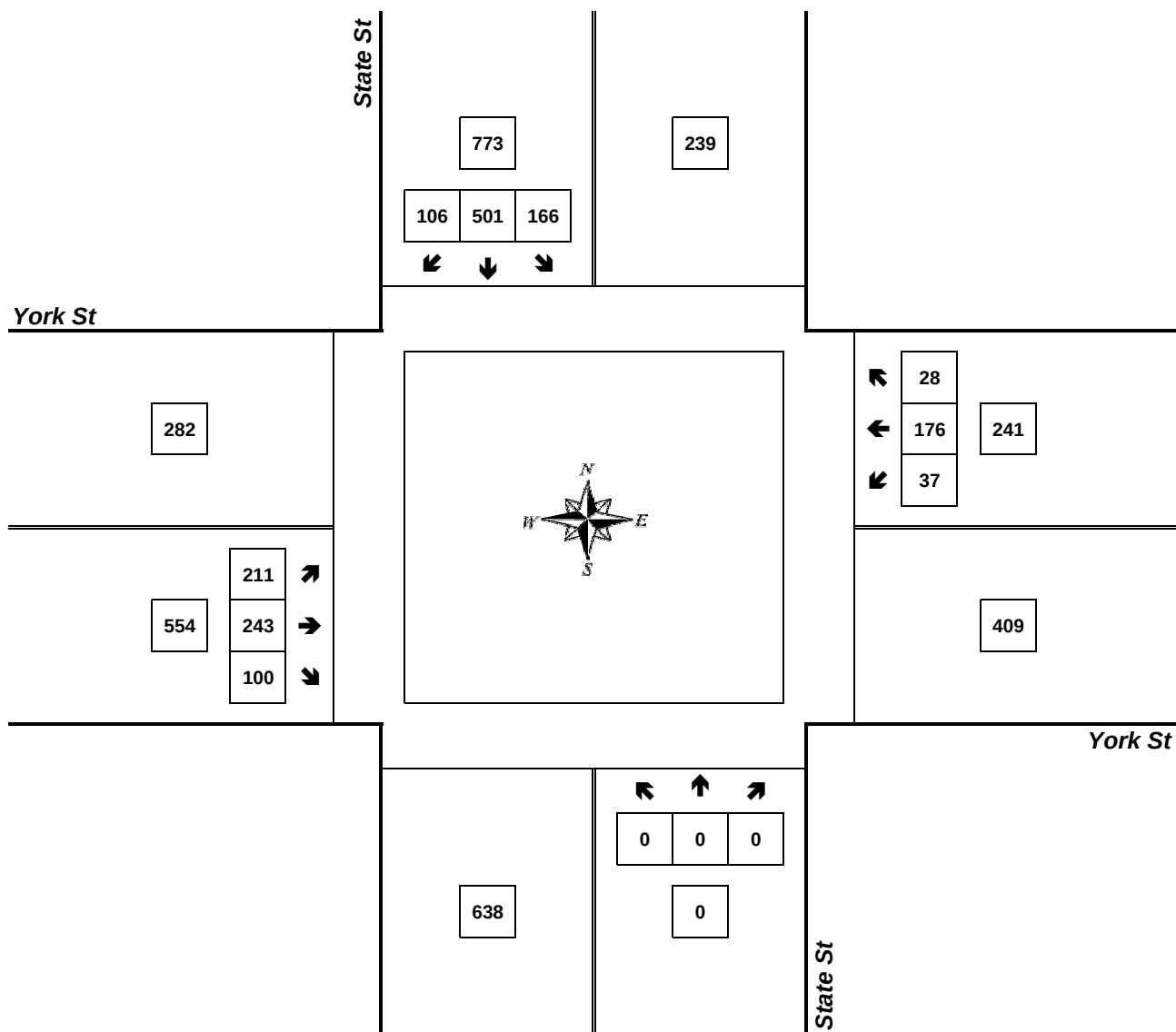


Mark Skaggs
(206) 251-0300

State St & York St

4:30 PM to 5:30 PM

Tuesday, April 10, 2007



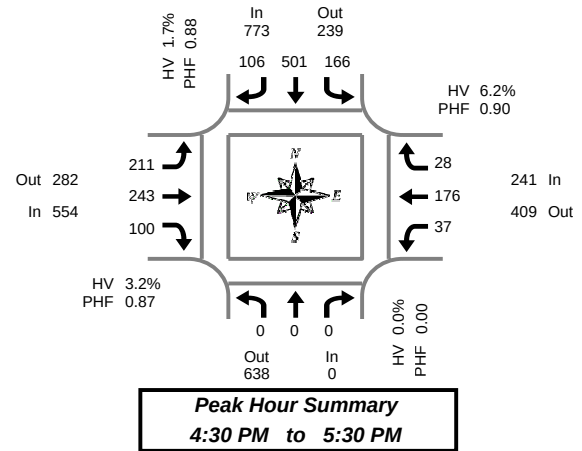
Approach	PHF	HV%	Volume
EB	0.87	3.2%	554
WB	0.90	6.2%	241
NB	0.00	0.0%	0
SB	0.88	1.7%	773
Intersection	0.90	2.9%	1,568

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



State St & York St

Tuesday, April 10, 2007
4:00 PM to 6:00 PM

15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound State St				Southbound State St				Eastbound York St				Westbound York St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	0	0	0	45	133	21	2	37	53	22	6	12	40	5	4	368
4:15 PM	0	0	0	0	32	117	26	3	49	72	25	4	7	54	4	5	386
4:30 PM	0	0	0	0	31	117	25	4	41	58	19	5	7	42	5	3	345
4:45 PM	0	0	0	0	42	135	26	3	36	64	21	3	8	49	6	4	387
5:00 PM	0	0	0	0	58	133	29	4	72	57	31	7	7	42	8	3	437
5:15 PM	0	0	0	0	35	116	26	2	62	64	29	3	15	43	9	5	399
5:30 PM	0	0	0	0	25	128	19	4	33	37	23	6	4	40	5	4	314
5:45 PM	0	0	0	0	23	118	18	2	29	35	11	4	9	41	4	4	288
Total Survey	0	0	0	0	291	997	190	24	359	440	181	38	69	351	46	32	2,924

Peak Hour Summary 4:30 PM to 5:30 PM

By Approach	Northbound State St				Southbound State St				Eastbound York St				Westbound York St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	0	638	638	0	773	239	1,012	13	554	282	836	18	241	409	650	15	1,568
%HV	0.0%				1.7%				3.2%				6.2%				2.9%
PHF	0.00				0.88				0.87				0.90				0.90

By Movement	Northbound State St				Southbound State St				Eastbound York St				Westbound York St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	166	501	106	773	211	243	100	554	37	176	28	241	1,568
PHF	0.00	0.00	0.00	0.00	0.72	0.93	0.91	0.88	0.73	0.95	0.81	0.87	0.62	0.90	0.78	0.90	0.90

Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound State St				Southbound State St				Eastbound York St				Westbound York St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	0	0	0	150	502	98	12	163	247	87	18	34	185	20	16	1,486
4:15 PM	0	0	0	0	163	502	106	14	198	251	96	19	29	187	23	15	1,555
4:30 PM	0	0	0	0	166	501	106	13	211	243	100	18	37	176	28	15	1,568
4:45 PM	0	0	0	0	160	512	100	13	203	222	104	19	34	174	28	16	1,537
5:00 PM	0	0	0	0	141	495	92	12	196	193	94	20	35	166	26	16	1,438

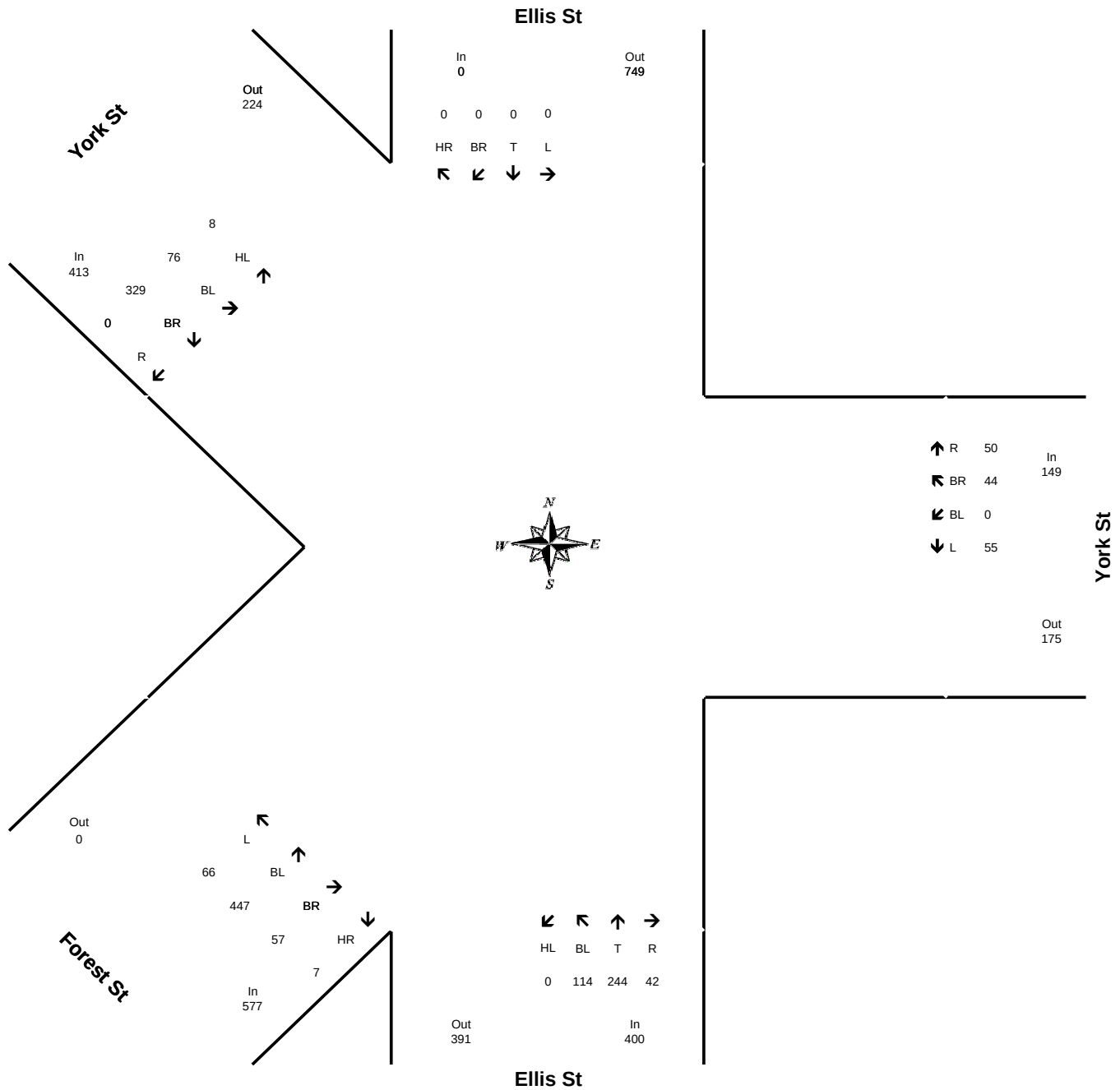
Peak Hour Summary



Mark Skaggs
(206) 251-0300

Ellis St & York St & Forest St

4:30 PM to 5:30 PM
Wednesday, April 11, 2007



	Intersection	NB	SB	WB	NEB	SEB
Volume	1,539	400	0	149	577	413
HV%	2.0%	0.5%	0.0%	1.3%	3.6%	1.5%
PHF	0.92	0.93	0.00	0.85	0.93	0.89

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300

Ellis St & York St & Forest St

Wednesday, April 11, 2007

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Ellis St					Southbound Ellis St					Westbound York St					Northeastbound Forest St					Southeastbound York St					Interval Total
	HL	BL	T	R	HV	L	T	BR	HR	HV	L	BL	BR	R	HV	L	BL	BR	HR	HV	HL	BL	BR	R	HV	
16:00	0	23	67	12	2	0	0	0	0	0	8	0	15	10	2	18	79	14	1	4	0	17	75	0	1	339
16:15	0	25	46	8	0	0	0	0	0	0	9	0	13	10	0	21	103	9	4	9	1	19	77	0	0	345
16:30	0	24	66	12	0	0	0	0	0	0	12	0	9	15	0	16	99	14	1	4	2	15	79	0	0	364
16:45	0	31	61	9	1	0	0	0	0	0	9	0	9	7	1	20	105	15	0	7	4	20	75	0	3	365
17:00	0	29	66	13	1	0	0	0	0	0	20	0	10	14	1	14	120	15	3	2	1	24	91	0	2	420
17:15	0	30	51	8	0	0	0	0	0	0	14	0	16	14	0	16	123	13	3	8	1	17	84	0	1	390
17:30	0	27	55	5	0	0	0	0	0	0	8	0	7	10	1	17	111	7	4	4	0	17	51	0	0	319
17:45	0	21	28	3	0	0	0	0	0	0	15	0	16	10	1	16	109	13	4	6	0	14	47	0	1	296
Total Survey	0	210	440	70	4	0	0	0	0	0	95	0	95	90	6	138	849	100	20	44	9	143	579	0	8	2,838

Peak Hour Summary

4:30 PM to 5:30 PM

By Approach	Northbound Ellis St				Southbound Ellis St				Westbound York St				Northeastbound Forest St				Southeastbound York St				Total
	Approach			HV	Approach			HV	Approach			HV	Approach			HV	Approach			HV	
In	400			2	0			0	149			2	577			21	413			6	1,539
Out	391				749				175				0				224				
Total	791				749				324				577				637				
%HV	0.5%				0.0%				1.3%				3.6%				1.5%				2.0%
PHF	0.93				0.00				0.85				0.93				0.89				0.92

By Movement	Northbound Ellis St					Southbound Ellis St					Westbound York St					Northeastbound Forest St					Southeastbound York St					Total
	HL	BL	T	R	Total	L	T	BR	HR	Total	L	BL	BR	R	Total	L	BL	BR	HR	Total	HL	BL	BR	R	Total	
Volume	0	114	244	42	400	0	0	0	0	0	55	0	44	50	149	66	447	57	7	577	8	76	329	0	413	1,539
PHF	0.00	0.92	0.92	0.81	0.93	0.00	0.00	0.00	0.00	0.00	0.69	0.00	0.69	0.83	0.85	0.83	0.91	0.95	0.58	0.93	0.50	0.79	0.90	0.00	0.89	0.92

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Ellis St					Southbound Ellis St					Westbound York St					Northeastbound Forest St					Southeastbound York St					Interval Total
	HL	BL	T	R	HV	L	T	BR	HR	HV	L	BL	BR	R	HV	L	BL	BR	HR	HV	HL	BL	BR	R	HV	
16:00	0	103	240	41	3	0	0	0	0	0	38	0	46	42	3	75	386	52	6	24	7	71	306	0	4	1,413
16:15	0	109	239	42	2	0	0	0	0	0	50	0	41	46	2	71	427	53	8	22	8	78	322	0	5	1,494
16:30	0	114	244	42	2	0	0	0	0	0	55	0	44	50	2	66	447	57	7	21	8	76	329	0	6	1,539
16:45	0	117	233	35	2	0	0	0	0	0	51	0	42	45	3	67	459	50	10	21	6	78	301	0	6	1,494
17:00	0	107	200	29	1	0	0	0	0	0	57	0	49	48	3	63	463	48	14	20	2	72	273	0	4	1,425

Peak Hour Summary

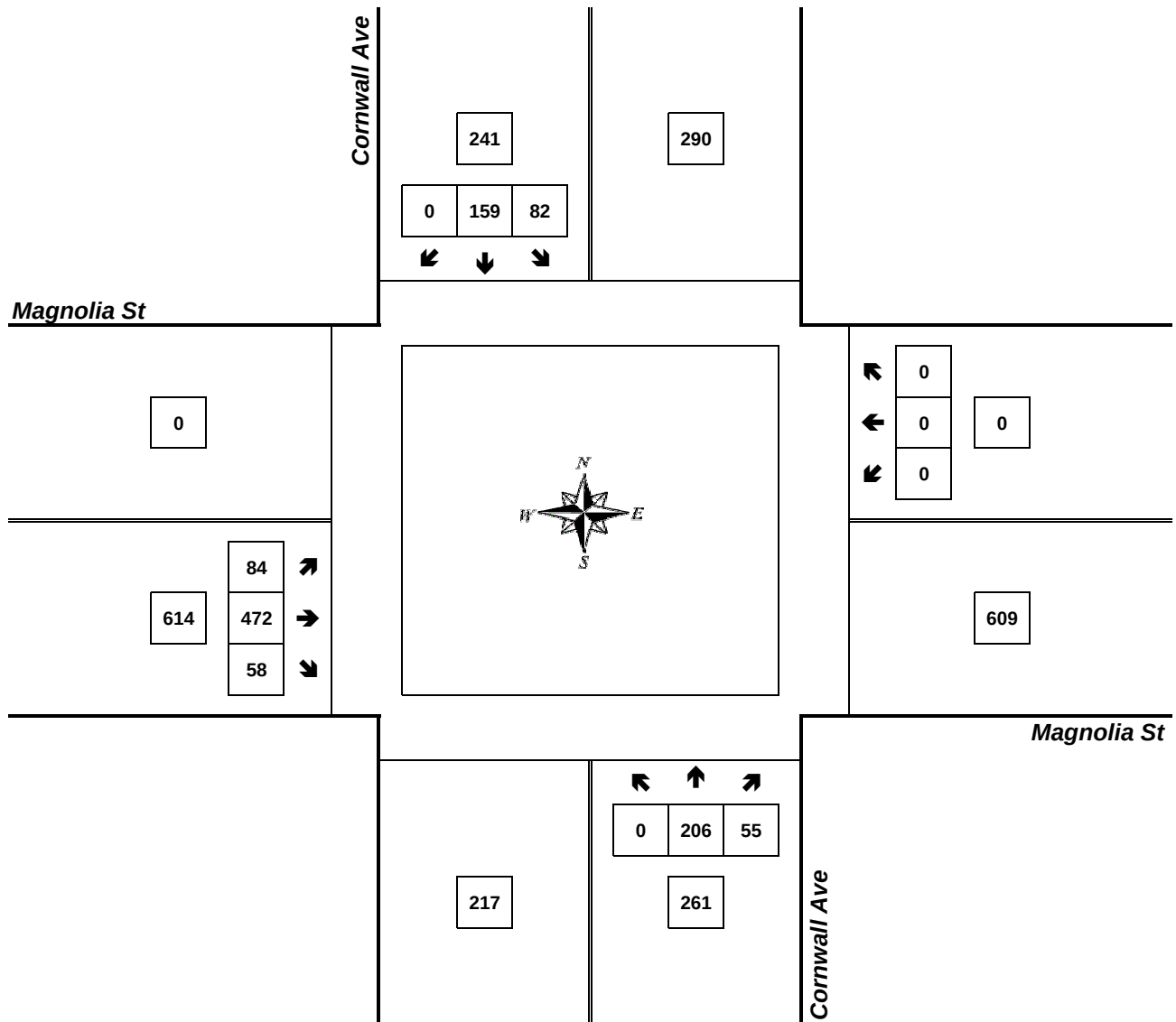


Mark Skaggs
(206) 251-0300

Cornwall Ave & Magnolia St

4:15 PM to 5:15 PM

Tuesday, April 10, 2007



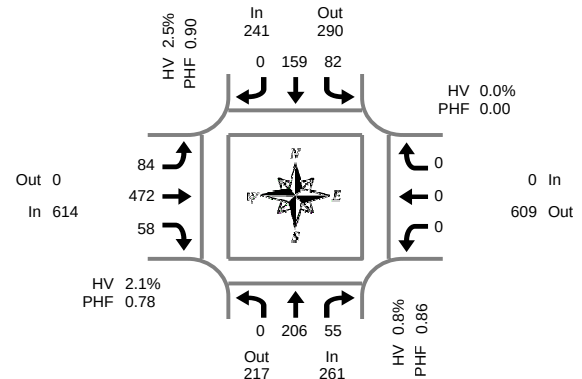
Approach	PHF	HV%	Volume
EB	0.78	2.1%	614
WB	0.00	0.0%	0
NB	0.86	0.8%	261
SB	0.90	2.5%	241
Intersection	0.82	1.9%	1,116

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



Cornwall Ave & Magnolia St

Tuesday, April 10, 2007

4:00 PM to 6:00 PM

Peak Hour Summary
4:15 PM to 5:15 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound Magnolia St				Westbound Magnolia St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	39	17	1	20	38	0	1	25	97	19	1	0	0	0	0	255
4:15 PM	0	43	14	0	21	43	0	0	19	94	17	4	0	0	0	0	251
4:30 PM	0	53	14	0	20	33	0	1	17	116	12	7	0	0	0	0	265
4:45 PM	0	44	17	0	24	33	0	4	20	110	13	1	0	0	0	0	261
5:00 PM	0	66	10	2	17	50	0	1	28	152	16	1	0	0	0	0	339
5:15 PM	0	45	7	0	23	38	0	0	14	104	17	0	0	0	0	0	248
5:30 PM	0	46	7	0	26	32	0	0	23	104	12	2	0	0	0	0	250
5:45 PM	0	37	7	0	15	30	0	0	12	76	17	1	0	0	0	0	194
Total Survey	0	373	93	3	166	297	0	7	158	853	123	17	0	0	0	0	2,063

Peak Hour Summary

4:15 PM to 5:15 PM

By Approach	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound Magnolia St				Westbound Magnolia St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	261	217	478	2	241	290	531	6	614	0	614	13	0	609	609	0	1,116
%HV	0.8%				2.5%				2.1%				0.0%				1.9%
PHF	0.86				0.90				0.78				0.00				0.82

By Movement	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound Magnolia St				Westbound Magnolia St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	206	55	261	82	159	0	241	84	472	58	614	0	0	0	0	1,116
PHF	0.00	0.78	0.81	0.86	0.85	0.80	0.00	0.90	0.75	0.78	0.85	0.78	0.00	0.00	0.00	0.00	0.82

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound Magnolia St				Westbound Magnolia St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	179	62	1	85	147	0	6	81	417	61	13	0	0	0	0	1,032
4:15 PM	0	206	55	2	82	159	0	6	84	472	58	13	0	0	0	0	1,116
4:30 PM	0	208	48	2	84	154	0	6	79	482	58	9	0	0	0	0	1,113
4:45 PM	0	201	41	2	90	153	0	5	85	470	58	4	0	0	0	0	1,098
5:00 PM	0	194	31	2	81	150	0	1	77	436	62	4	0	0	0	0	1,031

Peak Hour Summary

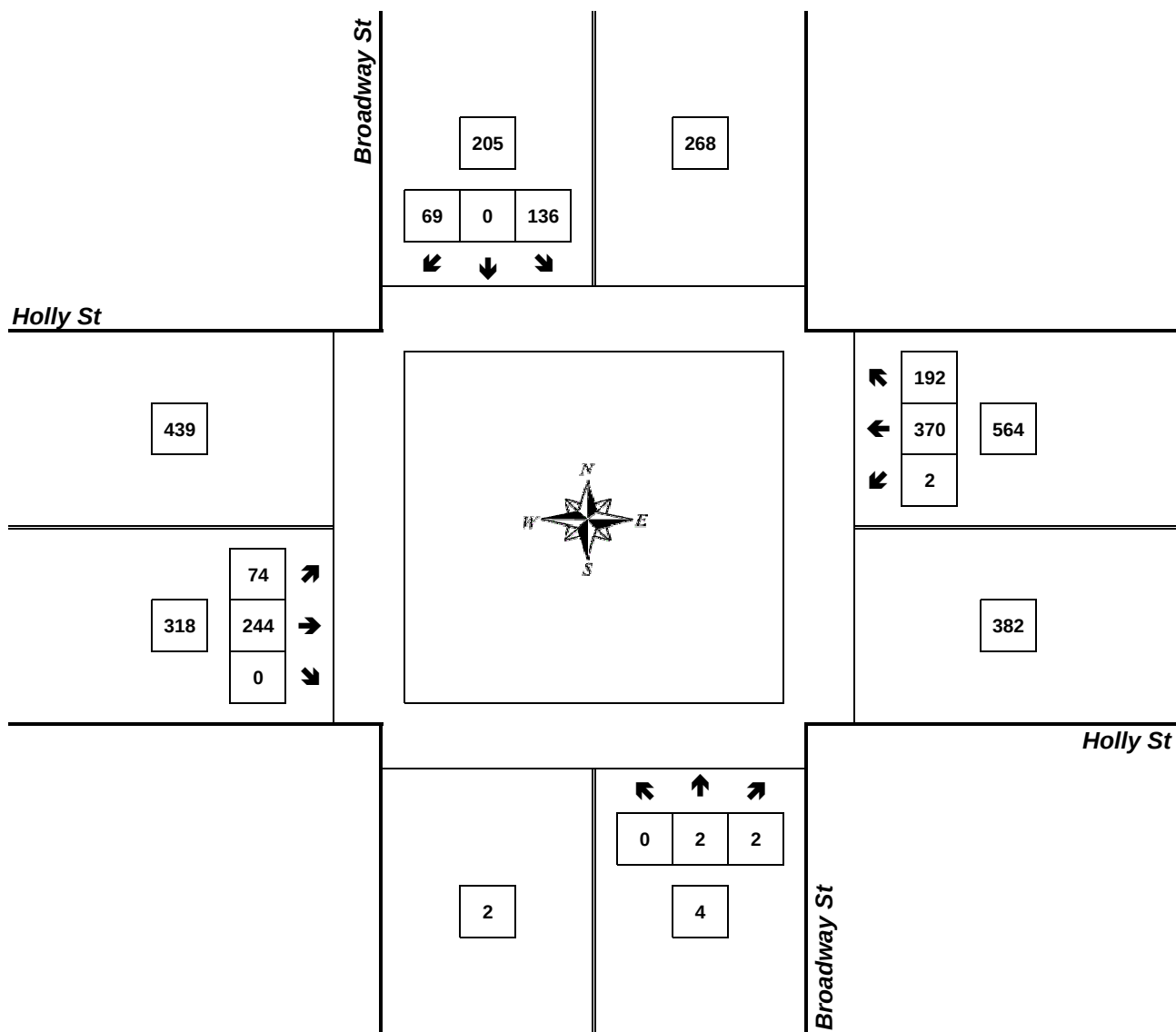


Mark Skaggs
(206) 251-0300

Broadway St & Holly St

4:15 PM to 5:15 PM

Tuesday, April 10, 2007



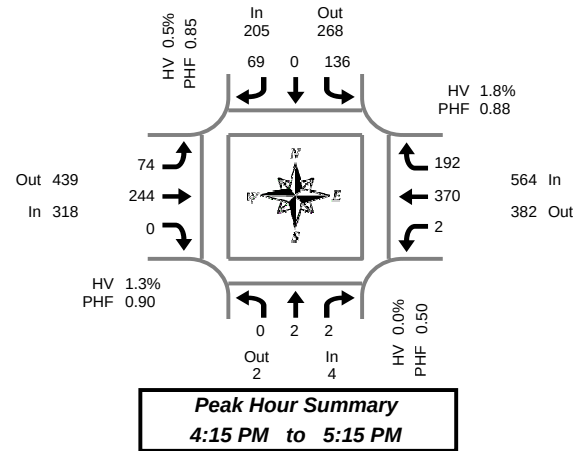
Approach	PHF	HV%	Volume
EB	0.90	1.3%	318
WB	0.88	1.8%	564
NB	0.50	0.0%	4
SB	0.85	0.5%	205
Intersection	0.91	1.4%	1,091

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



Broadway St & Holly St

Tuesday, April 10, 2007

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Broadway St				Southbound Broadway St				Eastbound Holly St				Westbound Holly St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	0	0	0	39	1	17	1	11	56	0	3	0	73	41	5	238
4:15 PM	0	0	1	0	39	0	12	1	12	59	0	1	0	73	53	3	249
4:30 PM	0	0	0	0	35	0	18	0	20	68	0	1	0	93	43	1	277
4:45 PM	0	1	0	0	26	0	15	0	21	60	0	0	0	96	45	6	264
5:00 PM	0	1	1	0	36	0	24	0	21	57	0	2	2	108	51	0	301
5:15 PM	0	0	0	0	35	0	17	1	14	52	0	0	0	92	38	1	248
5:30 PM	0	0	1	0	38	0	16	2	8	45	0	3	0	86	40	5	234
5:45 PM	0	0	1	0	40	0	13	0	19	51	0	0	0	70	41	1	235
Total Survey	0	2	4	0	288	1	132	5	126	448	0	10	2	691	352	22	2,046

Peak Hour Summary

4:15 PM to 5:15 PM

By Approach	Northbound Broadway St				Southbound Broadway St				Eastbound Holly St				Westbound Holly St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	4	2	6	0	205	268	473	1	318	439	757	4	564	382	946	10	1,091
%HV	0.0%				0.5%				1.3%				1.8%				1.4%
PHF	0.50				0.85				0.90				0.88				0.91

By Movement	Northbound Broadway St				Southbound Broadway St				Eastbound Holly St				Westbound Holly St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	2	2	4	136	0	69	205	74	244	0	318	2	370	192	564	1,091
PHF	0.00	0.50	0.50	0.50	0.87	0.00	0.72	0.85	0.88	0.90	0.00	0.90	0.25	0.86	0.91	0.88	0.91

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Broadway St				Southbound Broadway St				Eastbound Holly St				Westbound Holly St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	1	1	0	139	1	62	2	64	243	0	5	0	335	182	15	1,028
4:15 PM	0	2	2	0	136	0	69	1	74	244	0	4	2	370	192	10	1,091
4:30 PM	0	2	1	0	132	0	74	1	76	237	0	3	2	389	177	8	1,090
4:45 PM	0	2	2	0	135	0	72	3	64	214	0	5	2	382	174	12	1,047
5:00 PM	0	1	3	0	149	0	70	3	62	205	0	5	2	356	170	7	1,018

Peak Hour Summary

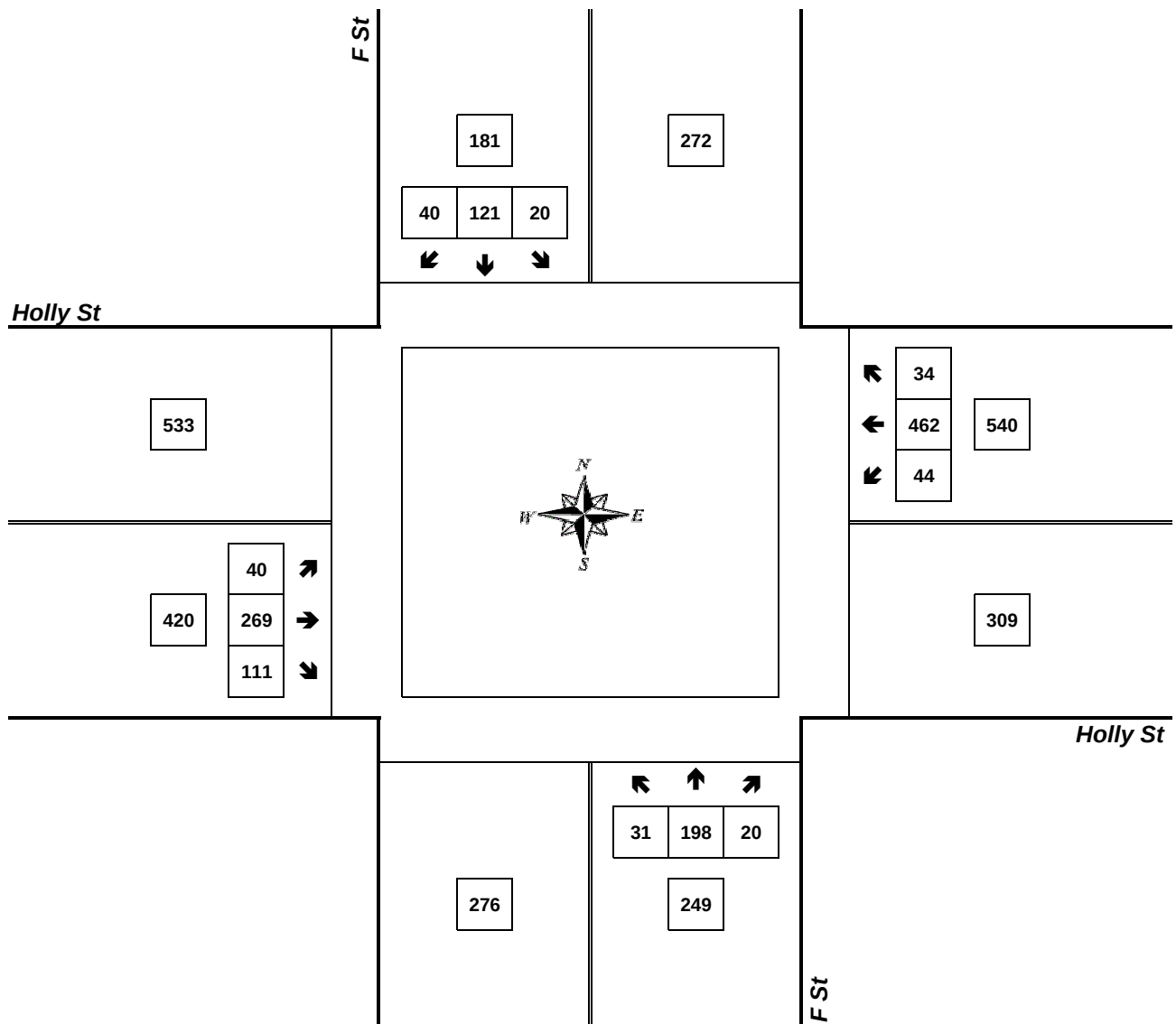


Mark Skaggs
(206) 251-0300

F St & Holly St

4:15 PM to 5:15 PM

Tuesday, April 10, 2007



Approach	PHF	HV%	Volume
EB	0.94	1.0%	420
WB	0.89	1.9%	540
NB	0.85	1.2%	249
SB	0.81	2.2%	181
Intersection	0.97	1.5%	1,390

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

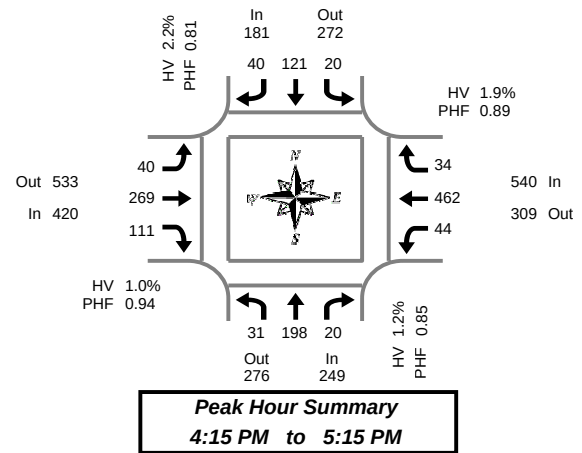


Mark Skaggs
(206) 251-0300

F St & Holly St

Tuesday, April 10, 2007

4:00 PM to 6:00 PM



15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound F St				Southbound F St				Eastbound Holly St				Westbound Holly St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	8	46	2	0	10	24	10	0	10	58	26	2	11	111	10	0	326
4:15 PM	5	48	7	3	6	33	7	2	8	75	28	2	8	97	5	2	327
4:30 PM	9	47	6	0	5	31	10	0	12	72	28	1	15	114	9	2	358
4:45 PM	3	47	4	0	6	39	11	1	11	60	24	0	6	123	11	4	345
5:00 PM	14	56	3	0	3	18	12	1	9	62	31	1	15	128	9	2	360
5:15 PM	9	43	0	0	3	25	9	0	6	54	29	0	14	107	10	0	309
5:30 PM	8	27	1	0	5	21	5	0	8	61	26	4	10	120	4	2	296
5:45 PM	9	24	2	0	5	18	6	0	11	61	31	0	15	99	12	0	293
Total Survey	65	338	25	3	43	209	70	4	75	503	223	10	94	899	70	12	2,614

Peak Hour Summary

4:15 PM to 5:15 PM

By Approach	Northbound F St				Southbound F St				Eastbound Holly St				Westbound Holly St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	249	276	525	3	181	272	453	4	420	533	953	4	540	309	849	10	1,390
%HV	1.2%				2.2%				1.0%				1.9%				1.5%
PHF	0.85				0.81				0.94				0.89				0.97

By Movement	Northbound F St				Southbound F St				Eastbound Holly St				Westbound Holly St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	31	198	20	249	20	121	40	181	40	269	111	420	44	462	34	540	1,390
PHF	0.55	0.88	0.71	0.85	0.83	0.78	0.83	0.81	0.83	0.90	0.90	0.94	0.73	0.90	0.77	0.89	0.97

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound F St				Southbound F St				Eastbound Holly St				Westbound Holly St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	25	188	19	3	27	127	38	3	41	265	106	5	40	445	35	8	1,356
4:15 PM	31	198	20	3	20	121	40	4	40	269	111	4	44	462	34	10	1,390
4:30 PM	35	193	13	0	17	113	42	2	38	248	112	2	50	472	39	8	1,372
4:45 PM	34	173	8	0	17	103	37	2	34	237	110	5	45	478	34	8	1,310
5:00 PM	40	150	6	0	16	82	32	1	34	238	117	5	54	454	35	4	1,258

Peak Hour Summary

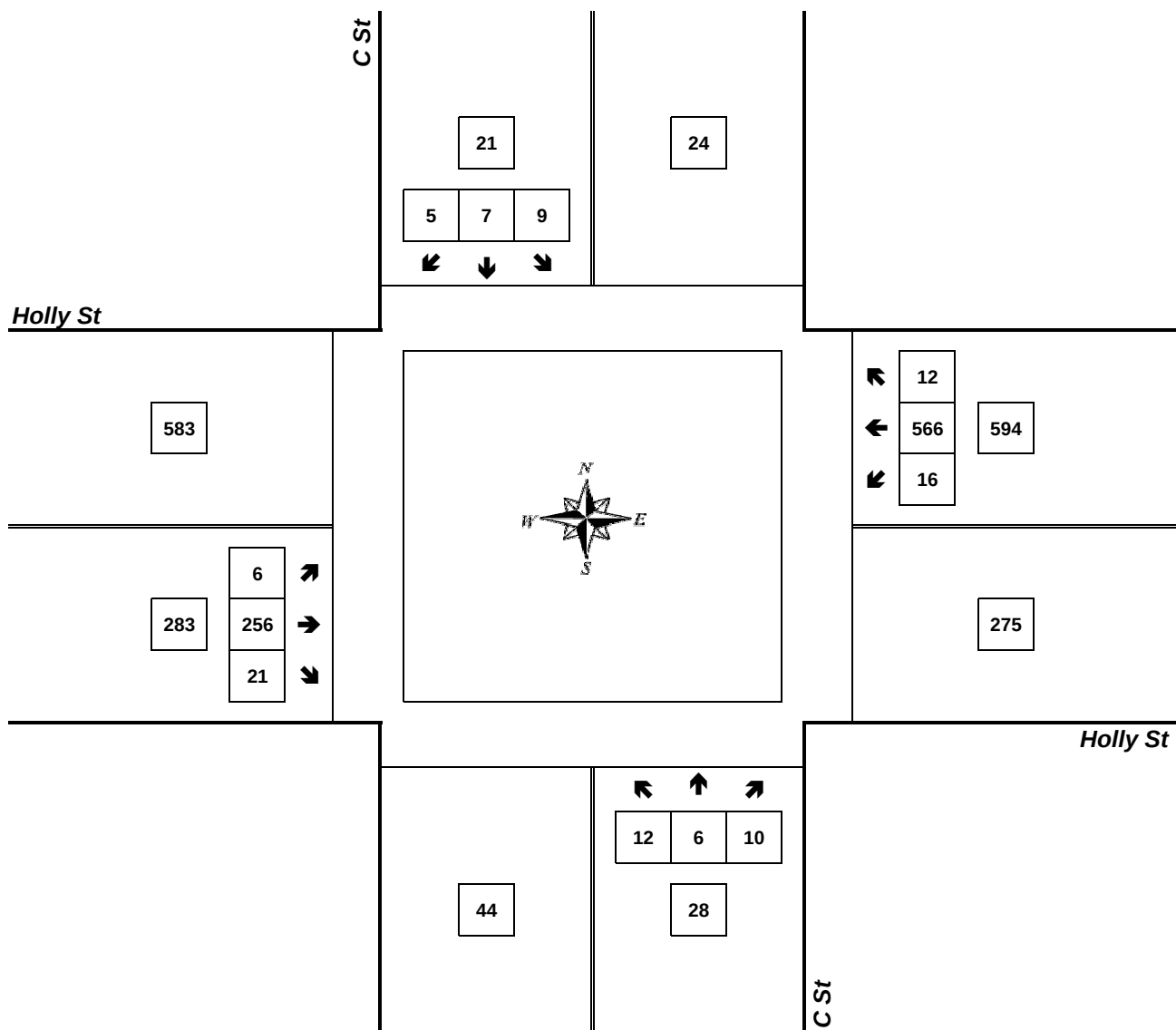


Mark Skaggs
(206) 251-0300

C St & Holly St

4:30 PM to 5:30 PM

Tuesday, April 10, 2007



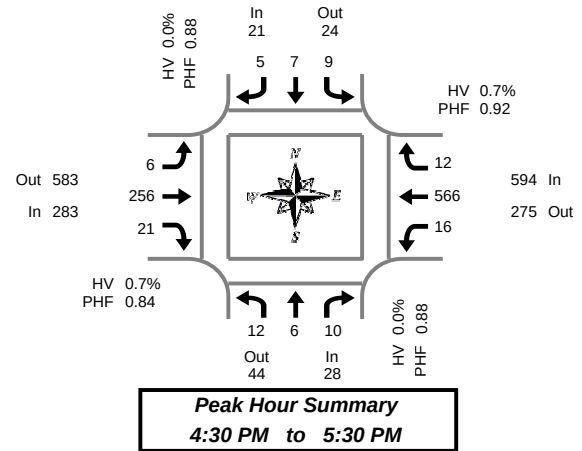
Approach	PHF	HV%	Volume
EB	0.84	0.7%	283
WB	0.92	0.7%	594
NB	0.88	0.0%	28
SB	0.88	0.0%	21
Intersection	0.97	0.6%	926

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



C St & Holly St

Tuesday, April 10, 2007

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound C St				Southbound C St				Eastbound Holly St				Westbound Holly St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	4	2	5	0	1	2	1	0	0	60	3	1	8	124	7	2	217
4:15 PM	3	1	0	0	1	1	3	0	4	74	5	1	9	113	6	0	220
4:30 PM	2	1	2	0	3	1	1	0	2	75	7	1	5	137	2	2	238
4:45 PM	4	2	2	0	4	1	1	0	1	56	5	0	3	150	8	1	237
5:00 PM	3	2	3	0	0	2	2	0	2	60	4	1	3	141	0	1	222
5:15 PM	3	1	3	0	2	3	1	0	1	65	5	0	5	138	2	0	229
5:30 PM	2	0	1	0	0	3	1	0	5	48	3	2	2	98	0	3	163
5:45 PM	3	0	1	0	0	0	2	0	0	66	3	0	4	125	2	0	206
Total Survey	24	9	17	0	11	13	12	0	15	504	35	6	39	1,026	27	9	1,732

Peak Hour Summary

4:30 PM to 5:30 PM

By Approach	Northbound C St				Southbound C St				Eastbound Holly St				Westbound Holly St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	28	44	72	0	21	24	45	0	283	583	866	2	594	275	869	4	926
%HV	0.0%				0.0%				0.7%				0.7%				0.6%
PHF	0.88				0.88				0.84				0.92				0.97

By Movement	Northbound C St				Southbound C St				Eastbound Holly St				Westbound Holly St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	12	6	10	28	9	7	5	21	6	256	21	283	16	566	12	594	926
PHF	0.75	0.75	0.83	0.88	0.56	0.58	0.63	0.88	0.75	0.85	0.75	0.84	0.80	0.94	0.38	0.92	0.97

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound C St				Southbound C St				Eastbound Holly St				Westbound Holly St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	13	6	9	0	9	5	6	0	7	265	20	3	25	524	23	5	912
4:15 PM	12	6	7	0	8	5	7	0	9	265	21	3	20	541	16	4	917
4:30 PM	12	6	10	0	9	7	5	0	6	256	21	2	16	566	12	4	926
4:45 PM	12	5	9	0	6	9	5	0	9	229	17	3	13	527	10	5	851
5:00 PM	11	3	8	0	2	8	6	0	8	239	15	3	14	502	4	4	820

Peak Hour Summary

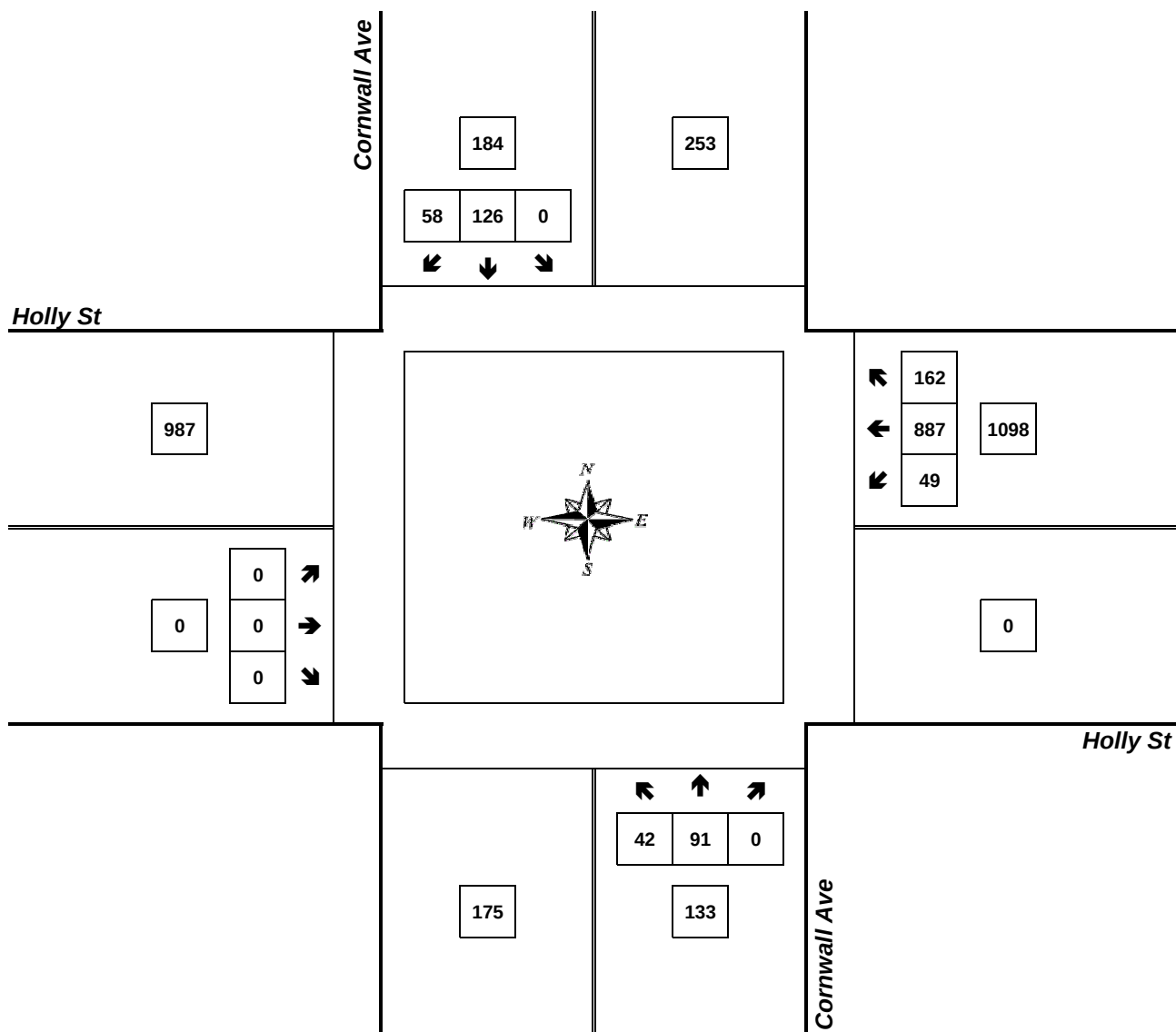


Mark Skaggs
(206) 251-0300

Cornwall Ave & Holly St

4:00 PM to 5:00 PM

Tuesday, April 10, 2007



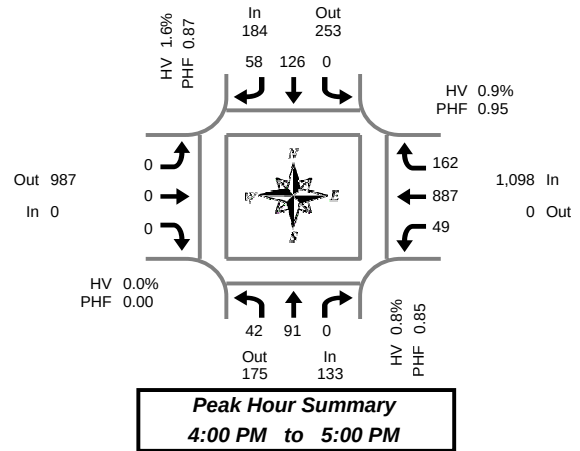
Approach	PHF	HV%	Volume
EB	0.00	0.0%	0
WB	0.95	0.9%	1,098
NB	0.85	0.8%	133
SB	0.87	1.6%	184
Intersection	0.96	1.0%	1,415

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



Cornwall Ave & Holly St

Tuesday, April 10, 2007

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound Holly St				Westbound Holly St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	12	27	0	1	0	33	11	1	0	0	0	0	9	237	41	2	370
4:15 PM	5	20	0	0	0	37	16	1	0	0	0	0	16	201	57	2	352
4:30 PM	12	24	0	0	0	24	18	1	0	0	0	0	10	217	21	4	326
4:45 PM	13	20	0	0	0	32	13	0	0	0	0	0	14	232	43	2	367
5:00 PM	7	39	0	1	0	39	22	0	0	0	0	0	7	194	30	2	338
5:15 PM	4	18	0	0	0	30	15	0	0	0	0	0	6	216	38	0	327
5:30 PM	6	25	0	1	0	19	18	1	0	0	0	0	9	199	32	3	308
5:45 PM	8	15	0	0	0	24	15	0	0	0	0	0	12	184	25	0	283
Total Survey	67	188	0	3	0	238	128	4	0	0	0	0	83	1,680	287	15	2,671

Peak Hour Summary

4:00 PM to 5:00 PM

By Approach	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound Holly St				Westbound Holly St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	133	175	308	1	184	253	437	3	0	987	987	0	1,098	0	1,098	10	1,415
%HV	0.8%				1.6%				0.0%				0.9%				1.0%
PHF	0.85				0.87				0.00				0.95				0.96

By Movement	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound Holly St				Westbound Holly St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	42	91	0	133	0	126	58	184	0	0	0	0	49	887	162	1,098	1,415
PHF	0.81	0.84	0.00	0.85	0.00	0.85	0.81	0.87	0.00	0.00	0.00	0.00	0.77	0.94	0.71	0.95	0.96

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound Holly St				Westbound Holly St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	42	91	0	1	0	126	58	3	0	0	0	0	49	887	162	10	1,415
4:15 PM	37	103	0	1	0	132	69	2	0	0	0	0	47	844	151	10	1,383
4:30 PM	36	101	0	1	0	125	68	1	0	0	0	0	37	859	132	8	1,358
4:45 PM	30	102	0	2	0	120	68	1	0	0	0	0	36	841	143	7	1,340
5:00 PM	25	97	0	2	0	112	70	1	0	0	0	0	34	793	125	5	1,256

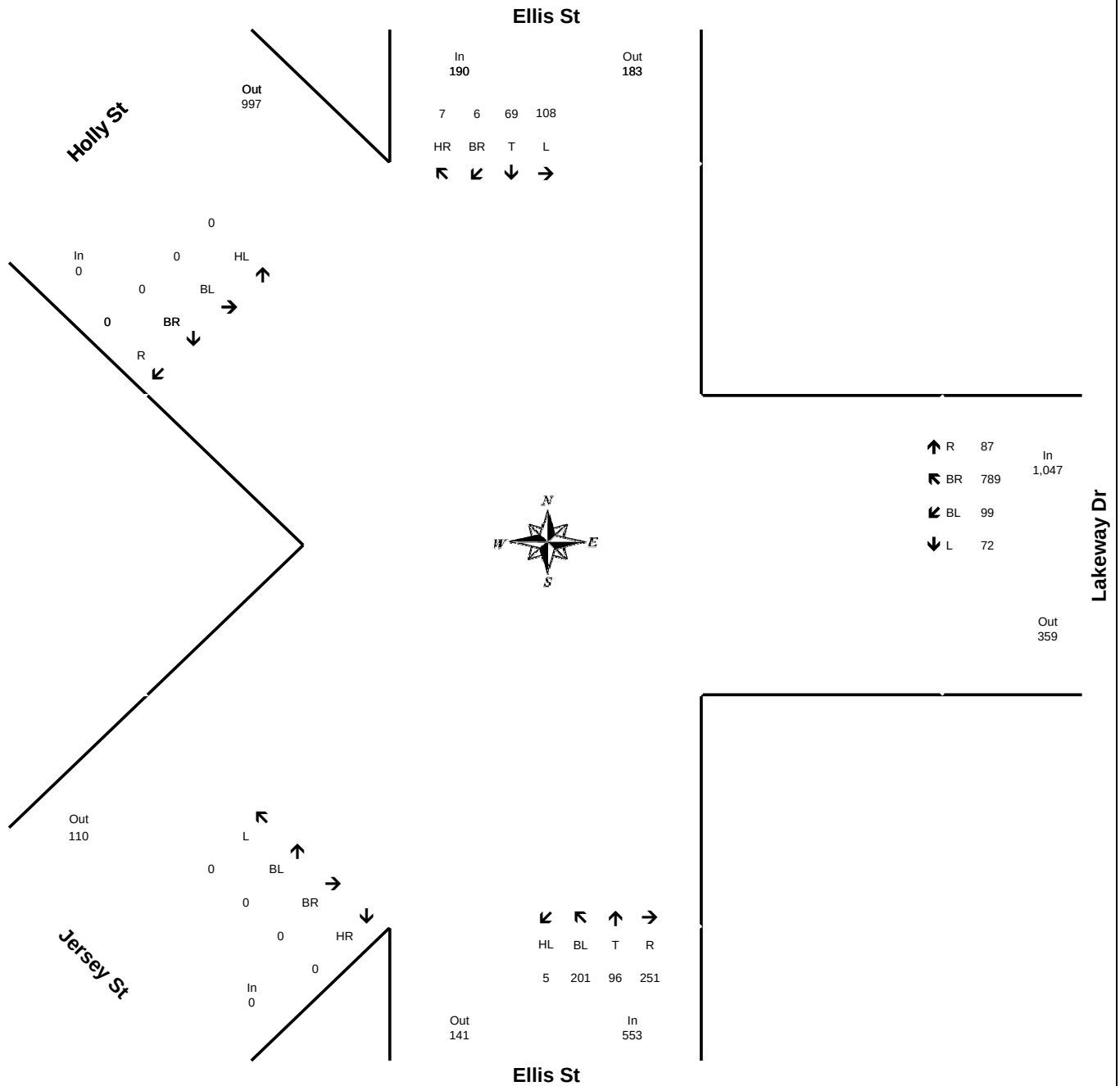
Peak Hour Summary



Mark Skaggs
(206) 251-0300

Ellis St & Lakeway Dr & Jersey St & Holly St

7:30 AM to 8:30 AM
Wednesday, April 11, 2007



	Intersection	NB	SB	WB	NEB	SEB
Volume	1,790	553	190	1,047	0	0
HV%	2.2%	3.3%	4.7%	1.2%	0.0%	0.0%
PHF	0.83	0.82	0.91	0.80	0.00	0.00

Count Period: 7:00 AM to 9:00 AM

All Traffic Data
Services Inc.
Mark Skaggs
(206) 251-0300

Wednesday, April 11, 2007
7:00 AM to 9:00 AM

[illegible]

By Approach	Northbound Ellis St		Southbound Ellis St		Westbound Lakeway Dr		Northeastbound Jersey St		Southeastbound Holly St		Total
	Approach	HV	Approach	HV	Approach	HV	Approach	HV	Approach	HV	
In	553	18	190	9	1,047	13	0	0	0	0	1,790
Out	141		183		359		110		997		
Total	694		373		1,406		110		997		
%HV	3.3%		4.7%		1.2%		0.0%		0.0%		2.2%
PHF	0.82		0.91		0.80		0.00		0.00		0.83

[illegible][illegible]

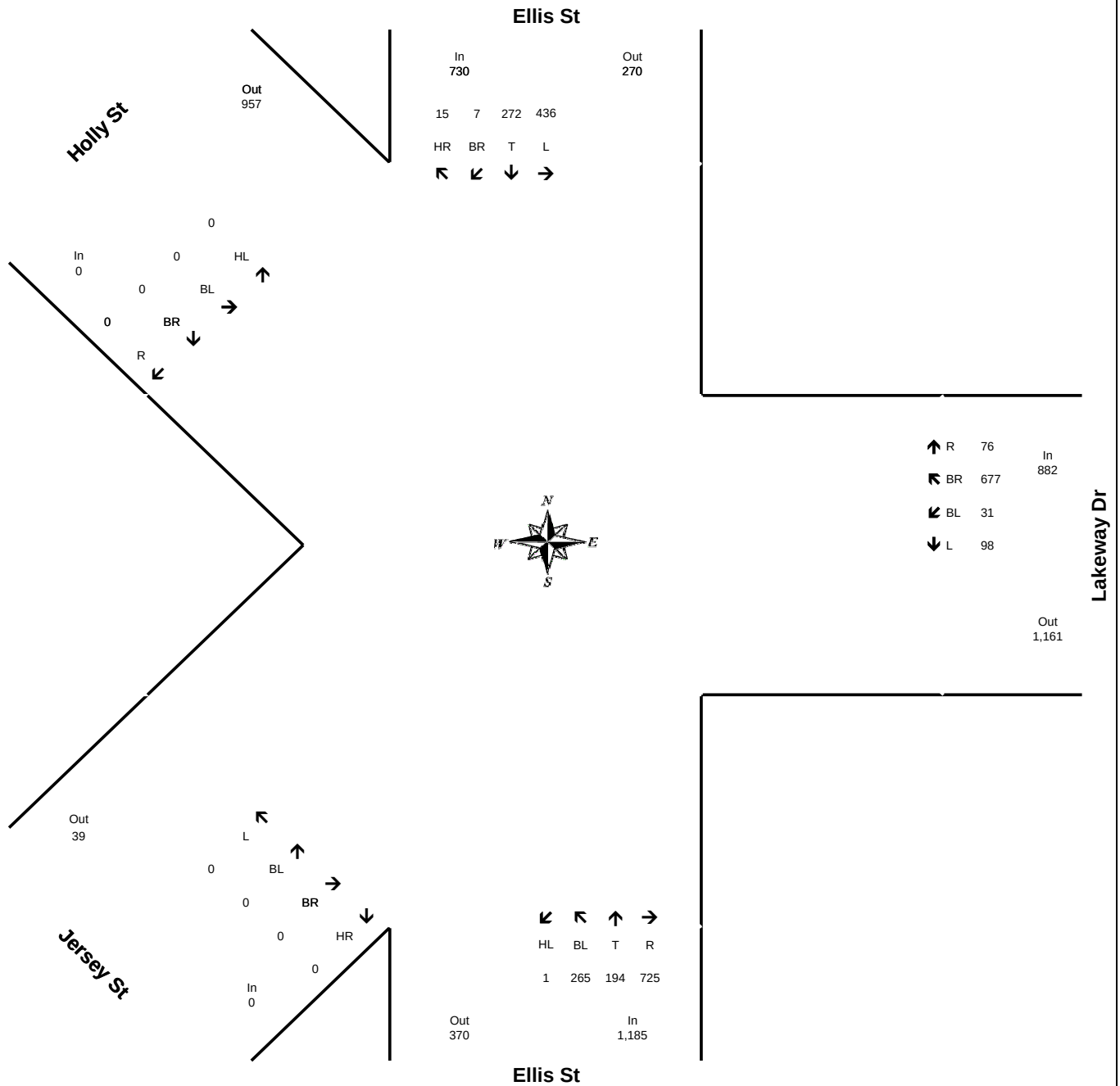
Peak Hour Summary



Mark Skaggs
(206) 251-0300

Ellis St & Lakeway Dr & Jersey St & Holly St

4:30 PM to 5:30 PM
Wednesday, April 11, 2007



	Intersection	NB	SB	WB	NEB	SEB
Volume	2,797	1,185	730	882	0	0
HV%	1.3%	1.3%	1.0%	1.5%	0.0%	0.0%
PHF	0.97	0.97	0.96	0.95	0.00	0.00

Count Period: 4:00 PM to 6:00 PM

All Traffic Data
Services Inc.

4:00 PM to 6:00 PM

4:00 PM to 6:00 PM

[illegible]

4:30 PM to 5:30 PM

By Approach	Northbound Ellis St		Southbound Ellis St		Westbound Lakeway Dr		Northeastbound Jersey St		Southeastbound Holly St		Total
	Approach	HV	Approach	HV	Approach	HV	Approach	HV	Approach	HV	
In	1,185	15	730	7	882	13	0	0	0	0	2,797
Out	370		270		1,161		39		957		
Total	1,555		1,000		2,043		39		957		
%HV	1.3%		1.0%		1.5%		0.0%		0.0%		1.3%
PHF	0.97		0.96		0.95		0.00		0.00		0.97

[illegible]

4:00 PM to 6:00 PM

[illegible]

Peak Hour Summary

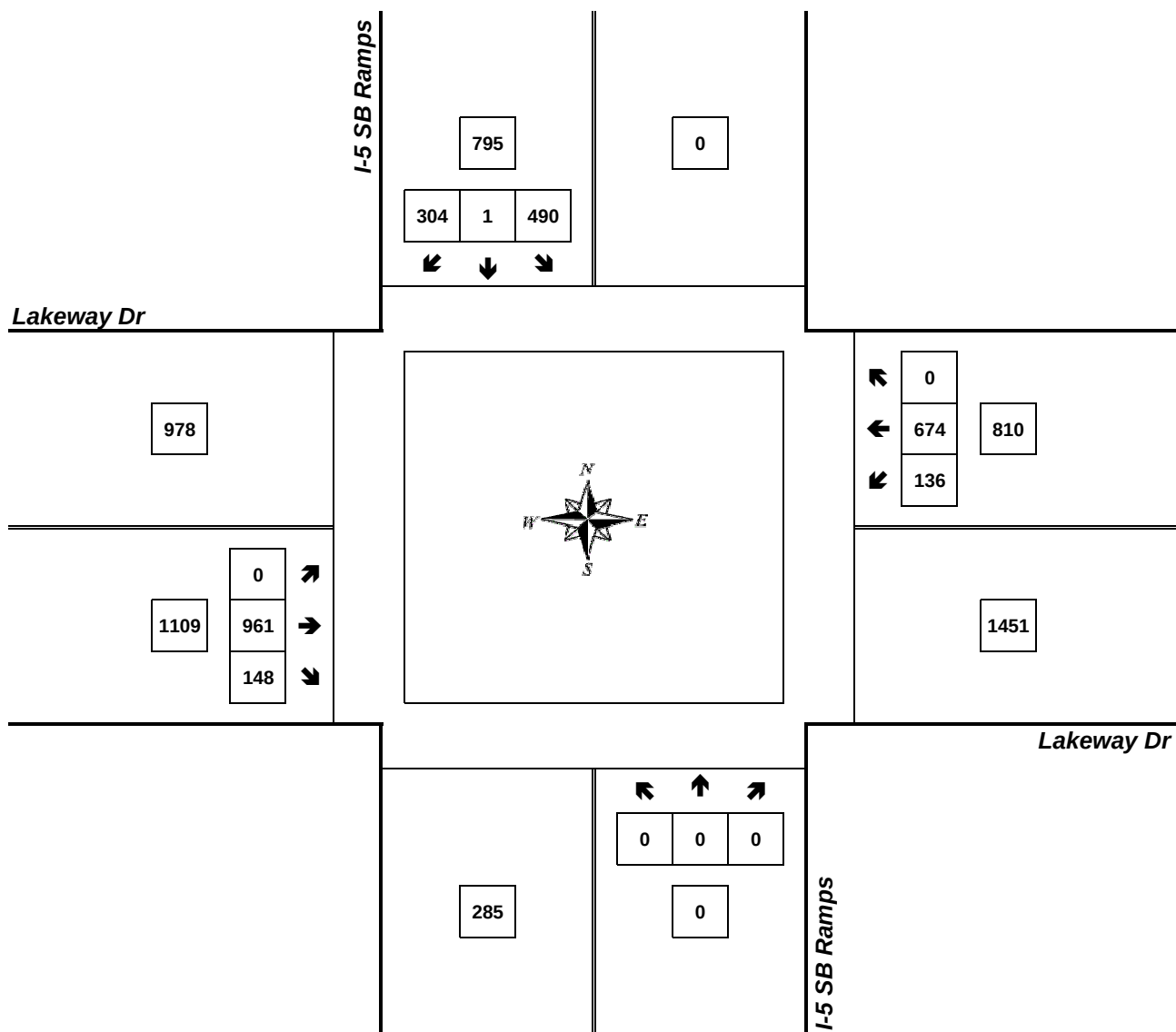


Mark Skaggs
(206) 251-0300

I-5 SB Ramps & Lakeway Dr

4:45 PM to 5:45 PM

Tuesday, April 10, 2007



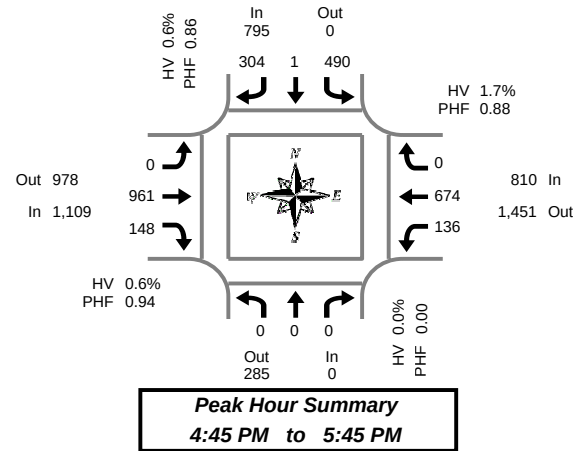
Approach	PHF	HV%	Volume
EB	0.94	0.6%	1,109
WB	0.88	1.7%	810
NB	0.00	0.0%	0
SB	0.86	0.6%	795
Intersection	0.95	1.0%	2,714

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



I-5 SB Ramps & Lakeway Dr

Tuesday, April 10, 2007

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound I-5 SB Ramps				Southbound I-5 SB Ramps				Eastbound Lakeway Dr				Westbound Lakeway Dr				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	0	0	0	109	0	64	2	0	226	31	2	20	141	0	4	591
4:15 PM	0	0	0	0	118	0	67	3	0	235	26	2	21	140	0	3	607
4:30 PM	0	0	0	0	109	2	71	2	0	228	50	4	23	165	0	5	648
4:45 PM	0	0	0	0	130	0	68	2	0	227	35	3	31	165	0	6	656
5:00 PM	0	0	0	0	95	0	81	2	0	238	41	1	40	190	0	5	685
5:15 PM	0	0	0	0	143	1	87	0	0	259	36	2	34	152	0	3	712
5:30 PM	0	0	0	0	122	0	68	1	0	237	36	1	31	167	0	0	661
5:45 PM	0	0	0	0	133	0	74	2	0	202	27	2	33	173	0	2	642
Total Survey	0	0	0	0	959	3	580	14	0	1,852	282	17	233	1,293	0	28	5,202

Peak Hour Summary

4:45 PM to 5:45 PM

By Approach	Northbound I-5 SB Ramps				Southbound I-5 SB Ramps				Eastbound Lakeway Dr				Westbound Lakeway Dr				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	0	285	285	0	795	0	795	5	1,109	978	2,087	7	810	1,451	2,261	14	2,714
%HV	0.0%				0.6%				0.6%				1.7%				1.0%
PHF	0.00				0.86				0.94				0.88				0.95

By Movement	Northbound I-5 SB Ramps				Southbound I-5 SB Ramps				Eastbound Lakeway Dr				Westbound Lakeway Dr				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	490	1	304	795	0	961	148	1,109	136	674	0	810	2,714
PHF	0.00	0.00	0.00	0.00	0.86	0.25	0.87	0.86	0.00	0.93	0.90	0.94	0.85	0.89	0.00	0.88	0.95

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound I-5 SB Ramps				Southbound I-5 SB Ramps				Eastbound Lakeway Dr				Westbound Lakeway Dr				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	0	0	0	466	2	270	9	0	916	142	11	95	611	0	18	2,502
4:15 PM	0	0	0	0	452	2	287	9	0	928	152	10	115	660	0	19	2,596
4:30 PM	0	0	0	0	477	3	307	6	0	952	162	10	128	672	0	19	2,701
4:45 PM	0	0	0	0	490	1	304	5	0	961	148	7	136	674	0	14	2,714
5:00 PM	0	0	0	0	493	1	310	5	0	936	140	6	138	682	0	10	2,700

Peak Hour Summary

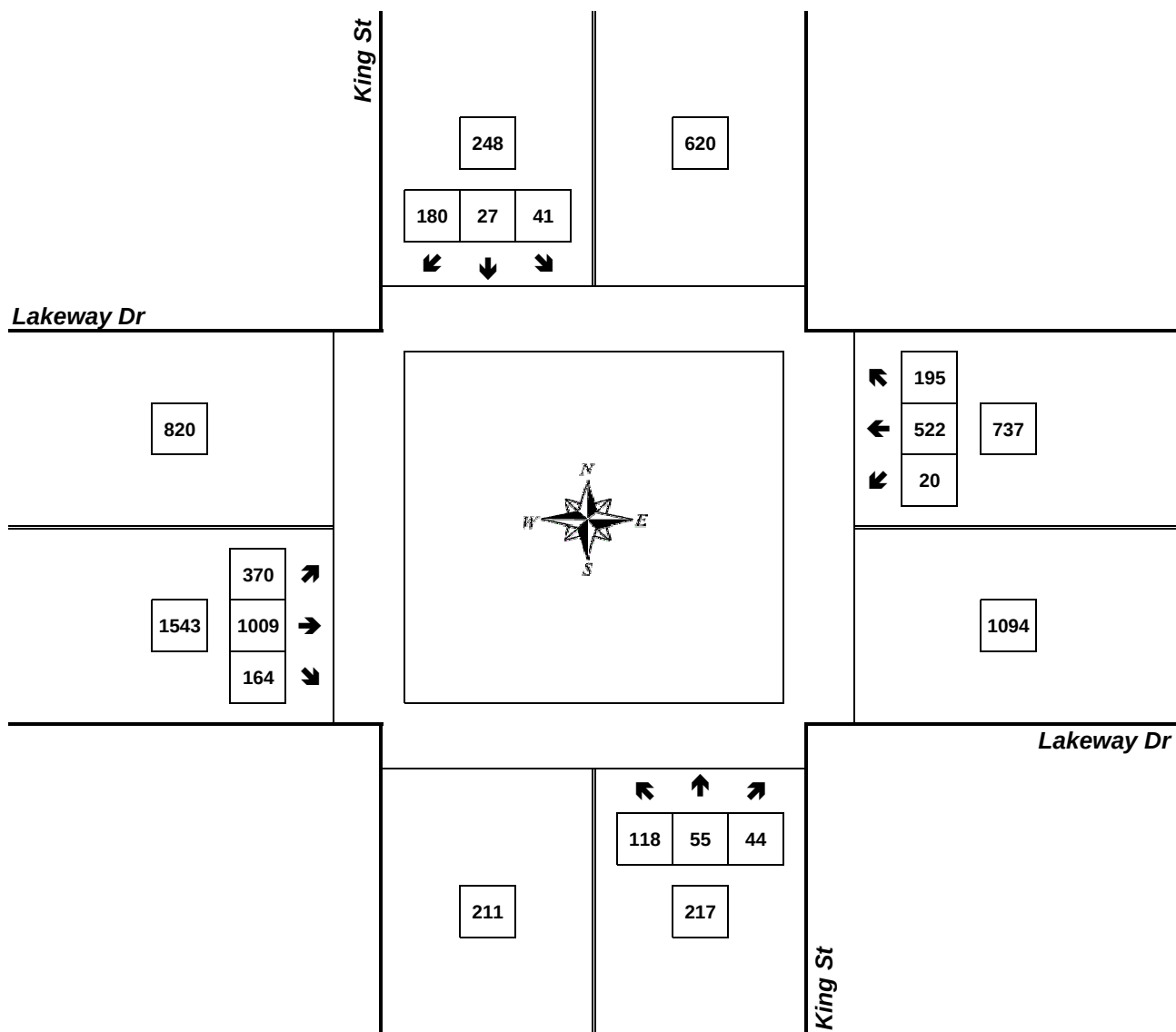


Mark Skaggs
(206) 251-0300

King St & Lakeway Dr

5:00 PM to 6:00 PM

Tuesday, April 10, 2007



Approach	PHF	HV%	Volume
EB	0.90	0.1%	1,543
WB	0.88	0.8%	737
NB	0.92	0.0%	217
SB	0.84	0.4%	248
Intersection	0.95	0.3%	2,745

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

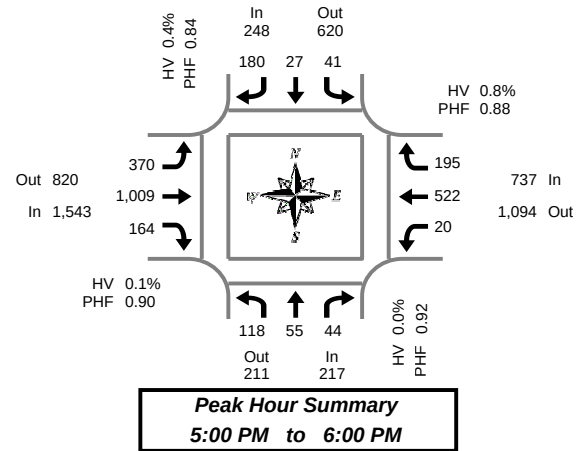


Mark Skaggs
(206) 251-0300

King St & Lakeway Dr

Tuesday, April 10, 2007

4:00 PM to 6:00 PM



Peak Hour Summary
5:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound King St				Southbound King St				Eastbound Lakeway Dr				Westbound Lakeway Dr				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	28	8	16	0	10	12	32	0	102	230	38	1	3	113	47	2	639
4:15 PM	26	14	11	0	9	5	41	1	101	191	48	1	8	114	44	2	612
4:30 PM	17	15	14	0	13	6	52	1	85	199	37	3	4	115	44	4	601
4:45 PM	29	7	11	0	12	2	42	1	130	209	44	3	2	143	52	4	683
5:00 PM	28	12	12	0	11	8	55	0	99	217	36	1	8	141	39	2	666
5:15 PM	35	10	10	0	8	9	35	0	89	253	50	0	5	114	42	3	660
5:30 PM	28	22	9	0	10	5	45	0	106	288	34	1	4	120	55	0	726
5:45 PM	27	11	13	0	12	5	45	1	76	251	44	0	3	147	59	1	693
Total Survey	218	99	96	0	85	52	347	4	788	1,838	331	10	37	1,007	382	18	5,280

Peak Hour Summary

5:00 PM to 6:00 PM

By Approach	Northbound King St				Southbound King St				Eastbound Lakeway Dr				Westbound Lakeway Dr				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	217	211	428	0	248	620	868	1	1,543	820	2,363	2	737	1,094	1,831	6	2,745
%HV	0.0%				0.4%				0.1%				0.8%				0.3%
PHF	0.92				0.84				0.90				0.88				0.95

By Movement	Northbound King St				Southbound King St				Eastbound Lakeway Dr				Westbound Lakeway Dr				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	118	55	44	217	41	27	180	248	370	1,009	164	1,543	20	522	195	737	2,745
PHF	0.84	0.63	0.85	0.92	0.85	0.75	0.82	0.84	0.87	0.88	0.82	0.90	0.63	0.89	0.83	0.88	0.95

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound King St				Southbound King St				Eastbound Lakeway Dr				Westbound Lakeway Dr				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	100	44	52	0	44	25	167	3	418	829	167	8	17	485	187	12	2,535
4:15 PM	100	48	48	0	45	21	190	3	415	816	165	8	22	513	179	12	2,562
4:30 PM	109	44	47	0	44	25	184	2	403	878	167	7	19	513	177	13	2,610
4:45 PM	120	51	42	0	41	24	177	1	424	967	164	5	19	518	188	9	2,735
5:00 PM	118	55	44	0	41	27	180	1	370	1,009	164	2	20	522	195	6	2,745

Peak Hour Summary

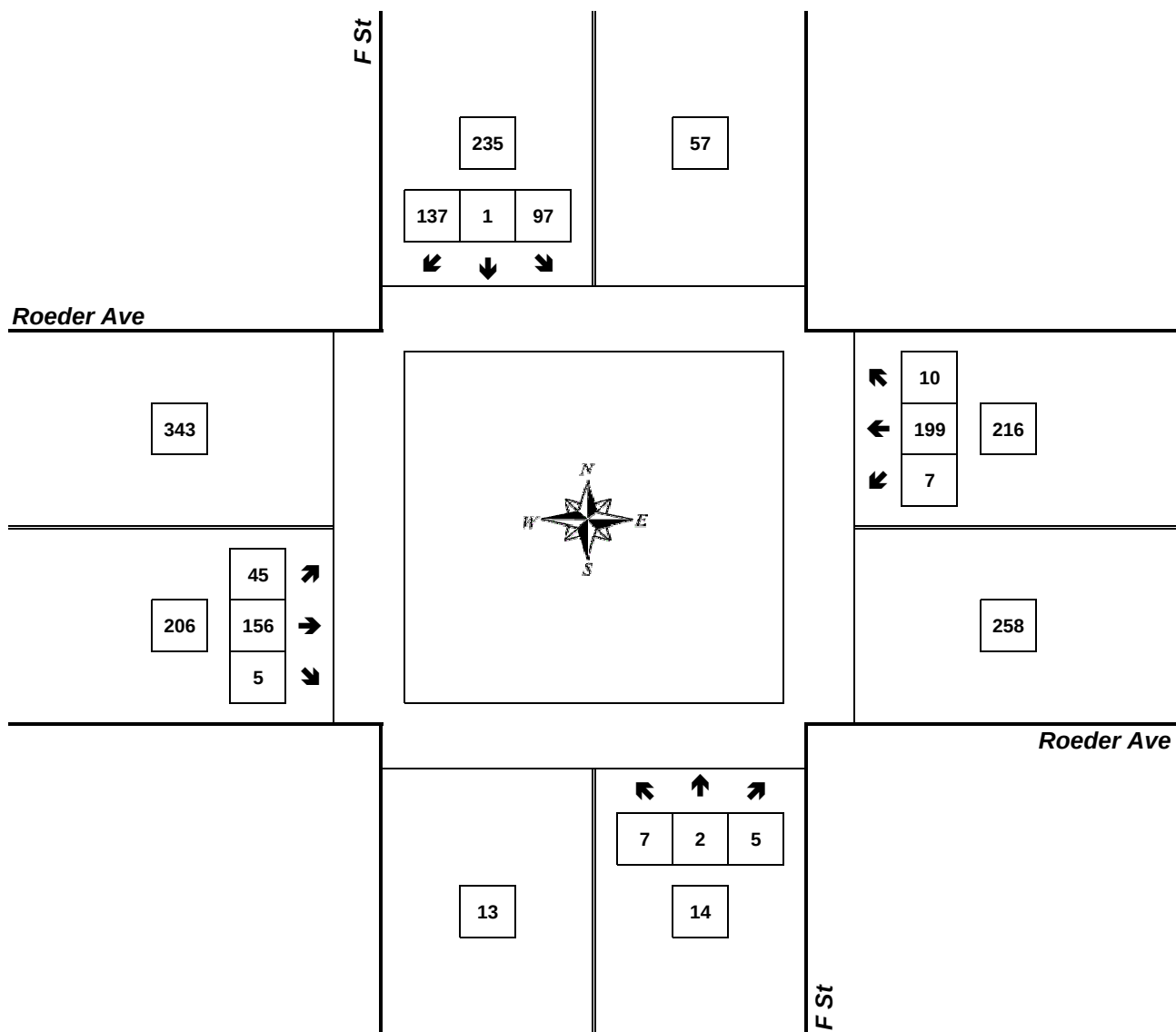


Mark Skaggs
(206) 251-0300

F St & Roeder Ave

7:30 AM to 8:30 AM

Tuesday, April 10, 2007



Approach	PHF	HV%	Volume
EB	0.80	3.9%	206
WB	0.73	5.6%	216
NB	0.70	78.6%	14
SB	0.83	3.0%	235
Intersection	0.79	5.7%	671

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

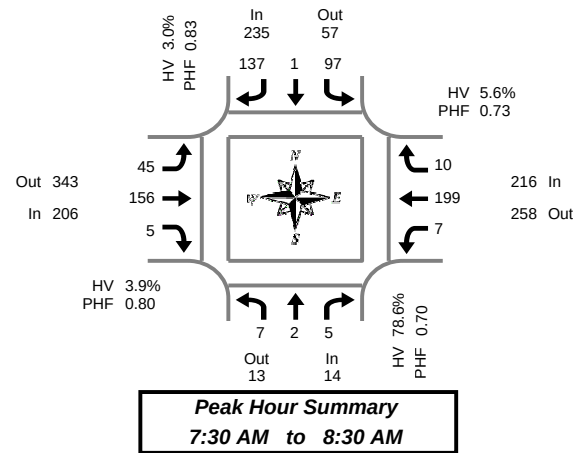


Mark Skaggs
(206) 251-0300

F St & Roeder Ave

Tuesday, April 10, 2007

7:00 AM to 9:00 AM



15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound F St				Southbound F St				Eastbound Roeder Ave				Westbound Roeder Ave				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
7:00 AM	4	0	1	4	12	0	29	0	4	16	0	1	1	21	0	0	88
7:15 AM	1	0	1	2	10	0	18	1	6	27	1	3	1	25	1	2	91
7:30 AM	4	0	0	3	20	0	26	2	6	31	1	1	0	55	3	4	146
7:45 AM	1	0	2	1	27	1	43	2	13	47	4	2	2	69	3	2	212
8:00 AM	2	2	1	5	19	0	34	1	13	45	0	2	1	49	1	4	167
8:15 AM	0	0	2	2	31	0	34	2	13	33	0	3	4	26	3	2	146
8:30 AM	0	2	0	1	23	1	22	2	18	42	1	3	0	29	4	2	142
8:45 AM	1	2	2	1	20	1	33	4	14	42	2	1	1	39	7	2	164
Total Survey	13	6	9	19	162	3	239	14	87	283	9	16	10	313	22	18	1,156

Peak Hour Summary

7:30 AM to 8:30 AM

By Approach	Northbound F St				Southbound F St				Eastbound Roeder Ave				Westbound Roeder Ave				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	14	13	27	11	235	57	292	7	206	343	549	8	216	258	474	12	671
%HV	78.6%				3.0%				3.9%				5.6%				5.7%
PHF	0.70				0.83				0.80				0.73				0.79

By Movement	Northbound F St				Southbound F St				Eastbound Roeder Ave				Westbound Roeder Ave				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	7	2	5	14	97	1	137	235	45	156	5	206	7	199	10	216	671
PHF	0.44	0.25	0.63	0.70	0.78	0.25	0.80	0.83	0.87	0.83	0.31	0.80	0.44	0.72	0.83	0.73	0.79

Rolling Hour Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound F St				Southbound F St				Eastbound Roeder Ave				Westbound Roeder Ave				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
7:00 AM	10	0	4	10	69	1	116	5	29	121	6	7	4	170	7	8	537
7:15 AM	8	2	4	11	76	1	121	6	38	150	6	8	4	198	8	12	616
7:30 AM	7	2	5	11	97	1	137	7	45	156	5	8	7	199	10	12	671
7:45 AM	3	4	5	9	100	2	133	7	57	167	5	10	7	173	11	10	667
8:00 AM	3	6	5	9	93	2	123	9	58	162	3	9	6	143	15	10	619

Peak Hour Summary

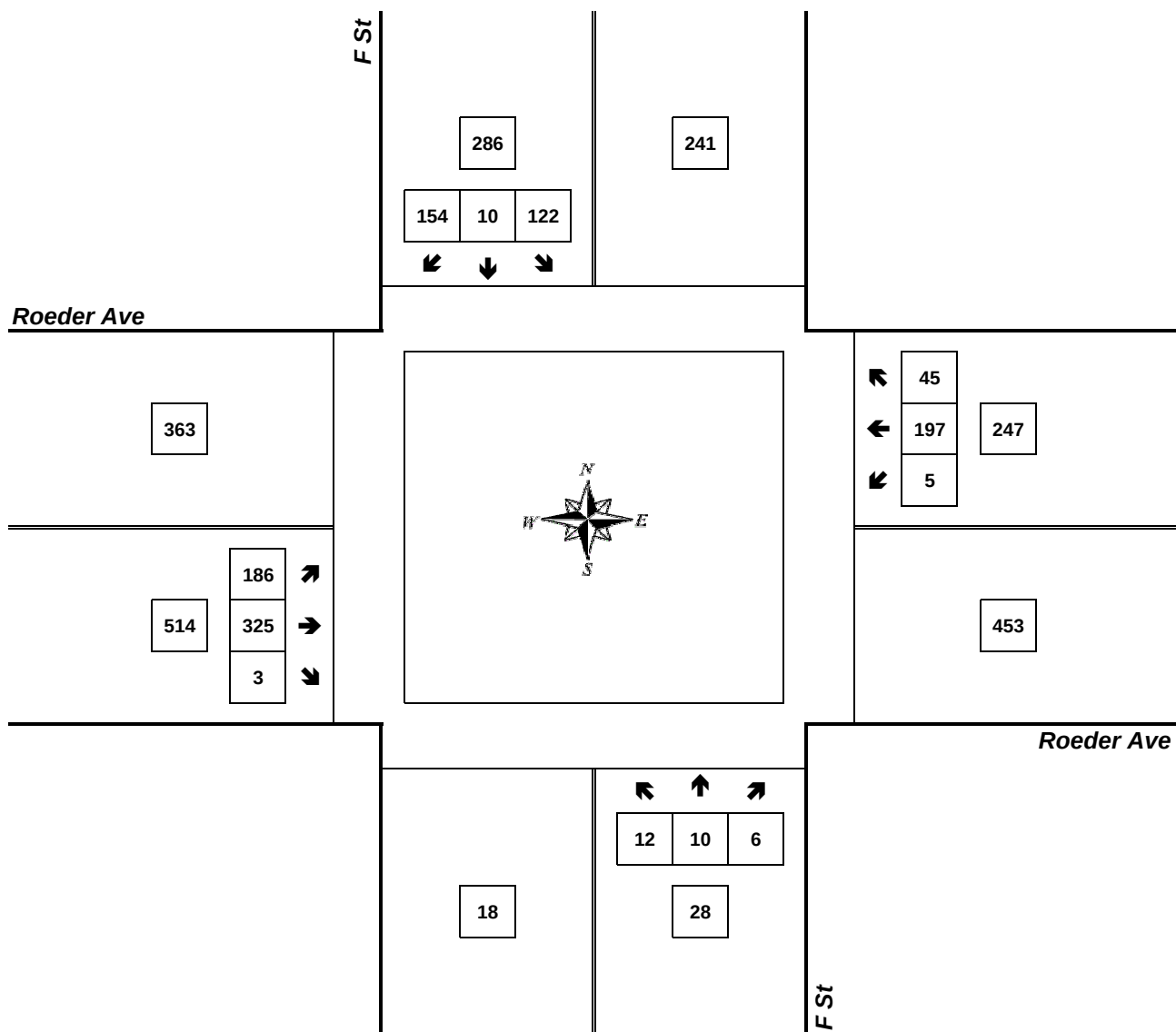


Mark Skaggs
(206) 251-0300

F St & Roeder Ave

4:15 PM to 5:15 PM

Tuesday, April 10, 2007



Approach	PHF	HV%	Volume
EB	0.81	0.6%	514
WB	0.92	1.6%	247
NB	0.78	17.9%	28
SB	0.93	2.1%	286
Intersection	0.95	1.7%	1,075

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

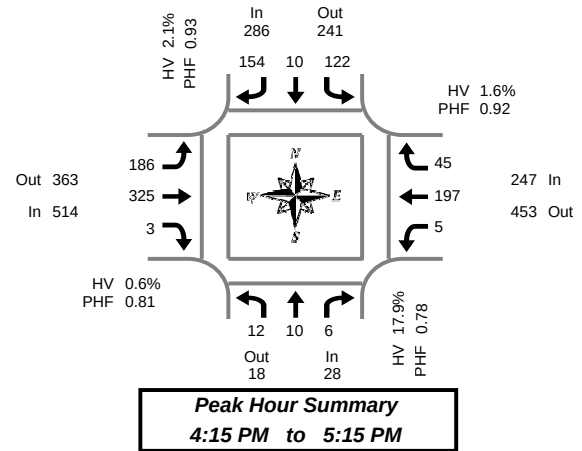


Mark Skaggs
(206) 251-0300

F St & Roeder Ave

Tuesday, April 10, 2007

4:00 PM to 6:00 PM



15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound F St				Southbound F St				Eastbound Roeder Ave				Westbound Roeder Ave				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	3	1	2	2	25	4	31	0	41	53	3	1	2	45	17	0	227
4:15 PM	3	5	1	1	30	4	36	2	38	61	0	3	3	53	11	2	245
4:30 PM	2	4	1	1	29	3	45	2	48	89	1	0	0	50	8	1	280
4:45 PM	3	1	2	2	32	3	41	0	42	76	1	0	0	55	11	0	267
5:00 PM	4	0	2	1	31	0	32	2	58	99	1	0	2	39	15	1	283
5:15 PM	0	0	0	0	30	0	39	0	36	77	0	0	0	42	9	0	233
5:30 PM	0	2	1	0	29	3	26	1	24	56	1	2	1	39	8	1	190
5:45 PM	1	0	0	0	27	1	34	0	25	49	1	1	0	25	11	0	174
Total Survey	16	13	9	7	233	18	284	7	312	560	8	7	8	348	90	5	1,899

Peak Hour Summary

4:15 PM to 5:15 PM

By Approach	Northbound F St				Southbound F St				Eastbound Roeder Ave				Westbound Roeder Ave				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	28	18	46	5	286	241	527	6	514	363	877	3	247	453	700	4	1,075
%HV	17.9%				2.1%				0.6%				1.6%				1.7%
PHF	0.78				0.93				0.81				0.92				0.95

By Movement	Northbound F St				Southbound F St				Eastbound Roeder Ave				Westbound Roeder Ave				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	12	10	6	28	122	10	154	286	186	325	3	514	5	197	45	247	1,075
PHF	0.75	0.50	0.75	0.78	0.95	0.63	0.86	0.93	0.80	0.82	0.75	0.81	0.42	0.90	0.75	0.92	0.95

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound F St				Southbound F St				Eastbound Roeder Ave				Westbound Roeder Ave				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	11	11	6	6	116	14	153	4	169	279	5	4	5	203	47	3	1,019
4:15 PM	12	10	6	5	122	10	154	6	186	325	3	3	5	197	45	4	1,075
4:30 PM	9	5	5	4	122	6	157	4	184	341	3	0	2	186	43	2	1,063
4:45 PM	7	3	5	3	122	6	138	3	160	308	3	2	3	175	43	2	973
5:00 PM	5	2	3	1	117	4	131	3	143	281	3	3	3	145	43	2	880

Peak Hour Summary

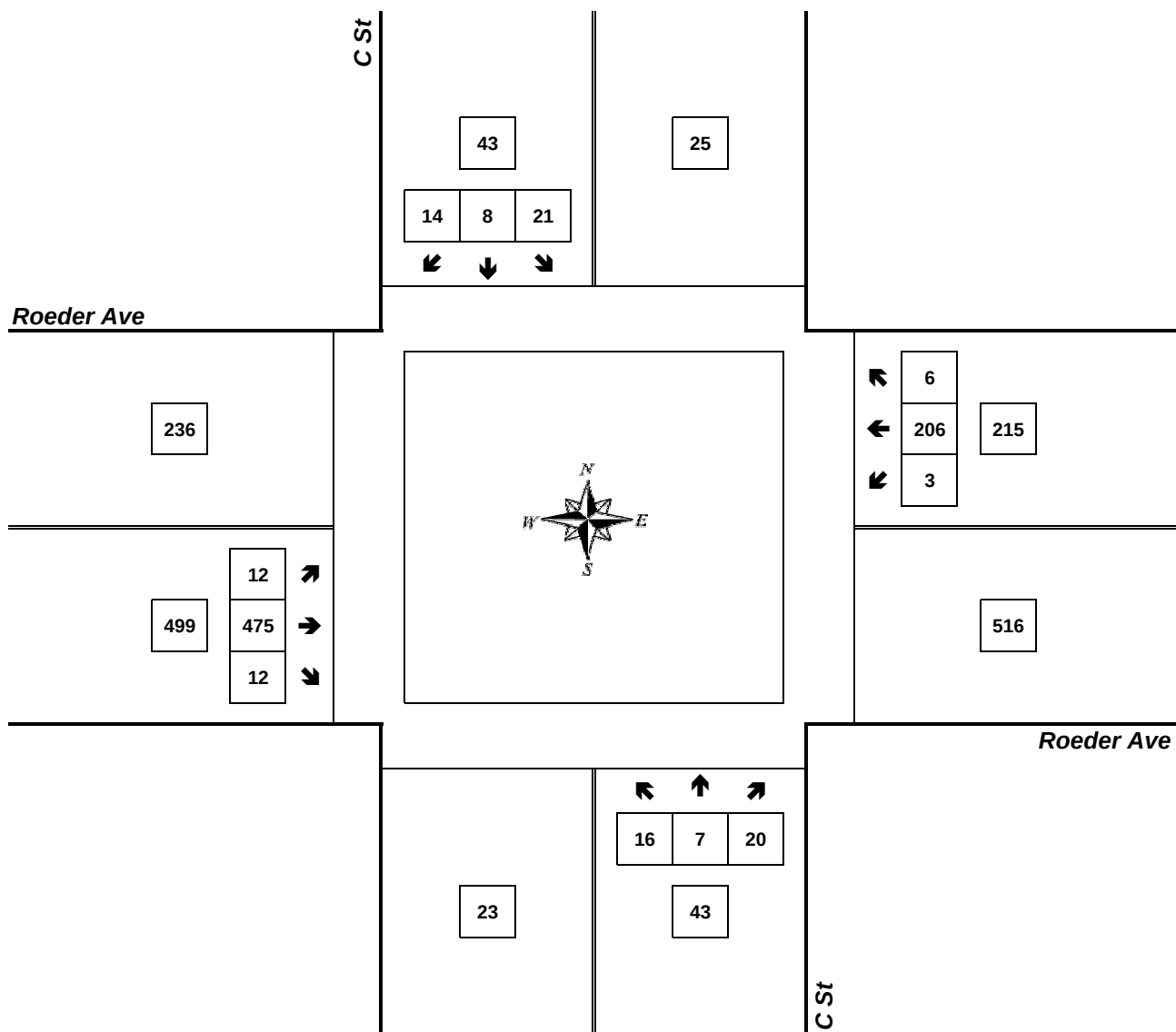


Mark Skaggs
(206) 251-0300

C St & Roeder Ave

4:30 PM to 5:30 PM

Tuesday, April 10, 2007



Approach	PHF	HV%	Volume
EB	0.92	0.2%	499
WB	0.84	0.0%	215
NB	0.83	0.0%	43
SB	0.77	0.0%	43
Intersection	0.94	0.1%	800

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

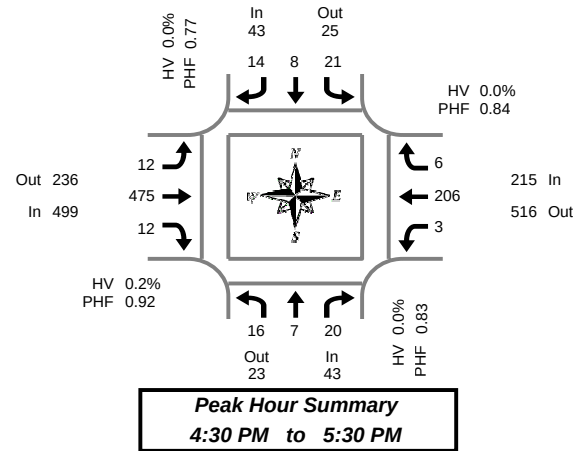


Mark Skaggs
(206) 251-0300

C St & Roeder Ave

Tuesday, April 10, 2007

4:00 PM to 6:00 PM



Peak Hour Summary
4:30 PM to 5:30 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound C St				Southbound C St				Eastbound Roeder Ave				Westbound Roeder Ave				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	6	1	2	0	3	4	3	0	2	82	3	0	2	49	4	0	161
4:15 PM	12	2	5	0	4	3	5	0	0	93	3	1	2	57	1	1	187
4:30 PM	4	2	7	0	9	1	4	0	3	116	2	0	1	62	1	0	212
4:45 PM	3	0	6	0	2	3	5	0	5	109	5	1	2	52	2	0	194
5:00 PM	4	4	4	0	4	2	1	0	3	129	4	0	0	47	1	0	203
5:15 PM	5	1	3	0	6	2	4	0	1	121	1	0	0	45	2	0	191
5:30 PM	0	0	1	0	4	0	3	0	0	88	1	4	1	44	1	1	143
5:45 PM	0	0	2	0	3	1	2	0	1	74	0	0	0	33	1	0	117
Total Survey	34	10	30	0	35	16	27	0	15	812	19	6	8	389	13	2	1,408

Peak Hour Summary

4:30 PM to 5:30 PM

By Approach	Northbound C St				Southbound C St				Eastbound Roeder Ave				Westbound Roeder Ave				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	43	23	66	0	43	25	68	0	499	236	735	1	215	516	731	0	800
%HV	0.0%				0.0%				0.2%				0.0%				0.1%
PHF	0.83				0.77				0.92				0.84				0.94

By Movement	Northbound C St				Southbound C St				Eastbound Roeder Ave				Westbound Roeder Ave				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	16	7	20	43	21	8	14	43	12	475	12	499	3	206	6	215	800
PHF	0.80	0.44	0.71	0.83	0.58	0.67	0.70	0.77	0.60	0.92	0.60	0.92	0.38	0.83	0.75	0.84	0.94

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound C St				Southbound C St				Eastbound Roeder Ave				Westbound Roeder Ave				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	25	5	20	0	18	11	17	0	10	400	13	2	7	220	8	1	754
4:15 PM	23	8	22	0	19	9	15	0	11	447	14	2	5	218	5	1	796
4:30 PM	16	7	20	0	21	8	14	0	12	475	12	1	3	206	6	0	800
4:45 PM	12	5	14	0	16	7	13	0	9	447	11	5	3	188	6	1	731
5:00 PM	9	5	10	0	17	5	10	0	5	412	6	4	1	169	5	1	654

Peak Hour Summary

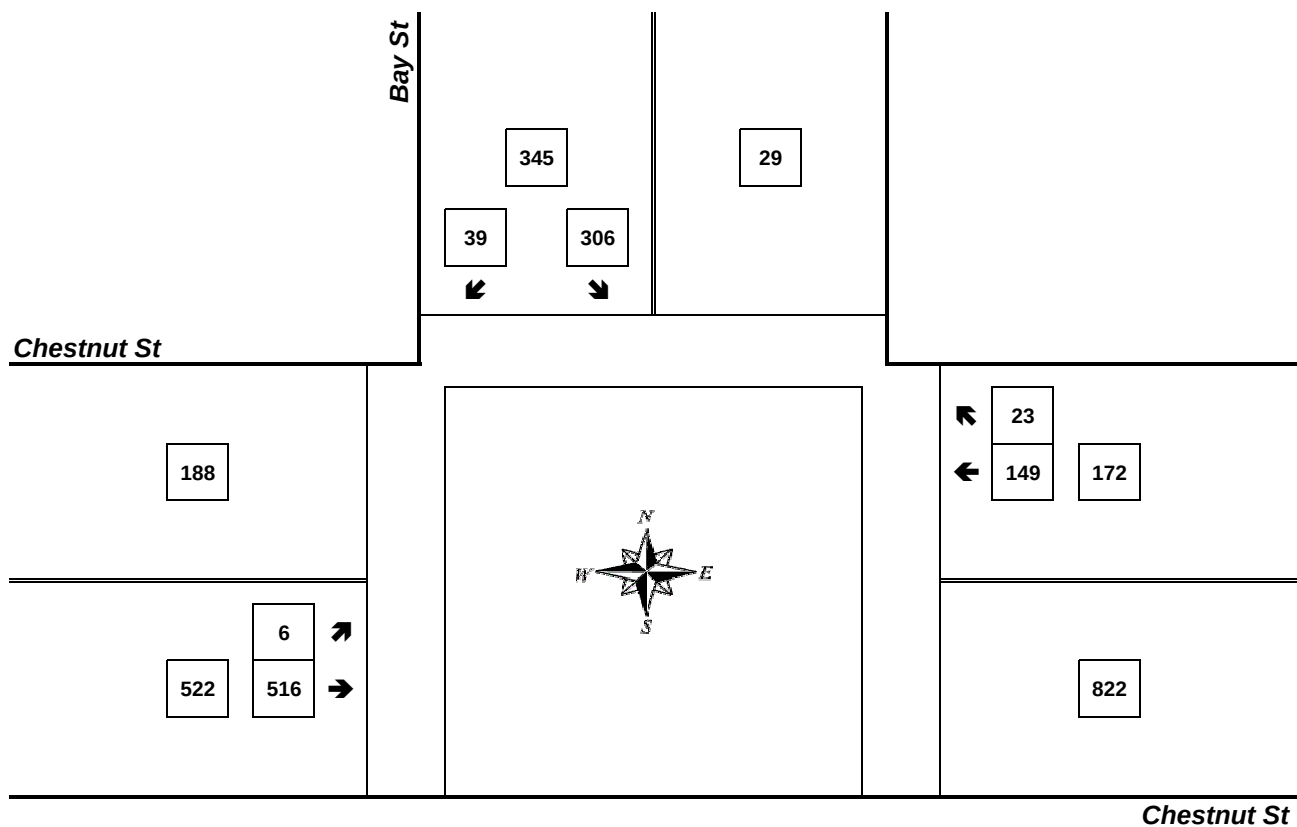


Mark Skaggs
(206) 251-0300

Bay St & Chestnut St

4:30 PM to 5:30 PM

Tuesday, April 10, 2007



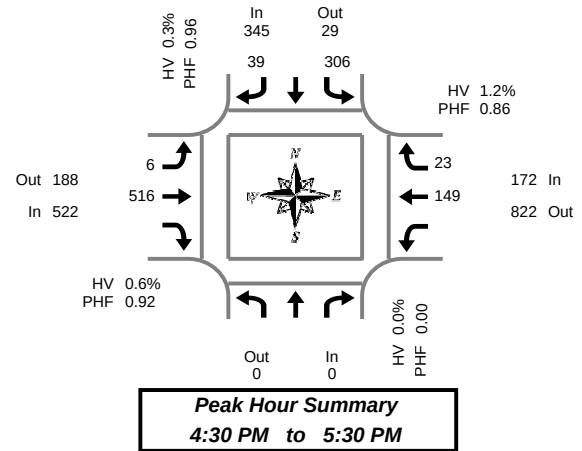
Approach	PHF	HV%	Volume
EB	0.92	0.6%	522
WB	0.86	1.2%	172
NB	0.00	0.0%	0
SB	0.96	0.3%	345
Intersection	0.98	0.6%	1,039

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



Bay St & Chestnut St

Tuesday, April 10, 2007

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Bay St				Southbound Bay St				Eastbound Chestnut St				Westbound Chestnut St				Interval Total
					L		R	HV	L	T		HV		T	R	HV	
4:00 PM					79		16	0	1	91		0		37	3	0	227
4:15 PM					90		8	1	1	100		1		47	6	2	252
4:30 PM					79		11	0	4	122		0		43	7	1	266
4:45 PM					74		13	0	1	120		0		42	5	0	255
5:00 PM					79		9	0	0	133		1		32	5	0	258
5:15 PM					74		6	1	1	141		2		32	6	1	260
5:30 PM					94		11	1	3	104		4		24	2	1	238
5:45 PM					58		8	2	3	85		0		26	3	1	183
Total Survey					627		82	5	14	896		8		283	37	6	1,939

Peak Hour Summary

4:30 PM to 5:30 PM

By Approach	Northbound Bay St				Southbound Bay St				Eastbound Chestnut St				Westbound Chestnut St				Total
	In	Out	Total		In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	0	0	0		345	29	374	1	522	188	710	3	172	822	994	2	1,039
%HV	0.0%				0.3%				0.6%				1.2%				0.6%
PHF	0.00				0.96				0.92				0.86				0.98

By Movement	Northbound Bay St				Southbound Bay St				Eastbound Chestnut St				Westbound Chestnut St				Total
			Total		L		R	Total	L	T		Total		T	R	Total	
Volume			0		306		39	345	6	516		522		149	23	172	1,039
PHF			0.00		0.97		0.75	0.96	0.38	0.91		0.92		0.87	0.82	0.86	0.98

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Bay St				Southbound Bay St				Eastbound Chestnut St				Westbound Chestnut St				Interval Total
					L		R	HV	L	T		HV		T	R	HV	
4:00 PM					322		48	1	7	433		1		169	21	3	1,000
4:15 PM					322		41	1	6	475		2		164	23	3	1,031
4:30 PM					306		39	1	6	516		3		149	23	2	1,039
4:45 PM					321		39	2	5	498		7		130	18	2	1,011
5:00 PM					305		34	4	7	463		7		114	16	3	939

Peak Hour Summary

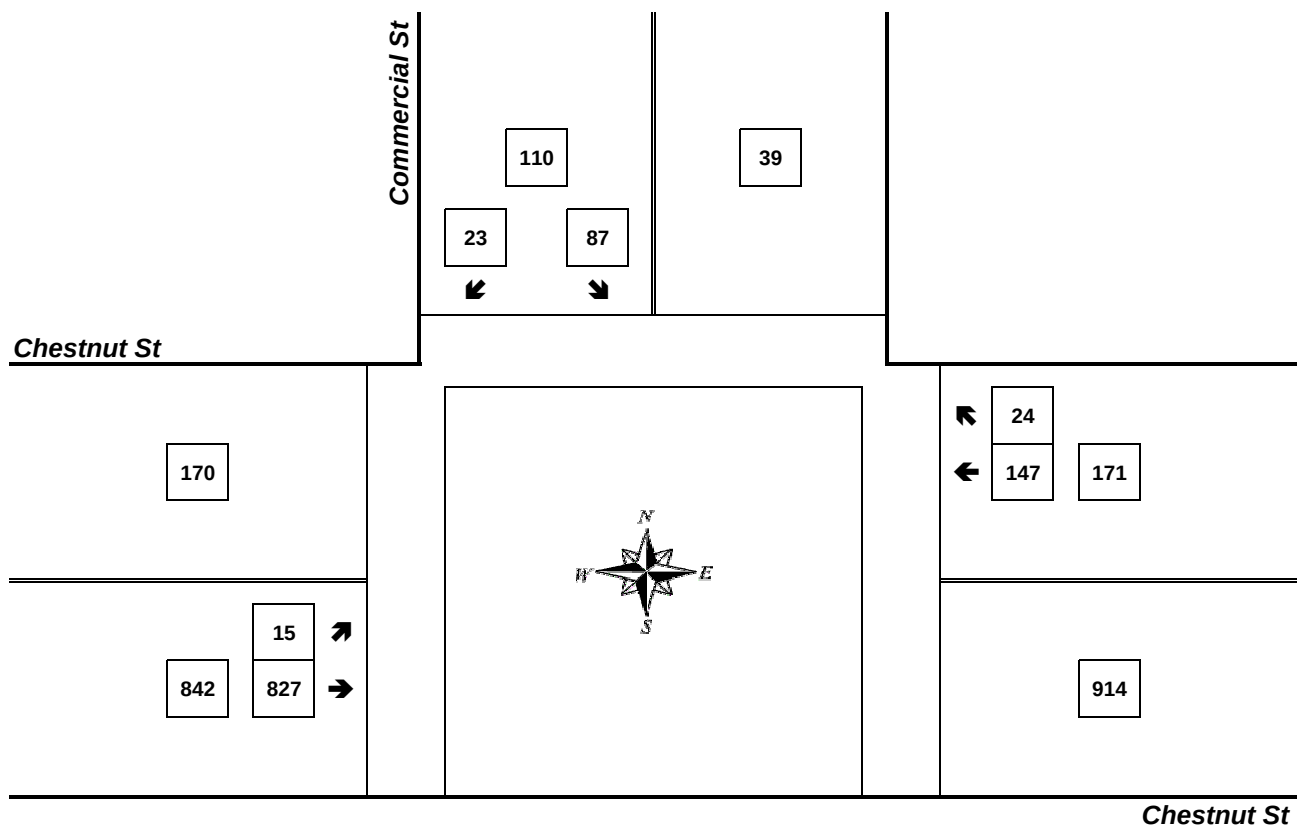


Mark Skaggs
(206) 251-0300

Commercial St & Chestnut St

4:30 PM to 5:30 PM

Tuesday, April 10, 2007



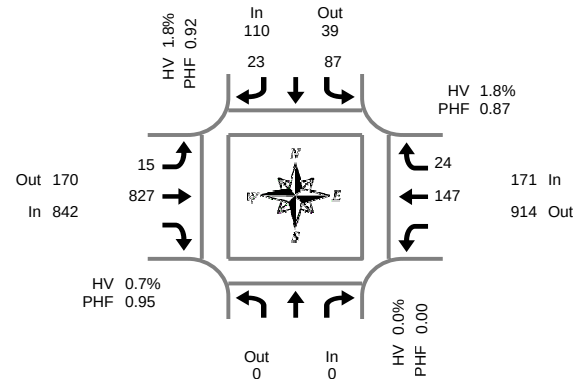
Approach	PHF	HV%	Volume
EB	0.95	0.7%	842
WB	0.87	1.8%	171
NB	0.00	0.0%	0
SB	0.92	1.8%	110
Intersection	0.98	1.0%	1,123

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



Commercial St & Chestnut St

Tuesday, April 10, 2007

4:00 PM to 6:00 PM

Peak Hour Summary
4:30 PM to 5:30 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Commercial St				Southbound Commercial St				Eastbound Chestnut St				Westbound Chestnut St				Interval Total
					L		R	HV	L	T		HV		T	R	HV	
4:00 PM					25		6	0	10	163		2		39	7	0	250
4:15 PM					21		9	1	11	187		1		35	5	1	268
4:30 PM					19		7	1	6	205		0		44	5	1	286
4:45 PM					21		8	0	2	196		0		40	8	2	275
5:00 PM					23		2	0	2	220		1		33	6	0	286
5:15 PM					24		6	1	5	206		5		30	5	0	276
5:30 PM					20		3	0	6	187		5		19	9	2	244
5:45 PM					17		2	0	2	152		1		30	4	1	207
Total Survey					170		43	3	44	1,516		15		270	49	7	2,092

Peak Hour Summary

4:30 PM to 5:30 PM

By Approach	Northbound Commercial St				Southbound Commercial St				Eastbound Chestnut St				Westbound Chestnut St				Total
	In	Out	Total		In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	0	0	0		110	39	149	2	842	170	1,012	6	171	914	1,085	3	1,123
%HV	0.0%				1.8%				0.7%				1.8%				1.0%
PHF	0.00				0.92				0.95				0.87				0.98

By Movement	Northbound Commercial St				Southbound Commercial St				Eastbound Chestnut St				Westbound Chestnut St				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	87		23	110	15	827		842		147	24	171	1,123
PHF				0.00	0.91		0.72	0.92	0.63	0.94		0.95		0.84	0.75	0.87	0.98

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Commercial St				Southbound Commercial St				Eastbound Chestnut St				Westbound Chestnut St				Interval Total
					L		R	HV	L	T		HV		T	R	HV	
4:00 PM					86		30	2	29	751		3		158	25	4	1,079
4:15 PM					84		26	2	21	808		2		152	24	4	1,115
4:30 PM					87		23	2	15	827		6		147	24	3	1,123
4:45 PM					88		19	1	15	809		11		122	28	4	1,081
5:00 PM					84		13	1	15	765		12		112	24	3	1,013

Peak Hour Summary

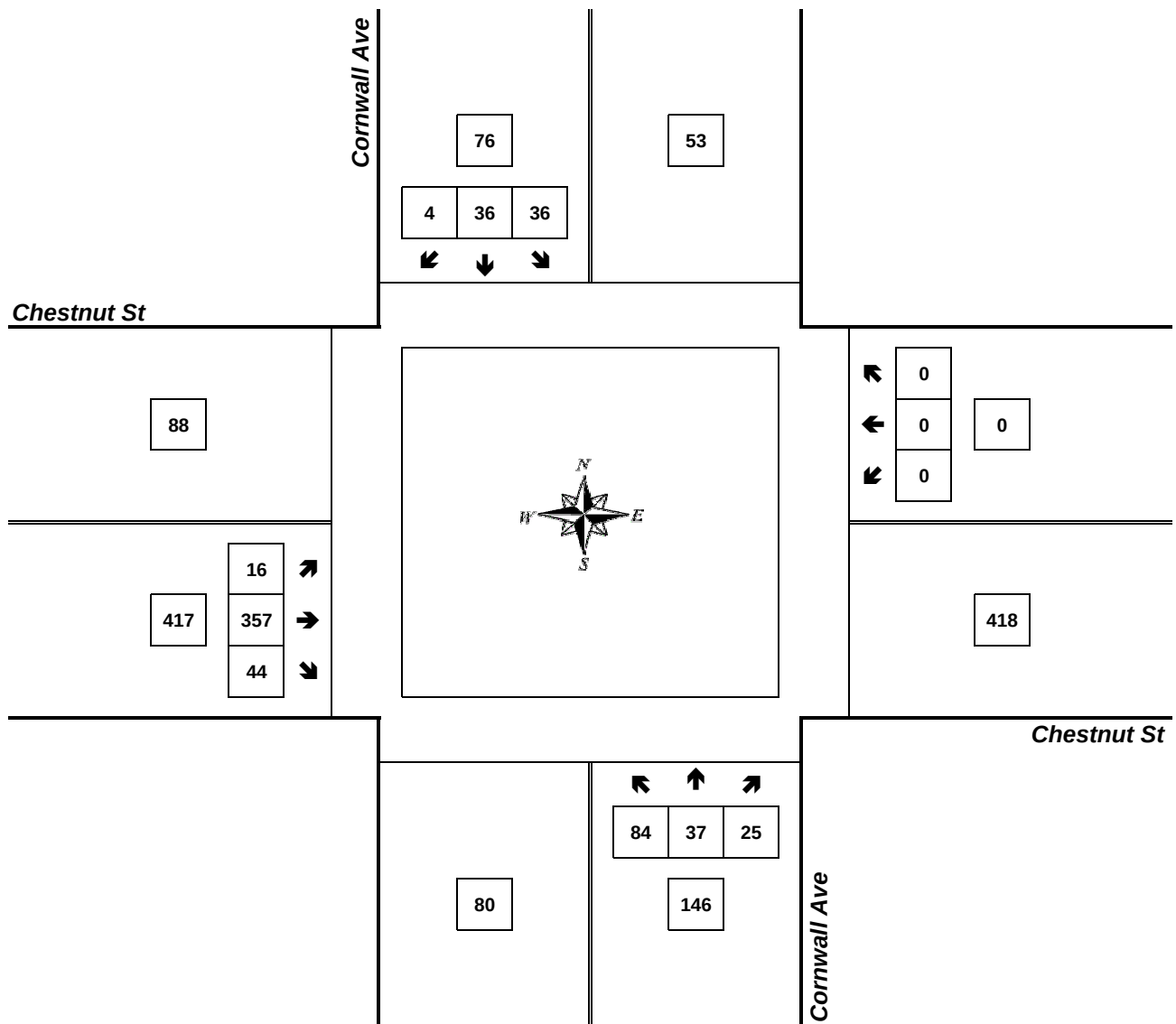


Mark Skaggs
(206) 251-0300

Cornwall Ave & Chestnut St

7:15 AM to 8:15 AM

Tuesday, April 10, 2007



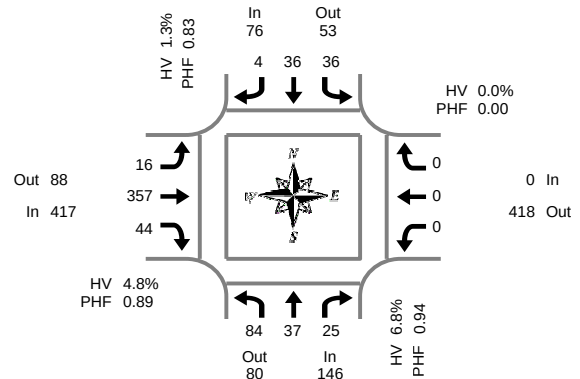
Approach	PHF	HV%	Volume
EB	0.89	4.8%	417
WB	0.00	0.0%	0
NB	0.94	6.8%	146
SB	0.83	1.3%	76
Intersection	0.89	4.9%	639

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



Cornwall Ave & Chestnut St

Tuesday, April 10, 2007

7:00 AM to 9:00 AM

Peak Hour Summary
7:15 AM to 8:15 AM

15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound Chestnut St				Westbound Chestnut St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
7:00 AM	12	8	5	2	4	8	1	0	3	71	12	6	0	0	0	0	124
7:15 AM	15	9	9	3	6	12	2	0	2	89	13	8	0	0	0	0	157
7:30 AM	20	13	4	2	7	5	0	1	6	89	12	7	0	0	0	0	156
7:45 AM	22	9	8	2	11	10	2	0	5	101	11	3	0	0	0	0	179
8:00 AM	27	6	4	3	12	9	0	0	3	78	8	2	0	0	0	0	147
8:15 AM	26	5	6	3	13	12	1	1	3	81	9	2	0	0	0	0	156
8:30 AM	24	6	6	4	12	10	1	0	2	74	6	1	0	0	0	0	141
8:45 AM	31	5	5	2	16	9	1	1	1	86	5	2	0	0	0	0	159
Total Survey	177	61	47	21	81	75	8	3	25	669	76	31	0	0	0	0	1,219

Peak Hour Summary

7:15 AM to 8:15 AM

By Approach	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound Chestnut St				Westbound Chestnut St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	146	80	226	10	76	53	129	1	417	88	505	20	0	418	418	0	639
%HV	6.8%				1.3%				4.8%				0.0%				4.9%
PHF	0.94				0.83				0.89				0.00				0.89

By Movement	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound Chestnut St				Westbound Chestnut St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	84	37	25	146	36	36	4	76	16	357	44	417	0	0	0	0	639
PHF	0.78	0.71	0.69	0.94	0.75	0.75	0.50	0.83	0.67	0.88	0.85	0.89	0.00	0.00	0.00	0.00	0.89

Rolling Hour Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound Chestnut St				Westbound Chestnut St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
7:00 AM	69	39	26	9	28	35	5	1	16	350	48	24	0	0	0	0	616
7:15 AM	84	37	25	10	36	36	4	1	16	357	44	20	0	0	0	0	639
7:30 AM	95	33	22	10	43	36	3	2	17	349	40	14	0	0	0	0	638
7:45 AM	99	26	24	12	48	41	4	1	13	334	34	8	0	0	0	0	623
8:00 AM	108	22	21	12	53	40	3	2	9	319	28	7	0	0	0	0	603

Peak Hour Summary

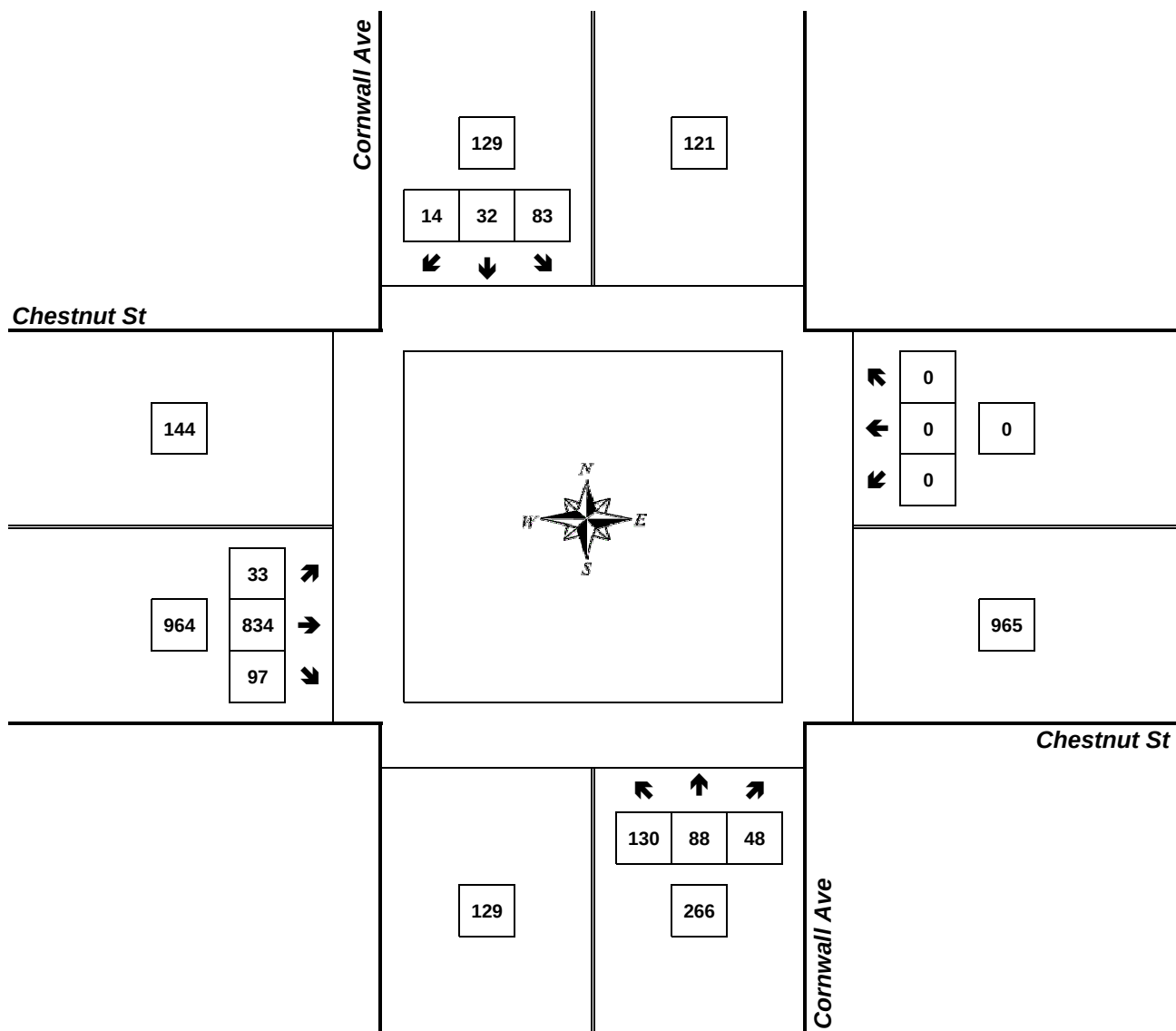


Mark Skaggs
(206) 251-0300

Cornwall Ave & Chestnut St

4:30 PM to 5:30 PM

Tuesday, April 10, 2007



Approach	PHF	HV%	Volume
EB	0.94	0.6%	964
WB	0.00	0.0%	0
NB	0.88	1.5%	266
SB	0.90	0.0%	129
Intersection	0.95	0.7%	1,359

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

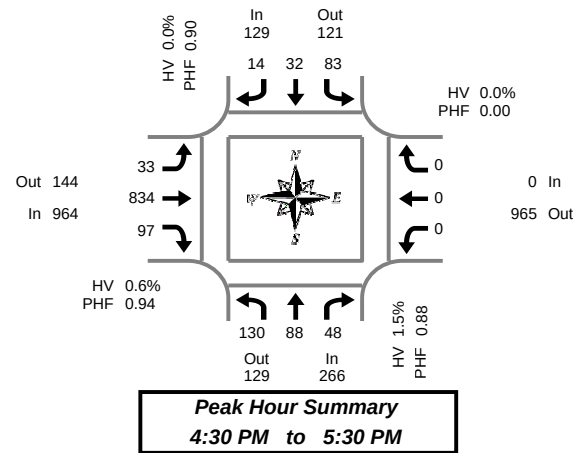


Mark Skaggs
(206) 251-0300

Cornwall Ave & Chestnut St

Tuesday, April 10, 2007

4:00 PM to 6:00 PM



15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound Chestnut St				Westbound Chestnut St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	44	23	8	0	20	13	3	2	12	155	15	3	0	0	0	0	293
4:15 PM	34	13	8	1	21	20	7	0	14	171	17	1	0	0	0	0	305
4:30 PM	39	20	17	2	24	4	4	0	6	203	21	0	0	0	0	0	338
4:45 PM	38	29	7	2	16	11	4	0	8	190	23	0	0	0	0	0	326
5:00 PM	26	23	15	0	22	10	4	0	15	212	29	1	0	0	0	0	356
5:15 PM	27	16	9	0	21	7	2	0	4	229	24	5	0	0	0	0	339
5:30 PM	21	18	7	1	19	4	1	1	10	187	21	6	0	0	0	0	288
5:45 PM	27	12	5	0	21	11	3	1	8	148	14	2	0	0	0	0	249
Total Survey	256	154	76	6	164	80	28	4	77	1,495	164	18	0	0	0	0	2,494

Peak Hour Summary

4:30 PM to 5:30 PM

By Approach	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound Chestnut St				Westbound Chestnut St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	266	129	395	4	129	121	250	0	964	144	1,108	6	0	965	965	0	1,359
%HV	1.5%				0.0%				0.6%				0.0%				0.7%
PHF	0.88				0.90				0.94				0.00				0.95

By Movement	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound Chestnut St				Westbound Chestnut St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	130	88	48	266	83	32	14	129	33	834	97	964	0	0	0	0	1,359
PHF	0.83	0.76	0.71	0.88	0.86	0.73	0.88	0.90	0.55	0.91	0.84	0.94	0.00	0.00	0.00	0.00	0.95

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Cornwall Ave				Southbound Cornwall Ave				Eastbound Chestnut St				Westbound Chestnut St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	155	85	40	5	81	48	18	2	40	719	76	4	0	0	0	0	1,262
4:15 PM	137	85	47	5	83	45	19	0	43	776	90	2	0	0	0	0	1,325
4:30 PM	130	88	48	4	83	32	14	0	33	834	97	6	0	0	0	0	1,359
4:45 PM	112	86	38	3	78	32	11	1	37	818	97	12	0	0	0	0	1,309
5:00 PM	101	69	36	1	83	32	10	2	37	776	88	14	0	0	0	0	1,232

Peak Hour Summary

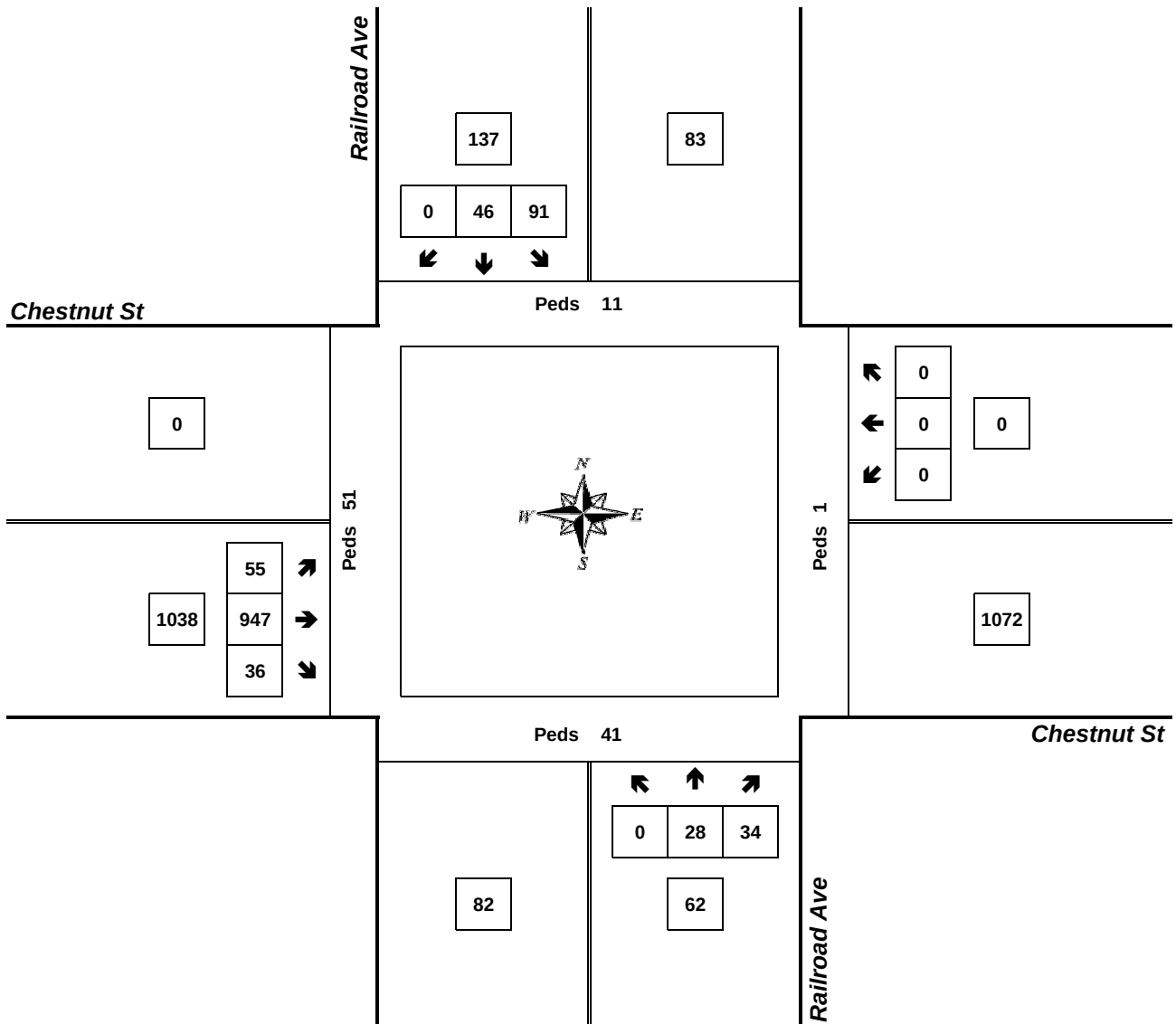


Mark Skaggs
(206) 251-0300

Railroad Ave & Chestnut St

4:30 PM to 5:30 PM

Tuesday, April 10, 2007



Approach	PHF	HV%	Volume
EB	0.88	0.6%	1,038
WB	0.00	0.0%	0
NB	0.82	0.0%	62
SB	0.74	0.0%	137
Intersection	0.91	0.5%	1,237

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

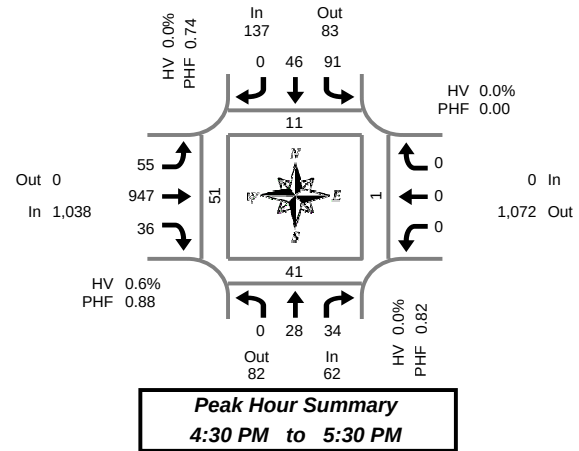


Mark Skaggs
(206) 251-0300

Railroad Ave & Chestnut St

Tuesday, April 10, 2007

4:00 PM to 6:00 PM



Peak Hour Summary
4:30 PM to 5:30 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Railroad Ave				Southbound Railroad Ave				Eastbound Chestnut St				Westbound Chestnut St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	0	9	7	0	23	12	0	1	17	182	4	0	0	0	0	0	254	1	3	1	3
4:15 PM	0	0	6	2	25	10	0	0	18	187	8	2	0	0	0	0	254	1	9	1	3
4:30 PM	0	9	9	0	15	8	0	0	12	226	7	2	0	0	0	0	286	1	10	1	11
4:45 PM	0	9	10	0	22	14	0	0	17	230	12	1	0	0	0	0	314	3	12	0	14
5:00 PM	0	5	8	0	25	7	0	0	13	275	6	3	0	0	0	0	339	5	11	0	9
5:15 PM	0	5	7	0	29	17	0	0	13	216	11	0	0	0	0	0	298	2	8	0	17
5:30 PM	0	5	16	0	24	10	0	0	22	175	5	1	0	0	0	0	257	5	6	12	12
5:45 PM	1	5	11	3	25	10	0	1	8	170	9	6	0	0	0	0	239	4	2	3	8
Total Survey	1	47	74	5	188	88	0	2	120	1,661	62	15	0	0	0	0	2,241	22	61	18	77

Peak Hour Summary

4:30 PM to 5:30 PM

By Approach	Northbound Railroad Ave				Southbound Railroad Ave				Eastbound Chestnut St				Westbound Chestnut St				Total	Pedestrians Crosswalk			
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV		North	South	East	West
Volume	62	82	144	0	137	83	220	0	1,038	0	1,038	6	0	1,072	1,072	0	1,237	11	41	1	51
%HV	0.0%				0.0%				0.6%				0.0%				0.5%				
PHF	0.82				0.74				0.88				0.00				0.91				

By Movement	Northbound Railroad Ave				Southbound Railroad Ave				Eastbound Chestnut St				Westbound Chestnut St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	28	34	62	91	46	0	137	55	947	36	1,038	0	0	0	0	1,237
PHF	0.00	0.78	0.85	0.82	0.78	0.68	0.00	0.74	0.81	0.86	0.75	0.88	0.00	0.00	0.00	0.00	0.91

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Railroad Ave				Southbound Railroad Ave				Eastbound Chestnut St				Westbound Chestnut St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	0	27	32	2	85	44	0	1	64	825	31	5	0	0	0	0	1,108	6	34	3	31
4:15 PM	0	23	33	2	87	39	0	0	60	918	33	8	0	0	0	0	1,193	10	42	2	37
4:30 PM	0	28	34	0	91	46	0	0	55	947	36	6	0	0	0	0	1,237	11	41	1	51
4:45 PM	0	24	41	0	100	48	0	0	65	896	34	5	0	0	0	0	1,208	15	37	12	52
5:00 PM	1	20	42	3	103	44	0	1	56	836	31	10	0	0	0	0	1,133	16	27	15	46

Peak Hour Summary

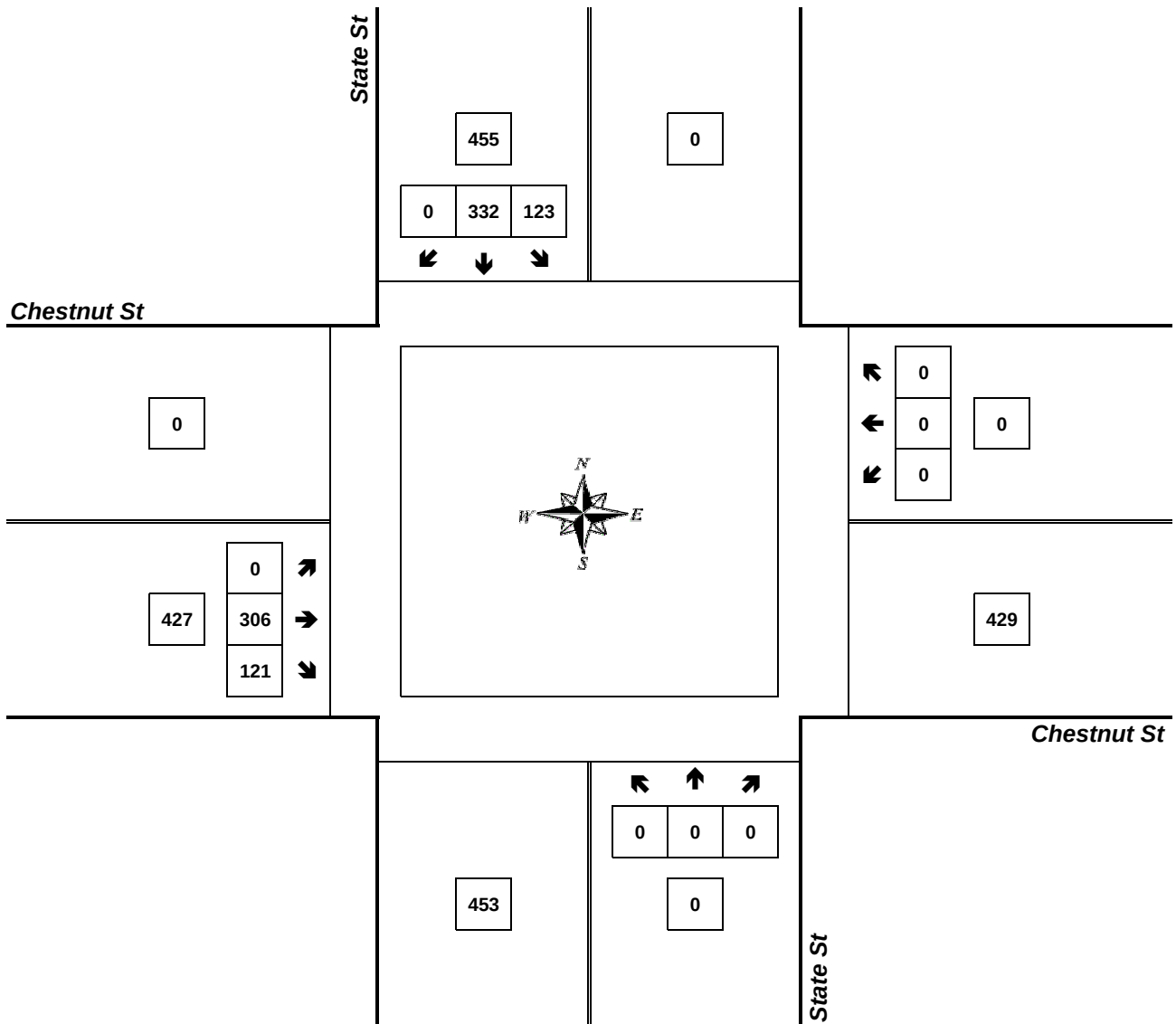


Mark Skaggs
(206) 251-0300

State St & Chestnut St

8:00 AM to 9:00 AM

Tuesday, April 10, 2007



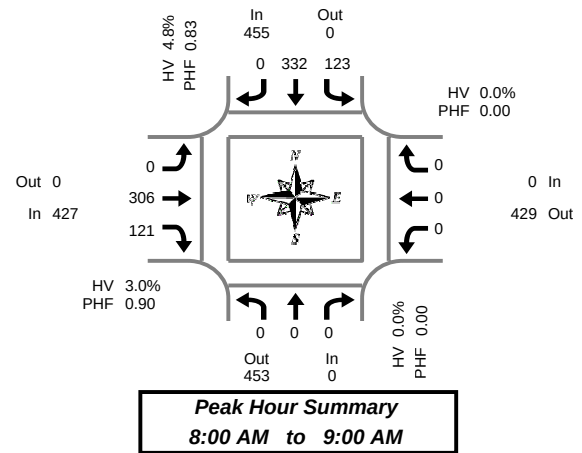
Approach	PHF	HV%	Volume
EB	0.90	3.0%	427
WB	0.00	0.0%	0
NB	0.00	0.0%	0
SB	0.83	4.8%	455
Intersection	0.92	4.0%	882

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



State St & Chestnut St

Tuesday, April 10, 2007
7:00 AM to 9:00 AM

15-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound State St				Southbound State St				Eastbound Chestnut St				Westbound Chestnut St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
7:00 AM	0	0	0	0	13	33	0	2	0	33	14	1	0	0	0	0	93
7:15 AM	0	0	0	0	21	39	0	2	0	59	17	2	0	0	0	0	136
7:30 AM	0	0	0	0	36	52	0	3	0	64	20	3	0	0	0	0	172
7:45 AM	0	0	0	0	28	80	0	5	0	85	43	3	0	0	0	0	236
8:00 AM	0	0	0	0	26	91	0	10	0	80	25	6	0	0	0	0	222
8:15 AM	0	0	0	0	19	74	0	5	0	71	30	4	0	0	0	0	194
8:30 AM	0	0	0	0	37	71	0	3	0	87	31	2	0	0	0	0	226
8:45 AM	0	0	0	0	41	96	0	4	0	68	35	1	0	0	0	0	240
Total Survey	0	0	0	0	221	536	0	34	0	547	215	22	0	0	0	0	1,519

Peak Hour Summary 8:00 AM to 9:00 AM

By Approach	Northbound State St				Southbound State St				Eastbound Chestnut St				Westbound Chestnut St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	0	453	453	0	455	0	455	22	427	0	427	13	0	429	429	0	882
%HV	0.0%				4.8%				3.0%				0.0%				4.0%
PHF	0.00				0.83				0.90				0.00				0.92

By Movement	Northbound State St				Southbound State St				Eastbound Chestnut St				Westbound Chestnut St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	123	332	0	455	0	306	121	427	0	0	0	0	882
PHF	0.00	0.00	0.00	0.00	0.75	0.86	0.00	0.83	0.00	0.88	0.86	0.90	0.00	0.00	0.00	0.00	0.92

Rolling Hour Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound State St				Southbound State St				Eastbound Chestnut St				Westbound Chestnut St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
7:00 AM	0	0	0	0	98	204	0	12	0	241	94	9	0	0	0	0	637
7:15 AM	0	0	0	0	111	262	0	20	0	288	105	14	0	0	0	0	766
7:30 AM	0	0	0	0	109	297	0	23	0	300	118	16	0	0	0	0	824
7:45 AM	0	0	0	0	110	316	0	23	0	323	129	15	0	0	0	0	878
8:00 AM	0	0	0	0	123	332	0	22	0	306	121	13	0	0	0	0	882

Peak Hour Summary

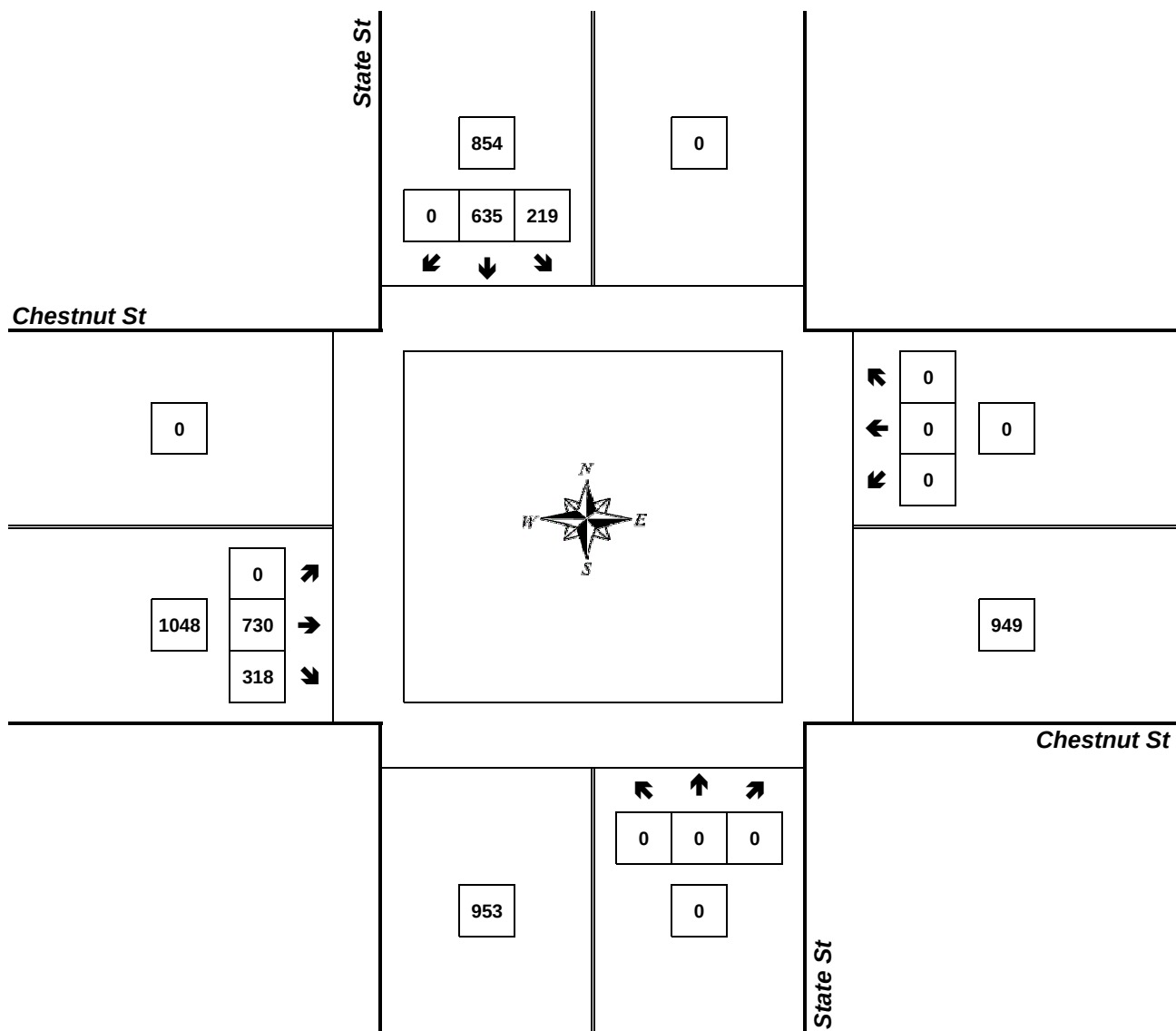


Mark Skaggs
(206) 251-0300

State St & Chestnut St

4:45 PM to 5:45 PM

Tuesday, April 10, 2007



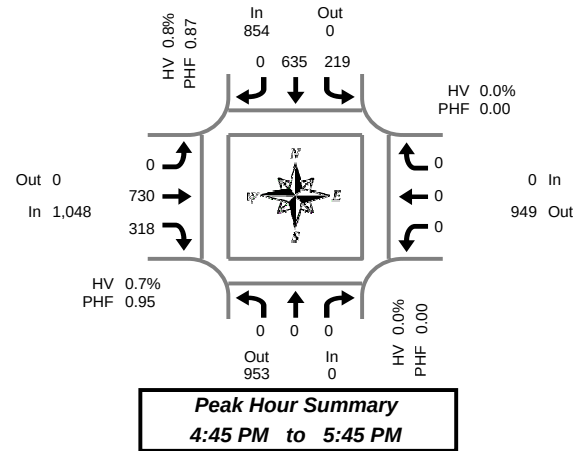
Approach	PHF	HV%	Volume
EB	0.95	0.7%	1,048
WB	0.00	0.0%	0
NB	0.00	0.0%	0
SB	0.87	0.8%	854
Intersection	0.91	0.7%	1,902

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



State St & Chestnut St

Tuesday, April 10, 2007

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound State St				Southbound State St				Eastbound Chestnut St				Westbound Chestnut St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	0	0	0	33	152	0	2	0	156	45	0	0	0	0	0	386
4:15 PM	0	0	0	0	47	122	0	2	0	155	66	1	0	0	0	0	390
4:30 PM	0	0	0	0	64	130	0	3	0	185	68	3	0	0	0	0	447
4:45 PM	0	0	0	0	51	125	0	2	0	164	84	1	0	0	0	0	424
5:00 PM	0	0	0	0	41	163	0	1	0	191	85	0	0	0	0	0	480
5:15 PM	0	0	0	0	58	188	0	2	0	208	68	1	0	0	0	0	522
5:30 PM	0	0	0	0	69	159	0	2	0	167	81	5	0	0	0	0	476
5:45 PM	0	0	0	0	55	161	0	0	0	141	65	1	0	0	0	0	422
Total Survey	0	0	0	0	418	1,200	0	14	0	1,367	562	12	0	0	0	0	3,547

Peak Hour Summary

4:45 PM to 5:45 PM

By Approach	Northbound State St				Southbound State St				Eastbound Chestnut St				Westbound Chestnut St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	0	953	953	0	854	0	854	7	1,048	0	1,048	7	0	949	949	0	1,902
%HV	0.0%				0.8%				0.7%				0.0%				0.7%
PHF	0.00				0.87				0.95				0.00				0.91

By Movement	Northbound State St				Southbound State St				Eastbound Chestnut St				Westbound Chestnut St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	219	635	0	854	0	730	318	1,048	0	0	0	0	1,902
PHF	0.00	0.00	0.00	0.00	0.79	0.84	0.00	0.87	0.00	0.88	0.94	0.95	0.00	0.00	0.00	0.00	0.91

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound State St				Southbound State St				Eastbound Chestnut St				Westbound Chestnut St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	0	0	0	195	529	0	9	0	660	263	5	0	0	0	0	1,647
4:15 PM	0	0	0	0	203	540	0	8	0	695	303	5	0	0	0	0	1,741
4:30 PM	0	0	0	0	214	606	0	8	0	748	305	5	0	0	0	0	1,873
4:45 PM	0	0	0	0	219	635	0	7	0	730	318	7	0	0	0	0	1,902
5:00 PM	0	0	0	0	223	671	0	5	0	707	299	7	0	0	0	0	1,900

Peak Hour Summary

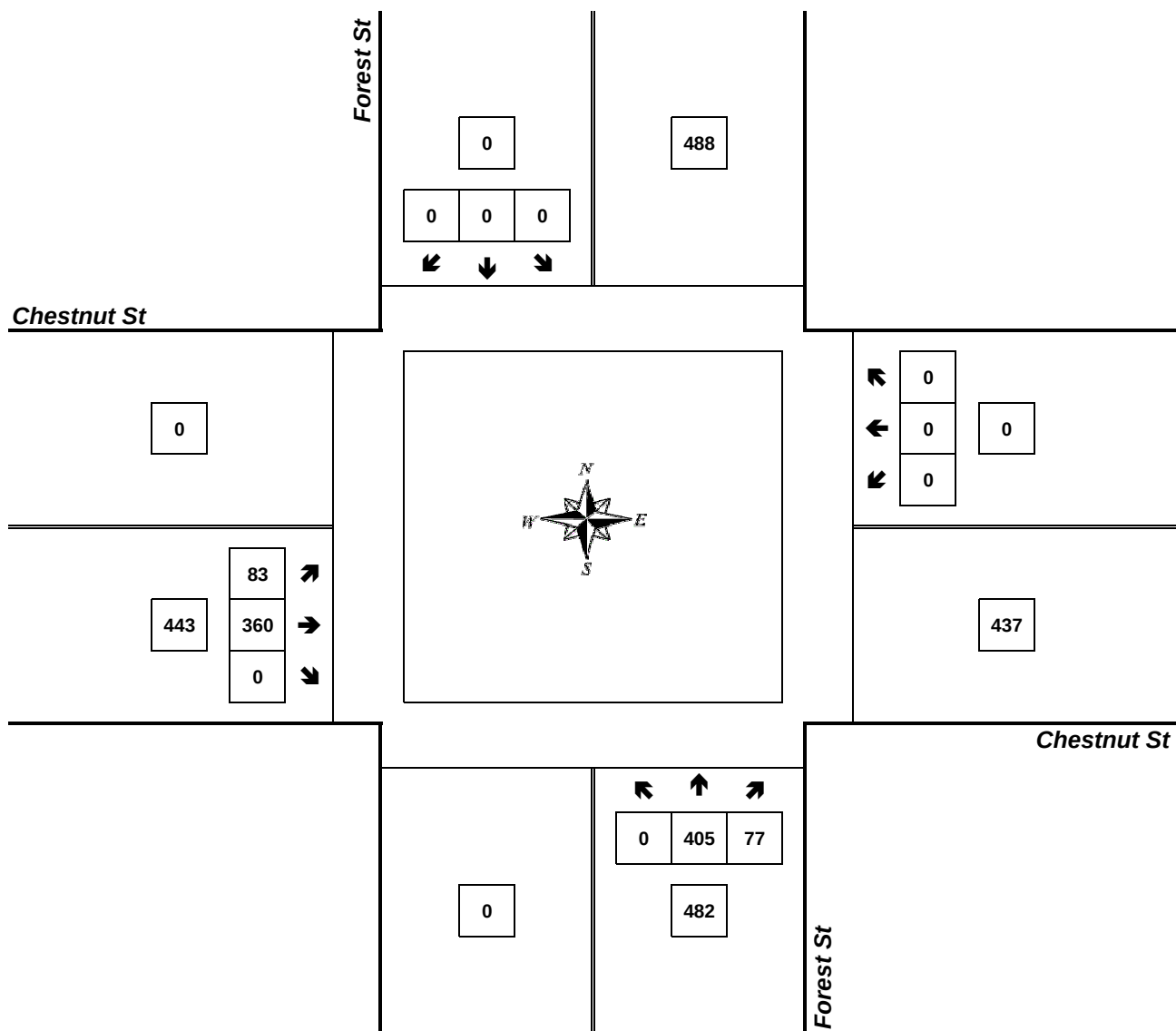


Mark Skaggs
(206) 251-0300

Forest St & Chestnut St

7:45 AM to 8:45 AM

Tuesday, April 10, 2007



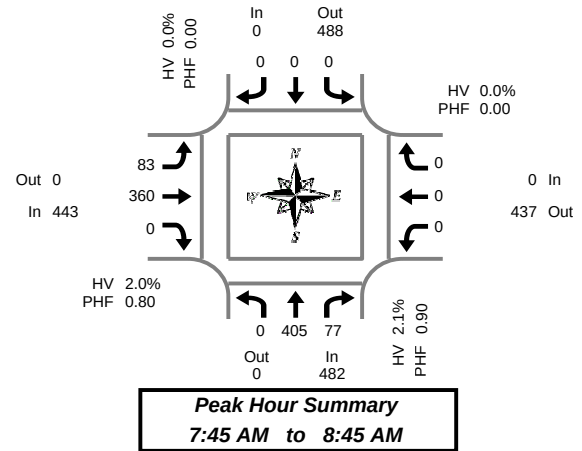
Approach	PHF	HV%	Volume
EB	0.80	2.0%	443
WB	0.00	0.0%	0
NB	0.90	2.1%	482
SB	0.00	0.0%	0
Intersection	0.85	2.1%	925

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



Forest St & Chestnut St

Tuesday, April 10, 2007

7:00 AM to 9:00 AM

15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Forest St				Southbound Forest St				Eastbound Chestnut St				Westbound Chestnut St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
7:00 AM	0	45	7	3	0	0	0	0	9	37	0	0	0	0	0	0	98
7:15 AM	0	59	17	3	0	0	0	0	15	64	0	3	0	0	0	0	155
7:30 AM	0	86	13	2	0	0	0	0	20	82	0	2	0	0	0	0	201
7:45 AM	0	119	15	1	0	0	0	0	21	100	0	2	0	0	0	0	255
8:00 AM	0	101	24	1	0	0	0	0	13	90	0	3	0	0	0	0	228
8:15 AM	0	66	23	5	0	0	0	0	21	60	0	2	0	0	0	0	170
8:30 AM	0	119	15	3	0	0	0	0	28	110	0	2	0	0	0	0	272
8:45 AM	0	105	13	1	0	0	0	0	32	69	0	3	0	0	0	0	219
Total Survey	0	700	127	19	0	0	0	0	159	612	0	17	0	0	0	0	1,598

Peak Hour Summary

7:45 AM to 8:45 AM

By Approach	Northbound Forest St				Southbound Forest St				Eastbound Chestnut St				Westbound Chestnut St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	482	0	482	10	0	488	488	0	443	0	443	9	0	437	437	0	925
%HV	2.1%				0.0%				2.0%				0.0%				2.1%
PHF	0.90				0.00				0.80				0.00				0.85

By Movement	Northbound Forest St				Southbound Forest St				Eastbound Chestnut St				Westbound Chestnut St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	405	77	482	0	0	0	0	83	360	0	443	0	0	0	0	925
PHF	0.00	0.85	0.80	0.90	0.00	0.00	0.00	0.00	0.74	0.82	0.00	0.80	0.00	0.00	0.00	0.00	0.85

Rolling Hour Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Forest St				Southbound Forest St				Eastbound Chestnut St				Westbound Chestnut St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
7:00 AM	0	309	52	9	0	0	0	0	65	283	0	7	0	0	0	0	709
7:15 AM	0	365	69	7	0	0	0	0	69	336	0	10	0	0	0	0	839
7:30 AM	0	372	75	9	0	0	0	0	75	332	0	9	0	0	0	0	854
7:45 AM	0	405	77	10	0	0	0	0	83	360	0	9	0	0	0	0	925
8:00 AM	0	391	75	10	0	0	0	0	94	329	0	10	0	0	0	0	889

Peak Hour Summary

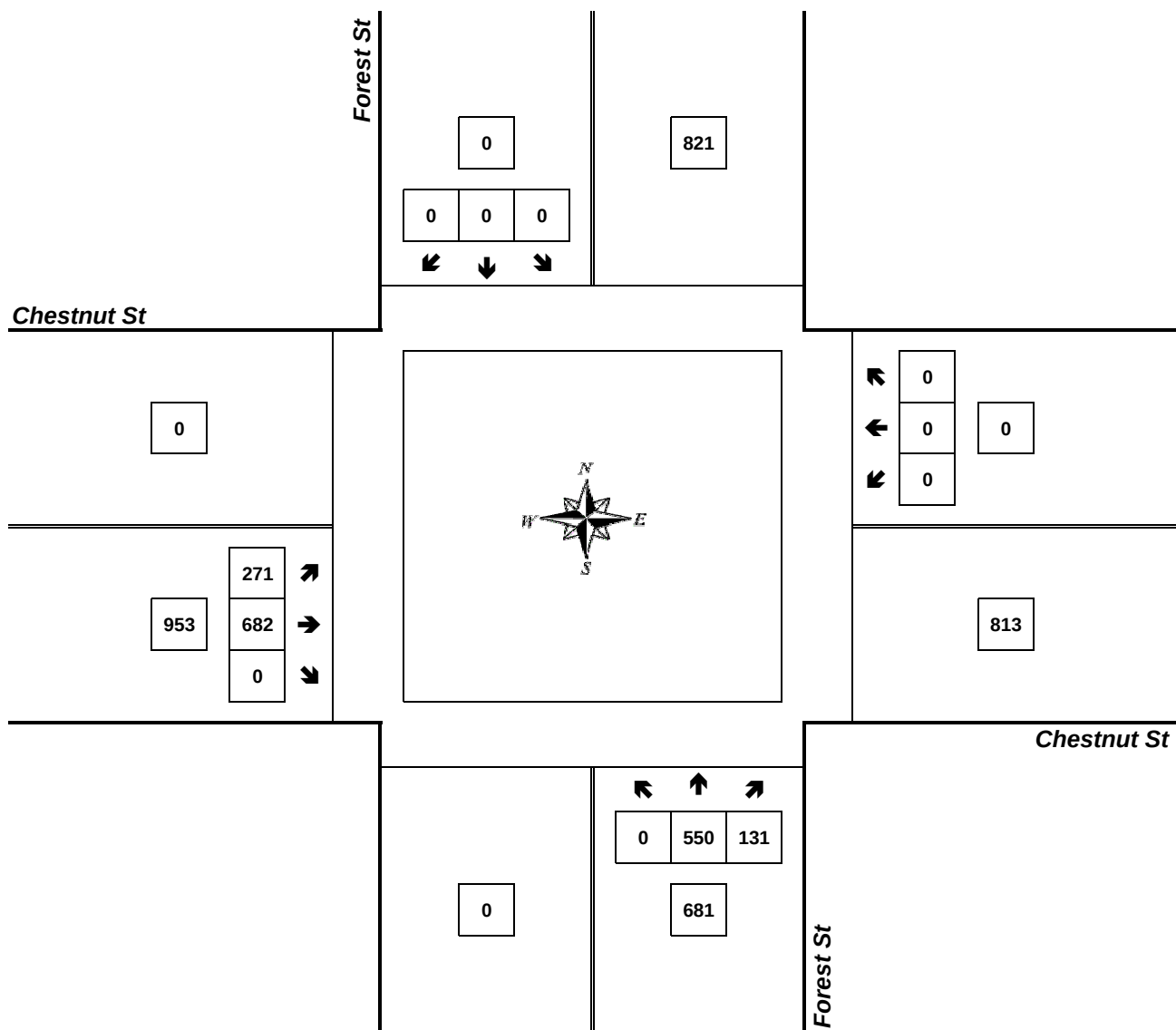


Mark Skaggs
(206) 251-0300

Forest St & Chestnut St

4:45 PM to 5:45 PM

Tuesday, April 10, 2007



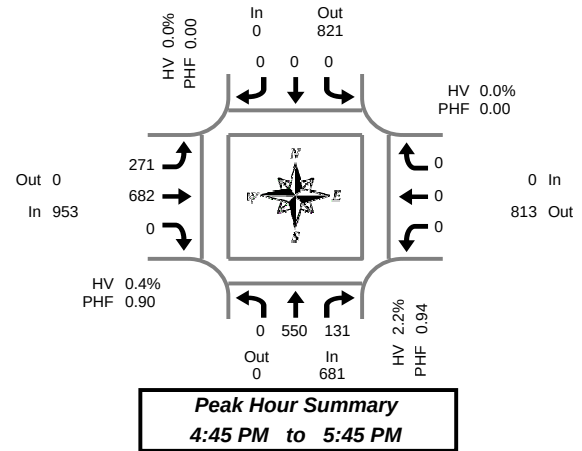
Approach	PHF	HV%	Volume
EB	0.90	0.4%	953
WB	0.00	0.0%	0
NB	0.94	2.2%	681
SB	0.00	0.0%	0
Intersection	0.94	1.2%	1,634

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



Forest St & Chestnut St

Tuesday, April 10, 2007

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Forest St				Southbound Forest St				Eastbound Chestnut St				Westbound Chestnut St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	172	41	3	0	0	0	0	30	153	0	2	0	0	0	0	396
4:15 PM	0	132	32	2	0	0	0	0	53	150	0	0	0	0	0	0	367
4:30 PM	0	111	42	2	0	0	0	0	60	198	0	4	0	0	0	0	411
4:45 PM	0	130	23	3	0	0	0	0	60	147	0	0	0	0	0	0	360
5:00 PM	0	140	36	4	0	0	0	0	54	182	0	0	0	0	0	0	412
5:15 PM	0	136	35	1	0	0	0	0	78	186	0	1	0	0	0	0	435
5:30 PM	0	144	37	7	0	0	0	0	79	167	0	3	0	0	0	0	427
5:45 PM	0	135	28	4	0	0	0	0	53	140	0	1	0	0	0	0	356
Total Survey	0	1,100	274	26	0	0	0	0	467	1,323	0	11	0	0	0	0	3,164

Peak Hour Summary

4:45 PM to 5:45 PM

By Approach	Northbound Forest St				Southbound Forest St				Eastbound Chestnut St				Westbound Chestnut St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	681	0	681	15	0	821	821	0	953	0	953	4	0	813	813	0	1,634
%HV	2.2%				0.0%				0.4%				0.0%				1.2%
PHF	0.94				0.00				0.90				0.00				0.94

By Movement	Northbound Forest St				Southbound Forest St				Eastbound Chestnut St				Westbound Chestnut St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	550	131	681	0	0	0	0	271	682	0	953	0	0	0	0	1,634
PHF	0.00	0.95	0.89	0.94	0.00	0.00	0.00	0.00	0.86	0.92	0.00	0.90	0.00	0.00	0.00	0.00	0.94

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Forest St				Southbound Forest St				Eastbound Chestnut St				Westbound Chestnut St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	545	138	10	0	0	0	0	203	648	0	6	0	0	0	0	1,534
4:15 PM	0	513	133	11	0	0	0	0	227	677	0	4	0	0	0	0	1,550
4:30 PM	0	517	136	10	0	0	0	0	252	713	0	5	0	0	0	0	1,618
4:45 PM	0	550	131	15	0	0	0	0	271	682	0	4	0	0	0	0	1,634
5:00 PM	0	555	136	16	0	0	0	0	264	675	0	5	0	0	0	0	1,630

Peak Hour Summary

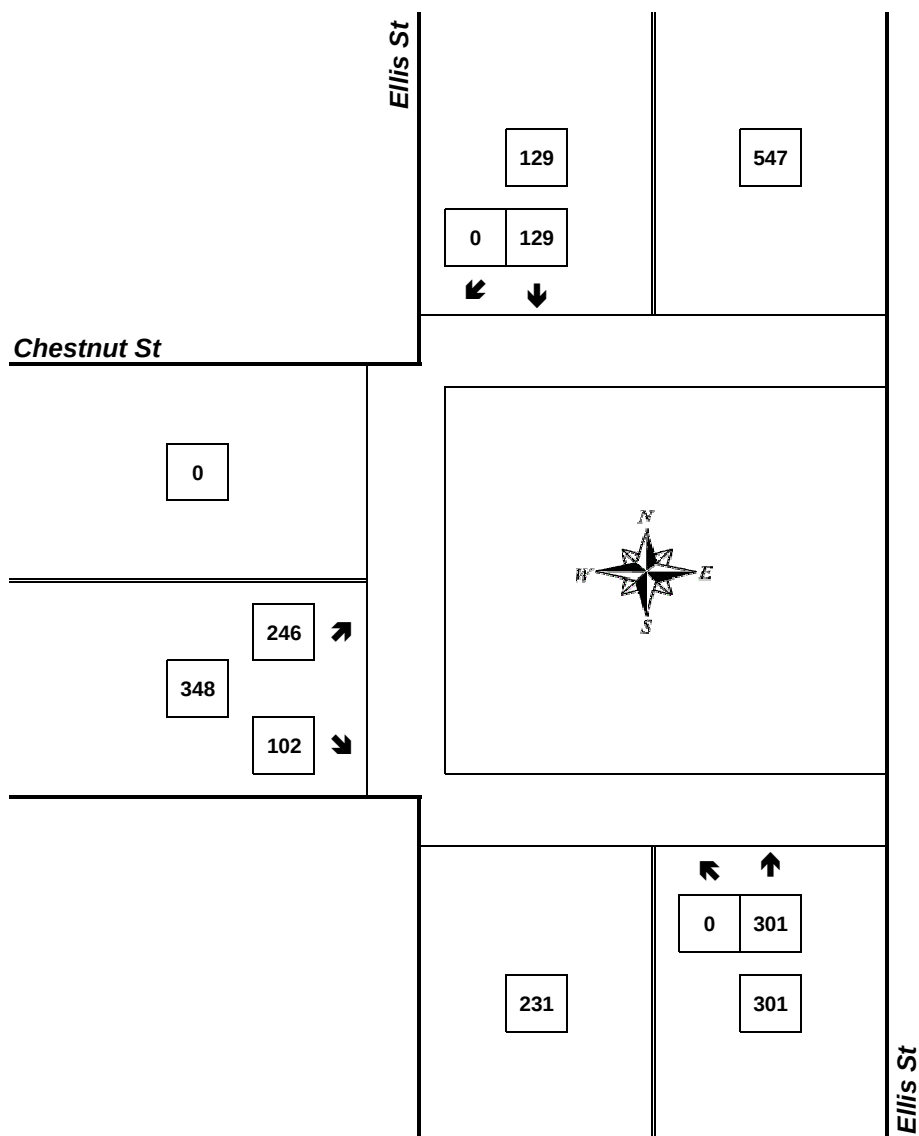


Mark Skaggs
(206) 251-0300

Ellis St & Chestnut St

7:45 AM to 8:45 AM

Tuesday, April 10, 2007



Approach	PHF	HV%	Volume
EB	0.94	7.5%	348
WB	0.00	0.0%	0
NB	0.72	2.7%	301
SB	0.79	3.9%	129
Intersection	0.82	5.0%	778

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

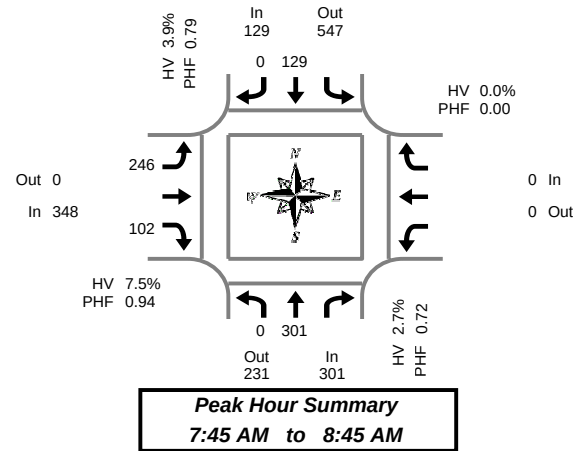


Mark Skaggs
(206) 251-0300

Ellis St & Chestnut St

Tuesday, April 10, 2007

7:00 AM to 9:00 AM



15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Ellis St				Southbound Ellis St				Eastbound Chestnut St				Westbound Chestnut St				Interval Total
	L	T		HV		T	R	HV	L		R	HV					
7:00 AM	0	32		1		10	0	1	27		8	0					77
7:15 AM	0	56		1		21	0	0	37		24	6					138
7:30 AM	0	69		3		25	0	0	61		23	3					178
7:45 AM	0	104		1		41	0	0	67		26	5					238
8:00 AM	0	74		4		30	0	3	64		22	8					190
8:15 AM	0	60		1		29	0	0	59		21	4					169
8:30 AM	0	63		2		29	0	2	56		33	9					181
8:45 AM	0	77		3		30	0	1	68		30	5					205
Total Survey	0	535		16		215	0	7	439		187	40					1,376

Peak Hour Summary

7:45 AM to 8:45 AM

By Approach	Northbound Ellis St				Southbound Ellis St				Eastbound Chestnut St				Westbound Chestnut St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total		
Volume	301	231	532	8	129	547	676	5	348	0	348	26	0	0	0		778
%HV	2.7%				3.9%				7.5%				0.0%				5.0%
PHF	0.72				0.79				0.94				0.00				0.82

By Movement	Northbound Ellis St				Southbound Ellis St				Eastbound Chestnut St				Westbound Chestnut St				Total
	L	T		Total		T	R	Total	L		R	Total				Total	
Volume	0	301		301		129	0	129	246		102	348				0	778
PHF	0.00	0.72		0.72		0.79	0.00	0.79	0.92		0.77	0.94				0.00	0.82

Rolling Hour Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Ellis St				Southbound Ellis St				Eastbound Chestnut St				Westbound Chestnut St				Interval Total
	L	T		HV		T	R	HV	L		R	HV					
7:00 AM	0	261		6		97	0	1	192		81	14					631
7:15 AM	0	303		9		117	0	3	229		95	22					744
7:30 AM	0	307		9		125	0	3	251		92	20					775
7:45 AM	0	301		8		129	0	5	246		102	26					778
8:00 AM	0	274		10		118	0	6	247		106	26					745

Peak Hour Summary

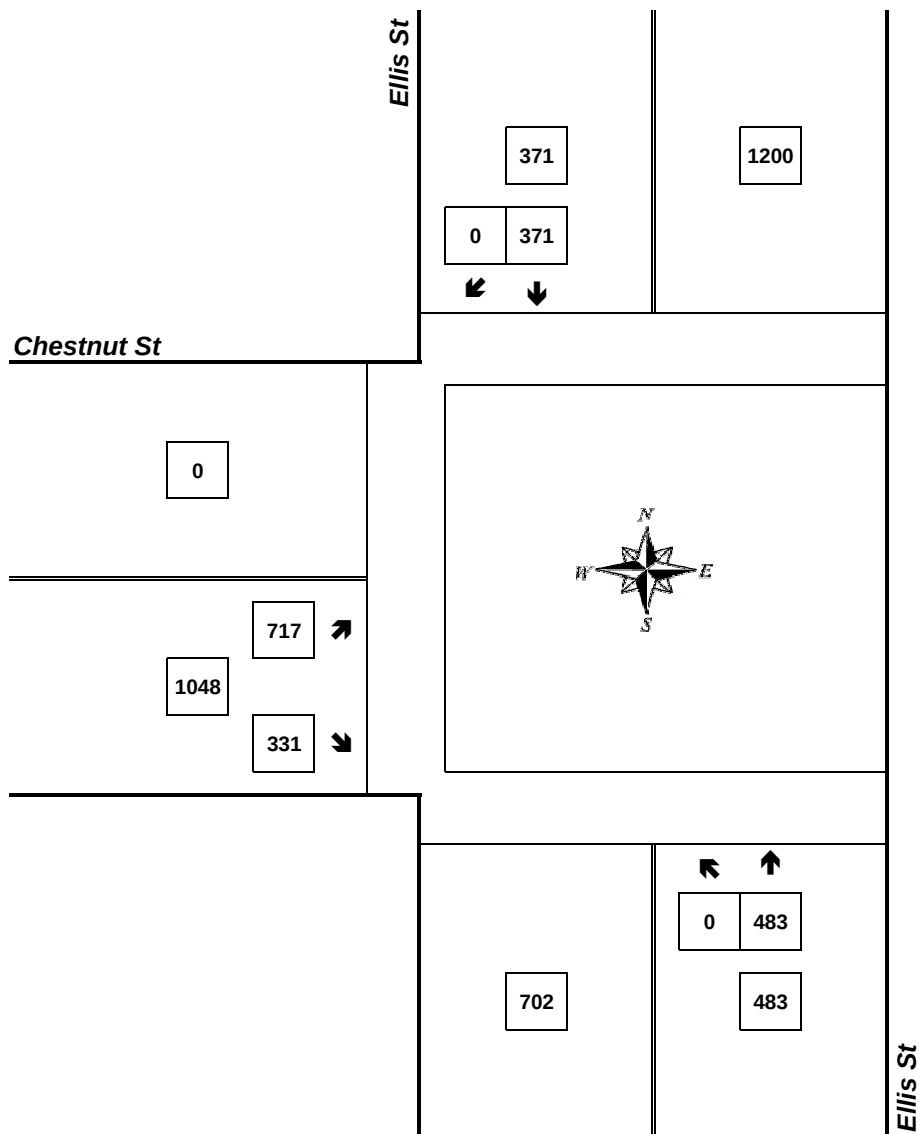


Mark Skaggs
(206) 251-0300

Ellis St & Chestnut St

4:30 PM to 5:30 PM

Tuesday, April 10, 2007



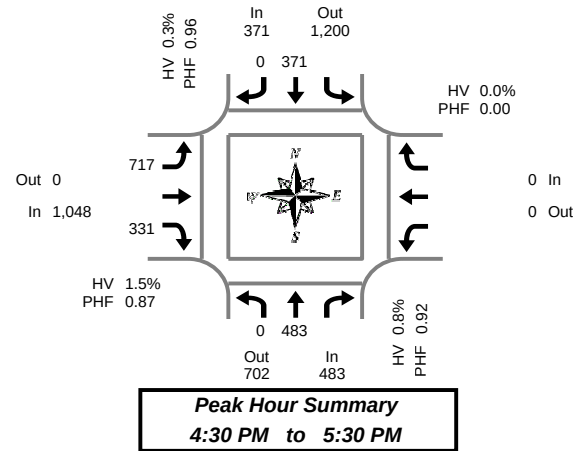
Approach	PHF	HV%	Volume
EB	0.87	1.5%	1,048
WB	0.00	0.0%	0
NB	0.92	0.8%	483
SB	0.96	0.3%	371
Intersection	0.93	1.1%	1,902

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



Ellis St & Chestnut St

Tuesday, April 10, 2007

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Ellis St			Southbound Ellis St			Eastbound Chestnut St			Westbound Chestnut St			Interval Total
	L	T	HV	T	R	HV	L	R	HV				
4:00 PM	0	99	0	71	0	1	188	59	4				417
4:15 PM	0	123	3	83	0	1	147	57	1				410
4:30 PM	0	110	1	94	0	1	186	65	5				455
4:45 PM	0	131	1	97	0	0	149	82	2				459
5:00 PM	0	122	2	89	0	0	197	104	3				512
5:15 PM	0	120	0	91	0	0	185	80	6				476
5:30 PM	0	126	1	88	0	0	140	80	3				434
5:45 PM	0	116	1	92	0	0	125	69	4				402
Total Survey	0	947	9	705	0	3	1,317	596	28				3,565

Peak Hour Summary

4:30 PM to 5:30 PM

By Approach	Northbound Ellis St			Southbound Ellis St			Eastbound Chestnut St			Westbound Chestnut St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	483	702	1,185	371	1,200	1,571	1,048	0	1,048	0	0	0	1,902
%HV	0.8%			0.3%			1.5%			0.0%			1.1%
PHF	0.92			0.96			0.87			0.00			0.93

By Movement	Northbound Ellis St			Southbound Ellis St			Eastbound Chestnut St			Westbound Chestnut St			Total
	L	T	Total	T	R	Total	L	R	Total			Total	
Volume	0	483	483	371	0	371	717	331	1,048			0	1,902
PHF	0.00	0.92	0.92	0.96	0.00	0.96	0.91	0.80	0.87			0.00	0.93

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Ellis St			Southbound Ellis St			Eastbound Chestnut St			Westbound Chestnut St			Interval Total
	L	T	HV	T	R	HV	L	R	HV				
4:00 PM	0	463	5	345	0	3	670	263	12				1,741
4:15 PM	0	486	7	363	0	2	679	308	11				1,836
4:30 PM	0	483	4	371	0	1	717	331	16				1,902
4:45 PM	0	499	4	365	0	0	671	346	14				1,881
5:00 PM	0	484	4	360	0	0	647	333	16				1,824

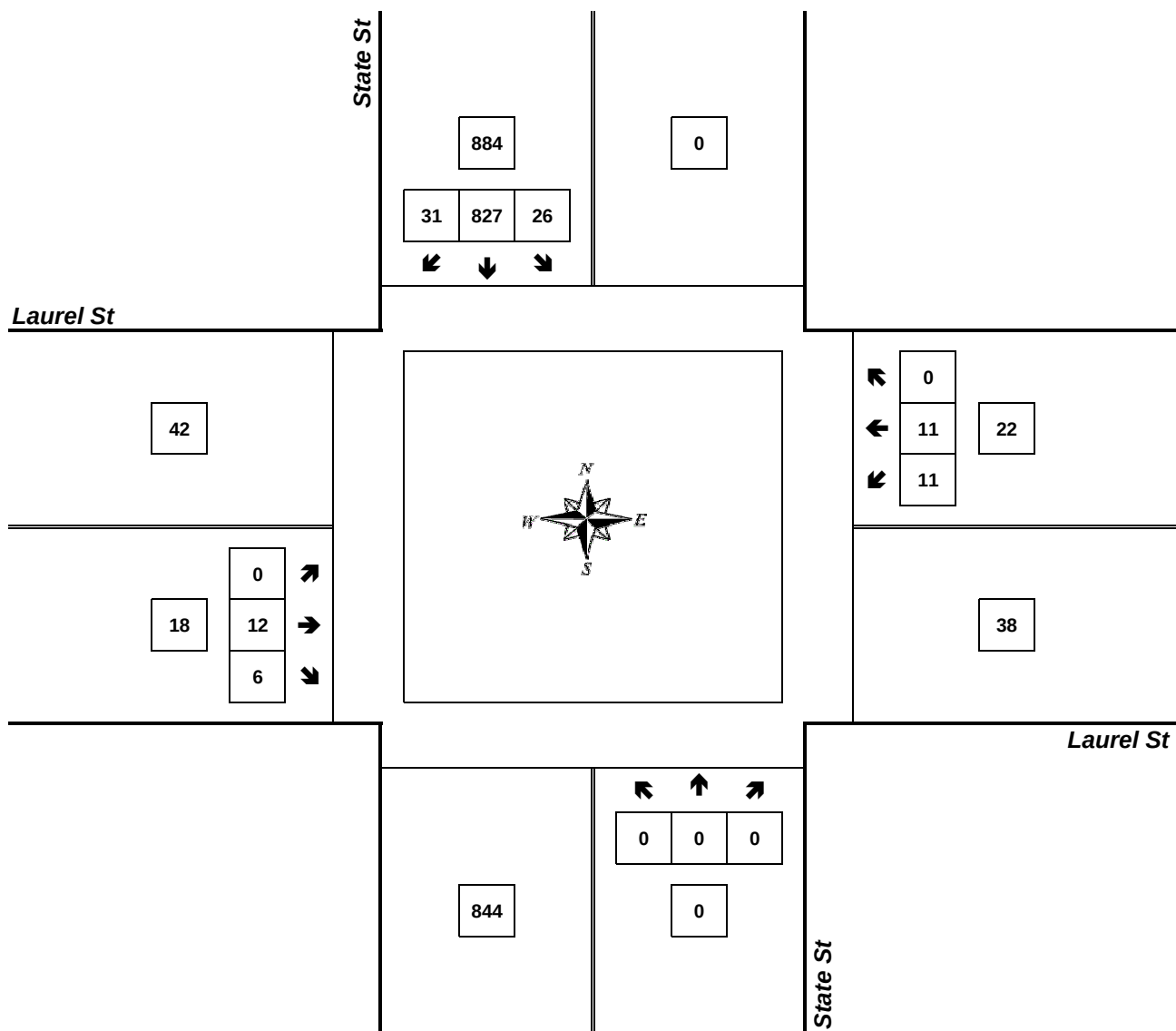
Peak Hour Summary



Mark Skaggs
(206) 251-0300

State St & Laurel St

5:00 PM to 6:00 PM
Wednesday, April 11, 2007



Approach	PHF	HV%	Volume
EB	0.64	0.0%	18
WB	0.92	0.0%	22
NB	0.00	0.0%	0
SB	0.89	0.9%	884
Intersection	0.90	0.9%	924

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

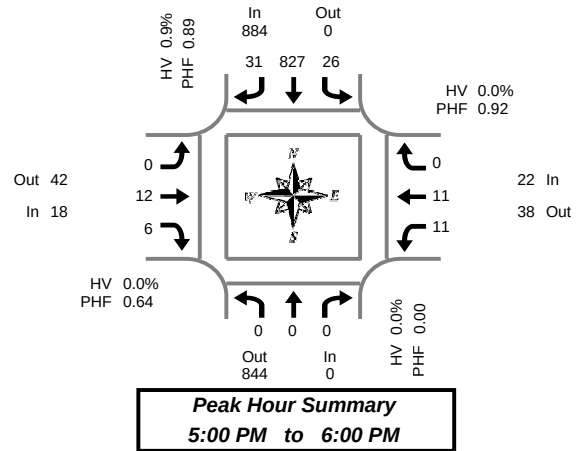


Mark Skaggs
(206) 251-0300

State St & Laurel St

Wednesday, April 11, 2007

4:00 PM to 6:00 PM



15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound State St				Southbound State St				Eastbound Laurel St				Westbound Laurel St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	0	0	0	4	152	6	2	0	4	1	0	1	0	0	0	168
4:15 PM	0	0	0	0	7	174	10	6	0	5	0	0	7	0	0	0	203
4:30 PM	0	0	0	0	8	159	3	2	0	3	1	0	4	3	0	0	181
4:45 PM	0	0	0	0	10	184	3	1	0	5	1	0	7	2	0	0	212
5:00 PM	0	0	0	0	8	235	6	4	0	1	2	0	1	4	0	0	257
5:15 PM	0	0	0	0	7	226	6	2	0	1	2	0	4	2	0	0	248
5:30 PM	0	0	0	0	5	179	8	1	0	4	1	0	2	3	0	0	202
5:45 PM	0	0	0	0	6	187	11	1	0	6	1	0	4	2	0	0	217
Total Survey	0	0	0	0	55	1,496	53	19	0	29	9	0	30	16	0	0	1,688

Peak Hour Summary

5:00 PM to 6:00 PM

By Approach	Northbound State St				Southbound State St				Eastbound Laurel St				Westbound Laurel St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	0	844	844	0	884	0	884	8	18	42	60	0	22	38	60	0	924
%HV	0.0%				0.9%				0.0%				0.0%				0.9%
PHF	0.00				0.89				0.64				0.92				0.90

By Movement	Northbound State St				Southbound State St				Eastbound Laurel St				Westbound Laurel St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	26	827	31	884	0	12	6	18	11	11	0	22	924
PHF	0.00	0.00	0.00	0.00	0.81	0.88	0.70	0.89	0.00	0.50	0.75	0.64	0.69	0.69	0.00	0.92	0.90

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound State St				Southbound State St				Eastbound Laurel St				Westbound Laurel St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	0	0	0	29	669	22	11	0	17	3	0	19	5	0	0	764
4:15 PM	0	0	0	0	33	752	22	13	0	14	4	0	19	9	0	0	853
4:30 PM	0	0	0	0	33	804	18	9	0	10	6	0	16	11	0	0	898
4:45 PM	0	0	0	0	30	824	23	8	0	11	6	0	14	11	0	0	919
5:00 PM	0	0	0	0	26	827	31	8	0	12	6	0	11	11	0	0	924

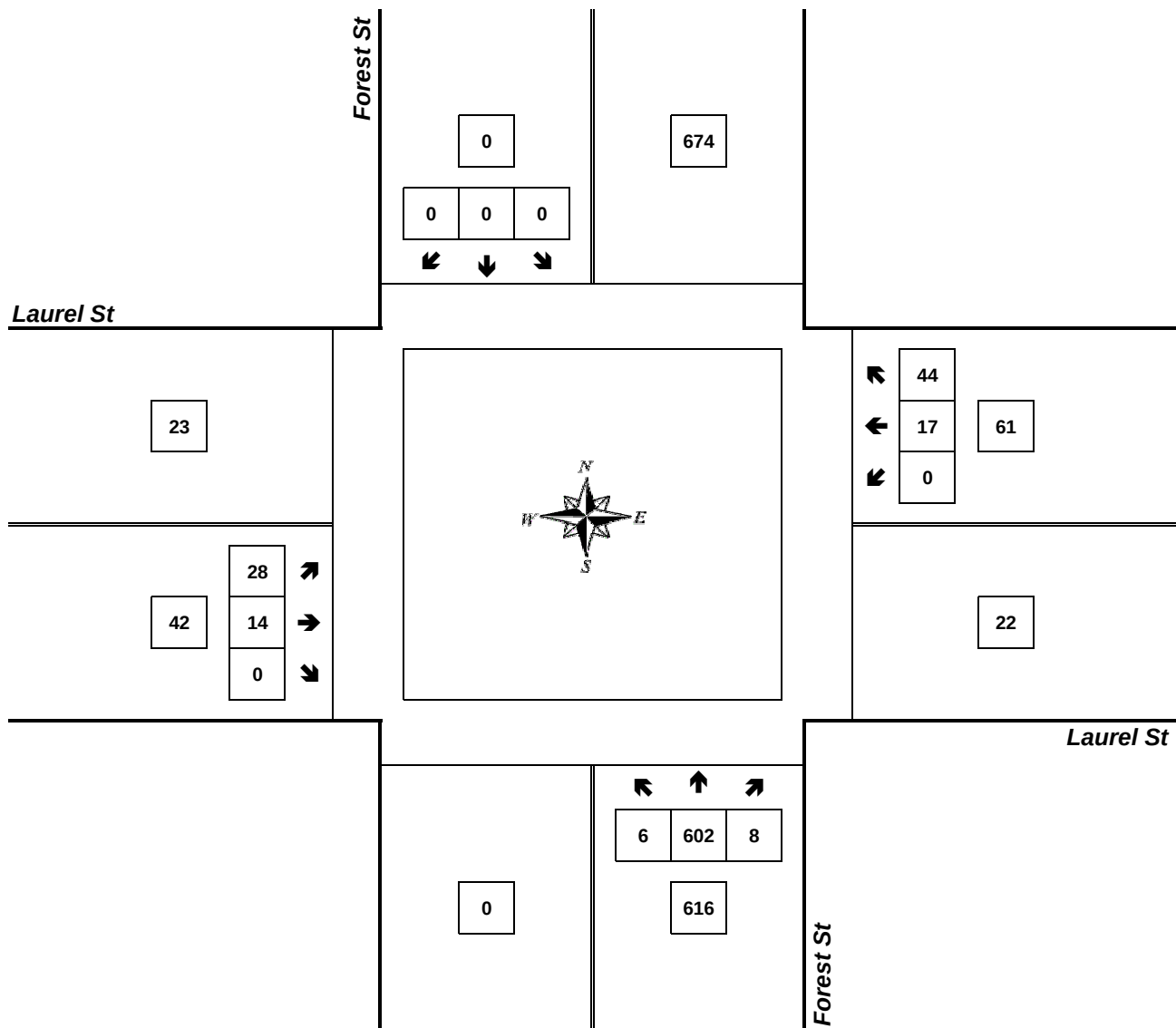
Peak Hour Summary



Mark Skaggs
(206) 251-0300

Forest St & Laurel St

4:45 PM to 5:45 PM
Wednesday, April 11, 2007



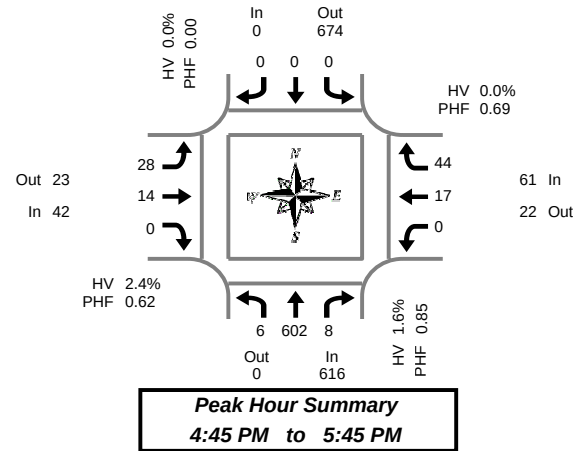
Approach	PHF	HV%	Volume
EB	0.62	2.4%	42
WB	0.69	0.0%	61
NB	0.85	1.6%	616
SB	0.00	0.0%	0
Intersection	0.84	1.5%	719

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



Forest St & Laurel St

Wednesday, April 11, 2007

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Forest St				Southbound Forest St				Eastbound Laurel St				Westbound Laurel St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	1	149	1	0	0	0	0	0	7	0	0	0	0	0	15	0	173
4:15 PM	1	130	2	2	0	0	0	0	7	4	0	1	0	5	15	0	164
4:30 PM	0	129	2	1	0	0	0	0	8	4	0	0	0	5	14	0	162
4:45 PM	0	179	2	4	0	0	0	0	13	4	0	0	0	7	8	0	213
5:00 PM	1	139	2	1	0	0	0	0	5	3	0	1	0	4	18	0	172
5:15 PM	1	144	1	3	0	0	0	0	6	2	0	0	0	5	9	0	168
5:30 PM	4	140	3	2	0	0	0	0	4	5	0	0	0	1	9	0	166
5:45 PM	2	132	0	3	0	0	0	0	10	2	0	0	0	3	5	0	154
Total Survey	10	1,142	13	16	0	0	0	0	60	24	0	2	0	30	93	0	1,372

Peak Hour Summary

4:45 PM to 5:45 PM

By Approach	Northbound Forest St				Southbound Forest St				Eastbound Laurel St				Westbound Laurel St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	616	0	616	10	0	674	674	0	42	23	65	1	61	22	83	0	719
%HV	1.6%				0.0%				2.4%				0.0%				1.5%
PHF	0.85				0.00				0.62				0.69				0.84

By Movement	Northbound Forest St				Southbound Forest St				Eastbound Laurel St				Westbound Laurel St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	6	602	8	616	0	0	0	0	28	14	0	42	0	17	44	61	719
PHF	0.38	0.84	0.67	0.85	0.00	0.00	0.00	0.00	0.54	0.70	0.00	0.62	0.00	0.61	0.61	0.69	0.84

Rolling Hour Summary

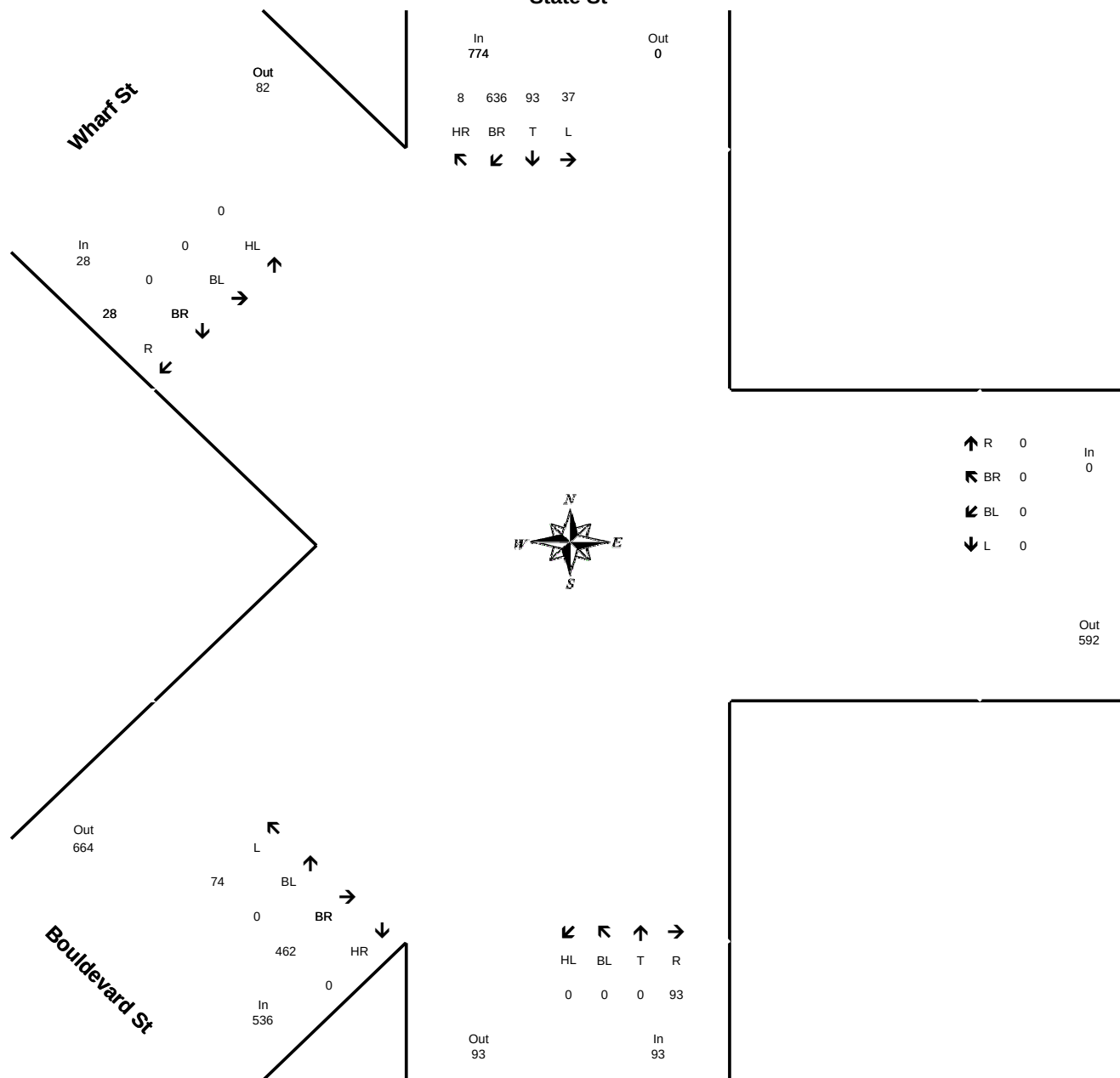
4:00 PM to 6:00 PM

Interval Start Time	Northbound Forest St				Southbound Forest St				Eastbound Laurel St				Westbound Laurel St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	2	587	7	7	0	0	0	0	35	12	0	1	0	17	52	0	712
4:15 PM	2	577	8	8	0	0	0	0	33	15	0	2	0	21	55	0	711
4:30 PM	2	591	7	9	0	0	0	0	32	13	0	1	0	21	49	0	715
4:45 PM	6	602	8	10	0	0	0	0	28	14	0	1	0	17	44	0	719
5:00 PM	8	555	6	9	0	0	0	0	25	12	0	1	0	13	41	0	660

All Traffic Data
Services Inc.

State St & Ivy St & Boulevard St & Wharf St

State St



State St

	Intersection	NB	SB	WB	NEB	SEB
Volume	1,431	93	774	0	536	28
HV%	0.7%	4.3%	0.6%	0.0%	0.2%	0.0%
PHF	0.93	0.93	0.87	0.00	0.85	0.88

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



State St & Ivy St & Boulevard St & Wharf St

Wednesday, April 11, 2007

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound State St					Southbound State St					Westbound Ivy St					Northeastbound Boulevard St					Southeastbound Wharf St					Interval Total	
	HL	BL	T	R	HV	L	T	BR	HR	HV	L	BL	BR	R	HV	L	BL	BR	HR	HV	HL	BL	BR	R	HV		
16:00	0	0	0	24	1	4	16	125	0	2	0	0	0	0	0	18	0	118	0	0	0	0	0	0	7	0	312
16:15	0	0	0	18	1	3	22	142	0	2	0	0	0	0	0	15	0	110	0	0	0	0	0	0	6	0	316
16:30	0	0	0	26	1	7	17	120	0	0	0	0	0	0	0	16	0	95	0	0	0	0	0	0	10	0	291
16:45	0	0	0	24	1	6	22	143	1	2	0	0	0	0	0	17	0	140	0	1	0	0	0	0	6	0	359
17:00	0	0	0	25	1	15	25	182	1	2	0	0	0	0	0	22	0	107	0	0	0	0	0	0	8	0	385
17:15	0	0	0	22	1	9	28	166	3	1	0	0	0	0	0	24	0	103	0	0	0	0	0	0	6	0	361
17:30	0	0	0	22	1	7	18	145	3	0	0	0	0	0	0	11	0	112	0	0	0	0	0	0	8	0	326
17:45	0	0	0	20	2	10	25	156	3	2	0	0	0	0	0	23	0	106	0	1	0	0	0	0	7	0	350
Total Survey	0	0	0	181	9	61	173	1,179	11	11	0	0	0	0	0	146	0	891	0	2	0	0	0	0	58	0	2,700

Peak Hour Summary

4:45 PM to 5:45 PM

By Approach	Northbound State St				HV	Southbound State St				HV	Westbound Ivy St				HV	Northeastbound Boulevard St				HV	Southeastbound Wharf St				Total
	Approach					Approach					Approach					Approach					Approach				
In	93				4	774				5	0				0	536				1	28				1,431
Out	93					0					592					664					82				
Total	186					774					592					1,200					110				
%HV	4.3%					0.6%					0.0%					0.2%					0.0%				0.7%
PHF	0.93					0.87					0.00					0.85					0.88				0.93

By Movement	Northbound State St					Southbound State St					Westbound Ivy St					Northeastbound Boulevard St					Southeastbound Wharf St					Total
	HL	BL	T	R	Total	L	T	BR	HR	Total	L	BL	BR	R	Total	L	BL	BR	HR	Total	HL	BL	BR	R	Total	
Volume	0	0	0	93	93	37	93	636	8	774	0	0	0	0	0	74	0	462	0	536	0	0	0	28	28	1,431
PHF	0.00	0.00	0.00	0.93	0.93	0.62	0.83	0.87	0.67	0.87	0.00	0.00	0.00	0.00	0.00	0.77	0.00	0.83	0.00	0.85	0.00	0.00	0.00	0.88	0.88	0.93

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound State St					Southbound State St					Westbound Ivy St					Northeastbound Boulevard St					Southeastbound Wharf St					Interval Total
	HL	BL	T	R	HV	L	T	BR	HR	HV	L	BL	BR	R	HV	L	BL	BR	HR	HV	HL	BL	BR	R	HV	
16:00	0	0	0	92	4	20	77	530	1	6	0	0	0	0	0	66	0	463	0	1	0	0	0	29	0	1,278
16:15	0	0	0	93	4	31	86	587	2	6	0	0	0	0	0	70	0	452	0	1	0	0	0	30	0	1,351
16:30	0	0	0	97	4	37	92	611	5	5	0	0	0	0	0	79	0	445	0	1	0	0	0	30	0	1,396
16:45	0	0	0	93	4	37	93	636	8	5	0	0	0	0	0	74	0	462	0	1	0	0	0	28	0	1,431
17:00	0	0	0	89	5	41	96	649	10	5	0	0	0	0	0	80	0	428	0	1	0	0	0	29	0	1,422

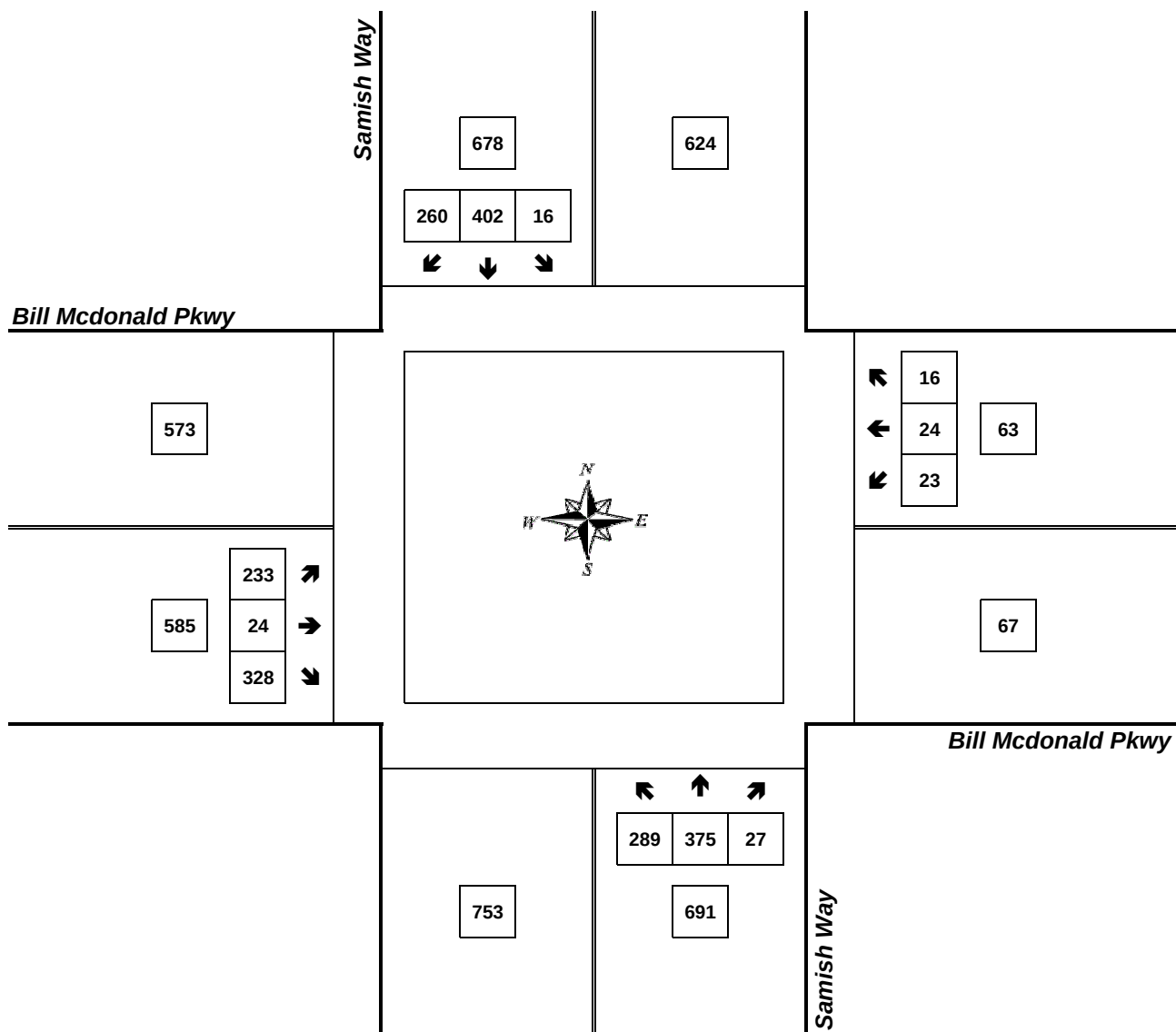
Peak Hour Summary



Mark Skaggs
(206) 251-0300

Samish Way & Bill McDonald Pkwy

4:45 PM to 5:45 PM
Wednesday, April 11, 2007



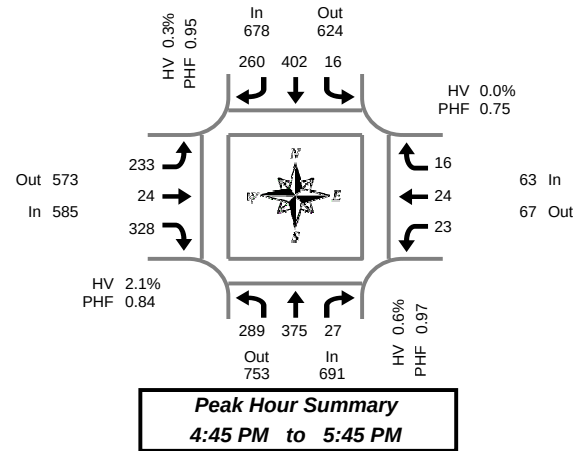
Approach	PHF	HV%	Volume
EB	0.84	2.1%	585
WB	0.75	0.0%	63
NB	0.97	0.6%	691
SB	0.95	0.3%	678
Intersection	0.97	0.9%	2,017

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



Samish Way & Bill McDonald Pkwy

Wednesday, April 11, 2007

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Samish Way				Southbound Samish Way				Eastbound Bill McDonald Pkwy				Westbound Bill McDonald Pkwy				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	72	60	7	5	3	97	50	3	54	2	133	1	5	1	1	0	485
4:15 PM	86	57	4	0	1	74	60	2	60	1	89	6	6	9	3	0	450
4:30 PM	86	80	6	5	1	91	61	1	62	1	91	3	2	3	3	0	487
4:45 PM	76	86	7	1	3	105	65	0	55	3	77	3	2	3	2	0	484
5:00 PM	61	97	7	1	6	96	77	1	55	6	87	3	6	7	5	0	510
5:15 PM	72	99	8	0	4	112	62	1	54	6	67	5	6	10	5	0	505
5:30 PM	80	93	5	2	3	89	56	0	69	9	97	1	9	4	4	0	518
5:45 PM	73	81	8	1	2	80	57	0	57	0	87	2	8	6	1	0	460
Total Survey	606	653	52	15	23	744	488	8	466	28	728	24	44	43	24	0	3,899

Peak Hour Summary

4:45 PM to 5:45 PM

By Approach	Northbound Samish Way				Southbound Samish Way				Eastbound Bill McDonald Pkwy				Westbound Bill McDonald Pkwy				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	691	753	1,444	4	678	624	1,302	2	585	573	1,158	12	63	67	130	0	2,017
%HV	0.6%				0.3%				2.1%				0.0%				0.9%
PHF	0.97				0.95				0.84				0.75				0.97

By Movement	Northbound Samish Way				Southbound Samish Way				Eastbound Bill McDonald Pkwy				Westbound Bill McDonald Pkwy				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	289	375	27	691	16	402	260	678	233	24	328	585	23	24	16	63	2,017
PHF	0.90	0.95	0.84	0.97	0.67	0.90	0.84	0.95	0.84	0.67	0.85	0.84	0.64	0.60	0.80	0.75	0.97

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Samish Way				Southbound Samish Way				Eastbound Bill McDonald Pkwy				Westbound Bill McDonald Pkwy				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	320	283	24	11	8	367	236	6	231	7	390	13	15	16	9	0	1,906
4:15 PM	309	320	24	7	11	366	263	4	232	11	344	15	16	22	13	0	1,931
4:30 PM	295	362	28	7	14	404	265	3	226	16	322	14	16	23	15	0	1,986
4:45 PM	289	375	27	4	16	402	260	2	233	24	328	12	23	24	16	0	2,017
5:00 PM	286	370	28	4	15	377	252	2	235	21	338	11	29	27	15	0	1,993

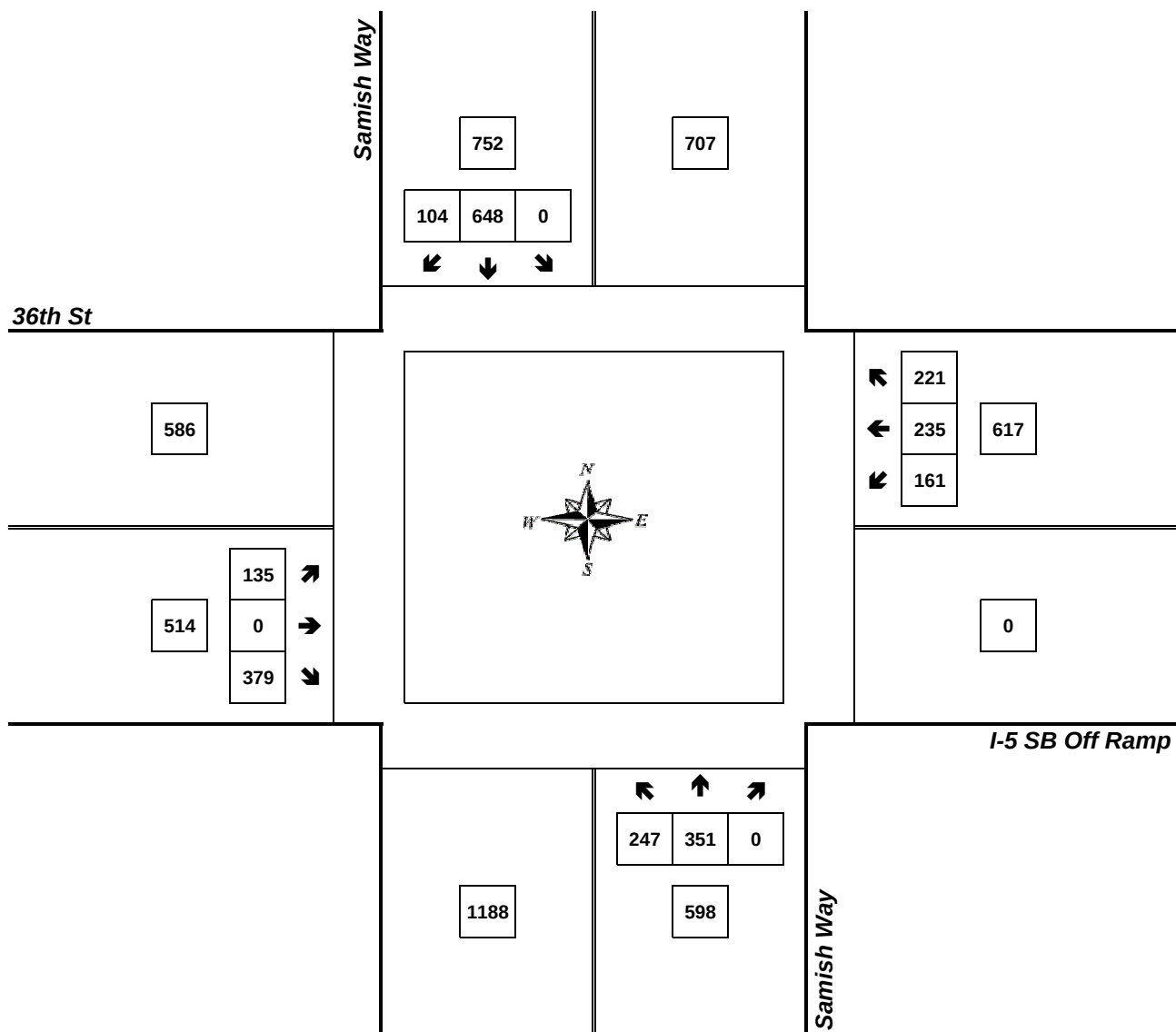
Peak Hour Summary



Mark Skaggs
(206) 251-0300

Samish Way & I-5 SB Off Ramp

5:00 PM to 6:00 PM
Wednesday, April 11, 2007



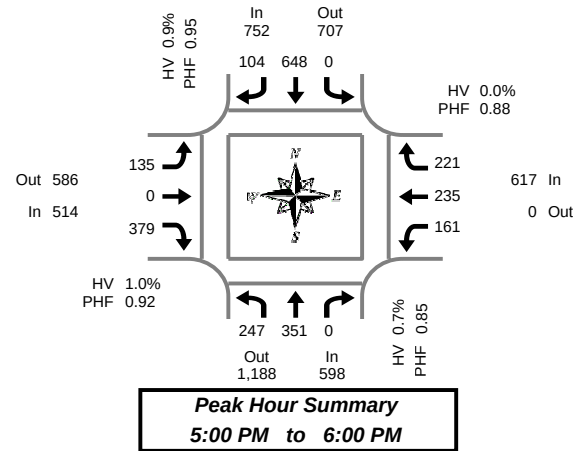
Approach	PHF	HV%	Volume
EB	0.92	1.0%	514
WB	0.88	0.0%	617
NB	0.85	0.7%	598
SB	0.95	0.9%	752
Intersection	0.95	0.6%	2,481

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



Samish Way & I-5 SB Off Ramp

Wednesday, April 11, 2007

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Samish Way				Southbound Samish Way				Eastbound 36th St				Westbound I-5 SB Off Ramp				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	60	77	0	3	0	207	27	4	14	0	68	0	37	48	47	3	585
4:15 PM	67	73	0	0	0	149	27	4	29	0	89	1	30	52	59	4	575
4:30 PM	60	85	0	2	0	147	27	3	23	0	93	3	23	57	63	2	578
4:45 PM	43	78	0	1	0	153	18	3	29	0	74	1	28	66	44	0	533
5:00 PM	55	81	0	1	0	148	39	2	37	0	81	0	39	64	41	0	585
5:15 PM	61	81	0	1	0	175	23	3	34	0	106	0	41	67	67	0	655
5:30 PM	68	107	0	1	0	167	17	0	36	0	104	2	44	53	48	0	644
5:45 PM	63	82	0	1	0	158	25	2	28	0	88	3	37	51	65	0	597
Total Survey	477	664	0	10	0	1,304	203	21	230	0	703	10	279	458	434	9	4,752

Peak Hour Summary

5:00 PM to 6:00 PM

By Approach	Northbound Samish Way				Southbound Samish Way				Eastbound 36th St				Westbound I-5 SB Off Ramp				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	598	1,188	1,786	4	752	707	1,459	7	514	586	1,100	5	617	0	617	0	2,481
%HV	0.7%				0.9%				1.0%				0.0%				0.6%
PHF	0.85				0.95				0.92				0.88				0.95

By Movement	Northbound Samish Way				Southbound Samish Way				Eastbound 36th St				Westbound I-5 SB Off Ramp				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	247	351	0	598	0	648	104	752	135	0	379	514	161	235	221	617	2,481
PHF	0.91	0.82	0.00	0.85	0.00	0.93	0.67	0.95	0.91	0.00	0.89	0.92	0.91	0.88	0.82	0.88	0.95

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Samish Way				Southbound Samish Way				Eastbound 36th St				Westbound I-5 SB Off Ramp				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	230	313	0	6	0	656	99	14	95	0	324	5	118	223	213	9	2,271
4:15 PM	225	317	0	4	0	597	111	12	118	0	337	5	120	239	207	6	2,271
4:30 PM	219	325	0	5	0	623	107	11	123	0	354	4	131	254	215	2	2,351
4:45 PM	227	347	0	4	0	643	97	8	136	0	365	3	152	250	200	0	2,417
5:00 PM	247	351	0	4	0	648	104	7	135	0	379	5	161	235	221	0	2,481

Peak Hour Summary

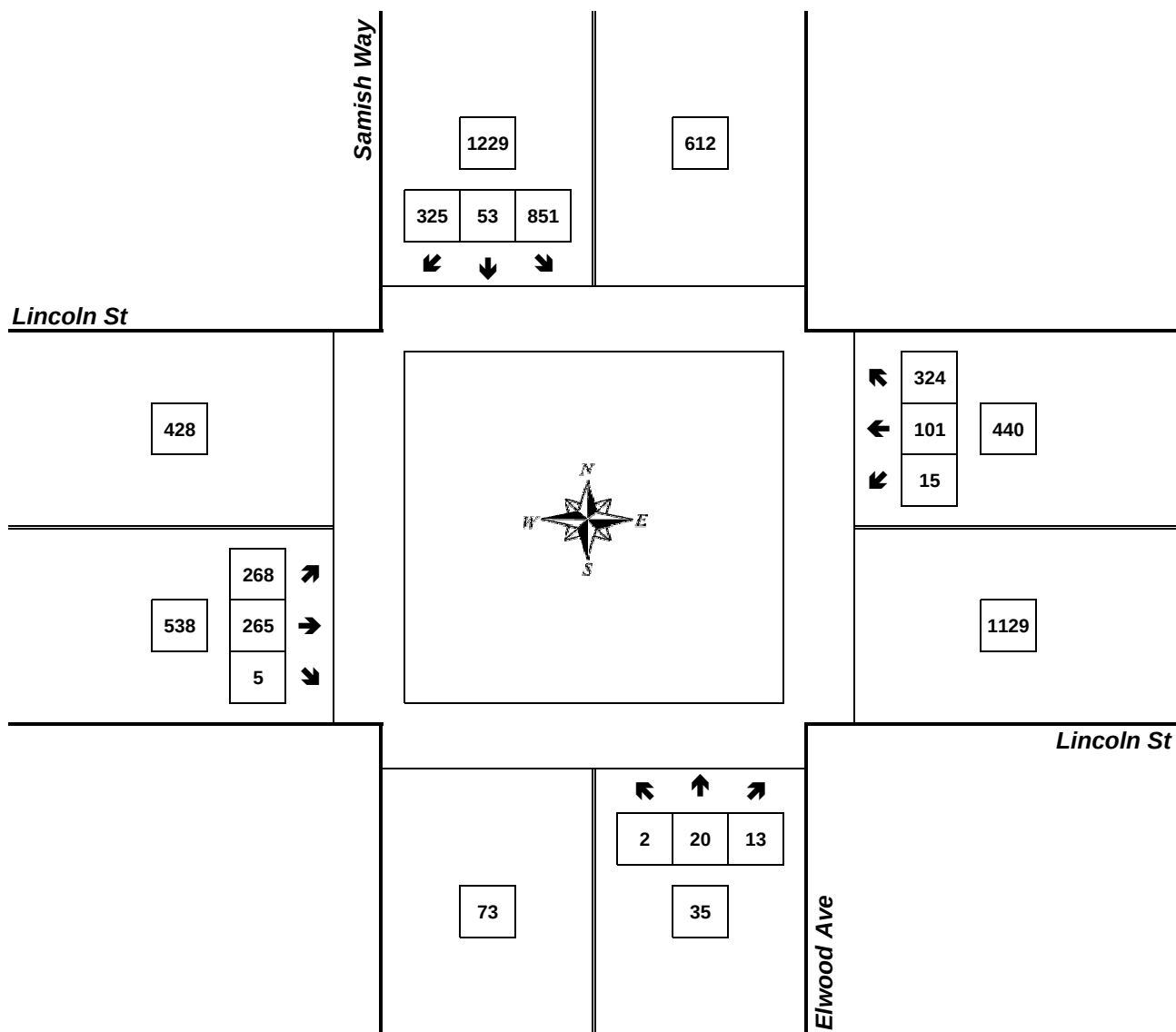


Mark Skaggs
(206) 251-0300

Samish Way & Lincoln St

5:00 PM to 6:00 PM

Wednesday, April 11, 2007



Approach	PHF	HV%	Volume
EB	0.96	0.6%	538
WB	0.87	1.4%	440
NB	0.73	2.9%	35
SB	0.93	1.0%	1,229
Intersection	0.95	1.0%	2,242

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

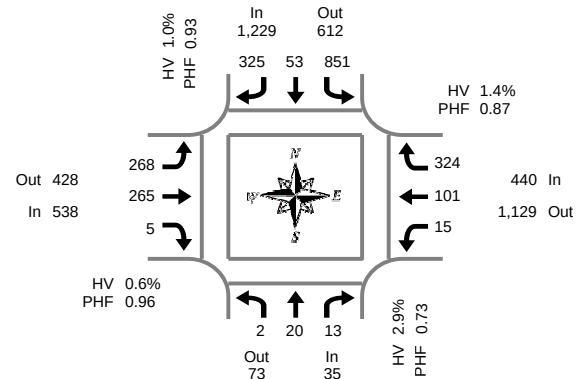


Mark Skaggs
(206) 251-0300

Samish Way & Lincoln St

Wednesday, April 11, 2007

4:00 PM to 6:00 PM



Peak Hour Summary
5:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Elwood Ave				Southbound Samish Way				Eastbound Lincoln St				Westbound Lincoln St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	7	2	1	206	11	59	4	44	60	1	1	2	22	69	4	483
4:15 PM	0	6	8	2	185	12	53	7	51	54	1	0	2	25	89	1	486
4:30 PM	0	6	6	1	198	8	55	4	54	68	0	2	2	19	74	3	490
4:45 PM	0	10	6	1	206	15	54	4	50	58	1	2	1	28	91	1	520
5:00 PM	1	3	5	0	201	15	67	2	64	73	0	0	2	35	89	1	555
5:15 PM	0	5	2	0	230	15	83	6	64	71	0	0	4	18	71	2	563
5:30 PM	1	4	2	0	228	13	91	1	83	57	0	1	2	27	83	3	591
5:45 PM	0	8	4	1	192	10	84	3	57	64	5	2	7	21	81	0	533
Total Survey	2	49	35	6	1,646	99	546	31	467	505	8	8	22	195	647	15	4,221

Peak Hour Summary

5:00 PM to 6:00 PM

By Approach	Northbound Elwood Ave				Southbound Samish Way				Eastbound Lincoln St				Westbound Lincoln St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	35	73	108	1	1,229	612	1,841	12	538	428	966	3	440	1,129	1,569	6	2,242
%HV	2.9%				1.0%				0.6%				1.4%				1.0%
PHF	0.73				0.93				0.96				0.87				0.95

By Movement	Northbound Elwood Ave				Southbound Samish Way				Eastbound Lincoln St				Westbound Lincoln St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	2	20	13	35	851	53	325	1,229	268	265	5	538	15	101	324	440	2,242
PHF	0.50	0.63	0.65	0.73	0.93	0.88	0.89	0.93	0.81	0.91	0.25	0.96	0.54	0.72	0.91	0.87	0.95

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Elwood Ave				Southbound Samish Way				Eastbound Lincoln St				Westbound Lincoln St				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	29	22	5	795	46	221	19	199	240	3	5	7	94	323	9	1,979
4:15 PM	1	25	25	4	790	50	229	17	219	253	2	4	7	107	343	6	2,051
4:30 PM	1	24	19	2	835	53	259	16	232	270	1	4	9	100	325	7	2,128
4:45 PM	2	22	15	1	865	58	295	13	261	259	1	3	9	108	334	7	2,229
5:00 PM	2	20	13	1	851	53	325	12	268	265	5	3	15	101	324	6	2,242

All Traffic Data
Services Inc.

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

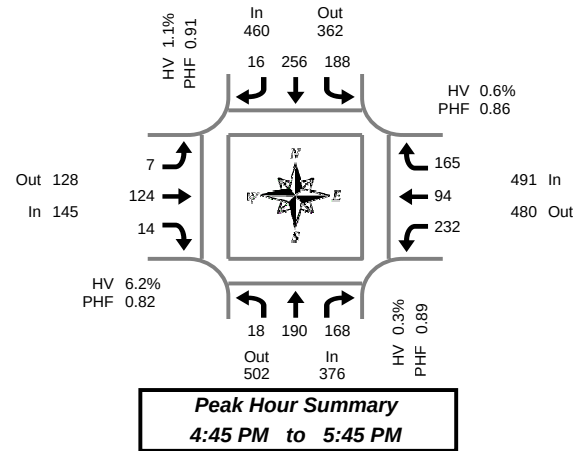


Mark Skaggs
(206) 251-0300

12th St & Old Fairhaven

Wednesday, April 11, 2007

4:00 PM to 6:00 PM



Peak Hour Summary
4:45 PM to 5:45 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound 12th St				Southbound 12th St				Eastbound Old Fairhaven				Westbound Old Fairhaven				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	40	25	1	65	38	4	2	1	25	0	0	43	12	43	1	296
4:15 PM	2	40	51	0	52	54	3	2	2	23	3	3	38	28	58	3	354
4:30 PM	0	47	42	1	56	51	2	2	0	54	4	2	35	32	34	33	357
4:45 PM	5	54	35	0	39	60	5	2	1	25	4	1	56	23	39	0	346
5:00 PM	3	48	55	0	55	51	5	1	0	29	7	4	65	27	51	0	396
5:15 PM	6	29	39	1	49	69	1	1	4	29	2	2	71	24	39	3	362
5:30 PM	4	59	39	0	45	76	5	1	2	41	1	2	40	20	36	0	368
5:45 PM	0	39	37	0	62	48	4	1	1	10	2	1	41	17	36	3	297
Total Survey	20	356	323	3	423	447	29	12	11	236	23	15	389	183	336	43	2,776

Peak Hour Summary

4:45 PM to 5:45 PM

By Approach	Northbound 12th St				Southbound 12th St				Eastbound Old Fairhaven				Westbound Old Fairhaven				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	376	502	878	1	460	362	822	5	145	128	273	9	491	480	971	3	1,472
%HV	0.3%				1.1%				6.2%				0.6%				1.2%
PHF	0.89				0.91				0.82				0.86				0.93

By Movement	Northbound 12th St				Southbound 12th St				Eastbound Old Fairhaven				Westbound Old Fairhaven				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	18	190	168	376	188	256	16	460	7	124	14	145	232	94	165	491	1,472
PHF	0.75	0.81	0.76	0.89	0.85	0.84	0.80	0.91	0.44	0.76	0.50	0.82	0.82	0.87	0.81	0.86	0.93

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound 12th St				Southbound 12th St				Eastbound Old Fairhaven				Westbound Old Fairhaven				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	7	181	153	2	212	203	14	8	4	127	11	6	172	95	174	37	1,353
4:15 PM	10	189	183	1	202	216	15	7	3	131	18	10	194	110	182	36	1,453
4:30 PM	14	178	171	2	199	231	13	6	5	137	17	9	227	106	163	36	1,461
4:45 PM	18	190	168	1	188	256	16	5	7	124	14	9	232	94	165	3	1,472
5:00 PM	13	175	170	1	211	244	15	4	7	109	12	9	217	88	162	6	1,423

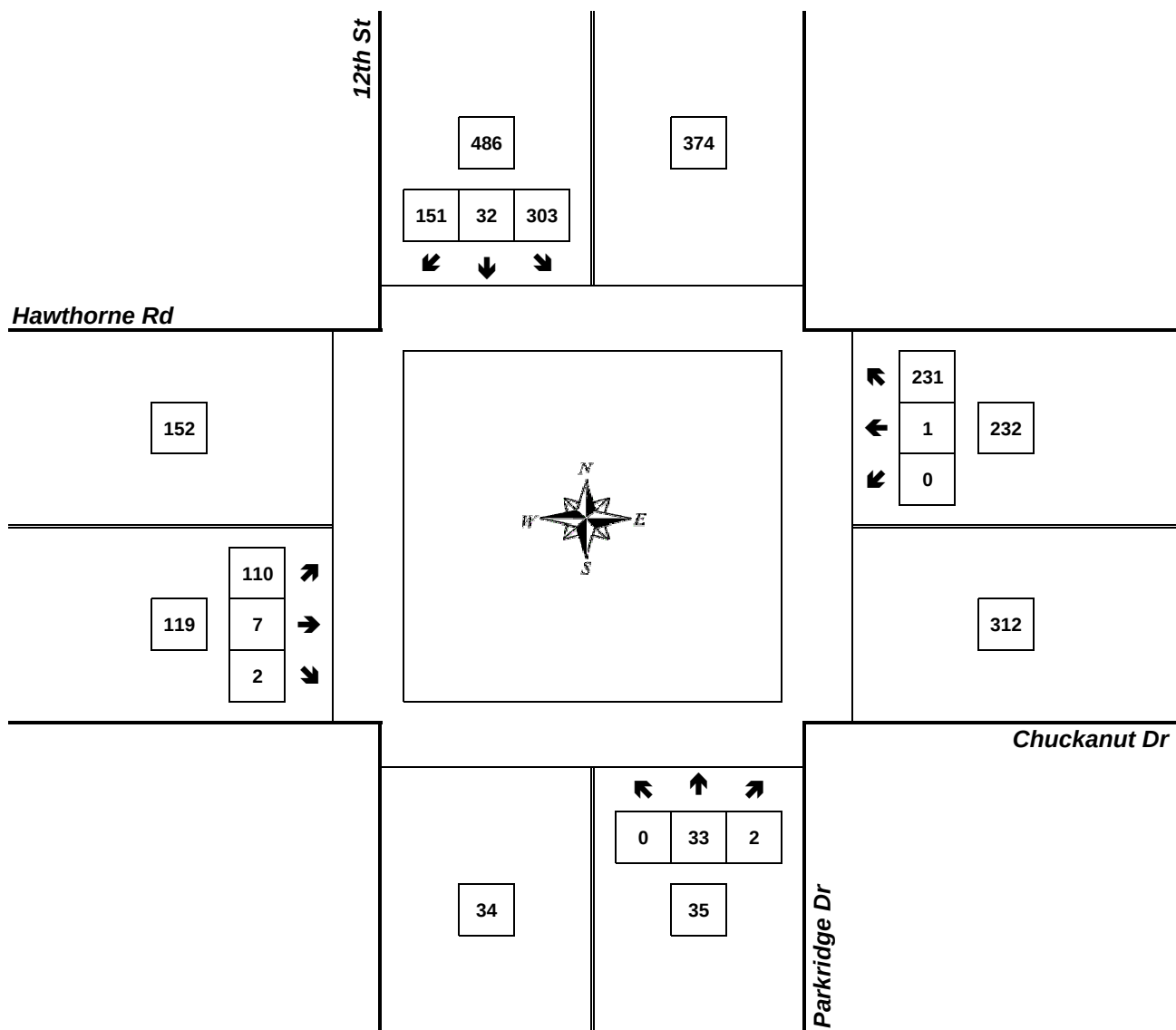
Peak Hour Summary



Mark Skaggs
(206) 251-0300

12th St & Chuckanut Dr

4:45 PM to 5:45 PM
Wednesday, April 11, 2007



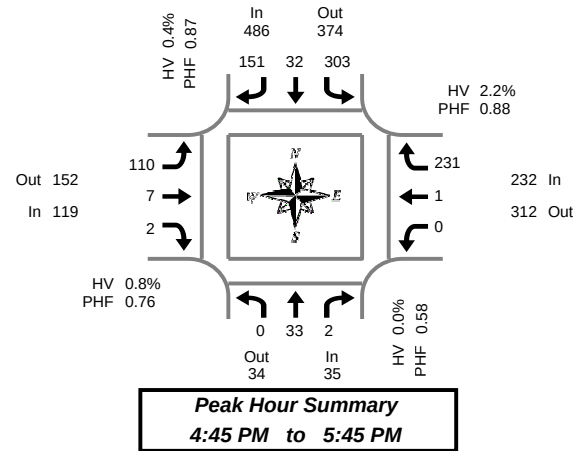
Approach	PHF	HV%	Volume
EB	0.76	0.8%	119
WB	0.88	2.2%	232
NB	0.58	0.0%	35
SB	0.87	0.4%	486
Intersection	0.92	0.9%	872

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



12th St & Chuckanut Dr

Wednesday, April 11, 2007

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Parkridge Dr				Southbound 12th St				Eastbound Hawthorne Rd				Westbound Chuckanut Dr				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	4	3	0	52	3	33	0	21	0	1	0	0	0	40	0	157
4:15 PM	0	4	0	0	60	12	28	2	22	0	0	0	1	1	73	0	201
4:30 PM	0	7	0	0	63	7	34	1	26	0	0	0	0	0	63	1	200
4:45 PM	0	5	0	0	67	9	28	0	20	2	1	0	0	0	62	1	194
5:00 PM	0	7	0	0	79	10	35	0	39	0	0	0	0	1	65	1	236
5:15 PM	0	7	1	0	87	8	45	1	21	3	1	0	0	0	47	1	220
5:30 PM	0	14	1	0	70	5	43	1	30	2	0	1	0	0	57	2	222
5:45 PM	0	3	0	0	38	7	29	0	20	0	1	0	0	1	47	0	146
Total Survey	0	51	5	0	516	61	275	5	199	7	4	1	1	3	454	6	1,576

Peak Hour Summary

4:45 PM to 5:45 PM

By Approach	Northbound Parkridge Dr				Southbound 12th St				Eastbound Hawthorne Rd				Westbound Chuckanut Dr				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	35	34	69	0	486	374	860	2	119	152	271	1	232	312	544	5	872
%HV	0.0%				0.4%				0.8%				2.2%				0.9%
PHF	0.58				0.87				0.76				0.88				0.92

By Movement	Northbound Parkridge Dr				Southbound 12th St				Eastbound Hawthorne Rd				Westbound Chuckanut Dr				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	33	2	35	303	32	151	486	110	7	2	119	0	1	231	232	872
PHF	0.00	0.59	0.50	0.58	0.87	0.80	0.84	0.87	0.71	0.58	0.50	0.76	0.00	0.25	0.89	0.88	0.92

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Parkridge Dr				Southbound 12th St				Eastbound Hawthorne Rd				Westbound Chuckanut Dr				Interval Total
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV	
4:00 PM	0	20	3	0	242	31	123	3	89	2	2	0	1	1	238	2	752
4:15 PM	0	23	0	0	269	38	125	3	107	2	1	0	1	2	263	3	831
4:30 PM	0	26	1	0	296	34	142	2	106	5	2	0	0	1	237	4	850
4:45 PM	0	33	2	0	303	32	151	2	110	7	2	1	0	1	231	5	872
5:00 PM	0	31	2	0	274	30	152	2	110	5	2	1	0	2	216	4	824

Appendix N-3: Intersection Level of Service Worksheets

Timings	Existing (2007) PM Peak Hour
19: Roeder Ave & F St	New Whatcom Redevelopment Project

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR	ø1	ø2
Lane Configurations										
Volume (vph)	185	325	5	195	10	10	10	155		
Turn Type	Perm		Perm		Split			Perm		
Protected Phases		6		6	3	3	5		1	2
Permitted Phases	6		6				5			
Detector Phases	6	6	6	6	3	3	5	5		
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	28.0	28.0	24.0	24.0
Total Split (s)	28.0	28.0	28.0	28.0	24.0	24.0	28.0	28.0	25.0	31.0
Total Split (%)	35.0%	35.0%	35.0%	35.0%	30.0%	30.0%	35.0%	35.0%	31%	39%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	5.0	5.0	1.0	1.0
Lead/Lag	Lag	Lag	Lag	Lag			Lead	Lead	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	None	None	None	None	Min	None
Act Effct Green (s)	25.4	25.4	25.4	25.4	10.7	10.7	16.0	16.0		
Actuated g/C Ratio	0.42	0.42	0.42	0.42	0.18	0.18	0.27	0.27		
v/c Ratio	0.54	0.45	0.02	0.34	0.04	0.06	0.30	0.31		
Control Delay	26.0	18.7	16.2	16.4	23.5	20.2	19.6	6.7		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	26.0	18.7	16.2	16.4	23.5	20.2	19.6	6.7		
LOS	C	B	B	B	C	C	B	A		
Approach Delay		21.3		16.4		21.5	12.6			
Approach LOS		C		B		C	B			

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 60.1

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

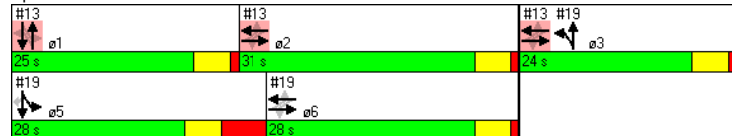
Maximum v/c Ratio: 0.62

Intersection LOS: B

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 19: Roeder Ave & F St



HCM Signalized Intersection Capacity Analysis 19: Roeder Ave & F St	Existing (2007) PM Peak Hour New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.97		1.00	0.95			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.96	1.00
Satd. Flow (prot)	1728	1815		1711	1750		1479	1484			1721	1531
Flt Permitted	0.56	1.00		0.45	1.00		0.95	1.00			0.96	1.00
Satd. Flow (perm)	1013	1815		810	1750		1479	1484			1721	1531
Volume (vph)	185	325	5	5	195	45	10	10	5	120	10	155
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	195	342	5	5	205	47	11	11	5	126	11	163
RTOR Reduction (vph)	0	1	0	0	9	0	0	4	0	0	0	126
Lane Group Flow (vph)	195	346	0	5	243	0	11	12	0	0	137	37
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	18%	18%	18%	2%	2%	2%
Turn Type	Perm			Perm			Split			Split		Perm
Protected Phases		6			6		3	3		5	5	
Permitted Phases	6			6								5
Actuated Green, G (s)	24.4	24.4		24.4	24.4		9.6	9.6			8.9	8.9
Effective Green, g (s)	25.4	25.4		25.4	25.4		10.6	10.6			13.9	13.9
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.17	0.17			0.22	0.22
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			9.0	9.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	416	745		332	718		253	254			386	344
v/s Ratio Prot		0.19			0.14		0.01	c0.01			c0.08	
v/s Ratio Perm	c0.19			0.01								0.02
v/c Ratio	0.47	0.46		0.02	0.34		0.04	0.05			0.35	0.11
Uniform Delay, d1	13.3	13.3		10.8	12.5		21.4	21.4			20.2	19.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			0.90	1.28
Incremental Delay, d2	3.8	2.1		0.1	1.3		0.1	0.1			0.6	0.1
Delay (s)	17.1	15.4		10.9	13.8		21.5	21.5			18.8	24.6
Level of Service	B	B		B	B		C	C			B	C
Approach Delay (s)		16.0			13.7			21.5			21.9	
Approach LOS		B			B			C			C	

Intersection Summary

HCM Average Control Delay	17.2	HCM Level of Service	B

HCM Volume to Capacity ratio	0.32

Actuated Cycle Length (s)	61.9	Sum of lost time (s)	8.0

Intersection Capacity Utilization	47.1%	ICU Level of Service	A

Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
20: Roeder Ave & C St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	475	10	5	205	5	15	5	20	20	10	15
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	11	505	11	5	218	5	16	5	21	21	11	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		735										
pX, platoon unblocked				0.90			0.90	0.90	0.90	0.90	0.90	
vC, conflicting volume	223			516			785	766	511	787	769	221
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	223			465			762	741	459	765	744	221
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			94	98	96	92	97	98
cM capacity (veh/h)	1357			1001			277	309	548	274	308	824
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	527	229	43	48								
Volume Left	11	5	16	21								
Volume Right	11	5	21	16								
cSH	1357	1001	375	364								
Volume to Capacity	0.01	0.01	0.11	0.13								
Queue Length 95th (ft)	1	0	10	11								
Control Delay (s)	0.2	0.3	15.8	16.4								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.2	0.3	15.8	16.4								
Approach LOS			C	C								
Intersection Summary												
Average Delay			1.9									
Intersection Capacity Utilization		40.6%		ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
21: E Chestnut St & Bay St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	WBT	WBR	SBL	SBR						
Lane Configurations												
Sign Control		Free	Free		Stop							
Grade		0%	0%		0%							
Volume (veh/h)	5	515	150	25	305	40						
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98						
Hourly flow rate (vph)	5	526	153	26	311	41						
Pedestrians		10			10							
Lane Width (ft)		11.0			11.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type					None							
Median storage (veh)												
Upstream signal (ft)			356									
pX, platoon unblocked												
vC, conflicting volume	189				712	186						
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	189				712	186						
tC, single (s)	4.1				6.4	6.2						
tC, 2 stage (s)												
tF (s)	2.2				3.5	3.3						
p0 queue free %	100				22	95						
cM capacity (veh/h)	1381				398	848						
Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2							
Volume Total	5	526	179	311	41							
Volume Left	5	0	0	311	0							
Volume Right	0	0	26	0	41							
cSH	1381	1700	1700	398	848							
Volume to Capacity	0.00	0.31	0.11	0.78	0.05							
Queue Length 95th (ft)	0	0	0	167	4							
Control Delay (s)	7.6	0.0	0.0	39.8	9.5							
Lane LOS	A			E	A							
Approach Delay (s)	0.1		0.0	36.3								
Approach LOS				E								
Intersection Summary												
Average Delay			12.1									
Intersection Capacity Utilization			50.7%	ICU Level of Service		A						
Analysis Period (min)			15									

Timings
22: E Chestnut St & Commercial St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations		↕↕	↕	↕
Volume (vph)	15	825	145	85
Turn Type	Perm			
Protected Phases		2	2	
Permitted Phases	2			8
Detector Phases	2	2	2	8
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	26.0	26.0	26.0	19.0
Total Split (s)	26.0	26.0	26.0	19.0
Total Split (%)	57.8%	57.8%	57.8%	42.2%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)		22.0	22.0	15.0
Actuated g/C Ratio		0.49	0.49	0.33
v/c Ratio		0.53	0.20	0.20
Control Delay		9.5	16.5	9.8
Queue Delay		0.0	0.0	0.0
Total Delay		9.5	16.5	9.8
LOS		A	B	A
Approach Delay		9.5	16.5	9.8
Approach LOS		A	B	A

Intersection Summary

Cycle Length: 45
Actuated Cycle Length: 45
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.53
Intersection Signal Delay: 10.6
Intersection LOS: B
Intersection Capacity Utilization 52.6%
ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 22: E Chestnut St & Commercial St



HCM Signalized Intersection Capacity Analysis
22: E Chestnut St & Commercial St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕		↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		0.95	1.00		1.00	
Frbp, ped/bikes		1.00	0.99		0.99	
Flpb, ped/bikes		1.00	1.00		0.99	
Frt		1.00	0.98		0.97	
Flt Protected		1.00	1.00		0.96	
Satd. Flow (prot)		3451	1754		1638	
Flt Permitted		0.95	1.00		0.96	
Satd. Flow (perm)		3283	1754		1638	
Volume (vph)	15	825	145	25	85	25
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	15	842	148	26	87	26
RTOR Reduction (vph)	0	0	13	0	17	0
Lane Group Flow (vph)	0	857	161	0	96	0
Confl. Peds. (#/hr)		20		20	20	20
Heavy Vehicles (%)	1%	1%	2%	2%	2%	2%
Turn Type	Perm					
Protected Phases		2	2			
Permitted Phases	2				8	
Actuated Green, G (s)		22.0	22.0		15.0	
Effective Green, g (s)		22.0	22.0		15.0	
Actuated g/C Ratio		0.49	0.49		0.33	
Clearance Time (s)		4.0	4.0		4.0	
Lane Grp Cap (vph)		1605	858		546	
v/s Ratio Prot			0.09			
v/s Ratio Perm		c0.26			c0.06	
v/c Ratio		0.53	0.19		0.18	
Uniform Delay, d1		8.0	6.5		10.6	
Progression Factor		1.00	2.78		1.00	
Incremental Delay, d2		1.3	0.4		0.7	
Delay (s)		9.2	18.4		11.3	
Level of Service		A	B		B	
Approach Delay (s)		9.2	18.4		11.3	
Approach LOS		A	B		B	

Intersection Summary

HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
23: E Chestnut St & Cornwall Ave

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	→	↖	↑	↗	↘	↓
Lane Group	EBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↔↔		↔	↗		↔↔
Volume (vph)	835	130	90	50	85	30
Turn Type	Perm			Perm	Perm	
Protected Phases	2		4		4	
Permitted Phases	4			4	4	
Detector Phases	2	4	4	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	26.0	19.0	19.0	19.0	19.0	19.0
Total Split (s)	26.0	19.0	19.0	19.0	19.0	19.0
Total Split (%)	57.8%	42.2%	42.2%	42.2%	42.2%	42.2%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	22.0		15.0	15.0		15.0
Actuated g/C Ratio	0.49		0.33	0.33		0.33
v/c Ratio	0.61		0.52	0.10		0.32
Control Delay	14.0		17.1	4.6		15.9
Queue Delay	0.0		0.0	0.0		0.0
Total Delay	14.0		17.1	4.6		15.9
LOS	B		B	A		B
Approach Delay	14.0		14.8			15.9
Approach LOS	B		B			B

Intersection Summary	
Cycle Length: 45	
Actuated Cycle Length: 45	
Offset: 35 (78%), Referenced to phase 2:EBTL, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 14.3	Intersection LOS: B
Intersection Capacity Utilization 62.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 23: E Chestnut St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
23: E Chestnut St & Cornwall Ave

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↘	↗	←	↖	↗	↑	↘	↗	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔	↗		↔↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0		4.0	
Lane Util. Factor		0.95						1.00	1.00		1.00	
Frpb, ped/bikes		0.99						1.00	0.94		0.99	
Flpb, ped/bikes		1.00						0.96	1.00		0.98	
Frt		0.99						1.00	0.85		0.98	
Flt Protected		1.00						0.97	1.00		0.97	
Satd. Flow (prot)		3368						1687	1445		1696	
Flt Permitted		1.00						0.77	1.00		0.71	
Satd. Flow (perm)		3368						1345	1445		1251	
Volume (vph)	35	835	95	0	0	0	130	90	50	85	30	15
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	879	100	0	0	0	137	95	53	89	32	16
RTOR Reduction (vph)	0	18	0	0	0	0	0	0	35	0	11	0
Lane Group Flow (vph)	0	998	0	0	0	0	0	232	18	0	126	0
Confl. Peds. (#/hr)	50		50				50		50	50		50
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	Perm						Perm		Perm	Perm		
Protected Phases	2						4		4		4	
Permitted Phases	2						4		4	4		
Actuated Green, G (s)		22.0						15.0	15.0		15.0	
Effective Green, g (s)		22.0						15.0	15.0		15.0	
Actuated g/C Ratio		0.49						0.33	0.33		0.33	
Clearance Time (s)		4.0						4.0	4.0		4.0	
Lane Grp Cap (vph)		1647						448	482		417	
v/s Ratio Prot												
v/s Ratio Perm		0.30						0.17	0.01		0.10	
v/c Ratio		0.61						0.52	0.04		0.30	
Uniform Delay, d1		8.4						12.1	10.1		11.1	
Progression Factor		1.49						1.00	1.00		1.32	
Incremental Delay, d2		1.5						4.2	0.1		1.7	
Delay (s)		14.0						16.3	10.3		16.4	
Level of Service		B						B	B		B	
Approach Delay (s)		14.0			0.0			15.2			16.4	
Approach LOS		B			A			B			B	

Intersection Summary	
HCM Average Control Delay	14.4
HCM Volume to Capacity ratio	0.57
Actuated Cycle Length (s)	45.0
Intersection Capacity Utilization	62.5%
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
40: Roeder Ave & Central Ave

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	5	505	5	5	180	5	5	5	5	10	5	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	549	5	5	196	5	5	5	5	11	5	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)	1113											
pX, platoon unblocked												
vC, conflicting volume	201			554				807	774	552	780	774
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	201			554				807	774	552	780	774
tC, single (s)	4.1			4.1				7.1	6.5	6.2	7.1	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2				3.5	4.0	3.3	3.5	4.0
p0 queue free %	100			99				98	98	99	96	98
cM capacity (veh/h)	1371			1016				283	326	534	303	326
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	560	207	16	49								
Volume Left	5	5	5	11								
Volume Right	5	5	5	33								
cSH	1371	1016	354	536								
Volume to Capacity	0.00	0.01	0.05	0.09								
Queue Length 95th (ft)	0	0	4	7								
Control Delay (s)	0.1	0.3	15.7	12.4								
Lane LOS	A	A	C	B								
Approach Delay (s)	0.1	0.3	15.7	12.4								
Approach LOS			C	B								
Intersection Summary												
Average Delay			1.2									
Intersection Capacity Utilization	39.1%		ICU Level of Service				A					
Analysis Period (min)			15									

Timings
1: Squalicum Pkwy & Meridian Street

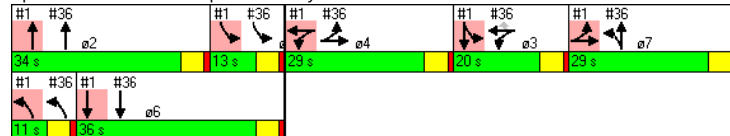
Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	ø1	ø3	ø6
Lane Configurations	↰	↱	↰	↰	↱	↰	↱			
Volume (vph)	180	5	5	5	590	15	530			
Turn Type	Split		Prot		Prot					
Protected Phases	7	7	4	5	2	13	3 6	1	3	6
Permitted Phases										
Detector Phases	7	7	4	5	2	13	3 6			
Minimum Initial (s)	6.0	6.0	6.0	6.0	10.0			6.0	6.0	10.0
Minimum Split (s)	29.0	29.0	29.0	11.0	23.0			11.0	11.0	23.0
Total Split (s)	29.0	29.0	29.0	11.0	34.0	33.0	56.0	13.0	20.0	36.0
Total Split (%)	23.2%	23.2%	23.2%	8.8%	27.2%	26.4%	44.8%	10%	16%	29%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0			1.0	1.0	1.0
Lead/Lag			Lead	Lead	Lead			Lag	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Max			None	None	None
Act Effct Green (s)	22.1	22.1	18.7	7.2	30.7	24.2	47.8			
Actuated g/C Ratio	0.20	0.20	0.17	0.06	0.27	0.21	0.42			
v/c Ratio	0.60	0.08	0.11	0.04	0.67	0.04	0.50			
Control Delay	51.7	19.0	21.8	56.2	43.4	12.3	6.6			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.1			
Total Delay	51.7	19.0	21.8	56.2	43.4	12.3	6.7			
LOS	D	B	C	E	D	B	A			
Approach Delay		47.8	21.8		43.5		6.8			
Approach LOS		D	C		D		A			

Intersection Summary

Cycle Length: 125	
Actuated Cycle Length: 113.2	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 27.2	Intersection LOS: C
Intersection Capacity Utilization 42.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Squalicum Pkwy & Meridian Street



HCM Signalized Intersection Capacity Analysis
1: Squalicum Pkwy & Meridian Street

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Flt	1.00	0.88			0.91		1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1559			1710		1787	3570		1752	3398	
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1687	1559			1710		1787	3570		1752	3398	
Volume (vph)	180	5	20	5	5	20	5	590	5	15	530	135
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	198	5	22	5	5	22	5	648	5	16	582	148
RTOR Reduction (vph)	0	18	0	0	18	0	0	1	0	0	17	0
Lane Group Flow (vph)	198	9	0	0	14	0	5	652	0	16	713	0
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split			Prot			Prot		
Protected Phases	7	7		4	4		5	2		1 3	3 6	
Permitted Phases												
Actuated Green, G (s)	21.1	21.1			17.7		4.5	29.7		20.6	45.8	
Effective Green, g (s)	22.1	22.1			18.7		5.5	30.7		22.6	47.8	
Actuated g/C Ratio	0.19	0.19			0.16		0.05	0.27		0.20	0.42	
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0				
Vehicle Extension (s)	3.0	3.0			3.0		2.0	2.0				
Lane Grp Cap (vph)	327	302			280		86	961		347	1424	
v/s Ratio Prot	c0.12	0.01			c0.01		0.00	c0.18		0.01	c0.21	
v/s Ratio Perm												
v/c Ratio	0.61	0.03			0.05		0.06	0.68		0.05	0.50	
Uniform Delay, d1	42.0	37.3			40.2		51.8	37.3		37.0	24.4	
Progression Factor	1.00	1.00			1.00		1.00	1.00		0.54	0.46	
Incremental Delay, d2	3.2	0.0			0.1		0.1	3.9		0.0	0.0	
Delay (s)	45.2	37.4			40.3		51.9	41.1		20.1	11.2	
Level of Service	D	D			D		D	D		C	B	
Approach Delay (s)		44.2			40.3			41.2			11.4	
Approach LOS		D			D			D			B	

Intersection Summary

HCM Average Control Delay	28.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	114.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Meridian Street & Broadway St

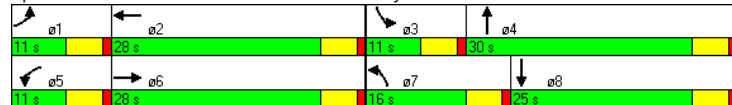
Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	20	260	35	375	170	85	15	45
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	1	6	5	2	7	4	3	8
Permitted Phases								
Detector Phases	1	6	5	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	25.0	11.0	25.0	11.0	25.0	11.0	25.0
Total Split (s)	11.0	28.0	11.0	28.0	16.0	30.0	11.0	25.0
Total Split (%)	13.8%	35.0%	13.8%	35.0%	20.0%	37.5%	13.8%	31.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	8.1	29.0	8.1	29.0	12.1	16.4	8.1	10.6
Actuated g/C Ratio	0.12	0.50	0.12	0.50	0.20	0.27	0.12	0.16
v/c Ratio	0.10	0.46	0.18	0.48	0.54	0.29	0.08	0.18
Control Delay	29.6	16.2	29.9	17.4	28.3	12.7	31.2	21.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.6	16.2	29.9	17.4	28.3	12.7	31.2	21.8
LOS	C	B	C	B	C	B	C	C
Approach Delay		16.9		18.4		21.5		24.0
Approach LOS		B		B		C		C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 58.3
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.54
Intersection Signal Delay: 19.0
Intersection Capacity Utilization 51.8%
Analysis Period (min) 15

Splits and Phases: 2: Meridian Street & Broadway St



HCM Signalized Intersection Capacity Analysis
2: Meridian Street & Broadway St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1732		1728	1806		1728	1708		1745	1808	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1728	1732		1728	1806		1728	1708		1745	1808	
Volume (vph)	20	260	105	35	375	15	170	85	45	15	45	5
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	22	286	115	38	412	16	187	93	49	16	49	5
RTOR Reduction (vph)	0	15	0	0	1	0	0	27	0	0	5	0
Lane Group Flow (vph)	22	386	0	38	427	0	187	115	0	16	49	0
Confl. Peds. (#/hr)			5			5			5			5
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	1.9	27.2		1.9	27.2		9.6	13.8		0.9	5.1	
Effective Green, g (s)	2.9	28.2		2.9	28.2		10.6	14.8		1.9	6.1	
Actuated g/C Ratio	0.05	0.44		0.05	0.44		0.17	0.23		0.03	0.10	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	79	766		79	798		287	396		52	173	
v/s Ratio Prot	0.01	0.22		c0.02	c0.24		c0.11	c0.07		0.01	0.03	
v/s Ratio Perm												
v/c Ratio	0.28	0.50		0.48	0.53		0.65	0.29		0.31	0.29	
Uniform Delay, d1	29.4	12.8		29.7	13.0		24.9	20.2		30.3	26.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.2		1.7	0.3		4.0	0.1		1.2	0.3	
Delay (s)	30.1	13.0		31.4	13.4		28.9	20.3		31.5	27.2	
Level of Service	C	B		C	B		C	C		C	C	
Approach Delay (s)		13.9			14.8			25.2			28.2	
Approach LOS		B			B			C			C	

Intersection Summary

HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	63.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

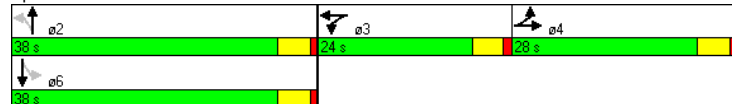
Timings
3: Ohio St & N State St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	225	230	160	105	20	790	30	535
Turn Type	Split		Split		Perm		Perm	
Protected Phases	4	4	3	3		2		6
Permitted Phases					2		6	
Detector Phases	4	4	3	3		2	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	23.0	23.0	21.0	21.0	21.0	21.0
Total Split (s)	28.0	28.0	24.0	24.0	38.0	38.0	38.0	38.0
Total Split (%)	31.1%	31.1%	26.7%	26.7%	42.2%	42.2%	42.2%	42.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead	Lead				
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	18.0	18.0	14.2	14.2	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.27	0.27	0.21	0.21	0.37	0.37	0.37	0.37
v/c Ratio	0.53	0.57	0.50	0.40	0.12	0.73	0.32	0.55
Control Delay	29.7	29.8	33.6	28.9	19.7	23.3	28.9	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.7	29.8	33.6	28.9	19.7	23.3	28.9	19.3
LOS	C	C	C	C	B	C	C	B
Approach Delay		29.8		31.4		23.2		19.7
Approach LOS		C		C		C		B

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 66.7	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 24.6	Intersection LOS: C
Intersection Capacity Utilization 57.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Ohio St & N State St



HCM Signalized Intersection Capacity Analysis
3: Ohio St & N State St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.97		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1792		1711	1740		1728	3418		1728	3367	
Flt Permitted	0.95	1.00		0.95	1.00		0.28	1.00		0.16	1.00	
Satd. Flow (perm)	1728	1792		1711	1740		506	3418		300	3367	
Volume (vph)	225	230	25	160	105	30	20	790	60	30	535	110
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	247	253	27	176	115	33	22	868	66	33	588	121
RTOR Reduction (vph)	0	4	0	0	12	0	0	6	0	0	19	0
Lane Group Flow (vph)	247	276	0	176	136	0	22	928	0	33	690	0
Heavy Vehicles (%)	1%	1%		2%	2%		2%	1%		1%	1%	
Turn Type	Split			Split			Perm			Perm		
Protected Phases	4	4		3	3			2			6	
Permitted Phases							2					
Actuated Green, G (s)	16.8	16.8		10.3	10.3		23.8	23.8		23.8	23.8	
Effective Green, g (s)	17.8	17.8		11.3	11.3		24.8	24.8		24.8	24.8	
Actuated g/C Ratio	0.27	0.27		0.17	0.17		0.38	0.38		0.38	0.38	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	467	484		293	298		190	1286		113	1267	
v/s Ratio Prot	0.14	c0.15		c0.10	0.08			c0.27			0.20	
v/s Ratio Perm							0.04			0.11		
v/c Ratio	0.53	0.57		0.60	0.45		0.12	0.72		0.29	0.54	
Uniform Delay, d1	20.5	20.7		25.2	24.5		13.4	17.6		14.4	16.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	1.9		4.0	1.5		0.3	2.0		1.4	0.5	
Delay (s)	21.9	22.6		29.2	26.0		13.7	19.6		15.8	16.6	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		22.3			27.8			19.5			16.6	
Approach LOS		C			C			B			B	

Intersection Summary	
HCM Average Control Delay	20.3
HCM Volume to Capacity ratio	0.65
Actuated Cycle Length (s)	65.9
Intersection Capacity Utilization	57.4%
Analysis Period (min)	15
c Critical Lane Group	

Timings
4: Iowa St & James Street

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	←	←	↙	↓	↘	↗	→	
Lane Group	WBL	WBT	SBL	SBT	SBR	NEL	NER	ø4
Lane Configurations								
Volume (vph)	330	30	120	80	355	375	525	
Turn Type	Split		Perm		Over		pt+ov	
Protected Phases	3	3		1	2	2	2 3	4
Permitted Phases			1					
Detector Phases	3	3	1	1	2	2	2 3	
Minimum Initial (s)	6.0	6.0	8.0	8.0	6.0	6.0		6.0
Minimum Split (s)	11.0	11.0	20.0	20.0	17.0	17.0		20.0
Total Split (s)	12.0	12.0	40.0	40.0	18.0	18.0	30.0	20.0
Total Split (%)	13.3%	13.3%	44.4%	44.4%	20.0%	20.0%	33.3%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0		1.0
Lead/Lag	Lead	Lead	Lead	Lead	Lag	Lag		Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None		None
Act Effct Green (s)	8.0	8.0		36.0	14.0	14.0		26.0
Actuated g/C Ratio	0.11	0.11		0.51	0.20	0.20		0.37
v/c Ratio	1.21	1.23		2.00	0.70	0.81		0.79
Control Delay	164.7	166.3		502.0	33.7	38.8		33.3
Queue Delay	0.0	0.0		8.7	0.0	0.2		0.3
Total Delay	164.7	166.3		510.8	33.7	39.0		33.6
LOS	F	F		F	C	D		C
Approach Delay		165.5		202.5		36.6		
Approach LOS		F		F		D		

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 70

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 2.00

Intersection Signal Delay: 115.8

Intersection LOS: F

Intersection Capacity Utilization 50.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Iowa St & James Street



HCM Signalized Intersection Capacity Analysis
4: Iowa St & James Street

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	←	←	↙	↓	↘	↗	→	↖	↗	↖
Movement	WBL	WBT	WBR	SBL	SBT	SBR	SBR2	NEL	NER	NER2
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95			1.00	0.88		0.97	0.91	
Frt	1.00	0.94			1.00	0.85		0.96	0.85	
Flt Protected	0.95	0.98			0.97	1.00		0.96	1.00	
Satd. Flow (prot)	1641	1582			1765	2720		3267	1407	
Flt Permitted	0.95	0.98			0.11	1.00		0.96	1.00	
Satd. Flow (perm)	1641	1582			202	2720		3267	1407	
Volume (vph)	330	30	105	120	80	355	10	375	525	10
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	344	31	109	125	83	370	10	391	547	10
RTOR Reduction (vph)	0	28	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	227	229	0	0	208	378	0	533	415	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Split			Perm		Over			pt+ov	
Protected Phases	3	3			1	2		2	2 3	
Permitted Phases					1					
Actuated Green, G (s)	7.0	7.0			35.0	13.0		13.0	25.0	
Effective Green, g (s)	8.0	8.0			36.0	14.0		14.0	26.0	
Actuated g/C Ratio	0.11	0.11			0.51	0.20		0.20	0.37	
Clearance Time (s)	5.0	5.0			5.0	5.0		5.0		
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0		
Lane Grp Cap (vph)	188	181			104	544		653	523	
v/s Ratio Prot	0.14	c0.14				0.14		0.16	c0.30	
v/s Ratio Perm					c1.03					
v/c Ratio	1.21	1.26			2.00	0.70		0.82	0.79	
Uniform Delay, d1	31.0	31.0			17.0	26.0		26.8	19.6	
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	132.6	155.0			482.3	3.9		7.8	8.1	
Delay (s)	163.6	186.0			499.3	29.9		34.6	27.7	
Level of Service	F	F			F	C		C	C	
Approach Delay (s)		175.5			195.9			31.6		
Approach LOS		F			F			C		

Intersection Summary

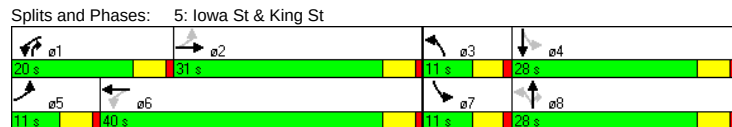
HCM Average Control Delay	113.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.63		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Iowa St & King St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	20	675	220	410	25	85	470	55	70
Turn Type	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	5	2	1	6	3	8	1	7	4
Permitted Phases	2		6		8		8	4	
Detector Phases	5	2	1	6	3	8	1	7	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	28.0	11.0	26.0	11.0	28.0	11.0	11.0	28.0
Total Split (s)	11.0	31.0	20.0	40.0	11.0	28.0	20.0	11.0	28.0
Total Split (%)	12.2%	34.4%	22.2%	44.4%	12.2%	31.1%	22.2%	12.2%	31.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	Min	None	Min	None	None	None	None	None
Act Effct Green (s)	27.4	20.5	40.2	40.2	13.9	10.7	22.2	14.6	12.4
Actuated g/C Ratio	0.43	0.36	0.70	0.70	0.22	0.17	0.38	0.24	0.20
v/c Ratio	0.05	0.64	0.46	0.22	0.08	0.31	0.76	0.17	0.28
Control Delay	8.8	21.0	13.0	9.4	20.7	30.3	18.7	20.5	24.6
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.8	21.1	13.0	9.4	20.7	30.3	18.7	20.5	24.6
LOS	A	C	B	A	C	B	C	C	C
Approach Delay		20.7		10.6		20.5			23.1
Approach LOS		C		B		C			C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 57.7	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 17.6	Intersection LOS: B
Intersection Capacity Utilization 63.2%	ICU Level of Service B
Analysis Period (min) 15	



HCM Signalized Intersection Capacity Analysis
5: Iowa St & King St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1728	3444		1711	3376		1728	1818	1546	1745	1775	
Flt Permitted	0.46	1.00		0.20	1.00		0.69	1.00	1.00	0.61	1.00	
Satd. Flow (perm)	843	3444		369	3376		1256	1818	1546	1116	1775	
Volume (vph)	20	675	15	220	410	40	25	85	470	55	70	20
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	23	767	17	250	466	45	28	97	534	62	80	23
RTOR Reduction (vph)	0	1	0	0	6	0	0	0	122	0	14	0
Lane Group Flow (vph)	23	783	0	250	505	0	28	97	412	62	89	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	0%	0%	0%
Turn Type	pm+pt			pm+pt			pm+pt		pm+ov	pm+pt		
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	25.7	24.0		42.5	35.8		7.7	6.0	19.5	9.7	7.0	
Effective Green, g (s)	27.7	25.0		43.5	36.8		9.7	7.0	21.5	11.7	8.0	
Actuated g/C Ratio	0.42	0.38		0.66	0.56		0.15	0.11	0.32	0.18	0.12	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.6		3.0	3.0		3.6	3.6	3.0	3.0	3.0	
Lane Grp Cap (vph)	389	1301		536	1877		203	192	596	232	215	
v/s Ratio Prot	0.00	c0.23		0.10	0.15		0.01	0.05	c0.15	c0.01	0.05	
v/s Ratio Perm	0.02			0.20			0.01		0.11	0.03		
v/c Ratio	0.06	0.60		0.47	0.27		0.14	0.51	0.69	0.27	0.41	
Uniform Delay, d1	11.3	16.6		6.4	7.7		24.5	28.0	19.5	23.3	26.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.8		0.6	0.1		0.4	2.5	3.5	0.6	1.3	
Delay (s)	11.4	17.4		7.1	7.8		24.9	30.5	22.9	23.9	28.2	
Level of Service	B	B		A	A		C	C	C	C	C	
Approach Delay (s)		17.3			7.5			24.1			26.6	
Approach LOS		B			A			C			C	

Intersection Summary	
HCM Average Control Delay	16.7
HCM Volume to Capacity ratio	0.62
Actuated Cycle Length (s)	66.2
Intersection Capacity Utilization	63.2%
Analysis Period (min)	15
c Critical Lane Group	

Timings
6: Iowa St & Moore St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	20	725	205	520	130	30	65	55
Turn Type	Prot		Prot		Perm		Perm	
Protected Phases	1	6	5	2		4		8
Permitted Phases					4		8	
Detector Phases	1	6	5	2	4	4	8	8
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	27.0	12.0	27.0	21.0	21.0	21.0	21.0
Total Split (s)	12.0	41.0	17.0	46.0	32.0	32.0	32.0	32.0
Total Split (%)	13.3%	45.6%	18.9%	51.1%	35.6%	35.6%	35.6%	35.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	8.1	34.7	13.1	47.3		25.6		25.6
Actuated g/C Ratio	0.09	0.41	0.15	0.55		0.30		0.30
v/c Ratio	0.15	0.91	0.87	0.32		0.91		0.43
Control Delay	41.8	32.0	69.7	12.4		49.6		28.3
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	41.8	32.0	69.7	12.4		49.6		28.3
LOS	D	C	E	B		D		C
Approach Delay		32.2		28.2		49.6		28.3
Approach LOS		C		C		D		C

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 85.6
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 33.4
Intersection Capacity Utilization 80.4%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service D

Splits and Phases: 6: Iowa St & Moore St



HCM Signalized Intersection Capacity Analysis
6: Iowa St & Moore St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.94		1.00	0.99			0.92			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1728	3258		1711	3402			1601			1673	
Flt Permitted	0.95	1.00		0.95	1.00			0.83			0.63	
Satd. Flow (perm)	1728	3258		1711	3402			1345			1087	
Volume (vph)	20	725	445	205	520	20	130	30	215	65	55	10
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	806	494	228	578	22	144	33	239	72	61	11
RTOR Reduction (vph)	0	101	0	0	3	0	0	55	0	0	4	0
Lane Group Flow (vph)	22	1199	0	228	597	0	0	361	0	0	140	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	4%	4%	4%	6%	6%	6%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	2.7	36.8		12.1	46.2			24.6			24.6	
Effective Green, g (s)	3.7	37.8		13.1	47.2			25.6			25.6	
Actuated g/C Ratio	0.04	0.43		0.15	0.53			0.29			0.29	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.5			3.5	
Lane Grp Cap (vph)	72	1392		253	1814			389			314	
v/s Ratio Prot	0.01	c0.37		c0.13	0.18							
v/s Ratio Perm								c0.27			0.13	
v/c Ratio	0.31	0.86		0.90	0.33			0.93			0.45	
Uniform Delay, d1	41.2	23.0		37.1	11.7			30.5			25.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.4	5.7		31.8	0.1			28.1			1.2	
Delay (s)	43.6	28.7		68.8	11.8			58.6			26.9	
Level of Service	D	C		E	B			E			C	
Approach Delay (s)		28.9			27.5			58.6			26.9	
Approach LOS		C			C			E			C	

Intersection Summary

HCM Average Control Delay	32.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	88.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Elm Street & Broadway St

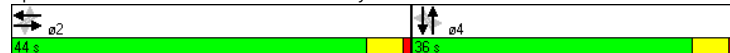
Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	5	195	40	335	115	150	40	135
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		2		2		4		4
Permitted Phases	2		2		4		4	
Detector Phases	2	2	2	2	4	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
Total Split (s)	44.0	44.0	44.0	44.0	36.0	36.0	36.0	36.0
Total Split (%)	55.0%	55.0%	55.0%	55.0%	45.0%	45.0%	45.0%	45.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	15.9	15.9	15.9	15.9	11.6	11.6	11.6	11.6
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.32	0.32	0.32	0.32
v/c Ratio	0.02	0.36	0.11	0.58	0.35	0.37	0.13	0.28
Control Delay	6.6	7.7	7.1	10.6	14.5	12.3	12.2	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.6	7.7	7.1	10.6	14.5	12.3	12.2	12.1
LOS	A	A	A	B	B	B	B	B
Approach Delay		7.7		10.3		13.1		12.1
Approach LOS		A		B		B		B

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 33.8
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 10.7
Intersection Capacity Utilization 56.6%
Analysis Period (min) 15

Splits and Phases: 7: Elm Street & Broadway St



HCM Signalized Intersection Capacity Analysis
7: Elm Street & Broadway St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1692	1719		1708	1749		1722	1752		1723	1797	
Flt Permitted	0.43	1.00		0.59	1.00		0.65	1.00		0.62	1.00	
Satd. Flow (perm)	772	1719		1056	1749		1185	1752		1132	1797	
Volume (vph)	5	195		55	40	335	70	115	150	40	135	10
Peak-hour factor, PHF	0.89	0.89		0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	6	219		62	45	376	79	129	169	45	152	11
RTOR Reduction (vph)	0	14		0	0	11	0	14	0	0	4	0
Lane Group Flow (vph)	6	267		0	45	444	0	129	200	0	45	159
Confl. Peds. (#/hr)	5			5			5			5		5
Heavy Vehicles (%)	3%	3%		3%	2%	2%	2%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	11.8	11.8		11.8	11.8		7.9	7.9		7.9	7.9	
Effective Green, g (s)	12.8	12.8		12.8	12.8		8.9	8.9		8.9	8.9	
Actuated g/C Ratio	0.43	0.43		0.43	0.43		0.30	0.30		0.30	0.30	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	333	741		455	754		355	525		339	538	
v/s Ratio Prot		0.16			c0.25			c0.11			0.09	
v/s Ratio Perm	0.01			0.04			0.11			0.04		
v/c Ratio	0.02	0.36		0.10	0.59		0.36	0.38		0.13	0.30	
Uniform Delay, d1	4.8	5.7		5.0	6.4		8.2	8.2		7.6	8.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.3		0.1	1.2		0.6	0.5		0.2	0.3	
Delay (s)	4.9	6.0		5.1	7.6		8.8	8.7		7.8	8.3	
Level of Service	A	A		A	A		A	A		A	A	
Approach Delay (s)		6.0			7.4			8.7			8.2	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	29.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Flora St & Cornwall Ave

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	110	305	25	135	125	15	250	95	185
Turn Type	Perm		Perm		Perm	Prot		Prot	
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8				
Detector Phases	4	4	8	8	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	11.0	27.0	11.0	27.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	11.0	29.0	14.0	32.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	15.7%	41.4%	20.0%	45.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		15.5		15.5	15.5	8.9	15.6	9.7	20.3
Actuated g/C Ratio		0.33		0.33	0.33	0.17	0.33	0.20	0.43
v/c Ratio		0.59		0.36	0.26	0.06	0.58	0.34	0.36
Control Delay		18.1		17.5	4.9	30.1	19.4	27.2	10.7
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		18.1		17.5	4.9	30.1	19.4	27.2	10.7
LOS		B		B	A	C	B	C	B
Approach Delay		18.1		12.0			19.9		15.5
Approach LOS		B		B			B		B

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 44.8	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 16.6	Intersection LOS: B
Intersection Capacity Utilization 68.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 8: Flora St & Cornwall Ave

↖ e1	↖ e2	↖ e4
14 s	29 s	27 s
↖ e5	↖ e6	↖ e8
11 s	32 s	27 s

HCM Signalized Intersection Capacity Analysis
8: Flora St & Cornwall Ave

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.95	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3319			1800	1464	1694	1739		1694	1713	
Flt Permitted		0.83			0.87	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		2776			1575	1464	1694	1739		1694	1713	
Volume (vph)	110	305	25	25	135	125	15	250	40	95	185	45
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	129	359	29	29	159	147	18	294	47	112	218	53
RTOR Reduction (vph)	0	6	0	0	0	105	0	9	0	0	13	0
Lane Group Flow (vph)	0	511	0	0	188	42	18	332	0	112	258	0
Confl. Peds. (#/hr)	35		35	35		35			35			35
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	3%	3%	3%
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		11.0			11.0	11.0	0.8	12.7		3.7	15.6	
Effective Green, g (s)		12.0			12.0	12.0	1.8	13.7		4.7	16.6	
Actuated g/C Ratio		0.28			0.28	0.28	0.04	0.32		0.11	0.39	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		786			446	414	72	562		188	671	
v/s Ratio Prot							0.01	c0.19		c0.07	c0.15	
v/s Ratio Perm		c0.18			0.12	0.03						
v/c Ratio		0.65			0.42	0.10	0.25	0.59		0.60	0.38	
Uniform Delay, d1		13.4			12.4	11.2	19.6	12.0		17.9	9.2	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.4			0.2	0.0	0.7	1.1		3.4	0.1	
Delay (s)		14.7			12.6	11.3	20.3	13.1		21.3	9.4	
Level of Service		B			B	B	C	B		C	A	
Approach Delay (s)		14.7			12.0		13.5			12.9		
Approach LOS		B			B		B			B		

Intersection Summary	
HCM Average Control Delay	13.4
HCM Volume to Capacity ratio	0.68
Actuated Cycle Length (s)	42.4
Intersection Capacity Utilization	68.0%
Analysis Period (min)	15
c Critical Lane Group	

Timings
9: York St & N State St

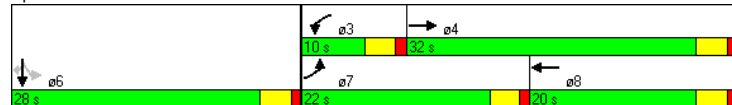
Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	SBT	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Volume (vph)	210	245	35	175	500	105
Turn Type	Prot		Prot		Perm	
Protected Phases	7	4	3	8	6	
Permitted Phases						6
Detector Phases	7	4	3	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	21.0	21.0
Total Split (s)	22.0	32.0	10.0	20.0	28.0	28.0
Total Split (%)	31.4%	45.7%	14.3%	28.6%	40.0%	40.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag		
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	12.0	18.4	6.9	9.1	18.1	18.1
Actuated g/C Ratio	0.25	0.39	0.14	0.19	0.40	0.40
v/c Ratio	0.54	0.29	0.17	0.35	0.55	0.17
Control Delay	23.8	10.2	28.1	20.7	15.5	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.8	10.2	28.1	20.7	15.5	4.2
LOS	C	B	C	C	B	A
Approach Delay		15.4		21.8	13.9	
Approach LOS		B		C	B	

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 45.2
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 15.6
Intersection Capacity Utilization 46.0%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service A

Splits and Phases: 9: York St & N State St



HCM Signalized Intersection Capacity Analysis
9: York St & N State St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱					↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95						0.95	1.00
Frt	1.00	0.96		1.00	0.98						1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (prot)	1694	3241		1646	3220						3379	1531
Flt Permitted	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (perm)	1694	3241		1646	3220						3379	1531
Volume (vph)	210	245	100	35	175	30	0	0	0	165	500	105
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	233	272	111	39	194	33	0	0	0	183	556	117
RTOR Reduction (vph)	0	71	0	0	22	0	0	0	0	0	0	72
Lane Group Flow (vph)	233	312	0	39	205	0	0	0	0	0	739	45
Heavy Vehicles (%)	3%	3%		6%	6%		0%	0%		0%	2%	2%
Turn Type	Prot			Prot						Perm		Perm
Protected Phases	7	4		3	8						6	
Permitted Phases										6		6
Actuated Green, G (s)	9.0	15.1		1.7	7.8						18.1	18.1
Effective Green, g (s)	9.0	15.1		1.7	7.8						18.1	18.1
Actuated g/C Ratio	0.19	0.32		0.04	0.17						0.39	0.39
Clearance Time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)	325	1043		60	536						1304	591
v/s Ratio Prot	c0.14	c0.10		0.02	0.06							
v/s Ratio Perm											0.22	0.03
v/c Ratio	0.72	0.30		0.65	0.38						0.57	0.08
Uniform Delay, d1	17.8	11.9		22.3	17.4						11.3	9.1
Progression Factor	1.00	1.00		1.00	1.00						1.00	1.00
Incremental Delay, d2	7.3	0.2		22.4	0.5						0.6	0.1
Delay (s)	25.1	12.1		44.7	17.9						11.9	9.2
Level of Service	C	B		D	B						B	A
Approach Delay (s)		17.0			21.8			0.0			11.5	
Approach LOS		B			C			A			B	

Intersection Summary

HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	46.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
10: York St & N Forest St

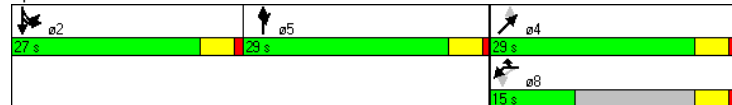
Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	←	↖	↑	↗	→	↘	↓	↙
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	NEL	NET
Lane Configurations	↖	↗	↖	↗	↖	↗	↖	↗
Volume (vph)	0	45	115	245	80	330	70	450
Turn Type	Prot	Split	Split	Split	custom	Prot		
Protected Phases	8!	8!	5	5	2	2	4!	4!
Permitted Phases							4	
Detector Phases	8	8	5	5	2	2	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	9.0	27.0	27.0	27.0	27.0	29.0	29.0
Total Split (s)	15.0	15.0	29.0	29.0	27.0	27.0	29.0	29.0
Total Split (%)	17.6%	17.6%	34.1%	34.1%	31.8%	31.8%	34.1%	34.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	Min	Min	Min	Min	None	None
Act Effct Green (s)	16.1	16.1	14.5	14.5	12.4	12.4	16.1	16.1
Actuated g/C Ratio	0.29	0.29	0.26	0.26	0.22	0.22	0.29	0.29
v/c Ratio	0.12	0.21	0.56	0.52	0.26	0.47	0.16	0.60
Control Delay	17.8	11.2	25.4	22.9	23.2	23.2	18.1	21.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.8	11.2	25.4	22.9	23.2	23.2	18.1	21.1
LOS	B	B	C	C	C	C	B	C
Approach Delay	13.6		24.2		23.2		20.8	
Approach LOS	B		C		C		C	

Intersection Summary

Cycle Length: 85
Actuated Cycle Length: 55.9
Natural Cycle: 85
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 21.6
Intersection Capacity Utilization 50.8%
Analysis Period (min) 15
! Phase conflict between lane groups.

Splits and Phases: 10: York St & N Forest St



HCM Signalized Intersection Capacity Analysis
10: York St & N Forest St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	WBL2	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL2	SBL	SBT	NEL	NET
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		0.95	0.95			1.00	0.95	1.00	0.95
Frt		1.00	0.85		0.93	0.85			1.00	1.00	1.00	0.98
Flt Protected		0.95	1.00		1.00	1.00			0.95	1.00	0.95	1.00
Satd. Flow (prot)		1728	1546		1606	1468			1711	3421	1678	3288
Flt Permitted		0.95	1.00		1.00	1.00			0.95	1.00	0.95	1.00
Satd. Flow (perm)		1728	1546		1606	1468			1711	3421	1678	3288
Volume (vph)	55	0	45	50	115	245	45	10	80	330	70	450
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	0	49	54	125	266	49	11	87	359	76	489
RTOR Reduction (vph)	0	0	38	0	0	14	0	0	0	0	0	1
Lane Group Flow (vph)	0	60	65	0	235	191	0	0	98	359	76	564
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%	4%	4%
Turn Type	Perm		Prot		Split			Split	Split		custom	Prot
Protected Phases		8!	8!		5	5		2	2	2		4!
Permitted Phases	8										4	
Actuated Green, G (s)		15.0	15.0		13.4	13.4			11.3	11.3	15.0	15.0
Effective Green, g (s)		16.0	16.0		14.4	14.4			12.3	12.3	16.0	16.0
Actuated g/C Ratio		0.29	0.29		0.26	0.26			0.22	0.22	0.29	0.29
Clearance Time (s)		5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		505	452		423	386			385	769	491	962
v/s Ratio Prot			0.04		c0.15	0.13			0.06	c0.10		c0.17
v/s Ratio Perm		0.03									0.05	
v/c Ratio		0.12	0.14		0.56	0.49			0.25	0.47	0.15	0.59
Uniform Delay, d1		14.2	14.3		17.4	17.1			17.4	18.4	14.3	16.5
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	0.1		1.6	1.0			0.4	0.5	0.1	0.9
Delay (s)		14.3	14.4		19.0	18.1			17.8	18.8	14.5	17.4
Level of Service		B	B		B	B			B	B	B	B
Approach Delay (s)		14.4			18.6					18.6		17.1
Approach LOS		B			B					B		B

Intersection Summary

HCM Average Control Delay 17.6
HCM Volume to Capacity ratio 0.54
Actuated Cycle Length (s) 54.7
Intersection Capacity Utilization 50.8%
Analysis Period (min) 15
! Phase conflict between lane groups.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: York St & N Forest St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

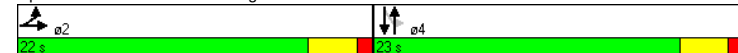
	↗	↘
Movement	NER	NER2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Volume (vph)	60	10
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	65	11
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	0	0
Heavy Vehicles (%)	4%	4%
Turn Type		
Protected Phases		
Permitted Phases		
Actuated Green, G (s)		
Effective Green, g (s)		
Actuated g/C Ratio		
Clearance Time (s)		
Vehicle Extension (s)		
Lane Grp Cap (vph)		
v/s Ratio Prot		
v/s Ratio Perm		
v/c Ratio		
Uniform Delay, d1		
Progression Factor		
Incremental Delay, d2		
Delay (s)		
Level of Service		
Approach Delay (s)		
Approach LOS		
Intersection Summary		

Timings
11: E Magnolia St & Cornwall Ave

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↔↔	↔		↔
Volume (vph)	470	205	80	160
Turn Type	Perm			
Protected Phases	2	4		4
Permitted Phases			4	
Detector Phases	2	4	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	23.0	23.0	23.0
Total Split (s)	22.0	23.0	23.0	23.0
Total Split (%)	48.9%	51.1%	51.1%	51.1%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	18.0	19.0		19.0
Actuated g/C Ratio	0.40	0.42		0.42
v/c Ratio	0.56	0.42		0.49
Control Delay	12.0	9.4		13.0
Queue Delay	0.0	0.0		0.0
Total Delay	12.0	9.4		13.0
LOS	B	A		B
Approach Delay	12.0	9.4		13.0
Approach LOS	B	A		B
Intersection Summary				
Cycle Length: 45				
Actuated Cycle Length: 45				
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green				
Natural Cycle: 45				
Control Type: Pretimed				
Maximum v/c Ratio: 0.56				
Intersection Signal Delay: 11.6			Intersection LOS: B	
Intersection Capacity Utilization 56.6%			ICU Level of Service B	
Analysis Period (min) 15				

Splits and Phases: 11: E Magnolia St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis

11: E Magnolia St & Cornwall Ave

Existing (2007) PM Peak Hour

New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕						↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		0.95						1.00			1.00	
Frpb, ped/bikes		0.99						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			0.99	
Frt		0.99						0.97			1.00	
Flt Protected		0.99						1.00			0.98	
Satd. Flow (prot)		3310						1741			1733	
Flt Permitted		0.99						1.00			0.80	
Satd. Flow (perm)		3310						1741			1418	
Volume (vph)	85	470	60	0	0	0	0	205	55	80	160	0
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	104	573	73	0	0	0	0	250	67	98	195	0
RTOR Reduction (vph)	0	18	0	0	0	0	0	21	0	0	0	0
Lane Group Flow (vph)	0	732	0	0	0	0	0	296	0	0	293	0
Confl. Peds. (#/hr)	80		80						80	80		
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split						Perm					
Protected Phases	2	2						4			4	
Permitted Phases										4		
Actuated Green, G (s)		18.0						19.0			19.0	
Effective Green, g (s)		18.0						19.0			19.0	
Actuated g/C Ratio		0.40						0.42			0.42	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		1324						735			599	
v/s Ratio Prot		c0.22						0.17				
v/s Ratio Perm										c0.21		
v/c Ratio		0.55						0.40			0.49	
Uniform Delay, d1		10.4						9.0			9.5	
Progression Factor		1.00						0.95			1.00	
Incremental Delay, d2		1.7						1.4			2.8	
Delay (s)		12.1						10.0			12.3	
Level of Service		B						A			B	
Approach Delay (s)		12.1			0.0			10.0			12.3	
Approach LOS		B			A			A			B	
Intersection Summary												
HCM Average Control Delay		11.6										
HCM Volume to Capacity ratio		0.52										
Actuated Cycle Length (s)		45.0						8.0				
Intersection Capacity Utilization		56.6%										
Analysis Period (min)		15										

c Critical Lane Group

Timings

12: W Holly St & Broadway St

Existing (2007) PM Peak Hour

New Whatcom Redevelopment Project

							
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations							
Volume (vph)	75	245	5	370	5	135	0
Turn Type	Perm		Perm			Perm	
Protected Phases		2		2	4		4
Permitted Phases	2		2			4	
Detector Phases	2	2	2	2	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	50.0	50.0	50.0	50.0	30.0	30.0	30.0
Total Split (%)	62.5%	62.5%	62.5%	62.5%	37.5%	37.5%	37.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None
Act Effct Green (s)		24.9		24.9	11.7	11.7	11.7
Actuated g/C Ratio		0.63		0.63	0.28	0.28	0.28
v/c Ratio		0.39		0.57	0.02	0.39	0.11
Control Delay		7.6		8.8	12.4	18.9	0.3
Queue Delay		0.0		0.0	0.0	0.0	0.0
Total Delay		7.6		8.8	12.4	18.9	0.3
LOS		A		A	B	B	A
Approach Delay		7.6		8.8	12.4		12.6
Approach LOS		A		A	B		B
Intersection Summary							
Cycle Length: 80							
Actuated Cycle Length: 39.5							
Natural Cycle: 55							
Control Type: Actuated-Uncoordinated							
Maximum v/c Ratio: 0.57							
Intersection Signal Delay: 9.2				Intersection LOS: A			
Intersection Capacity Utilization 72.8%				ICU Level of Service C			
Analysis Period (min) 15							

Splits and Phases: 12: W Holly St & Broadway St



HCM Signalized Intersection Capacity Analysis
12: W Holly St & Broadway St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔				↔			↔		↘	↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0				4.0			4.0		4.0		
Lane Util. Factor	1.00				1.00			1.00		1.00		
Frpb, ped/bikes	1.00				0.99			0.99		1.00		0.97
Flpb, ped/bikes	1.00				1.00			1.00		1.00		
Frt	1.00				0.95			0.93		1.00		0.85
Flt Protected	0.99				1.00			1.00		0.95		1.00
Satd. Flow (prot)	1797				1709			1700		1722		1507
Flt Permitted	0.80				1.00			1.00		0.75		1.00
Satd. Flow (perm)	1448				1705			1700		1361		1507
Volume (vph)	75	245	0	5	370	190	0	5	5	135	0	70
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	82	269	0	5	407	209	0	5	5	148	0	77
RTOR Reduction (vph)	0	0	0	0	24	0	0	4	0	0	59	0
Lane Group Flow (vph)	0	351	0	0	597	0	0	6	0	148	18	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type	Perm		Perm		Perm		Perm		Perm			
Protected Phases	2				2		4		4		4	
Permitted Phases	2				2		4		4			
Actuated Green, G (s)	20.9				20.9		7.9		7.9		7.9	
Effective Green, g (s)	21.9				21.9		8.9		8.9		8.9	
Actuated g/C Ratio	0.56				0.56		0.23		0.23		0.23	
Clearance Time (s)	5.0				5.0		5.0		5.0		5.0	
Vehicle Extension (s)	3.0				3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	817				962		390		312		346	
v/s Ratio Prot							0.00				0.01	
v/s Ratio Perm	0.24				c0.35				c0.11			
v/c Ratio	0.43				0.62		0.02		0.47		0.05	
Uniform Delay, d1	4.9				5.7		11.6		12.9		11.7	
Progression Factor	1.00				1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.4				1.3		0.0		1.1		0.1	
Delay (s)	5.2				6.9		11.6		14.1		11.7	
Level of Service	A				A		B		B		B	
Approach Delay (s)	5.2				6.9		11.6		13.3			
Approach LOS	A				A		B		B			

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	38.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

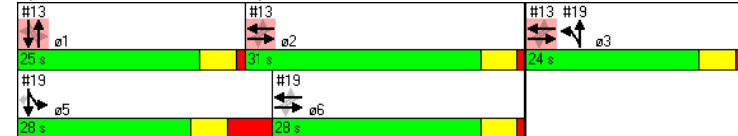
Timings
13: W Holly St & F St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø2	ø3	ø5	ø6
Lane Configurations	↘	↗	↘	↗		↔	↘	↗				
Volume (vph)	40	270	45	460	30	200	20	120				
Turn Type	Perm		Perm		Perm		Perm					
Protected Phases		2 3		2 3		1		1	2	3	5	6
Permitted Phases	2 3		2 3		1		1	1				
Detector Phases	2 3	2 3	2 3	2 3		1	1	1				
Minimum Initial (s)					6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)					24.0	24.0	24.0	24.0	24.0	24.0	28.0	24.0
Total Split (s)	55.0	55.0	55.0	55.0	25.0	25.0	25.0	25.0	31.0	24.0	28.0	28.0
Total Split (%)	68.8%	68.8%	68.8%	68.8%	31.3%	31.3%	31.3%	31.3%	39%	30%	35%	35%
Yellow Time (s)					4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)					1.0	1.0	1.0	1.0	1.0	1.0	5.0	1.0
Lead/Lag					Lead	Lead	Lead	Lead	Lag		Lead	Lag
Lead-Lag Optimize?												
Recall Mode					Min	Min	Min	Min	None	None	None	Max
Act Effct Green (s)	37.2	37.2	37.2	37.2	14.5	14.5	14.5	14.5				
Actuated g/C Ratio	0.62	0.62	0.62	0.62	0.24	0.24	0.24	0.24				
v/c Ratio	0.09	0.36	0.08	0.46	0.62	0.62	0.24	0.24				
Control Delay	6.0	6.4	5.9	8.2	38.3	38.3	16.4	16.4				
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Total Delay	6.0	6.4	5.9	8.2	38.3	38.3	16.4	16.4				
LOS	A	A	A	A	D	D	B	B				
Approach Delay		6.3		8.0	38.3	38.3	16.4	16.4				
Approach LOS		A		A	D	D	B	B				

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 60.1	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 14.0	Intersection LOS: B
Intersection Capacity Utilization 63.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 13: W Holly St & F St



HCM Signalized Intersection Capacity Analysis

13: W Holly St & F St

Existing (2007) PM Peak Hour

New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱			↰	↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			0.95	
Frt	1.00	0.96		1.00	0.99			0.99			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1728	1740		1711	1782			1788			3290	
Flt Permitted	0.42	1.00		0.50	1.00			0.94			0.91	
Satd. Flow (perm)	759	1740		902	1782			1694			3005	
Volume (vph)	40	270	110	45	460	35	30	200	20	20	120	40
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	41	278	113	46	474	36	31	206	21	21	124	41
RTOR Reduction (vph)	0	18	0	0	3	0	0	4	0	0	31	0
Lane Group Flow (vph)	41	373	0	46	507	0	0	254	0	0	155	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2 3			2 3			1			1	
Permitted Phases	2 3			2 3			1			1		
Actuated Green, G (s)	38.5	38.5		38.5	38.5			13.4			13.4	
Effective Green, g (s)	39.5	39.5		39.5	39.5			14.4			14.4	
Actuated g/C Ratio	0.64	0.64		0.64	0.64			0.23			0.23	
Clearance Time (s)								5.0			5.0	
Vehicle Extension (s)								3.0			3.0	
Lane Grp Cap (vph)	484	1110		576	1137			394			699	
v/s Ratio Prot		0.21			c0.28							
v/s Ratio Perm	0.05			0.05				c0.15			0.05	
v/c Ratio	0.08	0.34		0.08	0.45			0.65			0.22	
Uniform Delay, d1	4.3	5.2		4.3	5.7			21.4			19.2	
Progression Factor	1.00	1.00		1.00	1.00			1.48			1.00	
Incremental Delay, d2	0.1	0.2		0.1	0.3			3.2			0.2	
Delay (s)	4.4	5.3		4.3	5.9			35.0			19.4	
Level of Service	A	A		A	A			D			B	
Approach Delay (s)		5.2			5.8			35.0			19.4	
Approach LOS		A			A			D			B	
Intersection Summary												
HCM Average Control Delay		12.7						HCM Level of Service			B	
HCM Volume to Capacity ratio		0.50										
Actuated Cycle Length (s)		61.9						Sum of lost time (s)			8.0	
Intersection Capacity Utilization		63.2%						ICU Level of Service			B	
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

14: W Holly St & C St

Existing (2007) PM Peak Hour

New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↰			↰			↰	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	255	20	15	565	10	10	5	10	10	5	5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	5	263	21	15	582	10	10	5	10	10	5	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		753										
pX, platoon unblocked												
vC, conflicting volume	593			284			910	907	273	915	912	588
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	593			284			910	907	273	915	912	588
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			96	98	99	96	98	99
cM capacity (veh/h)	988			1285			248	273	770	245	271	513
Direction, Lane #												
Volume Total	289	608	26	21								
Volume Left	5	15	10	10								
Volume Right	21	10	10	5								
cSH	988	1285	349	290								
Volume to Capacity	0.01	0.01	0.07	0.07								
Queue Length 95th (ft)	0	1	6	6								
Control Delay (s)	0.2	0.3	16.1	18.4								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.2	0.3	16.1	18.4								
Approach LOS			C	C								
Intersection Summary												
Average Delay		1.1										
Intersection Capacity Utilization		48.3%						ICU Level of Service			A	
Analysis Period (min)		15										

Timings
15: W Holly St & Cornwall Ave

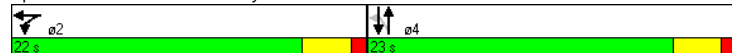
Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	←	↖	↑	↓
Lane Group	WBT	NBL	NBT	SBT
Lane Configurations	↔↔		↕	↕
Volume (vph)	885	40	90	125
Turn Type	Perm			
Protected Phases	2		4	4
Permitted Phases		4		
Detector Phases	2	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0
Minimum Split (s)	21.0	23.0	23.0	23.0
Total Split (s)	22.0	23.0	23.0	23.0
Total Split (%)	48.9%	51.1%	51.1%	51.1%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	18.0		19.0	19.0
Actuated g/C Ratio	0.40		0.42	0.42
v/c Ratio	0.84		0.20	0.26
Control Delay	19.7		4.6	7.7
Queue Delay	0.0		0.0	0.0
Total Delay	19.7		4.6	7.7
LOS	B		A	A
Approach Delay	19.7		4.6	7.7
Approach LOS	B		A	A

Intersection Summary

Cycle Length: 45
Actuated Cycle Length: 45
Offset: 0 (0%), Referenced to phase 2:WBT, Start of Green
Natural Cycle: 50
Control Type: Pretimed
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 16.7
Intersection Capacity Utilization 64.6%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service C

Splits and Phases: 15: W Holly St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
15: W Holly St & Cornwall Ave

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↘	↙	←	↖	↗	↑	↘	↙	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔↔			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.98			1.00			0.98	
Flpb, ped/bikes					1.00			0.99			1.00	
Frt					0.98			1.00			0.96	
Flt Protected					1.00			0.98			1.00	
Satd. Flow (prot)					3311			1767			1685	
Flt Permitted					1.00			0.89			1.00	
Satd. Flow (perm)					3311			1592			1685	
Volume (vph)	0	0	0	50	885	160	40	90	0	0	125	60
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	52	922	167	42	94	0	0	130	62
RTOR Reduction (vph)	0	0	0	0	31	0	0	0	0	0	16	0
Lane Group Flow (vph)	0	0	0	0	1110	0	0	136	0	0	176	0
Confl. Peds. (#/hr)				80		80	80					80
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Split				Perm							
Protected Phases					2	2		4			4	
Permitted Phases							4					
Actuated Green, G (s)					18.0			19.0			19.0	
Effective Green, g (s)					18.0			19.0			19.0	
Actuated g/C Ratio					0.40			0.42			0.42	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					1324			672			711	
v/s Ratio Prot					c0.34						c0.10	
v/s Ratio Perm								0.09				
v/c Ratio					0.84			0.20			0.25	
Uniform Delay, d1					12.2			8.2			8.4	
Progression Factor					1.00			0.47			0.93	
Incremental Delay, d2					6.5			0.6			0.7	
Delay (s)					18.7			4.5			8.5	
Level of Service					B			A			A	
Approach Delay (s)		0.0			18.7			4.5			8.5	
Approach LOS		A			B			A			A	

Intersection Summary

HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
16: Lakeway Dr & Jersey St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	←	↖	↗	↑	↘	↓
Lane Group	WBL	WBR	NBL	NBT	SBL	SBT
Lane Configurations						
Volume (vph)	30	680	265	195	435	270
Turn Type	Prot		Split		Split	
Protected Phases	8	8	2	2	6	6
Permitted Phases						
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	29.0	29.0	32.0	32.0	29.0	29.0
Total Split (%)	32.2%	32.2%	35.6%	35.6%	32.2%	32.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
Act Effct Green (s)	19.5	19.5	19.3	19.3	17.7	17.7
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.25	0.25
v/c Ratio	0.77	0.72	0.63	0.88dr	0.63	0.67
Control Delay	38.4	29.3	31.1	12.8	34.3	29.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.4	29.3	31.1	12.8	34.3	29.4
LOS	D	C	C	B	C	C
Approach Delay	32.8			16.9		30.9
Approach LOS	C			B		C

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 69.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 25.6
Intersection Capacity Utilization 69.7%
Analysis Period (min) 15
dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 16: Lakeway Dr & Jersey St



HCM Signalized Intersection Capacity Analysis
16: Lakeway Dr & Jersey St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	WBL2	WBL	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0			4.0	4.0		4.0	4.0		
Lane Util. Factor		1.00	0.91			0.91	0.91		0.91	0.91		
Frt		0.91	0.85			1.00	0.88		1.00	0.99		
Flt Protected		0.98	1.00			0.95	1.00		0.95	0.98		
Satd. Flow (prot)		1604	2786			1572	2918		1430	3088		
Flt Permitted		0.98	1.00			0.95	1.00		0.95	0.98		
Satd. Flow (perm)		1604	2786			1572	2918		1430	3088		
Volume (vph)	100	30	680	80	5	265	195	725	435	270	10	20
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	103	31	701	82	5	273	201	747	448	278	10	21
RTOR Reduction (vph)	0	0	14	0	0	0	438	0	0	3	0	0
Lane Group Flow (vph)	0	345	558	0	0	278	510	0	230	524	0	0
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	1%	1%	11%	1%	1%	1%
Turn Type	Split		Prot		Split	Split			Split			
Protected Phases	8	8	8		2	2	2		6	6		
Permitted Phases												
Actuated Green, G (s)		18.4	18.4			18.3	18.3		16.6	16.6		
Effective Green, g (s)		19.4	19.4			19.3	19.3		17.6	17.6		
Actuated g/C Ratio		0.28	0.28			0.28	0.28		0.26	0.26		
Clearance Time (s)		5.0	5.0			5.0	5.0		5.0	5.0		
Vehicle Extension (s)		2.0	2.0			2.0	2.0		2.0	2.0		
Lane Grp Cap (vph)		456	791			444	825		368	796		
v/s Ratio Prot		c0.22	0.20			c0.18	0.17		0.16	c0.17		
v/s Ratio Perm												
v/c Ratio		0.76	0.71			0.63	0.88dr		0.62	0.66		
Uniform Delay, d1		22.3	21.9			21.4	21.3		22.4	22.7		
Progression Factor		1.00	1.00			1.00	1.00		1.00	1.00		
Incremental Delay, d2		6.3	2.4			2.0	1.0		2.4	1.5		
Delay (s)		28.6	24.2			23.3	22.3		24.8	24.2		
Level of Service		C	C			C	C		C	C		
Approach Delay (s)		25.9					22.5			24.4		
Approach LOS		C					C			C		

Intersection Summary

HCM Average Control Delay	24.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	68.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		
dr Defacto Right Lane. Recode with 1 though lane as a right lane.			
c Critical Lane Group			

Timings
17: Lakeway Dr & I-5 SB Ramps

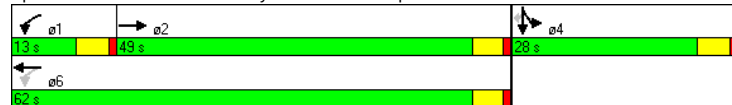
Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	→	↖	←	↓	↙
Lane Group	EBT	WBL	WBT	SBT	SBR
Lane Configurations	↑↑	↖	↑↑	↖	↖
Volume (vph)	960	135	675	5	305
Turn Type	pm+pt		Perm		
Protected Phases	2	1	6	4	
Permitted Phases		6			4
Detector Phases	2	1	6	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	10.0	23.0	28.0	28.0
Total Split (s)	49.0	13.0	62.0	28.0	28.0
Total Split (%)	54.4%	14.4%	68.9%	31.1%	31.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None
Act Effct Green (s)	32.8	42.5	42.3	25.0	25.0
Actuated g/C Ratio	0.43	0.55	0.56	0.33	0.33
v/c Ratio	0.79	0.50	0.37	0.91	0.47
Control Delay	22.3	13.7	9.0	51.4	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.3	13.7	9.0	51.4	8.9
LOS	C	B	A	D	A
Approach Delay	22.3		9.8	35.2	
Approach LOS	C		A	D	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 75.7
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 22.4
Intersection Capacity Utilization 76.2%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service D

Splits and Phases: 17: Lakeway Dr & I-5 SB Ramps



HCM Signalized Intersection Capacity Analysis
17: Lakeway Dr & I-5 SB Ramps

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		0.95		1.00	0.95						1.00	1.00
Frt		0.98		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		3385		1711	3421						1733	1546
Flt Permitted		1.00		0.11	1.00						0.95	1.00
Satd. Flow (perm)		3385		196	3421						1733	1546
Volume (vph)	0	960	150	135	675	0	0	0	0	490	5	305
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1011	158	142	711	0	0	0	0	516	5	321
RTOR Reduction (vph)	0	16	0	0	0	0	0	0	0	0	0	174
Lane Group Flow (vph)	0	1153	0	142	711	0	0	0	0	0	521	147
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type			pm+pt							Split		Perm
Protected Phases		2		1	6						4	
Permitted Phases				6								4
Actuated Green, G (s)		31.8		42.6	42.6					24.0	24.0	
Effective Green, g (s)		32.8		43.6	43.6					25.0	25.0	
Actuated g/C Ratio		0.43		0.57	0.57					0.33	0.33	
Clearance Time (s)		5.0		5.0	5.0					5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		1449		246	1947					566	505	
v/s Ratio Prot		c0.34		c0.05	0.21					c0.30		
v/s Ratio Perm				0.28								0.09
v/c Ratio		0.80		0.58	0.37					0.92	0.29	
Uniform Delay, d1		19.0		12.4	9.0					24.8	19.2	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		3.1		3.3	0.1					20.4	0.3	
Delay (s)		22.1		15.7	9.1					45.3	19.5	
Level of Service		C		B	A					D	B	
Approach Delay (s)		22.1			10.2			0.0			35.5	
Approach LOS		C			B			A			D	

Intersection Summary

HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	76.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
18: Lakeway Dr & King St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	370	1010	20	520	120	55	40	25
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	5	2	1	6	3	8	7	4
Permitted Phases								
Detector Phases	5	2	1	6	3	8	7	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	25.0	37.0	17.0	29.0	16.0	24.0	12.0	20.0
Total Split (%)	27.8%	41.1%	18.9%	32.2%	17.8%	26.7%	13.3%	22.2%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?								
Recall Mode	None	Min	None	None	None	Min	None	None
Act Effct Green (s)	20.9	33.0	13.0	25.1	12.0	14.5	12.7	15.2
Actuated g/C Ratio	0.23	0.37	0.15	0.28	0.13	0.16	0.14	0.17
v/c Ratio	0.95	0.97	0.08	0.77	0.54	0.33	0.17	0.50
Control Delay	69.3	46.9	35.4	19.1	45.6	22.5	38.7	11.7
Queue Delay	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0
Total Delay	69.3	46.9	35.4	19.9	45.6	22.5	38.7	11.7
LOS	E	D	D	B	D	C	D	B
Approach Delay		52.2		20.3		35.1		16.1
Approach LOS		D		C		D		B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 89.2

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

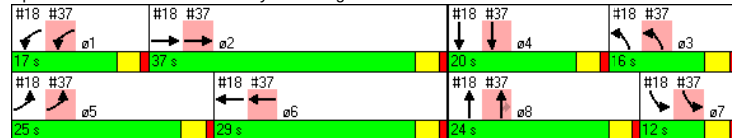
Maximum v/c Ratio: 0.98

Intersection Signal Delay: 39.1 Intersection LOS: D

Intersection Capacity Utilization 73.5% ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 18: Lakeway Dr & King St



HCM Signalized Intersection Capacity Analysis
18: Lakeway Dr & King St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.96		1.00	0.93		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	3416		1728	3314		1745	1713		1745	1594	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1745	3416		1728	3314		1745	1713		1745	1594	
Volume (vph)	370	1010	165	20	520	195	120	55	45	40	25	180
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	389	1063	174	21	547	205	126	58	47	42	26	189
RTOR Reduction (vph)	0	14	0	0	42	0	0	35	0	0	157	0
Lane Group Flow (vph)	389	1223	0	21	710	0	126	70	0	42	58	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	20.9	33.0		13.0	25.1		12.0	14.5		12.7	15.2	
Effective Green, g (s)	20.9	33.0		13.0	25.1		12.0	14.5		12.7	15.2	
Actuated g/C Ratio	0.23	0.37		0.15	0.28		0.13	0.16		0.14	0.17	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	409	1264		252	933		235	278		248	272	
v/s Ratio Prot	c0.22	c0.36		0.01	0.21		c0.07	c0.04		0.02	0.04	
v/s Ratio Perm												
v/c Ratio	0.95	0.97		0.08	0.76		0.54	0.25		0.17	0.21	
Uniform Delay, d1	33.6	27.6		32.9	29.3		36.0	32.6		33.6	31.9	
Progression Factor	1.00	1.00		1.04	0.55		1.00	1.00		1.00	1.00	
Incremental Delay, d2	32.1	17.8		0.1	2.3		2.3	0.5		0.3	0.4	
Delay (s)	65.7	45.4		34.2	18.5		38.4	33.1		33.9	32.3	
Level of Service	E	D		C	B		D	C		C	C	
Approach Delay (s)		50.2			18.9			36.0			32.5	
Approach LOS		D			B			D			C	

Intersection Summary

HCM Average Control Delay	39.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	89.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
24: E Chestnut St & Railroad Ave

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR							
Lane Configurations		↔↔↔						↔				↔							
Sign Control		Free			Free			Stop			Stop								
Grade		0%			0%			0%			0%								
Volume (veh/h)	55	945	35	0	0	0	0	30	35	90	45	0							
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91							
Hourly flow rate (vph)	60	1038	38	0	0	0	0	33	38	99	49	0							
Pedestrians					41			41			11								
Lane Width (ft)					0.0			11.0			11.0								
Walking Speed (ft/s)					4.0			4.0			4.0								
Percent Blockage					0			3			1								
Right turn flare (veh)																			
Median type								None			None								
Median storage (veh)																			
Upstream signal (ft)		353			350														
pX, platoon unblocked																			
vC, conflicting volume	11			1118			1244	1231	447	574	1250	11							
vC1, stage 1 conf vol																			
vC2, stage 2 conf vol																			
vCu, unblocked vol	11			1118			1244	1231	447	574	1250	11							
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9							
tC, 2 stage (s)																			
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3							
p0 queue free %	96			100			100	80	93	67	69	100							
cM capacity (veh/h)	1600			612			93	165	546	299	161	1065							
Direction, Lane #	EB 1	EB 2	EB 3	NB 1	SB 1														
Volume Total	320	519	298	71	148														
Volume Left	60	0	0	0	99														
Volume Right	0	0	38	38	0														
cSH	1600	1700	1700	265	233														
Volume to Capacity	0.04	0.31	0.18	0.27	0.64														
Queue Length 95th (ft)	3	0	0	27	97														
Control Delay (s)	1.7	0.0	0.0	23.5	44.2														
Lane LOS	A			C	E														
Approach Delay (s)	0.5			23.5	44.2														
Approach LOS				C	E														
Intersection Summary																			
Average Delay	6.5																		
Intersection Capacity Utilization	41.0%			ICU Level of Service			A												
Analysis Period (min)	15																		

Timings
25: E Chestnut St & N State St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

			
Lane Group	EBT	SBL	SBT
Lane Configurations	↑↑↑	↑	↑↑
Volume (vph)	730	220	635
Turn Type		Split	
Protected Phases	2	4	4
Permitted Phases			
Detector Phases	2	4	4
Minimum Initial (s)	6.0	6.0	6.0
Minimum Split (s)	22.0	20.0	20.0
Total Split (s)	24.0	21.0	21.0
Total Split (%)	53.3%	46.7%	46.7%
Yellow Time (s)	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	Max	Max	Max
Act Effct Green (s)	20.0	17.0	17.0
Actuated g/C Ratio	0.44	0.38	0.38
v/c Ratio	0.54	0.34	0.53
Control Delay	13.2	7.6	12.8
Queue Delay	0.0	0.0	0.0
Total Delay	13.2	7.6	12.8
LOS	B	A	B
Approach Delay	13.2		11.4
Approach LOS	B		B
Intersection Summary			
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 13 (29%), Referenced to phase 4:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 12.4		Intersection LOS: B	
Intersection Capacity Utilization 46.5%		ICU Level of Service A	
Analysis Period (min) 15			
Splits and Phases: 25: E Chestnut St & N State St			
 ø2  ø4 24 s 21 s			

HCM Signalized Intersection Capacity Analysis
25: E Chestnut St & N State St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑									↓	↑↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0								4.0	4.0	
Lane Util. Factor		0.91								1.00	0.95	
Frpb, ped/bikes		0.99								1.00	1.00	
Flpb, ped/bikes		1.00								1.00	1.00	
Frt		0.95								1.00	1.00	
Flt Protected		1.00								0.95	1.00	
Satd. Flow (prot)		4677								1728	3455	
Flt Permitted		1.00								0.95	1.00	
Satd. Flow (perm)		4677								1728	3455	
Volume (vph)	0	730	320	0	0	0	0	0	0	220	635	0
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	802	352	0	0	0	0	0	0	242	698	0
RTOR Reduction (vph)	0	52	0	0	0	0	0	0	0	62	0	0
Lane Group Flow (vph)	0	1102	0	0	0	0	0	0	0	180	698	0
Confl. Peds. (#/hr)		40								40		
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Turn Type										Split		
Protected Phases		2								4	4	
Permitted Phases												
Actuated Green, G (s)		20.0								17.0	17.0	
Effective Green, g (s)		20.0								17.0	17.0	
Actuated g/C Ratio		0.44								0.38	0.38	
Clearance Time (s)		4.0								4.0	4.0	
Lane Grp Cap (vph)		2079								653	1305	
v/s Ratio Prot		c0.24								0.10	c0.20	
v/s Ratio Perm												
v/c Ratio		0.53								0.28	0.53	
Uniform Delay, d1		9.1								9.7	10.9	
Progression Factor		1.45								1.00	1.00	
Incremental Delay, d2		0.9								1.0	1.6	
Delay (s)		14.1								10.8	12.5	
Level of Service		B								B	B	
Approach Delay (s)		14.1			0.0			0.0			12.0	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

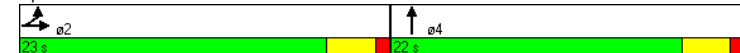
Timings
26: E Chestnut St & N Forest St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBT	NBT
Lane Configurations	↑↑↑	↑↑↑
Volume (vph)	680	550
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phases	2	4
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	22.0	21.0
Total Split (s)	23.0	22.0
Total Split (%)	51.1%	48.9%
Yellow Time (s)	3.0	3.0
All-Red Time (s)	1.0	1.0
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	Max
Act Effct Green (s)	19.0	18.0
Actuated g/C Ratio	0.42	0.40
v/c Ratio	0.46	0.37
Control Delay	3.7	8.6
Queue Delay	0.0	0.0
Total Delay	3.7	8.6
LOS	A	A
Approach Delay	3.7	8.6
Approach LOS	A	A

Intersection Summary	
Cycle Length: 45	
Actuated Cycle Length: 45	
Offset: 21 (47%), Referenced to phase 4:NBT, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.46	
Intersection Signal Delay: 5.7	Intersection LOS: A
Intersection Capacity Utilization 39.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 26: E Chestnut St & N Forest St



HCM Signalized Intersection Capacity Analysis
26: E Chestnut St & N Forest St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

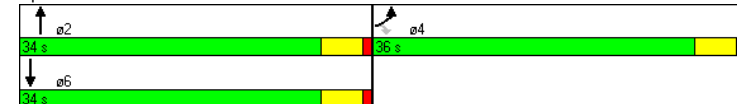
	↖	→	↗	↙	←	↖	↗	↑	↘	↓	↙	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖↖↖						↖↖↖				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0				
Lane Util. Factor		0.91						0.91				
Frpb, ped/bikes		1.00						0.99				
Flpb, ped/bikes		1.00						1.00				
Frt		1.00						0.97				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		4944						4736				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		4944						4736				
Volume (vph)	270	680	0	0	0	0	0	550	130	0	0	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	287	723	0	0	0	0	0	585	138	0	0	0
RTOR Reduction (vph)	0	92	0	0	0	0	0	68	0	0	0	0
Lane Group Flow (vph)	0	918	0	0	0	0	0	655	0	0	0	0
Confl. Peds. (#/hr)	40								40			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	Split											
Protected Phases	2	2						4				
Permitted Phases												
Actuated Green, G (s)		19.0						18.0				
Effective Green, g (s)		19.0						18.0				
Actuated g/C Ratio		0.42						0.40				
Clearance Time (s)		4.0						4.0				
Lane Grp Cap (vph)		2087						1894				
v/s Ratio Prot		c0.19						c0.14				
v/s Ratio Perm												
v/c Ratio		0.44						0.35				
Uniform Delay, d1		9.2						9.4				
Progression Factor		0.39						1.00				
Incremental Delay, d2		0.6						0.5				
Delay (s)		4.2						9.9				
Level of Service		A						A				
Approach Delay (s)		4.2			0.0			9.9			0.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay		6.6										
HCM Volume to Capacity ratio		0.39										
Actuated Cycle Length (s)		45.0						8.0				
Intersection Capacity Utilization		39.5%										
Analysis Period (min)		15										
c Critical Lane Group												

Timings
27: E Chestnut St & Ellis St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations	 		  	 
Volume (vph)	715	330	485	370
Turn Type	Perm			
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phases	4	4	2	6
Minimum Initial (s)	6.0	6.0	6.0	6.0
Minimum Split (s)	30.0	30.0	12.0	30.0
Total Split (s)	36.0	36.0	34.0	34.0
Total Split (%)	51.4%	51.4%	48.6%	48.6%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	20.7	20.7	17.9	17.9
Actuated g/C Ratio	0.43	0.43	0.37	0.37
v/c Ratio	0.54	0.44	0.28	0.31
Control Delay	12.3	3.9	11.1	11.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.3	3.9	11.1	11.6
LOS	B	A	B	B
Approach Delay	9.7		11.1	11.6
Approach LOS	A		B	B
Intersection Summary				
Cycle Length: 70				
Actuated Cycle Length: 47.9				
Natural Cycle: 60				
Control Type: Actuated-Uncoordinated				
Maximum v/c Ratio: 0.54				
Intersection Signal Delay: 10.4			Intersection LOS: B	
Intersection Capacity Utilization 41.8%			ICU Level of Service A	
Analysis Period (min) 15				

Splits and Phases: 27: E Chestnut St & Ellis St



HCM Signalized Intersection Capacity Analysis
27: E Chestnut St & Ellis St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.91	0.95	
Frpb, ped/bikes	1.00	0.96		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3319	1462		4964	3490	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3319	1462		4964	3490	
Volume (vph)	715	330	0	485	370	0
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	769	355	0	522	398	0
RTOR Reduction (vph)	0	182	0	0	0	0
Lane Group Flow (vph)	769	173	0	522	398	0
Confl. Peds. (#/hr)	60	60				
Heavy Vehicles (%)	2%	2%	1%	1%	0%	0%
Turn Type	Perm					
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	19.5	19.5		16.7	16.7	
Effective Green, g (s)	20.5	20.5		17.7	17.7	
Actuated g/C Ratio	0.44	0.44		0.38	0.38	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1473	649		1902	1337	
v/s Ratio Prot	c0.23			0.11	c0.11	
v/s Ratio Perm		0.12				
v/c Ratio	0.52	0.27		0.27	0.30	
Uniform Delay, d1	9.3	8.1		9.8	9.9	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2		0.1	0.1	
Delay (s)	9.6	8.3		9.9	10.0	
Level of Service	A	A		A	B	
Approach Delay (s)	9.2			9.9	10.0	
Approach LOS	A			A	B	
Intersection Summary						
HCM Average Control Delay		9.6		HCM Level of Service		A
HCM Volume to Capacity ratio		0.42				
Actuated Cycle Length (s)		46.2		Sum of lost time (s)		8.0
Intersection Capacity Utilization		41.8%		ICU Level of Service		A
Analysis Period (min)		15				
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
28: Laurel St & N State St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔					↔↔↔
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	10	0	0	0	25	825
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	11	0	0	0	28	917
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						1046
pX, platoon unblocked						
vC, conflicting volume	361	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	361	0			0	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			98	
cM capacity (veh/h)	606	1091			1629	
Direction, Lane #						
Volume Total	11	211	367	367		
Volume Left	11	28	0	0		
Volume Right	0	0	0	0		
cSH	606	1629	1700	1700		
Volume to Capacity	0.02	0.02	0.22	0.22		
Queue Length 95th (ft)	1	1	0	0		
Control Delay (s)	11.1	1.1	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	11.1	0.2				
Approach LOS	B					
Intersection Summary						
Average Delay		0.4				
Intersection Capacity Utilization		26.4%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
29: Laurel St & N Forest St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕↕↕				
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	30	15	0	0	15	45	5	600	10	0	0	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	36	18	0	0	18	54	6	714	12	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)										1032		
pX, platoon unblocked												
vC, conflicting volume	312	738	0	741	732	244	0			726		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	312	738	0	741	732	244	0			726		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	95	100	100	95	93	100			100		
cM capacity (veh/h)	550	343	1084	295	349	763	1622			886		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3							
Volume Total	54	71	185	357	190							
Volume Left	36	0	6	0	0							
Volume Right	0	54	0	0	12							
cSH	458	589	1622	1700	1700							
Volume to Capacity	0.12	0.12	0.00	0.21	0.11							
Queue Length 95th (ft)	10	10	0	0	0							
Control Delay (s)	13.9	12.0	0.3	0.0	0.0							
Lane LOS	B	B	A									
Approach Delay (s)	13.9	12.0	0.1									
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.9									
Intersection Capacity Utilization	27.7%		ICU Level of Service					A				
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
30: Wharf Street & N State St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	30	70	0	640	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	33	76	0	696	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	853	701	707			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	853	701	707			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	93	91			
cM capacity (veh/h)	301	439	892			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	33	76	707			
Volume Left	0	76	0			
Volume Right	33	0	11			
cSH	439	892	1700			
Volume to Capacity	0.07	0.09	0.42			
Queue Length 95th (ft)	6	7	0			
Control Delay (s)	13.9	9.4	0.0			
Lane LOS	B	A				
Approach Delay (s)	13.9	9.4	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization	44.8%		ICU Level of Service	A		
Analysis Period (min)	15					

Timings
31: Bill McDonald Pkwy & Samish Way

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱	↰
Volume (vph)	235	25	25	25	290	375	15	400	260
Turn Type	Perm		Perm		pm+pt		pm+pt		Perm
Protected Phases		4			8	5	2	1	6
Permitted Phases	4		8		2		6		6
Detector Phases	4	4	8	8	5	2	1	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	11.0	30.0	30.0	11.0	28.0	11.0	29.0	29.0
Total Split (s)	43.0	43.0	43.0	43.0	33.0	49.0	18.0	34.0	34.0
Total Split (%)	39.1%	39.1%	39.1%	39.1%	30.0%	44.5%	16.4%	30.9%	30.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	17.4	17.4		17.4	32.5	31.0	19.9	12.6	12.6
Actuated g/C Ratio	0.30	0.30		0.30	0.55	0.53	0.29	0.21	0.21
v/c Ratio	0.62	0.53		0.15	0.47	0.23	0.04	0.55	0.49
Control Delay	27.3	6.4		15.3	10.9	9.7	12.5	26.4	7.5
Queue Delay	0.0	0.1		0.0	0.3	0.1	0.0	0.0	0.0
Total Delay	27.3	6.4		15.3	11.2	9.8	12.5	26.4	7.5
LOS	C	A		B	B	A	B	C	A
Approach Delay		14.7		15.3		10.4		18.8	
Approach LOS		B		B		B		B	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 58.9	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 14.6	Intersection LOS: B
Intersection Capacity Utilization 62.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 31: Bill McDonald Pkwy & Samish Way

ø1	ø2	ø4
18 s	49 s	43 s
ø5	ø6	ø8
33 s	34 s	43 s

HCM Signalized Intersection Capacity Analysis
31: Bill McDonald Pkwy & Samish Way

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.86			0.97		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	1550			1747		1728	3422		1745	3490	1561
Flt Permitted	0.71	1.00			0.74		0.37	1.00		0.51	1.00	1.00
Satd. Flow (perm)	1284	1550			1318		665	3422		937	3490	1561
Volume (vph)	235	25	330	25	25	15	290	375	25	15	400	260
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	242	26	340	26	26	15	299	387	26	15	412	268
RTOR Reduction (vph)	0	245	0	0	11	0	0	4	0	0	0	192
Lane Group Flow (vph)	242	121	0	0	56	0	299	409	0	15	412	76
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm			Perm			pm+pt			pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	16.3	16.3			16.3		35.7	29.9		17.3	16.5	16.5
Effective Green, g (s)	17.3	17.3			17.3		36.7	30.9		19.3	17.5	17.5
Actuated g/C Ratio	0.28	0.28			0.28		0.59	0.50		0.31	0.28	0.28
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		2.0	2.0		3.0	2.0	2.0
Lane Grp Cap (vph)	358	433			368		654	1705		315	985	441
v/s Ratio Prot		0.08					c0.11	0.12		0.00	0.12	
v/s Ratio Perm	c0.19				0.04		c0.16			0.01		0.05
v/c Ratio	0.68	0.28			0.15		0.46	0.24		0.05	0.42	0.17
Uniform Delay, d1	19.9	17.5			16.8		6.7	8.9		14.8	18.1	16.8
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.0	0.4			0.2		0.2	0.0		0.1	0.1	0.1
Delay (s)	24.8	17.8			17.0		6.9	8.9		14.9	18.2	16.8
Level of Service	C	B			B		A	A		B	B	B
Approach Delay (s)		20.6			17.0			8.0			17.6	
Approach LOS		C			B			A			B	

Intersection Summary	
HCM Average Control Delay	15.2
HCM Volume to Capacity ratio	0.52
Actuated Cycle Length (s)	62.0
Intersection Capacity Utilization	62.3%
Analysis Period (min)	15
c Critical Lane Group	

Timings
32: Samish Way & I-5 SB Off-Ramp

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	→	↘	↙	←	↖	↗	↓	↘		
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	ø8
Lane Configurations	↑↑	↑↑	↑	↑↑	↑	↑	↑	↑	↑	
Volume (vph)	650	105	245	350	135	380	160	235	220	
Turn Type	Perm		pm+pt		Prot		custom	Split	Prot	
Protected Phases	6		5	2	4	4	3	3	3	8
Permitted Phases	6		2							
Detector Phases	6	6	5	2	4	4	3	3	3	
Minimum Initial (s)	7.0	7.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0	20.0
Minimum Split (s)	22.0	22.0	9.5	22.0	12.0	12.0	11.5	11.5	11.5	25.0
Total Split (s)	30.0	30.0	19.0	49.0	15.0	15.0	21.0	21.0	21.0	25.0
Total Split (%)	27.3%	27.3%	17.3%	44.5%	13.6%	13.6%	19.1%	19.1%	19.1%	23%
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	4.0	3.5	3.5	3.5	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lead	Lead	Lead	
Lead-Lag Optimize?										
Recall Mode	Min	Min	None	Min	None	None	None	None	None	None
Act Effct Green (s)	22.1	22.1	40.5	40.5	10.7	10.7	15.8	15.8	15.8	
Actuated g/C Ratio	0.28	0.28	0.51	0.51	0.14	0.14	0.20	0.20	0.20	
v/c Ratio	0.71	0.22	0.65	0.21	0.61	0.72	0.48	0.67	0.47	
Control Delay	30.4	5.9	24.1	11.0	46.6	12.4	34.6	40.6	7.8	
Queue Delay	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	32.5	5.9	24.1	11.0	46.6	12.4	34.6	40.6	7.8	
LOS	C	A	C	B	D	B	C	D	A	
Approach Delay	28.8			16.4			27.3			
Approach LOS	C			B			C			

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 79.2

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 23.9 Intersection LOS: C

Intersection Capacity Utilization 64.7% ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 32: Samish Way & I-5 SB Off-Ramp

← ø2	↘ ø3	↙ ø4	↘ ø8
49 s	21 s	15 s	25 s
↙ ø5	→ ø6		
19 s	30 s		

HCM Signalized Intersection Capacity Analysis
32: Samish Way & I-5 SB Off-Ramp

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑	↑	↓	↑↑		↓		↑	↓	↑	↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00		1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00		1.00		0.85	1.00	1.00	0.85	
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00	0.95	1.00	1.00	
Satd. Flow (prot)		3455	1546	1728	3455		1728		1546	1745	1837	1561	
Flt Permitted		1.00	1.00	0.18	1.00		0.95		1.00	0.95	1.00	1.00	
Satd. Flow (perm)		3455	1546	324	3455		1728		1546	1745	1837	1561	
Volume (vph)	0	650	105	245	350	0	135	0	380	160	235	220	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	684	111	258	368	0	142	0	400	168	247	232	
RTOR Reduction (vph)	0	0	80	0	0	0	0	0	346	0	0	186	
Lane Group Flow (vph)	0	684	31	258	368	0	142	0	54	168	247	46	
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%	
Turn Type		Perm		pm+pt			Prot		custom	Split		Prot	
Protected Phases		6		5	2		4		4	3	3	3	
Permitted Phases		6		2									
Actuated Green, G (s)		21.1	21.1	39.5	39.5		9.7		9.7	15.3	15.3	15.3	
Effective Green, g (s)		22.1	22.1	40.5	40.5		10.7		10.7	15.8	15.8	15.8	
Actuated g/C Ratio		0.28	0.28	0.51	0.51		0.14		0.14	0.20	0.20	0.20	
Clearance Time (s)		5.0	5.0	4.5	5.0		5.0		5.0	4.5	4.5	4.5	
Vehicle Extension (s)		3.5	3.5	3.5	3.5		3.5		3.5	4.0	4.0	4.0	
Lane Grp Cap (vph)		967	432	422	1771		234		209	349	367	312	
v/s Ratio Prot		c0.20		c0.11	0.11		c0.08		0.04	0.10	c0.13	0.03	
v/s Ratio Perm			0.02	0.20									
v/c Ratio		0.71	0.07	0.61	0.21		0.61		0.26	0.48	0.67	0.15	
Uniform Delay, d1		25.5	20.9	13.0	10.5		32.2		30.6	28.0	29.2	26.1	
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.5	0.1	2.7	0.1		4.6		0.8	1.4	5.2	0.3	
Delay (s)		28.0	21.0	15.8	10.6		36.8		31.4	29.4	34.5	26.4	
Level of Service		C	C	B	B		D		C	C	C	C	
Approach Delay (s)		27.0			12.7			32.8			30.2		
Approach LOS		C			B			C			C		

Intersection Summary

HCM Average Control Delay	25.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
33: Samish Way & Lincoln St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Volume (vph)	850	55	325	5	20	270	265	15	100	325
Turn Type	custom	pm+ov	custom	pm+pt	pm+pt	pm+ov	pm+ov	pm+ov	pm+ov	pm+ov
Protected Phases	4	4	5	3	3	5	2	1	6	4
Permitted Phases	4		4	3		2		6		6
Detector Phases	4	4	5	3	3	5	2	1	6	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	33.0	33.0	11.0	30.0	30.0	11.0	24.0	11.0	33.0	33.0
Total Split (s)	36.0	36.0	11.0	30.0	30.0	11.0	33.0	11.0	33.0	36.0
Total Split (%)	32.7%	32.7%	10.0%	27.3%	27.3%	10.0%	30.0%	10.0%	30.0%	32.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	Min	None	Min	None
Act Effct Green (s)	30.5	30.5	42.0	7.5	7.5	22.3	21.3	18.8	11.5	44.0
Actuated g/C Ratio	0.45	0.45	0.62	0.10	0.10	0.33	0.31	0.24	0.17	0.65
v/c Ratio	0.63	0.66	0.31	0.03	0.20	0.63	0.50	0.06	0.34	0.30
Control Delay	22.6	23.4	2.3	34.0	25.9	27.2	25.2	20.3	29.5	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.6	23.4	2.3	34.0	25.9	27.2	25.2	20.3	29.5	1.1
LOS	C	C	A	C	C	C	C	C	C	A
Approach Delay	17.5				26.8		26.2		8.2	
Approach LOS	B				C		C		A	

Intersection Summary										
Cycle Length: 110										
Actuated Cycle Length: 68										
Natural Cycle: 110										
Control Type: Actuated-Uncoordinated										
Maximum v/c Ratio: 0.66										
Intersection Signal Delay: 18.0										
Intersection Capacity Utilization 59.9%										
Analysis Period (min) 15										

Splits and Phases: 33: Samish Way & Lincoln St

ø1	ø2	ø3	ø4
11 s	33 s	30 s	36 s
ø5	ø6		
11 s	33 s		

HCM Signalized Intersection Capacity Analysis
33: Samish Way & Lincoln St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Flt	1.00	1.00	0.85	1.00	0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1641	1655	1546	1694	1668		1728	1814		1728	1818	1546
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.55	1.00		0.57	1.00	1.00
Satd. Flow (perm)	1641	1655	1546	1694	1668		1000	1814		1030	1818	1546
Volume (vph)	850	55	325	5	20	15	270	265	5	15	100	325
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	895	58	342	5	21	16	284	279	5	16	105	342
RTOR Reduction (vph)	0	0	168	0	15	0	0	1	0	0	0	128
Lane Group Flow (vph)	464	489	174	5	22	0	284	283	0	16	105	214
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	custom	pm+ov	custom	pm+pt	pm+pt	pm+ov	pm+pt	pm+pt	pm+ov	pm+pt	pm+pt	pm+ov
Protected Phases	4	4	5	3	3		5	2		1	6	4
Permitted Phases	4		4	3			2			6		6
Actuated Green, G (s)	29.5	29.5	35.8	3.5	3.5		26.1	20.2		15.7	14.8	44.3
Effective Green, g (s)	30.5	30.5	37.8	4.5	4.5		27.1	21.2		17.7	15.8	46.3
Actuated g/C Ratio	0.41	0.41	0.51	0.06	0.06		0.37	0.29		0.24	0.21	0.62
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	675	681	872	103	101		437	519		264	388	966
v/s Ratio Prot	0.28	c0.30	0.02	0.00	c0.01		c0.06	0.16		0.00	0.06	0.09
v/s Ratio Perm			0.09				c0.17			0.01		0.05
v/c Ratio	0.69	0.72	0.20	0.05	0.22		0.65	0.55		0.06	0.27	0.22
Uniform Delay, d1	17.9	18.2	9.9	32.8	33.1		18.7	22.4		21.7	24.3	6.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.3	3.0	0.0	0.1	0.4		2.5	0.6		0.0	0.1	0.0
Delay (s)	20.2	21.2	9.9	32.9	33.5		21.2	23.0		21.7	24.5	6.1
Level of Service	C	C	A	C	C		C	C		C	C	A
Approach Delay (s)	17.9				33.4		22.1			10.8		
Approach LOS	B				C		C			B		

Intersection Summary			
HCM Average Control Delay	17.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	74.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
34: Old Fairhaven Pkwy & 12th St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	5	125	230	95	20	190	190	255
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	27.0	11.0	27.0	11.0	27.0	11.0	27.0
Total Split (s)	11.0	27.0	11.0	27.0	11.0	28.0	14.0	31.0
Total Split (%)	13.8%	33.8%	13.8%	33.8%	13.8%	35.0%	17.5%	38.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)	17.8	12.4	20.1	18.7	30.7	26.1	35.3	32.4
Actuated g/C Ratio	0.24	0.19	0.30	0.29	0.43	0.40	0.52	0.50
v/c Ratio	0.02	0.44	0.59	0.49	0.04	0.52	0.48	0.31
Control Delay	16.6	27.8	24.7	15.6	10.4	19.5	13.3	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	27.8	24.7	15.6	10.4	19.5	13.3	14.8
LOS	B	C	C	B	B	B	B	B
Approach Delay		27.4		19.8		19.0		14.2
Approach LOS		C		B		B		B

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 65.2
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.59
Intersection Signal Delay: 18.6
Intersection Capacity Utilization 64.5%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service C

Splits and Phases: 34: Old Fairhaven Pkwy & 12th St

ø1	ø2	ø3	ø4
14 s	28 s	11 s	27 s
ø5	ø6	ø7	ø8
11 s	31 s	11 s	27 s

HCM Signalized Intersection Capacity Analysis
34: Old Fairhaven Pkwy & 12th St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.90		1.00	0.93		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1703	1764		1787	1702		1805	1765		1787	1866	
Flt Permitted	0.50	1.00		0.50	1.00		0.58	1.00		0.33	1.00	
Satd. Flow (perm)	889	1764		941	1702		1106	1765		622	1866	
Volume (vph)	5	125	15	230	95	165	20	190	170	190	255	15
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	5	134	16	247	102	177	22	204	183	204	274	16
RTOR Reduction (vph)	0	6	0	0	81	0	0	36	0	0	2	0
Lane Group Flow (vph)	5	144	0	247	198	0	22	351	0	204	288	0
Heavy Vehicles (%)	6%	6%	6%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.3	14.3		22.1	17.7		29.0	26.9		37.8	31.3	
Effective Green, g (s)	17.3	15.3		24.1	18.7		31.0	27.9		39.4	32.3	
Actuated g/C Ratio	0.24	0.21		0.33	0.26		0.43	0.39		0.55	0.45	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	236	374		378	441		506	683		461	836	
v/s Ratio Prot	0.00	0.08		c0.05	0.12		0.00	c0.20		c0.05	0.15	
v/s Ratio Perm	0.00			c0.17			0.02			0.20		
v/c Ratio	0.02	0.38		0.65	0.45		0.04	0.51		0.44	0.34	
Uniform Delay, d1	20.9	24.4		20.0	22.4		11.9	16.9		9.6	13.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.7		4.0	0.7		0.0	2.8		0.7	1.1	
Delay (s)	21.0	25.0		24.0	23.1		11.9	19.7		10.3	14.1	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		24.9			23.5			19.3			12.6	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	72.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
35: Hawthorne & 12th St

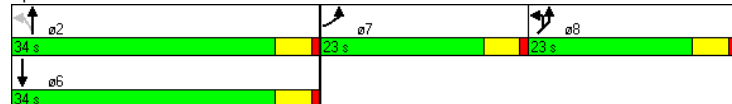
Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	NBL	NBT	SBT	NEL
Lane Group	EBL	NBL	NBT	SBT	NEL
Lane Configurations					
Volume (vph)	110	5	230	305	35
Turn Type	Perm				
Protected Phases	7		2	6	8
Permitted Phases		2			
Detector Phases	7	2	2	6	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	23.0	26.0	26.0	26.0	23.0
Total Split (s)	23.0	34.0	34.0	34.0	23.0
Total Split (%)	28.8%	42.5%	42.5%	42.5%	28.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead				Lag
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	Max	None
Act Effct Green (s)	10.3		30.9	30.9	8.0
Actuated g/C Ratio	0.19		0.57	0.57	0.13
v/c Ratio	0.38		0.24	0.50	0.18
Control Delay	23.6		8.9	11.0	24.1
Queue Delay	0.0		0.0	0.0	0.0
Total Delay	23.6		8.9	11.0	24.1
LOS	C		A	B	C
Approach Delay	23.7		8.9	11.0	24.1
Approach LOS	C		A	B	C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 53.8
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.50
Intersection Signal Delay: 12.8
Intersection Capacity Utilization 48.7%
Analysis Period (min) 15

Splits and Phases: 35: Hawthorne & 12th St



HCM Signalized Intersection Capacity Analysis
35: Hawthorne & 12th St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBR	EBR2	NBL	NBT	SBT	SBR	SBR2	NEL	NER
Movement	EBL	EBR	EBR2	NBL	NBT	SBT	SBR	SBR2	NEL	NER
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0				4.0	4.0			4.0	
Lane Util. Factor	1.00				1.00	1.00			1.00	
Frt	0.99				1.00	0.95			0.98	
Flt Protected	0.96				1.00	1.00			0.96	
Satd. Flow (prot)	1780				1861	1805			1791	
Flt Permitted	0.96				0.99	1.00			0.96	
Satd. Flow (perm)	1780				1847	1805			1791	
Volume (vph)	110	5	5	5	230	305	30	150	35	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	5	5	5	250	332	33	163	38	5
RTOR Reduction (vph)	2	0	0	0	0	15	0	0	5	0
Lane Group Flow (vph)	128	0	0	0	255	513	0	0	38	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	0%	0%	0%	0%	0%
Turn Type	Perm									
Protected Phases	7				2	6			8	
Permitted Phases				2						
Actuated Green, G (s)	9.3				29.8	29.8			2.7	
Effective Green, g (s)	10.3				30.8	30.8			3.7	
Actuated g/C Ratio	0.18				0.54	0.54			0.07	
Clearance Time (s)	5.0				5.0	5.0			5.0	
Vehicle Extension (s)	3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)	323				1002	979			117	
v/s Ratio Prot	c0.07					c0.28			c0.02	
v/s Ratio Perm					0.14					
v/c Ratio	0.40				0.25	0.52			0.33	
Uniform Delay, d1	20.5				6.9	8.3			25.4	
Progression Factor	1.00				1.00	1.00			1.00	
Incremental Delay, d2	0.8				0.1	2.0			1.6	
Delay (s)	21.3				7.0	10.3			27.0	
Level of Service	C				A	B			C	
Approach Delay (s)	21.3				7.0	10.3			27.0	
Approach LOS	C				A	B			C	

Intersection Summary

HCM Average Control Delay 11.7
HCM Volume to Capacity ratio 0.48
Actuated Cycle Length (s) 56.8
Intersection Capacity Utilization 48.7%
Analysis Period (min) 15

c Critical Lane Group

Timings
36: Birchwood Ave & Meridian Street

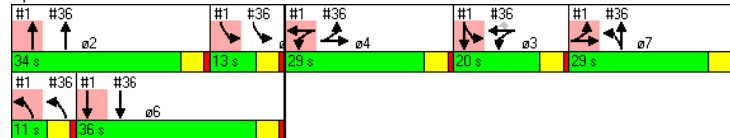
Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT	ø2	ø5	ø7
Lane Configurations											
Volume (vph)	190	95	145	180	75	690	80	575			
Turn Type	Split		Perm		Prot		Prot				
Protected Phases	4	4	3		5 7	2 7	1	6	2	5	7
Permitted Phases				3							
Detector Phases	4	4	3	3	5 7	2 7	1	6			
Minimum Initial (s)	6.0	6.0	6.0	6.0			6.0	10.0	10.0	6.0	6.0
Minimum Split (s)	29.0	29.0	11.0	11.0			11.0	23.0	23.0	11.0	29.0
Total Split (s)	29.0	29.0	20.0	20.0	40.0	63.0	13.0	36.0	34.0	11.0	29.0
Total Split (%)	23.2%	23.2%	16.0%	16.0%	32.0%	50.4%	10.4%	28.8%	27%	9%	23%
Yellow Time (s)	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lead	Lag	Lag			Lag	Lag	Lead	Lead	
Lead-Lag Optimize?											
Recall Mode	None	None	None	None			None	None	Max	None	None
Act Effct Green (s)	18.7	18.7	15.6	15.6	33.3	56.9	8.7	32.2			
Actuated g/C Ratio	0.17	0.17	0.14	0.14	0.29	0.50	0.08	0.28			
v/c Ratio	0.70	0.49	0.87	0.50	0.16	0.44	0.66	0.90			
Control Delay	59.0	44.8	81.9	11.7	57.9	5.6	77.8	51.7			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0			
Total Delay	59.0	44.8	81.9	11.7	57.9	6.0	77.8	51.7			
LOS	E	D	F	B	E	A	E	D			
Approach Delay		53.0	49.0			10.9		54.0			
Approach LOS		D	D			B		D			

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 113.2
Natural Cycle: 115
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 38.8
Intersection Capacity Utilization 63.1%
Analysis Period (min) 15

Splits and Phases: 36: Birchwood Ave & Meridian Street



HCM Signalized Intersection Capacity Analysis
36: Birchwood Ave & Meridian Street

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95		
Frt	1.00	0.95		1.00	0.85	1.00	0.99		1.00	0.96		
Flt Protected	0.95	1.00		0.99	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1805	1809		1873	1615	1787	3556		1752	3355		
Flt Permitted	0.95	1.00		0.99	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (perm)	1805	1809		1873	1615	1787	3556		1752	3355		
Volume (vph)	190	95	45	60	145	180	75	690	25	80	575	230
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	209	104	49	66	159	198	82	758	27	88	632	253
RTOR Reduction (vph)	0	14	0	0	0	171	0	2	0	0	33	0
Lane Group Flow (vph)	209	139	0	0	225	27	82	783	0	88	852	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split		Perm	Prot			Prot		
Protected Phases	4	4		3	3		5 7	2 7		1	6	
Permitted Phases						3						
Actuated Green, G (s)	17.7	17.7		14.6	14.6		30.6	55.8		6.0	31.2	
Effective Green, g (s)	18.7	18.7		15.6	15.6		31.6	56.8		7.0	32.2	
Actuated g/C Ratio	0.16	0.16		0.14	0.14		0.28	0.50		0.06	0.28	
Clearance Time (s)	5.0	5.0		5.0	5.0					5.0	5.0	
Vehicle Extension (s)	3.0	3.0		2.0	2.0					2.0	2.0	
Lane Grp Cap (vph)	296	296		256	221		495	1770		107	947	
v/s Ratio Prot	c0.12	0.08		c0.12			0.05	c0.22		0.05	c0.25	
v/s Ratio Perm						0.02						
v/c Ratio	0.71	0.47		0.88	0.12		0.17	0.44		0.82	0.90	
Uniform Delay, d1	45.1	43.2		48.3	43.2		31.3	18.5		52.9	39.4	
Progression Factor	1.00	1.00		1.00	1.00		1.78	0.26		1.00	1.00	
Incremental Delay, d2	7.5	1.2		26.3	0.1		0.0	0.1		36.2	11.0	
Delay (s)	52.6	44.4		74.7	43.3		55.6	4.9		89.2	50.4	
Level of Service	D	D		E	D		E	A		F	D	
Approach Delay (s)		49.1		60.0			9.7			53.9		
Approach LOS		D		E			A			D		

Intersection Summary

HCM Average Control Delay	39.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	114.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

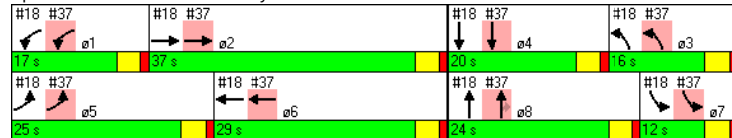
Timings
37: Lakeway Dr & Lincoln Street

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	40	925	225	525	205	140	405	125	190
Turn Type	Prot		Prot		Prot		Perm	Prot	
Protected Phases	5	2	1	6	3	8		7	4
Permitted Phases							8		
Detector Phases	5	2	1	6	3	8		7	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	25.0	37.0	17.0	29.0	16.0	24.0	24.0	12.0	20.0
Total Split (%)	27.8%	41.1%	18.9%	32.2%	17.8%	26.7%	26.7%	13.3%	22.2%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?									
Recall Mode	None	Min	None	None	None	Min	Min	None	None
Act Effct Green (s)	20.9	33.0	13.0	25.1	12.0	14.5	14.5	12.7	15.2
Actuated g/C Ratio	0.23	0.37	0.15	0.28	0.13	0.16	0.16	0.14	0.17
v/c Ratio	0.11	0.88	0.98	0.67	0.97	0.52	0.85	0.56	0.85
Control Delay	48.4	16.8	93.5	32.0	93.1	39.6	26.1	49.5	59.5
Queue Delay	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	19.9	93.5	32.0	93.1	39.6	26.1	49.5	59.5
LOS	D	B	F	C	F	D	C	D	E
Approach Delay		20.9		49.0		46.9			56.1
Approach LOS		C		D		D			E

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 89.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 39.4	Intersection LOS: D
Intersection Capacity Utilization 78.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 37: Lakeway Dr & Lincoln Street



HCM Signalized Intersection Capacity Analysis
37: Lakeway Dr & Lincoln Street

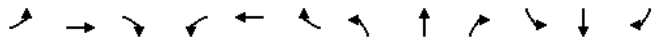
Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	1.00		0.85	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		1.00	0.95	
Satd. Flow (prot)	1711	3374		1711	3364		1711	1801		1531	1711	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		1.00	0.95	
Satd. Flow (perm)	1711	3374		1711	3364		1711	1801		1531	1711	
Volume (vph)	40	925	95	225	525	65	205	140	405	125	190	50
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	1005	103	245	571	71	223	152	440	136	207	54
RTOR Reduction (vph)	0	9	0	0	11	0	0	0	270	0	11	0
Lane Group Flow (vph)	43	1099	0	245	631	0	223	152	170	136	250	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			
Actuated Green, G (s)	20.9	33.0		13.0	25.1		12.0	14.5	14.5	12.7	15.2	
Effective Green, g (s)	20.9	33.0		13.0	25.1		12.0	14.5	14.5	12.7	15.2	
Actuated g/C Ratio	0.23	0.37		0.15	0.28		0.13	0.16	0.16	0.14	0.17	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	401	1248		249	947		230	293	249	244	297	
v/s Ratio Prot	0.03	c0.33		c0.14	0.19		c0.13	0.08		0.08	c0.14	
v/s Ratio Perm									0.11			
v/c Ratio	0.11	0.88		0.98	0.67		0.97	0.52	0.68	0.56	0.84	
Uniform Delay, d1	26.8	26.3		38.0	28.3		38.4	34.2	35.2	35.6	35.8	
Progression Factor	1.75	0.45		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	3.2		52.2	1.8		50.1	1.6	7.6	2.7	19.0	
Delay (s)	46.9	15.0		90.2	30.1		88.5	35.7	42.7	38.4	54.9	
Level of Service	D	B		F	C		F	D	D	D	D	
Approach Delay (s)		16.2			46.7			54.0			49.2	
Approach LOS		B			D			D			D	

Intersection Summary	
HCM Average Control Delay	38.0
HCM Volume to Capacity ratio	0.91
Actuated Cycle Length (s)	89.2
Intersection Capacity Utilization	78.8%
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
38: N Forrest St & N State St

Existing (2007) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑							↑	↑	↑	
Sign Control	Free				Free		Stop				Stop	
Grade	0%				0%		0%				0%	
Volume (veh/h)	0	460	0	0	0	0	0	0	90	40	90	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	500	0	0	0	0	0	0	98	43	98	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None								None			
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			500			549	500	500	598	500	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			500			549	500	500	598	500	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	83	87	79	100
cM capacity (veh/h)	1623			1064			375	473	571	343	473	1085
Direction, Lane #	EB 1	NB 1	SB 1	SB 2								
Volume Total	500	98	43	98								
Volume Left	0	0	43	0								
Volume Right	0	98	0	0								
cSH	1700	571	343	473								
Volume to Capacity	0.29	0.17	0.13	0.21								
Queue Length 95th (ft)	0	15	11	19								
Control Delay (s)	0.0	12.6	17.0	14.6								
Lane LOS		B	C	B								
Approach Delay (s)	0.0	12.6	15.3									
Approach LOS		B	C									
Intersection Summary												
Average Delay			4.6									
Intersection Capacity Utilization	43.6%		ICU Level of Service		A							
Analysis Period (min)	15											

Timings
19: Roeder Ave & F St

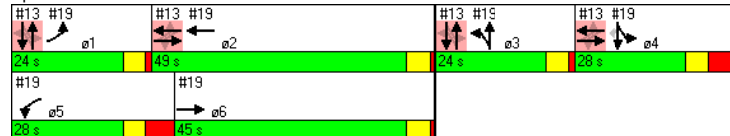
No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	230	505	5	530	20	15	12	185
Turn Type	Prot		Prot		Split		Perm	
Protected Phases	1	6	5	2	3	3	4	
Permitted Phases								4
Detector Phases	1	6	5	2	3	3	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	28.0	24.0	24.0	24.0	28.0	28.0
Total Split (s)	24.0	45.0	28.0	49.0	24.0	24.0	28.0	28.0
Total Split (%)	19.2%	36.0%	22.4%	39.2%	19.2%	19.2%	22.4%	22.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	5.0	1.0	1.0	1.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?								
Recall Mode	Min	Max	None	None	None	None	None	None
Act Effct Green (s)	19.3	65.3	11.2	45.1	18.3	18.3	23.6	23.6
Actuated g/C Ratio	0.16	0.53	0.09	0.37	0.15	0.15	0.19	0.19
v/c Ratio	0.89	0.55	0.03	0.97	0.09	0.09	0.50	0.43
Control Delay	83.1	23.3	52.2	67.9	46.2	38.2	47.3	9.9
Queue Delay	0.0	0.0	0.0	10.4	0.0	0.1	1.2	0.3
Total Delay	83.1	23.3	52.2	78.3	46.2	38.2	48.5	10.2
LOS	F	C	D	E	D	D	D	B
Approach Delay		41.9		78.1		42.2	27.8	
Approach LOS		D		E		D	C	

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 122.3
Natural Cycle: 115
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 51.9
Intersection Capacity Utilization 70.5%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service C

Splits and Phases: 19: Roeder Ave & F St



HCM Signalized Intersection Capacity Analysis
19: Roeder Ave & F St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.96	1.00
Satd. Flow (prot)	1728	1816		1711	1767		1479	1501			1721	1531
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.96	1.00
Satd. Flow (perm)	1728	1816		1711	1767		1479	1501			1721	1531
Volume (vph)	230	505	5	5	530	75	20	15	5	145	12	185
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	242	532	5	5	558	79	21	16	5	153	13	195
RTOR Reduction (vph)	0	0	0	0	4	0	0	4	0	0	0	159
Lane Group Flow (vph)	242	537	0	5	633	0	21	17	0	0	166	36
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	18%	18%	18%	2%	2%	2%
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	18.3	64.3		1.4	51.4		17.3	17.3			18.6	18.6
Effective Green, g (s)	19.3	65.3		6.4	52.4		18.3	18.3			23.6	23.6
Actuated g/C Ratio	0.15	0.50		0.05	0.40		0.14	0.14			0.18	0.18
Clearance Time (s)	5.0	5.0		9.0	5.0		5.0	5.0			9.0	9.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	257	915		84	714		209	212			313	279
v/s Ratio Prot	c0.14	0.30		0.00	c0.36		c0.01	0.01			c0.10	
v/s Ratio Perm												0.02
v/c Ratio	0.94	0.59		0.06	0.89		0.10	0.08			0.53	0.13
Uniform Delay, d1	54.6	22.6		58.7	35.9		48.5	48.3			48.0	44.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			0.93	1.17
Incremental Delay, d2	40.3	2.8		0.3	12.8		0.2	0.2			1.6	0.2
Delay (s)	94.9	25.4		59.0	48.6		48.7	48.5			46.3	52.1
Level of Service	F	C		E	D		D	D			D	D
Approach Delay (s)		47.0			48.7			48.6			49.5	
Approach LOS		D			D			D			D	

Intersection Summary

HCM Average Control Delay	48.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	129.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
20: Roeder Ave & C St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	15	630	20	20	580	15	25	15	55	25	15	15
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	16	663	21	21	611	16	26	16	58	26	16	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		735										
pX, platoon unblocked				0.78			0.78	0.78	0.78	0.78	0.78	
vC, conflicting volume	626			684			1389	1374	674	1432	1376	618
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	626			597			1497	1477	584	1551	1480	618
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			97			60	83	86	50	83	97
cM capacity (veh/h)	965			775			65	95	404	53	95	493
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	700	647	100	58								
Volume Left	16	21	26	26								
Volume Right	21	16	58	16								
cSH	965	775	141	83								
Volume to Capacity	0.02	0.03	0.71	0.69								
Queue Length 95th (ft)	1	2	102	83								
Control Delay (s)	0.4	0.7	77.1	114.3								
Lane LOS	A	A	F	F								
Approach Delay (s)	0.4	0.7	77.1	114.3								
Approach LOS			F	F								
Intersection Summary												
Average Delay	10.0											
Intersection Capacity Utilization	54.0%		ICU Level of Service				A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
21: E Chestnut St & Bay St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	WBT	WBR	SBL	SBR						
Lane Configurations												
Sign Control		Free	Free		Stop							
Grade		0%	0%		0%							
Volume (veh/h)	10	770	415	25	315	50						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95						
Hourly flow rate (vph)	11	811	437	26	332	53						
Pedestrians		10			10							
Lane Width (ft)		11.0			11.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type					None							
Median storage (veh)												
Upstream signal (ft)			356									
pX, platoon unblocked	0.88				0.88	0.88						
vC, conflicting volume	473				1292	470						
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	400				1332	396						
tC, single (s)	4.1				6.4	6.2						
tC, 2 stage (s)												
tF (s)	2.2				3.5	3.3						
p0 queue free %	99				0	91						
cM capacity (veh/h)	1014				148	568						
Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2							
Volume Total	11	811	463	332	53							
Volume Left	11	0	0	332	0							
Volume Right	0	0	26	0	53							
cSH	1014	1700	1700	148	568							
Volume to Capacity	0.01	0.48	0.27	2.24	0.09							
Queue Length 95th (ft)	1	0	0	687	8							
Control Delay (s)	8.6	0.0	0.0	628.1	12.0							
Lane LOS	A			F	B							
Approach Delay (s)	0.1		0.0	543.7								
Approach LOS				F								
Intersection Summary												
Average Delay			125.3									
Intersection Capacity Utilization			64.6%	ICU Level of Service		C						
Analysis Period (min)			15									

Timings
22: E Chestnut St & Commercial St

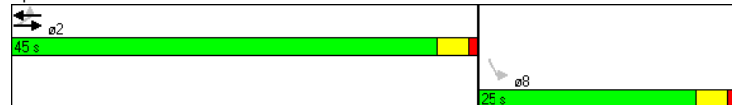
No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBT	SBL
Lane Group	EBL	EBT	WBT	SBL
Lane Configurations	↔	↕	↕	↕
Volume (vph)	85	930	425	150
Turn Type	Perm			
Protected Phases		2	2	
Permitted Phases	2			8
Detector Phases	2	2	2	8
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	26.0	26.0	26.0	19.0
Total Split (s)	45.0	45.0	45.0	25.0
Total Split (%)	64.3%	64.3%	64.3%	35.7%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)		41.0	41.0	21.0
Actuated g/C Ratio		0.59	0.59	0.30
v/c Ratio		0.61	0.46	0.47
Control Delay		11.2	20.1	20.4
Queue Delay		0.1	5.5	0.0
Total Delay		11.4	25.6	20.4
LOS		B	C	C
Approach Delay		11.4	25.6	20.4
Approach LOS		B	C	C

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 16.4
Intersection Capacity Utilization 76.4%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service D

Splits and Phases: 22: E Chestnut St & Commercial St



HCM Signalized Intersection Capacity Analysis
22: E Chestnut St & Commercial St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		0.95	1.00		1.00	
Frpb, ped/bikes		1.00	1.00		0.98	
Flpb, ped/bikes		1.00	1.00		0.98	
Frt		1.00	0.99		0.96	
Flt Protected		1.00	1.00		0.97	
Satd. Flow (prot)		3437	1775		1597	
Flt Permitted		0.87	1.00		0.97	
Satd. Flow (perm)		2993	1775		1597	
Volume (vph)	85	930	425	35	150	75
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	89	979	447	37	158	79
RTOR Reduction (vph)	0	0	4	0	26	0
Lane Group Flow (vph)	0	1068	480	0	211	0
Confl. Peds. (#/hr)		20		20	20	20
Heavy Vehicles (%)	1%	1%	2%	2%	2%	2%
Turn Type	Perm					
Protected Phases		2	2			
Permitted Phases	2				8	
Actuated Green, G (s)		41.0	41.0		21.0	
Effective Green, g (s)		41.0	41.0		21.0	
Actuated g/C Ratio		0.59	0.59		0.30	
Clearance Time (s)		4.0	4.0		4.0	
Lane Grp Cap (vph)		1753	1040		479	
v/s Ratio Prot			0.27			
v/s Ratio Perm		c0.36			c0.13	
v/c Ratio		0.61	0.46		0.44	
Uniform Delay, d1		9.3	8.2		19.8	
Progression Factor		1.00	2.38		1.00	
Incremental Delay, d2		1.6	0.1		2.9	
Delay (s)		10.9	19.7		22.7	
Level of Service		B	B		C	
Approach Delay (s)		10.9	19.7		22.7	
Approach LOS		B	B		C	

Intersection Summary

HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
23: E Chestnut St & Cornwall Ave

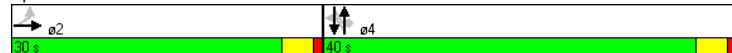
No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	→	↖	↑	↗	↘	↓
Lane Group	EBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↔↔		↔	↔		↔↔
Volume (vph)	840	435	220	55	130	100
Turn Type	Perm			Perm	Perm	
Protected Phases	2		4		4	
Permitted Phases	4			4	4	
Detector Phases	2	4	4	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	26.0	19.0	19.0	19.0	19.0	19.0
Total Split (s)	30.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	57.1%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	26.0		36.0	36.0		36.0
Actuated g/C Ratio	0.37		0.51	0.51		0.51
v/c Ratio	0.96		1.19	0.08		0.78
Control Delay	32.5		121.0	5.5		30.0
Queue Delay	2.6		29.1	0.0		2.0
Total Delay	35.1		150.2	5.5		32.0
LOS	D		F	A		C
Approach Delay	35.1		139.0			32.0
Approach LOS	D		F			C

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 60
Control Type: Pretimed
Maximum v/c Ratio: 1.19
Intersection Signal Delay: 69.9
Intersection Capacity Utilization 93.3%
Analysis Period (min) 15
Intersection LOS: E
ICU Level of Service F

Splits and Phases: 23: E Chestnut St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
23: E Chestnut St & Cornwall Ave

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↕	↕		↕↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0		4.0	
Lane Util. Factor		0.95						1.00	1.00		1.00	
Frpb, ped/bikes		0.98						1.00	0.92		0.99	
Flpb, ped/bikes		1.00						0.95	1.00		1.00	
Frt		0.97						1.00	0.85		0.99	
Flt Protected		1.00						0.97	1.00		0.98	
Satd. Flow (prot)		3258						1662	1407		1744	
Flt Permitted		1.00						0.66	1.00		0.37	
Satd. Flow (perm)		3258						1132	1407		657	
Volume (vph)	60	840	235	0	0	0	435	220	55	130	100	25
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	884	247	0	0	0	458	232	58	137	105	26
RTOR Reduction (vph)	0	33	0	0	0	0	0	0	15	0	5	0
Lane Group Flow (vph)	0	1161	0	0	0	0	0	690	43	0	263	0
Confl. Peds. (#/hr)	50		50				50		50	50		50
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	Perm						Perm		Perm	Perm		
Protected Phases	2						4				4	
Permitted Phases	2						4		4			
Actuated Green, G (s)	26.0						36.0		36.0		36.0	
Effective Green, g (s)	26.0						36.0		36.0		36.0	
Actuated g/C Ratio	0.37						0.51		0.51		0.51	
Clearance Time (s)	4.0						4.0		4.0		4.0	
Lane Grp Cap (vph)	1210						582		724		338	
v/s Ratio Prot							c0.61		0.03		0.40	
v/s Ratio Perm	0.36						1.19		0.06		0.78	
Uniform Delay, d1	21.5						17.0		8.5		13.8	
Progression Factor	0.71						1.00		1.00		1.03	
Incremental Delay, d2	15.7						100.0		0.2		12.9	
Delay (s)	30.9						117.0		8.7		27.1	
Level of Service	C						F		A		C	
Approach Delay (s)	30.9		0.0				108.6				27.1	
Approach LOS	C		A				F				C	

Intersection Summary

HCM Average Control Delay	56.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
38: Roeder Ave & Hilton Ave

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	770	10	10	725	20	15
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	811	11	11	763	21	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)				257		
pX, platoon unblocked					0.67	
vC, conflicting volume			821		1600	816
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			821		1898	816
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		58	96
cM capacity (veh/h)			808		50	377
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	821	774	37			
Volume Left	0	11	21			
Volume Right	11	0	16			
cSH	1700	808	80			
Volume to Capacity	0.48	0.01	0.46			
Queue Length 95th (ft)	0	1	47			
Control Delay (s)	0.0	0.4	83.6			
Lane LOS		A	F			
Approach Delay (s)	0.0	0.4	83.6			
Approach LOS			F			
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization	56.1%			ICU Level of Service	B	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
39: Roeder Ave & Central Ave

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕			↕			↕		
Sign Control		Free			Free			Stop			Stop		
Grade		0%			0%			0%			0%		
Volume (veh/h)	30	610	5	5	400	55	95	50	55	155	20	220	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	32	642	5	5	421	58	100	53	58	163	21	232	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type								None			None		
Median storage (veh)													
Upstream signal (ft)					1113								
pX, platoon unblocked													
vC, conflicting volume	479			647			1411	1197	645	1253	1171	450	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	479			647			1411	1197	645	1253	1171	450	
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2	
tC, 2 stage (s)													
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3	
p0 queue free %	97			99			0	71	88	0	89	62	
cM capacity (veh/h)	1083			938			64	179	472	99	186	609	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	679	484	211	416									
Volume Left	32	5	100	163									
Volume Right	5	58	58	232									
cSH	1083	938	106	193									
Volume to Capacity	0.03	0.01	1.98	2.15									
Queue Length 95th (ft)	2	0	438	815									
Control Delay (s)	0.8	0.2	540.8	573.8									
Lane LOS	A	A	F	F									
Approach Delay (s)	0.8	0.2	540.8	573.8									
Approach LOS			F	F									
Intersection Summary													
Average Delay	197.3												
Intersection Capacity Utilization	85.2%		ICU Level of Service				E						
Analysis Period (min)	15												

Timings
1: Squalicum Pkwy & Meridian Street

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBT	NBL	NBT	SBL	SBT	ø1	ø3	ø6
Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT			
Lane Configurations	↩	↩	↩	↩	↩	↩	↩			
Volume (vph)	315	5	10	5	600	25	640			
Turn Type	Split			Prot		Prot				
Protected Phases	7	7	4	5	2	13	3 6	1	3	6
Permitted Phases										
Detector Phases	7	7	4	5	2	13	3 6			
Minimum Initial (s)	6.0	6.0	6.0	6.0	10.0			6.0	6.0	10.0
Minimum Split (s)	29.0	29.0	29.0	11.0	23.0			11.0	11.0	23.0
Total Split (s)	29.0	29.0	29.0	11.0	34.0	38.0	61.0	16.0	22.0	39.0
Total Split (%)	22.3%	22.3%	22.3%	8.5%	26.2%	29.2%	46.9%	12%	17%	30%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0			1.0	1.0	1.0
Lead/Lag			Lead	Lead	Lead			Lag	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Max			None	None	None
Act Effct Green (s)	25.0	25.0	22.8	7.0	30.0	30.0	53.0			
Actuated g/C Ratio	0.20	0.20	0.18	0.05	0.23	0.23	0.41			
v/c Ratio	1.01	0.08	0.17	0.05	0.77	0.06	0.63			
Control Delay	102.8	20.2	22.0	59.6	53.0	11.6	6.8			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.3			
Total Delay	102.8	20.2	22.0	59.6	53.0	11.6	7.2			
LOS	F	C	C	E	D	B	A			
Approach Delay		96.8	22.0		53.1		7.3			
Approach LOS		F	C		D		A			

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 127.9

Natural Cycle: 145

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 38.7

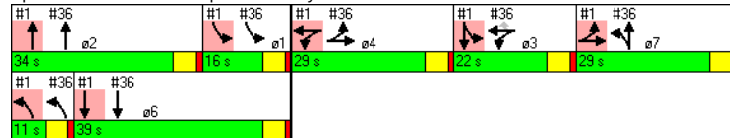
Intersection LOS: D

Intersection Capacity Utilization 55.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: Squalicum Pkwy & Meridian Street



HCM Signalized Intersection Capacity Analysis
1: Squalicum Pkwy & Meridian Street

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↩	↩	↩	↩	↩	↩	↩	↩	↩	↩	↩	↩
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.88			0.92		1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1561			1723		1787	3565		1752	3373	
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1687	1561			1723		1787	3565		1752	3373	
Volume (vph)	315	5	20	10	35	5	600	10	25	640	215	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	332	5	21	11	37	5	632	11	26	674	226	
RTOR Reduction (vph)	0	17	0	0	30	0	0	1	0	0	25	0
Lane Group Flow (vph)	332	9	0	0	29	0	5	642	0	26	875	0
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split			Prot			Prot		
Protected Phases	7	7		4	4		5	2		1 3	3 6	
Permitted Phases												
Actuated Green, G (s)	24.0	24.0			21.8		6.0	29.0		28.0	51.0	
Effective Green, g (s)	25.0	25.0			22.8		7.0	30.0		30.0	53.0	
Actuated g/C Ratio	0.20	0.20			0.18		0.05	0.23		0.23	0.41	
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0				
Vehicle Extension (s)	3.0	3.0			3.0		2.0	2.0				
Lane Grp Cap (vph)	330	305			307		98	837		411	1399	
v/s Ratio Prot	c0.20	0.01			c0.02		0.00	c0.18		0.01	c0.26	
v/s Ratio Perm												
v/c Ratio	1.01	0.03			0.09		0.05	0.77		0.06	0.63	
Uniform Delay, d1	51.4	41.6			43.9		57.3	45.6		38.0	29.6	
Progression Factor	1.00	1.00			1.00		1.00	1.00		0.53	0.45	
Incremental Delay, d2	51.1	0.0			0.1		0.1	6.7		0.0	0.1	
Delay (s)	102.5	41.6			44.0		57.3	52.3		20.0	13.4	
Level of Service	F	D			D		E	D		C	B	
Approach Delay (s)		98.1			44.0			52.3			13.5	
Approach LOS		F			D			D			B	

Intersection Summary

HCM Average Control Delay 42.3 HCM Level of Service D

HCM Volume to Capacity ratio 0.63

Actuated Cycle Length (s) 127.8 Sum of lost time (s) 16.0

Intersection Capacity Utilization 55.3% ICU Level of Service B

Analysis Period (min) 15

c Critical Lane Group

Timings
2: Meridian Street & Broadway St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	40	265	40	375	175	120	30	145
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	1	6	5	2	7	4	3	8
Permitted Phases								
Detector Phases	1	6	5	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	25.0	11.0	25.0	11.0	25.0	11.0	25.0
Total Split (s)	11.0	28.0	11.0	28.0	16.0	30.0	11.0	25.0
Total Split (%)	13.8%	35.0%	13.8%	35.0%	20.0%	37.5%	13.8%	31.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	7.2	28.0	7.2	28.0	10.5	20.9	7.2	12.4
Actuated g/C Ratio	0.11	0.45	0.11	0.45	0.16	0.33	0.10	0.19
v/c Ratio	0.23	0.50	0.23	0.52	0.65	0.30	0.17	0.56
Control Delay	34.7	21.7	34.7	23.3	39.6	16.4	35.0	28.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	21.7	34.7	23.3	39.6	16.4	35.0	28.0
LOS	C	C	C	C	D	B	D	C
Approach Delay		22.9		24.4		28.3		29.0
Approach LOS		C		C		C		C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 62.1
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 25.6
Intersection Capacity Utilization 60.8%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service B

Splits and Phases: 2: Meridian Street & Broadway St

⤴	⤵	⤴	⤵	⤴	⤵	⤴	⤵
⤴	⤵	⤴	⤵	⤴	⤵	⤴	⤵
11 s	28 s	11 s	30 s	11 s	25 s	11 s	25 s
11 s	28 s	11 s	16 s	11 s	25 s	11 s	25 s

HCM Signalized Intersection Capacity Analysis
2: Meridian Street & Broadway St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1730		1728	1798		1728	1731		1745	1765	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1728	1730		1728	1798		1728	1731		1745	1765	
Volume (vph)	40	265	110	40	375	25	175	120	45	30	145	45
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	279	116	42	395	26	184	126	47	32	153	47
RTOR Reduction (vph)	0	16	0	0	2	0	0	18	0	0	15	0
Lane Group Flow (vph)	42	379	0	42	419	0	184	155	0	32	185	0
Confl. Peds. (#/hr)			5			5			5			5
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	3.0	25.8		3.0	25.8		7.8	17.9		1.9	12.0	
Effective Green, g (s)	4.0	26.8		4.0	26.8		8.8	18.9		2.9	13.0	
Actuated g/C Ratio	0.06	0.39		0.06	0.39		0.13	0.28		0.04	0.19	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	101	676		101	702		222	477		74	334	
v/s Ratio Prot	c0.02	0.22		0.02	c0.23		c0.11	0.09		0.02	c0.10	
v/s Ratio Perm												
v/c Ratio	0.42	0.56		0.42	0.60		0.83	0.32		0.43	0.55	
Uniform Delay, d1	31.2	16.3		31.2	16.6		29.2	19.8		32.0	25.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.6		1.0	0.9		20.9	0.1		1.5	1.1	
Delay (s)	32.2	16.9		32.2	17.5		50.0	19.9		33.5	26.3	
Level of Service	C	B		C	B		D	B		C	C	
Approach Delay (s)	18.3			18.8			35.4			27.3		
Approach LOS	B			B			D			C		

Intersection Summary

HCM Average Control Delay	24.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	68.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
3: Ohio St & N State St

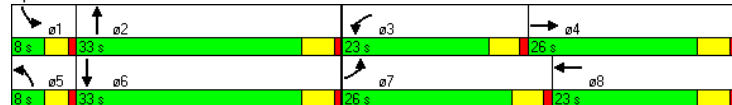
No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	330	335	230	125	35	895	40	625
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	24.0	24.0	23.0	23.0	8.0	21.0	8.0	21.0
Total Split (s)	26.0	26.0	23.0	23.0	8.0	33.0	8.0	33.0
Total Split (%)	28.9%	28.9%	25.6%	25.6%	8.9%	36.7%	8.9%	36.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	24.7	20.9	16.4	16.2	4.1	27.3	4.1	27.3
Actuated g/C Ratio	0.30	0.26	0.20	0.19	0.05	0.34	0.05	0.34
v/c Ratio	0.66	0.86	0.70	0.53	0.45	0.88	0.51	0.69
Control Delay	37.2	50.4	43.7	33.4	59.5	37.1	64.2	27.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	50.4	43.7	33.4	59.5	37.1	64.2	27.4
LOS	D	D	D	C	E	D	E	C
Approach Delay		44.3		39.2		37.9		29.2
Approach LOS		D		D		D		C

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 81.4
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 37.3
Intersection Capacity Utilization 76.3%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service D

Splits and Phases: 3: Ohio St & N State St



HCM Signalized Intersection Capacity Analysis
3: Ohio St & N State St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.96		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1786		1711	1723		1728	3417		1728	3369	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1728	1786		1711	1723		1728	3417		1728	3369	
Volume (vph)	330	335	45	230	125	50	35	895	70	40	625	125
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	347	353	47	242	132	53	37	942	74	42	658	132
RTOR Reduction (vph)	0	5	0	0	17	0	0	6	0	0	18	0
Lane Group Flow (vph)	347	395	0	242	168	0	37	1010	0	42	772	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	23.6	21.3		15.4	13.1		2.2	26.3		2.2	26.3	
Effective Green, g (s)	24.6	22.3		16.4	14.1		2.2	27.3		2.2	27.3	
Actuated g/C Ratio	0.29	0.26		0.19	0.17		0.03	0.32		0.03	0.32	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	505	473		333	289		45	1108		45	1092	
v/s Ratio Prot	c0.20	c0.22		0.14	0.10		0.02	c0.30		c0.02	0.23	
v/s Ratio Perm												
v/c Ratio	0.69	0.83		0.73	0.58		0.82	0.91		0.93	0.71	
Uniform Delay, d1	26.4	29.2		31.8	32.3		40.8	27.3		40.9	24.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.2	12.5		8.2	3.5		70.2	11.2		108.1	2.1	
Delay (s)	30.6	41.7		40.0	35.8		111.0	38.5		149.0	27.1	
Level of Service	C	D		D	D		F	D		F	C	
Approach Delay (s)		36.6			38.2			41.0			33.2	
Approach LOS		D			D			D			C	

Intersection Summary

HCM Average Control Delay	37.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	84.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
4: Iowa St & James Street

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	WBL	WBT	SBL	SBT	SBR	NEL	NER
Lane Group	WBL	WBT	SBL	SBT	SBR	NEL	NER
Lane Configurations							
Volume (vph)	400	5	175	140	430	400	755
Turn Type	Split		Perm		Over		pt+ov
Protected Phases	3	3		1	2	2	2 3
Permitted Phases			1				
Detector Phases	3	3	1	1	2	2	2 3
Minimum Initial (s)	6.0	6.0	8.0	8.0	6.0	6.0	
Minimum Split (s)	11.0	11.0	20.0	20.0	17.0	17.0	
Total Split (s)	13.0	13.0	47.0	47.0	20.0	20.0	33.0
Total Split (%)	16.3%	16.3%	58.8%	58.8%	25.0%	25.0%	41.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag			Lead	Lead	Lag	Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	
Act Effct Green (s)	9.0	9.0		43.0	16.0	16.0	29.0
Actuated g/C Ratio	0.11	0.11		0.54	0.20	0.20	0.36
v/c Ratio	1.30	1.21		3.64	0.85	1.08	1.04
Control Delay	200.5	164.6		1226.9	47.3	92.0	78.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	19.5
Total Delay	200.5	164.6		1226.9	47.3	92.0	97.9
LOS	F	F		F	D	F	F
Approach Delay		182.8		538.4		94.5	
Approach LOS		F		F		F	

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

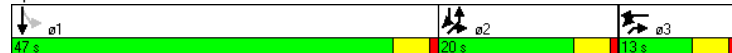
Maximum v/c Ratio: 3.64

Intersection Signal Delay: 252.7 Intersection LOS: F

Intersection Capacity Utilization 59.1% ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 4: Iowa St & James Street



HCM Signalized Intersection Capacity Analysis
4: Iowa St & James Street

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	WBL	WBT	WBR	SBL	SBT	SBR	SBR2	NEL	NER	NER2
Movement	WBL	WBT	WBR	SBL	SBT	SBR	SBR2	NEL	NER	NER2
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95			1.00	0.88		0.97	0.91	
Frt	1.00	0.97			1.00	0.85		0.94	0.85	
Flt Protected	0.95	0.96			0.97	1.00		0.97	1.00	
Satd. Flow (prot)	1641	1613			1769	2720		3221	1407	
Flt Permitted	0.95	0.96			0.09	1.00		0.97	1.00	
Satd. Flow (perm)	1641	1613			169	2720		3221	1407	
Volume (vph)	400	5	45	175	140	430	10	400	755	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	421	5	47	184	147	453	11	421	795	11
RTOR Reduction (vph)	0	12	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	240	221	0	0	331	462	0	697	530	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Split			Perm		Over			pt+ov	
Protected Phases	3	3			1	2		2	2 3	
Permitted Phases				1						
Actuated Green, G (s)	8.0	8.0			42.0	15.0		15.0	28.0	
Effective Green, g (s)	9.0	9.0			43.0	16.0		16.0	29.0	
Actuated g/C Ratio	0.11	0.11			0.54	0.20		0.20	0.36	
Clearance Time (s)	5.0	5.0			5.0	5.0		5.0		
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0		
Lane Grp Cap (vph)	185	181			91	544		644	510	
v/s Ratio Prot	0.15	0.14				0.17		0.22	0.38	
v/s Ratio Perm					c1.96					
v/c Ratio	1.30	1.22			3.64	0.85		1.08	1.04	
Uniform Delay, d1	35.5	35.5			18.5	30.8		32.0	25.5	
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	167.7	139.8			1213.5	12.1		59.8	50.4	
Delay (s)	203.2	175.3			1232.0	42.9		91.8	75.9	
Level of Service	F	F			F	D		F	E	
Approach Delay (s)		189.4			538.0			84.9		
Approach LOS		F			F			F		

Intersection Summary

HCM Average Control Delay 249.1 HCM Level of Service F

HCM Volume to Capacity ratio 2.59

Actuated Cycle Length (s) 80.0 Sum of lost time (s) 8.0

Intersection Capacity Utilization 59.1% ICU Level of Service B

Analysis Period (min) 15

c Critical Lane Group

Timings
5: Iowa St & King St

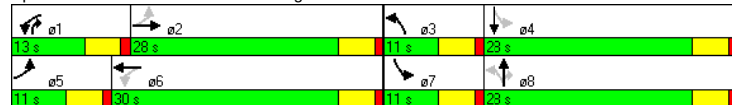
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New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Volume (vph)	35	880	270	470	35	150	515	95	125
Turn Type	pm+pt		pm+pt		pm+pt		pm+ov	pm+pt	
Protected Phases	5	2	1	6	3	8	1	7	4
Permitted Phases	2		6		8		8	4	
Detector Phases	5	2	1	6	3	8	1	7	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	28.0	11.0	26.0	11.0	28.0	11.0	28.0	28.0
Total Split (s)	11.0	28.0	13.0	30.0	11.0	28.0	13.0	11.0	28.0
Total Split (%)	13.8%	35.0%	16.3%	37.5%	13.8%	35.0%	16.3%	13.8%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	Min	None	Min	None	None	None	None	None
Act Effct Green (s)	30.1	23.3	36.8	35.2	17.6	12.4	22.6	19.1	16.5
Actuated g/C Ratio	0.43	0.37	0.59	0.56	0.25	0.19	0.36	0.29	0.25
v/c Ratio	0.09	0.78	0.73	0.30	0.11	0.46	0.82	0.25	0.36
Control Delay	10.4	25.4	28.3	12.9	16.8	29.1	24.8	17.1	21.7
Queue Delay	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.4	25.9	28.3	12.9	16.8	29.1	24.8	17.1	21.7
LOS	B	C	C	B	B	C	C	B	C
Approach Delay		25.4		18.0		25.3			20.0
Approach LOS		C		B		C			B

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 62.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 22.7
Intersection Capacity Utilization 73.5%
Analysis Period (min) 15

Splits and Phases: 5: Iowa St & King St



HCM Signalized Intersection Capacity Analysis
5: Iowa St & King St

No Action (2016) PM Peak Hour
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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1728	3420		1711	3355		1728	1818	1546	1745	1776	
Flt Permitted	0.44	1.00		0.13	1.00		0.65	1.00	1.00	0.48	1.00	
Satd. Flow (perm)	797	3420		233	3355		1183	1818	1546	887	1776	
Volume (vph)	35	880	65	270	470	70	35	150	515	95	125	35
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	926	68	284	495	74	37	158	542	100	132	37
RTOR Reduction (vph)	0	6	0	0	11	0	0	0	108	0	14	0
Lane Group Flow (vph)	37	988	0	284	558	0	37	158	434	100	155	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	0%	0%	0%
Turn Type	pm+pt			pm+pt			pm+pt		pm+ov	pm+pt		
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	28.0	25.9		39.7	32.6		13.2	11.1	19.9	17.6	13.3	
Effective Green, g (s)	30.0	26.9		40.7	33.6		15.2	12.1	21.9	19.6	14.3	
Actuated g/C Ratio	0.43	0.38		0.58	0.48		0.22	0.17	0.31	0.28	0.20	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.6		3.0	3.0		3.6	3.6	3.0	3.0	3.0	
Lane Grp Cap (vph)	382	1312		342	1608		281	314	571	313	362	
v/s Ratio Prot	0.00	0.29		c0.12	0.17		0.01	0.09	c0.11	c0.02	0.09	
v/s Ratio Perm	0.04			c0.37			0.02		0.17	0.07		
v/c Ratio	0.10	0.75		0.83	0.35		0.13	0.50	0.76	0.32	0.43	
Uniform Delay, d1	11.7	18.7		14.6	11.4		22.0	26.3	21.7	19.4	24.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	2.6		15.6	0.1		0.3	1.5	5.9	0.6	0.8	
Delay (s)	11.8	21.3		30.2	11.5		22.2	27.8	27.6	20.0	25.1	
Level of Service	B	C		C	B		C	C	C	B	C	
Approach Delay (s)		21.0			17.8			27.4			23.2	
Approach LOS		C			B			C			C	

Intersection Summary

HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	70.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Iowa St & Moore St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	35	845	205	600	130	55	115	95
Turn Type	Prot		Prot		Perm		Perm	
Protected Phases	1	6	5	2		4		8
Permitted Phases					4		8	
Detector Phases	1	6	5	2	4	4	8	8
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	27.0	12.0	27.0	21.0	21.0	21.0	21.0
Total Split (s)	12.0	37.0	16.0	41.0	27.0	27.0	27.0	27.0
Total Split (%)	15.0%	46.3%	20.0%	51.3%	33.8%	33.8%	33.8%	33.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	8.0	33.0	12.0	41.8		23.0		23.0
Actuated g/C Ratio	0.09	0.41	0.15	0.52		0.29		0.29
v/c Ratio	0.23	1.00	0.84	0.38		1.05		0.91
Control Delay	37.3	43.7	62.4	13.0		83.8		67.2
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	37.3	43.7	62.4	13.0		83.8		67.2
LOS	D	D	E	B		F		E
Approach Delay		43.6		25.0		83.8		67.2
Approach LOS		D		C		F		E

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.05
Intersection Signal Delay: 46.1
Intersection Capacity Utilization 90.6%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service E

Splits and Phases: 6: Iowa St & Moore St



HCM Signalized Intersection Capacity Analysis
6: Iowa St & Moore St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.94		1.00	0.99			0.92			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1728	3250		1711	3393			1604			1671	
Flt Permitted	0.95	1.00		0.95	1.00			0.80			0.52	
Satd. Flow (perm)	1728	3250		1711	3393			1309			894	
Volume (vph)	35	845	555	205	600	35	130	55	255	115	95	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	889	584	216	632	37	137	58	268	121	100	21
RTOR Reduction (vph)	0	134	0	0	5	0	0	63	0	0	4	0
Lane Group Flow (vph)	37	1339	0	216	664	0	0	400	0	0	238	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	4%	4%	4%	6%	6%	6%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	4.2	34.0		11.0	40.8			22.0			22.0	
Effective Green, g (s)	5.2	35.0		12.0	41.8			23.0			23.0	
Actuated g/C Ratio	0.06	0.43		0.15	0.51			0.28			0.28	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.5			3.5	
Lane Grp Cap (vph)	110	1387		250	1730			367			251	
v/s Ratio Prot	0.02	c0.41		c0.13	0.20							
v/s Ratio Perm								c0.31			0.27	
v/c Ratio	0.34	0.97		0.86	0.38			1.09			0.95	
Uniform Delay, d1	36.7	22.9		34.2	12.3			29.5			28.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.8	16.5		25.2	0.1			73.7			42.3	
Delay (s)	38.6	39.4		59.4	12.4			103.2			71.2	
Level of Service	D	D		E	B			F			E	
Approach Delay (s)		39.3			23.9			103.2			71.2	
Approach LOS		D			C			F			E	

Intersection Summary

HCM Average Control Delay	46.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	82.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Elm Street & Broadway St

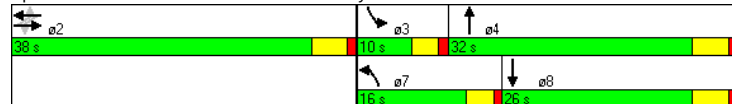
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	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	5	230	45	400	145	195	45	185
Turn Type	Perm		Perm		Prot		Prot	
Protected Phases		2		2	7	4	3	8
Permitted Phases	2		2					
Detector Phases	2	2	2	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	26.0	26.0	26.0	26.0	8.0	26.0	8.0	26.0
Total Split (s)	38.0	38.0	38.0	38.0	16.0	32.0	10.0	26.0
Total Split (%)	47.5%	47.5%	47.5%	47.5%	20.0%	40.0%	12.5%	32.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	21.9	21.9	21.9	21.9	10.4	19.2	7.4	13.7
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.19	0.35	0.13	0.25
v/c Ratio	0.02	0.43	0.14	0.71	0.47	0.41	0.21	0.46
Control Delay	12.6	14.5	13.6	20.8	31.4	18.3	33.2	25.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	14.5	13.6	20.8	31.4	18.3	33.2	25.2
LOS	B	B	B	C	C	B	C	C
Approach Delay		14.5		20.2		23.3		26.7
Approach LOS		B		C		C		C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 52.9
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 20.9
Intersection Capacity Utilization 63.3%
Analysis Period (min) 15

Splits and Phases: 7: Elm Street & Broadway St



HCM Signalized Intersection Capacity Analysis
7: Elm Street & Broadway St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1692	1726		1707	1754		1728	1759		1728	1801	
Flt Permitted	0.27	1.00		0.51	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	489	1726		919	1754		1728	1759		1728	1801	
Volume (vph)	5	230	55	45	400	75	145	195	45	45	185	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	242	58	47	421	79	153	205	47	47	195	11
RTOR Reduction (vph)	0	12	0	0	9	0	0	11	0	0	3	0
Lane Group Flow (vph)	5	288	0	47	491	0	153	241	0	47	203	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		2			2		7	4		3	8	
Permitted Phases	2			2								
Actuated Green, G (s)	16.6	16.6		16.6	16.6		7.1	14.2		2.8	9.9	
Effective Green, g (s)	17.6	17.6		17.6	17.6		7.1	15.2		2.8	10.9	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.15	0.32		0.06	0.23	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	181	638		340	649		258	562		102	412	
v/s Ratio Prot		0.17			c0.28		c0.09	c0.14		0.03	0.11	
v/s Ratio Perm	0.01			0.05								
v/c Ratio	0.03	0.45		0.14	0.76		0.59	0.43		0.46	0.49	
Uniform Delay, d1	9.6	11.3		10.0	13.1		18.9	12.8		21.7	15.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.5		0.2	5.0		3.6	0.5		3.3	0.9	
Delay (s)	9.6	11.9		10.1	18.1		22.5	13.3		24.9	16.9	
Level of Service	A	B		B	B		C	B		C	B	
Approach Delay (s)		11.8			17.4			16.8			18.4	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	47.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
8: Flora St & Cornwall Ave

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Volume (vph)	195	385	25	145	170	20	300	145	250
Turn Type	Perm	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	4	8	8	5	2	1	6	6
Permitted Phases	4	4	8	8	5	2	1	6	6
Detector Phases	4	4	8	8	5	2	1	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	11.0	27.0	11.0	27.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	11.0	32.0	11.0	32.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	15.7%	45.7%	15.7%	45.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag	
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	18.0	18.0	18.0	18.0	7.2	19.6	7.4	29.3	29.3
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.11	0.34	0.13	0.51	0.51
v/c Ratio	0.79	0.36	0.31	0.31	0.11	0.81	0.71	0.37	0.37
Control Delay	26.7	19.1	4.9	32.0	27.6	51.0	11.3	11.3	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.7	19.1	4.9	32.0	27.6	51.0	11.3	11.3	11.3
LOS	C	B	A	C	C	D	B	B	B
Approach Delay	26.7	12.0				27.8	24.0		
Approach LOS	C	B				C	C		

Intersection Summary

Cycle Length: 70	
Actuated Cycle Length: 57.5	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 23.7	Intersection LOS: C
Intersection Capacity Utilization 81.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: Flora St & Cornwall Ave

e1	e2	e4
11 s	32 s	27 s
e5	e6	e8
11 s	32 s	27 s

HCM Signalized Intersection Capacity Analysis
8: Flora St & Cornwall Ave

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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frpb, ped/bikes	1.00	1.00	1.00	0.93	1.00	0.99	1.00	0.99	1.00	1.00	0.99	0.99
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	1.00	0.85	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.97	0.97
Flt Protected	0.98	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3297	1801	1441	1694	1666	1694	1666	1694	1709	1694	1709	1709
Flt Permitted	0.78	0.87	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	2610	1575	1441	1694	1666	1694	1666	1694	1709	1694	1709	1709
Volume (vph)	195	385	25	25	145	170	20	300	160	145	250	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	205	405	26	26	153	179	21	316	168	153	263	63
RTOR Reduction (vph)	0	4	0	0	0	127	0	28	0	0	11	0
Lane Group Flow (vph)	0	632	0	0	179	52	21	456	0	153	315	0
Confl. Peds. (#/hr)	35	35	35	35	35	35	35	35	35	35	35	35
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	3%	3%	3%
Turn Type	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	4	8	8	5	2	1	6	6	6	6	6
Permitted Phases	4	4	8	8	5	2	1	6	6	6	6	6
Actuated Green, G (s)	16.9	16.9	16.9	16.9	1.0	23.0	6.3	28.3	28.3	28.3	28.3	28.3
Effective Green, g (s)	17.9	17.9	17.9	17.9	2.0	24.0	7.3	29.3	29.3	29.3	29.3	29.3
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.03	0.39	0.12	0.48	0.48	0.48	0.48	0.48
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	763	461	421	55	653	202	818	202	818	202	818	818
v/s Ratio Prot	c0.24	0.11	0.04	0.11	0.04	0.01	c0.27	c0.09	0.18	0.09	0.18	0.18
v/s Ratio Perm	0.83	0.39	0.12	0.38	0.70	0.76	0.39	0.76	0.39	0.76	0.39	0.39
Uniform Delay, d1	20.2	17.3	15.9	29.0	15.6	26.1	10.2	26.1	10.2	26.1	10.2	10.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.0	0.2	0.0	1.6	2.6	13.4	0.1	13.4	0.1	13.4	0.1	0.1
Delay (s)	27.2	17.5	15.9	30.6	18.2	39.5	10.3	39.5	10.3	39.5	10.3	10.3
Level of Service	C	B	B	C	B	D	B	D	B	D	B	B
Approach Delay (s)	27.2	16.7	18.7	19.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6
Approach LOS	C	B	B	C	B	D	B	D	B	D	B	B

Intersection Summary

HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	61.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
9: York St & N State St

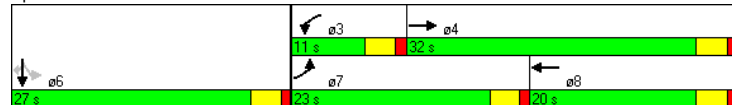
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	EBL	EBT	WBL	WBT	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	SBT	SBR
Lane Configurations	↰	↰↱	↰	↰↱	↰↱	↰
Volume (vph)	350	305	65	220	615	145
Turn Type	Prot		Prot		Perm	
Protected Phases	7	4	3	8	6	
Permitted Phases						6
Detector Phases	7	4	3	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	21.0	21.0
Total Split (s)	23.0	32.0	11.0	20.0	27.0	27.0
Total Split (%)	32.9%	45.7%	15.7%	28.6%	38.6%	38.6%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag		
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	16.1	24.3	6.6	9.9	19.8	19.8
Actuated g/C Ratio	0.28	0.42	0.11	0.17	0.34	0.34
v/c Ratio	0.79	0.31	0.39	0.50	0.79	0.25
Control Delay	35.1	11.6	34.8	23.6	24.2	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.1	11.6	34.8	23.6	24.2	4.5
LOS	D	B	C	C	C	A
Approach Delay		22.4		25.8	21.3	
Approach LOS		C		C	C	

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 58.3
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 22.4
Intersection Capacity Utilization 61.2%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service B

Splits and Phases: 9: York St & N State St



HCM Signalized Intersection Capacity Analysis
9: York St & N State St

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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↰↱						↰↱	↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95						0.95	1.00
Frt	1.00	0.96		1.00	0.97						1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (prot)	1694	3257		1646	3200						3373	1531
Flt Permitted	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (perm)	1694	3257		1646	3200						3373	1531
Volume (vph)	350	305	105	65	220	50	0	0	0	245	615	145
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	368	321	111	68	232	53	0	0	0	258	647	153
RTOR Reduction (vph)	0	49	0	0	29	0	0	0	0	0	0	102
Lane Group Flow (vph)	368	383	0	68	256	0	0	0	0	0	905	51
Heavy Vehicles (%)	3%	3%	3%	6%	6%	6%	0%	0%	0%	0%	2%	2%
Turn Type	Prot			Prot						Perm		Perm
Protected Phases	7	4		3	8						6	
Permitted Phases										6		6
Actuated Green, G (s)	16.1	24.3		3.7	11.9						19.8	19.8
Effective Green, g (s)	16.1	24.3		3.7	11.9						19.8	19.8
Actuated g/C Ratio	0.27	0.41		0.06	0.20						0.33	0.33
Clearance Time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)	456	1323		102	637						1117	507
v/s Ratio Prot	c0.22	0.12		0.04	c0.08							
v/s Ratio Perm											0.27	0.03
v/c Ratio	0.81	0.29		0.67	0.40						0.81	0.10
Uniform Delay, d1	20.4	11.9		27.4	20.9						18.3	13.8
Progression Factor	1.00	1.00		1.00	1.00						1.00	1.00
Incremental Delay, d2	10.1	0.1		15.2	0.4						4.5	0.1
Delay (s)	30.5	12.1		42.7	21.3						22.8	13.9
Level of Service	C	B		D	C						C	B
Approach Delay (s)		20.5			25.4			0.0			21.5	
Approach LOS		C			C			A			C	

Intersection Summary

HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	59.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

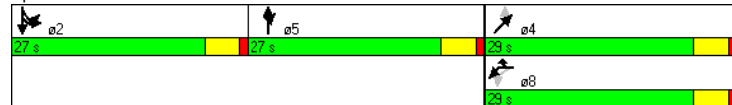
Timings
10: York St & N Forest St

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	←	↖	↑	↗	↘	↓	↙	↘
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	NEL	NET
Lane Configurations								
Volume (vph)	0	90	160	325	135	395	80	590
Turn Type	Prot	Split	Split	Split	Split	custom	Prot	Prot
Protected Phases	8!	8!	5	5	2	2		4!
Permitted Phases							4	
Detector Phases	8	8	5	5	2	2	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0	27.0	29.0	29.0
Total Split (s)	29.0	29.0	27.0	27.0	27.0	27.0	29.0	29.0
Total Split (%)	34.9%	34.9%	32.5%	32.5%	32.5%	32.5%	34.9%	34.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	Min	Min	Min	Min	None	None
Act Effct Green (s)	19.9	19.9	17.3	17.3	14.5	14.5	19.9	19.9
Actuated g/C Ratio	0.31	0.31	0.27	0.27	0.22	0.22	0.31	0.31
v/c Ratio	0.19	0.37	0.72	0.67	0.41	0.54	0.16	0.73
Control Delay	19.9	16.0	33.7	30.0	27.4	26.4	19.6	26.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.9	16.0	33.7	30.0	27.4	26.4	19.6	26.0
LOS	B	B	C	C	C	C	B	C
Approach Delay	17.3		32.0			26.7		25.4
Approach LOS	B		C			C		C

Intersection Summary	
Cycle Length: 83	
Actuated Cycle Length: 64.5	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 26.4	Intersection LOS: C
Intersection Capacity Utilization 69.1%	ICU Level of Service C
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 10: York St & N Forest St



HCM Signalized Intersection Capacity Analysis
10: York St & N Forest St

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Movement	WBL2	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL2	SBL	SBT	NEL	NET
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		0.95	0.95			1.00	0.95	1.00	0.95
Frt		1.00	0.85		0.93	0.85			1.00	1.00	1.00	0.98
Flt Protected		0.95	1.00		1.00	1.00			0.95	1.00	0.95	1.00
Satd. Flow (prot)		1728	1546		1609	1468			1711	3421	1678	3276
Flt Permitted		0.95	1.00		1.00	1.00			0.95	1.00	0.95	1.00
Satd. Flow (perm)		1728	1546		1609	1468			1711	3421	1678	3276
Volume (vph)	95	0	90	90	160	325	70	15	135	395	80	590
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	0	95	95	168	342	74	16	142	416	84	621
RTOR Reduction (vph)	0	0	43	0	0	16	0	0	0	0	0	1
Lane Group Flow (vph)	0	100	147	0	310	258	0	0	158	416	84	736
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%	4%	4%
Turn Type	Perm		Prot		Split			Split	Split		custom	Prot
Protected Phases		8!	8!		5	5		2	2	2		4!
Permitted Phases	8											4
Actuated Green, G (s)		18.8	18.8		16.2	16.2			13.4	13.4	18.8	18.8
Effective Green, g (s)		19.8	19.8		17.2	17.2			14.4	14.4	19.8	19.8
Actuated g/C Ratio		0.31	0.31		0.27	0.27			0.23	0.23	0.31	0.31
Clearance Time (s)		5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		540	483		437	398			389	777	524	1023
v/s Ratio Prot			0.10		c0.19	0.18			0.09	c0.12		c0.22
v/s Ratio Perm		0.06									0.05	
v/c Ratio		0.19	0.31		0.71	0.65			0.41	0.54	0.16	0.72
Uniform Delay, d1		15.9	16.6		20.8	20.4			20.9	21.6	15.8	19.3
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2	0.4		5.2	3.6			0.7	0.7	0.1	2.4
Delay (s)		16.1	16.9		26.1	24.0			21.6	22.3	15.9	21.8
Level of Service		B	B		C	C			C	C	B	C
Approach Delay (s)		16.6			25.1					22.1		21.2
Approach LOS		B			C					C		C

Intersection Summary	
HCM Average Control Delay	21.8
HCM Volume to Capacity ratio	0.66
Actuated Cycle Length (s)	63.4
Intersection Capacity Utilization	69.1%
Analysis Period (min)	15
! Phase conflict between lane groups.	
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
10: York St & N Forest St

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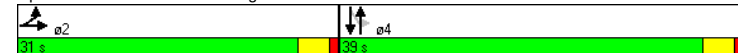
	↗	↘
Movement	NER	NER2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Volume (vph)	100	10
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	105	11
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	0	0
Heavy Vehicles (%)	4%	4%
Turn Type		
Protected Phases		
Permitted Phases		
Actuated Green, G (s)		
Effective Green, g (s)		
Actuated g/C Ratio		
Clearance Time (s)		
Vehicle Extension (s)		
Lane Grp Cap (vph)		
v/s Ratio Prot		
v/s Ratio Perm		
v/c Ratio		
Uniform Delay, d1		
Progression Factor		
Incremental Delay, d2		
Delay (s)		
Level of Service		
Approach Delay (s)		
Approach LOS		
Intersection Summary		

Timings
11: E Magnolia St & Cornwall Ave

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	→	↑	↙	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↔↔	↔	↔	↔↔
Volume (vph)	520	405	95	235
Turn Type	Perm			
Protected Phases	2	4		4
Permitted Phases			4	
Detector Phases	2	4	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	23.0	23.0	23.0
Total Split (s)	31.0	39.0	39.0	39.0
Total Split (%)	44.3%	55.7%	55.7%	55.7%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	27.0	35.0		35.0
Actuated g/C Ratio	0.39	0.50		0.50
v/c Ratio	0.61	0.56		0.57
Control Delay	18.9	12.4		16.8
Queue Delay	0.0	0.0		0.0
Total Delay	18.9	12.4		16.8
LOS	B	B		B
Approach Delay	18.9	12.4		16.8
Approach LOS	B	B		B
Intersection Summary				
Cycle Length: 70				
Actuated Cycle Length: 70				
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green				
Natural Cycle: 45				
Control Type: Pretimed				
Maximum v/c Ratio: 0.61				
Intersection Signal Delay: 16.4			Intersection LOS: B	
Intersection Capacity Utilization 75.5%			ICU Level of Service D	
Analysis Period (min) 15				

Splits and Phases: 11: E Magnolia St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
11: E Magnolia St & Cornwall Ave

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕						↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		0.95						1.00			1.00	
Frpb, ped/bikes		0.97						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			0.99	
Frt		0.97						0.98			1.00	
Flt Protected		0.99						1.00			0.99	
Satd. Flow (prot)		3216						1760			1741	
Flt Permitted		0.99						1.00			0.69	
Satd. Flow (perm)		3216						1760			1225	
Volume (vph)	90	520	125	0	0	0	0	405	65	95	235	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	547	132	0	0	0	0	426	68	100	247	0
RTOR Reduction (vph)	0	25	0	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	749	0	0	0	0	0	486	0	0	347	0
Confl. Peds. (#/hr)	80		80						80	80		
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split							Perm				
Protected Phases	2	2						4			4	
Permitted Phases									4			
Actuated Green, G (s)		27.0						35.0			35.0	
Effective Green, g (s)		27.0						35.0			35.0	
Actuated g/C Ratio		0.39						0.50			0.50	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		1240						880			613	
v/s Ratio Prot		c0.23						0.28				
v/s Ratio Perm											c0.28	
v/c Ratio		0.60						0.55			0.57	
Uniform Delay, d1		17.2						12.1			12.2	
Progression Factor		1.00						0.86			1.00	
Incremental Delay, d2		2.2						1.9			3.8	
Delay (s)		19.4						12.3			16.0	
Level of Service		B						B			B	
Approach Delay (s)		19.4			0.0			12.3			16.0	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM Average Control Delay		16.5										
HCM Volume to Capacity ratio		0.58										
Actuated Cycle Length (s)		70.0						8.0				
Intersection Capacity Utilization		75.5%										
Analysis Period (min)		15										

c Critical Lane Group

Timings
12: W Holly St & Broadway St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations		↕↕		↕↕	↕↕	↕	↕
Volume (vph)	80	365	5	465	5	165	0
Turn Type	Perm		Perm			Perm	
Protected Phases		2		2	4		4
Permitted Phases	2		2			4	
Detector Phases	2	2	2	2	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	54.0	54.0	54.0	54.0	26.0	26.0	26.0
Total Split (%)	67.5%	67.5%	67.5%	67.5%	32.5%	32.5%	32.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None
Act Effct Green (s)		30.3		30.3	13.2	13.2	13.2
Actuated g/C Ratio		0.66		0.66	0.27	0.27	0.27
v/c Ratio		0.49		0.62	0.02	0.47	0.11
Control Delay		8.9		9.9	14.8	23.4	0.3
Queue Delay		0.0		0.0	0.0	0.0	0.0
Total Delay		8.9		9.9	14.8	23.4	0.3
LOS		A		A	B	C	A
Approach Delay		8.9		9.9	14.8		16.2
Approach LOS		A		A	B		B
Intersection Summary							
Cycle Length: 80							
Actuated Cycle Length: 46.1							
Natural Cycle: 60							
Control Type: Actuated-Uncoordinated							
Maximum v/c Ratio: 0.62							
Intersection Signal Delay: 10.7						Intersection LOS: B	
Intersection Capacity Utilization 86.5%						ICU Level of Service E	
Analysis Period (min) 15							

Splits and Phases: 12: W Holly St & Broadway St



HCM Signalized Intersection Capacity Analysis
12: W Holly St & Broadway St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0			4.0			4.0		4.0
Lane Util. Factor	1.00			1.00			1.00			1.00		1.00
Frpb, ped/bikes	1.00			1.00			0.99			1.00		0.97
Flpb, ped/bikes	1.00			1.00			1.00			1.00		1.00
Frt	1.00			0.96			0.93			1.00		0.85
Flt Protected	0.99			1.00			1.00			0.95		1.00
Satd. Flow (prot)	1802			1719			1699			1721		1505
Flt Permitted	0.82			1.00			1.00			0.75		1.00
Satd. Flow (perm)	1483			1715			1699			1361		1505
Volume (vph)	80	365	0	5	465	200	0	5	5	165	0	75
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	384	0	5	489	211	0	5	5	174	0	79
RTOR Reduction (vph)	0	0	0	0	21	0	0	4	0	0	61	0
Lane Group Flow (vph)	0	468	0	0	684	0	0	6	0	174	18	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	25.9			25.9			9.1			9.1		9.1
Effective Green, g (s)	26.9			26.9			10.1			10.1		10.1
Actuated g/C Ratio	0.60			0.60			0.22			0.22		0.22
Clearance Time (s)	5.0			5.0			5.0			5.0		5.0
Vehicle Extension (s)	3.0			3.0			3.0			3.0		3.0
Lane Grp Cap (vph)	887			1025			381			305		338
v/s Ratio Prot							0.00					0.01
v/s Ratio Perm	0.32			c0.40						c0.13		
v/c Ratio	0.53			0.67			0.02			0.57		0.05
Uniform Delay, d1	5.3			6.1			13.6			15.5		13.7
Progression Factor	1.00			1.00			1.00			1.00		1.00
Incremental Delay, d2	0.6			1.7			0.0			2.6		0.1
Delay (s)	5.9			7.7			13.6			18.1		13.8
Level of Service	A			A			B			B		B
Approach Delay (s)	5.9			7.7			13.6			16.7		
Approach LOS	A			A			B			B		

Intersection Summary

HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
13: W Holly St & F St

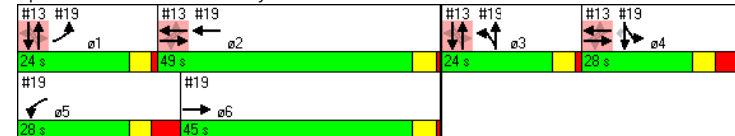
No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø1	ø2	ø3	ø4
Lane Configurations												
Volume (vph)	50	375	55	590	35	275	55	135				
Turn Type	Perm		Perm		Perm		Perm					
Protected Phases		2 4		2 4		1 3		1 3	1	2	3	4
Permitted Phases	2 4		2 4		1 3		1 3					
Detector Phases	2 4	2 4	2 4	2 4	1 3	1 3	1 3	1 3				
Minimum Initial (s)									6.0	6.0	6.0	6.0
Minimum Split (s)									24.0	24.0	24.0	28.0
Total Split (s)	77.0	77.0	77.0	77.0	48.0	48.0	48.0	48.0	24.0	49.0	24.0	28.0
Total Split (%)	61.6%	61.6%	61.6%	61.6%	38.4%	38.4%	38.4%	38.4%	19%	39%	19%	22%
Yellow Time (s)									4.0	4.0	4.0	4.0
All-Red Time (s)									1.0	1.0	1.0	5.0
Lead/Lag									Lead	Lag	Lead	Lag
Lead-Lag Optimize?												
Recall Mode									Min	None	None	None
Act Effct Green (s)	68.6	68.6	68.6	68.6		37.7		37.7				
Actuated g/C Ratio	0.56	0.56	0.56	0.56		0.31		0.31				
v/c Ratio	0.23	0.54	0.17	0.68		0.67		0.33				
Control Delay	10.0	10.6	8.3	14.1		24.2		16.5				
Queue Delay	0.0	0.0	0.0	0.0		0.1		0.0				
Total Delay	10.0	10.6	8.3	14.1		24.3		16.5				
LOS	A	B	A	B		C		B				
Approach Delay		10.5		13.6		24.3		16.5				
Approach LOS		B		B		C		B				

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 122.3
Natural Cycle: 115
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 15.0
Intersection Capacity Utilization 77.9%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service D

Splits and Phases: 13: W Holly St & F St



Timings
13: W Holly St & F St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	ø5	ø6
Lane Configurations		
Volume (vph)		
Turn Type		
Protected Phases	5	6
Permitted Phases		
Detector Phases		
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	28.0	24.0
Total Split (s)	28.0	45.0
Total Split (%)	22%	36%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	5.0	1.0
Lead/Lag	Lead	Lag
Lead-Lag Optimize?		
Recall Mode	None	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

HCM Signalized Intersection Capacity Analysis
13: W Holly St & F St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			0.95	
Frt	1.00	0.96		1.00	0.99			0.99			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1728	1746		1711	1776			1791			3276	
Flt Permitted	0.25	1.00		0.35	1.00			0.94			0.69	
Satd. Flow (perm)	457	1746		629	1776			1691			2301	
Volume (vph)	50	375	135	55	590	60	35	275	25	55	135	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	395	142	58	621	63	37	289	26	58	142	53
RTOR Reduction (vph)	0	10	0	0	3	0	0	2	0	0	20	0
Lane Group Flow (vph)	53	527	0	58	681	0	0	350	0	0	233	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2 4			2 4			1 3			1 3	
Permitted Phases	2 4			2 4			1 3			1 3		
Actuated Green, G (s)	70.0	70.0		70.0	70.0			35.6			35.6	
Effective Green, g (s)	76.0	76.0		76.0	76.0			37.6			37.6	
Actuated g/C Ratio	0.59	0.59		0.59	0.59			0.29			0.29	
Clearance Time (s)												
Vehicle Extension (s)												
Lane Grp Cap (vph)	268	1024		369	1041			491			668	
v/s Ratio Prot		0.30			c0.38							
v/s Ratio Perm	0.12			0.09				c0.21			0.10	
v/c Ratio	0.20	0.52		0.16	0.65			0.71			0.35	
Uniform Delay, d1	12.5	15.9		12.2	18.0			41.2			36.3	
Progression Factor	1.00	1.00		1.00	1.00			1.03			1.00	
Incremental Delay, d2	0.4	0.4		0.2	1.5			2.6			0.3	
Delay (s)	12.9	16.3		12.4	19.5			44.9			36.7	
Level of Service	B	B		B	B			D			D	
Approach Delay (s)		16.0			18.9			44.9			36.7	
Approach LOS		B			B			D			D	
Intersection Summary												
HCM Average Control Delay		25.1			HCM Level of Service			C				
HCM Volume to Capacity ratio		0.67										
Actuated Cycle Length (s)		129.6			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		77.9%			ICU Level of Service			D				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 14: W Holly St & C St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free				Free		Stop				Stop	
Grade	0%				0%		0%				0%	
Volume (veh/h)	10	455	35	20	700	55	20	15	25	55	15	5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	479	37	21	737	58	21	16	26	58	16	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)	753											
pX, platoon unblocked				0.88			0.88			0.88		
vC, conflicting volume	795				516	1339			1355	497	1361	1345
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	795				447	1388			1406	426	1412	1394
tC, single (s)	4.1				4.1	7.1			6.5	6.2	7.1	6.5
tC, 2 stage (s)												
tF (s)	2.2				2.2	3.5			4.0	3.3	3.5	4.0
p0 queue free %	99				98	77			87	95	32	87
cM capacity (veh/h)	831				979	92			119	554	85	121
												406
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	526	816	63	79								
Volume Left	11	21	21	58								
Volume Right	37	58	26	5								
cSH	831	979	154	96								
Volume to Capacity	0.01	0.02	0.41	0.82								
Queue Length 95th (ft)	1	2	45	112								
Control Delay (s)	0.4	0.6	43.6	127.2								
Lane LOS	A	A	E	F								
Approach Delay (s)	0.4	0.6	43.6	127.2								
Approach LOS			E	F								
Intersection Summary												
Average Delay				9.1								
Intersection Capacity Utilization				65.4%			ICU Level of Service			C		
Analysis Period (min)	15											

Timings 15: W Holly St & Cornwall Ave

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

				
Lane Group	WBT	NBL	NBT	SBT
Lane Configurations				
Volume (vph)	1050	70	230	245
Turn Type	Perm			
Protected Phases	2		4	4
Permitted Phases	4			
Detector Phases	2		4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0
Minimum Split (s)	21.0	23.0	23.0	23.0
Total Split (s)	40.0	30.0	30.0	30.0
Total Split (%)	57.1%	42.9%	42.9%	42.9%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	36.0		26.0	26.0
Actuated g/C Ratio	0.51		0.37	0.37
v/c Ratio	0.81		0.62	0.57
Control Delay	18.4		16.5	14.7
Queue Delay	0.0		0.0	0.0
Total Delay	18.4		16.5	14.7
LOS	B		B	B
Approach Delay	18.4		16.5	14.7
Approach LOS	B		B	B
Intersection Summary				
Cycle Length: 70				
Actuated Cycle Length: 70				
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green				
Natural Cycle: 55				
Control Type: Pretimed				
Maximum v/c Ratio: 0.81				
Intersection Signal Delay: 17.4			Intersection LOS: B	
Intersection Capacity Utilization 84.8%			ICU Level of Service E	
Analysis Period (min) 15				

Splits and Phases: 15: W Holly St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
15: W Holly St & Cornwall Ave

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.97			1.00			0.97	
Flpb, ped/bikes					1.00			0.99			1.00	
Frt					0.98			1.00			0.96	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					3275			1779			1676	
Flt Permitted					1.00			0.76			1.00	
Satd. Flow (perm)					3275			1377			1676	
Volume (vph)	0	0	0	59	1050	200	70	230	0	0	245	105
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	62	1105	211	74	242	0	0	258	111
RTOR Reduction (vph)	0	0	0	0	21	0	0	0	0	0	22	0
Lane Group Flow (vph)	0	0	0	0	1357	0	0	316	0	0	347	0
Confl. Peds. (#/hr)				80		80	80					80
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type				Split		Perm						
Protected Phases				2	2			4			4	
Permitted Phases							4					
Actuated Green, G (s)					36.0			26.0			26.0	
Effective Green, g (s)					36.0			26.0			26.0	
Actuated g/C Ratio					0.51			0.37			0.37	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					1684			511			623	
v/s Ratio Prot					c0.41						0.21	
v/s Ratio Perm								c0.23				
v/c Ratio					0.81			0.62			0.56	
Uniform Delay, d1					14.1			18.0			17.4	
Progression Factor					1.00			0.85			0.71	
Incremental Delay, d2					4.2			0.5			2.9	
Delay (s)					18.3			15.7			15.3	
Level of Service					B			B			B	
Approach Delay (s)		0.0			18.3			15.7			15.3	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
16: Lakeway Dr & Jersey St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	WBL	WBR	NBL	NBT	SBL	SBT
Lane Configurations						
Volume (vph)	30	760	385	285	565	360
Turn Type		Prot	Split		Split	
Protected Phases	8	8	2	2	6	6
Permitted Phases						
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	34.0	34.0	35.0	35.0	31.0	31.0
Total Split (%)	34.0%	34.0%	35.0%	35.0%	31.0%	31.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
Act Effct Green (s)	25.6	25.6	27.3	27.3	23.8	23.8
Actuated g/C Ratio	0.29	0.29	0.30	0.30	0.27	0.27
v/c Ratio	0.86	0.81	0.86	0.96dr	0.79	0.84
Control Delay	51.7	38.6	49.7	21.9	49.6	43.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.7	38.6	49.7	21.9	49.6	43.3
LOS	D	D	D	C	D	D
Approach Delay	43.5			29.3		45.2
Approach LOS	D			C		D

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 89.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 37.9	Intersection LOS: D
Intersection Capacity Utilization 81.6%	ICU Level of Service D
Analysis Period (min) 15	
dr Defacto Right Lane. Recode with 1 though lane as a right lane.	

Splits and Phases: 16: Lakeway Dr & Jersey St



HCM Signalized Intersection Capacity Analysis
16: Lakeway Dr & Jersey St

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Movement	WBL2	WBL	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0			4.0	4.0	
Lane Util. Factor	1.00	0.91			0.91	0.91			0.91	0.91	
Frt	0.91	0.85			1.00	0.89			1.00	1.00	
Flt Protected	0.98	1.00			0.95	1.00			0.95	0.98	
Satd. Flow (prot)	1604	2786			1572	2945			1430	3097	
Flt Permitted	0.98	1.00			0.95	1.00			0.95	0.98	
Satd. Flow (perm)	1604	2786			1572	2945			1430	3097	
Volume (vph)	115	30	760	90	5	385	285	790	565	360	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	121	32	800	95	5	405	300	832	595	379	21
RTOR Reduction (vph)	0	0	14	0	0	0	417	0	0	0	0
Lane Group Flow (vph)	0	395	639	0	0	410	715	0	302	693	0
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	1%	1%	11%	1%	1%
Turn Type	Split	Prot			Split	Split			Split		
Protected Phases	8	8	8		2	2	2		6	6	
Permitted Phases											
Actuated Green, G (s)	24.5	24.5			26.2	26.2			22.7	22.7	
Effective Green, g (s)	25.5	25.5			27.2	27.2			23.7	23.7	
Actuated g/C Ratio	0.29	0.29			0.31	0.31			0.27	0.27	
Clearance Time (s)	5.0	5.0			5.0	5.0			5.0	5.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0			2.0	2.0	
Lane Grp Cap (vph)	463	804			484	906			383	830	
v/s Ratio Prot	c0.25	0.23			c0.26	0.24			0.21	c0.22	
v/s Ratio Perm											
v/c Ratio	0.85	0.80			0.85	0.96dr			0.79	0.83	
Uniform Delay, d1	29.7	29.0			28.7	28.0			30.0	30.5	
Progression Factor	1.00	1.00			1.00	1.00			1.00	1.00	
Incremental Delay, d2	13.7	5.1			12.4	4.3			9.6	7.0	
Delay (s)	43.3	34.2			41.1	32.3			39.6	37.5	
Level of Service	D	C			D	C			D	D	
Approach Delay (s)	37.6				34.6				38.1		
Approach LOS	D				C				D		

Intersection Summary

HCM Average Control Delay	36.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	88.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		
dr	Defacto Right Lane. Recode with 1 though lane as a right lane.		
c	Critical Lane Group		

Timings
17: Lakeway Dr & I-5 SB Ramps

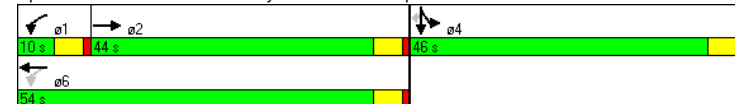
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Lane Group	EBT	WBL	WBT	SBT	SBR
Lane Configurations					
Volume (vph)	1120	165	750	20	320
Turn Type	pm+pt			Perm	
Protected Phases	2	1	6	4	
Permitted Phases		6			4
Detector Phases	2	1	6	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	10.0	23.0	28.0	28.0
Total Split (s)	44.0	10.0	54.0	46.0	46.0
Total Split (%)	44.0%	10.0%	54.0%	46.0%	46.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None
Act Effct Green (s)	40.1	50.1	50.1	39.1	39.1
Actuated g/C Ratio	0.41	0.52	0.52	0.40	0.40
v/c Ratio	0.98	0.97	0.45	0.91	0.48
Control Delay	48.1	80.7	16.4	46.7	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	48.1	80.7	16.4	46.7	14.6
LOS	D	F	B	D	B
Approach Delay	48.1		28.0	35.6	
Approach LOS	D		C	D	

Intersection Summary

Cycle Length: 100	
Actuated Cycle Length: 97.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 38.6	Intersection LOS: D
Intersection Capacity Utilization 89.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 17: Lakeway Dr & I-5 SB Ramps



HCM Signalized Intersection Capacity Analysis 17: Lakeway Dr & I-5 SB Ramps

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑↑						↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		0.95		1.00	0.95						1.00	1.00
Frt		0.98		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		3382		1711	3421						1735	1546
Flt Permitted		1.00		0.09	1.00						0.95	1.00
Satd. Flow (perm)		3382		163	3421						1735	1546
Volume (vph)	0	1120	185	165	750	0	0	0	0	585	20	320
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1179	195	174	789	0	0	0	0	616	21	337
RTOR Reduction (vph)	0	13	0	0	0	0	0	0	0	0	0	81
Lane Group Flow (vph)	0	1361	0	174	789	0	0	0	0	0	637	256
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type		pm+pt								Split	Perm	
Protected Phases		2		1	6					4	4	
Permitted Phases				6								4
Actuated Green, G (s)		39.1		49.1	49.1					38.1	38.1	
Effective Green, g (s)		40.1		50.1	50.1					39.1	39.1	
Actuated g/C Ratio		0.41		0.52	0.52					0.40	0.40	
Clearance Time (s)		5.0		5.0	5.0					5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		1395		180	1763					698	622	
v/s Ratio Prot		0.40		c0.06	0.23					c0.37		
v/s Ratio Perm				c0.44							0.17	
v/c Ratio		0.98		0.97	0.45					0.91	0.41	
Uniform Delay, d1		28.1		22.9	14.8					27.4	20.8	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		18.4		56.7	0.2					16.3	0.4	
Delay (s)		46.5		79.7	15.0					43.7	21.2	
Level of Service		D		E	B					D	C	
Approach Delay (s)		46.5			26.7			0.0		36.0		
Approach LOS		D			C			A		D		

Intersection Summary

HCM Average Control Delay	37.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	97.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings 18: Lakeway Dr & King St

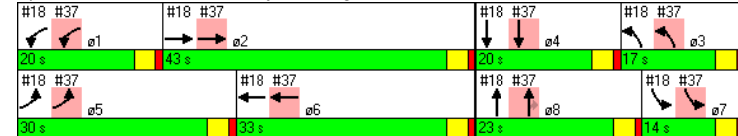
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Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑↑	↑	↑	↑	↑
Volume (vph)	415	1080	20	625	140	80	50	25
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	5	2	1	6	3	8	7	4
Permitted Phases								
Detector Phases	5	2	1	6	3	8	7	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	30.0	43.0	20.0	33.0	17.0	23.0	14.0	20.0
Total Split (%)	30.0%	43.0%	20.0%	33.0%	17.0%	23.0%	14.0%	20.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?								
Recall Mode	None	Min	None	None	None	Min	None	None
Act Effct Green (s)	26.0	39.0	16.0	29.0	13.0	16.5	12.5	16.0
Actuated g/C Ratio	0.26	0.39	0.16	0.29	0.13	0.16	0.12	0.16
v/c Ratio	0.96	1.00	0.08	0.92	0.65	0.43	0.24	0.57
Control Delay	71.9	55.9	38.6	27.6	55.7	33.6	44.8	12.8
Queue Delay	0.0	0.0	0.0	7.4	0.0	0.0	0.0	0.0
Total Delay	71.9	55.9	38.6	35.0	55.7	33.6	44.8	12.8
LOS	E	E	D	D	E	C	D	B
Approach Delay		59.8		35.1		45.3		18.4
Approach LOS		E		D		D		B

Intersection Summary

Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 47.7	Intersection LOS: D
Intersection Capacity Utilization 83.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 18: Lakeway Dr & King St



HCM Signalized Intersection Capacity Analysis 18: Lakeway Dr & King St

No Action (2016) PM Peak Hour
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.96		1.00	0.95		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	3408		1728	3307		1745	1738		1745	1590	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1745	3408		1728	3307		1745	1738		1745	1590	
Volume (vph)	415	1080	200	20	625	250	140	80	45	50	25	215
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	437	1137	211	21	658	263	147	84	47	53	26	226
RTOR Reduction (vph)	0	15	0	0	43	0	0	21	0	0	190	0
Lane Group Flow (vph)	437	1333	0	21	878	0	147	110	0	53	62	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	26.0	39.0		16.0	29.0		13.0	16.5		12.5	16.0	
Effective Green, g (s)	26.0	39.0		16.0	29.0		13.0	16.5		12.5	16.0	
Actuated g/C Ratio	0.26	0.39		0.16	0.29		0.13	0.16		0.12	0.16	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	454	1329		276	959		227	287		218	254	
v/s Ratio Prot	c0.25	c0.39		0.01	0.27		c0.08	c0.06		0.03	0.04	
v/s Ratio Perm												
v/c Ratio	0.96	1.00		0.08	0.92		0.65	0.38		0.24	0.24	
Uniform Delay, d1	36.5	30.5		35.7	34.3		41.3	37.2		39.5	36.7	
Progression Factor	1.00	1.00		1.06	0.57		1.00	1.00		1.00	1.00	
Incremental Delay, d2	32.5	25.4		0.1	7.1		6.2	0.9		0.6	0.5	
Delay (s)	69.1	55.9		37.9	26.5		47.5	38.1		40.1	37.2	
Level of Service	E	E		D	C		D	D		D	D	
Approach Delay (s)		59.1			26.8			43.1			37.7	
Approach LOS		E			C			D			D	
Intersection Summary												
HCM Average Control Delay		46.6										
HCM Volume to Capacity ratio		0.78										
Actuated Cycle Length (s)		100.0										
Intersection Capacity Utilization		83.9%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 24: E Chestnut St & Railroad Ave

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	80	1010	35	0	0	0	0	30	130	95	80	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	84	1063	37	0	0	0	0	32	137	100	84	0
Pedestrians					41			41			11	
Lane Width (ft)					0.0			11.0			11.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			3			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		353			350							
pX, platoon unblocked												
vC, conflicting volume	11			1141			1333	1302	455	727	1320	11
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	11			1141			1333	1302	455	727	1320	11
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			100	79	75	45	41	100
cM capacity (veh/h)	1600			600			56	148	540	182	144	1065
Direction, Lane #												
Volume Total	350	532	303	168	184							
Volume Left	84	0	0	0	100							
Volume Right	0	0	37	137	0							
cSH	1600	1700	1700	361	162							
Volume to Capacity	0.05	0.31	0.18	0.47	1.13							
Queue Length 95th (ft)	4	0	0	60	245							
Control Delay (s)	2.1	0.0	0.0	23.4	168.0							
Lane LOS	A			C	F							
Approach Delay (s)	0.6			23.4	168.0							
Approach LOS				C	F							
Intersection Summary												
Average Delay		23.2										
Intersection Capacity Utilization		54.6%										
Analysis Period (min)		15										

Timings
25: E Chestnut St & N State St

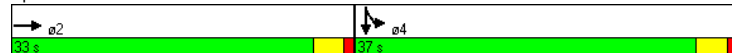
No Action (2016) PM Peak Hour
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	→	↘	↓
Lane Group	EBT	SBL	SBT
Lane Configurations	↑↑↑	↑	↑↑
Volume (vph)	790	225	830
Turn Type	Split		
Protected Phases	2	4	4
Permitted Phases			
Detector Phases	2	4	4
Minimum Initial (s)	6.0	6.0	6.0
Minimum Split (s)	22.0	20.0	20.0
Total Split (s)	33.0	37.0	37.0
Total Split (%)	47.1%	52.9%	52.9%
Yellow Time (s)	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	Max	Max	Max
Act Effct Green (s)	29.0	33.0	33.0
Actuated g/C Ratio	0.41	0.47	0.47
v/c Ratio	0.65	0.28	0.54
Control Delay	17.8	8.5	14.6
Queue Delay	0.0	0.0	0.0
Total Delay	17.8	8.5	14.6
LOS	B	A	B
Approach Delay	17.8		13.3
Approach LOS	B		B

Intersection Summary

Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 0 (0%), Referenced to phase 4:SBTL, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 15.7	Intersection LOS: B
Intersection Capacity Utilization 55.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 25: E Chestnut St & N State St



HCM Signalized Intersection Capacity Analysis
25: E Chestnut St & N State St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑↑								↓	↑↑		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0								4.0	4.0		
Lane Util. Factor		0.91								1.00	0.95		
Frpb, ped/bikes		0.98								1.00	1.00		
Flpb, ped/bikes		1.00								1.00	1.00		
Frt		0.95								1.00	1.00		
Flt Protected		1.00								0.95	1.00		
Satd. Flow (prot)		4606								1728	3455		
Flt Permitted		1.00								0.95	1.00		
Satd. Flow (perm)		4606								1728	3455		
Volume (vph)	0	790	430	0	0	0	0	0	0	225	830	0	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	832	453	0	0	0	0	0	0	237	874	0	
RTOR Reduction (vph)	0	54	0	0	0	0	0	0	0	40	0	0	
Lane Group Flow (vph)	0	1231	0	0	0	0	0	0	0	197	874	0	
Confl. Peds. (#/hr)			40							40			
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	1%	1%	1%	
Turn Type										Split			
Protected Phases		2								4	4		
Permitted Phases													
Actuated Green, G (s)		29.0								33.0	33.0		
Effective Green, g (s)		29.0								33.0	33.0		
Actuated g/C Ratio		0.41								0.47	0.47		
Clearance Time (s)		4.0								4.0	4.0		
Lane Grp Cap (vph)		1908								815	1629		
v/s Ratio Prot		c0.27								0.11	c0.25		
v/s Ratio Perm													
v/c Ratio		0.64								0.24	0.54		
Uniform Delay, d1		16.4								11.0	13.1		
Progression Factor		1.07								1.00	1.00		
Incremental Delay, d2		1.3								0.7	1.3		
Delay (s)		18.8								11.7	14.4		
Level of Service		B								B	B		
Approach Delay (s)		18.8			0.0			0.0			13.8		
Approach LOS		B			A			A			B		

Intersection Summary

HCM Average Control Delay	16.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
26: E Chestnut St & N Forest St

No Action (2016) PM Peak Hour
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	→	↑
Lane Group	EBT	NBT
Lane Configurations	↑↑↑	↑↑
Volume (vph)	740	615
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phases	2	4
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	22.0	21.0
Total Split (s)	38.0	32.0
Total Split (%)	54.3%	45.7%
Yellow Time (s)	3.0	3.0
All-Red Time (s)	1.0	1.0
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	Max
Act Effct Green (s)	34.0	28.0
Actuated g/C Ratio	0.49	0.40
v/c Ratio	0.45	0.60
Control Delay	4.8	17.7
Queue Delay	0.1	0.0
Total Delay	4.9	17.7
LOS	A	B
Approach Delay	4.9	17.7
Approach LOS	A	B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 10.3
Intersection Capacity Utilization 50.3%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service A

Splits and Phases: 26: E Chestnut St & N Forest St



HCM Signalized Intersection Capacity Analysis
26: E Chestnut St & N Forest St

No Action (2016) PM Peak Hour
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR								
Lane Configurations		↑↑↑						↑↑												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900								
Total Lost time (s)		4.0						4.0												
Lane Util. Factor		0.91						0.95												
Frpb, ped/bikes		1.00						0.99												
Flpb, ped/bikes		1.00						1.00												
Frt		1.00						0.97												
Flt Protected		0.98						1.00												
Satd. Flow (prot)		4939						3276												
Flt Permitted		0.98						1.00												
Satd. Flow (perm)		4939						3276												
Volume (vph)	325	740	0	0	0	0	0	615	157	0	0	0								
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95								
Adj. Flow (vph)	342	779	0	0	0	0	0	647	165	0	0	0								
RTOR Reduction (vph)	0	66	0	0	0	0	0	32	0	0	0	0								
Lane Group Flow (vph)	0	1055	0	0	0	0	0	780	0	0	0	0								
Confl. Peds. (#/hr)	40								40											
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	0%	0%	0%								
Turn Type	Split																			
Protected Phases	2	2						4												
Permitted Phases																				
Actuated Green, G (s)		34.0						28.0												
Effective Green, g (s)		34.0						28.0												
Actuated g/C Ratio		0.49						0.40												
Clearance Time (s)		4.0						4.0												
Lane Grp Cap (vph)		2399						1310												
v/s Ratio Prot		c0.21						c0.24												
v/s Ratio Perm																				
v/c Ratio		0.44						0.60												
Uniform Delay, d1		11.8						16.5												
Progression Factor		0.41						1.00												
Incremental Delay, d2		0.5						2.0												
Delay (s)		5.3						18.5												
Level of Service		A						B												
Approach Delay (s)		5.3			0.0			18.5			0.0									
Approach LOS		A			A			B			A									

Intersection Summary

HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
27: E Chestnut St & Ellis St

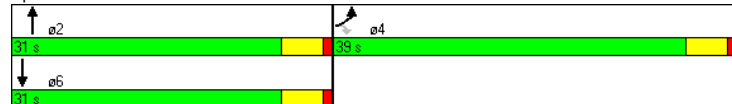
No Action (2016) PM Peak Hour
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	↖	↗	↖	↗
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations	↖↗	↖	↖↗↗	↖↗
Volume (vph)	765	470	655	445
Turn Type	Perm			
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phases	4	4	2	6
Minimum Initial (s)	6.0	6.0	6.0	6.0
Minimum Split (s)	30.0	30.0	12.0	30.0
Total Split (s)	39.0	39.0	31.0	31.0
Total Split (%)	55.7%	55.7%	44.3%	44.3%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	22.5	22.5	18.4	18.4
Actuated g/C Ratio	0.45	0.45	0.37	0.37
v/c Ratio	0.54	0.64	0.38	0.37
Control Delay	12.1	10.6	12.8	13.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.1	10.6	12.8	13.1
LOS	B	B	B	B
Approach Delay	11.5		12.8	13.1
Approach LOS	B		B	B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 50.2
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 12.2
Intersection Capacity Utilization 52.6%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service A

Splits and Phases: 27: E Chestnut St & Ellis St



HCM Signalized Intersection Capacity Analysis
27: E Chestnut St & Ellis St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

	↖	↗	↖	↗	↖	↗
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↖	↖↗	↖↗↗	↖↗	↖↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.91	0.95	
Frbp, ped/bikes	1.00	0.95		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3319	1460		4964	3490	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3319	1460		4964	3490	
Volume (vph)	765	470	0	655	445	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	805	495	0	689	468	0
RTOR Reduction (vph)	0	121	0	0	0	0
Lane Group Flow (vph)	805	374	0	689	468	0
Confl. Peds. (#/hr)	60	60				
Heavy Vehicles (%)	2%	2%	1%	1%	0%	0%
Turn Type	Perm					
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	21.4	21.4		17.3	17.3	
Effective Green, g (s)	22.4	22.4		18.3	18.3	
Actuated g/C Ratio	0.46	0.46		0.38	0.38	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1527	672		1865	1311	
v/s Ratio Prot	0.24			0.14	0.13	
v/s Ratio Perm		0.26				
v/c Ratio	0.53	0.56		0.37	0.36	
Uniform Delay, d1	9.4	9.5		11.0	11.0	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.0		0.1	0.2	
Delay (s)	9.7	10.5		11.1	11.1	
Level of Service	A	B		B	B	
Approach Delay (s)	10.0			11.1	11.1	
Approach LOS	B			B	B	

Intersection Summary

HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	48.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Laurel St & N State St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											  	
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Volume (veh/h)	0	20	10	30	20	0	0	0	0	45	1165	55
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	21	11	32	21	0	0	0	0	47	1226	58
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)	1046											
pX, platoon unblocked												
vC, conflicting volume	1361	1350	438	525	1379	0	1284	0				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1361	1350	438	525	1379	0	1284	0				
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	100	85	98	92	85	100	100	97				
cM capacity (veh/h)	93	145	567	376	139	1091	536	1629				
Direction, Lane #	EB 1	WB 1	SB 1	SB 2	SB 3							
Volume Total	32	53	354	613	364							
Volume Left	0	32	47	0	0							
Volume Right	11	0	0	0	58							
cSH	193	224	1629	1700	1700							
Volume to Capacity	0.16	0.24	0.03	0.36	0.21							
Queue Length 95th (ft)	14	22	2	0	0							
Control Delay (s)	27.3	26.0	1.2	0.0	0.0							
Lane LOS	D	D	A									
Approach Delay (s)	27.3	26.0	0.3									
Approach LOS	D	D										
Intersection Summary												
Average Delay	1.9											
Intersection Capacity Utilization	40.7%		ICU Level of Service					A				
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
29: Laurel St & N Forest St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	50	15	0	0	45	105	5	720	50	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	53	16	0	0	47	111	5	758	53	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)										1032		
pX, platoon unblocked												
vC, conflicting volume	524	821	0	803	795	405	0			811		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	524	821	0	803	795	405	0			811		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	83	95	100	100	85	82	100			100		
cM capacity (veh/h)	315	307	1084	267	322	601	1622			824		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	68	158	384	432								
Volume Left	53	0	5	0								
Volume Right	0	111	0	53								
cSH	313	477	1622	1700								
Volume to Capacity	0.22	0.33	0.00	0.25								
Queue Length 95th (ft)	20	36	0	0								
Control Delay (s)	19.7	16.2	0.1	0.0								
Lane LOS	C	C	A									
Approach Delay (s)	19.7	16.2	0.1									
Approach LOS	C	C										
Intersection Summary												
Average Delay			3.8									
Intersection Capacity Utilization	44.0%		ICU Level of Service		A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 30: N Forrest St & N State St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑							↑	↑	↑	
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	0	570	0	0	0	0	0	0	165	50	165	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	600	0	0	0	0	0	0	174	53	174	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			600			687	600	600	774	600	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			600			687	600	600	774	600	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	65	74	58	100
cM capacity (veh/h)	1623			977			243	415	501	206	415	1085

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	600	174	53	174
Volume Left	0	0	53	0
Volume Right	0	174	0	0
cSH	1700	501	206	415
Volume to Capacity	0.35	0.35	0.26	0.42
Queue Length 95th (ft)	0	38	24	51
Control Delay (s)	0.0	16.0	28.3	19.8
Lane LOS	C	D	C	
Approach Delay (s)	0.0	16.0	21.8	
Approach LOS	C	C		

Intersection Summary			
Average Delay	7.7		
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

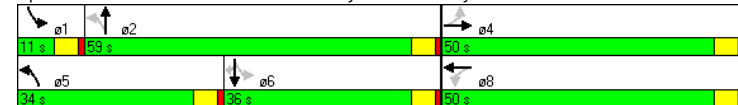
Timings 31: Bill McDonald Pkwy & Samish Way

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↙	↘	↙	↘	↙	↘	↙	↘	↙
Volume (vph)	290	45	45	45	325	475	25	625	330
Turn Type	Perm		Perm		pm+pt		pm+pt		Perm
Protected Phases	4		8		5		2		6
Permitted Phases	4		8		2		6		6
Detector Phases	4	4	8	8	5	2	1	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	11.0	30.0	30.0	11.0	28.0	11.0	29.0	29.0
Total Split (s)	50.0	50.0	50.0	50.0	34.0	59.0	11.0	36.0	36.0
Total Split (%)	41.7%	41.7%	41.7%	41.7%	28.3%	49.2%	9.2%	30.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	26.2	26.2		26.2	45.3	42.2	27.8	20.6	20.6
Actuated g/C Ratio	0.32	0.32		0.32	0.56	0.52	0.32	0.25	0.25
v/c Ratio	0.78	0.54		0.31	0.65	0.31	0.08	0.74	0.53
Control Delay	42.1	7.3		23.3	22.5	14.2	14.9	36.4	7.1
Queue Delay	0.0	0.2		0.1	0.6	0.4	0.0	0.1	0.0
Total Delay	42.1	7.5		23.4	23.1	14.6	14.9	36.5	7.1
LOS	D	A		C	C	B	B	D	A
Approach Delay	22.4		23.4		17.9		26.0		
Approach LOS	C		C		B		C		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 81	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 22.3	Intersection LOS: C
Intersection Capacity Utilization 78.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 31: Bill McDonald Pkwy & Samish Way



HCM Signalized Intersection Capacity Analysis
31: Bill McDonald Pkwy & Samish Way

No Action (2016) PM Peak Hour
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87		0.97	1.00		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.98	0.95		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	1562		1749	1728		1745	3411		1745	3490	1561
Flt Permitted	0.68	1.00		0.60	0.21		0.45	1.00		0.45	1.00	1.00
Satd. Flow (perm)	1233	1562		1071	382		822	3490		822	3490	1561
Volume (vph)	290	45	340	45	45	25	325	475	45	25	625	330
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	305	47	358	47	47	26	342	500	47	26	658	347
RTOR Reduction (vph)	0	245	0	0	9	0	0	5	0	0	0	243
Lane Group Flow (vph)	305	160	0	0	111	0	342	542	0	26	658	104
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm			Perm			pm+pt			pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.0	25.0		25.0	47.7		41.0			25.6	23.9	23.9
Effective Green, g (s)	26.0	26.0		26.0	48.7		42.0			27.6	24.9	24.9
Actuated g/C Ratio	0.31	0.31		0.31	0.59		0.51			0.33	0.30	0.30
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	2.0		2.0			3.0	2.0	2.0
Lane Grp Cap (vph)	388	491		337	547		1732			304	1051	470
v/s Ratio Prot		0.10			c0.15		0.16			0.00	0.19	
v/s Ratio Perm	c0.25			0.10	c0.22		0.03			0.03		0.07
v/c Ratio	0.79	0.32		0.33	0.63		0.31			0.09	0.63	0.22
Uniform Delay, d1	25.8	21.6		21.7	10.9		11.9			18.6	24.9	21.6
Progression Factor	1.00	1.00		1.00	1.00		1.00			1.00	1.00	1.00
Incremental Delay, d2	10.1	0.4		0.6	1.6		0.0			0.1	0.8	0.1
Delay (s)	35.9	22.0		22.3	12.5		11.9			18.8	25.7	21.7
Level of Service	D	C		C	B		B			B	C	C
Approach Delay (s)		28.0			22.3		12.1				24.2	
Approach LOS		C			C		B				C	

Intersection Summary

HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	82.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
32: Samish Way & I-5 SB Off-Ramp

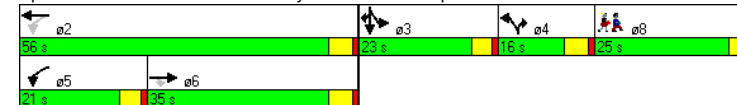
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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	ø8
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱	↰	
Volume (vph)	715	270	265	440	155	450	250	260	245	
Turn Type	Perm	pm+pt		Protcustom		Split	Prot			
Protected Phases	6		5	2	4	4	3	3	3	8
Permitted Phases		6	2							
Detector Phases	6	6	5	2	4	4	3	3	3	
Minimum Initial (s)	7.0	7.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0	20.0
Minimum Split (s)	22.0	22.0	9.5	22.0	12.0	12.0	11.5	11.5	11.5	25.0
Total Split (s)	35.0	35.0	21.0	56.0	16.0	16.0	23.0	23.0	23.0	25.0
Total Split (%)	29.2%	29.2%	17.5%	46.7%	13.3%	13.3%	19.2%	19.2%	19.2%	21%
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	4.0	3.5	3.5	3.5	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lead	Lead	Lead	
Lead-Lag Optimize?										
Recall Mode	Min	Min	None	Min	None	None	None	None	None	None
Act Effct Green (s)	26.5	26.5	47.2	47.2	12.1	12.1	18.5	18.5	18.5	
Actuated g/C Ratio	0.29	0.29	0.53	0.53	0.13	0.13	0.21	0.21	0.21	
v/c Ratio	0.74	0.43	0.71	0.25	0.70	0.77	0.73	0.72	0.49	
Control Delay	33.4	5.2	31.0	12.0	56.5	13.3	47.9	46.8	7.9	
Queue Delay	9.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	42.5	5.7	31.0	12.0	56.5	13.3	47.9	46.8	7.9	
LOS	D	A	C	B	E	B	D	D	A	
Approach Delay	32.4			19.1			34.5			
Approach LOS	C			B			C			

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 89.9	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 28.3	Intersection LOS: C
Intersection Capacity Utilization 71.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 32: Samish Way & I-5 SB Off-Ramp



HCM Signalized Intersection Capacity Analysis
32: Samish Way & I-5 SB Off-Ramp

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3455	1546	1728	3455	1728	1728	1546	1745	1837	1561	1561	1561
Flt Permitted	1.00	1.00	0.15	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3455	1546	275	3455	1728	1728	1546	1745	1837	1561	1561	1561
Volume (vph)	0	715	270	265	440	0	155	0	450	250	260	245
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	753	284	279	463	0	163	0	474	263	274	258
RTOR Reduction (vph)	0	0	200	0	0	0	0	0	410	0	0	205
Lane Group Flow (vph)	0	753	84	279	463	0	163	0	64	263	274	53
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Perm pm+pt			Prot			custom			Split		Prot
Protected Phases	6			5			4			4		3
Permitted Phases	6			2			4			3		3
Actuated Green, G (s)	25.5			46.2			11.1			18.0		18.0
Effective Green, g (s)	26.5			47.2			12.1			18.5		18.5
Actuated g/C Ratio	0.30			0.53			0.13			0.21		0.21
Clearance Time (s)	5.0			5.0			5.0			4.5		4.5
Vehicle Extension (s)	3.5			3.5			3.5			4.0		4.0
Lane Grp Cap (vph)	1020			456			233			359		322
v/s Ratio Prot	c0.22			c0.13			c0.09			c0.15		0.15
v/s Ratio Perm	0.05			0.23			0.31			0.72		0.17
Uniform Delay, d1	28.5			15.3			37.1			33.3		29.3
Progression Factor	1.00			1.00			1.00			1.00		1.00
Incremental Delay, d2	2.9			0.2			9.2			7.2		0.3
Delay (s)	31.4			19.8			46.3			41.3		29.6
Level of Service	C			B			D			D		C
Approach Delay (s)	29.4			14.8			38.7			37.2		
Approach LOS	C			B			D			D		

Intersection Summary

HCM Average Control Delay	29.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	89.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings

33: Samish Way & Lincoln St

No Action (2016) PM Peak Hour
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Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Volume (vph)	850	230	390	5	90	340	315	20	115	345
Turn Type	custom	pm+ov	custom	pm+pt	pm+pt	pm+ov	pm+ov	pm+ov	pm+ov	pm+ov
Protected Phases	4	4	5	3	3	5	2	1	6	4
Permitted Phases	4	4	3	2	6	6	6	6	6	6
Detector Phases	4	4	5	3	3	5	2	1	6	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	33.0	33.0	11.0	30.0	30.0	11.0	24.0	11.0	33.0	33.0
Total Split (s)	46.0	46.0	11.0	30.0	30.0	11.0	33.0	11.0	33.0	46.0
Total Split (%)	38.3%	38.3%	9.2%	25.0%	25.0%	9.2%	27.5%	9.2%	27.5%	38.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	Min	None	Min	None
Act Effct Green (s)	39.8	39.8	51.3	13.3	13.3	26.3	24.0	23.6	16.1	56.0
Actuated g/C Ratio	0.43	0.43	0.55	0.14	0.14	0.28	0.26	0.24	0.17	0.60
v/c Ratio	0.79	0.81	0.40	0.02	0.64	0.98	0.76	0.11	0.38	0.34
Control Delay	36.1	37.3	3.0	38.6	44.5	77.1	45.6	27.2	38.3	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.1	37.3	3.0	38.6	44.5	77.1	45.6	27.2	38.3	1.4
LOS	D	D	A	D	D	E	D	C	D	A
Approach Delay	27.8			44.3			61.5			11.3
Approach LOS	C			D			E			B

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 93.2	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 34.1	Intersection LOS: C
Intersection Capacity Utilization 74.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 33: Samish Way & Lincoln St

ø1	ø2	ø3	ø4
11 s	33 s	30 s	46 s
ø5	ø6		
11 s	33 s		

HCM Signalized Intersection Capacity Analysis
33: Samish Way & Lincoln St

No Action (2016) PM Peak Hour
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1641	1678	1546	1694	1666		1728	1802		1728	1818	1546
Flt Permitted	0.95	0.97	1.00	0.95	1.00		0.52	1.00		0.29	1.00	1.00
Satd. Flow (perm)	1641	1678	1546	1694	1666		949	1802		523	1818	1546
Volume (vph)	850	230	390	5	90	70	340	315	20	20	115	345
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	895	242	411	5	95	74	358	332	21	21	121	363
RTOR Reduction (vph)	0	0	210	0	26	0	0	2	0	0	0	138
Lane Group Flow (vph)	554	583	201	5	143	0	358	351	0	21	121	225
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	custom			pm+ov custom			pm+pt			pm+pt		pm+ov
Protected Phases	4	4	5	3	3		5	2		1	6	4
Permitted Phases	4		4	3			2			6		6
Actuated Green, G (s)	38.8	38.8	45.0	12.3	12.3		29.1	22.9		20.7	18.7	57.5
Effective Green, g (s)	39.8	39.8	47.0	13.3	13.3		30.9	23.9		22.7	19.7	59.5
Actuated g/C Ratio	0.41	0.41	0.49	0.14	0.14		0.32	0.25		0.24	0.21	0.62
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	680	696	821	235	231		364	449		161	373	958
v/s Ratio Prot	0.34	c0.35	0.02	0.00	c0.09		c0.07	0.19		0.00	0.07	0.10
v/s Ratio Perm			0.11				c0.24			0.03		0.05
v/c Ratio	0.81	0.84	0.25	0.02	0.62		0.98	0.78		0.13	0.32	0.23
Uniform Delay, d1	24.8	25.2	14.2	35.7	39.0		32.2	33.6		28.8	32.5	8.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	7.1	8.3	0.1	0.0	3.5		42.4	7.9		0.1	0.2	0.0
Delay (s)	31.9	33.5	14.3	35.7	42.4		74.5	41.6		28.9	32.7	8.2
Level of Service	C	C	B	D	D		E	D		C	C	A
Approach Delay (s)	27.8			42.2			58.2			14.9		
Approach LOS	C			D			E			B		

Intersection Summary

HCM Average Control Delay	33.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	96.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
34: Old Fairhaven Pkwy & 12th St

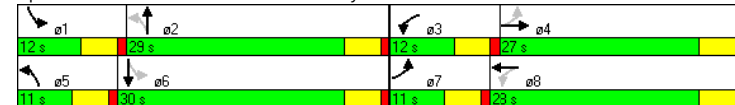
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Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	10	150	275	110	20	190	200	260
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	27.0	11.0	27.0	11.0	27.0	11.0	27.0
Total Split (s)	11.0	27.0	12.0	28.0	11.0	29.0	12.0	30.0
Total Split (%)	13.8%	33.8%	15.0%	35.0%	13.8%	36.3%	15.0%	37.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)	20.6	13.4	24.9	23.5	32.1	25.1	36.0	33.0
Actuated g/C Ratio	0.26	0.19	0.35	0.33	0.42	0.36	0.51	0.47
v/c Ratio	0.04	0.51	0.63	0.46	0.05	0.62	0.54	0.34
Control Delay	16.3	29.8	24.5	15.4	11.0	21.2	16.1	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	29.8	24.5	15.4	11.0	21.2	16.1	16.0
LOS	B	C	C	B	B	C	B	B
Approach Delay	29.0		19.9		20.7		16.1	
Approach LOS	C		B		C		B	

Intersection Summary

Cycle Length: 80	
Actuated Cycle Length: 70.6	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 19.9	Intersection LOS: B
Intersection Capacity Utilization 70.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 34: Old Fairhaven Pkwy & 12th St



HCM Signalized Intersection Capacity Analysis
34: Old Fairhaven Pkwy & 12th St

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.91		1.00	0.92		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1703	1768		1787	1710		1805	1754		1787	1857	
Flt Permitted	0.55	1.00		0.45	1.00		0.57	1.00		0.28	1.00	
Satd. Flow (perm)	994	1768		854	1710		1086	1754		535	1857	
Volume (vph)	10	150	15	275	110	170	20	190	200	200	260	25
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	158	16	289	116	179	21	200	211	211	274	26
RTOR Reduction (vph)	0	5	0	0	69	0	0	44	0	0	3	0
Lane Group Flow (vph)	11	169	0	289	226	0	21	367	0	211	297	0
Heavy Vehicles (%)	6%	6%	6%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.7	16.6		28.6	22.5		29.6	27.3		39.0	32.0	
Effective Green, g (s)	19.7	17.6		29.6	23.5		31.6	28.3		40.3	33.0	
Actuated g/C Ratio	0.25	0.23		0.38	0.30		0.41	0.36		0.52	0.42	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	270	399		420	516		471	637		405	787	
v/s Ratio Prot	0.00	0.10		c0.07	0.13		0.00	c0.21		c0.05	0.16	
v/s Ratio Perm	0.01			c0.19			0.02			0.22		
v/c Ratio	0.04	0.42		0.69	0.44		0.04	0.58		0.52	0.38	
Uniform Delay, d1	21.9	25.8		19.0	21.9		13.9	20.0		12.1	15.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.7		4.6	0.6		0.0	3.8		1.2	1.4	
Delay (s)	21.9	26.5		23.6	22.5		14.0	23.7		13.3	16.8	
Level of Service	C	C		C	C		B	C		B	B	
Approach Delay (s)		26.3			23.1			23.3			15.3	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	21.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	77.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

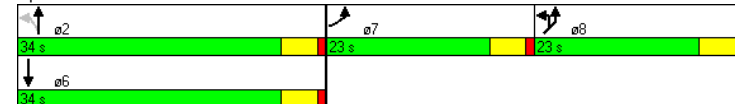
Timings
35: Hawthorne & 12th St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	NBL	NBT	SBT	NEL
Lane Configurations	↰		↱	↱	↰
Volume (vph)	155	10	275	360	60
Turn Type	Perm				
Protected Phases	7		2	6	8
Permitted Phases		2			
Detector Phases	7	2	2	6	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	23.0	26.0	26.0	26.0	23.0
Total Split (s)	23.0	34.0	34.0	34.0	23.0
Total Split (%)	28.8%	42.5%	42.5%	42.5%	28.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead				Lag
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	Max	None
Act Effct Green (s)	12.2		31.1	31.1	8.8
Actuated g/C Ratio	0.21		0.53	0.53	0.14
v/c Ratio	0.50		0.45	0.70	0.29
Control Delay	26.6		15.0	19.0	25.9
Queue Delay	0.0		0.0	0.0	0.0
Total Delay	26.6		15.0	19.0	25.9
LOS	C		B	B	C
Approach Delay	26.6		15.0	19.0	25.9
Approach LOS	C		B	B	C

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 59	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 19.6	Intersection LOS: B
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 35: Hawthorne & 12th St



HCM Signalized Intersection Capacity Analysis
35: Hawthorne & 12th St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBR	EBR2	NBL	NBT	SBT	SBR	SBR2	NEL	NER
Lane Configurations	↰	↱	↱	↰	↰	↱	↱	↱	↰	↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0				4.0	4.0			4.0	
Lane Util. Factor	1.00				1.00	1.00			1.00	
Frt	0.98				1.00	0.94			0.98	
Flt Protected	0.96				1.00	1.00			0.96	
Satd. Flow (prot)	1773				1859	1789			1786	
Flt Permitted	0.96				0.98	1.00			0.96	
Satd. Flow (perm)	1773				1817	1789			1786	
Volume (vph)	155	10	10	10	275	360	55	220	60	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	163	11	11	11	289	379	58	232	63	11
RTOR Reduction (vph)	3	0	0	0	0	19	0	0	9	0
Lane Group Flow (vph)	182	0	0	0	300	650	0	0	65	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	0%	0%	0%	0%	0%
Turn Type	Perm									
Protected Phases	7				2		6			
Permitted Phases					2					
Actuated Green, G (s)	11.1				30.1		30.1			
Effective Green, g (s)	12.1				31.1		31.1			
Actuated g/C Ratio	0.20				0.51		0.51			
Clearance Time (s)	5.0				5.0		5.0			
Vehicle Extension (s)	3.0				3.0		3.0			
Lane Grp Cap (vph)	352				926		912			
v/s Ratio Prot	c0.10						c0.36			
v/s Ratio Perm					0.17					
v/c Ratio	0.52				0.32		0.71			
Uniform Delay, d1	21.8				8.8		11.5			
Progression Factor	1.00				1.00		1.00			
Incremental Delay, d2	1.3				0.2		4.7			
Delay (s)	23.1				9.0		16.2			
Level of Service	C				A		B			
Approach Delay (s)	23.1				9.0		16.2			
Approach LOS	C				A		B			

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

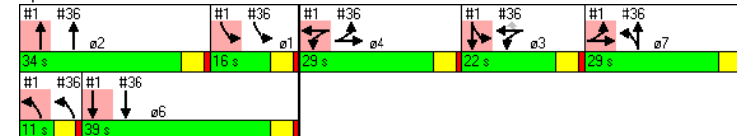
Timings
36: Birchwood Ave & Meridian Street

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT	ø2	ø5	ø7
Lane Configurations	↰	↱	↰	↱	↰	↰	↱	↱			
Volume (vph)	255	140	195	260	105	810	115	745			
Turn Type	Split			Perm	Prot		Prot				
Protected Phases	4	4	3		5 7	2 7	1	6	2	5	7
Permitted Phases				3							
Detector Phases	4	4	3	3	5 7	2 7	1	6			
Minimum Initial (s)	6.0	6.0	6.0	6.0			6.0	10.0	10.0	6.0	6.0
Minimum Split (s)	29.0	29.0	11.0	11.0			11.0	23.0	23.0	11.0	29.0
Total Split (s)	29.0	29.0	22.0	22.0	40.0	63.0	16.0	39.0	34.0	11.0	29.0
Total Split (%)	22.3%	22.3%	16.9%	16.9%	30.8%	48.5%	12.3%	30.0%	26%	8%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lead	Lag	Lag			Lag	Lag	Lead	Lead	
Lead-Lag Optimize?											
Recall Mode	None	None	None	None			None	None	Max	None	None
Act Effct Green (s)	22.8	22.8	18.0	18.0	36.0	59.0	12.0	35.0			
Actuated g/C Ratio	0.18	0.18	0.14	0.14	0.28	0.46	0.09	0.27			
v/c Ratio	0.83	0.62	1.08	0.62	0.22	0.54	0.73	1.09			
Control Delay	72.5	53.7	129.0	15.7	54.4	6.3	82.5	98.3			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0			
Total Delay	72.5	53.7	129.0	15.7	54.4	7.2	82.5	98.3			
LOS	E	D	F	B	D	A	F	F			
Approach Delay	64.2		73.3		12.5		96.6				
Approach LOS	E		E		B		F				

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 127.9	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.09	
Intersection Signal Delay: 61.3	Intersection LOS: E
Intersection Capacity Utilization 75.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 36: Birchwood Ave & Meridian Street



HCM Signalized Intersection Capacity Analysis
36: Birchwood Ave & Meridian Street

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↰	↱	↰	↱	↱	↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1814			1874	1615	1787	3552		1752	3379	
Flt Permitted	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	1814			1874	1615	1787	3552		1752	3379	
Volume (vph)	255	140	60	75	195	260	105	810	35	115	745	235
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	268	147	63	79	205	274	111	853	37	121	784	247
RTOR Reduction (vph)	0	12	0	0	0	212	0	2	0	0	23	0
Lane Group Flow (vph)	268	198	0	0	284	62	111	888	0	121	1008	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split		Perm	Prot			Prot		
Protected Phases	4	4		3	3		5 7	2 7		1	6	
Permitted Phases						3						
Actuated Green, G (s)	21.8	21.8			17.0	17.0	35.0	58.0		11.0	34.0	
Effective Green, g (s)	22.8	22.8			18.0	18.0	36.0	59.0		12.0	35.0	
Actuated g/C Ratio	0.18	0.18			0.14	0.14	0.28	0.46		0.09	0.27	
Clearance Time (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Vehicle Extension (s)	3.0	3.0			2.0	2.0				2.0	2.0	
Lane Grp Cap (vph)	322	324			264	227	503	1640		165	925	
v/s Ratio Prot	c0.15	0.11			c0.15		0.06	c0.25		0.07	c0.30	
v/s Ratio Perm						0.04						
v/c Ratio	0.83	0.61			1.08	0.27	0.22	0.54		0.73	1.09	
Uniform Delay, d1	50.7	48.4			54.9	49.0	35.2	24.7		56.3	46.4	
Progression Factor	1.00	1.00			1.00	1.00	1.49	0.22		1.00	1.00	
Incremental Delay, d2	16.6	3.4			77.0	0.2	0.0	0.2		13.5	57.0	
Delay (s)	67.2	51.8			131.9	49.3	52.3	5.7		69.8	103.4	
Level of Service	E	D			F	D	D	A		E	F	
Approach Delay (s)		60.4			91.3		10.9				99.9	
Approach LOS		E			F		B				F	

Intersection Summary

HCM Average Control Delay	64.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	127.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
37: Lakeway Dr & Lincoln Street

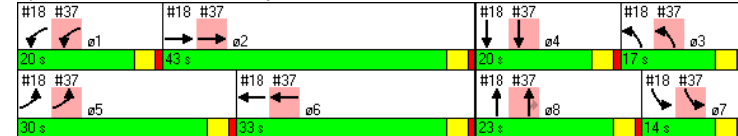
No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↱	↰	↱
Volume (vph)	45	1010	260	680	215	160	465	150	195
Turn Type	Prot		Prot		Prot		Perm	Prot	
Protected Phases	5	2	1	6	3	8		7	4
Permitted Phases							8		
Detector Phases	5	2	1	6	3	8	8	7	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	30.0	43.0	20.0	33.0	17.0	23.0	23.0	14.0	20.0
Total Split (%)	30.0%	43.0%	20.0%	33.0%	17.0%	23.0%	23.0%	14.0%	20.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?									
Recall Mode	None	Min	None	None	None	Min	Min	None	None
Act Effct Green (s)	26.0	39.0	16.0	29.0	13.0	16.5	16.5	12.5	16.0
Actuated g/C Ratio	0.26	0.39	0.16	0.29	0.13	0.16	0.16	0.12	0.16
v/c Ratio	0.11	0.89	1.00	0.81	1.02	0.57	0.93	0.74	0.93
Control Delay	51.9	16.5	98.1	40.0	109.9	45.4	40.4	66.0	78.2
Queue Delay	0.0	7.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.9	24.1	98.1	40.0	109.9	45.4	40.4	66.0	78.2
LOS	D	C	F	D	F	D	D	E	E
Approach Delay		25.2		54.9		59.1			73.7
Approach LOS		C		D		E			E

Intersection Summary

Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 48.0	Intersection LOS: D
Intersection Capacity Utilization 85.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 37: Lakeway Dr & Lincoln Street



HCM Signalized Intersection Capacity Analysis
37: Lakeway Dr & Lincoln Street

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0		
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00			
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	0.96			
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1711	3369		1711	3370		1711	1801	1531	1711	1737			
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00			
Satd. Flow (perm)	1711	3369		1711	3370		1711	1801	1531	1711	1737			
Volume (vph)	45	1010	115	260	680	76	215	160	465	150	195	60		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	1063	121	274	716	80	226	168	489	158	205	63		
RTOR Reduction (vph)	0	9	0	0	9	0	0	0	271	0	11	0		
Lane Group Flow (vph)	47	1175	0	274	787	0	226	168	218	158	257	0		
Turn Type	Prot			Prot			Prot		Perm	Prot				
Protected Phases	5	2		1	6		3	8		7	4			
Permitted Phases									8					
Actuated Green, G (s)	26.0	39.0		16.0	29.0		13.0	16.5	16.5	12.5	16.0			
Effective Green, g (s)	26.0	39.0		16.0	29.0		13.0	16.5	16.5	12.5	16.0			
Actuated g/C Ratio	0.26	0.39		0.16	0.29		0.13	0.16	0.16	0.12	0.16			
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	445	1314		274	977		222	297	253	214	278			
v/s Ratio Prot	0.03	c0.35		c0.16	0.23		c0.13	0.09		0.09	c0.15			
v/s Ratio Perm									0.14					
v/c Ratio	0.11	0.89		1.00	0.81		1.02	0.57	0.86	0.74	0.92			
Uniform Delay, d1	28.2	28.6		42.0	32.9		43.5	38.4	40.7	42.2	41.4			
Progression Factor	1.81	0.42		1.00	1.00		1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	0.0	3.0		54.4	4.9		65.1	2.5	24.9	12.5	34.4			
Delay (s)	51.0	15.0		96.4	37.8		108.6	40.9	65.5	54.7	75.8			
Level of Service	D	B		F	D		F	D	E	D	E			
Approach Delay (s)		16.4			52.8			71.9			68.0			
Approach LOS		B			D			E			E			
Intersection Summary														
HCM Average Control Delay			46.9			HCM Level of Service					D			
HCM Volume to Capacity ratio			0.90											
Actuated Cycle Length (s)			100.0			Sum of lost time (s)					12.0			
Intersection Capacity Utilization			85.1%			ICU Level of Service					E			
Analysis Period (min)			15											
c Critical Lane Group														

HCM Unsignalized Intersection Capacity Analysis
82: Wharf Street & N State St

No Action (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↰	↱		↰	↱
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	75	85	0	920	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	79	89	0	968	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None				
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1158	979	989			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1158	979	989			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	74	87			
cM capacity (veh/h)	189	303	699			
Direction, Lane #						
Volume Total	79	89	989			
Volume Left	0	89	0			
Volume Right	79	0	21			
cSH	303	699	1700			
Volume to Capacity	0.26	0.13	0.58			
Queue Length 95th (ft)	25	11	0			
Control Delay (s)	21.0	10.9	0.0			
Lane LOS	C	B				
Approach Delay (s)	21.0	10.9	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		2.3				
Intersection Capacity Utilization		61.0%			ICU Level of Service	B
Analysis Period (min)		15				

Timings
19: Roeder Ave & F St

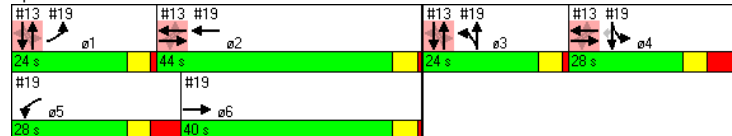
No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	230	660	5	745	30	75	15	225
Turn Type	Prot		Prot		Split		Perm	
Protected Phases	1	6	5	2	3	3	4	
Permitted Phases								4
Detector Phases	1	6	5	2	3	3	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	28.0	24.0	24.0	24.0	28.0	28.0
Total Split (s)	24.0	40.0	28.0	44.0	24.0	24.0	28.0	28.0
Total Split (%)	20.0%	33.3%	23.3%	36.7%	20.0%	20.0%	23.3%	23.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	5.0	1.0	1.0	1.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?								
Recall Mode	Min	Max	None	None	None	None	None	None
Act Effct Green (s)	19.3	60.1	11.2	40.0	19.8	19.8	24.0	24.0
Actuated g/C Ratio	0.16	0.50	0.09	0.34	0.17	0.17	0.20	0.20
v/c Ratio	0.82	0.73	0.03	1.45	0.12	0.33	0.56	0.46
Control Delay	72.1	30.0	49.8	243.1	44.1	45.4	47.6	9.2
Queue Delay	3.3	0.0	0.0	23.7	0.0	0.8	2.0	0.3
Total Delay	75.5	30.0	49.8	266.8	44.1	46.2	49.6	9.5
LOS	E	C	D	F	D	D	D	A
Approach Delay		41.7		265.6		45.7	28.1	
Approach LOS		D		F		D	C	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 119.1
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.45
Intersection Signal Delay: 124.1
Intersection Capacity Utilization 86.7%
Analysis Period (min) 15
Intersection LOS: F
ICU Level of Service E

Splits and Phases: 19: Roeder Ave & F St



HCM Signalized Intersection Capacity Analysis
19: Roeder Ave & F St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.96	1.00
Satd. Flow (prot)	1728	1816		1711	1763		1479	1529			1721	1531
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.96	1.00
Satd. Flow (perm)	1728	1816		1711	1763		1479	1529			1721	1531
Volume (vph)	230	660	5	5	745	120	30	75	10	180	15	225
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	230	660	5	5	745	120	30	75	10	180	15	225
RTOR Reduction (vph)	0	0	0	0	4	0	0	4	0	0	0	182
Lane Group Flow (vph)	230	665	0	5	861	0	30	81	0	0	195	43
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	18%	18%	18%	2%	2%	2%
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	18.3	59.1		1.4	46.2		18.8	18.8			19.0	19.0
Effective Green, g (s)	19.3	60.1		6.4	47.2		19.8	19.8			24.0	24.0
Actuated g/C Ratio	0.15	0.48		0.05	0.37		0.16	0.16			0.19	0.19
Clearance Time (s)	5.0	5.0		9.0	5.0		5.0	5.0			9.0	9.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	264	864		87	659		232	240			327	291
v/s Ratio Prot	c0.13	0.37		0.00	c0.49		0.02	c0.05			c0.11	
v/s Ratio Perm												0.03
v/c Ratio	0.87	0.77		0.06	1.31		0.13	0.34			0.60	0.15
Uniform Delay, d1	52.3	27.4		57.1	39.6		45.8	47.4			46.7	42.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			0.96	1.19
Incremental Delay, d2	25.4	6.5		0.3	148.5		0.3	0.8			2.6	0.2
Delay (s)	77.7	33.9		57.4	188.0		46.1	48.2			47.3	50.9
Level of Service	E	C		E	F		D	D			D	D
Approach Delay (s)		45.2			187.3			47.7			49.3	
Approach LOS		D			F			D			D	

Intersection Summary

HCM Average Control Delay	99.8	HCM Level of Service	F
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	126.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
20: Roeder Ave & C St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	30	805	25	30	770	70	35	25	115	30	20	55
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	30	805	25	30	770	70	35	25	115	30	20	55
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		735										
pX, platoon unblocked				0.68			0.68	0.68	0.68	0.68	0.68	
vC, conflicting volume	840			830			1808	1778	818	1870	1755	805
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	840			749			2193	2148	730	2285	2115	805
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			95			0	17	60	0	37	86
cM capacity (veh/h)	804			588			9	30	288	3	32	386
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	860	870	175	105								
Volume Left	30	30	35	30								
Volume Right	25	70	115	55								
cSH	804	588	34	11								
Volume to Capacity	0.04	0.05	5.14	9.70								
Queue Length 95th (ft)	3	4	Err	Err								
Control Delay (s)	1.0	1.5	Err	Err								
Lane LOS	A	A	F	F								
Approach Delay (s)	1.0	1.5	Err	Err								
Approach LOS			F	F								
Intersection Summary												
Average Delay	1394.0											
Intersection Capacity Utilization	76.0%		ICU Level of Service				D					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
21: E Chestnut St & Bay St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	900	620	35	390	60
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	10	900	620	35	390	60
Pedestrians		10			10	
Lane Width (ft)		11.0			11.0	
Walking Speed (ft/s)		4.0			4.0	
Percent Blockage		1			1	
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			356			
pX, platoon unblocked	0.84				0.84	0.84
vC, conflicting volume	665				1568	658
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	602				1674	593
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				0	86
cM capacity (veh/h)	819				88	422
Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2	
Volume Total	10	900	655	390	60	
Volume Left	10	0	0	390	0	
Volume Right	0	0	35	0	60	
cSH	819	1700	1700	88	422	
Volume to Capacity	0.01	0.53	0.39	4.45	0.14	
Queue Length 95th (ft)	1	0	0	Err	12	
Control Delay (s)	9.4	0.0	0.0	Err	14.9	
Lane LOS	A			F	B	
Approach Delay (s)	0.1		0.0	8667.8		
Approach LOS				F		
Intersection Summary						
Average Delay	1935.8					
Intersection Capacity Utilization	75.6%		ICU Level of Service		D	
Analysis Period (min)	15					

Timings
22: E Chestnut St & Commercial St

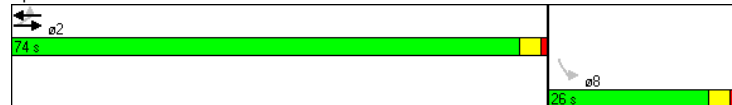
No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBT	SBL
Lane Group	EBL	EBT	WBT	SBL
Lane Configurations	↔	↕	↕	↕
Volume (vph)	155	1165	570	85
Turn Type	Perm			
Protected Phases		2	2	
Permitted Phases	2			8
Detector Phases	2	2	2	8
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	26.0	26.0	26.0	19.0
Total Split (s)	74.0	74.0	74.0	26.0
Total Split (%)	74.0%	74.0%	74.0%	26.0%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	70.0	70.0	22.0	
Actuated g/C Ratio	0.70	0.70	0.22	
v/c Ratio	0.77	0.52	0.53	
Control Delay	13.7	14.2	29.0	
Queue Delay	28.4	91.7	412.9	
Total Delay	42.1	105.9	441.8	
LOS	D	F	F	
Approach Delay	42.1	105.9	441.8	
Approach LOS	D	F	F	

Intersection Summary

Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 98.8	Intersection LOS: F
Intersection Capacity Utilization 94.4%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 22: E Chestnut St & Commercial St



HCM Signalized Intersection Capacity Analysis
22: E Chestnut St & Commercial St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		0.95	1.00		1.00	
Frlpb, ped/bikes		1.00	0.99		0.95	
Flpb, ped/bikes		1.00	1.00		0.98	
Frt		1.00	0.99		0.92	
Flt Protected		0.99	1.00		0.98	
Satd. Flow (prot)		3430	1762		1518	
Flt Permitted		0.71	1.00		0.98	
Satd. Flow (perm)		2454	1762		1518	
Volume (vph)	155	1165	570	70	85	120
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	155	1165	570	70	85	120
RTOR Reduction (vph)	0	0	5	0	51	0
Lane Group Flow (vph)	0	1320	636	0	154	0
Confl. Peds. (#/hr)	20		20	20	20	20
Heavy Vehicles (%)	1%	1%	2%	2%	2%	2%
Turn Type	Perm					
Protected Phases		2	2			
Permitted Phases	2				8	
Actuated Green, G (s)		70.0	70.0		22.0	
Effective Green, g (s)		70.0	70.0		22.0	
Actuated g/C Ratio		0.70	0.70		0.22	
Clearance Time (s)		4.0	4.0		4.0	
Lane Grp Cap (vph)		1718	1233		334	
v/s Ratio Prot			0.36			
v/s Ratio Perm		c0.54			c0.10	
v/c Ratio		0.77	0.52		0.46	
Uniform Delay, d1		9.7	7.0		33.9	
Progression Factor		1.00	1.97		1.00	
Incremental Delay, d2		3.4	0.1		4.5	
Delay (s)		13.1	14.0		38.4	
Level of Service		B	B		D	
Approach Delay (s)		13.1	14.0		38.4	
Approach LOS		B	B		D	

Intersection Summary

HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

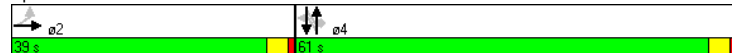
Timings
23: E Chestnut St & Cornwall Ave

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	→	↖	↑	↗	↘	↓
Lane Group	EBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↔↔		↔	↗		↔↔
Volume (vph)	1045	570	395	70	100	180
Turn Type	Perm			Perm	Perm	
Protected Phases	2		4		4	
Permitted Phases	4			4	4	
Detector Phases	2	4	4	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	26.0	19.0	19.0	19.0	19.0	19.0
Total Split (s)	39.0	61.0	61.0	61.0	61.0	61.0
Total Split (%)	39.0%	61.0%	61.0%	61.0%	61.0%	61.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	35.0		57.0	57.0		57.0
Actuated g/C Ratio	0.35		0.57	0.57		0.57
v/c Ratio	1.30		1.57	0.09		1.39
Control Delay	166.3		286.5	8.6		213.6
Queue Delay	51.7		46.4	0.0		46.9
Total Delay	218.0		332.9	8.6		260.4
LOS	F		F	A		F
Approach Delay	218.0		311.0			260.4
Approach LOS	F		F			F

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Natural Cycle: 100	
Control Type: Pretimed	
Maximum v/c Ratio: 1.57	
Intersection Signal Delay: 256.6	Intersection LOS: F
Intersection Capacity Utilization 125.2%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 23: E Chestnut St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
23: E Chestnut St & Cornwall Ave

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↘	↗	←	↖	↗	↑	↘	↗	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔	↗		↔↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0		4.0	
Lane Util. Factor		0.95						1.00	1.00		1.00	
Frpb, ped/bikes		0.97						1.00	0.89		0.97	
Flpb, ped/bikes		0.99						0.95	1.00		1.00	
Frt		0.96						1.00	0.85		0.98	
Flt Protected		1.00						0.97	1.00		0.99	
Satd. Flow (prot)		3191						1666	1362		1716	
Flt Permitted		1.00						0.63	1.00		0.24	
Satd. Flow (perm)		3191						1080	1362		411	
Volume (vph)	75	1045	370	0	0	0	570	395	70	100	180	55
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	75	1045	370	0	0	0	570	395	70	100	180	55
RTOR Reduction (vph)	0	32	0	0	0	0	0	0	5	0	7	0
Lane Group Flow (vph)	0	1458	0	0	0	0	0	965	65	0	328	0
Confl. Peds. (#/hr)	50		50				50		50	50		50
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	Perm						Perm		Perm	Perm		
Protected Phases	2						4		4		4	
Permitted Phases	2						4		4	4		
Actuated Green, G (s)		35.0						57.0	57.0		57.0	
Effective Green, g (s)		35.0						57.0	57.0		57.0	
Actuated g/C Ratio		0.35						0.57	0.57		0.57	
Clearance Time (s)		4.0						4.0	4.0		4.0	
Lane Grp Cap (vph)		1117						616	776		234	
v/s Ratio Prot												
v/s Ratio Perm		0.46						0.89	0.05		0.80	
v/c Ratio		1.31						1.57	0.08		1.40	
Uniform Delay, d1		32.5						21.5	9.7		21.5	
Progression Factor		0.92						1.00	1.00		0.73	
Incremental Delay, d2		142.6						262.8	0.2		198.9	
Delay (s)		172.5						284.3	9.9		214.6	
Level of Service		F						F	A		F	
Approach Delay (s)		172.5			0.0			265.7			214.6	
Approach LOS		F			A			F			F	

Intersection Summary	
HCM Average Control Delay	211.2
HCM Volume to Capacity ratio	1.47
Actuated Cycle Length (s)	100.0
Intersection Capacity Utilization	125.2%
Analysis Period (min)	15
HCM Level of Service	F
Sum of lost time (s)	8.0
ICU Level of Service	H

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
38: Roeder Ave & Hilton Ave

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	915	20	10	935	60	5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	915	20	10	935	60	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)				257		
pX, platoon unblocked					0.63	
vC, conflicting volume			935		1880	925
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			935		2393	925
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		0	98
cM capacity (veh/h)			732		23	326
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	935	945	65			
Volume Left	0	10	60			
Volume Right	20	0	5			
cSH	1700	732	25			
Volume to Capacity	0.55	0.01	2.61			
Queue Length 95th (ft)	0	1	201			
Control Delay (s)	0.0	0.4	1060.2			
Lane LOS		A	F			
Approach Delay (s)	0.0	0.4	1060.2			
Approach LOS			F			
Intersection Summary						
Average Delay		35.6				
Intersection Capacity Utilization		67.5%	ICU Level of Service	C		
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
39: Roeder Ave & Central Avenue

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕			↕			↕		
Sign Control		Free			Free			Stop			Stop		
Grade		0%			0%			0%			0%		
Volume (veh/h)	80	730	20	10	570	70	195	125	120	60	35	145	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly flow rate (vph)	80	730	20	10	570	70	195	125	120	60	35	145	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type								None			None		
Median storage (veh)													
Upstream signal (ft)					1113								
pX, platoon unblocked	0.94						0.94	0.94		0.94	0.94	0.94	
vC, conflicting volume	640			750			1688	1560	740	1708	1535	605	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	615			750			1734	1598	740	1756	1571	578	
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2	
tC, 2 stage (s)													
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3	
p0 queue free %	91			99			0	0	71	0	62	70	
cM capacity (veh/h)	903			859			30	90	417	0	93	483	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	830	650	440	240									
Volume Left	80	10	195	60									
Volume Right	20	70	120	145									
cSH	903	859	53	0									
Volume to Capacity	0.09	0.01	8.27	Err									
Queue Length 95th (ft)	7	1	Err	Err									
Control Delay (s)	2.2	0.3	Err	Err									
Lane LOS	A	A	F	F									
Approach Delay (s)	2.2	0.3	Err	Err									
Approach LOS			F	F									
Intersection Summary													
Average Delay			Err										
Intersection Capacity Utilization		130.9%		ICU Level of Service	H								
Analysis Period (min)		15											

Timings
1: Squalicum Pkwy & Meridian Street

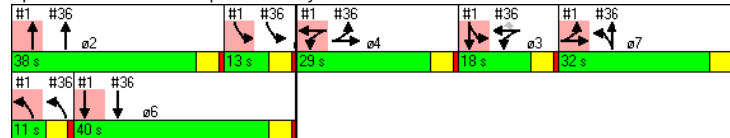
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	EBL	EBT	WBT	NBL	NBT	SBL	SBT	ø1	ø3	ø6
Lane Configurations										
Volume (vph)	425	5	10	5	745	30	725			
Turn Type	Split			Prot		Prot				
Protected Phases	7	7	4	5	2	13	3 6	1	3	6
Permitted Phases										
Detector Phases	7	7	4	5	2	13	3 6			
Minimum Initial (s)	6.0	6.0	6.0	6.0	10.0			6.0	6.0	10.0
Minimum Split (s)	29.0	29.0	29.0	11.0	23.0			11.0	11.0	23.0
Total Split (s)	32.0	32.0	29.0	11.0	38.0	31.0	58.0	13.0	18.0	40.0
Total Split (%)	24.6%	24.6%	22.3%	8.5%	29.2%	23.8%	44.6%	10%	14%	31%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0			1.0	1.0	1.0
Lead/Lag			Lead	Lead	Lead			Lag	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Max			None	None	None
Act Effct Green (s)	28.0	28.0	23.7	7.0	34.0	23.0	50.0			
Actuated g/C Ratio	0.22	0.22	0.18	0.05	0.26	0.18	0.39			
v/c Ratio	1.16	0.07	0.17	0.05	0.80	0.10	0.79			
Control Delay	142.5	19.6	20.6	59.6	51.9	13.9	10.5			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	1.7			
Total Delay	142.5	19.6	20.6	59.6	51.9	13.9	12.2			
LOS	F	B	C	E	D	B	B			
Approach Delay		135.7	20.6		51.9		12.3			
Approach LOS		F	C		D		B			

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 128.8
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.54
Intersection Signal Delay: 48.8
Intersection Capacity Utilization 67.6%
Analysis Period (min) 15

Splits and Phases: 1: Squalicum Pkwy & Meridian Street



HCM Signalized Intersection Capacity Analysis
1: Squalicum Pkwy & Meridian Street

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.88			0.91		1.00	1.00		1.00	0.95	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1563			1715		1787	3567		1752	3339	
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1687	1563			1715		1787	3567		1752	3339	
Volume (vph)	425	5	20	10	10	40	5	745	10	30	725	335
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	425	5	20	10	10	40	5	745	10	30	725	335
RTOR Reduction (vph)	0	16	0	0	33	0	0	1	0	0	42	0
Lane Group Flow (vph)	425	9	0	0	27	0	5	754	0	30	1018	0
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split			Prot			Prot		
Protected Phases	7	7		4	4		5	2		1 3	3 6	
Permitted Phases												
Actuated Green, G (s)	27.0	27.0			22.7		6.0	33.0		21.0	48.0	
Effective Green, g (s)	28.0	28.0			23.7		7.0	34.0		23.0	50.0	
Actuated g/C Ratio	0.22	0.22			0.18		0.05	0.26		0.18	0.39	
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0				
Vehicle Extension (s)	3.0	3.0			3.0		2.0	2.0				
Lane Grp Cap (vph)	367	340			316		97	942		313	1297	
v/s Ratio Prot	c0.25	0.01			c0.02		0.00	c0.21		0.02	c0.31	
v/s Ratio Perm												
v/c Ratio	1.16	0.03			0.09		0.05	0.80		0.10	0.79	
Uniform Delay, d1	50.3	39.6			43.5		57.7	44.2		44.2	34.6	
Progression Factor	1.00	1.00			1.00		1.00	1.00		0.54	0.53	
Incremental Delay, d2	97.4	0.0			0.1		0.1	7.1		0.0	0.3	
Delay (s)	147.7	39.7			43.6		57.8	51.3		23.6	18.7	
Level of Service	F	D			D		E	D		C	B	
Approach Delay (s)		141.7			43.6			51.3			18.8	
Approach LOS		F			D			D			B	

Intersection Summary

HCM Average Control Delay	53.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	128.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Meridian Street & Broadway St

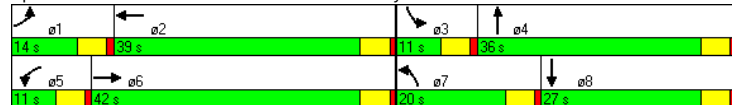
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	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	90	355	35	390	180	230	35	220
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	1	6	5	2	7	4	3	8
Permitted Phases								
Detector Phases	1	6	5	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	25.0	11.0	25.0	11.0	25.0	11.0	25.0
Total Split (s)	14.0	42.0	11.0	39.0	20.0	36.0	11.0	27.0
Total Split (%)	14.0%	42.0%	11.0%	39.0%	20.0%	36.0%	11.0%	27.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	9.9	35.6	8.5	31.7	13.1	23.2	8.5	16.0
Actuated g/C Ratio	0.14	0.50	0.11	0.45	0.18	0.32	0.11	0.22
v/c Ratio	0.38	0.52	0.18	0.52	0.58	0.51	0.18	0.66
Control Delay	43.1	23.7	42.9	27.2	42.4	25.6	42.8	38.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.1	23.7	42.9	27.2	42.4	25.6	42.8	38.0
LOS	D	C	D	C	D	C	D	D
Approach Delay		26.9		28.4		32.0		38.6
Approach LOS		C		C		C		D

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 70.8
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 30.6
Intersection Capacity Utilization 68.6%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service C

Splits and Phases: 2: Meridian Street & Broadway St



HCM Signalized Intersection Capacity Analysis
2: Meridian Street & Broadway St

No Action (2026) PM Peak Hour
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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1747		1728	1795		1728	1751		1745	1785	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1728	1747		1728	1795		1728	1751		1745	1785	
Volume (vph)	90	355	110	35	390	30	180	230	60	35	220	45
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	90	355	110	35	390	30	180	230	60	35	220	45
RTOR Reduction (vph)	0	10	0	0	2	0	0	10	0	0	8	0
Lane Group Flow (vph)	90	455	0	35	418	0	180	280	0	35	257	0
Confl. Peds. (#/hr)			5			5			5			5
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	5.6	31.1		2.8	28.3		8.7	18.5		2.8	12.6	
Effective Green, g (s)	6.6	32.1		3.8	29.3		9.7	19.5		3.8	13.6	
Actuated g/C Ratio	0.09	0.43		0.05	0.39		0.13	0.26		0.05	0.18	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	152	746		87	699		223	454		88	323	
v/s Ratio Prot	c0.05	c0.26		0.02	0.23		c0.10	0.16		0.02	c0.14	
v/s Ratio Perm												
v/c Ratio	0.59	0.61		0.40	0.60		0.81	0.62		0.40	0.80	
Uniform Delay, d1	33.0	16.7		34.6	18.3		31.8	24.5		34.6	29.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.1	1.0		1.1	0.9		17.9	1.7		1.1	11.9	
Delay (s)	37.1	17.7		35.7	19.2		49.8	26.3		35.7	41.3	
Level of Service	D	B		D	B		D	C		D	D	
Approach Delay (s)		20.8			20.4			35.3			40.7	
Approach LOS		C			C			D			D	

Intersection Summary

HCM Average Control Delay	27.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	75.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
3: Ohio St & N State St

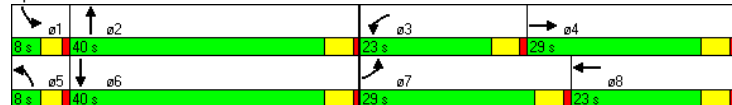
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New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	480	415	225	125	40	1150	40	975
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	24.0	24.0	23.0	23.0	8.0	21.0	8.0	21.0
Total Split (s)	29.0	29.0	23.0	23.0	8.0	40.0	8.0	40.0
Total Split (%)	29.0%	29.0%	23.0%	23.0%	8.0%	40.0%	8.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	25.1	25.1	17.1	17.1	4.0	36.2	4.0	36.2
Actuated g/C Ratio	0.26	0.26	0.18	0.18	0.04	0.38	0.04	0.38
v/c Ratio	1.05	0.99	0.73	0.57	0.57	1.05	0.57	0.92
Control Delay	92.6	75.0	52.2	39.4	77.9	68.4	77.9	41.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	92.6	75.0	52.2	39.4	77.9	68.4	77.9	41.6
LOS	F	E	D	D	E	E	E	D
Approach Delay	83.9		46.5		68.6		42.8	
Approach LOS	F		D		E		D	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 95
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.05
Intersection Signal Delay: 62.0
Intersection Capacity Utilization 86.1%
Analysis Period (min) 15
Intersection LOS: E
ICU Level of Service E

Splits and Phases: 3: Ohio St & N State St



HCM Signalized Intersection Capacity Analysis
3: Ohio St & N State St

No Action (2026) PM Peak Hour
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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.95		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1787		1711	1713		1728	3375		1728	3358	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1728	1787		1711	1713		1728	3375		1728	3358	
Volume (vph)	480	415	55	225	125	60	40	1150	210	40	975	225
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	480	415	55	225	125	60	40	1150	210	40	975	225
RTOR Reduction (vph)	0	4	0	0	17	0	0	14	0	0	19	0
Lane Group Flow (vph)	480	466	0	225	168	0	40	1346	0	40	1181	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	24.1	24.1		16.1	16.1		2.3	35.2		2.3	35.2	
Effective Green, g (s)	25.1	25.1		17.1	17.1		2.3	36.2		2.3	36.2	
Actuated g/C Ratio	0.26	0.26		0.18	0.18		0.02	0.37		0.02	0.37	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	449	464		303	303		41	1263		41	1257	
v/s Ratio Prot	c0.28	c0.26		0.13	0.10		c0.02	c0.40		0.02	0.35	
v/s Ratio Perm												
v/c Ratio	1.07	1.00		0.74	0.55		0.98	1.07		0.98	0.94	
Uniform Delay, d1	35.8	35.8		37.7	36.3		47.2	30.2		47.2	29.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	62.1	42.6		10.0	2.7		130.1	44.7		130.1	13.2	
Delay (s)	97.9	78.4		47.7	39.0		177.3	75.0		177.3	42.4	
Level of Service	F	E		D	D		F	E		F	D	
Approach Delay (s)	88.3		43.8		77.9		46.8					
Approach LOS	F		D		E		D					

Intersection Summary

HCM Average Control Delay	67.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	96.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
4: Iowa St & James Street

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	←	←	↙	↓	↘	↗	→
Lane Group	WBL	WBT	SBL	SBT	SBR	NEL	NER
Lane Configurations							
Volume (vph)	465	65	220	170	810	775	785
Turn Type	Split		Perm		Over		pt+ov
Protected Phases	3	3		1	2	2	2 3
Permitted Phases			1				
Detector Phases	3	3	1	1	2	2	2 3
Minimum Initial (s)	6.0	6.0	8.0	8.0	6.0	6.0	
Minimum Split (s)	11.0	11.0	20.0	20.0	17.0	17.0	
Total Split (s)	13.0	13.0	45.0	45.0	22.0	22.0	35.0
Total Split (%)	16.3%	16.3%	56.3%	56.3%	27.5%	27.5%	43.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag			Lead	Lead	Lag	Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	
Act Effct Green (s)	9.0	9.0		41.0	18.0	18.0	31.0
Actuated g/C Ratio	0.11	0.11		0.51	0.22	0.22	0.39
v/c Ratio	1.42	1.45		4.29	1.34	1.23	1.21
Control Delay	246.9	260.8		1515.7	191.6	144.5	137.8
Queue Delay	0.0	0.0		0.0	0.0	32.5	67.5
Total Delay	246.9	260.8		1515.7	191.6	177.0	205.3
LOS	F	F		F	F	F	F
Approach Delay		254.0		618.4		188.9	
Approach LOS		F		F		F	

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 4.29

Intersection Signal Delay: 355.9

Intersection LOS: F

Intersection Capacity Utilization 76.4%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 4: Iowa St & James Street



HCM Signalized Intersection Capacity Analysis
4: Iowa St & James Street

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	←	←	↙	↓	↘	↗	→	↖	↗	↘
Movement	WBL	WBT	WBR	SBL	SBT	SBR	SBR2	NEL	NER	NER2
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95			1.00	0.88		0.97	0.91	
Frt	1.00	1.00			1.00	0.85		0.98	0.85	
Flt Protected	0.95	0.96			0.97	1.00		0.96	1.00	
Satd. Flow (prot)	1641	1661			1769	2720		3307	1407	
Flt Permitted	0.95	0.96			0.10	1.00		0.96	1.00	
Satd. Flow (perm)	1641	1661			177	2720		3307	1407	
Volume (vph)	465	65	5	220	170	810	10	775	785	15
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	465	65	5	220	170	810	10	775	785	15
RTOR Reduction (vph)	0	1	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	262	272	0	0	390	819	0	914	661	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Split			Perm		Over			pt+ov	
Protected Phases	3	3			1	2		2	2 3	
Permitted Phases				1						
Actuated Green, G (s)	8.0	8.0			40.0	17.0		17.0	30.0	
Effective Green, g (s)	9.0	9.0			41.0	18.0		18.0	31.0	
Actuated g/C Ratio	0.11	0.11			0.51	0.22		0.22	0.39	
Clearance Time (s)	5.0	5.0			5.0	5.0		5.0		
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0		
Lane Grp Cap (vph)	185	187			91	612		744	545	
v/s Ratio Prot	0.16	0.16				c0.30		0.28	c0.47	
v/s Ratio Perm					c2.20					
v/c Ratio	1.42	1.46			4.29	1.34		1.23	1.21	
Uniform Delay, d1	35.5	35.5			19.5	31.0		31.0	24.5	
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	216.0	232.0			1503.9	163.2		114.5	111.9	
Delay (s)	251.5	267.5			1523.4	194.2		145.5	136.4	
Level of Service	F	F			F	F		F	F	
Approach Delay (s)		259.7			622.6			141.7		
Approach LOS		F			F			F		

Intersection Summary

HCM Average Control Delay 336.0 HCM Level of Service F

HCM Volume to Capacity ratio 2.98

Actuated Cycle Length (s) 80.0 Sum of lost time (s) 8.0

Intersection Capacity Utilization 76.4% ICU Level of Service D

Analysis Period (min) 15

c Critical Lane Group

Timings
5: Iowa St & King St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Volume (vph)	45	910	285	550	40	185	755	115	150
Turn Type	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	5	2	1	6	3	8	1	7	4
Permitted Phases	2		6		8		8	4	
Detector Phases	5	2	1	6	3	8	1	7	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	28.0	11.0	26.0	11.0	28.0	11.0	28.0	28.0
Total Split (s)	11.0	35.0	26.0	50.0	11.0	28.0	26.0	11.0	28.0
Total Split (%)	11.0%	35.0%	26.0%	50.0%	11.0%	28.0%	26.0%	11.0%	28.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	Min	None	Min	None	None	None	None	None
Act Effct Green (s)	36.4	29.5	55.0	49.0	20.9	15.5	41.0	21.7	17.7
Actuated g/C Ratio	0.40	0.34	0.63	0.56	0.23	0.18	0.47	0.24	0.20
v/c Ratio	0.12	0.87	0.57	0.33	0.15	0.57	0.96	0.39	0.53
Control Delay	11.1	38.0	21.5	13.0	24.8	41.3	45.9	28.7	35.8
Queue Delay	0.0	25.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.1	63.2	21.5	13.0	24.8	41.3	45.9	28.7	35.8
LOS	B	E	C	B	C	D	D	C	D
Approach Delay		61.0		15.6		44.2			33.2
Approach LOS		E		B		D			C

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 87
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 40.6
Intersection Capacity Utilization 91.6%
Analysis Period (min) 15

Splits and Phases: 5: Iowa St & King St

ø1	ø2	ø3	ø4
26 s	35 s	11 s	28 s
ø5	ø6	ø7	ø8
11 s	50 s	11 s	28 s

HCM Signalized Intersection Capacity Analysis
5: Iowa St & King St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	1.00		0.85	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	3402		1711	3353		1728	1818		1546	1745	
Flt Permitted	0.41	1.00		0.11	1.00		0.49	1.00		1.00	0.43	
Satd. Flow (perm)	747	3402		201	3353		891	1818		1546	791	
Volume (vph)	45	910	105	285	550	85	40	185	755	115	150	45
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	45	910	105	285	550	85	40	185	755	115	150	45
RTOR Reduction (vph)	0	8	0	0	11	0	0	0	61	0	11	0
Lane Group Flow (vph)	45	1007	0	285	624	0	40	185	694	115	184	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	0%	0%	0%
Turn Type	pm+pt			pm+pt			pm+pt			pm+ov	pm+pt	
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases	2			6			8			8	4	
Actuated Green, G (s)	34.2	30.9		56.3	48.0		18.7	15.4	35.8	21.1	16.6	
Effective Green, g (s)	36.2	31.9		57.3	49.0		20.7	16.4	37.8	23.1	17.6	
Actuated g/C Ratio	0.40	0.35		0.63	0.54		0.23	0.18	0.41	0.25	0.19	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.6		3.0	3.0		3.6	3.6	3.0	3.0	3.0	
Lane Grp Cap (vph)	343	1190		481	1802		242	327	709	258	342	
v/s Ratio Prot	0.01	c0.30		0.14	0.19		0.01	0.10	c0.23	c0.03	0.10	
v/s Ratio Perm	0.05			0.23			0.03		0.22	0.09		
v/c Ratio	0.13	0.85		0.59	0.35		0.17	0.57	0.98	0.45	0.54	
Uniform Delay, d1	17.0	27.4		18.0	12.0		28.0	34.1	26.3	27.4	33.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	5.9		2.0	0.1		0.4	2.5	28.2	1.2	1.6	
Delay (s)	17.2	33.2		19.9	12.1		28.4	36.6	54.6	28.6	34.8	
Level of Service	B	C		B	B		C	D	D	C	C	
Approach Delay (s)		32.6			14.5			50.1			32.5	
Approach LOS		C			B			D			C	

Intersection Summary

HCM Average Control Delay	32.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	91.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
6: Iowa St & Moore St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	45	1120	260	770	145	65	140	115
Turn Type	Prot		Prot		Perm		Perm	
Protected Phases	1	6	5	2		4		8
Permitted Phases					4		8	
Detector Phases	1	6	5	2	4	4	8	8
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	27.0	12.0	27.0	21.0	21.0	21.0	21.0
Total Split (s)	12.0	51.0	17.0	56.0	32.0	32.0	32.0	32.0
Total Split (%)	12.0%	51.0%	17.0%	56.0%	32.0%	32.0%	32.0%	32.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	8.0	47.0	13.0	56.8		28.0		28.0
Actuated g/C Ratio	0.08	0.47	0.13	0.57		0.28		0.28
v/c Ratio	0.34	1.07	1.17	0.42		1.14		1.08
Control Delay	51.6	67.6	154.4	13.8		118.9		114.8
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	51.6	67.6	154.4	13.8		118.9		114.8
LOS	D	E	F	B		F		F
Approach Delay		67.2		47.8		118.9		114.8
Approach LOS		E		D		F		F

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.17
Intersection Signal Delay: 71.6
Intersection Capacity Utilization 103.5%
Analysis Period (min) 15
Intersection LOS: E
ICU Level of Service G

Splits and Phases: 6: Iowa St & Moore St



HCM Signalized Intersection Capacity Analysis
6: Iowa St & Moore St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.95		1.00	0.99			0.93			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1728	3275		1711	3393			1612			1673	
Flt Permitted	0.95	1.00		0.95	1.00			0.78			0.52	
Satd. Flow (perm)	1728	3275		1711	3393			1278			894	
Volume (vph)	45	1120	595	260	770	45	145	65	245	140	115	20
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	45	1120	595	260	770	45	145	65	245	140	115	20
RTOR Reduction (vph)	0	68	0	0	4	0	0	42	0	0	3	0
Lane Group Flow (vph)	45	1647	0	260	811	0	0	413	0	0	272	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	4%	4%	4%	6%	6%	6%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	4.2	48.0		12.0	55.8			27.0			27.0	
Effective Green, g (s)	5.2	49.0		13.0	56.8			28.0			28.0	
Actuated g/C Ratio	0.05	0.48		0.13	0.56			0.27			0.27	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.5			3.5	
Lane Grp Cap (vph)	88	1573		218	1889			351			245	
v/s Ratio Prot	0.03	c0.50		c0.15	0.24							
v/s Ratio Perm								c0.32			0.30	
v/c Ratio	0.51	1.05		1.19	0.43			1.18			1.11	
Uniform Delay, d1	47.2	26.5		44.5	13.2			37.0			37.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	4.9	36.1		122.8	0.2			105.2			90.4	
Delay (s)	52.1	62.6		167.3	13.3			142.2			127.4	
Level of Service	D	E		F	B			F			F	
Approach Delay (s)		62.3			50.6			142.2			127.4	
Approach LOS		E			D			F			F	

Intersection Summary

HCM Average Control Delay	74.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	102.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	103.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Elm Street & Broadway St

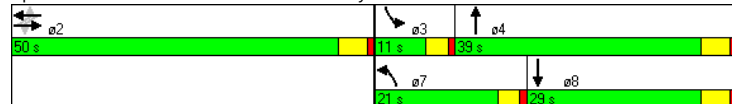
No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	10	230	55	485	180	250	45	285
Turn Type	Perm		Perm		Prot		Prot	
Protected Phases		2		2	7	4	3	8
Permitted Phases	2		2					
Detector Phases	2	2	2	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	26.0	26.0	26.0	26.0	8.0	26.0	8.0	26.0
Total Split (s)	50.0	50.0	50.0	50.0	21.0	39.0	11.0	29.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	21.0%	39.0%	11.0%	29.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	29.0	29.0	29.0	29.0	12.2	25.5	7.2	18.1
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.17	0.36	0.10	0.26
v/c Ratio	0.05	0.43	0.15	0.77	0.61	0.55	0.27	0.64
Control Delay	15.9	17.0	16.4	26.7	42.6	23.5	44.2	34.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	17.0	16.4	26.7	42.6	23.5	44.2	34.6
LOS	B	B	B	C	D	C	D	C
Approach Delay		17.0		25.8		30.0		35.9
Approach LOS		B		C		C		D

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 69.9
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 27.4
Intersection Capacity Utilization 74.7%
Analysis Period (min) 15

Splits and Phases: 7: Elm Street & Broadway St



HCM Signalized Intersection Capacity Analysis
7: Elm Street & Broadway St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1692	1707		1706	1758		1728	1723		1728	1802	
Flt Permitted	0.22	1.00		0.48	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	398	1707		868	1758		1728	1723		1728	1802	
Volume (vph)	10	230	80	55	485	80	180	250	105	45	285	15
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	230	80	55	485	80	180	250	105	45	285	15
RTOR Reduction (vph)	0	13	0	0	6	0	0	15	0	0	2	0
Lane Group Flow (vph)	10	297	0	55	559	0	180	340	0	45	298	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		2			2		7	4		3	8	
Permitted Phases	2			2								
Actuated Green, G (s)	27.7	27.7		27.7	27.7		9.7	24.2		3.3	17.8	
Effective Green, g (s)	28.7	28.7		28.7	28.7		9.7	25.2		3.3	18.8	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.14	0.36		0.05	0.27	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	165	708		360	729		242	627		82	490	
v/s Ratio Prot		0.17			c0.32		c0.10	c0.20		0.03	0.17	
v/s Ratio Perm	0.03			0.06								
v/c Ratio	0.06	0.42		0.15	0.77		0.74	0.54		0.55	0.61	
Uniform Delay, d1	12.2	14.3		12.7	17.4		28.6	17.4		32.2	22.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.4		0.2	4.8		11.7	1.0		7.3	2.1	
Delay (s)	12.3	14.7		12.9	22.2		40.2	18.4		39.5	24.1	
Level of Service	B	B		B	C		D	B		D	C	
Approach Delay (s)	14.7			21.4			25.7			26.1		
Approach LOS		B			C			C			C	

Intersection Summary

HCM Average Control Delay	22.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	69.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Flora St & Cornwall Ave

No Action (2026) PM Peak Hour
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Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	295	425	30	195	205	25	335	195	310
Turn Type	Perm		Perm		Perm	Prot		Prot	
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8				
Detector Phases	4	4	8	8	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	11.0	27.0	11.0	27.0
Total Split (s)	34.0	34.0	34.0	34.0	34.0	11.0	41.0	15.0	45.0
Total Split (%)	37.8%	37.8%	37.8%	37.8%	37.8%	12.2%	45.6%	16.7%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	29.0		29.0		29.0	7.0	33.7	11.1	44.7
Actuated g/C Ratio	0.34		0.34		0.34	0.08	0.39	0.13	0.52
v/c Ratio	0.95		0.46		0.34	0.19	0.94	0.89	0.43
Control Delay	51.9		27.1		5.0	44.0	46.5	79.1	15.3
Queue Delay	0.0		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	51.9		27.1		5.0	44.0	46.5	79.1	15.3
LOS	D		C		A	D	D	E	B
Approach Delay	51.9		16.5				46.4		36.8
Approach LOS	D		B				D		D

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 85.9
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 40.5
Intersection Capacity Utilization 98.8%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service F

Splits and Phases: 8: Flora St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
8: Flora St & Cornwall Ave

No Action (2026) PM Peak Hour
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  	  	  	  		  		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.91	1.00	0.97		1.00	0.98	
Flpb, ped/bikes		0.98			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3267			1802	1408	1694	1616		1694	1701	
Flt Permitted		0.69			0.78	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		2313			1410	1408	1694	1616		1694	1701	
Volume (vph)	295	425	25	30	195	205	25	335	295	195	310	75
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	295	425	25	30	195	205	25	335	295	195	310	75
RTOR Reduction (vph)	0	3	0	0	0	138	0	35	0	0	9	0
Lane Group Flow (vph)	0	742	0	0	225	67	25	595	0	195	376	0
Confl. Peds. (#/hr)	35		35	35		35			35			35
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	3%	3%	3%
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		28.0			28.0	28.0	2.3	35.9		10.1	43.7	
Effective Green, g (s)		29.0			29.0	29.0	3.3	36.9		11.1	44.7	
Actuated g/C Ratio		0.33			0.33	0.33	0.04	0.41		0.12	0.50	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		754			459	459	63	670		211	854	
v/s Ratio Prot							0.01	c0.37		c0.12	0.22	
v/s Ratio Perm		c0.32			0.16	0.05						
v/c Ratio		0.98			0.49	0.15	0.40	0.89		0.92	0.44	
Uniform Delay, d1		29.8			24.1	21.2	41.9	24.1		38.5	14.2	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		28.6			0.3	0.1	1.5	13.2		40.6	0.1	
Delay (s)		58.4			24.4	21.3	43.4	37.4		79.2	14.3	
Level of Service		E			C	C	D	D		E	B	
Approach Delay (s)		58.4			22.9			37.6			36.1	
Approach LOS		E			C			D			D	

Intersection Summary

HCM Average Control Delay	41.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	89.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	98.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
9: York St & N State St

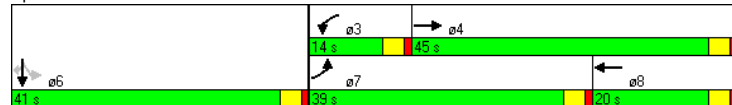
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	EBL	EBT	WBL	WBT	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	560	355	80	270	830	200
Turn Type	Prot		Prot		Perm	
Protected Phases	7	4	3	8	6	
Permitted Phases						6
Detector Phases	7	4	3	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	21.0	21.0
Total Split (s)	39.0	45.0	14.0	20.0	41.0	41.0
Total Split (%)	39.0%	45.0%	14.0%	20.0%	41.0%	41.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag		
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	32.8	40.0	8.7	13.4	34.8	34.8
Actuated g/C Ratio	0.35	0.43	0.09	0.14	0.37	0.37
v/c Ratio	0.94	0.32	0.53	0.68	0.92	0.29
Control Delay	56.3	17.7	56.0	44.0	41.7	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.3	17.7	56.0	44.0	41.7	4.4
LOS	E	B	E	D	D	A
Approach Delay	38.9		46.3		36.2	
Approach LOS	D		D		D	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 93.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 38.7
Intersection Capacity Utilization 82.9%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service E

Splits and Phases: 9: York St & N State St



HCM Signalized Intersection Capacity Analysis
9: York St & N State St

No Action (2026) PM Peak Hour
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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95						0.95	1.00
Frt	1.00	0.97		1.00	0.97						1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (prot)	1694	3272		1646	3202						3373	1531
Flt Permitted	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (perm)	1694	3272		1646	3202						3373	1531
Volume (vph)	560	355	105	80	270	60	0	0	0	330	830	200
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	560	355	105	80	270	60	0	0	0	330	830	200
RTOR Reduction (vph)	0	27	0	0	19	0	0	0	0	0	0	126
Lane Group Flow (vph)	560	433	0	80	311	0	0	0	0	0	1160	74
Heavy Vehicles (%)	3%	3%		6%	6%		0%	0%		0%	2%	2%
Turn Type	Prot			Prot						Perm		Perm
Protected Phases	7	4		3	8						6	
Permitted Phases										6		6
Actuated Green, G (s)	32.8	40.0		7.2	14.4						34.8	34.8
Effective Green, g (s)	32.8	40.0		7.2	14.4						34.8	34.8
Actuated g/C Ratio	0.35	0.43		0.08	0.15						0.37	0.37
Clearance Time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)	591	1392		126	491						1249	567
v/s Ratio Prot	c0.33	0.13		0.05	c0.10							
v/s Ratio Perm											0.34	0.05
v/c Ratio	0.95	0.31		0.63	0.63						0.93	0.13
Uniform Delay, d1	29.8	17.9		42.1	37.3						28.4	19.6
Progression Factor	1.00	1.00		1.00	1.00						1.00	1.00
Incremental Delay, d2	24.4	0.1		10.0	2.7						11.9	0.1
Delay (s)	54.2	18.0		52.1	40.0						40.3	19.7
Level of Service	D	B		D	D						D	B
Approach Delay (s)	37.9		42.4		0.0		37.3					
Approach LOS	D		D		A		D					

Intersection Summary

HCM Average Control Delay	38.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	94.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

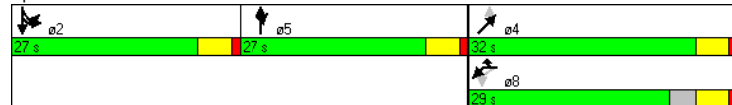
Timings
10: York St & N Forest St

No Action (2026) PM Peak Hour
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	←	↖	↑	↗	↘	↓	↙	↘
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	NEL	NET
Lane Configurations	↖	↖	↖	↖	↖	↖	↖	↖
Volume (vph)	0	95	185	385	165	480	95	830
Turn Type	Prot	Split	Split	Split	Split	custom	Prot	Prot
Protected Phases	8!	8!	5	5	2	2	4!	4!
Permitted Phases							4	
Detector Phases	8	8	5	5	2	2	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0	27.0	29.0	29.0
Total Split (s)	29.0	29.0	27.0	27.0	27.0	27.0	32.0	32.0
Total Split (%)	33.7%	33.7%	31.4%	31.4%	31.4%	31.4%	37.2%	37.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	Min	Min	Min	Min	None	None
Act Effct Green (s)	26.0	26.0	20.1	20.1	17.1	17.1	26.0	26.0
Actuated g/C Ratio	0.34	0.34	0.27	0.27	0.23	0.23	0.34	0.34
v/c Ratio	0.20	0.35	0.82	0.76	0.48	0.62	0.16	0.85
Control Delay	20.7	15.4	44.8	38.7	31.1	31.0	20.4	32.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.7	15.4	44.8	38.7	31.1	31.0	20.4	32.9
LOS	C	B	D	D	C	C	C	C
Approach Delay	17.4		41.9			31.0		31.8
Approach LOS	B		D			C		C

Intersection Summary	
Cycle Length: 86	
Actuated Cycle Length: 75.6	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 32.3	Intersection LOS: C
Intersection Capacity Utilization 83.0%	ICU Level of Service E
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 10: York St & N Forest St



HCM Signalized Intersection Capacity Analysis
10: York St & N Forest St

No Action (2026) PM Peak Hour
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Movement	WBL2	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL2	SBL	SBT	NEL	NET
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		0.95	0.95			1.00	0.95	1.00	0.95
Frt		1.00	0.85		0.93	0.85			1.00	1.00	1.00	0.98
Flt Protected		0.95	1.00		1.00	1.00			0.95	1.00	0.95	1.00
Satd. Flow (prot)		1728	1546		1605	1468			1711	3421	1678	3287
Flt Permitted		0.95	1.00		1.00	1.00			0.95	1.00	0.95	1.00
Satd. Flow (perm)		1728	1546		1605	1468			1711	3421	1678	3287
Volume (vph)	120	0	95	110	185	385	90	20	165	480	95	830
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	120	0	95	110	185	385	90	20	165	480	95	830
RTOR Reduction (vph)	0	0	47	0	0	17	0	0	0	0	0	1
Lane Group Flow (vph)	0	120	158	0	350	293	0	0	185	480	95	959
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%	4%	4%
Turn Type	Perm		Prot		Split			Split	Split		custom	Prot
Protected Phases		8!	8!		5	5		2	2	2		4!
Permitted Phases	8											4
Actuated Green, G (s)		25.0	25.0		19.1	19.1			16.0	16.0	25.0	25.0
Effective Green, g (s)		26.0	26.0		20.1	20.1			17.0	17.0	26.0	26.0
Actuated g/C Ratio		0.35	0.35		0.27	0.27			0.23	0.23	0.35	0.35
Clearance Time (s)		5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		598	535		430	393			387	774	581	1138
v/s Ratio Prot			0.10		c0.22	0.20			0.11	c0.14		c0.29
v/s Ratio Perm		0.07									0.06	
v/c Ratio		0.20	0.30		0.81	0.75			0.48	0.62	0.16	0.84
Uniform Delay, d1		17.2	17.9		25.7	25.2			25.2	26.1	17.0	22.7
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2	0.3		11.2	7.5			0.9	1.6	0.1	5.8
Delay (s)		17.4	18.2		37.0	32.7			26.1	27.7	17.1	28.5
Level of Service		B	B		D	C			C	C	B	C
Approach Delay (s)		17.9			35.0					27.3		27.5
Approach LOS		B			C					C		C

Intersection Summary	
HCM Average Control Delay	28.1
HCM Volume to Capacity ratio	0.77
Actuated Cycle Length (s)	75.1
Intersection Capacity Utilization	83.0%
Analysis Period (min)	15
! Phase conflict between lane groups.	
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
10: York St & N Forest St

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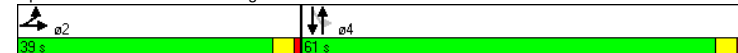
	↗	↘
Movement	NER	NER2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Volume (vph)	120	10
Peak-hour factor, PHF	1.00	1.00
Adj. Flow (vph)	120	10
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	0	0
Heavy Vehicles (%)	4%	4%
Turn Type		
Protected Phases		
Permitted Phases		
Actuated Green, G (s)		
Effective Green, g (s)		
Actuated g/C Ratio		
Clearance Time (s)		
Vehicle Extension (s)		
Lane Grp Cap (vph)		
v/s Ratio Prot		
v/s Ratio Perm		
v/c Ratio		
Uniform Delay, d1		
Progression Factor		
Incremental Delay, d2		
Delay (s)		
Level of Service		
Approach Delay (s)		
Approach LOS		
Intersection Summary		

Timings
11: E Magnolia St & Cornwall Ave

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↔↔	↔		↕
Volume (vph)	785	585	120	335
Turn Type	Perm			
Protected Phases	2	4		4
Permitted Phases			4	
Detector Phases	2	4	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	23.0	23.0	23.0
Total Split (s)	39.0	61.0	61.0	61.0
Total Split (%)	39.0%	61.0%	61.0%	61.0%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	35.0	57.0		57.0
Actuated g/C Ratio	0.35	0.57		0.57
v/c Ratio	0.87	0.64		0.83
Control Delay	39.4	15.4		32.7
Queue Delay	0.0	2.3		0.0
Total Delay	39.4	17.7		32.7
LOS	D	B		C
Approach Delay	39.4	17.7		32.7
Approach LOS	D	B		C
Intersection Summary				
Cycle Length: 100				
Actuated Cycle Length: 100				
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green				
Natural Cycle: 60				
Control Type: Pretimed				
Maximum v/c Ratio: 0.87				
Intersection Signal Delay: 31.3			Intersection LOS: C	
Intersection Capacity Utilization 98.0%			ICU Level of Service F	
Analysis Period (min) 15				

Splits and Phases: 11: E Magnolia St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
11: E Magnolia St & Cornwall Ave

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕						↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		0.95						1.00			1.00	
Frpb, ped/bikes		0.97						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.98						0.99			1.00	
Flt Protected		1.00						1.00			0.99	
Satd. Flow (prot)		3248						1773			1760	
Flt Permitted		1.00						1.00			0.54	
Satd. Flow (perm)		3248						1773			966	
Volume (vph)	90	785	120	0	0	0	0	585	60	120	335	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	90	785	120	0	0	0	0	585	60	120	335	0
RTOR Reduction (vph)	0	10	0	0	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	985	0	0	0	0	0	641	0	0	455	0
Confl. Peds. (#/hr)	80		80						80	80		
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split						Perm					
Protected Phases	2	2					4				4	
Permitted Phases										4		
Actuated Green, G (s)		35.0						57.0			57.0	
Effective Green, g (s)		35.0						57.0			57.0	
Actuated g/C Ratio		0.35						0.57			0.57	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		1137						1011			551	
v/s Ratio Prot		c0.30						0.36				
v/s Ratio Perm										c0.47		
v/c Ratio		0.87						0.63			0.83	
Uniform Delay, d1		30.3						14.5			17.5	
Progression Factor		1.00						0.91			1.00	
Incremental Delay, d2		8.9						1.9			13.2	
Delay (s)		39.2						15.1			30.7	
Level of Service		D						B			C	
Approach Delay (s)		39.2			0.0			15.1			30.7	
Approach LOS		D			A			B			C	
Intersection Summary												
HCM Average Control Delay		29.9										
HCM Volume to Capacity ratio		0.84										
Actuated Cycle Length (s)		100.0							8.0			
Intersection Capacity Utilization		98.0%										
Analysis Period (min)		15										

c Critical Lane Group

Timings
12: W Holly St & Broadway St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

							
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations							
Volume (vph)	85	560	5	695	5	200	0
Turn Type	Perm		Perm			Perm	
Protected Phases		2		2	4		4
Permitted Phases	2		2			4	
Detector Phases	2	2	2	2	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	73.0	73.0	73.0	73.0	27.0	27.0	27.0
Total Split (%)	73.0%	73.0%	73.0%	73.0%	27.0%	27.0%	27.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None
Act Effct Green (s)		51.0		51.0	16.5	16.5	16.5
Actuated g/C Ratio		0.74		0.74	0.23	0.23	0.23
v/c Ratio		0.61		0.77	0.03	0.64	0.16
Control Delay		10.6		14.4	22.6	40.9	0.6
Queue Delay		0.0		0.0	0.0	0.0	0.0
Total Delay		10.6		14.4	22.6	40.9	0.6
LOS		B		B	C	D	A
Approach Delay		10.6		14.4	22.6		28.4
Approach LOS		B		B	C		C
Intersection Summary							
Cycle Length: 100							
Actuated Cycle Length: 69.3							
Natural Cycle: 75							
Control Type: Actuated-Uncoordinated							
Maximum v/c Ratio: 0.77							
Intersection Signal Delay: 15.3				Intersection LOS: B			
Intersection Capacity Utilization 116.0%				ICU Level of Service H			
Analysis Period (min) 15							

Splits and Phases: 12: W Holly St & Broadway St



HCM Signalized Intersection Capacity Analysis
12: W Holly St & Broadway St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99			0.99		1.00	0.97	
Flpb, ped/bikes		1.00			1.00			1.00		0.99	1.00	
Frt		1.00			0.96			0.93		1.00	0.85	
Flt Protected		0.99			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1806			1722			1698		1718	1500	
Flt Permitted		0.80			1.00			1.00		0.75	1.00	
Satd. Flow (perm)		1451			1718			1698		1358	1500	
Volume (vph)	85	560	0	5	695	280	0	5	5	200	0	90
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	85	560	0	5	695	280	0	5	5	200	0	90
RTOR Reduction (vph)	0	0	0	0	14	0	0	4	0	0	73	0
Lane Group Flow (vph)	0	645	0	0	966	0	0	6	0	200	17	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		46.2			46.2			11.9		11.9	11.9	
Effective Green, g (s)		47.2			47.2			12.9		12.9	12.9	
Actuated g/C Ratio		0.69			0.69			0.19		0.19	0.19	
Clearance Time (s)		5.0			5.0			5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		1006			1191			322		257	284	
v/s Ratio Prot								0.00			0.01	
v/s Ratio Perm		0.44			c0.56					c0.15		
v/c Ratio		0.64			0.81			0.02		0.78	0.06	
Uniform Delay, d1		5.8			7.3			22.5		26.2	22.6	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		1.4			4.3			0.0		13.8	0.1	
Delay (s)		7.2			11.6			22.5		40.0	22.7	
Level of Service		A			B			C		D	C	
Approach Delay (s)		7.2			11.6			22.5			34.6	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM Average Control Delay	13.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	68.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	116.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

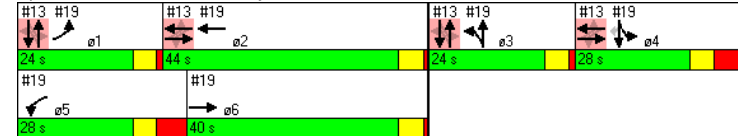
Timings
13: W Holly St & F St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø1	ø2	ø3	ø4
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔				
Volume (vph)	60	555	65	775	60	375	70	170				
Turn Type	Perm		Perm		Perm		Perm					
Protected Phases		2 4		2 4		1 3		1 3	1	2	3	4
Permitted Phases	2 4		2 4		1 3		1 3					
Detector Phases	2 4	2 4	2 4	2 4	1 3	1 3	1 3	1 3				
Minimum Initial (s)									6.0	6.0	6.0	6.0
Minimum Split (s)									24.0	24.0	24.0	28.0
Total Split (s)	72.0	72.0	72.0	72.0	48.0	48.0	48.0	48.0	24.0	44.0	24.0	28.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%	20%	37%	20%	23%
Yellow Time (s)									4.0	4.0	4.0	4.0
All-Red Time (s)									1.0	1.0	1.0	5.0
Lead/Lag									Lead	Lag	Lead	Lag
Lead-Lag Optimize?												
Recall Mode									Min	None	None	None
Act Effct Green (s)	64.0	64.0	64.0	64.0		39.1		39.1				
Actuated g/C Ratio	0.54	0.54	0.54	0.54		0.33		0.33				
v/c Ratio	0.81	0.75	0.35	0.92		0.86		0.41				
Control Delay	81.8	16.8	14.1	31.5		29.0		16.3				
Queue Delay	0.0	0.1	0.0	0.0		0.1		0.0				
Total Delay	81.8	16.9	14.1	31.5		29.2		16.3				
LOS	F	B	B	C		C		B				
Approach Delay		21.9		30.3		29.2		16.3				
Approach LOS		C		C		C		B				

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.1	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.45	
Intersection Signal Delay: 25.8	Intersection LOS: C
Intersection Capacity Utilization 97.5%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 13: W Holly St & F St



Timings
13: W Holly St & F St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	ø5	ø6
Lane Configurations		
Volume (vph)		
Turn Type		
Protected Phases	5	6
Permitted Phases		
Detector Phases		
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	28.0	24.0
Total Split (s)	28.0	40.0
Total Split (%)	23%	33%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	5.0	1.0
Lead/Lag	Lead	Lag
Lead-Lag Optimize?		
Recall Mode	None	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

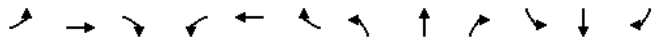
HCM Signalized Intersection Capacity Analysis
13: W Holly St & F St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			0.95	
Frt	1.00	0.97		1.00	0.98			0.99			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1728	1757		1711	1768			1791			3280	
Flt Permitted	0.11	1.00		0.21	1.00			0.91			0.64	
Satd. Flow (perm)	194	1757		387	1768			1639			2107	
Volume (vph)	60	555	160	65	775	105	60	375	30	70	170	60
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	555	160	65	775	105	60	375	30	70	170	60
RTOR Reduction (vph)	0	8	0	0	4	0	0	2	0	0	19	0
Lane Group Flow (vph)	60	707	0	65	876	0	0	463	0	0	281	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2 4			2 4			1 3			1 3	
Permitted Phases	2 4			2 4			1 3			1 3		
Actuated Green, G (s)	65.2	65.2		65.2	65.2			37.1			37.1	
Effective Green, g (s)	71.2	71.2		71.2	71.2			39.1			39.1	
Actuated g/C Ratio	0.56	0.56		0.56	0.56			0.31			0.31	
Clearance Time (s)												
Vehicle Extension (s)												
Lane Grp Cap (vph)	109	990		218	997			507			652	
v/s Ratio Prot		0.40			c0.50							
v/s Ratio Perm	0.31			0.17				c0.28			0.13	
v/c Ratio	0.55	0.71		0.30	0.88			0.91			0.43	
Uniform Delay, d1	17.4	20.1		14.4	23.8			42.0			34.7	
Progression Factor	1.00	1.00		1.00	1.00			0.90			1.00	
Incremental Delay, d2	5.9	2.5		0.8	8.9			12.6			0.5	
Delay (s)	23.3	22.6		15.2	32.7			50.3			35.2	
Level of Service	C	C		B	C			D			D	
Approach Delay (s)		22.6			31.5			50.3			35.2	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM Average Control Delay		32.7			HCM Level of Service			C				
HCM Volume to Capacity ratio		0.89										
Actuated Cycle Length (s)		126.3			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		97.5%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 14: W Holly St & C St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	5	675	45	65	950	85	60	20	50	50	15	5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	675	45	65	950	85	60	20	50	50	15	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)	753											
pX, platoon unblocked				0.74			0.74			0.74		
vC, conflicting volume	1035				720	1842			1872	698	1890	1852
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1035				621	2141			2181	590	2205	2154
tC, single (s)	4.1				4.1	7.1			6.5	6.2	7.1	6.5
tC, 2 stage (s)												
tF (s)	2.2				2.2	3.5			4.0	3.3	3.5	4.0
p0 queue free %	99				91	0			36	87	0	54
cM capacity (veh/h)	675				712	15			31	377	9	32
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	725	1100	130	70								
Volume Left	5	65	60	50								
Volume Right	45	85	50	5								
cSH	675	712	28	12								
Volume to Capacity	0.01	0.09	4.66	5.83								
Queue Length 95th (ft)	1	8	Err	Err								
Control Delay (s)	0.2	2.9	Err	Err								
Lane LOS	A	A	F	F								
Approach Delay (s)	0.2	2.9	Err	Err								
Approach LOS				F	F							
Intersection Summary												
Average Delay	989.2											
Intersection Capacity Utilization	114.5%			ICU Level of Service			H					
Analysis Period (min)	15											

Timings 15: W Holly St & Cornwall Ave

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	WBT	NBL	NBT	SBT
Lane Configurations	↕↕		↕	↕
Volume (vph)	1295	180	255	280
Turn Type	Perm			
Protected Phases	2		4	4
Permitted Phases	4			
Detector Phases	2	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0
Minimum Split (s)	21.0	23.0	23.0	23.0
Total Split (s)	51.0	49.0	49.0	49.0
Total Split (%)	51.0%	49.0%	49.0%	49.0%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	47.0		45.0	45.0
Actuated g/C Ratio	0.47		0.45	0.45
v/c Ratio	1.04		1.06	0.54
Control Delay	61.4		55.9	15.5
Queue Delay	0.0		0.9	0.0
Total Delay	61.4		56.9	15.5
LOS	E		E	B
Approach Delay	61.4		56.9	15.5
Approach LOS	E		E	B
Intersection Summary				
Cycle Length: 100				
Actuated Cycle Length: 100				
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green				
Natural Cycle: 80				
Control Type: Pretimed				
Maximum v/c Ratio: 1.06				
Intersection Signal Delay: 53.0			Intersection LOS: D	
Intersection Capacity Utilization 103.6%			ICU Level of Service G	
Analysis Period (min) 15				
Splits and Phases: 15: W Holly St & Cornwall Ave				
↕ ø2 51 s ↕↕ ø4 49 s				

HCM Signalized Intersection Capacity Analysis
15: W Holly St & Cornwall Ave

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.97			1.00			0.96	
Flpb, ped/bikes					1.00			0.98			1.00	
Frt					0.98			1.00			0.96	
Flt Protected					1.00			0.98			1.00	
Satd. Flow (prot)					3262			1745			1653	
Flt Permitted					1.00			0.51			1.00	
Satd. Flow (perm)					3262			909			1653	
Volume (vph)	0	0	0	100	1295	215	180	255	0	0	280	125
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	100	1295	215	180	255	0	0	280	125
RTOR Reduction (vph)	0	0	0	0	12	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	0	0	0	1598	0	0	435	0	0	396	0
Confl. Peds. (#/hr)				80		80	80					80
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type				Split		Perm						
Protected Phases				2	2			4			4	
Permitted Phases							4					
Actuated Green, G (s)					47.0			45.0			45.0	
Effective Green, g (s)					47.0			45.0			45.0	
Actuated g/C Ratio					0.47			0.45			0.45	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					1533			409			744	
v/s Ratio Prot					c0.49						0.24	
v/s Ratio Perm								c0.48				
v/c Ratio					1.04			1.06			0.53	
Uniform Delay, d1					26.5			27.5			19.9	
Progression Factor					1.00			0.70			0.72	
Incremental Delay, d2					34.8			34.2			1.4	
Delay (s)					61.3			53.5			15.7	
Level of Service					E			D			B	
Approach Delay (s)		0.0			61.3			53.5			15.7	
Approach LOS		A			E			D			B	

Intersection Summary			
HCM Average Control Delay	52.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	103.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

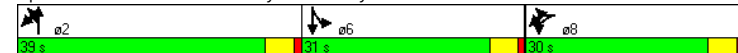
Timings
16: Lakeway Dr & Jersey St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	WBL	WBR	NBL	NBT	SBL	SBT
Lane Configurations						
Volume (vph)	30	825	545	375	655	495
Turn Type		Prot	Split		Split	
Protected Phases	8	8	2	2	6	6
Permitted Phases						
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	30.0	30.0	39.0	39.0	31.0	31.0
Total Split (%)	30.0%	30.0%	39.0%	39.0%	31.0%	31.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
Act Effct Green (s)	26.0	26.0	35.0	35.0	27.0	27.0
Actuated g/C Ratio	0.26	0.26	0.35	0.35	0.27	0.27
v/c Ratio	1.00	0.93	0.93	1.02dr	0.92	0.97
Control Delay	81.2	56.4	58.1	31.1	66.0	61.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.2	56.4	58.1	31.1	66.0	61.1
LOS	F	E	E	C	E	E
Approach Delay	65.8			38.7		62.6
Approach LOS	E			D		E

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 52.8	Intersection LOS: D
Intersection Capacity Utilization 95.0%	ICU Level of Service F
Analysis Period (min) 15	
dr Defacto Right Lane. Recode with 1 though lane as a right lane.	

Splits and Phases: 16: Lakeway Dr & Jersey St



HCM Signalized Intersection Capacity Analysis
16: Lakeway Dr & Jersey St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	WBL2	WBL	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0			4.0	4.0	
Lane Util. Factor	1.00	0.91			0.91	0.91			0.91	0.91	
Frt	0.91	0.85			1.00	0.90			1.00	1.00	
Flt Protected	0.98	1.00			0.95	1.00			0.95	0.98	
Satd. Flow (prot)	1610	2786			1572	2965			1430	3124	
Flt Permitted	0.98	1.00			0.95	1.00			0.95	0.98	
Satd. Flow (perm)	1610	2786			1572	2965			1430	3124	
Volume (vph)	145	30	825	105	5	545	375	895	655	495	20
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	145	30	825	105	5	545	375	895	655	495	20
RTOR Reduction (vph)	0	0	14	0	0	0	361	0	0	0	0
Lane Group Flow (vph)	0	416	675	0	0	514	945	0	354	816	0
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	1%	1%	11%	1%	1%
Turn Type	Split	Prot			Split	Split			Split		
Protected Phases	8	8	8		2	2	2		6	6	
Permitted Phases											
Actuated Green, G (s)	25.0	25.0			34.0	34.0			26.0	26.0	
Effective Green, g (s)	26.0	26.0			35.0	35.0			27.0	27.0	
Actuated g/C Ratio	0.26	0.26			0.35	0.35			0.27	0.27	
Clearance Time (s)	5.0	5.0			5.0	5.0			5.0	5.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0			2.0	2.0	
Lane Grp Cap (vph)	419	724			550	1038			386	843	
v/s Ratio Prot	c0.26	0.24			c0.33	0.32			0.25	c0.26	
v/s Ratio Perm											
v/c Ratio	0.99	0.93			0.93	1.02dr			0.92	0.97	
Uniform Delay, d1	36.9	36.1			31.4	31.0			35.4	36.1	
Progression Factor	1.00	1.00			1.00	1.00			1.00	1.00	
Incremental Delay, d2	41.8	18.6			23.0	11.5			25.6	23.0	
Delay (s)	78.7	54.7			54.3	42.5			61.0	59.1	
Level of Service	E	D			D	D			E	E	
Approach Delay (s)	63.8					45.8				59.7	
Approach LOS	E					D				E	

Intersection Summary

HCM Average Control Delay	54.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.0%	ICU Level of Service	F
Analysis Period (min)	15		
dr	Defacto Right Lane. Recode with 1 though lane as a right lane.		
c	Critical Lane Group		

Timings
17: Lakeway Dr & I-5 SB Ramps

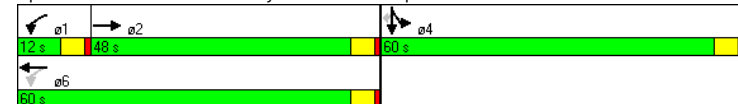
No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBT	WBL	WBT	SBT	SBR
Lane Configurations					
Volume (vph)	1230	200	825	260	325
Turn Type	pm+pt			Perm	
Protected Phases	2	1	6	4	
Permitted Phases		6			4
Detector Phases	2	1	6	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	10.0	23.0	28.0	28.0
Total Split (s)	48.0	12.0	60.0	60.0	60.0
Total Split (%)	40.0%	10.0%	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None
Act Effct Green (s)	44.0	56.0	56.0	56.0	56.0
Actuated g/C Ratio	0.37	0.47	0.47	0.47	0.47
v/c Ratio	1.18	1.15	0.52	1.19	0.42
Control Delay	122.5	141.2	23.9	128.4	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	122.5	141.2	23.9	128.4	15.7
LOS	F	F	C	F	B
Approach Delay	122.5		46.8	100.3	
Approach LOS	F		D	F	

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.19	
Intersection Signal Delay: 94.5	Intersection LOS: F
Intersection Capacity Utilization 116.0%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 17: Lakeway Dr & I-5 SB Ramps



HCM Signalized Intersection Capacity Analysis 17: Lakeway Dr & I-5 SB Ramps

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00
Flt Protected	1.00	0.95	1.00	1.00	0.96	1.00	1.00	1.00	1.00	1.00	0.96	1.00
Satd. Flow (prot)	3371	1711	3421	1711	3421	1711	3421	1711	3421	1711	3421	1711
Flt Permitted	1.00	0.08	1.00	1.00	0.96	1.00	1.00	1.00	1.00	1.00	0.96	1.00
Satd. Flow (perm)	3371	150	3421	150	3421	150	3421	150	3421	150	3421	150
Volume (vph)	0	1230	240	200	825	0	0	0	0	715	260	325
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1230	240	200	825	0	0	0	0	715	260	325
RTOR Reduction (vph)	0	13	0	0	0	0	0	0	0	0	0	56
Lane Group Flow (vph)	0	1457	0	200	825	0	0	0	0	975	269	269
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type	pm+pt						Split			Perm		
Protected Phases	2						4			4		
Permitted Phases	6						4			4		
Actuated Green, G (s)	43.0						55.0			55.0		
Effective Green, g (s)	44.0						56.0			56.0		
Actuated g/C Ratio	0.37						0.47			0.47		
Clearance Time (s)	5.0						5.0			5.0		
Vehicle Extension (s)	3.0						3.0			3.0		
Lane Grp Cap (vph)	1236						174			1596		
v/s Ratio Prot	0.43						c0.08			0.24		
v/s Ratio Perm	c0.46						c0.46			0.17		
v/c Ratio	1.18						1.15			0.52		
Uniform Delay, d1	38.0						58.2			22.5		
Progression Factor	1.00						1.00			1.00		
Incremental Delay, d2	89.0						114.1			0.3		
Delay (s)	127.0						172.3			22.8		
Level of Service	F						F			C		
Approach Delay (s)	127.0						52.0			0.0		
Approach LOS	F						D			A		

Intersection Summary			
HCM Average Control Delay	98.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	116.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

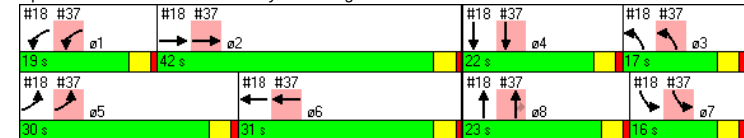
Timings 18: Lakeway Dr & King St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Volume (vph)	490	1155	25	710	170	105	60	25
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	5	2	1	6	3	8	7	4
Permitted Phases	5	2	1	6	3	8	7	4
Detector Phases	5	2	1	6	3	8	7	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	30.0	42.0	19.0	31.0	17.0	23.0	16.0	22.0
Total Split (%)	30.0%	42.0%	19.0%	31.0%	17.0%	23.0%	16.0%	22.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?								
Recall Mode	None	Min	None	None	None	Min	None	None
Act Effct Green (s)	26.0	38.0	15.0	27.0	13.1	19.0	12.0	17.9
Actuated g/C Ratio	0.26	0.38	0.15	0.27	0.13	0.19	0.12	0.18
v/c Ratio	1.08	1.07	0.10	1.06	0.75	0.44	0.29	0.57
Control Delay	102.0	76.0	40.6	58.8	62.7	35.5	44.2	11.4
Queue Delay	0.0	0.0	0.0	28.8	0.0	0.0	0.0	0.0
Total Delay	102.0	76.0	40.6	87.6	62.7	35.5	44.2	11.4
LOS	F	E	D	F	E	D	D	B
Approach Delay	82.7		86.4		49.7		17.1	
Approach LOS	F		F		D		B	

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.10	
Intersection Signal Delay: 74.5	Intersection LOS: E
Intersection Capacity Utilization 96.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 18: Lakeway Dr & King St



HCM Signalized Intersection Capacity Analysis 18: Lakeway Dr & King St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.95		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	3398		1728	3307		1745	1748		1745	1585	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1745	3398		1728	3307		1745	1748		1745	1585	
Volume (vph)	490	1155	245	25	710	285	170	105	50	60	25	260
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	490	1155	245	25	710	285	170	105	50	60	25	260
RTOR Reduction (vph)	0	18	0	0	43	0	0	17	0	0	213	0
Lane Group Flow (vph)	490	1382	0	25	952	0	170	138	0	60	72	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	26.0	38.0		15.0	27.0		13.1	19.0		12.0	17.9	
Effective Green, g (s)	26.0	38.0		15.0	27.0		13.1	19.0		12.0	17.9	
Actuated g/C Ratio	0.26	0.38		0.15	0.27		0.13	0.19		0.12	0.18	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	454	1291		259	893		229	332		209	284	
v/s Ratio Prot	c0.28	c0.41		0.01	0.29		c0.10	c0.08		0.03	0.05	
v/s Ratio Perm												
v/c Ratio	1.08	1.07		0.10	1.07		0.74	0.42		0.29	0.25	
Uniform Delay, d1	37.0	31.0		36.7	36.5		41.8	35.6		40.1	35.3	
Progression Factor	1.00	1.00		1.09	0.65		1.00	1.00		1.00	1.00	
Incremental Delay, d2	65.2	46.2		0.0	36.0		12.2	0.8		0.8	0.5	
Delay (s)	102.2	77.2		40.0	59.7		54.0	36.5		40.9	35.8	
Level of Service	F	E		D	E		D	D		D	D	
Approach Delay (s)		83.7			59.2			45.7			36.6	
Approach LOS		F			E			D			D	
Intersection Summary												
HCM Average Control Delay		68.7										
HCM Volume to Capacity ratio		0.84										
Actuated Cycle Length (s)		100.0										
Intersection Capacity Utilization		96.0%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 24: E Chestnut St & Railroad Ave

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	95	1175	35	0	0	0	0	35	195	115	100	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	95	1175	35	0	0	0	0	35	195	115	100	0
Pedestrians					41			41			11	
Lane Width (ft)					0.0			11.0			11.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			3			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		353			350							
pX, platoon unblocked												
vC, conflicting volume	11			1251			1474	1434	491	846	1452	11
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	11			1251			1474	1434	491	846	1452	11
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			100	71	62	0	16	100
cM capacity (veh/h)	1600			545			24	122	512	115	119	1065
Direction, Lane #												
Volume Total	389	588		329			230		215			
Volume Left	95	0		0			0		115			
Volume Right	0	0		35			195		0			
cSH	1600	1700		1700			344		117			
Volume to Capacity	0.06	0.35		0.19			0.67		1.84			
Queue Length 95th (ft)	5	0		0			114		425			
Control Delay (s)	2.2	0.0		0.0			34.1		472.1			
Lane LOS	A			D			F					
Approach Delay (s)	0.7			34.1			472.1					
Approach LOS				D			F					
Intersection Summary												
Average Delay		63.0										
Intersection Capacity Utilization		63.9%										
ICU Level of Service										B		
Analysis Period (min)		15										

Timings
25: E Chestnut St & N State St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	→	↘	↓
Lane Group	EBT	SBL	SBT
Lane Configurations	↑↑↑	↘	↑↑
Volume (vph)	945	250	675
Turn Type	Split		
Protected Phases	2	4	4
Permitted Phases			
Detector Phases	2	4	4
Minimum Initial (s)	6.0	6.0	6.0
Minimum Split (s)	22.0	20.0	20.0
Total Split (s)	56.0	44.0	44.0
Total Split (%)	56.0%	44.0%	44.0%
Yellow Time (s)	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	Max	Max	Max
Act Effct Green (s)	52.0	40.0	40.0
Actuated g/C Ratio	0.52	0.40	0.40
v/c Ratio	0.58	0.33	0.49
Control Delay	27.2	13.7	23.9
Queue Delay	0.0	0.0	0.0
Total Delay	27.2	13.7	23.9
LOS	C	B	C
Approach Delay	27.2	21.1	
Approach LOS	C	C	

Intersection Summary

Cycle Length: 100		
Actuated Cycle Length: 100		
Offset: 13 (13%), Referenced to phase 4:SBTL, Start of Green		
Natural Cycle: 45		
Control Type: Pretimed		
Maximum v/c Ratio: 0.58		
Intersection Signal Delay: 24.8		Intersection LOS: C
Intersection Capacity Utilization 55.1%		ICU Level of Service B
Analysis Period (min) 15		

Splits and Phases: 25: E Chestnut St & N State St



HCM Signalized Intersection Capacity Analysis
25: E Chestnut St & N State St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		  								  	  		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0								4.0	4.0		
Lane Util. Factor		0.91								1.00	0.95		
Frpb, ped/bikes		0.97								1.00	1.00		
Flpb, ped/bikes		1.00								1.00	1.00		
Frt		0.95								1.00	1.00		
Flt Protected		1.00								0.95	1.00		
Satd. Flow (prot)		4599								1728	3455		
Flt Permitted		1.00								0.95	1.00		
Satd. Flow (perm)		4599								1728	3455		
Volume (vph)	0	945	465	0	0	0	0	0	0	250	675	0	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	0	945	465	0	0	0	0	0	0	250	675	0	
RTOR Reduction (vph)	0	56	0	0	0	0	0	0	0	59	0	0	
Lane Group Flow (vph)	0	1354	0	0	0	0	0	0	0	191	675	0	
Confl. Peds. (#/hr)			40							40			
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	1%	1%	1%	
Turn Type										Split			
Protected Phases		2								4	4		
Permitted Phases													
Actuated Green, G (s)		52.0								40.0	40.0		
Effective Green, g (s)		52.0								40.0	40.0		
Actuated g/C Ratio		0.52								0.40	0.40		
Clearance Time (s)		4.0								4.0	4.0		
Lane Grp Cap (vph)		2391								691	1382		
v/s Ratio Prot		c0.29								0.11	c0.20		
v/s Ratio Perm													
v/c Ratio		0.57								0.28	0.49		
Uniform Delay, d1		16.3								20.2	22.4		
Progression Factor		1.78								1.00	1.00		
Incremental Delay, d2		0.4								1.0	1.2		
Delay (s)		29.5								21.2	23.6		
Level of Service		C								C	C		
Approach Delay (s)	29.5			0.0				0.0			23.0		
Approach LOS	C			A				A			C		

Intersection Summary

HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
26: E Chestnut St & N Forest St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	→	↑
Lane Group	EBT	NBT
Lane Configurations	↑↑↑	↑↑
Volume (vph)	860	860
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phases	2	4
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	22.0	21.0
Total Split (s)	53.0	47.0
Total Split (%)	53.0%	47.0%
Yellow Time (s)	3.0	3.0
All-Red Time (s)	1.0	1.0
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	Max
Act Effct Green (s)	49.0	43.0
Actuated g/C Ratio	0.49	0.43
v/c Ratio	0.51	0.69
Control Delay	9.2	25.7
Queue Delay	0.2	0.0
Total Delay	9.4	25.7
LOS	A	C
Approach Delay	9.4	25.7
Approach LOS	A	C

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 21 (21%), Referenced to phase 4:NBT, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 16.6
Intersection LOS: B
Intersection Capacity Utilization 59.6%
ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 26: E Chestnut St & N Forest St



HCM Signalized Intersection Capacity Analysis
26: E Chestnut St & N Forest St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		  						 					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0						4.0					
Lane Util. Factor		0.91						0.95					
Frpb, ped/bikes		1.00						0.99					
Flpb, ped/bikes		1.00						1.00					
Frt		1.00						0.98					
Flt Protected		0.98						1.00					
Satd. Flow (prot)		4938						3315					
Flt Permitted		0.98						1.00					
Satd. Flow (perm)		4938						3315					
Volume (vph)	385	860	0	0	0	0	0	860	135	0	0	0	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	385	860	0	0	0	0	0	860	135	0	0	0	
RTOR Reduction (vph)	0	39	0	0	0	0	0	13	0	0	0	0	
Lane Group Flow (vph)	0	1206	0	0	0	0	0	982	0	0	0	0	
Confl. Peds. (#/hr)	40								40				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	0%	0%	0%	
Turn Type	Split												
Protected Phases	2	2						4					
Permitted Phases													
Actuated Green, G (s)		49.0						43.0					
Effective Green, g (s)		49.0						43.0					
Actuated g/C Ratio		0.49						0.43					
Clearance Time (s)		4.0						4.0					
Lane Grp Cap (vph)		2420						1425					
v/s Ratio Prot		c0.24						c0.30					
v/s Ratio Perm													
v/c Ratio		0.50						0.69					
Uniform Delay, d1		17.2						23.1					
Progression Factor		0.53						1.00					
Incremental Delay, d2		0.6						2.8					
Delay (s)		9.7						25.8					
Level of Service		A						C					
Approach Delay (s)		9.7			0.0			25.8			0.0		
Approach LOS		A			A			C			A		

Intersection Summary

HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
27: E Chestnut St & Ellis St

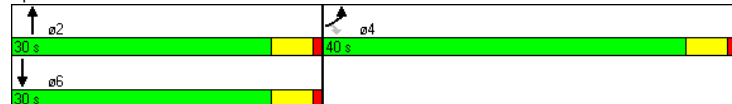
No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	↗	↖	↗
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations	↖↗	↖	↖↗↗	↖↗
Volume (vph)	840	680	940	585
Turn Type	Perm			
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phases	4	4	2	6
Minimum Initial (s)	6.0	6.0	6.0	6.0
Minimum Split (s)	30.0	30.0	12.0	30.0
Total Split (s)	40.0	40.0	30.0	30.0
Total Split (%)	57.1%	57.1%	42.9%	42.9%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	29.4	29.4	20.0	20.0
Actuated g/C Ratio	0.51	0.51	0.34	0.34
v/c Ratio	0.50	0.86	0.55	0.49
Control Delay	11.2	23.9	17.2	17.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.2	23.9	17.2	17.2
LOS	B	C	B	B
Approach Delay	16.9		17.2	17.2
Approach LOS	B		B	B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 58.2
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 17.1
Intersection Capacity Utilization 69.4%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service C

Splits and Phases: 27: E Chestnut St & Ellis St



HCM Signalized Intersection Capacity Analysis
27: E Chestnut St & Ellis St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	↗	↖	↗	↖	↗
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↖		↖↗↗	↖↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.91	0.95	
Frbp, ped/bikes	1.00	0.95		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3319	1450		4964	3490	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3319	1450		4964	3490	
Volume (vph)	840	680	0	940	585	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	840	680	0	940	585	0
RTOR Reduction (vph)	0	67	0	0	0	0
Lane Group Flow (vph)	840	613	0	940	585	0
Confl. Peds. (#/hr)	60	60				
Heavy Vehicles (%)	2%	2%	1%	1%	0%	0%
Turn Type	Perm					
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	28.3	28.3		18.9	18.9	
Effective Green, g (s)	29.3	29.3		19.9	19.9	
Actuated g/C Ratio	0.51	0.51		0.35	0.35	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1700	743		1727	1214	
v/s Ratio Prot	0.25			0.19	0.17	
v/s Ratio Perm		0.42				
v/c Ratio	0.49	0.83		0.54	0.48	
Uniform Delay, d1	9.1	11.8		15.0	14.6	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	7.4		0.4	0.3	
Delay (s)	9.3	19.2		15.4	14.9	
Level of Service	A	B		B	B	
Approach Delay (s)	13.8			15.4	14.9	
Approach LOS	B			B	B	

Intersection Summary

HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	57.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Laurel St & N State St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Volume (veh/h)	0	25	10	35	25	0	0	0	0	210	1320	65
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	25	10	35	25	0	0	0	0	210	1320	65
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)	1046											
pX, platoon unblocked												
vC, conflicting volume	1785	1772	472	882	1805	0	1385	0				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1785	1772	472	882	1805	0	1385	0				
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	100	65	98	78	63	100	100	87				
cM capacity (veh/h)	33	72	538	158	68	1091	490	1629				
Direction, Lane #	EB 1	WB 1	SB 1	SB 2	SB 3							
Volume Total	35	60	540	660	395							
Volume Left	0	35	210	0	0							
Volume Right	10	0	0	0	65							
cSH	95	102	1629	1700	1700							
Volume to Capacity	0.37	0.59	0.13	0.39	0.23							
Queue Length 95th (ft)	37	70	11	0	0							
Control Delay (s)	63.4	81.3	3.7	0.0	0.0							
Lane LOS	F	F	A									
Approach Delay (s)	63.4	81.3	1.2									
Approach LOS	F	F										
Intersection Summary												
Average Delay	5.4											
Intersection Capacity Utilization	47.8%		ICU Level of Service					A				
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
29: Laurel St & N Forest St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	150	70	0	0	55	175	10	820	75	0	0	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	150	70	0	0	55	175	10	820	75	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)										1032		
pX, platoon unblocked												
vC, conflicting volume	632	915	0	912	878	448	0			895		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	632	915	0	912	878	448	0			895		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	30	74	100	100	81	69	99			100		
cM capacity (veh/h)	213	270	1084	184	287	564	1622			767		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	220	230	420	485								
Volume Left	150	0	10	0								
Volume Right	0	175	0	75								
cSH	229	458	1622	1700								
Volume to Capacity	0.96	0.50	0.01	0.29								
Queue Length 95th (ft)	214	69	0	0								
Control Delay (s)	95.3	20.5	0.2	0.0								
Lane LOS	F	C	A									
Approach Delay (s)	95.3	20.5	0.1									
Approach LOS	F	C										
Intersection Summary												
Average Delay			19.0									
Intersection Capacity Utilization	61.0%		ICU Level of Service					B				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 30: N Forrest St & N State St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	0	715	0	0	0	0	0	0	200	60	200	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	715	0	0	0	0	0	0	200	60	200	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0	715			815			715	715	915	715	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	715			815			715	715	915	715	0
tC, single (s)	4.1	4.1			7.1			6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2	2.2			3.5			4.0	3.3	3.5	4.0	3.3
p0 queue free %	100	100			100			100	54	56	44	100
cM capacity (veh/h)	1623	885			164			356	431	136	356	1085

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	715	200	60	200
Volume Left	0	0	60	0
Volume Right	0	200	0	0
cSH	1700	431	136	356
Volume to Capacity	0.42	0.46	0.44	0.56
Queue Length 95th (ft)	0	60	49	82
Control Delay (s)	0.0	20.4	51.0	27.3
Lane LOS	C	F	D	
Approach Delay (s)	0.0	20.4	32.8	
Approach LOS	C		D	

Intersection Summary			
Average Delay	10.7		
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

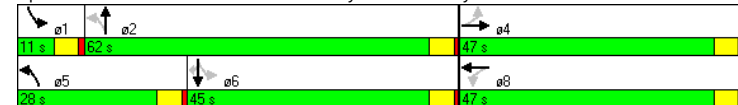
Timings 31: Bill McDonald Pkwy & Samish Way

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↙	↘		↗	↖	↗	↙	↘	↗
Volume (vph)	370	55	50	55	365	640	35	915	395
Turn Type	Perm		Perm		pm+pt		pm+pt		Perm
Protected Phases	4		8		5		2		6
Permitted Phases	4		8		2		6		6
Detector Phases	4	4	8	8	5	2	1	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	11.0	30.0	30.0	11.0	28.0	11.0	29.0	29.0
Total Split (s)	47.0	47.0	47.0	47.0	28.0	62.0	11.0	45.0	45.0
Total Split (%)	39.2%	39.2%	39.2%	39.2%	23.3%	51.7%	9.2%	37.5%	37.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	36.8	36.8		36.8	58.2	52.4	39.0	31.9	31.9
Actuated g/C Ratio	0.36	0.36		0.36	0.56	0.51	0.36	0.31	0.31
v/c Ratio	0.90	0.52		0.34	0.83	0.40	0.11	0.85	0.52
Control Delay	59.6	10.8		26.1	44.3	18.1	14.3	43.0	5.6
Queue Delay	0.0	0.6		0.4	10.6	1.1	0.0	2.2	0.0
Total Delay	59.6	11.4		26.4	54.9	19.3	14.3	45.2	5.6
LOS	E	B		C	D	B	B	D	A
Approach Delay	35.0		26.5		31.5		32.8		
Approach LOS	D		C		C		C		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 103.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 32.6	Intersection LOS: C
Intersection Capacity Utilization 89.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 31: Bill McDonald Pkwy & Samish Way



HCM Signalized Intersection Capacity Analysis
31: Bill McDonald Pkwy & Samish Way

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87		0.97	1.00		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.98	0.95		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	1569		1744	1728		1745	3414		1745	3490	1561
Flt Permitted	0.65	1.00		0.65	0.10		0.39	1.00		0.39	1.00	1.00
Satd. Flow (perm)	1166	1569		1161	188		711	3490		711	3490	1561
Volume (vph)	370	55	330	50	55	35	365	640	55	35	915	395
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	370	55	330	50	55	35	365	640	55	35	915	395
RTOR Reduction (vph)	0	183	0	0	10	0	0	5	0	0	0	265
Lane Group Flow (vph)	370	202	0	0	130	0	365	690	0	35	915	130
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm			Perm			pm+pt			pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	35.7	35.7		35.7	59.6	51.4	36.8	33.6	33.6			
Effective Green, g (s)	36.7	36.7		36.7	60.6	52.4	38.8	34.6	34.6			
Actuated g/C Ratio	0.35	0.35		0.35	0.58	0.50	0.37	0.33	0.33			
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0			
Vehicle Extension (s)	3.0	3.0		3.0	2.0	2.0	3.0	2.0	2.0			
Lane Grp Cap (vph)	406	547		405	430	1699	303	1147	513			
v/s Ratio Prot		0.13			c0.18	0.20	0.00	0.26				
v/s Ratio Perm	c0.32			0.11	c0.31		0.04		0.08			
v/c Ratio	0.91	0.37		0.32	0.85	0.41	0.12	0.80	0.25			
Uniform Delay, d1	32.7	25.6		25.1	28.4	16.7	21.4	32.2	25.9			
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	24.3	0.4		0.5	13.9	0.1	0.2	3.7	0.1			
Delay (s)	57.0	26.1		25.6	42.3	16.7	21.6	35.9	26.0			
Level of Service	E	C		C	D	B	C	D	C			
Approach Delay (s)		41.2			25.6			32.6				
Approach LOS		D			C			C				

Intersection Summary

HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	105.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings

32: Samish Way & I-5 SB Off-Ramp

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	ø8
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱	↰	
Volume (vph)	975	295	295	615	185	500	310	280	250	
Turn Type	Perm	pm+pt		Protcustom		Split	Prot			
Protected Phases	6		5	2	4	4	3	3	3	8
Permitted Phases		6	2							
Detector Phases	6	6	5	2	4	4	3	3	3	
Minimum Initial (s)	7.0	7.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0	20.0
Minimum Split (s)	22.0	22.0	9.5	22.0	12.0	12.0	11.5	11.5	11.5	25.0
Total Split (s)	40.0	40.0	18.0	58.0	15.0	15.0	22.0	22.0	22.0	25.0
Total Split (%)	33.3%	33.3%	15.0%	48.3%	12.5%	12.5%	18.3%	18.3%	18.3%	21%
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	4.0	3.5	3.5	3.5	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lead	Lead	Lead	
Lead-Lag Optimize?										
Recall Mode	Min	Min	None	Min	None	None	None	None	None	None
Act Effct Green (s)	33.5	33.5	51.5	51.5	11.0	11.0	18.0	18.0	18.0	
Actuated g/C Ratio	0.36	0.36	0.56	0.56	0.12	0.12	0.19	0.19	0.19	
v/c Ratio	0.78	0.40	0.88	0.32	0.90	0.85	0.91	0.78	0.50	
Control Delay	31.3	5.3	50.8	11.5	84.3	21.1	69.8	53.0	8.2	
Queue Delay	86.6	0.8	0.0	0.0	1.1	0.0	0.0	0.0	0.1	
Total Delay	117.9	6.1	50.8	11.5	85.4	21.1	69.8	53.0	8.4	
LOS	F	A	D	B	F	C	E	D	A	
Approach Delay	91.9			24.3			45.9			
Approach LOS	F			C			D			

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 92.6	
Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 55.0	Intersection LOS: D
Intersection Capacity Utilization 85.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 32: Samish Way & I-5 SB Off-Ramp

↰ ø2	↱ ø3	↰ ø4	↱ ø8
58 s	22 s	15 s	25 s
↰ ø5	↱ ø6		
18 s	40 s		

HCM Signalized Intersection Capacity Analysis
32: Samish Way & I-5 SB Off-Ramp

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3455	1546	1728	3455	1728	1728	1546	1745	1837	1561	1561	1561
Flt Permitted	1.00	1.00	0.11	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3455	1546	199	3455	1728	1546	1745	1837	1561	1561	1561	1561
Volume (vph)	0	975	295	295	615	0	185	0	500	310	280	250
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	975	295	295	615	0	185	0	500	310	280	250
RTOR Reduction (vph)	0	0	173	0	0	0	0	0	404	0	0	201
Lane Group Flow (vph)	0	975	122	295	615	0	185	0	96	310	280	49
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Perm pm+pt			Prot			custom			Split		Prot
Protected Phases	6			2			4			4		3
Permitted Phases	6			2			4			4		3
Actuated Green, G (s)	32.5	32.5	50.5	50.5	10.0	10.0	17.5	17.5	17.5	17.5	17.5	17.5
Effective Green, g (s)	33.5	33.5	51.5	51.5	11.0	11.0	18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.36	0.36	0.56	0.56	0.12	0.12	0.19	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	5.0	5.0	4.5	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1251	560	342	1924	205	184	340	357	304	304	304	304
v/s Ratio Prot	0.28	c0.13	0.18	c0.11	0.06	c0.18	0.15	0.03	0.03	0.03	0.03	0.03
v/s Ratio Perm	0.08	c0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
v/c Ratio	0.78	0.22	0.86	0.32	0.90	0.52	0.91	0.78	0.16	0.16	0.16	0.16
Uniform Delay, d1	26.2	20.4	23.3	11.1	40.2	38.3	36.5	35.4	31.0	31.0	31.0	31.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.2	0.2	19.9	0.1	37.6	2.9	28.0	11.4	0.3	0.3	0.3	0.3
Delay (s)	29.5	20.7	43.2	11.2	77.8	41.1	64.5	46.8	31.3	31.3	31.3	31.3
Level of Service	C	C	D	B	E	D	E	D	C	C	C	C
Approach Delay (s)	27.4	21.6	51.0	48.7								
Approach LOS	C	C	D	D								

Intersection Summary

HCM Average Control Delay	35.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	92.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings

33: Samish Way & Lincoln St

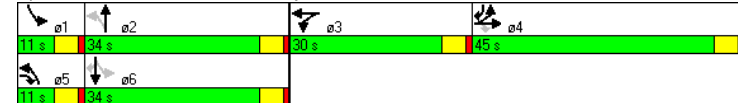
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Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Volume (vph)	905	525	420	5	170	380	270	25	125	425
Turn Type	custom	pm+ov	custom	pm+pt	pm+pt	pm+pt	pm+pt	pm+ov	pm+ov	pm+ov
Protected Phases	4	4	5	3	3	5	2	1	6	4
Permitted Phases	4	4	3	2	6	6	6	6	6	6
Detector Phases	4	4	5	3	3	5	2	1	6	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	33.0	33.0	11.0	30.0	30.0	11.0	24.0	11.0	33.0	33.0
Total Split (s)	45.0	45.0	11.0	30.0	30.0	11.0	34.0	11.0	34.0	45.0
Total Split (%)	37.5%	37.5%	9.2%	25.0%	25.0%	9.2%	28.3%	9.2%	28.3%	37.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	Min	None	Min	None
Act Effct Green (s)	41.9	41.9	53.2	19.2	19.2	27.3	23.5	25.6	18.2	60.1
Actuated g/C Ratio	0.41	0.41	0.52	0.19	0.19	0.27	0.23	0.24	0.18	0.58
v/c Ratio	1.04	1.05	0.44	0.02	0.80	1.12	0.70	0.12	0.39	0.41
Control Delay	79.2	82.6	6.2	36.6	56.1	119.7	47.7	28.2	40.7	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.2	82.6	6.2	36.6	56.1	119.7	47.7	28.2	40.7	2.6
LOS	E	F	A	D	E	F	D	C	D	A
Approach Delay	64.0	55.7	88.5	12.0						
Approach LOS	E	E	F	B						

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 102.8	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.12	
Intersection Signal Delay: 59.3	Intersection LOS: E
Intersection Capacity Utilization 94.6%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 33: Samish Way & Lincoln St



HCM Signalized Intersection Capacity Analysis
33: Samish Way & Lincoln St

No Action (2026) PM Peak Hour
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1641	1703	1546	1694	1687		1728	1800		1728	1818	1546
Flt Permitted	0.95	0.99	1.00	0.95	1.00		0.53	1.00		0.34	1.00	1.00
Satd. Flow (perm)	1641	1703	1546	1694	1687		960	1800		612	1818	1546
Volume (vph)	905	525	420	5	170	95	380	270	20	25	125	425
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	905	525	420	5	170	95	380	270	20	25	125	425
RTOR Reduction (vph)	0	0	178	0	17	0	0	2	0	0	0	137
Lane Group Flow (vph)	697	733	242	5	248	0	380	288	0	25	125	288
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	custom		pm+ov custom		pm+pt		pm+pt		pm+ov			
Protected Phases	4	4	5	3	3		5	2		1	6	4
Permitted Phases	4		4	3			2			6		6
Actuated Green, G (s)	40.9	40.9	47.0	18.1	18.1		28.6	22.5		22.8	19.6	60.5
Effective Green, g (s)	41.9	41.9	49.0	19.1	19.1		30.6	23.5		24.8	20.6	62.5
Actuated g/C Ratio	0.40	0.40	0.47	0.18	0.18		0.29	0.22		0.24	0.20	0.60
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	657	682	783	309	308		333	404		190	358	923
v/s Ratio Prot	0.42	c0.43	0.02	0.00	c0.15		c0.08	0.16		0.01	0.07	0.12
v/s Ratio Perm			0.14				c0.26			0.03		0.06
v/c Ratio	1.06	1.07	0.31	0.02	0.80		1.14	0.71		0.13	0.35	0.31
Uniform Delay, d1	31.4	31.4	17.3	35.1	41.0		36.9	37.5		31.3	36.3	10.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	52.4	56.3	0.1	0.0	13.4		93.3	4.9		0.1	0.2	0.1
Delay (s)	83.8	87.7	17.4	35.1	54.4		130.2	42.4		31.4	36.5	10.5
Level of Service	F	F	B	D	D		F	D		C	D	B
Approach Delay (s)	70.3				54.0		92.2		17.1			
Approach LOS	E				D		F		B			

Intersection Summary

HCM Average Control Delay	64.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	104.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	94.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
34: Old Fairhaven Pkwy & 12th St

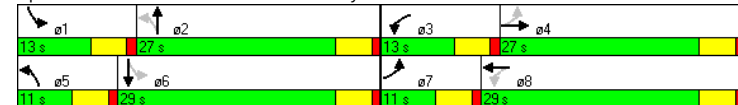
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Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	15	180	340	135	25	205	215	295
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	27.0	11.0	27.0	11.0	27.0	11.0	27.0
Total Split (s)	11.0	27.0	13.0	29.0	11.0	27.0	13.0	29.0
Total Split (%)	13.8%	33.8%	16.3%	36.3%	13.8%	33.8%	16.3%	36.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)	21.4	14.2	26.9	25.3	30.0	23.1	35.3	31.9
Actuated g/C Ratio	0.27	0.20	0.38	0.35	0.39	0.32	0.50	0.45
v/c Ratio	0.05	0.56	0.73	0.47	0.06	0.73	0.64	0.40
Control Delay	15.9	30.8	27.9	16.0	12.1	27.5	22.6	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	30.8	27.9	16.0	12.1	27.5	22.6	17.6
LOS	B	C	C	B	B	C	C	B
Approach Delay	29.7		22.2		26.6		19.6	
Approach LOS	C		C		C		B	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 71.3
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 23.4
Intersection Capacity Utilization 80.6%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service D

Splits and Phases: 34: Old Fairhaven Pkwy & 12th St



HCM Signalized Intersection Capacity Analysis
34: Old Fairhaven Pkwy & 12th St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.92		1.00	0.92		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1703	1766		1787	1722		1805	1745		1787	1851	
Flt Permitted	0.57	1.00		0.42	1.00		0.54	1.00		0.21	1.00	
Satd. Flow (perm)	1014	1766		790	1722		1031	1745		402	1851	
Volume (vph)	15	180	20	340	135	175	25	205	245	215	295	35
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	180	20	340	135	175	25	205	245	215	295	35
RTOR Reduction (vph)	0	5	0	0	58	0	0	50	0	0	5	0
Lane Group Flow (vph)	15	195	0	340	252	0	25	400	0	215	325	0
Heavy Vehicles (%)	6%	6%	6%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7		4	3		8	5		2	1		6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.5	17.4		30.4	24.3		27.6	25.3		38.2	30.9	
Effective Green, g (s)	20.5	18.4		31.4	25.3		29.6	26.3		39.2	31.9	
Actuated g/C Ratio	0.26	0.23		0.40	0.32		0.38	0.33		0.50	0.41	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	283	413		430	554		421	584		357	751	
v/s Ratio Prot	0.00	0.11		c0.09	0.15		0.00	c0.23		c0.07	0.18	
v/s Ratio Perm	0.01			c0.23			0.02			0.23		
v/c Ratio	0.05	0.47		0.79	0.46		0.06	0.69		0.60	0.43	
Uniform Delay, d1	21.7	25.9		19.3	21.2		15.5	22.6		13.7	16.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.9		9.6	0.6		0.1	6.4		2.9	1.8	
Delay (s)	21.7	26.8		28.8	21.8		15.6	29.0		16.6	18.6	
Level of Service	C	C		C	C		B	C		B	B	
Approach Delay (s)	26.4			25.5			28.3			17.8		
Approach LOS	C			C			C			B		

Intersection Summary			
HCM Average Control Delay	24.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	78.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

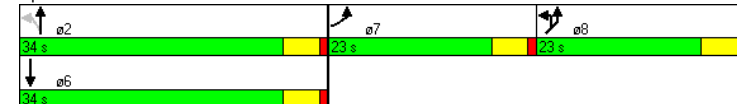
Timings
35: Hawthorne & 12th St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

					
Lane Group	EBL	NBL	NBT	SBT	NEL
Lane Configurations					
Volume (vph)	170	10	335	365	75
Turn Type	Perm				
Protected Phases	7		2	6	8
Permitted Phases	2				
Detector Phases	7	2	2	6	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	23.0	26.0	26.0	26.0	23.0
Total Split (s)	23.0	34.0	34.0	34.0	23.0
Total Split (%)	28.8%	42.5%	42.5%	42.5%	28.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	Max	None
Act Effct Green (s)	12.6		30.9	30.9	9.3
Actuated g/C Ratio	0.20		0.50	0.50	0.14
v/c Ratio	0.52		0.54	0.75	0.32
Control Delay	28.3		18.1	21.9	27.2
Queue Delay	0.0		0.0	0.0	0.0
Total Delay	28.3		18.1	21.9	27.2
LOS	C		B	C	C
Approach Delay	28.3		18.1	21.9	27.2
Approach LOS	C		B	C	C

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 62.2	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 22.2	Intersection LOS: C
Intersection Capacity Utilization 63.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 35: Hawthorne & 12th St



HCM Signalized Intersection Capacity Analysis
35: Hawthorne & 12th St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBR	EBR2	NBL	NBT	SBT	SBR	SBR2	NEL	NER
Lane Configurations	↰	↱	↱	↰	↰	↱	↱	↱	↰	↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0				4.0	4.0			4.0	
Lane Util. Factor	1.00				1.00	1.00			1.00	
Frt	0.99				1.00	0.94			0.98	
Flt Protected	0.96				1.00	1.00			0.96	
Satd. Flow (prot)	1775				1860	1782			1791	
Flt Permitted	0.96				0.98	1.00			0.96	
Satd. Flow (perm)	1775				1827	1782			1791	
Volume (vph)	170	10	10	10	335	365	65	245	75	10
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	170	10	10	10	335	365	65	245	75	10
RTOR Reduction (vph)	2	0	0	0	0	21	0	0	7	0
Lane Group Flow (vph)	188	0	0	0	345	654	0	0	78	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	0%	0%	0%	0%	0%
Turn Type	Perm									
Protected Phases	7				2	6			8	
Permitted Phases				2						
Actuated Green, G (s)	11.6				29.8	29.8			6.7	
Effective Green, g (s)	12.6				30.8	30.8			7.7	
Actuated g/C Ratio	0.20				0.49	0.49			0.12	
Clearance Time (s)	5.0				5.0	5.0			5.0	
Vehicle Extension (s)	3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)	354				892	870			219	
v/s Ratio Prot	c0.11					c0.37			c0.04	
v/s Ratio Perm					0.19					
v/c Ratio	0.53				0.39	0.75			0.36	
Uniform Delay, d1	22.6				10.2	13.1			25.4	
Progression Factor	1.00				1.00	1.00			1.00	
Incremental Delay, d2	1.4				0.3	5.9			1.0	
Delay (s)	24.0				10.5	19.0			26.4	
Level of Service	C				B	B			C	
Approach Delay (s)	24.0				10.5	19.0			26.4	
Approach LOS	C				B	B			C	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	63.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

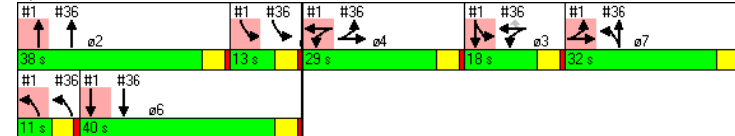
Timings
36: Birchwood Ave & Meridian Street

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT	ø2	ø5	ø7
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱			
Volume (vph)	290	180	235	365	95	1070	170	935			
Turn Type	Split			Perm	Prot		Prot				
Protected Phases	4	4	3		5 7	2 7	1	6	2	5	7
Permitted Phases				3							
Detector Phases	4	4	3	3	5 7	2 7	1	6			
Minimum Initial (s)	6.0	6.0	6.0	6.0			6.0	10.0	10.0	6.0	6.0
Minimum Split (s)	29.0	29.0	11.0	11.0			11.0	23.0	23.0	11.0	29.0
Total Split (s)	29.0	29.0	18.0	18.0	43.0	70.0	13.0	40.0	38.0	11.0	32.0
Total Split (%)	22.3%	22.3%	13.8%	13.8%	33.1%	53.8%	10.0%	30.8%	29%	8%	25%
Yellow Time (s)	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lead	Lag	Lag			Lag	Lag	Lead	Lead	
Lead-Lag Optimize?											
Recall Mode	None	None	None	None			None	None	Max	None	None
Act Effct Green (s)	23.7	23.7	14.0	14.0	39.0	66.0	9.0	36.0			
Actuated g/C Ratio	0.18	0.18	0.11	0.11	0.30	0.51	0.07	0.28			
v/c Ratio	0.87	0.73	1.54	1.08	0.18	0.61	1.39	1.29			
Control Delay	76.8	60.3	306.1	98.0	49.5	5.2	260.4	176.1			
Queue Delay	0.0	0.0	47.0	0.0	0.0	1.4	0.0	0.0			
Total Delay	76.8	60.3	353.1	98.0	49.5	6.6	260.4	176.1			
LOS	E	E	F	F	D	A	F	F			
Approach Delay	69.1	216.2			10.0		186.2				
Approach LOS	E	F			A		F				

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 128.8	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.54	
Intersection Signal Delay: 119.6	Intersection LOS: F
Intersection Capacity Utilization 87.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 36: Birchwood Ave & Meridian Street



HCM Signalized Intersection Capacity Analysis
36: Birchwood Ave & Meridian Street

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↰	↱	↰	↱	↱	↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1816			1876	1615	1787	3553		1752	3372	
Flt Permitted	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	1816			1876	1615	1787	3553		1752	3372	
Volume (vph)	290	180	75	80	235	365	95	1070	45	170	935	315
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	290	180	75	80	235	365	95	1070	45	170	935	315
RTOR Reduction (vph)	0	11	0	0	0	163	0	2	0	0	25	0
Lane Group Flow (vph)	290	244	0	0	315	202	95	1113	0	170	1225	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split		Perm	Prot			Prot		
Protected Phases	4	4		3	3		5 7	2 7		1	6	
Permitted Phases						3						
Actuated Green, G (s)	22.7	22.7			13.0	13.0	38.0	65.0		8.0	35.0	
Effective Green, g (s)	23.7	23.7			14.0	14.0	39.0	66.0		9.0	36.0	
Actuated g/C Ratio	0.18	0.18			0.11	0.11	0.30	0.51		0.07	0.28	
Clearance Time (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Vehicle Extension (s)	3.0	3.0			2.0	2.0				2.0	2.0	
Lane Grp Cap (vph)	332	334			204	176	542	1822		123	943	
v/s Ratio Prot	c0.16	0.13			c0.17		0.05	c0.31		0.10	c0.36	
v/s Ratio Perm						0.13						
v/c Ratio	0.87	0.73			1.54	1.15	0.18	0.61		1.38	1.30	
Uniform Delay, d1	51.0	49.5			57.4	57.4	33.0	22.2		59.8	46.3	
Progression Factor	1.00	1.00			1.00	1.00	1.45	0.20		1.00	1.00	
Incremental Delay, d2	21.5	7.8			267.8	113.0	0.0	0.2		214.4	142.3	
Delay (s)	72.6	57.2			325.1	170.3	48.0	4.8		274.3	188.7	
Level of Service	E	E			F	F	D	A		F	F	
Approach Delay (s)		65.4			242.0		8.2			198.9		
Approach LOS		E			F		A			F		

Intersection Summary

HCM Average Control Delay	127.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	128.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
37: Lakeway Dr & Lincoln Street

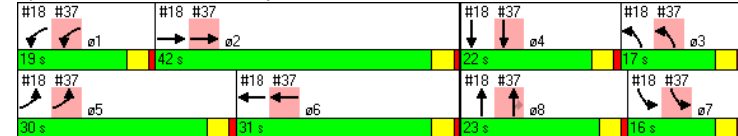
No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↱	↰	↱
Volume (vph)	55	1065	280	835	210	165	565	225	250
Turn Type	Prot		Prot		Prot		Perm	Prot	
Protected Phases	5	2	1	6	3	8		7	4
Permitted Phases							8		
Detector Phases	5	2	1	6	3	8	8	7	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	30.0	42.0	19.0	31.0	17.0	23.0	23.0	16.0	22.0
Total Split (%)	30.0%	42.0%	19.0%	31.0%	17.0%	23.0%	23.0%	16.0%	22.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?									
Recall Mode	None	Min	None	None	None	Min	Min	None	None
Act Effct Green (s)	26.0	38.0	15.0	27.0	13.1	19.0	19.0	12.0	17.9
Actuated g/C Ratio	0.26	0.38	0.15	0.27	0.13	0.19	0.19	0.12	0.18
v/c Ratio	0.12	0.90	1.09	1.01	0.94	0.48	1.06	1.10	0.93
Control Delay	53.2	15.6	123.6	69.4	91.3	41.6	75.2	134.0	76.4
Queue Delay	0.0	15.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.2	31.4	123.6	69.4	91.3	41.6	75.2	134.0	76.4
LOS	D	C	F	E	F	D	E	F	E
Approach Delay		32.4		82.0		72.9			101.0
Approach LOS		C		F		E			F

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Natural Cycle: 110
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.10
Intersection Signal Delay: 66.8
Intersection Capacity Utilization 90.1%
Analysis Period (min) 15
Intersection LOS: E
ICU Level of Service E

Splits and Phases: 37: Lakeway Dr & Lincoln Street



HCM Signalized Intersection Capacity Analysis
37: Lakeway Dr & Lincoln Street

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	1.00		0.85	1.00	0.98
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		1.00	0.95	1.00
Satd. Flow (prot)	1711	3377		1711	3369		1711	1801		1531	1711	1756
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		1.00	0.95	1.00
Satd. Flow (perm)	1711	3377		1711	3369		1711	1801		1531	1711	1756
Volume (vph)	55	1065	100	280	835	95	210	165	565	225	250	50
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	1065	100	280	835	95	210	165	565	225	250	50
RTOR Reduction (vph)	0	7	0	0	9	0	0	0	243	0	7	0
Lane Group Flow (vph)	55	1158	0	280	921	0	210	165	322	225	293	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			
Actuated Green, G (s)	26.0	38.0		15.0	27.0		13.1	19.0	19.0	12.0	17.9	
Effective Green, g (s)	26.0	38.0		15.0	27.0		13.1	19.0	19.0	12.0	17.9	
Actuated g/C Ratio	0.26	0.38		0.15	0.27		0.13	0.19	0.19	0.12	0.18	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	445	1283		257	910		224	342	291	205	314	
v/s Ratio Prot	0.03	c0.34		c0.16	c0.27		0.12	0.09		c0.13	0.17	
v/s Ratio Perm									c0.21			
v/c Ratio	0.12	0.90		1.09	1.01		0.94	0.48	1.11	1.10	0.93	
Uniform Delay, d1	28.3	29.3		42.5	36.5		43.0	36.1	40.5	44.0	40.4	
Progression Factor	1.85	0.46		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	1.0		82.1	32.9		42.6	1.1	84.4	91.4	33.4	
Delay (s)	52.3	14.5		124.6	69.4		85.6	37.2	124.9	135.4	73.8	
Level of Service	D	B		F	E		F	D	F	F	E	
Approach Delay (s)		16.2			82.2			100.7			100.2	
Approach LOS		B			F			F			F	
Intersection Summary												
HCM Average Control Delay		68.4										
HCM Volume to Capacity ratio		1.07										
Actuated Cycle Length (s)		100.0							20.0			
Intersection Capacity Utilization		90.1%							E			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
82: Wharf Street & N State St

No Action (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↰	↱		↰	↱
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	170	100	0	1060	25
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	170	100	0	1060	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1272	1072	1085			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1272	1072	1085			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	37	84			
cM capacity (veh/h)	156	268	643			
Direction, Lane #						
Volume Total	170	100	1085			
Volume Left	0	100	0			
Volume Right	170	0	25			
cSH	268	643	1700			
Volume to Capacity	0.63	0.16	0.64			
Queue Length 95th (ft)	99	14	0			
Control Delay (s)	39.2	11.6	0.0			
Lane LOS	E	B				
Approach Delay (s)	39.2	11.6	0.0			
Approach LOS	E					
Intersection Summary						
Average Delay		5.8				
Intersection Capacity Utilization		74.5%			ICU Level of Service	D
Analysis Period (min)		15				

Timings
19: Roeder Ave & F St

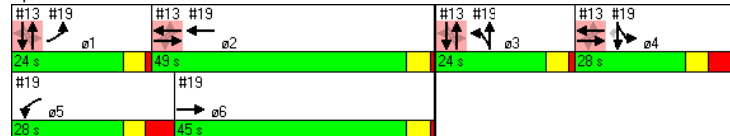
Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	210	505	5	495	60	100	65	185
Turn Type	Prot		Prot		Split		Perm	
Protected Phases	1	6	5	2	3	3	4	
Permitted Phases								4
Detector Phases	1	6	5	2	3	3	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	28.0	24.0	24.0	24.0	28.0	28.0
Total Split (s)	24.0	45.0	28.0	49.0	24.0	24.0	28.0	28.0
Total Split (%)	19.2%	36.0%	22.4%	39.2%	19.2%	19.2%	22.4%	22.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	5.0	1.0	1.0	1.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?								
Recall Mode	Min	Max	None	None	None	None	None	None
Act Effct Green (s)	20.0	65.8	11.2	45.0	20.0	20.0	23.9	23.9
Actuated g/C Ratio	0.16	0.53	0.09	0.36	0.16	0.16	0.19	0.19
v/c Ratio	0.80	0.59	0.03	1.02	0.27	0.44	0.66	0.43
Control Delay	72.3	24.8	52.4	79.2	49.5	52.9	54.1	10.8
Queue Delay	33.7	0.0	0.0	25.2	0.0	2.5	4.3	0.3
Total Delay	106.0	24.8	52.4	104.4	49.5	55.4	58.4	11.2
LOS	F	C	D	F	D	E	E	B
Approach Delay		47.7		104.0		53.2	36.3	
Approach LOS		D		F		D	D	

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 124.9
Natural Cycle: 135
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.10
Intersection Signal Delay: 63.9
Intersection Capacity Utilization 73.1%
Analysis Period (min) 15
Intersection LOS: E
ICU Level of Service D

Splits and Phases: 19: Roeder Ave & F St



HCM Signalized Intersection Capacity Analysis
19: Roeder Ave & F St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (prot)	1728	1803		1711	1748		1479	1546			1740	1531
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (perm)	1728	1803		1711	1748		1479	1546			1740	1531
Volume (vph)	210	505	30	5	495	120	60	100	5	145	65	185
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	221	532	32	5	521	126	63	105	5	153	68	195
RTOR Reduction (vph)	0	2	0	0	7	0	0	2	0	0	0	160
Lane Group Flow (vph)	221	562	0	5	640	0	63	108	0	0	221	35
Heavy Vehicles (%)	1%	1%		2%	2%		18%	18%		2%	2%	2%
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	19.0	64.8		1.4	51.2		19.0	19.0			18.9	18.9
Effective Green, g (s)	20.0	65.8		6.4	52.2		20.0	20.0			23.9	23.9
Actuated g/C Ratio	0.15	0.50		0.05	0.40		0.15	0.15			0.18	0.18
Clearance Time (s)	5.0	5.0		9.0	5.0		5.0	5.0			9.0	9.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	262	898		83	691		224	234			315	277
v/s Ratio Prot	c0.13	0.31		0.00	c0.37		0.04	c0.07			c0.13	
v/s Ratio Perm												0.02
v/c Ratio	0.84	0.63		0.06	0.93		0.28	0.46			0.70	0.13
Uniform Delay, d1	54.5	24.2		60.0	38.1		49.7	51.1			50.8	45.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			0.95	1.35
Incremental Delay, d2	21.2	3.3		0.3	18.4		0.7	1.4			6.3	0.2
Delay (s)	75.7	27.5		60.3	56.5		50.4	52.6			54.4	61.5
Level of Service	E	C		E	E		D	D			D	E
Approach Delay (s)		41.1			56.6			51.8			57.7	
Approach LOS		D			E			D			E	

Intersection Summary

HCM Average Control Delay	50.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	132.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis 20: Roeder Ave & C St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control	Free			Free			Stop			Stop			
Grade	0%			0%			0%			0%			
Volume (veh/h)	40	625	20	90	535	20	25	35	155	30	30	20	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	42	658	21	95	563	21	26	37	163	32	32	21	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (ft)	735												
pX, platoon unblocked				0.77			0.77			0.77			
vC, conflicting volume	584				679			1553			1526		
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	584				583			1717			1683		
tC, single (s)	4.1				4.1			7.1			6.5		
tC, 2 stage (s)													
tF (s)	2.2				2.2			3.5			4.0		
p0 queue free %	96				88			6			40		
cM capacity (veh/h)	1000				771			28			62		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	721	679	226	84									
Volume Left	42	95	26	32									
Volume Right	21	21	163	21									
cSH	1000	771	117	25									
Volume to Capacity	0.04	0.12	1.94	3.33									
Queue Length 95th (ft)	3	10	458	Err									
Control Delay (s)	1.1	3.1	513.7	Err									
Lane LOS	A	A	F	F									
Approach Delay (s)	1.1	3.1	513.7	Err									
Approach LOS			F	F									
Intersection Summary													
Average Delay	561.9												
Intersection Capacity Utilization	79.7%			ICU Level of Service			D						
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis 21: E Chestnut St & Bay St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control	Free			Free			Stop			Stop			
Grade	0%			0%			0%			0%			
Volume (veh/h)	10	565	20	15	265	25	195	40	10	365	35	45	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	11	595	21	16	279	26	205	42	11	384	37	47	
Pedestrians	10												
Lane Width (ft)	11.0												
Walking Speed (ft/s)	4.0												
Percent Blockage	1												
Right turn flare (veh)													
Median type	None								None				
Median storage (veh)													
Upstream signal (ft)	356												
pX, platoon unblocked	0.95						0.95	0.95			0.95	0.95	0.95
vC, conflicting volume	315	616					1026	973	605	981	971	312	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	282	616					1027	972	605	980	969	279	
tC, single (s)	4.1	4.1					7.1	6.5	6.2	7.1	6.5	6.2	
tC, 2 stage (s)													
tF (s)	2.2	2.2					3.5	4.0	3.3	3.5	4.0	3.3	
p0 queue free %	99	98					0	82	98	0	84	93	
cM capacity (veh/h)	1218	964					161	233	497	180	234	718	
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	11	616	321	205	53	384	84						
Volume Left	11	0	16	205	0	384	0						
Volume Right	0	21	26	0	11	0	47						
cSH	1218	1700	964	161	261	180	377						
Volume to Capacity	0.01	0.36	0.02	1.27	0.20	2.14	0.22						
Queue Length 95th (ft)	1	0	1	298	18	757	21						
Control Delay (s)	8.0	0.0	0.6	216.9	22.3	571.4	17.3						
Lane LOS	A		A	F	C	F	C						
Approach Delay (s)	0.1	0.6			177.2	471.8							
Approach LOS		F			F								
Intersection Summary													
Average Delay	159.5												
Intersection Capacity Utilization	64.5%			ICU Level of Service				C					
Analysis Period (min)	15												

Timings
22: E Chestnut St & Commercial St

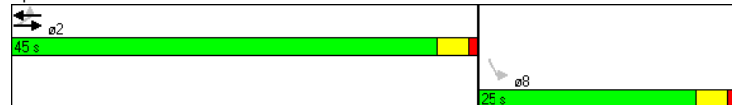
Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBT	SBL
Lane Group	EBL	EBT	WBT	SBL
Lane Configurations	↔	↕	↕	↕
Volume (vph)	85	795	300	150
Turn Type	Perm			
Protected Phases		2	2	
Permitted Phases	2			8
Detector Phases	2	2	2	8
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	26.0	26.0	26.0	19.0
Total Split (s)	45.0	45.0	45.0	25.0
Total Split (%)	64.3%	64.3%	64.3%	35.7%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)		41.0	41.0	21.0
Actuated g/C Ratio		0.59	0.59	0.30
v/c Ratio		0.52	0.34	0.45
Control Delay		10.0	18.1	20.3
Queue Delay		0.0	1.4	0.0
Total Delay		10.0	19.5	20.3
LOS		B	B	C
Approach Delay		10.0	19.5	20.3
Approach LOS		B	B	C

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 13.8
Intersection Capacity Utilization 65.6%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service C

Splits and Phases: 22: E Chestnut St & Commercial St



HCM Signalized Intersection Capacity Analysis
22: E Chestnut St & Commercial St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		0.95	1.00		1.00	
Frbp, ped/bikes		1.00	0.99		0.98	
Flpb, ped/bikes		1.00	1.00		0.98	
Frt		1.00	0.99		0.96	
Flt Protected		1.00	1.00		0.97	
Satd. Flow (prot)		3433	1766		1604	
Flt Permitted		0.88	1.00		0.97	
Satd. Flow (perm)		3026	1766		1604	
Volume (vph)	85	795	300	35	150	65
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	89	837	316	37	158	68
RTOR Reduction (vph)	0	0	6	0	22	0
Lane Group Flow (vph)	0	926	347	0	204	0
Confl. Peds. (#/hr)		20		20	20	20
Heavy Vehicles (%)	1%	1%	2%	2%	2%	2%
Turn Type	Perm					
Protected Phases		2	2			
Permitted Phases	2				8	
Actuated Green, G (s)		41.0	41.0		21.0	
Effective Green, g (s)		41.0	41.0		21.0	
Actuated g/C Ratio		0.59	0.59		0.30	
Clearance Time (s)		4.0	4.0		4.0	
Lane Grp Cap (vph)		1772	1034		481	
v/s Ratio Prot			0.20			
v/s Ratio Perm		c0.31			c0.13	
v/c Ratio		0.52	0.34		0.42	
Uniform Delay, d1		8.7	7.5		19.6	
Progression Factor		1.00	2.41		1.00	
Incremental Delay, d2		1.1	0.3		2.7	
Delay (s)		9.8	18.3		22.4	
Level of Service		A	B		C	
Approach Delay (s)		9.8	18.3		22.4	
Approach LOS		A	B		C	

Intersection Summary

HCM Average Control Delay	13.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
23: E Chestnut St & Cornwall Ave

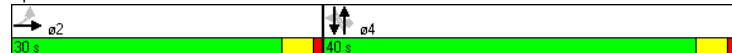
Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	→	↖	↑	↗	↘	↓
Lane Group	EBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↔	↔	↔	↔↔
Volume (vph)	710	345	210	55	115	120
Turn Type	Perm		Perm		Perm	
Protected Phases	2		4		4	
Permitted Phases	4		4		4	
Detector Phases	2	4	4	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	26.0	19.0	19.0	19.0	19.0	19.0
Total Split (s)	30.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	57.1%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	26.0		36.0	36.0		36.0
Actuated g/C Ratio	0.37		0.51	0.51		0.51
v/c Ratio	0.85		0.99	0.08		0.58
Control Delay	20.3		54.1	3.6		13.9
Queue Delay	0.3		0.0	0.0		0.0
Total Delay	20.6		54.1	3.6		13.9
LOS	C		D	A		B
Approach Delay	20.6		49.5			13.9
Approach LOS	C		D			B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 65
Control Type: Pretimed
Maximum v/c Ratio: 0.99
Intersection Signal Delay: 29.1
Intersection Capacity Utilization 84.4%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service E

Splits and Phases: 23: E Chestnut St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
23: E Chestnut St & Cornwall Ave

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↘	↗	↖	↗	↖	↗	↖	↗	↖	↗	↖	↗
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		↔↔						↔	↔		↔↔			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)		4.0						4.0	4.0		4.0			
Lane Util. Factor		0.95						1.00	1.00		1.00			
Frpb, ped/bikes		0.98						1.00	0.92		0.99			
Flpb, ped/bikes		1.00						0.96	1.00		0.99			
Frt		0.97						1.00	0.85		0.99			
Flt Protected		1.00						0.97	1.00		0.98			
Satd. Flow (prot)		3236						1672	1407		1737			
Flt Permitted		1.00						0.67	1.00		0.51			
Satd. Flow (perm)		3236						1151	1407		911			
Volume (vph)	60	710	230	0	0	0	345	210	55	115	120	25		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Adj. Flow (vph)	63	747	242	0	0	0	363	221	58	121	126	26		
RTOR Reduction (vph)	0	40	0	0	0	0	0	0	25	0	5	0		
Lane Group Flow (vph)	0	1012	0	0	0	0	0	584	33	0	268	0		
Confl. Peds. (#/hr)	50		50				50		50	50		50		
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	0%	0%	0%		
Turn Type	Perm							Perm		Perm		Perm		
Protected Phases	2							4		4		4		
Permitted Phases	2							4		4		4		
Actuated Green, G (s)	26.0							36.0		36.0		36.0		
Effective Green, g (s)	26.0							36.0		36.0		36.0		
Actuated g/C Ratio	0.37							0.51		0.51		0.51		
Clearance Time (s)	4.0							4.0		4.0		4.0		
Lane Grp Cap (vph)	1202							592		724		469		
v/s Ratio Prot														
v/s Ratio Perm	0.31							0.51		0.02		0.29		
v/c Ratio	0.84							0.99		0.05		0.57		
Uniform Delay, d1	20.1							16.8		8.5		11.7		
Progression Factor	0.67							1.00		1.00		0.81		
Incremental Delay, d2	6.5							33.8		0.1		4.0		
Delay (s)	20.0							50.6		8.6		13.4		
Level of Service	B							D		A		B		
Approach Delay (s)	20.0		0.0					46.8				13.4		
Approach LOS	B		A					D				B		

Intersection Summary

HCM Average Control Delay	27.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

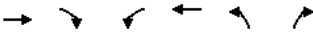
HCM Unsignalized Intersection Capacity Analysis
38: Roeder Ave & Central Ave

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	95	480	225	5	375	35	155	65	25	160	120	220
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	100	505	237	5	395	37	163	68	26	168	126	232
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (ft)	1113											
pX, platoon unblocked												
vC, conflicting volume	432	742			1542			1266	624	1308	1366	413
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	432	742			1542			1266	624	1308	1366	413
tC, single (s)	4.1	4.1			7.1			6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2	2.2			3.5			4.0	3.3	3.5	4.0	3.3
p0 queue free %	91	99			0			55	95	0	5	64
cM capacity (veh/h)	1128	865			9			153	486	78	133	639
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	842	437	258	526								
Volume Left	100	5	163	168								
Volume Right	237	37	26	232								
cSH	1128	865	13	152								
Volume to Capacity	0.09	0.01	19.19	3.46								
Queue Length 95th (ft)	7	0	Err	Err								
Control Delay (s)	2.2	0.2	Err	Err								
Lane LOS	A	A	F	F								
Approach Delay (s)	2.2	0.2	Err	Err								
Approach LOS	F			F								
Intersection Summary												
Average Delay	3801.6											
Intersection Capacity Utilization	105.6%			ICU Level of Service					G			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
39: Roeder Ave & Hilton Ave

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻↻↻↻↻↻					
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	745	75	55	710	75	55
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	784	79	58	747	79	58
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	544					
pX, platoon unblocked						
vC, conflicting volume				863	1687	824
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol				863	2029	824
tC, single (s)				4.1	6.4	6.2
tC, 2 stage (s)						
tF (s)				2.2	3.5	3.3
p0 queue free %				93	0	84
cM capacity (veh/h)				779	39	373
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	863	805	137			
Volume Left	0	58	79			
Volume Right	79	0	58			
cSH	1700	779	63			
Volume to Capacity	0.51	0.07	2.18			
Queue Length 95th (ft)	0	6	329			
Control Delay (s)	0.0	1.9	683.0			
Lane LOS		A	F			
Approach Delay (s)	0.0	1.9	683.0			
Approach LOS	F					
Intersection Summary						
Average Delay	52.6					
Intersection Capacity Utilization	96.9%		ICU Level of Service		F	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
45: Laurel St & Bay St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	30	325	15	335	60	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	342	16	353	63	11
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	374	368	74			
Volume Left (vph)	32	0	63			
Volume Right (vph)	0	353	11			
Hadj (s)	0.05	-0.54	0.12			
Departure Headway (s)	4.5	4.0	5.6			
Degree Utilization, x	0.47	0.41	0.11			
Capacity (veh/h)	776	872	563			
Control Delay (s)	11.5	9.7	9.3			
Approach Delay (s)	11.5	9.7	9.3			
Approach LOS	B	A	A			
Intersection Summary						
Delay			10.5			
HCM Level of Service			B			
Intersection Capacity Utilization			52.6%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
48: Oak Street/Wharf Street & Cornwall Ave

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	95	40	20	75	60	10	10	55	30	10	85	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	100	42	21	79	63	11	11	58	32	11	89	32
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	163	153	100	132								
Volume Left (vph)	100	79	11	11								
Volume Right (vph)	21	11	32	32								
Hadj (s)	0.08	0.10	-0.13	-0.09								
Departure Headway (s)	4.7	4.8	4.7	4.7								
Degree Utilization, x	0.22	0.20	0.13	0.17								
Capacity (veh/h)	711	708	706	706								
Control Delay (s)	9.0	9.0	8.4	8.7								
Approach Delay (s)	9.0	9.0	8.4	8.7								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				8.8								
HCM Level of Service				A								
Intersection Capacity Utilization				26.6%	ICU Level of Service	A						
Analysis Period (min)				15								

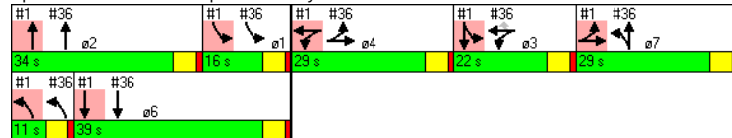
Timings
1: Squalicum Pkwy & Meridian Street

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	ø1	ø3	ø6
Lane Configurations										
Volume (vph)	320	5	10	5	620	25	630			
Turn Type	Split			Prot		Prot				
Protected Phases	7	7	4	5	2	13	3 6	1	3	6
Permitted Phases										
Detector Phases	7	7	4	5	2	13	3 6			
Minimum Initial (s)	6.0	6.0	6.0	6.0	10.0			6.0	6.0	10.0
Minimum Split (s)	29.0	29.0	29.0	11.0	23.0			11.0	11.0	23.0
Total Split (s)	29.0	29.0	29.0	11.0	34.0	38.0	61.0	16.0	22.0	39.0
Total Split (%)	22.3%	22.3%	22.3%	8.5%	26.2%	29.2%	46.9%	12%	17%	30%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0			1.0	1.0	1.0
Lead/Lag			Lead	Lead	Lead			Lag	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Max			None	None	None
Act Effct Green (s)	25.0	25.0	22.7	7.0	30.0	30.0	53.0			
Actuated g/C Ratio	0.20	0.20	0.18	0.05	0.23	0.23	0.42			
v/c Ratio	1.02	0.08	0.18	0.05	0.79	0.06	0.65			
Control Delay	105.8	20.2	22.1	59.6	54.1	11.6	7.0			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.4			
Total Delay	105.8	20.2	22.1	59.6	54.1	11.6	7.4			
LOS	F	C	C	E	D	B	A			
Approach Delay		99.7	22.1		54.2		7.5			
Approach LOS		F	C		D		A			

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 127.7	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.11	
Intersection Signal Delay: 39.7	Intersection LOS: D
Intersection Capacity Utilization 56.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Squalicum Pkwy & Meridian Street



HCM Signalized Intersection Capacity Analysis
1: Squalicum Pkwy & Meridian Street

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.88		0.92	1.00		1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00		0.99	0.95		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1561		1723	1787		1787	3565		1752	3358	
Flt Permitted	0.95	1.00		0.99	0.95		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1687	1561		1723	1787		1787	3565		1752	3358	
Volume (vph)	320	5	20	10	35	5	620	10	25	630	245	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	337	5	21	11	37	5	653	11	26	663	258	
RTOR Reduction (vph)	0	17	0	0	30	0	0	1	0	0	31	0
Lane Group Flow (vph)	337	9	0	0	29	0	5	663	0	26	890	0
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split			Prot			Prot		
Protected Phases	7	7		4	4		5	2		1 3	3 6	
Permitted Phases												
Actuated Green, G (s)	24.0	24.0		21.7			6.0	29.0		28.0	51.0	
Effective Green, g (s)	25.0	25.0		22.7			7.0	30.0		30.0	53.0	
Actuated g/C Ratio	0.20	0.20		0.18			0.05	0.23		0.23	0.42	
Clearance Time (s)	5.0	5.0		5.0			5.0	5.0				
Vehicle Extension (s)	3.0	3.0		3.0			2.0	2.0				
Lane Grp Cap (vph)	330	306		306			98	838		412	1394	
v/s Ratio Prot	c0.20	0.01		c0.02			0.00	c0.19		0.01	c0.27	
v/s Ratio Perm												
v/c Ratio	1.02	0.03		0.09			0.05	0.79		0.06	0.64	
Uniform Delay, d1	51.4	41.5		43.9			57.2	45.9		37.9	29.7	
Progression Factor	1.00	1.00		1.00			1.00	1.00		0.53	0.46	
Incremental Delay, d2	55.1	0.0		0.1			0.1	7.5		0.0	0.1	
Delay (s)	106.4	41.6		44.0			57.3	53.5		20.0	13.8	
Level of Service	F	D		D			E	D		B	B	
Approach Delay (s)		101.8		44.0			53.5				14.0	
Approach LOS		F		D			D				B	

Intersection Summary	
HCM Average Control Delay	43.5 HCM Level of Service D
HCM Volume to Capacity ratio	0.65
Actuated Cycle Length (s)	127.7 Sum of lost time (s) 16.0
Intersection Capacity Utilization	56.3% ICU Level of Service B
Analysis Period (min)	15
c Critical Lane Group	

Timings
2: Meridian Street & Broadway St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	60	270	35	380	175	110	30	145
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	1	6	5	2	7	4	3	8
Permitted Phases								
Detector Phases	1	6	5	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	25.0	11.0	25.0	11.0	25.0	11.0	25.0
Total Split (s)	11.0	28.0	11.0	28.0	16.0	30.0	11.0	25.0
Total Split (%)	13.8%	35.0%	13.8%	35.0%	20.0%	37.5%	13.8%	31.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	7.1	30.6	7.2	28.5	10.6	20.5	7.2	11.7
Actuated g/C Ratio	0.11	0.49	0.10	0.45	0.16	0.32	0.10	0.18
v/c Ratio	0.34	0.47	0.21	0.52	0.65	0.30	0.18	0.48
Control Delay	36.6	19.2	35.1	22.8	39.2	16.0	34.7	28.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.6	19.2	35.1	22.8	39.2	16.0	34.7	28.3
LOS	D	B	D	C	D	B	C	C
Approach Delay		21.6		23.8		28.1		29.4
Approach LOS		C		C		C		C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 62.8
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 24.9
Intersection Capacity Utilization 58.9%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service B

Splits and Phases: 2: Meridian Street & Broadway St

⬅️ e1	⬅️ e2	⬅️ e3	⬅️ e4
11 s	28 s	11 s	30 s
⬅️ e5	⬅️ e6	⬅️ e7	⬅️ e8
11 s	28 s	16 s	25 s

HCM Signalized Intersection Capacity Analysis
2: Meridian Street & Broadway St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.95		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1731		1728	1799		1728	1717		1745	1827	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1728	1731		1728	1799		1728	1717		1745	1827	
Volume (vph)	60	270	110	35	380	25	175	110	50	30	145	5
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	284	116	37	400	26	184	116	53	32	153	5
RTOR Reduction (vph)	0	15	0	0	2	0	0	22	0	0	2	0
Lane Group Flow (vph)	63	385	0	37	424	0	184	147	0	32	156	0
Confl. Peds. (#/hr)			5			5			5			5
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	3.1	28.6		2.0	27.5		8.0	17.6		2.0	11.6	
Effective Green, g (s)	4.1	29.6		3.0	28.5		9.0	18.6		3.0	12.6	
Actuated g/C Ratio	0.06	0.42		0.04	0.41		0.13	0.26		0.04	0.18	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	101	730		74	730		222	455		75	328	
v/s Ratio Prot	c0.04	0.22		0.02	c0.24		c0.11	0.09		0.02	c0.09	
v/s Ratio Perm												
v/c Ratio	0.62	0.53		0.50	0.58		0.83	0.32		0.43	0.48	
Uniform Delay, d1	32.3	15.1		32.9	16.2		29.8	20.7		32.8	25.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.3	0.3		1.9	0.8		20.9	0.2		1.4	0.4	
Delay (s)	40.6	15.4		34.8	17.0		50.7	20.9		34.2	26.2	
Level of Service	D	B		C	B		D	C		C	C	
Approach Delay (s)		18.8			18.4			36.4			27.6	
Approach LOS		B			B			D			C	

Intersection Summary

HCM Average Control Delay	24.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	70.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
3: Ohio St & N State St

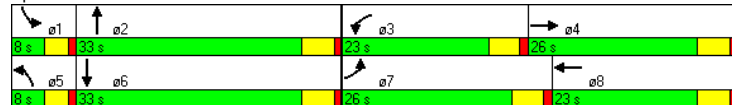
Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	340	335	240	135	35	865	40	635
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	24.0	24.0	23.0	23.0	8.0	21.0	8.0	21.0
Total Split (s)	26.0	26.0	23.0	23.0	8.0	33.0	8.0	33.0
Total Split (%)	28.9%	28.9%	25.6%	25.6%	8.9%	36.7%	8.9%	36.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	20.4	20.9	16.7	17.2	4.1	26.8	4.1	26.8
Actuated g/C Ratio	0.25	0.26	0.21	0.21	0.05	0.33	0.05	0.33
v/c Ratio	0.82	0.86	0.72	0.51	0.45	0.87	0.51	0.71
Control Delay	48.2	50.1	44.7	32.7	59.3	36.0	63.9	28.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.2	50.1	44.7	32.7	59.3	36.0	63.9	28.1
LOS	D	D	D	C	E	D	E	C
Approach Delay		49.2		39.5		36.8		29.9
Approach LOS		D		D		D		C

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 81.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 38.3
Intersection Capacity Utilization 76.5%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service D

Splits and Phases: 3: Ohio St & N State St



HCM Signalized Intersection Capacity Analysis
3: Ohio St & N State St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.96		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1786		1711	1727		1728	3416		1728	3364	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1728	1786		1711	1727		1728	3416		1728	3364	
Volume (vph)	340	335	45	240	135	50	35	865	70	40	635	135
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	358	353	47	253	142	53	37	911	74	42	668	142
RTOR Reduction (vph)	0	5	0	0	15	0	0	7	0	0	20	0
Lane Group Flow (vph)	358	395	0	253	180	0	37	978	0	42	790	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	19.3	19.9		15.6	16.2		2.2	25.8		2.2	25.8	
Effective Green, g (s)	20.3	20.9		16.6	17.2		2.2	26.8		2.2	26.8	
Actuated g/C Ratio	0.25	0.25		0.20	0.21		0.03	0.32		0.03	0.32	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	425	452		344	360		46	1110		46	1093	
v/s Ratio Prot	c0.21	c0.22		0.15	0.10		0.02	c0.29		c0.02	0.23	
v/s Ratio Perm												
v/c Ratio	0.84	0.87		0.74	0.50		0.80	0.88		0.91	0.72	
Uniform Delay, d1	29.6	29.5		30.9	28.8		39.9	26.3		40.1	24.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.6	17.2		8.4	1.5		63.5	8.4		99.4	2.4	
Delay (s)	44.1	46.8		39.3	30.3		103.5	34.8		139.4	27.0	
Level of Service	D	D		D	C		F	C		F	C	
Approach Delay (s)		45.5			35.4			37.2			32.5	
Approach LOS		D			D			D			C	

Intersection Summary

HCM Average Control Delay	37.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	82.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
4: Iowa St & James Street

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	WBL	WBT	SBL	SBT	SBR	NEL	NER
Lane Group	WBL	WBT	SBL	SBT	SBR	NEL	NER
Lane Configurations							
Volume (vph)	405	40	175	140	445	505	625
Turn Type	Split	Perm	Perm	Over	pt+ov		
Protected Phases	3	3		1	2	2	2 3
Permitted Phases			1				
Detector Phases	3	3	1	1	2	2	2 3
Minimum Initial (s)	6.0	6.0	8.0	8.0	6.0	6.0	
Minimum Split (s)	11.0	11.0	20.0	20.0	17.0	17.0	
Total Split (s)	13.0	13.0	47.0	47.0	20.0	20.0	33.0
Total Split (%)	16.3%	16.3%	58.8%	58.8%	25.0%	25.0%	41.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag			Lead	Lead	Lag	Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	
Act Effct Green (s)	9.0	9.0		43.0	16.0	16.0	29.0
Actuated g/C Ratio	0.11	0.11		0.54	0.20	0.20	0.36
v/c Ratio	1.54	1.49		3.64	0.88	1.04	1.02
Control Delay	297.4	272.0		1226.9	50.3	79.3	72.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	5.6
Total Delay	297.4	272.0		1226.9	50.3	79.3	78.1
LOS	F	F		F	D	E	E
Approach Delay		284.1		531.1		78.8	
Approach LOS		F		F		E	

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 3.64

Intersection Signal Delay: 266.3

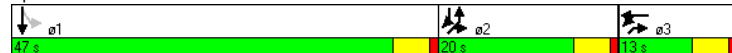
Intersection LOS: F

Intersection Capacity Utilization 64.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Iowa St & James Street



HCM Signalized Intersection Capacity Analysis
4: Iowa St & James Street

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	WBL	WBT	WBR	SBL	SBT	SBR	SBR2	NEL	NER	NER2
Movement	WBL	WBT	WBR	SBL	SBT	SBR	SBR2	NEL	NER	NER2
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95			1.00	0.88		0.97	0.91	
Frt	1.00	0.94			1.00	0.85		0.97	0.85	
Flt Protected	0.95	0.98			0.97	1.00		0.96	1.00	
Satd. Flow (prot)	1641	1584			1769	2720		3283	1407	
Flt Permitted	0.95	0.98			0.09	1.00		0.96	1.00	
Satd. Flow (perm)	1641	1584			169	2720		3283	1407	
Volume (vph)	405	40	125	175	140	445	10	505	625	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	426	42	132	184	147	468	11	532	658	11
RTOR Reduction (vph)	0	33	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	285	282	0	0	331	477	0	682	519	0
Heavy Vehicles (%)	1%	1%		1%	1%	1%		1%	1%	
Turn Type	Split			Perm		Over			pt+ov	
Protected Phases	3	3			1	2		2	2 3	
Permitted Phases				1						
Actuated Green, G (s)	8.0	8.0			42.0	15.0		15.0	28.0	
Effective Green, g (s)	9.0	9.0			43.0	16.0		16.0	29.0	
Actuated g/C Ratio	0.11	0.11			0.54	0.20		0.20	0.36	
Clearance Time (s)	5.0	5.0			5.0	5.0		5.0		
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0		
Lane Grp Cap (vph)	185	178			91	544		657	510	
v/s Ratio Prot	0.17	c0.18				0.18		0.21	c0.37	
v/s Ratio Perm					c1.96					
v/c Ratio	1.54	1.59			3.64	0.88		1.04	1.02	
Uniform Delay, d1	35.5	35.5			18.5	31.0		32.0	25.5	
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	268.4	288.3			1213.5	14.8		45.3	44.4	
Delay (s)	303.9	323.8			1232.0	45.9		77.3	69.9	
Level of Service	F	F			F	D		E	E	
Approach Delay (s)		314.4			530.6			74.1		
Approach LOS		F			F			E		

Intersection Summary

HCM Average Control Delay	270.9	HCM Level of Service	F
HCM Volume to Capacity ratio	2.78		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Iowa St & King St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	35	815	265	470	35	150	510	95	125
Turn Type	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+ov	pm+pt		
Protected Phases	5	2	1	6	3	8	1	7	4
Permitted Phases	2		6		8		8	4	
Detector Phases	5	2	1	6	3	8	1	7	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	28.0	11.0	26.0	11.0	28.0	11.0	28.0	28.0
Total Split (s)	11.0	28.0	13.0	30.0	11.0	28.0	13.0	11.0	28.0
Total Split (%)	13.8%	35.0%	16.3%	37.5%	13.8%	35.0%	16.3%	13.8%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	Min	None	Min	None	None	None	None	None
Act Effct Green (s)	28.5	21.5	35.6	34.3	17.6	12.4	22.8	19.0	16.5
Actuated g/C Ratio	0.42	0.35	0.58	0.56	0.26	0.20	0.37	0.30	0.26
v/c Ratio	0.10	0.73	0.70	0.30	0.10	0.45	0.79	0.24	0.36
Control Delay	10.4	23.4	26.0	12.9	16.7	28.8	22.3	16.9	21.6
Queue Delay	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.4	23.7	26.0	12.9	16.7	28.8	22.3	16.9	21.6
LOS	B	C	C	B	B	C	C	B	C
Approach Delay		23.2		17.2		23.4			19.9
Approach LOS		C		B		C			B

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 61.2
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 21.1
Intersection Capacity Utilization 70.0%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service C

Splits and Phases: 5: Iowa St & King St

ø1	ø2	ø3	ø4
13 s	28 s	11 s	23 s
ø5	ø6	ø7	ø8
11 s	30 s	11 s	23 s

HCM Signalized Intersection Capacity Analysis
5: Iowa St & King St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1728	3443		1711	3355		1728	1818	1546	1745	1776	
Flt Permitted	0.44	1.00		0.16	1.00		0.65	1.00	1.00	0.49	1.00	
Satd. Flow (perm)	797	3443		285	3355		1183	1818	1546	894	1776	
Volume (vph)	35	815	20	265	470	70	35	150	510	95	125	35
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	858	21	279	495	74	37	158	537	100	132	37
RTOR Reduction (vph)	0	2	0	0	12	0	0	0	110	0	14	0
Lane Group Flow (vph)	37	877	0	279	557	0	37	158	427	100	155	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	0%	0%	0%
Turn Type	pm+pt			pm+pt			pm+pt		pm+ov	pm+pt		
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	26.3	24.3		38.4	31.4		12.9	10.9	20.0	17.3	13.1	
Effective Green, g (s)	28.3	25.3		39.4	32.4		14.9	11.9	22.0	19.3	14.1	
Actuated g/C Ratio	0.41	0.37		0.58	0.47		0.22	0.17	0.32	0.28	0.21	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.6		3.0	3.0		3.6	3.6	3.0	3.0	3.0	
Lane Grp Cap (vph)	370	1272		374	1587		281	316	587	316	366	
v/s Ratio Prot	0.00	0.25		c0.11	0.17		0.01	0.09	c0.11	c0.02	0.09	
v/s Ratio Perm	0.04			c0.32			0.02		0.17	0.07		
v/c Ratio	0.10	0.69		0.75	0.35		0.13	0.50	0.73	0.32	0.42	
Uniform Delay, d1	12.1	18.3		10.5	11.4		21.4	25.6	20.6	18.8	23.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.7		7.9	0.1		0.3	1.5	4.5	0.6	0.8	
Delay (s)	12.2	19.9		18.4	11.5		21.7	27.1	25.1	19.4	24.4	
Level of Service	B	B		B	B		C	C	C	B	C	
Approach Delay (s)		19.6			13.8			25.3			22.6	
Approach LOS		B			B			C			C	

Intersection Summary

HCM Average Control Delay	19.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	68.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Iowa St & Moore St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	35	830	205	600	135	55	115	95
Turn Type	Prot		Prot		Perm		Perm	
Protected Phases	1	6	5	2		4		8
Permitted Phases					4		8	
Detector Phases	1	6	5	2	4	4	8	8
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	27.0	12.0	27.0	21.0	21.0	21.0	21.0
Total Split (s)	12.0	37.0	16.0	41.0	27.0	27.0	27.0	27.0
Total Split (%)	15.0%	46.3%	20.0%	51.3%	33.8%	33.8%	33.8%	33.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	8.0	33.0	12.0	41.8		23.0		23.0
Actuated g/C Ratio	0.09	0.41	0.15	0.52		0.29		0.29
v/c Ratio	0.23	0.97	0.84	0.38		1.07		0.91
Control Delay	37.3	38.9	62.4	13.0		89.8		66.4
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	37.3	38.9	62.4	13.0		89.8		66.4
LOS	D	D	E	B		F		E
Approach Delay		38.9		25.0		89.8		66.4
Approach LOS		D		C		F		E

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.07
Intersection Signal Delay: 44.8
Intersection Capacity Utilization 89.8%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service E

Splits and Phases: 6: Iowa St & Moore St



HCM Signalized Intersection Capacity Analysis
6: Iowa St & Moore St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.94		1.00	0.99			0.92			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1728	3253		1711	3393			1605			1671	
Flt Permitted	0.95	1.00		0.95	1.00			0.80			0.53	
Satd. Flow (perm)	1728	3253		1711	3393			1304			899	
Volume (vph)	35	830	530	205	600	35	135	55	255	115	95	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	874	558	216	632	37	142	58	268	121	100	21
RTOR Reduction (vph)	0	125	0	0	5	0	0	61	0	0	4	0
Lane Group Flow (vph)	37	1307	0	216	664	0	0	407	0	0	238	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	4%	4%	4%	6%	6%	6%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	4.2	34.0		11.0	40.8			22.0			22.0	
Effective Green, g (s)	5.2	35.0		12.0	41.8			23.0			23.0	
Actuated g/C Ratio	0.06	0.43		0.15	0.51			0.28			0.28	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.5			3.5	
Lane Grp Cap (vph)	110	1388		250	1730			366			252	
v/s Ratio Prot	0.02	c0.40		c0.13	0.20							
v/s Ratio Perm								c0.31			0.26	
v/c Ratio	0.34	0.94		0.86	0.38			1.11			0.94	
Uniform Delay, d1	36.7	22.5		34.2	12.3			29.5			28.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.8	12.7		25.2	0.1			80.7			41.4	
Delay (s)	38.6	35.3		59.4	12.4			110.2			70.3	
Level of Service	D	D		E	B			F			E	
Approach Delay (s)		35.3			23.9			110.2			70.3	
Approach LOS		D			C			F			E	

Intersection Summary

HCM Average Control Delay	46.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	82.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Elm Street & Broadway St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	5	230	45	400	185	175	45	195
Turn Type	Perm		Perm		Prot		Prot	
Protected Phases		2		2	7	4	3	8
Permitted Phases	2		2					
Detector Phases	2	2	2	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	26.0	26.0	26.0	26.0	8.0	26.0	8.0	26.0
Total Split (s)	38.0	38.0	38.0	38.0	16.0	32.0	10.0	26.0
Total Split (%)	47.5%	47.5%	47.5%	47.5%	20.0%	40.0%	12.5%	32.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	22.5	22.5	22.5	22.5	11.5	20.3	7.4	14.2
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.20	0.36	0.13	0.25
v/c Ratio	0.03	0.43	0.14	0.72	0.56	0.40	0.21	0.48
Control Delay	12.8	15.0	13.9	21.7	34.6	17.6	34.0	26.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.8	15.0	13.9	21.7	34.6	17.6	34.0	26.0
LOS	B	B	B	C	C	B	C	C
Approach Delay		15.0		21.0		25.0		27.4
Approach LOS		B		C		C		C

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 54.6

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 22.1

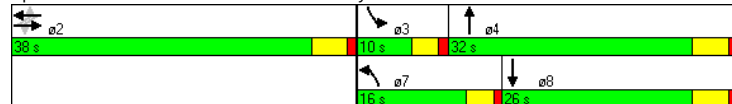
Intersection LOS: C

Intersection Capacity Utilization 66.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 7: Elm Street & Broadway St



HCM Signalized Intersection Capacity Analysis
7: Elm Street & Broadway St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00		
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Frt	1.00	0.97		1.00	0.98		1.00	0.96		1.00	0.99		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1692	1726		1707	1751		1728	1732		1728	1802		
Flt Permitted	0.26	1.00		0.51	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (perm)	469	1726		910	1751		1728	1732		1728	1802		
Volume (vph)	5	230	55	45	400	80	185	175	65	45	195	10	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	242	58	47	421	84	195	184	68	47	205	11	
RTOR Reduction (vph)	0	12	0	0	10	0	0	17	0	0	2	0	
Lane Group Flow (vph)	5	288	0	47	495	0	195	235	0	47	214	0	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5	
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	1%	1%	1%	
Turn Type	Perm			Perm			Prot			Prot			
Protected Phases		2			2		7	4		3	8		
Permitted Phases	2			2									
Actuated Green, G (s)	17.0	17.0		17.0	17.0		7.7	15.2		2.8	10.3		
Effective Green, g (s)	18.0	18.0		18.0	18.0		7.7	16.2		2.8	11.3		
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.16	0.33		0.06	0.23		
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	172	634		334	643		272	573		99	416		
v/s Ratio Prot		0.17			c0.28		c0.11	0.14		0.03	c0.12		
v/s Ratio Perm	0.01			0.05									
v/c Ratio	0.03	0.45		0.14	0.77		0.72	0.41		0.47	0.51		
Uniform Delay, d1	9.9	11.8		10.3	13.7		19.6	12.7		22.4	16.5		
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	0.1	0.5		0.2	5.5		8.7	0.5		3.6	1.1		
Delay (s)	10.0	12.3		10.5	19.2		28.3	13.2		25.9	17.5		
Level of Service	A	B		B	B		C	B		C	B		
Approach Delay (s)		12.3			18.5			19.8			19.0		
Approach LOS		B			B			B			B		

Intersection Summary

HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	49.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Flora St & Cornwall Ave

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	155	375	30	145	175	20	360	145	245
Turn Type	Perm		Perm		Perm	Prot		Prot	
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8				
Detector Phases	4	4	8	8	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	11.0	27.0	11.0	27.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	11.0	32.0	11.0	32.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	15.7%	45.7%	15.7%	45.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		17.6		17.6	17.6	7.2	22.4	7.3	32.0
Actuated g/C Ratio		0.29		0.29	0.29	0.10	0.37	0.12	0.53
v/c Ratio		0.75		0.40	0.33	0.12	0.86	0.74	0.36
Control Delay		26.4		20.9	5.1	32.6	31.9	55.7	10.8
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		26.4		20.9	5.1	32.6	31.9	55.7	10.8
LOS		C		C	A	C	C	E	B
Approach Delay		26.4		13.0			31.9		24.9
Approach LOS		C		B			C		C

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 59.9
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 25.2
Intersection Capacity Utilization 85.0%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service E

Splits and Phases: 8: Flora St & Cornwall Ave

↖ e1	↖ e2	↖ e4
11 s	32 s	27 s
↖ e5	↖ e6	↖ e8
11 s	32 s	27 s

HCM Signalized Intersection Capacity Analysis
8: Flora St & Cornwall Ave

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 				 		 			 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.93	1.00	0.99		1.00	0.98	
Flpb, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.95		1.00	0.97	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3306			1797	1438	1694	1673		1694	1697	
Flt Permitted		0.78			0.83	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		2618			1507	1438	1694	1673		1694	1697	
Volume (vph)	155	375	25	30	145	175	20	360	175	145	245	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	163	395	26	32	153	184	21	379	184	153	258	74
RTOR Reduction (vph)	0	5	0	0	0	133	0	24	0	0	12	0
Lane Group Flow (vph)	0	579	0	0	185	51	21	539	0	153	320	0
Confl. Peds. (#/hr)	35		35	35		35			35			35
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	3%	3%	3%
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		16.6			16.6	16.6	1.0	25.7		6.3	31.0	
Effective Green, g (s)		17.6			17.6	17.6	2.0	26.7		7.3	32.0	
Actuated g/C Ratio		0.28			0.28	0.28	0.03	0.42		0.11	0.50	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		724			417	398	53	702		194	854	
v/s Ratio Prot							0.01	c0.32		c0.09	0.19	
v/s Ratio Perm		c0.22			0.12	0.04						
v/c Ratio		0.80			0.44	0.13	0.40	0.77		0.79	0.37	
Uniform Delay, d1		21.4			19.0	17.2	30.2	15.8		27.4	9.7	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		5.8			0.3	0.1	1.8	4.5		17.5	0.1	
Delay (s)		27.1			19.2	17.3	32.0	20.3		44.9	9.8	
Level of Service		C			B	B	C	C		D	A	
Approach Delay (s)		27.1			18.3			20.7			20.9	
Approach LOS		C			B			C			C	

Intersection Summary

HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	63.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
9: York St & N State St

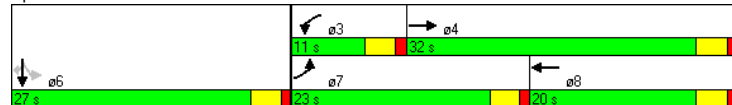
Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	SBT	SBR
Lane Configurations	↰	↰↱	↰	↰↱	↰↱	↰
Volume (vph)	360	300	65	220	660	145
Turn Type	Prot		Prot		Perm	
Protected Phases	7	4	3	8	6	
Permitted Phases						6
Detector Phases	7	4	3	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	21.0	21.0
Total Split (s)	23.0	32.0	11.0	20.0	27.0	27.0
Total Split (%)	32.9%	45.7%	15.7%	28.6%	38.6%	38.6%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag		
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	16.5	24.7	6.6	9.9	20.4	20.4
Actuated g/C Ratio	0.28	0.42	0.10	0.17	0.34	0.34
v/c Ratio	0.80	0.30	0.39	0.50	0.82	0.24
Control Delay	36.4	11.7	35.2	24.0	25.7	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.4	11.7	35.2	24.0	25.7	4.4
LOS	D	B	D	C	C	A
Approach Delay		23.4		26.1	22.7	
Approach LOS		C		C	C	

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 59.3
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 23.5
Intersection Capacity Utilization 62.8%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service B

Splits and Phases: 9: York St & N State St



HCM Signalized Intersection Capacity Analysis
9: York St & N State St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	↰	↰↱	↱	↰	↰↱	↱	↰	↰↱	↱	↰	↰↱	↱
Lane Configurations	↰	↰↱	↱	↰	↰↱	↱	↰	↰↱	↱	↰	↰↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95						0.95	1.00
Frt	1.00	0.96		1.00	0.97						1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (prot)	1694	3261		1646	3200						3376	1531
Flt Permitted	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (perm)	1694	3261		1646	3200						3376	1531
Volume (vph)	360	300	100	65	220	50	0	0	0	240	660	145
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	379	316	105	68	232	53	0	0	0	253	695	153
RTOR Reduction (vph)	0	46	0	0	29	0	0	0	0	0	0	102
Lane Group Flow (vph)	379	375	0	68	256	0	0	0	0	0	948	51
Heavy Vehicles (%)	3%	3%	3%	6%	6%	6%	0%	0%	0%	2%	2%	2%
Turn Type	Prot			Prot						Perm		Perm
Protected Phases	7	4		3	8						6	
Permitted Phases										6		6
Actuated Green, G (s)	16.5	24.7		3.8	12.0						20.4	20.4
Effective Green, g (s)	16.5	24.7		3.8	12.0						20.4	20.4
Actuated g/C Ratio	0.27	0.41		0.06	0.20						0.33	0.33
Clearance Time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)	459	1323		103	631						1131	513
v/s Ratio Prot	c0.22	0.12		0.04	c0.08							
v/s Ratio Perm											0.28	0.03
v/c Ratio	0.83	0.28		0.66	0.41						0.84	0.10
Uniform Delay, d1	20.8	12.2		27.9	21.3						18.7	13.9
Progression Factor	1.00	1.00		1.00	1.00						1.00	1.00
Incremental Delay, d2	11.5	0.1		14.7	0.4						5.6	0.1
Delay (s)	32.4	12.3		42.7	21.8						24.3	14.0
Level of Service	C	B		D	C						C	B
Approach Delay (s)		21.8			25.8			0.0			22.9	
Approach LOS		C			C			A			C	

Intersection Summary

HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	60.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
10: York St & N Forest St

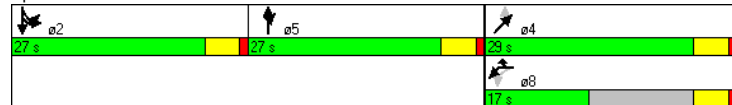
Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	←	↖	↑	↗	↘	↓	↙	↘
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	NEL	NET
Lane Configurations								
Volume (vph)	0	80	160	320	135	465	70	550
Turn Type	Prot	Split	Split	Split	custom	Prot		
Protected Phases	8!	8!	5	5	2	2		4!
Permitted Phases							4	
Detector Phases	8	8	5	5	2	2	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	9.0	27.0	27.0	27.0	27.0	29.0	29.0
Total Split (s)	17.0	17.0	27.0	27.0	27.0	27.0	29.0	29.0
Total Split (%)	20.5%	20.5%	32.5%	32.5%	32.5%	32.5%	34.9%	34.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	Min	Min	Min	Min	None	None
Act Effct Green (s)	19.6	19.6	17.3	17.3	16.0	16.0	19.6	19.6
Actuated g/C Ratio	0.30	0.30	0.26	0.26	0.24	0.24	0.30	0.30
v/c Ratio	0.19	0.35	0.73	0.68	0.38	0.59	0.15	0.71
Control Delay	20.8	15.4	35.0	31.2	26.2	26.6	20.4	26.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.8	15.4	35.0	31.2	26.2	26.6	20.4	26.5
LOS	C	B	C	C	C	C	C	C
Approach Delay	17.3		33.2			26.5		25.9
Approach LOS	B		C			C		C

Intersection Summary

Cycle Length: 83
Actuated Cycle Length: 65.8
Natural Cycle: 85
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 26.9
Intersection Capacity Utilization 67.2%
Analysis Period (min) 15
! Phase conflict between lane groups.

Splits and Phases: 10: York St & N Forest St



HCM Signalized Intersection Capacity Analysis
10: York St & N Forest St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	WBL2	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL2	SBL	SBT	NEL	NET
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		0.95	0.95			1.00	0.95	1.00	0.95
Frt		1.00	0.85		0.93	0.85			1.00	1.00	1.00	0.97
Flt Protected		0.95	1.00		1.00	1.00			0.95	1.00	0.95	1.00
Satd. Flow (prot)		1728	1546		1610	1468			1711	3421	1678	3271
Flt Permitted		0.95	1.00		1.00	1.00			0.95	1.00	0.95	1.00
Satd. Flow (perm)		1728	1546		1610	1468			1711	3421	1678	3271
Volume (vph)	95	0	80	90	160	320	70	15	135	465	70	550
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	0	84	95	168	337	74	16	142	489	74	579
RTOR Reduction (vph)	0	0	49	0	0	16	0	0	0	0	0	1
Lane Group Flow (vph)	0	100	130	0	307	256	0	0	158	489	74	694
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%	4%	4%
Turn Type	Perm		Prot		Split			Split	Split		custom	Prot
Protected Phases		8!	8!		5	5		2	2	2		4!
Permitted Phases	8											4
Actuated Green, G (s)		18.5	18.5		16.2	16.2			14.9	14.9	18.5	18.5
Effective Green, g (s)		19.5	19.5		17.2	17.2			15.9	15.9	19.5	19.5
Actuated g/C Ratio		0.30	0.30		0.27	0.27			0.25	0.25	0.30	0.30
Clearance Time (s)		5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		522	467		429	391			421	842	507	987
v/s Ratio Prot			0.08		c0.19	0.17			0.09	c0.14		c0.21
v/s Ratio Perm		0.06									0.04	
v/c Ratio		0.19	0.28		0.72	0.65			0.38	0.58	0.15	0.70
Uniform Delay, d1		16.7	17.2		21.5	21.1			20.2	21.4	16.5	20.0
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2	0.3		5.6	3.9			0.6	1.0	0.1	2.3
Delay (s)		16.9	17.5		27.1	25.0			20.8	22.4	16.6	22.3
Level of Service		B	B		C	C			C	C	B	C
Approach Delay (s)		17.3			26.1				22.0			21.7
Approach LOS		B			C				C			C

Intersection Summary

HCM Average Control Delay	22.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	64.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		
! Phase conflict between lane groups.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
10: York St & N Forest St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

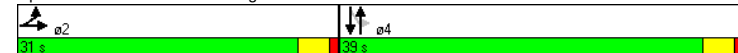
	↗	↘
Movement	NER	NER2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Volume (vph)	100	10
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	105	11
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	0	0
Heavy Vehicles (%)	4%	4%
Turn Type		
Protected Phases		
Permitted Phases		
Actuated Green, G (s)		
Effective Green, g (s)		
Actuated g/C Ratio		
Clearance Time (s)		
Vehicle Extension (s)		
Lane Grp Cap (vph)		
v/s Ratio Prot		
v/s Ratio Perm		
v/c Ratio		
Uniform Delay, d1		
Progression Factor		
Incremental Delay, d2		
Delay (s)		
Level of Service		
Approach Delay (s)		
Approach LOS		
Intersection Summary		

Timings
11: E Magnolia St & Cornwall Ave

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	→	↑	↙	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↔↔	↔		↔↔
Volume (vph)	525	480	95	235
Turn Type	Perm			
Protected Phases	2	4		4
Permitted Phases			4	
Detector Phases	2	4	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	23.0	23.0	23.0
Total Split (s)	31.0	39.0	39.0	39.0
Total Split (%)	44.3%	55.7%	55.7%	55.7%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	27.0	35.0		35.0
Actuated g/C Ratio	0.39	0.50		0.50
v/c Ratio	0.62	0.64		0.64
Control Delay	19.0	14.6		19.7
Queue Delay	0.0	0.0		0.0
Total Delay	19.0	14.6		19.7
LOS	B	B		B
Approach Delay	19.0	14.6		19.7
Approach LOS	B	B		B
Intersection Summary				
Cycle Length: 70				
Actuated Cycle Length: 70				
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green				
Natural Cycle: 50				
Control Type: Pretimed				
Maximum v/c Ratio: 0.64				
Intersection Signal Delay: 17.7			Intersection LOS: B	
Intersection Capacity Utilization 79.7%			ICU Level of Service D	
Analysis Period (min) 15				

Splits and Phases: 11: E Magnolia St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
11: E Magnolia St & Cornwall Ave

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕						↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		0.95						1.00			1.00	
Frpb, ped/bikes		0.97						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			0.99	
Frt		0.97						0.98			1.00	
Flt Protected		0.99						1.00			0.99	
Satd. Flow (prot)		3212						1768			1744	
Flt Permitted		0.99						1.00			0.61	
Satd. Flow (perm)		3212						1768			1081	
Volume (vph)	90	525	130	0	0	0	0	480	65	95	235	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	553	137	0	0	0	0	505	68	100	247	0
RTOR Reduction (vph)	0	26	0	0	0	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	759	0	0	0	0	0	566	0	0	347	0
Confl. Peds. (#/hr)	80		80						80	80		
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split								Perm			
Protected Phases	2	2						4			4	
Permitted Phases										4		
Actuated Green, G (s)		27.0						35.0			35.0	
Effective Green, g (s)		27.0						35.0			35.0	
Actuated g/C Ratio		0.39						0.50			0.50	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		1239						884			541	
v/s Ratio Prot		c0.24						0.32				
v/s Ratio Perm											c0.32	
v/c Ratio		0.61						0.64			0.64	
Uniform Delay, d1		17.3						12.9			12.9	
Progression Factor		1.00						0.87			1.00	
Incremental Delay, d2		2.3						3.1			5.7	
Delay (s)		19.6						14.3			18.6	
Level of Service		B						B			B	
Approach Delay (s)		19.6			0.0			14.3			18.6	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM Average Control Delay		17.6										
HCM Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		70.0						8.0				
Intersection Capacity Utilization		79.7%										
Analysis Period (min)		15										

c Critical Lane Group

Timings
12: W Holly St & Broadway St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

							
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations							
Volume (vph)	80	400	5	485	5	165	0
Turn Type	Perm		Perm			Perm	
Protected Phases		2		2	4		4
Permitted Phases	2		2			4	
Detector Phases	2	2	2	2	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	54.0	54.0	54.0	54.0	26.0	26.0	26.0
Total Split (%)	67.5%	67.5%	67.5%	67.5%	32.5%	32.5%	32.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None
Act Effct Green (s)		31.4		31.4	13.3	13.3	13.3
Actuated g/C Ratio		0.66		0.66	0.27	0.27	0.27
v/c Ratio		0.51		0.63	0.02	0.48	0.12
Control Delay		9.2		10.2	15.0	24.1	0.4
Queue Delay		0.0		0.0	0.0	0.0	0.0
Total Delay		9.2		10.2	15.0	24.1	0.4
LOS		A		B	B	C	A
Approach Delay		9.2		10.2	15.0		16.7
Approach LOS		A		B	B		B
Intersection Summary							
Cycle Length: 80							
Actuated Cycle Length: 47.4							
Natural Cycle: 60							
Control Type: Actuated-Uncoordinated							
Maximum v/c Ratio: 0.63							
Intersection Signal Delay: 11.0				Intersection LOS: B			
Intersection Capacity Utilization 89.4%				ICU Level of Service E			
Analysis Period (min) 15							

Splits and Phases: 12: W Holly St & Broadway St



HCM Signalized Intersection Capacity Analysis
12: W Holly St & Broadway St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00			0.99		1.00	0.97	
Flpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	
Frt		1.00			0.96			0.93		1.00	0.85	
Flt Protected		0.99			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1803			1722			1699		1721	1505	
Flt Permitted		0.82			1.00			1.00		0.75	1.00	
Satd. Flow (perm)		1494			1717			1699		1361	1505	
Volume (vph)	80	400	0	5	485	200	0	5	5	165	0	75
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	421	0	5	511	211	0	5	5	174	0	79
RTOR Reduction (vph)	0	0	0	0	19	0	0	4	0	0	62	0
Lane Group Flow (vph)	0	505	0	0	708	0	0	6	0	174	17	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		27.2			27.2			9.3		9.3	9.3	
Effective Green, g (s)		28.2			28.2			10.3		10.3	10.3	
Actuated g/C Ratio		0.61			0.61			0.22		0.22	0.22	
Clearance Time (s)		5.0			5.0			5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		906			1041			376		301	333	
v/s Ratio Prot								0.00			0.01	
v/s Ratio Perm		0.34			c0.41					c0.13		
v/c Ratio		0.56			0.68			0.02		0.58	0.05	
Uniform Delay, d1		5.4			6.1			14.1		16.2	14.3	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.7			1.8			0.0		2.7	0.1	
Delay (s)		6.2			7.9			14.2		18.8	14.3	
Level of Service		A			A			B		B	B	
Approach Delay (s)		6.2			7.9			14.2			17.4	
Approach LOS		A			A			B			B	

Intersection Summary

HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	46.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
13: W Holly St & F St

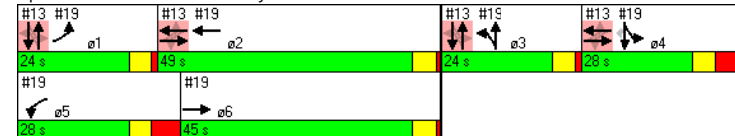
Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø1	ø2	ø3	ø4
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔				
Volume (vph)	45	385	55	555	90	365	60	205				
Turn Type	Perm		Perm		Perm		Perm					
Protected Phases		2 4		2 4		1 3		1 3	1	2	3	4
Permitted Phases	2 4		2 4		1 3		1 3					
Detector Phases	2 4	2 4	2 4	2 4	1 3	1 3	1 3	1 3				
Minimum Initial (s)									6.0	6.0	6.0	6.0
Minimum Split (s)									24.0	24.0	24.0	28.0
Total Split (s)	77.0	77.0	77.0	77.0	48.0	48.0	48.0	48.0	24.0	49.0	24.0	28.0
Total Split (%)	61.6%	61.6%	61.6%	61.6%	38.4%	38.4%	38.4%	38.4%	19%	39%	19%	22%
Yellow Time (s)									4.0	4.0	4.0	4.0
All-Red Time (s)									1.0	1.0	1.0	5.0
Lead/Lag									Lead	Lag	Lead	Lag
Lead-Lag Optimize?												
Recall Mode									Min	None	None	None
Act Effct Green (s)	68.9	68.9	68.9	68.9		40.0		40.0				
Actuated g/C Ratio	0.55	0.55	0.55	0.55		0.32		0.32				
v/c Ratio	0.19	0.56	0.18	0.67		1.10		0.45				
Control Delay	9.2	11.2	8.5	13.9		91.7		19.1				
Queue Delay	0.0	0.1	0.0	0.0		0.0		0.1				
Total Delay	9.2	11.3	8.5	13.9		91.7		19.1				
LOS	A	B	A	B		F		B				
Approach Delay		11.1		13.4		91.7		19.1				
Approach LOS		B		B		F		B				

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 124.9
Natural Cycle: 135
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.10
Intersection Signal Delay: 32.1
Intersection Capacity Utilization 86.5%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service E

Splits and Phases: 13: W Holly St & F St



Timings
13: W Holly St & F St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	ø5	ø6
Lane Configurations		
Volume (vph)		
Turn Type		
Protected Phases	5	6
Permitted Phases		
Detector Phases		
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	28.0	24.0
Total Split (s)	28.0	45.0
Total Split (%)	22%	36%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	5.0	1.0
Lead/Lag	Lead	Lag
Lead-Lag Optimize?		
Recall Mode	None	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

HCM Signalized Intersection Capacity Analysis
13: W Holly St & F St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			0.95	
Frt	1.00	0.96		1.00	0.98			0.99			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1728	1748		1711	1770			1789			3308	
Flt Permitted	0.26	1.00		0.34	1.00			0.76			0.66	
Satd. Flow (perm)	474	1748		605	1770			1380			2190	
Volume (vph)	45	385	135	55	555	70	90	365	25	60	205	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	405	142	58	584	74	95	384	26	63	216	53
RTOR Reduction (vph)	0	10	0	0	3	0	0	1	0	0	13	0
Lane Group Flow (vph)	47	537	0	58	655	0	0	504	0	0	319	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2 4			2 4			1 3			1 3	
Permitted Phases	2 4			2 4			1 3			1 3		
Actuated Green, G (s)	70.1	70.1		70.1	70.1			38.0			38.0	
Effective Green, g (s)	76.1	76.1		76.1	76.1			40.0			40.0	
Actuated g/C Ratio	0.58	0.58		0.58	0.58			0.30			0.30	
Clearance Time (s)												
Vehicle Extension (s)												
Lane Grp Cap (vph)	273	1007		349	1020			418			663	
v/s Ratio Prot		0.31			c0.37							
v/s Ratio Perm	0.10			0.10				c0.37			0.15	
v/c Ratio	0.17	0.53		0.17	0.64			1.20			0.48	
Uniform Delay, d1	13.2	17.1		13.1	18.8			46.1			37.6	
Progression Factor	1.00	1.00		1.00	1.00			0.89			1.00	
Incremental Delay, d2	0.3	0.5		0.2	1.4			107.5			0.6	
Delay (s)	13.5	17.7		13.4	20.2			148.4			38.1	
Level of Service	B	B		B	C			F			D	
Approach Delay (s)		17.4			19.7			148.4			38.1	
Approach LOS		B			B			F			D	
Intersection Summary												
HCM Average Control Delay		52.2			HCM Level of Service			D				
HCM Volume to Capacity ratio		0.84										
Actuated Cycle Length (s)		132.1			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		86.5%			ICU Level of Service			E				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 14: W Holly St & C St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control	Free			Free			Stop			Stop			
Grade	0%			0%			0%			0%			
Volume (veh/h)	15	430	35	40	680	50	20	25	65	50	15	5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	16	453	37	42	716	53	21	26	68	53	16	5	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type							None			None			
Median storage (veh)													
Upstream signal (ft)	753												
pX, platoon unblocked				0.86			0.86			0.86	0.86	0.86	0.86
vC, conflicting volume	768				489			1342	1355	471	1411	1347	742
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	768				408			1397	1412	386	1476	1403	742
tC, single (s)	4.1				4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)													
tF (s)	2.2				2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98				96			76	77	88	16	86	99
cM capacity (veh/h)	850				997			87	113	574	63	114	419
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	505	811	116	74									
Volume Left	16	42	21	53									
Volume Right	37	53	68	5									
cSH	850	997	195	74									
Volume to Capacity	0.02	0.04	0.59	0.99									
Queue Length 95th (ft)	1	3	82	130									
Control Delay (s)	0.5	1.1	47.4	197.7									
Lane LOS	A	A	E	F									
Approach Delay (s)	0.5	1.1	47.4	197.7									
Approach LOS				E	F								
Intersection Summary													
Average Delay				14.1									
Intersection Capacity Utilization	73.5%			ICU Level of Service			D						
Analysis Period (min)				15									

Timings 15: W Holly St & Cornwall Ave

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

				
Lane Group	WBT	NBL	NBT	SBT
Lane Configurations				
Volume (vph)	945	65	225	250
Turn Type	Perm			
Protected Phases	2		4	4
Permitted Phases	4			
Detector Phases	2	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0
Minimum Split (s)	21.0	23.0	23.0	23.0
Total Split (s)	40.0	30.0	30.0	30.0
Total Split (%)	57.1%	42.9%	42.9%	42.9%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	36.0		26.0	26.0
Actuated g/C Ratio	0.51		0.37	0.37
v/c Ratio	0.74		0.58	0.58
Control Delay	16.2		17.2	15.6
Queue Delay	0.0		0.0	0.0
Total Delay	16.2		17.2	15.6
LOS	B		B	B
Approach Delay	16.2		17.2	15.6
Approach LOS	B		B	B
Intersection Summary				
Cycle Length: 70				
Actuated Cycle Length: 70				
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green				
Natural Cycle: 55				
Control Type: Pretimed				
Maximum v/c Ratio: 0.74				
Intersection Signal Delay: 16.2			Intersection LOS: B	
Intersection Capacity Utilization 81.5%			ICU Level of Service D	
Analysis Period (min) 15				

Splits and Phases: 15: W Holly St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
15: W Holly St & Cornwall Ave

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.97			1.00			0.97	
Flpb, ped/bikes					1.00			0.99			1.00	
Frt					0.98			1.00			0.96	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					3264			1782			1678	
Flt Permitted					1.00			0.78			1.00	
Satd. Flow (perm)					3264			1410			1678	
Volume (vph)	0	0	0	60	945	195	65	225	0	0	250	105
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	63	995	205	68	237	0	0	263	111
RTOR Reduction (vph)	0	0	0	0	23	0	0	0	0	0	22	0
Lane Group Flow (vph)	0	0	0	0	1240	0	0	305	0	0	352	0
Confl. Peds. (#/hr)				80		80	80					80
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type				Split		Perm						
Protected Phases				2	2			4			4	
Permitted Phases							4					
Actuated Green, G (s)					36.0			26.0			26.0	
Effective Green, g (s)					36.0			26.0			26.0	
Actuated g/C Ratio					0.51			0.37			0.37	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					1679			524			623	
v/s Ratio Prot					c0.38						0.21	
v/s Ratio Perm								c0.22				
v/c Ratio					0.74			0.58			0.57	
Uniform Delay, d1					13.3			17.6			17.5	
Progression Factor					1.00			0.82			0.77	
Incremental Delay, d2					3.0			2.0			2.9	
Delay (s)					16.3			16.6			16.4	
Level of Service					B			B			B	
Approach Delay (s)		0.0			16.3			16.6			16.4	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
16: Lakeway Dr & Jersey St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	WBL	WBR	NBL	NBT	SBL	SBT
Lane Configurations						
Volume (vph)	30	780	410	285	575	340
Turn Type		Prot	Split		Split	
Protected Phases	8	8	2	2	6	6
Permitted Phases						
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	34.0	34.0	35.0	35.0	31.0	31.0
Total Split (%)	34.0%	34.0%	35.0%	35.0%	31.0%	31.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
Act Effct Green (s)	25.9	25.9	27.5	27.5	23.8	23.8
Actuated g/C Ratio	0.29	0.29	0.31	0.31	0.26	0.26
v/c Ratio	0.87	0.82	0.87	0.95dr	0.80	0.84
Control Delay	52.9	39.3	51.2	22.3	50.5	43.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.9	39.3	51.2	22.3	50.5	43.0
LOS	D	D	D	C	D	D
Approach Delay	44.4			30.1		45.3
Approach LOS	D			C		D

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 90	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 38.5	Intersection LOS: D
Intersection Capacity Utilization 82.2%	ICU Level of Service E
Analysis Period (min) 15	
dr Defacto Right Lane. Recode with 1 though lane as a right lane.	

Splits and Phases: 16: Lakeway Dr & Jersey St



HCM Signalized Intersection Capacity Analysis
16: Lakeway Dr & Jersey St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	WBL2	WBL	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0				4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91				0.91	0.91		0.91	0.91	
Frt	0.91	0.85				1.00	0.89		1.00	1.00	
Flt Protected	0.98	1.00				0.95	1.00		0.95	0.98	
Satd. Flow (prot)	1603	2786				1572	2950		1430	3087	
Flt Permitted	0.98	1.00				0.95	1.00		0.95	0.98	
Satd. Flow (perm)	1603	2786				1572	2950		1430	3087	
Volume (vph)	115	30	780	90	5	410	285	780	575	340	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	121	32	821	95	5	432	300	821	605	358	21
RTOR Reduction (vph)	0	0	13	0	0	0	415	0	0	0	0
Lane Group Flow (vph)	0	403	653	0	0	418	725	0	303	681	0
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	1%	1%	11%	1%	1%
Turn Type	Split	Prot			Split	Split			Split		
Protected Phases	8	8	8		2	2	2		6	6	
Permitted Phases											
Actuated Green, G (s)	24.8	24.8				26.5	26.5		22.7	22.7	
Effective Green, g (s)	25.8	25.8				27.5	27.5		23.7	23.7	
Actuated g/C Ratio	0.29	0.29				0.31	0.31		0.27	0.27	
Clearance Time (s)	5.0	5.0				5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0				2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	465	808				486	912		381	822	
v/s Ratio Prot	c0.25	0.23				c0.27	0.25		0.21	c0.22	
v/s Ratio Perm											
v/c Ratio	0.87	0.81				0.86	0.95dr		0.80	0.83	
Uniform Delay, d1	30.0	29.3				28.9	28.2		30.4	30.7	
Progression Factor	1.00	1.00				1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.0	5.6				13.9	4.5		10.2	6.6	
Delay (s)	45.0	35.0				42.9	32.7		40.6	37.3	
Level of Service	D	C				D	C		D	D	
Approach Delay (s)	38.7					35.4			38.3		
Approach LOS	D					D			D		

Intersection Summary

HCM Average Control Delay	37.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	89.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		
dr	Defacto Right Lane. Recode with 1 though lane as a right lane.		
c	Critical Lane Group		

Timings
17: Lakeway Dr & I-5 SB Ramps

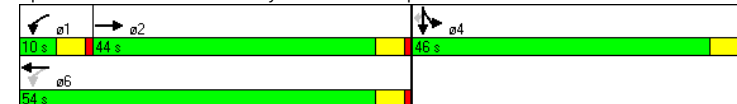
Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBT	WBL	WBT	SBT	SBR
Lane Configurations					
Volume (vph)	1125	165	765	20	315
Turn Type	pm+pt			Perm	
Protected Phases	2	1	6	4	
Permitted Phases		6			4
Detector Phases	2	1	6	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	10.0	23.0	28.0	28.0
Total Split (s)	44.0	10.0	54.0	46.0	46.0
Total Split (%)	44.0%	10.0%	54.0%	46.0%	46.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None
Act Effct Green (s)	40.2	50.2	50.2	37.2	37.2
Actuated g/C Ratio	0.42	0.53	0.53	0.39	0.39
v/c Ratio	0.96	0.95	0.45	0.89	0.49
Control Delay	44.4	75.2	15.9	44.4	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	44.4	75.2	15.9	44.4	15.1
LOS	D	E	B	D	B
Approach Delay	44.4		26.4	34.0	
Approach LOS	D		C	C	

Intersection Summary

Cycle Length: 100	
Actuated Cycle Length: 95.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 36.1	Intersection LOS: D
Intersection Capacity Utilization 87.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 17: Lakeway Dr & I-5 SB Ramps



HCM Signalized Intersection Capacity Analysis
17: Lakeway Dr & I-5 SB Ramps

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑↑						↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		0.95		1.00	0.95						1.00	1.00
Frt		0.98		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		3382		1711	3421						1735	1546
Flt Permitted		1.00		0.09	1.00						0.95	1.00
Satd. Flow (perm)		3382		163	3421						1735	1546
Volume (vph)	0	1125	185	165	765	0	0	0	0	555	20	315
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1184	195	174	805	0	0	0	0	584	21	332
RTOR Reduction (vph)	0	13	0	0	0	0	0	0	0	0	0	79
Lane Group Flow (vph)	0	1366	0	174	805	0	0	0	0	0	605	253
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type		pm+pt								Split	Perm	
Protected Phases		2		1	6					4	4	
Permitted Phases				6								4
Actuated Green, G (s)		39.2		49.2	49.2					36.2	36.2	
Effective Green, g (s)		40.2		50.2	50.2					37.2	37.2	
Actuated g/C Ratio		0.42		0.53	0.53					0.39	0.39	
Clearance Time (s)		5.0		5.0	5.0					5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		1425		183	1800					677	603	
v/s Ratio Prot		0.40		c0.06	0.24					c0.35		
v/s Ratio Perm				c0.44							0.16	
v/c Ratio		0.96		0.95	0.45					0.89	0.42	
Uniform Delay, d1		26.8		22.1	14.0					27.2	21.2	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		15.0		52.1	0.2					14.2	0.5	
Delay (s)		41.8		74.3	14.2					41.4	21.7	
Level of Service		D		E	B					D	C	
Approach Delay (s)		41.8			24.9			0.0		34.4		
Approach LOS		D			C			A		C		

Intersection Summary

HCM Average Control Delay	34.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	95.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
18: Lakeway Dr & King St

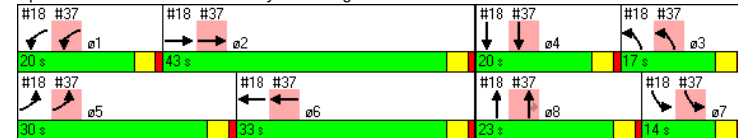
Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑↑	↑	↑	↑	↑
Volume (vph)	410	1110	20	655	120	80	50	25
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	5	2	1	6	3	8	7	4
Permitted Phases								
Detector Phases	5	2	1	6	3	8	7	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	30.0	43.0	20.0	33.0	17.0	23.0	14.0	20.0
Total Split (%)	30.0%	43.0%	20.0%	33.0%	17.0%	23.0%	14.0%	20.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?								
Recall Mode	None	Min	None	None	None	Min	None	None
Act Effct Green (s)	25.8	39.0	16.0	29.2	13.0	16.5	12.5	16.0
Actuated g/C Ratio	0.26	0.39	0.16	0.29	0.13	0.16	0.12	0.16
v/c Ratio	0.96	1.03	0.08	0.92	0.56	0.46	0.24	0.57
Control Delay	71.3	62.0	38.2	28.4	51.0	33.3	44.8	12.8
Queue Delay	0.0	0.0	0.0	6.0	0.0	0.0	0.0	0.0
Total Delay	71.3	62.0	38.2	34.4	51.0	33.3	44.8	12.8
LOS	E	E	D	C	D	C	D	B
Approach Delay		64.2		34.5		41.6		18.4
Approach LOS		E		C		D		B

Intersection Summary

Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 49.8	Intersection LOS: D
Intersection Capacity Utilization 82.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 18: Lakeway Dr & King St



HCM Signalized Intersection Capacity Analysis 18: Lakeway Dr & King St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.96		1.00	0.94		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	3410		1728	3325		1745	1724		1745	1590	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1745	3410		1728	3325		1745	1724		1745	1590	
Volume (vph)	410	1110	200	20	655	220	120	80	55	50	25	215
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	432	1168	211	21	689	232	126	84	58	53	26	226
RTOR Reduction (vph)	0	15	0	0	33	0	0	26	0	0	190	0
Lane Group Flow (vph)	432	1364	0	21	888	0	126	116	0	53	62	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	25.8	39.0		16.0	29.2		13.0	16.5		12.5	16.0	
Effective Green, g (s)	25.8	39.0		16.0	29.2		13.0	16.5		12.5	16.0	
Actuated g/C Ratio	0.26	0.39		0.16	0.29		0.13	0.16		0.12	0.16	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	450	1330		276	971		227	284		218	254	
v/s Ratio Prot	c0.25	c0.40		0.01	0.27		c0.07	c0.07		0.03	0.04	
v/s Ratio Perm												
v/c Ratio	0.96	1.03		0.08	0.91		0.56	0.41		0.24	0.24	
Uniform Delay, d1	36.6	30.5		35.7	34.2		40.8	37.4		39.5	36.7	
Progression Factor	1.00	1.00		1.05	0.57		1.00	1.00		1.00	1.00	
Incremental Delay, d2	32.2	31.5		0.1	7.3		2.9	1.0		0.6	0.5	
Delay (s)	68.8	62.0		37.5	26.9		43.7	38.3		40.1	37.2	
Level of Service	E	E		D	C		D	D		D	D	
Approach Delay (s)		63.6			27.1			40.9			37.7	
Approach LOS		E			C			D			D	
Intersection Summary												
HCM Average Control Delay		49.1										
HCM Volume to Capacity ratio		0.77										
Actuated Cycle Length (s)		100.0										
Intersection Capacity Utilization		82.4%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 24: E Chestnut St & Railroad Ave

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	80	860	35	0	0	0	0	30	60	95	80	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	84	905	37	0	0	0	0	32	63	100	84	0
Pedestrians					41			41			11	
Lane Width (ft)					0.0			11.0			11.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			3			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		353			350							
pX, platoon unblocked												
vC, conflicting volume	11			983			1175	1144	402	601	1163	11
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	11			983			1175	1144	402	601	1163	11
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			100	83	89	64	53	100
cM capacity (veh/h)	1600			688			85	183	585	278	179	1065
Direction, Lane #												
Volume Total	311	453	263	95	184							
Volume Left	84	0	0	0	100							
Volume Right	0	0	37	63	0							
cSH	1600	1700	1700	338	222							
Volume to Capacity	0.05	0.27	0.15	0.28	0.83							
Queue Length 95th (ft)	4	0	0	28	157							
Control Delay (s)	2.3	0.0	0.0	19.7	69.8							
Lane LOS	A			C	F							
Approach Delay (s)	0.7			19.7	69.8							
Approach LOS				C	F							
Intersection Summary												
Average Delay				11.8								
Intersection Capacity Utilization		41.9%										
Analysis Period (min)		15										

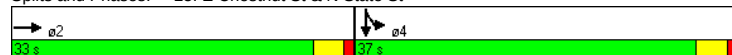
Timings	Alternative 1 (2016) PM Peak Hour
25: E Chestnut St & N State St	New Whatcom Redevelopment Project

	→	↘	↓
Lane Group	EBT	SBL	SBT
Lane Configurations	↑↑↑	↑	↑↑
Volume (vph)	670	230	875
Turn Type	Split		
Protected Phases	2	4	4
Permitted Phases			
Detector Phases	2	4	4
Minimum Initial (s)	6.0	6.0	6.0
Minimum Split (s)	22.0	20.0	20.0
Total Split (s)	33.0	37.0	37.0
Total Split (%)	47.1%	52.9%	52.9%
Yellow Time (s)	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	Max	Max	Max
Act Effct Green (s)	29.0	33.0	33.0
Actuated g/C Ratio	0.41	0.47	0.47
v/c Ratio	0.60	0.28	0.57
Control Delay	17.6	6.8	15.0
Queue Delay	0.0	0.0	0.0
Total Delay	17.6	6.8	15.0
LOS	B	A	B
Approach Delay	17.6		13.3
Approach LOS	B		B

Intersection Summary

Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 0 (0%), Referenced to phase 4:SBTL, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 15.5	Intersection LOS: B
Intersection Capacity Utilization 54.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 25: E Chestnut St & N State St



HCM Signalized Intersection Capacity Analysis 25: E Chestnut St & N State St	Alternative 1 (2016) PM Peak Hour New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  									 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0								4.0	4.0	
Lane Util. Factor		0.91								1.00	0.95	
Frpb, ped/bikes		0.98								1.00	1.00	
Flpb, ped/bikes		1.00								1.00	1.00	
Frt		0.94								1.00	1.00	
Flt Protected		1.00								0.95	1.00	
Satd. Flow (prot)		4568								1728	3455	
Flt Permitted		1.00								0.95	1.00	
Satd. Flow (perm)		4568								1728	3455	
Volume (vph)	0	670	430	0	0	0	0	0	0	230	875	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	705	453	0	0	0	0	0	0	242	921	0
RTOR Reduction (vph)	0	47	0	0	0	0	0	0	0	61	0	0
Lane Group Flow (vph)	0	1111	0	0	0	0	0	0	0	181	921	0
Confl. Peds. (#/hr)			40							40		
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Turn Type										Split		
Protected Phases		2								4	4	
Permitted Phases												
Actuated Green, G (s)		29.0								33.0	33.0	
Effective Green, g (s)		29.0								33.0	33.0	
Actuated g/C Ratio		0.41								0.47	0.47	
Clearance Time (s)		4.0								4.0	4.0	
Lane Grp Cap (vph)		1892								815	1629	
v/s Ratio Prot		c0.24								0.10	c0.27	
v/s Ratio Perm												
v/c Ratio		0.59								0.22	0.57	
Uniform Delay, d1		15.9								10.9	13.3	
Progression Factor		1.10								1.00	1.00	
Incremental Delay, d2		1.1								0.6	1.4	
Delay (s)		18.6								11.6	14.8	
Level of Service		B								B	B	
Approach Delay (s)		18.6			0.0			0.0			14.1	
Approach LOS		B			A			A			B	

Intersection Summary

HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
26: E Chestnut St & N Forest St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	→	↑
Lane Group	EBT	NBT
Lane Configurations	↑↑↑	↑↑
Volume (vph)	720	655
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phases	2	4
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	22.0	21.0
Total Split (s)	38.0	32.0
Total Split (%)	54.3%	45.7%
Yellow Time (s)	3.0	3.0
All-Red Time (s)	1.0	1.0
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	Max
Act Effct Green (s)	34.0	28.0
Actuated g/C Ratio	0.49	0.40
v/c Ratio	0.41	0.63
Control Delay	4.6	18.4
Queue Delay	0.0	0.0
Total Delay	4.6	18.4
LOS	A	B
Approach Delay	4.6	18.4
Approach LOS	A	B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.63
Intersection Signal Delay: 10.9
Intersection Capacity Utilization 48.8%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service A

Splits and Phases: 26: E Chestnut St & N Forest St



HCM Signalized Intersection Capacity Analysis
26: E Chestnut St & N Forest St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑↑						↑↑					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0						4.0					
Lane Util. Factor		0.91						0.95					
Frpb, ped/bikes		1.00						0.99					
Flpb, ped/bikes		1.00						1.00					
Frt		1.00						0.97					
Flt Protected		0.99						1.00					
Satd. Flow (prot)		4954						3288					
Flt Permitted		0.99						1.00					
Satd. Flow (perm)		4954						3288					
Volume (vph)	230	720	0	0	0	0	0	655	150	0	0	0	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	242	758	0	0	0	0	0	689	158	0	0	0	
RTOR Reduction (vph)	0	58	0	0	0	0	0	28	0	0	0	0	
Lane Group Flow (vph)	0	942	0	0	0	0	0	819	0	0	0	0	
Confl. Peds. (#/hr)	40								40				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	0%	0%	0%	
Turn Type	Split												
Protected Phases	2	2						4					
Permitted Phases													
Actuated Green, G (s)		34.0						28.0					
Effective Green, g (s)		34.0						28.0					
Actuated g/C Ratio		0.49						0.40					
Clearance Time (s)		4.0						4.0					
Lane Grp Cap (vph)		2406						1315					
v/s Ratio Prot		c0.19						c0.25					
v/s Ratio Perm													
v/c Ratio		0.39						0.62					
Uniform Delay, d1		11.4						16.8					
Progression Factor		0.40						1.00					
Incremental Delay, d2		0.4						2.2					
Delay (s)		5.0						19.0					
Level of Service		A						B					
Approach Delay (s)		5.0			0.0			19.0			0.0		
Approach LOS		A			A			B			A		

Intersection Summary

HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
27: E Chestnut St & Ellis St

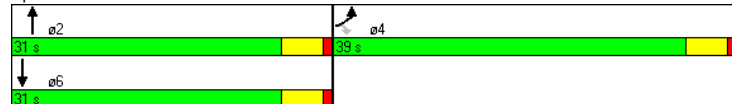
Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	↖	↗	↖	↗
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations	↖↗	↖↗	↖↗↖↗	↖↗↖↗
Volume (vph)	760	490	680	425
Turn Type	Perm			
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phases	4	4	2	6
Minimum Initial (s)	6.0	6.0	6.0	6.0
Minimum Split (s)	30.0	30.0	12.0	30.0
Total Split (s)	39.0	39.0	31.0	31.0
Total Split (%)	55.7%	55.7%	44.3%	44.3%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	22.6	22.6	18.5	18.5
Actuated g/C Ratio	0.45	0.45	0.37	0.37
v/c Ratio	0.54	0.66	0.39	0.35
Control Delay	12.0	10.8	12.9	13.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.0	10.8	12.9	13.1
LOS	B	B	B	B
Approach Delay	11.6		12.9	13.1
Approach LOS	B		B	B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 50.4
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 12.2
Intersection Capacity Utilization 53.2%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service A

Splits and Phases: 27: E Chestnut St & Ellis St



HCM Signalized Intersection Capacity Analysis
27: E Chestnut St & Ellis St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	↖	↗	↖	↗	↖	↗
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↖↗	↖↗	↖↗↖↗	↖↗↖↗	↖↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.91	0.95	
Frpb, ped/bikes	1.00	0.95		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3319	1459		4964	3490	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3319	1459		4964	3490	
Volume (vph)	760	490	0	680	425	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	800	516	0	716	447	0
RTOR Reduction (vph)	0	130	0	0	0	0
Lane Group Flow (vph)	800	386	0	716	447	0
Confl. Peds. (#/hr)	60	60				
Heavy Vehicles (%)	2%	2%	1%	1%	0%	0%
Turn Type	Perm					
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	21.5	21.5		17.4	17.4	
Effective Green, g (s)	22.5	22.5		18.4	18.4	
Actuated g/C Ratio	0.46	0.46		0.38	0.38	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1527	671		1868	1313	
v/s Ratio Prot	0.24			0.14	0.13	
v/s Ratio Perm		0.26				
v/c Ratio	0.52	0.58		0.38	0.34	
Uniform Delay, d1	9.4	9.7		11.1	10.9	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.2		0.1	0.2	
Delay (s)	9.7	10.9		11.2	11.1	
Level of Service	A	B		B	B	
Approach Delay (s)	10.2			11.2	11.1	
Approach LOS	B			B	B	

Intersection Summary

HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	48.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
28: Laurel St & N State St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop				Stop		Free				Free	
Grade	0%				0%		0%				0%	
Volume (veh/h)	0	205	185	35	295	0	0	0	0	45	1020	100
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	216	195	37	311	0	0	0	0	47	1074	105
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (ft)	1046											
pX, platoon unblocked												
vC, conflicting volume	1376	1221	411	755	1274	0	1179			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1376	1221	411	755	1274	0	1179			0		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	67	0	0	100	100			97		
cM capacity (veh/h)	0	173	590	0	161	1091	588			1629		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2	SB 3							
Volume Total	411	347	316	537	374							
Volume Left	0	37	47	0	0							
Volume Right	195	0	0	0	105							
cSH	261	0	1629	1700	1700							
Volume to Capacity	1.57	Err	0.03	0.32	0.22							
Queue Length 95th (ft)	623	Err	2	0	0							
Control Delay (s)	311.0	Err	1.3	0.0	0.0							
Lane LOS	F	F	A									
Approach Delay (s)	311.0	Err	0.3									
Approach LOS	F	F										
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization	72.4%				ICU Level of Service				C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
29: Laurel St & N Forest St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	160	65	0	0	145	95	175	720	20	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	168	68	0	0	153	100	184	758	21	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)										1032		
pX, platoon unblocked												
vC, conflicting volume	924	1147	0	1171	1137	389	0			779		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	924	1147	0	1171	1137	389	0			779		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	61	100	100	15	84	89			100		
cM capacity (veh/h)	50	175	1084	96	180	615	1622			847		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	237	253	563	400								
Volume Left	168	0	184	0								
Volume Right	0	100	0	21								
cSH	63	250	1622	1700								
Volume to Capacity	3.75	1.01	0.11	0.24								
Queue Length 95th (ft)	Err	247	10	0								
Control Delay (s)	Err	102.1	3.2	0.0								
Lane LOS	F	F	A									
Approach Delay (s)	Err	102.1	1.9									
Approach LOS	F	F										
Intersection Summary												
Average Delay			1649.3									
Intersection Capacity Utilization			61.3%	ICU Level of Service		B						
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 30: N Forrest St & N State St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		↑							↑	↑	↑			
Sign Control	Free			Free			Stop			Stop				
Grade	0%			0%			0%			0%				
Volume (veh/h)	0	570	0	0	0	0	0	0	165	50	165	0		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Hourly flow rate (vph)	0	600	0	0	0	0	0	0	174	53	174	0		
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)														
Median type							None			None				
Median storage (veh)														
Upstream signal (ft)														
pX, platoon unblocked														
vC, conflicting volume	0				600				687	600	600	774	600	0
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	0				600				687	600	600	774	600	0
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100				100				100	100	65	74	58	100
cM capacity (veh/h)	1623				977				243	415	501	206	415	1085

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	600	174	53	174
Volume Left	0	0	53	0
Volume Right	0	174	0	0
cSH	1700	501	206	415
Volume to Capacity	0.35	0.35	0.26	0.42
Queue Length 95th (ft)	0	38	24	51
Control Delay (s)	0.0	16.0	28.3	19.8
Lane LOS	C	D	C	
Approach Delay (s)	0.0	16.0	21.8	
Approach LOS	C	C		

Intersection Summary			
Average Delay	7.7		
Intersection Capacity Utilization	64.0%	ICU Level of Service	C
Analysis Period (min)	15		

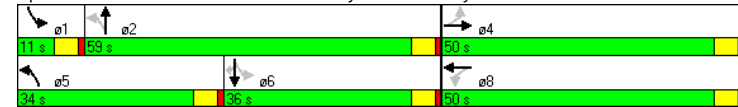
Timings 31: Bill McDonald Pkwy & Samish Way

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↙	↗	↙	↗	↙	↗	↙	↗	↙
Volume (vph)	290	45	45	45	325	490	25	625	320
Turn Type	Perm		Perm		pm+pt		pm+pt		Perm
Protected Phases	4		8		5		1		6
Permitted Phases	4		8		2		6		6
Detector Phases	4	4	8	8	5	2	1	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	11.0	30.0	30.0	11.0	28.0	11.0	29.0	29.0
Total Split (s)	50.0	50.0	50.0	50.0	34.0	59.0	11.0	36.0	36.0
Total Split (%)	41.7%	41.7%	41.7%	41.7%	28.3%	49.2%	9.2%	30.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	26.1	26.1		26.1	45.3	42.1	27.8	20.5	20.5
Actuated g/C Ratio	0.32	0.32		0.32	0.56	0.52	0.32	0.25	0.25
v/c Ratio	0.78	0.53		0.30	0.65	0.32	0.08	0.74	0.52
Control Delay	42.0	7.3		23.1	22.5	14.3	14.9	36.3	7.0
Queue Delay	0.0	0.2		0.1	0.6	0.4	0.0	0.1	0.0
Total Delay	42.0	7.5		23.2	23.2	14.7	14.9	36.4	7.0
LOS	D	A		C	C	B	B	D	A
Approach Delay	22.6		23.2		17.9		26.2		
Approach LOS	C		C		B		C		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 80.9	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 22.4	Intersection LOS: C
Intersection Capacity Utilization 77.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 31: Bill McDonald Pkwy & Samish Way



HCM Signalized Intersection Capacity Analysis
31: Bill McDonald Pkwy & Samish Way

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87		0.97	1.00		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.98	0.95		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	1563		1749	1728		1745	3412		1745	3490	1561
Flt Permitted	0.68	1.00		0.62	0.21		0.21	1.00		0.44	1.00	1.00
Satd. Flow (perm)	1233	1563		1105	381		3412			810	3490	1561
Volume (vph)	290	45	330	45	45	25	325	490	45	25	625	320
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	305	47	347	47	47	26	342	516	47	26	658	337
RTOR Reduction (vph)	0	238	0	0	9	0	0	5	0	0	0	236
Lane Group Flow (vph)	305	156	0	0	111	0	342	558	0	26	658	101
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm			Perm			pm+pt			pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.0	25.0		25.0			47.6	40.9		25.5	23.8	23.8
Effective Green, g (s)	26.0	26.0		26.0			48.6	41.9		27.5	24.8	24.8
Actuated g/C Ratio	0.31	0.31		0.31			0.59	0.51		0.33	0.30	0.30
Clearance Time (s)	5.0	5.0		5.0			5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0			2.0	2.0		3.0	2.0	2.0
Lane Grp Cap (vph)	388	492		348			547	1731		300	1048	469
v/s Ratio Prot		0.10					c0.15	0.16		0.00	0.19	
v/s Ratio Perm	c0.25			0.10			c0.22			0.03		0.06
v/c Ratio	0.79	0.32		0.32			0.63	0.32		0.09	0.63	0.22
Uniform Delay, d1	25.8	21.5		21.6			10.9	12.0		18.7	24.9	21.6
Progression Factor	1.00	1.00		1.00			1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.1	0.4		0.5			1.6	0.0		0.1	0.9	0.1
Delay (s)	35.8	21.9		22.1			12.5	12.0		18.8	25.8	21.7
Level of Service	D	C		C			B	B		B	C	C
Approach Delay (s)		28.0			22.1			12.2			24.3	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	21.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	82.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings

32: Samish Way & I-5 SB Off-Ramp

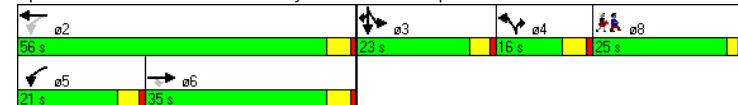
Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	ø8
Lane Configurations	↱	↰	↰	↱	↰	↱	↰	↱	↰	
Volume (vph)	710	275	265	450	160	445	245	255	245	
Turn Type	Perm	pm+pt		Protcustom		Split	Prot			
Protected Phases	6		5	2	4	4	3	3	3	8
Permitted Phases		6	2							
Detector Phases	6	6	5	2	4	4	3	3	3	
Minimum Initial (s)	7.0	7.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0	20.0
Minimum Split (s)	22.0	22.0	9.5	22.0	12.0	12.0	11.5	11.5	11.5	25.0
Total Split (s)	35.0	35.0	21.0	56.0	16.0	16.0	23.0	23.0	23.0	25.0
Total Split (%)	29.2%	29.2%	17.5%	46.7%	13.3%	13.3%	19.2%	19.2%	19.2%	21%
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	4.0	3.5	3.5	3.5	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lead	Lead	Lead	
Lead-Lag Optimize?										
Recall Mode	Min	Min	None	Min	None	None	None	None	None	None
Act Effct Green (s)	26.3	26.3	47.0	47.0	12.1	12.1	18.3	18.3	18.3	
Actuated g/C Ratio	0.29	0.29	0.53	0.53	0.14	0.14	0.20	0.20	0.20	
v/c Ratio	0.74	0.44	0.71	0.26	0.72	0.76	0.72	0.71	0.49	
Control Delay	33.3	5.3	30.9	12.0	57.7	13.2	47.3	46.0	7.9	
Queue Delay	7.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	41.0	5.7	30.9	12.0	57.7	13.2	47.3	46.0	8.0	
LOS	D	A	C	B	E	B	D	D	A	
Approach Delay	31.1			19.0			33.9			
Approach LOS	C			B			C			

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 89.5
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 27.8
Intersection Capacity Utilization 70.8%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service C

Splits and Phases: 32: Samish Way & I-5 SB Off-Ramp



HCM Signalized Intersection Capacity Analysis
32: Samish Way & I-5 SB Off-Ramp

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		↕↕	↗	↗	↕↕		↗		↗	↗	↕	↗		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0		4.0	4.0	4.0	4.0		
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00		1.00	1.00	1.00	1.00		
Frt		1.00	0.85	1.00	1.00		1.00		0.85	1.00	1.00	0.85		
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00	0.95	1.00	1.00		
Satd. Flow (prot)		3455	1546	1728	3455		1728		1546	1745	1837	1561		
Flt Permitted		1.00	1.00	0.15	1.00		0.95		1.00	0.95	1.00	1.00		
Satd. Flow (perm)		3455	1546	280	3455		1728		1546	1745	1837	1561		
Volume (vph)	0	710	275	265	450	0	160	0	445	245	255	245		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Adj. Flow (vph)	0	747	289	279	474	0	168	0	468	258	268	258		
RTOR Reduction (vph)	0	0	204	0	0	0	0	0	405	0	0	205		
Lane Group Flow (vph)	0	747	85	279	474	0	168	0	63	258	268	53		
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%		
Turn Type	Perm			pm+pt			Prot			custom			Split	Prot
Protected Phases	6			5			2			4			3	3
Permitted Phases	6			2			4			3			3	3
Actuated Green, G (s)	25.3	25.3	46.0	46.0			11.1			11.1	17.8	17.8	17.8	
Effective Green, g (s)	26.3	26.3	47.0	47.0			12.1			12.1	18.3	18.3	18.3	
Actuated g/C Ratio	0.29	0.29	0.53	0.53			0.14			0.14	0.20	0.20	0.20	
Clearance Time (s)	5.0	5.0	4.5	5.0			5.0			5.0	4.5	4.5	4.5	
Vehicle Extension (s)	3.5	3.5	3.5	3.5			3.5			3.5	4.0	4.0	4.0	
Lane Grp Cap (vph)	1016	455	418	1816			234			209	357	376	320	
v/s Ratio Prot	c0.22		c0.12		0.14		c0.10		0.04		c0.15	0.15	0.03	
v/s Ratio Perm			0.06		0.23									
v/c Ratio	0.74	0.19	0.67	0.26			0.72			0.30	0.72	0.71	0.17	
Uniform Delay, d1	28.4	23.6	15.0	11.7			37.0			34.8	33.2	33.1	29.3	
Progression Factor	1.00	1.00	1.00	1.00			1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.9	0.2	4.2	0.1			10.4			1.0	7.5	6.7	0.3	
Delay (s)	31.3	23.8	19.1	11.7			47.4			35.8	40.7	39.8	29.6	
Level of Service	C	C	B	B			D			D	D	D	C	
Approach Delay (s)	29.2				14.5		38.9				36.7			
Approach LOS	C				B		D				D			
Intersection Summary														
HCM Average Control Delay			29.5			HCM Level of Service			C					
HCM Volume to Capacity ratio			0.72											
Actuated Cycle Length (s)			89.4			Sum of lost time (s)			16.0					
Intersection Capacity Utilization			70.8%			ICU Level of Service			C					
Analysis Period (min)			15											
c Critical Lane Group														

Timings

33: Samish Way & Lincoln St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	865	305	340	5	90	350	315	20	110	340
Turn Type	custom	pm+ov custom			pm+pt		pm+pt		pm+ov	
Protected Phases	4	4	5	3	3	5	2	1	6	4
Permitted Phases	4		4	3		2		6		6
Detector Phases	4	4	5	3	3	5	2	1	6	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	33.0	33.0	11.0	30.0	30.0	11.0	24.0	11.0	33.0	33.0
Total Split (s)	46.0	46.0	11.0	30.0	30.0	11.0	33.0	11.0	33.0	46.0
Total Split (%)	38.3%	38.3%	9.2%	25.0%	25.0%	9.2%	27.5%	9.2%	27.5%	38.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	Min	None	Min	None
Act Effct Green (s)	43.0	43.0	54.3	13.4	13.4	26.1	23.7	23.6	16.2	59.2
Actuated g/C Ratio	0.45	0.45	0.57	0.14	0.14	0.27	0.25	0.23	0.17	0.62
v/c Ratio	0.82	0.84	0.35	0.02	0.66	1.04	0.78	0.12	0.38	0.33
Control Delay	37.5	38.7	3.6	38.4	45.7	92.9	48.1	27.4	38.7	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.5	38.7	3.6	38.4	45.7	92.9	48.1	27.4	38.7	1.4
LOS	D	D	A	D	D	F	D	C	D	A
Approach Delay	30.4					45.5		71.2		11.2
Approach LOS	C					D		E		B
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 96.1										
Natural Cycle: 120										
Control Type: Actuated-Uncoordinated										
Maximum v/c Ratio: 1.04										
Intersection Signal Delay: 37.9					Intersection LOS: D					
Intersection Capacity Utilization 77.0%					ICU Level of Service D					
Analysis Period (min) 15										

Splits and Phases: 33: Samish Way & Lincoln St

ø1	ø2	ø3	ø4
11 s	33 s	30 s	46 s
ø5	ø6		
11 s	33 s		

HCM Signalized Intersection Capacity Analysis
33: Samish Way & Lincoln St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1641	1686	1546	1694	1666		1728	1806		1728	1818	1546
Flt Permitted	0.95	0.98	1.00	0.95	1.00		0.52	1.00		0.27	1.00	1.00
Satd. Flow (perm)	1641	1686	1546	1694	1666		953	1806		493	1818	1546
Volume (vph)	865	305	340	5	90	70	350	315	15	20	110	340
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	911	321	358	5	95	74	368	332	16	21	116	358
RTOR Reduction (vph)	0	0	166	0	26	0	0	2	0	0	0	132
Lane Group Flow (vph)	600	632	192	5	143	0	368	346	0	21	116	226
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	custom		pm+ov custom		pm+pt		pm+pt		pm+ov			
Protected Phases	4	4	5	3	3		5	2		1	6	4
Permitted Phases	4		4	3			2			6		6
Actuated Green, G (s)	42.0	42.0	48.1	12.4	12.4		28.8	22.7		20.6	18.6	60.6
Effective Green, g (s)	43.0	43.0	50.1	13.4	13.4		30.7	23.7		22.6	19.6	62.6
Actuated g/C Ratio	0.43	0.43	0.51	0.14	0.14		0.31	0.24		0.23	0.20	0.63
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	712	732	844	229	225		351	432		150	360	977
v/s Ratio Prot	0.37	c0.37	0.02	0.00	c0.09		c0.08	0.19		0.00	0.06	0.10
v/s Ratio Perm			0.11				c0.25			0.03		0.05
v/c Ratio	0.84	0.86	0.23	0.02	0.64		1.05	0.80		0.14	0.32	0.23
Uniform Delay, d1	25.0	25.4	13.7	37.2	40.5		34.1	35.5		30.4	34.1	7.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	8.6	10.0	0.1	0.0	4.3		61.3	9.7		0.2	0.2	0.0
Delay (s)	33.6	35.4	13.7	37.2	44.8		95.4	45.2		30.6	34.2	7.9
Level of Service	C	D	B	D	D		F	D		C	C	A
Approach Delay (s)	29.9				44.6		71.0		15.0			
Approach LOS	C				D		E		B			

Intersection Summary

HCM Average Control Delay	38.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	99.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings

34: Old Fairhaven Pkwy & 12th St

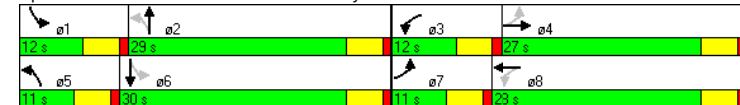
Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	10	150	275	110	20	195	200	265
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	27.0	11.0	27.0	11.0	27.0	11.0	27.0
Total Split (s)	11.0	27.0	12.0	28.0	11.0	29.0	12.0	30.0
Total Split (%)	13.8%	33.8%	15.0%	35.0%	13.8%	36.3%	15.0%	37.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)	20.7	13.4	25.0	23.5	32.0	25.1	36.0	33.0
Actuated g/C Ratio	0.26	0.19	0.35	0.33	0.41	0.36	0.51	0.47
v/c Ratio	0.04	0.51	0.63	0.47	0.05	0.62	0.55	0.35
Control Delay	16.3	29.7	24.4	15.4	11.1	21.6	16.5	16.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	29.7	24.4	15.4	11.1	21.6	16.5	16.1
LOS	B	C	C	B	B	C	B	B
Approach Delay	28.9		19.8		21.1		16.3	
Approach LOS	C		B		C		B	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 70.6
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.63
Intersection Signal Delay: 20.1
Intersection Capacity Utilization 71.0%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service C

Splits and Phases: 34: Old Fairhaven Pkwy & 12th St



HCM Signalized Intersection Capacity Analysis
34: Old Fairhaven Pkwy & 12th St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.91		1.00	0.92		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1703	1768		1787	1708		1805	1755		1787	1857	
Flt Permitted	0.54	1.00		0.45	1.00		0.57	1.00		0.28	1.00	
Satd. Flow (perm)	977	1768		854	1708		1074	1755		525	1857	
Volume (vph)	10	150	15	275	110	175	20	195	200	200	265	25
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	158	16	289	116	184	21	205	211	211	279	26
RTOR Reduction (vph)	0	5	0	0	71	0	0	43	0	0	3	0
Lane Group Flow (vph)	11	169	0	289	229	0	21	373	0	211	302	0
Heavy Vehicles (%)	6%	6%	6%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.7	16.6		28.6	22.5		29.6	27.3		39.0	32.0	
Effective Green, g (s)	19.7	17.6		29.6	23.5		31.6	28.3		40.3	33.0	
Actuated g/C Ratio	0.25	0.23		0.38	0.30		0.41	0.36		0.52	0.42	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	267	399		420	515		467	638		401	787	
v/s Ratio Prot	0.00	0.10		c0.07	0.13		0.00	c0.21		c0.05	0.16	
v/s Ratio Perm	0.01			c0.19			0.02			0.22		
v/c Ratio	0.04	0.42		0.69	0.44		0.04	0.59		0.53	0.38	
Uniform Delay, d1	21.9	25.8		19.0	21.9		13.9	20.1		12.1	15.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.7		4.6	0.6		0.0	3.9		1.2	1.4	
Delay (s)	22.0	26.5		23.6	22.5		14.0	24.0		13.4	16.9	
Level of Service	C	C		C	C		B	C		B	B	
Approach Delay (s)		26.3			23.1			23.5			15.4	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	77.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

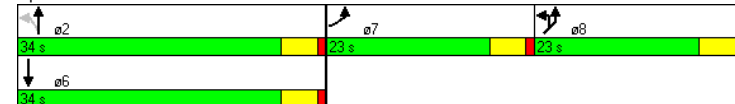
Timings
35: Hawthorne & 12th St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	NBL	NBT	SBT	NEL
Lane Configurations	↰		↱	↱	↰
Volume (vph)	155	10	275	360	60
Turn Type	Perm				
Protected Phases	7		2	6	8
Permitted Phases		2			
Detector Phases	7	2	2	6	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	23.0	26.0	26.0	26.0	23.0
Total Split (s)	23.0	34.0	34.0	34.0	23.0
Total Split (%)	28.8%	42.5%	42.5%	42.5%	28.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead				Lag
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	Max	None
Act Effct Green (s)	12.2		31.1	31.1	8.8
Actuated g/C Ratio	0.21		0.53	0.53	0.14
v/c Ratio	0.50		0.45	0.70	0.29
Control Delay	26.6		15.0	19.0	25.9
Queue Delay	0.0		0.0	0.0	0.0
Total Delay	26.6		15.0	19.0	25.9
LOS	C		B	B	C
Approach Delay	26.6		15.0	19.0	25.9
Approach LOS	C		B	B	C

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 59	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 19.6	Intersection LOS: B
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 35: Hawthorne & 12th St



HCM Signalized Intersection Capacity Analysis
35: Hawthorne & 12th St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBR	EBR2	NBL	NBT	SBT	SBR	SBR2	NEL	NER
Lane Configurations	↰	↱	↱	↰	↰	↱	↱	↱	↰	↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0				4.0	4.0			4.0	
Lane Util. Factor	1.00				1.00	1.00			1.00	
Fr _t	0.98				1.00	0.94			0.98	
Fl _t Protected	0.96				1.00	1.00			0.96	
Satd. Flow (prot)	1773				1859	1789			1786	
Fl _t Permitted	0.96				0.98	1.00			0.96	
Satd. Flow (perm)	1773				1817	1789			1786	
Volume (vph)	155	10	10	10	275	360	55	220	60	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	163	11	11	11	289	379	58	232	63	11
RTOR Reduction (vph)	3	0	0	0	0	19	0	0	9	0
Lane Group Flow (vph)	182	0	0	0	300	650	0	0	65	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	0%	0%	0%	0%	0%
Turn Type	Perm									
Protected Phases	7				2	6			8	
Permitted Phases				2						
Actuated Green, G (s)	11.1				30.1	30.1			4.8	
Effective Green, g (s)	12.1				31.1	31.1			5.8	
Actuated g/C Ratio	0.20				0.51	0.51			0.10	
Clearance Time (s)	5.0				5.0	5.0			5.0	
Vehicle Extension (s)	3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)	352				926	912			170	
v/s Ratio Prot	c0.10				c0.36				c0.04	
v/s Ratio Perm					0.17					
v/c Ratio	0.52				0.32	0.71			0.38	
Uniform Delay, d1	21.8				8.8	11.5			25.9	
Progression Factor	1.00				1.00	1.00			1.00	
Incremental Delay, d2	1.3				0.2	4.7			1.4	
Delay (s)	23.1				9.0	16.2			27.4	
Level of Service	C				A	B			C	
Approach Delay (s)	23.1				9.0	16.2			27.4	
Approach LOS	C				A	B			C	

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

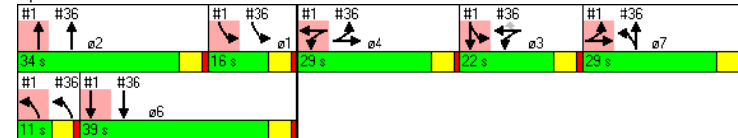
Timings
36: Birchwood Ave & Meridian Street

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT	ø2	ø5	ø7
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱			
Volume (vph)	250	135	185	255	90	850	115	765			
Turn Type	Split			Perm	Prot		Prot				
Protected Phases	4	4	3		5 7	2 7	1	6	2	5	7
Permitted Phases				3							
Detector Phases	4	4	3	3	5 7	2 7	1	6			
Minimum Initial (s)	6.0	6.0	6.0	6.0			6.0	10.0	10.0	6.0	6.0
Minimum Split (s)	29.0	29.0	11.0	11.0			11.0	23.0	23.0	11.0	29.0
Total Split (s)	29.0	29.0	22.0	22.0	40.0	63.0	16.0	39.0	34.0	11.0	29.0
Total Split (%)	22.3%	22.3%	16.9%	16.9%	30.8%	48.5%	12.3%	30.0%	26%	8%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lead	Lag	Lag			Lag	Lag	Lead	Lead	
Lead-Lag Optimize?											
Recall Mode	None	None	None	None			None	None	Max	None	None
Act Effct Green (s)	22.7	22.7	18.0	18.0	36.0	59.0	12.0	35.0			
Actuated g/C Ratio	0.18	0.18	0.14	0.14	0.28	0.46	0.09	0.27			
v/c Ratio	0.82	0.61	1.04	0.61	0.19	0.57	0.73	1.11			
Control Delay	71.4	53.2	118.8	15.3	54.1	6.7	82.3	105.6			
Queue Delay	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0			
Total Delay	71.4	53.2	118.8	15.3	54.1	7.8	82.3	105.6			
LOS	E	D	F	B	D	A	F	F			
Approach Delay	63.4	67.6			12.0		103.2				
Approach LOS	E	E			B		F				

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 127.7	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.11	
Intersection Signal Delay: 62.2	Intersection LOS: E
Intersection Capacity Utilization 74.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 36: Birchwood Ave & Meridian Street



HCM Signalized Intersection Capacity Analysis
36: Birchwood Ave & Meridian Street

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↰	↱	↰	↱	↱	↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1812			1873	1615	1787	3553		1752	3381	
Flt Permitted	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	1812			1873	1615	1787	3553		1752	3381	
Volume (vph)	250	135	60	75	185	255	90	850	35	115	765	235
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	263	142	63	79	195	268	95	895	37	121	805	247
RTOR Reduction (vph)	0	12	0	0	0	209	0	2	0	0	22	0
Lane Group Flow (vph)	263	193	0	0	274	59	95	930	0	121	1030	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split		Perm	Prot			Prot		
Protected Phases	4	4		3	3		5 7	2 7		1	6	
Permitted Phases						3						
Actuated Green, G (s)	21.7	21.7			17.0	17.0	35.0	58.0		11.0	34.0	
Effective Green, g (s)	22.7	22.7			18.0	18.0	36.0	59.0		12.0	35.0	
Actuated g/C Ratio	0.18	0.18			0.14	0.14	0.28	0.46		0.09	0.27	
Clearance Time (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Vehicle Extension (s)	3.0	3.0			2.0	2.0				2.0	2.0	
Lane Grp Cap (vph)	321	322			264	228	504	1642		165	927	
v/s Ratio Prot	c0.15	0.11			c0.15		0.05	c0.26		0.07	c0.30	
v/s Ratio Perm						0.04						
v/c Ratio	0.82	0.60			1.04	0.26	0.19	0.57		0.73	1.11	
Uniform Delay, d1	50.5	48.3			54.8	48.9	34.8	25.0		56.3	46.4	
Progression Factor	1.00	1.00			1.00	1.00	1.49	0.24		1.00	1.00	
Incremental Delay, d2	14.9	3.0			65.6	0.2	0.0	0.2		13.5	65.0	
Delay (s)	65.5	51.3			120.4	49.1	52.0	6.1		69.8	111.4	
Level of Service	E	D			F	D	D	A		E	F	
Approach Delay (s)		59.3			85.2		10.4			107.1		
Approach LOS		E			F		B			F		

Intersection Summary

HCM Average Control Delay	65.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	127.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
37: Lakeway Dr & Lincoln Street

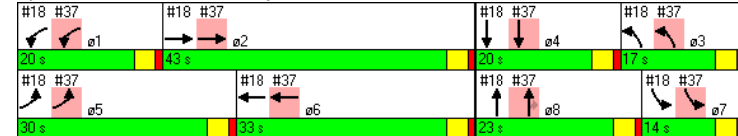
Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↱	↰	↱
Volume (vph)	45	1040	260	660	215	160	465	145	195
Turn Type	Prot		Prot		Prot		Perm	Prot	
Protected Phases	5	2	1	6	3	8		7	4
Permitted Phases							8		
Detector Phases	5	2	1	6	3	8	8	7	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	30.0	43.0	20.0	33.0	17.0	23.0	23.0	14.0	20.0
Total Split (%)	30.0%	43.0%	20.0%	33.0%	17.0%	23.0%	23.0%	14.0%	20.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?									
Recall Mode	None	Min	None	None	None	Min	Min	None	None
Act Effct Green (s)	25.8	39.0	16.0	29.2	13.0	16.5	16.5	12.5	16.0
Actuated g/C Ratio	0.26	0.39	0.16	0.29	0.13	0.16	0.16	0.12	0.16
v/c Ratio	0.11	0.92	1.00	0.78	1.02	0.57	0.93	0.72	0.93
Control Delay	51.7	17.5	98.1	38.5	109.9	45.4	40.4	64.0	78.2
Queue Delay	0.0	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.7	30.0	98.1	38.5	109.9	45.4	40.4	64.0	78.2
LOS	D	C	F	D	F	D	D	E	E
Approach Delay		30.8		54.1		59.1			73.0
Approach LOS		C		D		E			E

Intersection Summary

Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 49.4	Intersection LOS: D
Intersection Capacity Utilization 85.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 37: Lakeway Dr & Lincoln Street



HCM Signalized Intersection Capacity Analysis
37: Lakeway Dr & Lincoln Street

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	1.00		0.85	1.00	0.96
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		1.00	0.95	1.00
Satd. Flow (prot)	1711	3372		1711	3369		1711	1801		1531	1711	1737
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		1.00	0.95	1.00
Satd. Flow (perm)	1711	3372		1711	3369		1711	1801		1531	1711	1737
Volume (vph)	45	1040	110	260	660	75	215	160	465	145	195	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	1095	116	274	695	79	226	168	489	153	205	63
RTOR Reduction (vph)	0	8	0	0	8	0	0	0	271	0	11	0
Lane Group Flow (vph)	47	1203	0	274	766	0	226	168	218	153	257	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			
Actuated Green, G (s)	25.8	39.0		16.0	29.2		13.0	16.5	16.5	12.5	16.0	
Effective Green, g (s)	25.8	39.0		16.0	29.2		13.0	16.5	16.5	12.5	16.0	
Actuated g/C Ratio	0.26	0.39		0.16	0.29		0.13	0.16	0.16	0.12	0.16	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	441	1315		274	984		222	297	253	214	278	
v/s Ratio Prot	0.03	c0.36		c0.16	0.23		c0.13	0.09		0.09	c0.15	
v/s Ratio Perm								0.14				
v/c Ratio	0.11	0.91		1.00	0.78		1.02	0.57	0.86	0.71	0.92	
Uniform Delay, d1	28.3	28.9		42.0	32.4		43.5	38.4	40.7	42.0	41.4	
Progression Factor	1.80	0.44		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	3.3		54.4	3.9		65.1	2.5	24.9	10.8	34.4	
Delay (s)	51.1	16.0		96.4	36.4		108.6	40.9	65.5	52.8	75.8	
Level of Service	D	B		F	D		F	D	E	D	E	
Approach Delay (s)		17.3			52.1			71.9			67.5	
Approach LOS		B			D			E			E	
Intersection Summary												
HCM Average Control Delay		46.6			HCM Level of Service			D				
HCM Volume to Capacity ratio		0.91										
Actuated Cycle Length (s)		100.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		85.8%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
40: Wharf Street & N State St

Alternative 1 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↰	↱		↰	↱
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	80	85	0	920	60
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	84	89	0	968	63
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1179	1000	1032			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1179	1000	1032			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	71	87			
cM capacity (veh/h)	183	295	674			
Direction, Lane #						
Volume Total	84	89	1032			
Volume Left	0	89	0			
Volume Right	84	0	63			
cSH	295	674	1700			
Volume to Capacity	0.29	0.13	0.61			
Queue Length 95th (ft)	29	11	0			
Control Delay (s)	22.0	11.2	0.0			
Lane LOS	C	B				
Approach Delay (s)	22.0	11.2	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		2.4				
Intersection Capacity Utilization		63.7%		ICU Level of Service		B
Analysis Period (min)		15				

Timings
19: Roeder Ave & F St

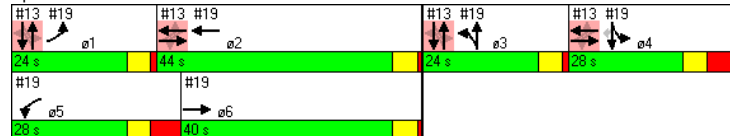
Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	195	660	10	750	55	200	125	225
Turn Type	Prot		Prot		Split		Perm	
Protected Phases	1	6	5	2	3	3	4	
Permitted Phases								4
Detector Phases	1	6	5	2	3	3	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	28.0	24.0	24.0	24.0	28.0	28.0
Total Split (s)	24.0	40.0	28.0	44.0	24.0	24.0	28.0	28.0
Total Split (%)	20.0%	33.3%	23.3%	36.7%	20.0%	20.0%	23.3%	23.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	5.0	1.0	1.0	1.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?								
Recall Mode	Min	Max	None	None	None	None	None	None
Act Effct Green (s)	20.0	60.7	11.5	40.0	20.0	20.0	24.0	24.0
Actuated g/C Ratio	0.17	0.51	0.10	0.33	0.17	0.17	0.20	0.20
v/c Ratio	0.68	0.77	0.06	1.49	0.22	0.81	0.87	0.46
Control Delay	59.8	32.0	49.9	258.9	46.1	71.9	66.5	9.6
Queue Delay	2.5	0.0	0.0	75.2	0.0	1.6	36.9	0.4
Total Delay	62.4	32.0	49.9	334.1	46.1	73.5	103.4	10.0
LOS	E	C	D	F	D	E	F	A
Approach Delay		38.6		330.9		67.8	63.7	
Approach LOS		D		F		E	E	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.49
Intersection Signal Delay: 147.6
Intersection Capacity Utilization 99.2%
Analysis Period (min) 15
Intersection LOS: F
ICU Level of Service F

Splits and Phases: 19: Roeder Ave & F St



HCM Signalized Intersection Capacity Analysis
19: Roeder Ave & F St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.99		1.00	0.98		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (prot)	1728	1803		1711	1761		1479	1545			1749	1531
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (perm)	1728	1803		1711	1761		1479	1545			1749	1531
Volume (vph)	195	660	40	10	750	130	55	200	10	180	125	225
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	195	660	40	10	750	130	55	200	10	180	125	225
RTOR Reduction (vph)	0	2	0	0	5	0	0	2	0	0	0	183
Lane Group Flow (vph)	195	698	0	10	875	0	55	208	0	0	305	42
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	18%	18%	18%	2%	2%	2%
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	19.0	59.7		1.5	46.2		19.0	19.0			19.0	19.0
Effective Green, g (s)	20.0	60.7		6.5	47.2		20.0	20.0			24.0	24.0
Actuated g/C Ratio	0.16	0.48		0.05	0.37		0.16	0.16			0.19	0.19
Clearance Time (s)	5.0	5.0		9.0	5.0		5.0	5.0			9.0	9.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	272	860		87	653		233	243			330	289
v/s Ratio Prot	c0.11	c0.39		0.01	c0.50		0.04	c0.13			c0.17	
v/s Ratio Perm												0.03
v/c Ratio	0.72	0.81		0.11	1.34		0.24	0.86			0.92	0.15
Uniform Delay, d1	50.9	28.4		57.6	40.0		46.9	52.2			50.7	43.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			0.97	1.30
Incremental Delay, d2	8.7	8.2		0.6	163.2		0.5	24.5			26.4	0.2
Delay (s)	59.6	36.6		58.2	203.2		47.4	76.7			75.4	56.3
Level of Service	E	D		E	F		D	E			E	E
Approach Delay (s)		41.6			201.5			70.6			67.3	
Approach LOS		D			F			E			E	

Intersection Summary

HCM Average Control Delay	105.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	127.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	99.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis 20: Roeder Ave & C St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control	Free			Free			Stop			Stop			
Grade	0%			0%			0%			0%			
Volume (veh/h)	70	845	25	140	795	50	35	65	215	40	70	50	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly flow rate (vph)	70	845	25	140	795	50	35	65	215	40	70	50	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (ft)	735												
pX, platoon unblocked				0.66			0.66			0.66			
vC, conflicting volume	845				870			2182			2122		
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	845				802			2801			2710		
tC, single (s)	4.1				4.1			7.1			6.5		
tC, 2 stage (s)													
tF (s)	2.2				2.2			3.5			4.0		
p0 queue free %	91				74			0			0		
cM capacity (veh/h)	800				545			0			10		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	940	985	315	160									
Volume Left	70	140	35	40									
Volume Right	25	50	215	50									
cSH	800	545	0	0									
Volume to Capacity	0.09	0.26	Err	Err									
Queue Length 95th (ft)	7	25	Err	Err									
Control Delay (s)	2.4	8.0	Err	Err									
Lane LOS	A	A	F	F									
Approach Delay (s)	2.4	8.0	Err	Err									
Approach LOS			F	F									
Intersection Summary													
Average Delay	Err												
Intersection Capacity Utilization	112.9%			ICU Level of Service			H						
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis 21: E Chestnut St & Bay St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	825	80	20	655	35	255	245	5	340	70	45
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	10	825	80	20	655	35	255	245	5	340	70	45
Pedestrians		10									10	
Lane Width (ft)		11.0									11.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		1									1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)					356							
pX, platoon unblocked	0.83						0.83	0.83		0.83	0.83	0.83
vC, conflicting volume	700			905			1688	1625	865	1695	1648	692
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	637			905			1832	1756	865	1841	1784	628
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			0	0	99	0	0	89
cM capacity (veh/h)	780			752			0	67	353	0	64	396
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1	SB 2	SB 3					
Volume Total	10	905	710	505	340	70	45					
Volume Left	10	0	20	255	340	0	0					
Volume Right	0	80	35	5	0	0	45					
cSH	780	1700	752	0	0	64	396					
Volume to Capacity	0.01	0.53	0.03	Err	Err	1.09	0.11					
Queue Length 95th (ft)	1	0	2	Err	Err	137	10					
Control Delay (s)	9.7	0.0	0.7	Err	Err	247.1	15.3					
Lane LOS	A		A	F	F	F	C					
Approach Delay (s)	0.1		0.7	Err	Err							
Approach LOS				F	F							
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization		93.5%		ICU Level of Service				F				
Analysis Period (min)			15									

Timings
22: E Chestnut St & Commercial St

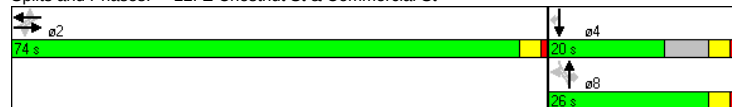
Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	130	965	115	365	210	285	100	185	145	85
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	D.Pm	Perm	Perm	Perm
Protected Phases	2	2	2	2	8	8	8	4	4	4
Permitted Phases	2	2	2	2	8	8	8	4	4	4
Detector Phases	2	2	2	2	8	8	8	4	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	26.0	26.0	26.0	26.0	19.0	19.0	19.0	20.0	20.0	20.0
Total Split (s)	74.0	74.0	74.0	74.0	26.0	26.0	26.0	20.0	20.0	20.0
Total Split (%)	74.0%	74.0%	74.0%	74.0%	26.0%	26.0%	26.0%	20.0%	20.0%	20.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	70.0	70.0	70.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.70	0.70	0.70	0.22	0.22	0.22	0.22	0.22	0.22	0.22
v/c Ratio	0.57	0.44	0.31	0.92	0.72	0.24	1.58	0.37	0.23	0.23
Control Delay	8.8	14.8	11.7	81.5	47.8	8.2	328.1	36.3	8.9	8.9
Queue Delay	0.5	0.0	3.2	0.0	0.0	0.3	183.0	0.0	0.0	0.0
Total Delay	9.3	14.8	14.8	81.5	47.8	8.6	511.1	36.3	8.9	8.9
LOS	A	B	B	F	D	A	F	D	A	A
Approach Delay	9.3	14.8			53.1			242.3		
Approach LOS	A	B			D			F		

Intersection Summary

Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 1.58	
Intersection Signal Delay: 56.5	Intersection LOS: E
Intersection Capacity Utilization 91.5%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 22: E Chestnut St & Commercial St



HCM Signalized Intersection Capacity Analysis
22: E Chestnut St & Commercial St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.92
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00
Frt	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.99	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3402	1711	1776	1711	1801	1531	1681	1801	1406	1801	1406	1406
Flt Permitted	0.83	0.21	1.00	0.58	1.00	1.00	0.30	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	2851	376	1776	1043	1801	1531	533	1801	1406	1801	1406	1406
Volume (vph)	130	965	50	115	365	25	210	285	100	185	145	85
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	130	965	50	115	365	25	210	285	100	185	145	85
RTOR Reduction (vph)	0	3	0	0	2	0	0	0	78	0	0	66
Lane Group Flow (vph)	0	1142	0	115	388	0	210	285	22	185	145	19
Confl. Peds. (#/hr)	20			20			20			20		20
Heavy Vehicles (%)	1%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	D.Pm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	8	8	8	8	4	4
Permitted Phases	2	2	2	2	2	2	8	8	8	8	4	4
Actuated Green, G (s)	70.0	70.0	70.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Effective Green, g (s)	70.0	70.0	70.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.70	0.70	0.70	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1996	263	1243	229	396	337	117	396	309	309	309	309
v/s Ratio Prot				0.22			0.16			0.08		
v/s Ratio Perm	c0.40	0.31		0.20			0.01	c0.35		0.01		0.01
v/c Ratio	0.57	0.44	0.31	0.92	0.72	0.07	1.58	0.37	0.06	0.37	0.06	0.06
Uniform Delay, d1	7.5	6.5	5.8	38.1	36.1	30.9	39.0	33.1	30.8	33.1	30.8	30.8
Progression Factor	1.00	1.89	2.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.5	0.1	41.3	10.8	0.4	298.2	2.6	0.4	2.6	0.4	0.4
Delay (s)	8.7	12.8	11.6	79.4	46.9	31.2	337.2	35.7	31.2	35.7	31.2	31.2
Level of Service	A	B	B	E	D	C	F	D	C	D	C	C
Approach Delay (s)	8.7	11.9		55.7			169.2					
Approach LOS	A	B		E			F					

Intersection Summary

HCM Average Control Delay	44.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
23: E Chestnut St & Cornwall Ave

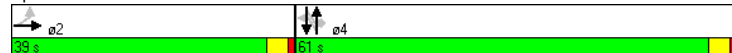
Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	→	↖	↑	↗	↘	↓
Lane Group	EBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↔↔		↔	↗		↔↔
Volume (vph)	975	370	325	75	125	200
Turn Type	Perm			Perm	Perm	
Protected Phases	2		4		4	
Permitted Phases	4			4	4	
Detector Phases	2	4	4	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	26.0	19.0	19.0	19.0	19.0	19.0
Total Split (s)	39.0	61.0	61.0	61.0	61.0	61.0
Total Split (%)	39.0%	61.0%	61.0%	61.0%	61.0%	61.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	35.0		57.0	57.0		57.0
Actuated g/C Ratio	0.35		0.57	0.57		0.57
v/c Ratio	1.15		1.17	0.10		0.95
Control Delay	103.6		118.8	8.3		41.9
Queue Delay	42.6		0.0	0.0		0.0
Total Delay	146.2		118.8	8.3		41.9
LOS	F		F	A		D
Approach Delay	146.2		108.0			41.9
Approach LOS	F		F			D

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 80
Control Type: Pretimed
Maximum v/c Ratio: 1.17
Intersection Signal Delay: 116.0
Intersection Capacity Utilization 113.3%
Analysis Period (min) 15

Splits and Phases: 23: E Chestnut St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
23: E Chestnut St & Cornwall Ave

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↘	↗	←	↖	↗	↑	↘	↗	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔	↗		↔↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0		4.0	
Lane Util. Factor		0.95						1.00	1.00		1.00	
Frpb, ped/bikes		0.97						1.00	0.89		0.97	
Flpb, ped/bikes		0.99						0.98	1.00		1.00	
Frt		0.97						1.00	0.85		0.96	
Flt Protected		1.00						0.97	1.00		0.99	
Satd. Flow (prot)		3224						1721	1362		1684	
Flt Permitted		1.00						0.59	1.00		0.48	
Satd. Flow (perm)		3224						1039	1362		825	
Volume (vph)	75	975	280	0	0	0	370	325	75	125	200	135
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	75	975	280	0	0	0	370	325	75	125	200	135
RTOR Reduction (vph)	0	24	0	0	0	0	0	0	7	0	15	0
Lane Group Flow (vph)	0	1306	0	0	0	0	0	695	68	0	445	0
Confl. Peds. (#/hr)	50		50				50		50	50		50
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	Perm						Perm		Perm	Perm		
Protected Phases	2						4		4	4	4	
Permitted Phases	2						4		4	4		
Actuated Green, G (s)		35.0						57.0	57.0		57.0	
Effective Green, g (s)		35.0						57.0	57.0		57.0	
Actuated g/C Ratio		0.35						0.57	0.57		0.57	
Clearance Time (s)		4.0						4.0	4.0		4.0	
Lane Grp Cap (vph)		1128						592	776		470	
v/s Ratio Prot												
v/s Ratio Perm		0.41						0.67	0.05		0.54	
v/c Ratio		1.16						1.17	0.09		0.95	
Uniform Delay, d1		32.5						21.5	9.7		20.1	
Progression Factor		0.80						1.00	1.00		0.76	
Incremental Delay, d2		78.9						95.2	0.2		25.0	
Delay (s)		105.0						116.7	10.0		40.2	
Level of Service		F						F	A		D	
Approach Delay (s)		105.0			0.0			106.3			40.2	
Approach LOS		F			A			F			D	

Intersection Summary

HCM Average Control Delay	93.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	113.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
38: Roeder Ave & Central Ave

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	50	735	350	60	495	335	340	345	70	160	310	195
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	50	735	350	60	495	335	340	345	70	160	310	195
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)					1113							
pX, platoon unblocked	1.00						1.00	1.00		1.00	1.00	1.00
vC, conflicting volume	830			1085			2142	1960	910	2035	1968	662
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	830			1085			2145	1962	910	2037	1970	662
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			91			0	0	79	0	0	58
cM capacity (veh/h)	800			643			0	54	333	0	53	461
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	1135	890	755	665								
Volume Left	50	60	340	160								
Volume Right	350	335	70	195								
cSH	800	643	0	0								
Volume to Capacity	0.06	0.09	Err	Err								
Queue Length 95th (ft)	5	8	Err	Err								
Control Delay (s)	2.0	2.7	Err	Err								
Lane LOS	A	A	F	F								
Approach Delay (s)	2.0	2.7	Err	Err								
Approach LOS			F	F								
Intersection Summary												
Average Delay	Err											
Intersection Capacity Utilization	155.2%		ICU Level of Service				H					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
39: Roeder Ave & Hilton Ave

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕↕↕↕↕					
Sign Control	Free			Free		Stop
Grade	0%			0%		0%
Volume (veh/h)	910	95	0	960	120	5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	910	95	0	960	120	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	550					
pX, platoon unblocked					0.64	
vC, conflicting volume	1005			1918		958
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1005			2435		958
tC, single (s)	4.1			6.4		6.2
tC, 2 stage (s)						
tF (s)	2.2			3.5		3.3
p0 queue free %	100			0		98
cM capacity (veh/h)	689			22		312
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	1005	960	125			
Volume Left	0	0	120			
Volume Right	95	0	5			
cSH	1700	689	23			
Volume to Capacity	0.59	0.00	5.39			
Queue Length 95th (ft)	0	0	Err			
Control Delay (s)	0.0	0.0	Err			
Lane LOS			F			
Approach Delay (s)	0.0	0.0	Err			
Approach LOS			F			
Intersection Summary						
Average Delay	598.0					
Intersection Capacity Utilization	67.3%		ICU Level of Service		C	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
45: Laurel St & Bay St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	95	340	150	465	125	30
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	95	340	150	465	125	30
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total (vph)	208	227	100	515	155	
Volume Left (vph)	95	0	0	0	125	
Volume Right (vph)	0	0	0	465	30	
Hadj (s)	0.26	0.03	0.03	-0.60	0.08	
Departure Headway (s)	5.9	5.7	5.6	4.9	6.2	
Degree Utilization, x	0.34	0.36	0.16	0.71	0.27	
Capacity (veh/h)	583	612	622	706	526	
Control Delay (s)	10.8	10.6	8.4	17.8	11.4	
Approach Delay (s)	10.7		16.3		11.4	
Approach LOS	B		C		B	
Intersection Summary						
Delay			13.6			
HCM Level of Service			B			
Intersection Capacity Utilization			50.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
47: Oak St & Cornwall Ave

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	55	20	20	245	140	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	55	20	20	245	140	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)					671	
pX, platoon unblocked						
vC, conflicting volume	432	148	155			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	432	148	155			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	98	99			
cM capacity (veh/h)	572	899	1425			
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	75	265	155			
Volume Left	55	20	0			
Volume Right	20	0	15			
cSH	634	1425	1700			
Volume to Capacity	0.12	0.01	0.09			
Queue Length 95th (ft)	10	1	0			
Control Delay (s)	11.4	0.7	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.4	0.7	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			36.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 48: Wharf Street & Cornwall Ave

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free				Free				Stop			
Grade	0%				0%				0%			
Volume (veh/h)	20	325	45	65	30	10	20	235	90	50	40	20
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	20	325	45	65	30	10	20	235	90	50	40	20
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type									None		None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	40				370				592	558	348	760
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	40				370				592	558	348	760
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1
tC, 2 stage (s)												
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5
p0 queue free %	99				95				94	43	87	66
cM capacity (veh/h)	1570				1189				359	409	696	146
											400	1038
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	390	105	345	110								
Volume Left	20	65	20	50								
Volume Right	45	10	90	20								
cSH	1570	1189	454	238								
Volume to Capacity	0.01	0.05	0.76	0.46								
Queue Length 95th (ft)	1	4	161	56								
Control Delay (s)	0.5	5.3	33.9	32.5								
Lane LOS	A	A	D	D								
Approach Delay (s)	0.5	5.3	33.9	32.5								
Approach LOS					D							
Intersection Summary												
Average Delay					16.8							
Intersection Capacity Utilization					60.9%	ICU Level of Service		B				
Analysis Period (min)					15							

HCM Signalized Intersection Capacity Analysis
49: Maple St & Bay St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.97		1.00	0.96			1.00			0.96	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1711	1739		1711	1733			1792			1711	
Flt Permitted	0.44	1.00		0.41	1.00			1.00			0.99	
Satd. Flow (perm)	797	1739		730	1733			1792			1711	
Volume (vph)	115	235	70	15	150	50	15	530	15	30	75	45
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	115	235	70	15	150	50	15	530	15	30	75	45
RTOR Reduction (vph)	0	13	0	0	15	0	0	1	0	0	22	0
Lane Group Flow (vph)	115	292	0	15	185	0	0	559	0	0	128	0
Turn Type	pm+pt			pm+pt			Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases	4			8								
Actuated Green, G (s)	20.0	17.0		15.4	14.7			26.8			8.6	
Effective Green, g (s)	20.0	17.0		15.4	14.7			26.8			8.6	
Actuated g/C Ratio	0.29	0.25		0.22	0.21			0.39			0.12	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	270	428		173	369			695			213	
v/s Ratio Prot	c0.02	c0.17		0.00	0.11			c0.31			c0.07	
v/s Ratio Perm	0.10			0.02								
v/c Ratio	0.43	0.68		0.09	0.50			0.80			0.60	
Uniform Delay, d1	19.5	23.6		21.2	24.0			18.8			28.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.1	4.5		0.2	1.1			6.7			4.7	
Delay (s)	20.6	28.1		21.4	25.0			25.5			33.4	
Level of Service	C	C		C	C			C			C	
Approach Delay (s)		26.0			24.8			25.5			33.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	69.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

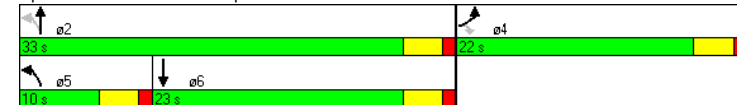
Timings
50: Maple St & Commercial St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations	↰	↱	↰	↱	↱
Volume (vph)	110	165	160	575	275
Turn Type	Perm pm+pt				
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phases	4	4	5	2	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	8.0	22.0	22.0
Total Split (s)	22.0	22.0	10.0	33.0	23.0
Total Split (%)	40.0%	40.0%	18.2%	60.0%	41.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lead		Lag
Lead-Lag Optimize?					
Recall Mode	None	None	None	C-Min	None
Act Effct Green (s)	9.4	9.4	39.5	40.3	31.2
Actuated g/C Ratio	0.17	0.17	0.72	0.73	0.57
v/c Ratio	0.38	0.41	0.26	0.44	0.33
Control Delay	22.5	6.9	5.1	6.1	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	6.9	5.1	6.1	10.9
LOS	C	A	A	A	B
Approach Delay	13.2			5.9	10.9
Approach LOS	B			A	B

Intersection Summary	
Cycle Length: 55	
Actuated Cycle Length: 55	
Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.44	
Intersection Signal Delay: 8.6	Intersection LOS: A
Intersection Capacity Utilization 43.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 50: Maple St & Commercial St



HCM Signalized Intersection Capacity Analysis
50: Maple St & Commercial St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1711	1531	1711	1801	1760	
Flt Permitted	0.95	1.00	0.46	1.00	1.00	
Satd. Flow (perm)	1711	1531	830	1801	1760	
Volume (vph)	110	165	160	575	275	55
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	110	165	160	575	275	55
RTOR Reduction (vph)	0	140	0	0	10	0
Lane Group Flow (vph)	110	25	160	575	320	0
Turn Type	Perm pm+pt					
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	8.3	8.3	38.7	38.7	28.8	
Effective Green, g (s)	8.3	8.3	38.7	38.7	28.8	
Actuated g/C Ratio	0.15	0.15	0.70	0.70	0.52	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	258	231	679	1267	922	
v/s Ratio Prot	c0.06		0.03	c0.32	0.18	
v/s Ratio Perm		0.02	0.14			
v/c Ratio	0.43	0.11	0.24	0.45	0.35	
Uniform Delay, d1	21.2	20.2	3.0	3.5	7.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	0.2	0.2	1.2	0.2	
Delay (s)	22.3	20.4	3.2	4.7	7.9	
Level of Service	C	C	A	A	A	
Approach Delay (s)	21.1			4.4	7.9	
Approach LOS	C			A	A	
Intersection Summary						
HCM Average Control Delay		8.7		HCM Level of Service	A	
HCM Volume to Capacity ratio		0.45				
Actuated Cycle Length (s)		55.0		Sum of lost time (s)	8.0	
Intersection Capacity Utilization		43.0%		ICU Level of Service	A	
Analysis Period (min)		15				
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
52: Maple St & Central Ave

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	10	310	385	95	285	330
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	10	310	385	95	285	330
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1332	432			480	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1332	432			480	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	50			74	
cM capacity (veh/h)	125	623			1082	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	320	480	615			
Volume Left	10	0	285			
Volume Right	310	95	0			
cSH	554	1700	1082			
Volume to Capacity	0.58	0.28	0.26			
Queue Length 95th (ft)	91	0	27			
Control Delay (s)	20.0	0.0	6.1			
Lane LOS	C		A			
Approach Delay (s)	20.0	0.0	6.1			
Approach LOS	C					
Intersection Summary						
Average Delay		7.2				
Intersection Capacity Utilization		88.9%		ICU Level of Service	E	
Analysis Period (min)		15				



Movement Summary

New Whatcom

Alternative 1 2026

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	% HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95 % Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
Laurel Street										
11L	L	10	9.1	0.917	43.4	LOS D	522	1.00	1.66	15.2
16T	T	350	2.0	0.941	37.1	LOS D	522	1.00	1.67	15.9
16R	R	140	2.1	0.940	38.7	LOS D	522	1.00	1.61	15.6
Approach		501	2.2	0.942	37.7	LOS D	522	1.00	1.65	15.8
Commercial Street										
17L	L	130	2.3	0.681	19.9	LOS B	218	0.94	1.16	20.8
14T	T	230	2.2	0.680	13.2	LOS B	218	0.94	1.13	22.8
14R	R	61	1.6	0.678	14.7	LOS B	218	0.94	1.05	22.2
Approach		421	2.1	0.681	15.5	LOS B	218	0.94	1.13	22.0
Laurel Street										
15L	L	1	50.0	0.667	13.7	LOS B	180	0.83	1.00	23.0
12T	T	330	2.1	0.607	7.0	LOS A	180	0.83	0.83	25.6
12R	R	140	2.1	0.606	8.8	LOS A	180	0.83	0.80	24.8
Approach		472	2.3	0.607	7.6	LOS A	180	0.83	0.82	25.3
Long Pond										
5L	L	160	1.9	0.479	18.4	LOS B	114	0.89	1.04	21.3
2R	R	85	2.4	0.480	11.9	LOS B	114	0.89	0.99	23.4
Approach		245	2.0	0.479	16.1	LOS B	114	0.89	1.03	21.9
Commercial Street										
13L	L	200	2.0	1.015	60.3	LOS E	755	1.00	2.08	12.9
18T	T	350	2.0	1.014	53.6	LOS D	755	1.00	2.08	13.1
18R	R	45	2.2	1.023	55.2	LOS E	755	1.00	2.03	12.9
Approach		595	2.0	1.015	56.0	LOS E	755	1.00	2.07	13.0
All Vehicles		2234	2.1	1.023	29.6	LOS C	755	0.94	1.42	17.7

Symbols which may appear in this table:

Following Degree of Saturation

Timings
1: Squalicum Pkwy & Meridian Street

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBT	NBL	NBT	SBL	SBT	ø1	ø3	ø6
Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT			
Lane Configurations	↰	↱	↰	↰	↱	↰	↱			
Volume (vph)	465	5	10	5	790	30	720			
Turn Type	Split			Prot		Prot				
Protected Phases	7	7	4	5	2	13	3 6	1	3	6
Permitted Phases										
Detector Phases	7	7	4	5	2	13	3 6			
Minimum Initial (s)	6.0	6.0	6.0	6.0	10.0			6.0	6.0	10.0
Minimum Split (s)	29.0	29.0	29.0	11.0	23.0			11.0	11.0	23.0
Total Split (s)	32.0	32.0	29.0	11.0	38.0	31.0	58.0	13.0	18.0	40.0
Total Split (%)	24.6%	24.6%	22.3%	8.5%	29.2%	23.8%	44.6%	10%	14%	31%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0			1.0	1.0	1.0
Lead/Lag			Lead	Lead	Lead			Lag	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Max			None	None	None
Act Effct Green (s)	28.0	28.0	23.1	7.0	34.0	23.0	50.0			
Actuated g/C Ratio	0.22	0.22	0.18	0.05	0.27	0.18	0.39			
v/c Ratio	1.26	0.07	0.18	0.05	0.84	0.10	0.81			
Control Delay	179.1	19.6	20.8	59.6	54.3	13.8	11.3			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	2.1			
Total Delay	179.1	19.6	20.8	59.6	54.3	13.8	13.4			
LOS	F	B	C	E	D	B	B			
Approach Delay		171.0	20.8		54.3		13.4			
Approach LOS		F	C		D		B			

Intersection Summary										
Cycle Length: 130										
Actuated Cycle Length: 128.2										
Natural Cycle: 145										
Control Type: Actuated-Uncoordinated										
Maximum v/c Ratio: 1.59										
Intersection Signal Delay: 58.1										
Intersection LOS: E										
Intersection Capacity Utilization 70.8%										
ICU Level of Service C										
Analysis Period (min) 15										

Splits and Phases: 1: Squalicum Pkwy & Meridian Street

#1 #36 ↑	#1 #36 ↑	#1 #36 ↑	#1 #36 ↑	#1 #36 ↑	#1 #36 ↑	#1 #36 ↑	#1 #36 ↑	#1 #36 ↑	#1 #36 ↑	#1 #36 ↑
ø2	ø2	ø2	ø2	ø2	ø2	ø2	ø2	ø2	ø2	ø2
13 s	13 s	13 s	13 s	13 s	13 s	13 s	13 s	13 s	13 s	13 s
#1 #36 ↑	#1 #36 ↑	#1 #36 ↑	#1 #36 ↑	#1 #36 ↑	#1 #36 ↑	#1 #36 ↑	#1 #36 ↑	#1 #36 ↑	#1 #36 ↑	#1 #36 ↑
ø6	ø6	ø6	ø6	ø6	ø6	ø6	ø6	ø6	ø6	ø6
11 s	11 s	11 s	11 s	11 s	11 s	11 s	11 s	11 s	11 s	11 s

HCM Signalized Intersection Capacity Analysis
1: Squalicum Pkwy & Meridian Street

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↰	↰	↱	↰	↰	↱	↰	↰	↱	↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.88			0.91		1.00	1.00		1.00	0.95	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1563			1715		1787	3568		1752	3326	
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1687	1563			1715		1787	3568		1752	3326	
Volume (vph)	465	5	20	10	10	40	5	790	10	30	720	370
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	465	5	20	10	10	40	5	790	10	30	720	370
RTOR Reduction (vph)	0	16	0	0	33	0	0	1	0	0	50	0
Lane Group Flow (vph)	465	9	0	0	27	0	5	799	0	30	1040	0
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split			Prot			Prot		
Protected Phases	7	7		4	4		5	2		13	3 6	
Permitted Phases												
Actuated Green, G (s)	27.0	27.0			22.1		6.0	33.0		21.0	48.0	
Effective Green, g (s)	28.0	28.0			23.1		7.0	34.0		23.0	50.0	
Actuated g/C Ratio	0.22	0.22			0.18		0.05	0.27		0.18	0.39	
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0				
Vehicle Extension (s)	3.0	3.0			3.0		2.0	2.0				
Lane Grp Cap (vph)	369	342			309		98	947		315	1298	
v/s Ratio Prot	c0.28	0.01			c0.02		0.00	c0.22		0.02	c0.31	
v/s Ratio Perm												
v/c Ratio	1.26	0.03			0.09		0.05	0.84		0.10	0.80	
Uniform Delay, d1	50.0	39.3			43.7		57.4	44.5		43.9	34.6	
Progression Factor	1.00	1.00			1.00		1.00	1.00		0.53	0.56	
Incremental Delay, d2	137.2	0.0			0.1		0.1	9.1		0.0	0.3	
Delay (s)	187.3	39.4			43.9		57.5	53.6		23.3	19.8	
Level of Service	F	D			D		E	D		C	B	
Approach Delay (s)		179.7			43.9			53.7			19.9	
Approach LOS		F			D			D			B	

Intersection Summary			
HCM Average Control Delay	63.1	HCM Level of Service	E
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	128.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Meridian Street & Broadway St

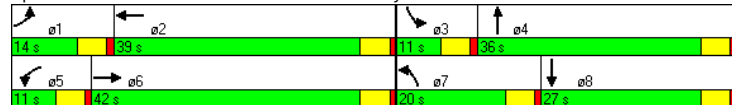
Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	110	360	40	395	180	220	35	220
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	1	6	5	2	7	4	3	8
Permitted Phases								
Detector Phases	1	6	5	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	25.0	11.0	25.0	11.0	25.0	11.0	25.0
Total Split (s)	14.0	42.0	11.0	39.0	20.0	36.0	11.0	27.0
Total Split (%)	14.0%	42.0%	11.0%	39.0%	20.0%	36.0%	11.0%	27.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	10.4	36.1	8.7	31.9	13.4	23.5	8.7	16.3
Actuated g/C Ratio	0.14	0.51	0.12	0.45	0.18	0.32	0.12	0.22
v/c Ratio	0.45	0.53	0.20	0.53	0.57	0.58	0.17	0.66
Control Delay	45.0	23.8	43.4	27.4	42.4	26.7	43.0	38.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.0	23.8	43.4	27.4	42.4	26.7	43.0	38.0
LOS	D	C	D	C	D	C	D	D
Approach Delay	27.8		28.8		32.3		38.5	
Approach LOS	C		C		C		D	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 71.1
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 31.0
Intersection Capacity Utilization 69.1%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service C

Splits and Phases: 2: Meridian Street & Broadway St



HCM Signalized Intersection Capacity Analysis
2: Meridian Street & Broadway St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1745		1728	1796		1728	1711		1745	1785	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1728	1745		1728	1796		1728	1711		1745	1785	
Volume (vph)	110	360	115	40	395	30	180	220	110	35	220	45
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	110	360	115	40	395	30	180	220	110	35	220	45
RTOR Reduction (vph)	0	11	0	0	2	0	0	19	0	0	8	0
Lane Group Flow (vph)	110	464	0	40	423	0	180	311	0	35	257	0
Confl. Peds. (#/hr)	5			5			5			5		
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	5.8	31.1		2.8	28.1		8.7	18.5		2.8	12.6	
Effective Green, g (s)	6.8	32.1		3.8	29.1		9.7	19.5		3.8	13.6	
Actuated g/C Ratio	0.09	0.43		0.05	0.39		0.13	0.26		0.05	0.18	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	156	745		87	695		223	444		88	323	
v/s Ratio Prot	c0.06	c0.27		0.02	0.24		c0.10	c0.18		0.02	0.14	
v/s Ratio Perm												
v/c Ratio	0.71	0.62		0.46	0.61		0.81	0.70		0.40	0.80	
Uniform Delay, d1	33.2	16.8		34.7	18.5		31.8	25.2		34.6	29.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.2	1.2		1.4	1.0		17.9	3.9		1.1	11.9	
Delay (s)	44.4	18.0		36.1	19.5		49.8	29.1		35.7	41.3	
Level of Service	D	B		D	B		D	C		D	D	
Approach Delay (s)	23.0			20.9			36.4			40.7		
Approach LOS	C			C			D			D		

Intersection Summary

HCM Average Control Delay	29.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	75.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
3: Ohio St & N State St

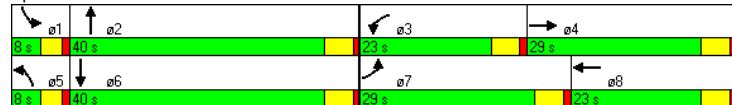
Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	550	440	290	140	40	1135	40	1025
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	24.0	24.0	23.0	23.0	8.0	21.0	8.0	21.0
Total Split (s)	29.0	29.0	23.0	23.0	8.0	40.0	8.0	40.0
Total Split (%)	29.0%	29.0%	23.0%	23.0%	8.0%	40.0%	8.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	25.1	25.1	18.7	18.7	4.0	36.1	4.0	36.1
Actuated g/C Ratio	0.26	0.26	0.19	0.19	0.04	0.37	0.04	0.37
v/c Ratio	1.22	1.06	0.87	0.57	0.58	1.11	0.58	1.01
Control Delay	153.5	93.4	65.7	39.8	79.4	89.4	79.4	59.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	153.5	93.4	65.7	39.8	79.4	89.4	79.4	59.2
LOS	F	F	E	D	E	F	E	E
Approach Delay	125.0		55.1		89.1		59.8	
Approach LOS	F		E		F		E	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 96.5
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.22
Intersection Signal Delay: 84.9
Intersection Capacity Utilization 92.7%
Analysis Period (min) 15
Intersection LOS: F
ICU Level of Service F

Splits and Phases: 3: Ohio St & N State St



HCM Signalized Intersection Capacity Analysis
3: Ohio St & N State St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.96		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1788		1711	1720		1728	3354		1728	3349	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1728	1788		1711	1720		1728	3354		1728	3349	
Volume (vph)	550	440	55	290	140	60	40	1135	275	40	1025	265
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	550	440	55	290	140	60	40	1135	275	40	1025	265
RTOR Reduction (vph)	0	4	0	0	15	0	0	21	0	0	23	0
Lane Group Flow (vph)	550	491	0	290	185	0	40	1389	0	40	1267	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	24.0	24.0		17.7	17.7		2.3	35.1		2.3	35.1	
Effective Green, g (s)	25.0	25.0		18.7	18.7		2.3	36.1		2.3	36.1	
Actuated g/C Ratio	0.25	0.25		0.19	0.19		0.02	0.37		0.02	0.37	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	440	456		326	328		41	1234		41	1232	
v/s Ratio Prot	c0.32	c0.27		0.17	0.11		c0.02	c0.41		0.02	0.38	
v/s Ratio Perm												
v/c Ratio	1.25	1.08		0.89	0.56		0.98	1.13		0.98	1.03	
Uniform Delay, d1	36.6	36.6		38.7	36.0		47.9	31.0		47.9	31.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	130.2	64.0		24.7	2.7		130.1	67.5		130.1	33.2	
Delay (s)	166.7	100.5		63.4	38.7		178.0	98.5		178.0	64.2	
Level of Service	F	F		E	D		F	F		F	E	
Approach Delay (s)	135.4			53.3			100.7			67.6		
Approach LOS	F			D			F			E		

Intersection Summary

HCM Average Control Delay	93.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	98.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
4: Iowa St & James Street

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	←	←	↙	↓	↘	↗	→
Lane Group	WBL	WBT	SBL	SBT	SBR	NEL	NER
Lane Configurations							
Volume (vph)	525	70	225	170	840	795	815
Turn Type	Split		Perm		Over		pt+ov
Protected Phases	3	3		1	2	2	2 3
Permitted Phases			1				
Detector Phases	3	3	1	1	2	2	2 3
Minimum Initial (s)	6.0	6.0	8.0	8.0	6.0	6.0	
Minimum Split (s)	11.0	11.0	20.0	20.0	17.0	17.0	
Total Split (s)	13.0	13.0	45.0	45.0	22.0	22.0	35.0
Total Split (%)	16.3%	16.3%	56.3%	56.3%	27.5%	27.5%	43.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag			Lead	Lead	Lag	Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	
Act Effct Green (s)	9.0	9.0		41.0	18.0	18.0	31.0
Actuated g/C Ratio	0.11	0.11		0.51	0.22	0.22	0.39
v/c Ratio	1.59	1.63		4.34	1.39	1.27	1.25
Control Delay	317.6	333.2		1540.2	212.1	160.4	153.4
Queue Delay	0.0	0.0		0.0	0.0	5.3	20.0
Total Delay	317.6	333.2		1540.2	212.1	165.8	173.4
LOS	F	F		F	F	F	F
Approach Delay		325.6		633.5		169.0	
Approach LOS		F		F		F	

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 4.34

Intersection Signal Delay: 362.7 Intersection LOS: F

Intersection Capacity Utilization 79.3% ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 4: Iowa St & James Street



HCM Signalized Intersection Capacity Analysis
4: Iowa St & James Street

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	←	←	↙	↓	↘	↗	→	↖	↗	↘
Movement	WBL	WBT	WBR	SBL	SBT	SBR	SBR2	NEL	NER	NER2
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95			1.00	0.88		0.97	0.91	
Frt	1.00	1.00			1.00	0.85		0.98	0.85	
Flt Protected	0.95	0.96			0.97	1.00		0.96	1.00	
Satd. Flow (prot)	1641	1661			1768	2720		3305	1407	
Flt Permitted	0.95	0.96			0.10	1.00		0.96	1.00	
Satd. Flow (perm)	1641	1661			177	2720		3305	1407	
Volume (vph)	525	70	5	225	170	840	10	795	815	15
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	525	70	5	225	170	840	10	795	815	15
RTOR Reduction (vph)	0	1	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	294	305	0	0	395	849	0	943	682	0
Heavy Vehicles (%)	1%	1%		1%	1%	1%		1%	1%	
Turn Type	Split			Perm		Over			pt+ov	
Protected Phases	3	3			1	2		2	2 3	
Permitted Phases				1						
Actuated Green, G (s)	8.0	8.0			40.0	17.0		17.0	30.0	
Effective Green, g (s)	9.0	9.0			41.0	18.0		18.0	31.0	
Actuated g/C Ratio	0.11	0.11			0.51	0.22		0.22	0.39	
Clearance Time (s)	5.0	5.0			5.0	5.0		5.0		
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0		
Lane Grp Cap (vph)	185	187			91	612		744	545	
v/s Ratio Prot	0.18	c0.18				c0.31		0.29	0.48	
v/s Ratio Perm					c2.23					
v/c Ratio	1.59	1.63			4.34	1.39		1.27	1.25	
Uniform Delay, d1	35.5	35.5			19.5	31.0		31.0	24.5	
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	289.2	307.2			1528.6	184.4		130.9	127.7	
Delay (s)	324.7	342.7			1548.1	215.4		161.9	152.2	
Level of Service	F	F			F	F		F	F	
Approach Delay (s)		333.9			638.2			157.8		
Approach LOS		F			F			F		

Intersection Summary

HCM Average Control Delay 360.6 HCM Level of Service F

HCM Volume to Capacity ratio 3.21

Actuated Cycle Length (s) 80.0 Sum of lost time (s) 12.0

Intersection Capacity Utilization 79.3% ICU Level of Service D

Analysis Period (min) 15

c Critical Lane Group

Timings
5: Iowa St & King St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱	↰
Volume (vph)	45	815	275	565	35	185	840	115	150
Turn Type	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	5	2	1	6	3	8	1	7	4
Permitted Phases	2		6		8		8	4	
Detector Phases	5	2	1	6	3	8	1	7	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	28.0	11.0	26.0	11.0	28.0	11.0	11.0	28.0
Total Split (s)	11.0	35.0	26.0	50.0	11.0	28.0	26.0	11.0	28.0
Total Split (%)	11.0%	35.0%	26.0%	50.0%	11.0%	28.0%	26.0%	11.0%	28.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	Min	None	Min	None	None	None	None	None
Act Effct Green (s)	34.8	27.8	54.6	48.6	20.9	15.5	42.2	21.6	17.7
Actuated g/C Ratio	0.38	0.32	0.63	0.56	0.23	0.18	0.49	0.24	0.20
v/c Ratio	0.13	0.84	0.52	0.34	0.13	0.57	1.03	0.39	0.52
Control Delay	11.2	35.9	19.9	13.1	24.4	41.1	63.1	28.5	35.6
Queue Delay	0.0	9.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.2	45.9	19.9	13.1	24.4	41.1	63.1	28.5	35.6
LOS	B	D	B	B	C	D	E	C	D
Approach Delay		44.3		15.1		58.0			33.0
Approach LOS		D		B		E			C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 86.5

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 39.4

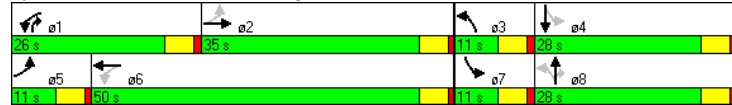
Intersection LOS: D

Intersection Capacity Utilization 94.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 5: Iowa St & King St



HCM Signalized Intersection Capacity Analysis
5: Iowa St & King St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1728	3393		1711	3354		1728	1818	1546	1745	1773	
Flt Permitted	0.40	1.00		0.12	1.00		0.49	1.00	1.00	0.43	1.00	
Satd. Flow (perm)	736	3393		210	3354		895	1818	1546	794	1773	
Volume (vph)	45	815	110	275	565	85	35	185	840	115	150	45
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	45	815	110	275	565	85	35	185	840	115	150	45
RTOR Reduction (vph)	0	10	0	0	10	0	0	0	64	0	11	0
Lane Group Flow (vph)	45	915	0	275	640	0	35	185	776	115	184	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	0%	0%	0%
Turn Type	pm+pt			pm+pt			pm+pt		pm+ov	pm+pt		
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	32.6	29.3		55.9	47.6		18.7	15.4	37.0	21.1	16.6	
Effective Green, g (s)	34.6	30.3		56.9	48.6		20.7	16.4	39.0	23.1	17.6	
Actuated g/C Ratio	0.38	0.33		0.63	0.54		0.23	0.18	0.43	0.25	0.19	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.6		3.0	3.0		3.6	3.6	3.0	3.0	3.0	
Lane Grp Cap (vph)	327	1132		505	1795		243	328	732	260	344	
v/s Ratio Prot	0.01	c0.27		0.14	0.19		0.01	0.10	c0.26	c0.03	0.10	
v/s Ratio Perm	0.05			0.21			0.03		0.24	0.09		
v/c Ratio	0.14	0.81		0.54	0.36		0.14	0.56	1.06	0.44	0.53	
Uniform Delay, d1	17.9	27.6		16.0	12.1		27.7	33.9	25.9	27.2	32.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	4.5		1.2	0.1		0.3	2.5	50.1	1.2	1.6	
Delay (s)	18.1	32.1		17.2	12.2		28.0	36.4	76.0	28.4	34.5	
Level of Service	B	C		B	B		C	D	E	C	C	
Approach Delay (s)		31.4			13.7			67.5			32.2	
Approach LOS		C			B			E			C	

Intersection Summary

HCM Average Control Delay	38.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	90.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
6: Iowa St & Moore St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	45	1180	205	815	155	65	140	115
Turn Type	Prot		Prot		Perm		Perm	
Protected Phases	1	6	5	2		4		8
Permitted Phases					4		8	
Detector Phases	1	6	5	2	4	4	8	8
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	27.0	12.0	27.0	21.0	21.0	21.0	21.0
Total Split (s)	12.0	51.0	17.0	56.0	32.0	32.0	32.0	32.0
Total Split (%)	12.0%	51.0%	17.0%	56.0%	32.0%	32.0%	32.0%	32.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	8.0	47.0	13.0	56.8		28.0		28.0
Actuated g/C Ratio	0.08	0.47	0.13	0.57		0.28		0.28
v/c Ratio	0.34	1.11	0.92	0.45		1.18		1.06
Control Delay	51.6	85.9	88.0	14.2		133.6		109.6
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	51.6	85.9	88.0	14.2		133.6		109.6
LOS	D	F	F	B		F		F
Approach Delay		85.1		28.4		133.6		109.6
Approach LOS		F		C		F		F

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.18
Intersection Signal Delay: 76.5
Intersection Capacity Utilization 103.5%
Analysis Period (min) 15
Intersection LOS: E
ICU Level of Service G

Splits and Phases: 6: Iowa St & Moore St



HCM Signalized Intersection Capacity Analysis
6: Iowa St & Moore St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.95		1.00	0.99			0.93			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1728	3278		1711	3394			1614			1673	
Flt Permitted	0.95	1.00		0.95	1.00			0.77			0.53	
Satd. Flow (perm)	1728	3278		1711	3394			1267			908	
Volume (vph)	45	1180		610	205	815	45	155	65	245	140	115
Peak-hour factor, PHF	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	45	1180		610	205	815	45	155	65	245	140	115
RTOR Reduction (vph)	0	65		0	0	4	0	0	41	0	0	3
Lane Group Flow (vph)	45	1725		0	205	856	0	0	424	0	0	272
Heavy Vehicles (%)	1%	1%		2%	2%	2%	2%	4%	4%	4%	6%	6%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	4.2	48.0		12.0	55.8			27.0			27.0	
Effective Green, g (s)	5.2	49.0		13.0	56.8			28.0			28.0	
Actuated g/C Ratio	0.05	0.48		0.13	0.56			0.27			0.27	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.5			3.5	
Lane Grp Cap (vph)	88	1575		218	1890			348			249	
v/s Ratio Prot	0.03	c0.53		c0.12	0.25							
v/s Ratio Perm								c0.33			0.30	
v/c Ratio	0.51	1.10		0.94	0.45			1.22			1.09	
Uniform Delay, d1	47.2	26.5		44.1	13.4			37.0			37.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	4.9	53.4		44.4	0.2			122.0			84.0	
Delay (s)	52.1	79.9		88.5	13.6			159.0			121.0	
Level of Service	D	E		F	B			F			F	
Approach Delay (s)		79.2			28.0			159.0			121.0	
Approach LOS		E			C			F			F	

Intersection Summary

HCM Average Control Delay	77.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	102.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	103.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Elm Street & Broadway St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	10	270	55	485	225	245	50	275
Turn Type	Perm		Perm		Prot		Prot	
Protected Phases		2		2	7	4	3	8
Permitted Phases	2		2					
Detector Phases	2	2	2	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	26.0	26.0	26.0	26.0	8.0	26.0	8.0	26.0
Total Split (s)	50.0	50.0	50.0	50.0	21.0	39.0	11.0	29.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	21.0%	39.0%	11.0%	29.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	29.5	29.5	29.5	29.5	13.8	30.3	6.8	17.4
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.19	0.41	0.09	0.23
v/c Ratio	0.06	0.50	0.17	0.80	0.70	0.47	0.33	0.68
Control Delay	16.0	19.1	17.1	29.5	46.3	22.1	46.7	37.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.0	19.1	17.1	29.5	46.3	22.1	46.7	37.8
LOS	B	B	B	C	D	C	D	D
Approach Delay		19.0		28.4		31.9		39.1
Approach LOS		B		C		C		D

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 74.2

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 29.6

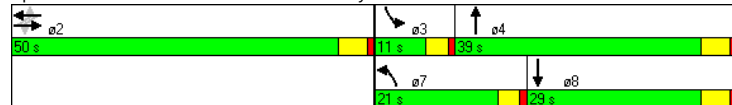
Intersection LOS: C

Intersection Capacity Utilization 76.7%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 7: Elm Street & Broadway St



HCM Signalized Intersection Capacity Analysis
7: Elm Street & Broadway St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1692	1715		1706	1758		1728	1731		1728	1802	
Flt Permitted	0.19	1.00		0.42	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	343	1715		754	1758		1728	1731		1728	1802	
Volume (vph)	10	270	80	55	485	80	225	245	90	50	275	15
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	270	80	55	485	80	225	245	90	50	275	15
RTOR Reduction (vph)	0	12	0	0	7	0	0	12	0	0	2	0
Lane Group Flow (vph)	10	338	0	55	558	0	225	323	0	50	288	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		2			2		7	4		3	8	
Permitted Phases	2			2								
Actuated Green, G (s)	28.4	28.4		28.4	28.4		13.8	29.1		3.5	18.8	
Effective Green, g (s)	29.4	29.4		29.4	29.4		13.8	30.1		3.5	19.8	
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.18	0.40		0.05	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	134	672		296	689		318	695		81	476	
v/s Ratio Prot		0.20			c0.32		c0.13	0.19		0.03	c0.16	
v/s Ratio Perm	0.03			0.07								
v/c Ratio	0.07	0.50		0.19	0.81		0.71	0.46		0.62	0.60	
Uniform Delay, d1	14.3	17.3		15.0	20.3		28.7	16.5		35.1	24.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.6		0.3	7.2		7.0	0.5		13.2	2.2	
Delay (s)	14.5	17.9		15.3	27.5		35.7	17.0		48.3	26.3	
Level of Service	B	B		B	C		D	B		D	C	
Approach Delay (s)		17.8			26.4			24.5			29.6	
Approach LOS		B			C			C			C	

Intersection Summary

HCM Average Control Delay	24.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Flora St & Cornwall Ave

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	280	585	30	245	175	25	460	175	395
Turn Type	Perm		Perm		Perm	Prot		Prot	
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8		2	1	6
Detector Phases	4	4	8	8	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	11.0	27.0	11.0	27.0
Total Split (s)	34.0	34.0	34.0	34.0	34.0	11.0	41.0	15.0	45.0
Total Split (%)	37.8%	37.8%	37.8%	37.8%	37.8%	12.2%	45.6%	16.7%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	30.0		30.0		30.0	7.0	36.0	10.8	46.4
Actuated g/C Ratio	0.34		0.34		0.34	0.07	0.41	0.12	0.52
v/c Ratio	1.15		0.66		0.30	0.20	0.96	0.85	0.52
Control Delay	113.8		34.7		5.0	44.3	52.7	73.4	17.2
Queue Delay	0.0		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	113.8		34.7		5.0	44.3	52.7	73.4	17.2
LOS	F		C		A	D	D	E	B
Approach Delay	113.8		23.1				52.4		32.5
Approach LOS	F		C				D		C

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 88.8
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.15
Intersection Signal Delay: 63.1
Intersection Capacity Utilization 103.3%
Analysis Period (min) 15
Intersection LOS: E
ICU Level of Service G

Splits and Phases: 8: Flora St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
8: Flora St & Cornwall Ave

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor		0.95			1.00	1.00		1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.91		1.00		0.98	1.00	
Flpb, ped/bikes		0.99			1.00	1.00		1.00		1.00	1.00	
Frt		1.00			1.00	0.85		1.00		0.95	1.00	
Flt Protected		0.98			0.99	1.00		0.95		1.00	0.95	
Satd. Flow (prot)		3301			1806	1404		1694		1670	1694	
Flt Permitted		0.67			0.65	1.00		0.95		1.00	0.95	
Satd. Flow (perm)		2262			1187	1404		1694		1670	1694	
Volume (vph)	280	585	25	30	245	175	25	460	210	175	395	75
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	280	585	25	30	245	175	25	460	210	175	395	75
RTOR Reduction (vph)	0	2	0	0	0	118	0	18	0	0	7	0
Lane Group Flow (vph)	0	888	0	0	275	57	25	652	0	175	463	0
Confl. Peds. (#/hr)	35		35	35		35			35			35
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	3%	3%	3%
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)	29.0			29.0		29.0	2.4	38.1		9.8	45.5	
Effective Green, g (s)	30.0			30.0		30.0	3.4	39.1		10.8	46.5	
Actuated g/C Ratio	0.33			0.33		0.33	0.04	0.43		0.12	0.51	
Clearance Time (s)	5.0			5.0		5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0			2.0		2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	738			387		458	63	711		199	868	
v/s Ratio Prot							0.01	c0.39		c0.10	0.27	
v/s Ratio Perm	c0.39				0.23	0.04						
v/c Ratio	1.20			0.71		0.12	0.40	0.92		0.88	0.53	
Uniform Delay, d1	31.0			27.1		21.7	43.2	24.9		39.9	15.4	
Progression Factor	1.00			1.00		1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	104.1			5.1		0.0	16.3	31.8		0.3		
Delay (s)	135.1			32.2		21.8	44.7	41.2		71.7	15.7	
Level of Service	F			C		C	D	D		E	B	
Approach Delay (s)	135.1			28.1			41.4			30.9		
Approach LOS	F			C			D			C		

Intersection Summary

HCM Average Control Delay	67.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	91.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	103.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Timings
9: York St & N State St

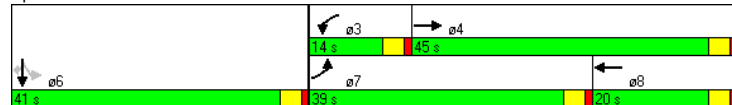
Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	SBT	SBR
Lane Configurations						
Volume (vph)	640	435	80	295	940	195
Turn Type	Prot		Prot		Perm	
Protected Phases	7	4	3	8	6	
Permitted Phases						6
Detector Phases	7	4	3	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	21.0	21.0
Total Split (s)	39.0	45.0	14.0	20.0	41.0	41.0
Total Split (%)	39.0%	45.0%	14.0%	20.0%	41.0%	41.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag		
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	35.0	42.6	8.9	14.4	37.0	37.0
Actuated g/C Ratio	0.36	0.43	0.09	0.15	0.38	0.38
v/c Ratio	1.06	0.37	0.55	0.73	1.01	0.28
Control Delay	86.8	19.2	57.4	47.3	58.9	5.2
Queue Delay	0.0	0.0	0.0	0.0	2.0	0.0
Total Delay	86.8	19.2	57.4	47.3	61.0	5.2
LOS	F	B	E	D	E	A
Approach Delay		55.9		49.2	53.6	
Approach LOS		E		D	D	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 98.4
Natural Cycle: 110
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.06
Intersection Signal Delay: 53.9
Intersection Capacity Utilization 91.4%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service F

Splits and Phases: 9: York St & N State St



HCM Signalized Intersection Capacity Analysis
9: York St & N State St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95						0.95	1.00
Frt	1.00	0.97		1.00	0.97						1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (prot)	1694	3289		1646	3209						3376	1531
Flt Permitted	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (perm)	1694	3289		1646	3209						3376	1531
Volume (vph)	640	435	105	80	295	60	0	0	0	340	940	195
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	640	435	105	80	295	60	0	0	0	340	940	195
RTOR Reduction (vph)	0	21	0	0	17	0	0	0	0	0	0	114
Lane Group Flow (vph)	640	519	0	80	338	0	0	0	0	0	1280	81
Heavy Vehicles (%)	3%	3%	3%	6%	6%	6%	0%	0%	0%	0%	2%	2%
Turn Type	Prot			Prot						Perm		Perm
Protected Phases	7	4		3	8						6	
Permitted Phases										6		6
Actuated Green, G (s)	35.0	42.6		7.6	15.2						37.0	37.0
Effective Green, g (s)	35.0	42.6		7.6	15.2						37.0	37.0
Actuated g/C Ratio	0.35	0.43		0.08	0.15						0.37	0.37
Clearance Time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)	598	1412		126	492						1259	571
v/s Ratio Prot	c0.38	0.16		0.05	c0.11							
v/s Ratio Perm											0.38	0.05
v/c Ratio	1.07	0.37		0.63	0.69						1.02	0.14
Uniform Delay, d1	32.1	19.2		44.5	39.7						31.1	20.6
Progression Factor	1.00	1.00		1.00	1.00						1.00	1.00
Incremental Delay, d2	57.0	0.2		10.0	4.0						29.6	0.1
Delay (s)	89.1	19.3		54.5	43.7						60.7	20.7
Level of Service	F	B		D	D						E	C
Approach Delay (s)		57.2			45.7			0.0			55.4	
Approach LOS		E			D			A			E	

Intersection Summary

HCM Average Control Delay	54.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	99.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
10: York St & N Forest St

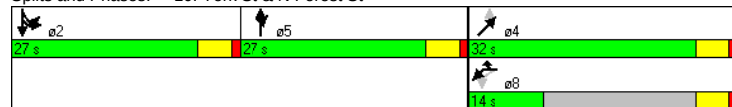
Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	←	↖	↑	↗	↘	↓	↙	↘
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	NEL	NET
Lane Configurations	↖	↖	↖	↖	↖	↖	↖	↖
Volume (vph)	0	95	185	385	165	665	70	830
Turn Type	Prot	Split	Split	Split	Split	custom	Prot	Prot
Protected Phases	8!	8!	5	5	2	2		4!
Permitted Phases							4	
Detector Phases	8	8	5	5	2	2	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	9.0	27.0	27.0	27.0	27.0	29.0	29.0
Total Split (s)	14.0	14.0	27.0	27.0	27.0	27.0	32.0	32.0
Total Split (%)	16.3%	16.3%	31.4%	31.4%	31.4%	31.4%	37.2%	37.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	Min	Min	Min	Min	None	None
Act Effct Green (s)	26.2	26.2	19.6	19.6	20.1	20.1	26.2	26.2
Actuated g/C Ratio	0.33	0.33	0.25	0.25	0.26	0.26	0.33	0.33
v/c Ratio	0.21	0.36	0.80	0.75	0.42	0.76	0.12	0.87
Control Delay	21.8	16.2	44.4	41.0	28.9	33.9	20.9	36.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
Total Delay	21.8	16.2	44.4	41.0	28.9	34.2	20.9	36.1
LOS	C	B	D	D	C	C	C	D
Approach Delay	18.3		42.8			33.1		35.1
Approach LOS	B		D			C		D

Intersection Summary

Cycle Length: 86
Actuated Cycle Length: 78.3
Natural Cycle: 85
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 34.2
Intersection Capacity Utilization 81.5%
Analysis Period (min) 15
! Phase conflict between lane groups.

Splits and Phases: 10: York St & N Forest St



HCM Signalized Intersection Capacity Analysis
10: York St & N Forest St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	WBL2	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL2	SBL	SBT	NEL	NET
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		0.95	0.95			1.00	0.95	1.00	0.95
Frt		1.00	0.85		0.94	0.85			1.00	1.00	1.00	0.98
Flt Protected		0.95	1.00		1.00	1.00			0.95	1.00	0.95	1.00
Satd. Flow (prot)		1728	1546		1617	1468			1711	3421	1678	3287
Flt Permitted		0.95	1.00		1.00	1.00			0.95	1.00	0.95	1.00
Satd. Flow (perm)		1728	1546		1617	1468			1711	3421	1678	3287
Volume (vph)	120	0	95	110	185	385	30	20	165	665	70	830
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	120	0	95	110	185	385	30	20	165	665	70	830
RTOR Reduction (vph)	0	0	48	0	0	5	0	0	0	0	0	1
Lane Group Flow (vph)	0	120	157	0	322	273	0	0	185	665	70	959
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%	4%	4%
Turn Type	Perm		Prot		Split			Split	Split		custom	Prot
Protected Phases		8!			5	5			2	2	2	4!
Permitted Phases	8											4
Actuated Green, G (s)		25.2	25.2		18.6	18.6			19.1	19.1	25.2	25.2
Effective Green, g (s)		26.2	26.2		19.6	19.6			20.1	20.1	26.2	26.2
Actuated g/C Ratio		0.34	0.34		0.25	0.25			0.26	0.26	0.34	0.34
Clearance Time (s)		5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		581	520		407	369			441	883	564	1106
v/s Ratio Prot			0.10		c0.20	0.19			0.11	c0.19		c0.29
v/s Ratio Perm		0.07									0.04	
v/c Ratio		0.21	0.30		0.79	0.74			0.42	0.75	0.12	0.87
Uniform Delay, d1		18.4	19.1		27.2	26.8			24.0	26.6	17.9	24.2
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2	0.3		10.1	7.6			0.6	3.7	0.1	7.4
Delay (s)		18.6	19.4		37.3	34.4			24.7	30.3	18.0	31.6
Level of Service		B	B		D	C			C	C	B	C
Approach Delay (s)		19.1			35.9				29.1			30.7
Approach LOS		B			D				C			C

Intersection Summary

HCM Average Control Delay	30.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	77.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		
! Phase conflict between lane groups.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
10: York St & N Forest St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

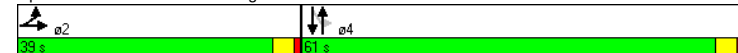
		
Movement	NER	NER2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Volume (vph)	120	10
Peak-hour factor, PHF	1.00	1.00
Adj. Flow (vph)	120	10
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	0	0
Heavy Vehicles (%)	4%	4%
Turn Type		
Protected Phases		
Permitted Phases		
Actuated Green, G (s)		
Effective Green, g (s)		
Actuated g/C Ratio		
Clearance Time (s)		
Vehicle Extension (s)		
Lane Grp Cap (vph)		
v/s Ratio Prot		
v/s Ratio Perm		
v/c Ratio		
Uniform Delay, d1		
Progression Factor		
Incremental Delay, d2		
Delay (s)		
Level of Service		
Approach Delay (s)		
Approach LOS		
Intersection Summary		

Timings
11: E Magnolia St & Cornwall Ave

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

				
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	695	625	115	340
Turn Type	Perm			
Protected Phases	2	4		4
Permitted Phases			4	
Detector Phases	2	4	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	23.0	23.0	23.0
Total Split (s)	39.0	61.0	61.0	61.0
Total Split (%)	39.0%	61.0%	61.0%	61.0%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	35.0	57.0		57.0
Actuated g/C Ratio	0.35	0.57		0.57
v/c Ratio	0.75	0.68		0.87
Control Delay	33.2	17.4		38.5
Queue Delay	0.0	2.6		0.0
Total Delay	33.2	20.0		38.5
LOS	C	C		D
Approach Delay	33.2	20.0		38.5
Approach LOS	C	C		D
Intersection Summary				
Cycle Length: 100				
Actuated Cycle Length: 100				
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green				
Natural Cycle: 60				
Control Type: Pretimed				
Maximum v/c Ratio: 0.87				
Intersection Signal Delay: 29.9				
Intersection Capacity Utilization 96.6%				
Intersection LOS: C				
ICU Level of Service F				
Analysis Period (min) 15				

Splits and Phases: 11: E Magnolia St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
11: E Magnolia St & Cornwall Ave

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		0.95						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.99						0.99			1.00	
Flt Protected		0.99						1.00			0.99	
Satd. Flow (prot)		3276						1772			1761	
Flt Permitted		0.99						1.00			0.51	
Satd. Flow (perm)		3276						1772			915	
Volume (vph)	90	695	85	0	0	0	0	625	65	115	340	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	90	695	85	0	0	0	0	625	65	115	340	0
RTOR Reduction (vph)	0	8	0	0	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	862	0	0	0	0	0	686	0	0	455	0
Confl. Peds. (#/hr)	80		80						80	80		
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split						Perm					
Protected Phases	2	2					4				4	
Permitted Phases										4		
Actuated Green, G (s)		35.0						57.0			57.0	
Effective Green, g (s)		35.0						57.0			57.0	
Actuated g/C Ratio		0.35						0.57			0.57	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		1147						1010			522	
v/s Ratio Prot		c0.26						0.39				
v/s Ratio Perm										c0.50		
v/c Ratio		0.75						0.68			0.87	
Uniform Delay, d1		28.7						15.1			18.4	
Progression Factor		1.00						0.93			1.00	
Incremental Delay, d2		4.6						3.0			17.9	
Delay (s)		33.2						17.0			36.3	
Level of Service		C						B			D	
Approach Delay (s)		33.2			0.0			17.0			36.3	
Approach LOS		C			A			B			D	
Intersection Summary												
HCM Average Control Delay		28.4										C
HCM Volume to Capacity ratio		0.83										
Actuated Cycle Length (s)		100.0						Sum of lost time (s)		8.0		
Intersection Capacity Utilization		96.6%						ICU Level of Service		F		
Analysis Period (min)		15										

c Critical Lane Group

Timings
12: W Holly St & Broadway St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

							
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations							
Volume (vph)	85	620	5	735	5	200	0
Turn Type	Perm		Perm			Perm	
Protected Phases		2		2	4		4
Permitted Phases	2		2			4	
Detector Phases	2	2	2	2	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	73.0	73.0	73.0	73.0	27.0	27.0	27.0
Total Split (%)	73.0%	73.0%	73.0%	73.0%	27.0%	27.0%	27.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None
Act Effect Green (s)		54.3		54.3	16.9	16.9	16.9
Actuated g/C Ratio		0.74		0.74	0.23	0.23	0.23
v/c Ratio		0.65		0.79	0.03	0.66	0.16
Control Delay		11.7		15.5	22.8	43.2	0.6
Queue Delay		0.0		0.0	0.0	0.0	0.0
Total Delay		11.7		15.5	22.8	43.2	0.6
LOS		B		B	C	D	A
Approach Delay		11.7		15.5	22.8		30.5
Approach LOS		B		B	C		C
Intersection Summary							
Cycle Length: 100							
Actuated Cycle Length: 72.9							
Natural Cycle: 80							
Control Type: Actuated-Uncoordinated							
Maximum v/c Ratio: 0.79							
Intersection Signal Delay: 16.3				Intersection LOS: B			
Intersection Capacity Utilization 120.3%				ICU Level of Service H			
Analysis Period (min) 15							

Splits and Phases: 12: W Holly St & Broadway St



HCM Signalized Intersection Capacity Analysis

12: W Holly St & Broadway St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00			0.99		1.00	0.97	
Flpb, ped/bikes		1.00			1.00			1.00		0.99	1.00	
Frt		1.00			0.96			0.93		1.00	0.85	
Flt Protected		0.99			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1807			1725			1697		1717	1500	
Flt Permitted		0.80			1.00			1.00		0.75	1.00	
Satd. Flow (perm)		1458			1721			1697		1358	1500	
Volume (vph)	85	620	0	5	735	280	0	5	5	200	0	85
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	85	620	0	5	735	280	0	5	5	200	0	85
RTOR Reduction (vph)	0	0	0	0	13	0	0	4	0	0	69	0
Lane Group Flow (vph)	0	705	0	0	1007	0	0	6	0	200	16	0
Conf. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		49.7			49.7			12.2		12.2	12.2	
Effective Green, g (s)		50.7			50.7			13.2		13.2	13.2	
Actuated g/C Ratio		0.71			0.71			0.18		0.18	0.18	
Clearance Time (s)		5.0			5.0			5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		1028			1214			312		249	275	
v/s Ratio Prot								0.00			0.01	
v/s Ratio Perm		0.48			0.59					0.15		
v/c Ratio		0.69			0.83			0.02		0.80	0.06	
Uniform Delay, d1		6.1			7.5			24.0		28.1	24.2	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		1.9			4.8			0.0		16.9	0.1	
Delay (s)		8.0			12.4			24.1		45.0	24.3	
Level of Service		A			B			C		D	C	
Approach Delay (s)		8.0			12.4			24.1			38.8	
Approach LOS		A			B			C			D	

Intersection Summary

HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	71.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	120.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Timings
13: W Holly St & F St

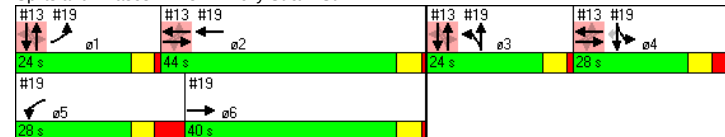
Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

																
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø1	ø2	ø3	ø4				
Lane Configurations																
Volume (vph)	60	575	65	820	90	470	95	265								
Turn Type	Perm		Perm		Perm		Perm									
Protected Phases		2 4		2 4		1 3		1 3	1	2	3	4				
Permitted Phases	2 4		2 4		1 3		1 3									
Detector Phases	2 4	2 4	2 4	2 4	1 3	1 3	1 3	1 3								
Minimum Initial (s)									6.0	6.0	6.0	6.0				
Minimum Split (s)									24.0	24.0	24.0	28.0				
Total Split (s)	72.0	72.0	72.0	72.0	48.0	48.0	48.0	48.0	24.0	44.0	24.0	28.0				
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%	20%	37%	20%	23%				
Yellow Time (s)									4.0	4.0	4.0	4.0				
All-Red Time (s)									1.0	1.0	1.0	5.0				
Lead/Lag									Lead	Lag	Lead	Lag				
Lead-Lag Optimize?																
Recall Mode									Min	None	None	None				
Act Effect Green (s)	64.0	64.0	64.0	64.0		40.0		40.0								
Actuated g/C Ratio	0.53	0.53	0.53	0.53		0.33		0.33								
v/c Ratio	1.00	0.78	0.38	0.97		1.27		0.63								
Control Delay	143.2	18.2	15.6	39.2		151.0		21.7								
Queue Delay	0.0	1.0	0.4	0.0		0.0		0.4								
Total Delay	143.2	19.2	16.0	39.2		151.0		22.1								
LOS	F	B	B	D		F		C								
Approach Delay		28.6		37.7		151.0		22.1								
Approach LOS		C		D		F		C								

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.49	
Intersection Signal Delay: 56.8	Intersection LOS: E
Intersection Capacity Utilization 107.4%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 13: W Holly St & F St



Timings
13: W Holly St & F St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	ø5	ø6
Lane Configurations		
Volume (vph)		
Turn Type		
Protected Phases	5	6
Permitted Phases		
Detector Phases		
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	28.0	24.0
Total Split (s)	28.0	40.0
Total Split (%)	23%	33%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	5.0	1.0
Lead/Lag	Lead	Lag
Lead-Lag Optimize?		
Recall Mode	None	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

HCM Signalized Intersection Capacity Analysis
13: W Holly St & F St

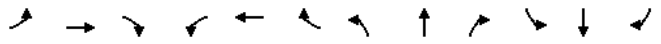
Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			0.95	
Frt	1.00	0.97		1.00	0.98			0.99			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1728	1759		1711	1773			1792			3315	
Flt Permitted	0.08	1.00		0.20	1.00			0.74			0.56	
Satd. Flow (perm)	144	1759		357	1773			1335			1875	
Volume (vph)	60	575	160	65	820	95	90	470	30	95	265	55
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	575	160	65	820	95	90	470	30	95	265	55
RTOR Reduction (vph)	0	8	0	0	3	0	0	1	0	0	10	0
Lane Group Flow (vph)	60	727	0	65	912	0	0	589	0	0	405	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2 4			2 4			1 3			1 3	
Permitted Phases	2 4			2 4			1 3			1 3		
Actuated Green, G (s)	65.2	65.2		65.2	65.2			38.0			38.0	
Effective Green, g (s)	71.2	71.2		71.2	71.2			40.0			40.0	
Actuated g/C Ratio	0.56	0.56		0.56	0.56			0.31			0.31	
Clearance Time (s)												
Vehicle Extension (s)												
Lane Grp Cap (vph)	81	985		200	992			420			590	
v/s Ratio Prot		0.41			c0.51							
v/s Ratio Perm	0.42			0.18				c0.44			0.22	
v/c Ratio	0.74	0.74		0.32	0.92			1.40			0.69	
Uniform Delay, d1	21.1	21.0		15.1	25.4			43.6			38.1	
Progression Factor	1.00	1.00		1.00	1.00			0.72			1.00	
Incremental Delay, d2	30.1	2.9		1.0	13.0			188.3			3.3	
Delay (s)	51.1	23.9		16.0	38.4			219.8			41.4	
Level of Service	D	C		B	D			F			D	
Approach Delay (s)		26.0			36.9			219.8			41.4	
Approach LOS		C			D			F			D	
Intersection Summary												
HCM Average Control Delay		73.3			HCM Level of Service			E				
HCM Volume to Capacity ratio		1.09										
Actuated Cycle Length (s)		127.2			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		107.4%			ICU Level of Service			G				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 14: W Holly St & C St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

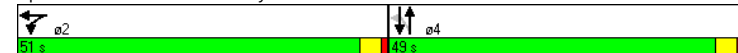
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free				Free		Stop				Stop	
Grade	0%				0%		0%				0%	
Volume (veh/h)	5	695	45	110	1020	70	25	30	125	40	15	5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	695	45	110	1020	70	25	30	125	40	15	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)	753											
pX, platoon unblocked				0.72			0.72			0.72		
vC, conflicting volume	1090				740			2015	2038	718	2142	2025
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1090				638			2413	2445	607	2591	2427
tC, single (s)	4.1				4.1			7.1	6.5	6.2	7.1	6.5
tC, 2 stage (s)												
tF (s)	2.2				2.2			3.5	4.0	3.3	3.5	4.0
p0 queue free %	99				84			0	0	65	0	23
cM capacity (veh/h)	644				683			5	19	359	0	19
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	745	1200	180	60								
Volume Left	5	110	25	40								
Volume Right	45	70	125	5								
cSH	644	683	27	0								
Volume to Capacity	0.01	0.16	6.69	Err								
Queue Length 95th (ft)	1	14	Err	Err								
Control Delay (s)	0.2	5.6	Err	Err								
Lane LOS	A	A	F	F								
Approach Delay (s)	0.2	5.6	Err	Err								
Approach LOS			F	F								
Intersection Summary												
Average Delay	Err											
Intersection Capacity Utilization	124.9%			ICU Level of Service			H					
Analysis Period (min)	15											

Timings 15: W Holly St & Cornwall Ave

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

				
Lane Group	WBT	NBL	NBT	SBT
Lane Configurations	↔	↔	↔	↔
Volume (vph)	1040	150	220	250
Turn Type	Perm			
Protected Phases	2	4	4	4
Permitted Phases	4			
Detector Phases	2	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0
Minimum Split (s)	21.0	23.0	23.0	23.0
Total Split (s)	51.0	49.0	49.0	49.0
Total Split (%)	51.0%	49.0%	49.0%	49.0%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	47.0	45.0	45.0	45.0
Actuated g/C Ratio	0.47	0.45	0.45	0.45
v/c Ratio	0.96	0.81	0.50	0.50
Control Delay	40.4	20.1	13.0	13.0
Queue Delay	0.0	1.7	0.0	0.0
Total Delay	40.4	21.8	13.0	13.0
LOS	D	C	B	B
Approach Delay	40.4	21.8	13.0	13.0
Approach LOS	D	C	B	B
Intersection Summary				
Cycle Length: 100				
Actuated Cycle Length: 100				
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green				
Natural Cycle: 55				
Control Type: Pretimed				
Maximum v/c Ratio: 0.96				
Intersection Signal Delay: 32.6	Intersection LOS: C			
Intersection Capacity Utilization 94.9%	ICU Level of Service F			
Analysis Period (min) 15				

Splits and Phases: 15: W Holly St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
15: W Holly St & Cornwall Ave

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.96			1.00			0.95	
Flpb, ped/bikes					1.00			0.98			1.00	
Frt					0.98			1.00			0.96	
Flt Protected					0.99			0.98			1.00	
Satd. Flow (prot)					3215			1743			1642	
Flt Permitted					0.99			0.57			1.00	
Satd. Flow (perm)					3215			1020			1642	
Volume (vph)	0	0	0	185	1040	235	150	220	0	0	250	125
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	185	1040	235	150	220	0	0	250	125
RTOR Reduction (vph)	0	0	0	0	16	0	0	0	0	0	18	0
Lane Group Flow (vph)	0	0	0	0	1444	0	0	370	0	0	357	0
Confl. Peds. (#/hr)				80		80	80					80
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type				Split		Perm						
Protected Phases				2	2			4			4	
Permitted Phases							4					
Actuated Green, G (s)					47.0			45.0			45.0	
Effective Green, g (s)					47.0			45.0			45.0	
Actuated g/C Ratio					0.47			0.45			0.45	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					1511			459			739	
v/s Ratio Prot					c0.45						0.22	
v/s Ratio Perm								c0.36				
v/c Ratio					0.96			0.81			0.48	
Uniform Delay, d1					25.5			23.7			19.3	
Progression Factor					1.00			0.71			0.65	
Incremental Delay, d2					14.8			1.4			1.1	
Delay (s)					40.3			18.3			13.8	
Level of Service					D			B			B	
Approach Delay (s)		0.0			40.3			18.3			13.8	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM Average Control Delay	32.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

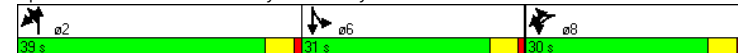
Timings
16: Lakeway Dr & Jersey St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	WBL	WBR	NBL	NBT	SBL	SBT
Lane Configurations						
Volume (vph)	30	885	615	340	670	410
Turn Type		Prot	Split		Split	
Protected Phases	8	8	2	2	6	6
Permitted Phases						
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	30.0	30.0	39.0	39.0	31.0	31.0
Total Split (%)	30.0%	30.0%	39.0%	39.0%	31.0%	31.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
Act Effct Green (s)	26.0	26.0	35.0	35.0	26.4	26.4
Actuated g/C Ratio	0.26	0.26	0.35	0.35	0.27	0.27
v/c Ratio	1.04	0.98	1.00	1.14dr	0.88	0.93
Control Delay	92.1	64.6	72.8	44.9	60.7	54.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	92.1	64.6	72.8	44.9	60.7	54.9
LOS	F	E	E	D	E	D
Approach Delay	75.0			52.8		56.7
Approach LOS	E			D		E

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 99.4	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 59.9	Intersection LOS: E
Intersection Capacity Utilization 98.2%	ICU Level of Service F
Analysis Period (min) 15	
dr Defacto Right Lane. Recode with 1 though lane as a right lane.	

Splits and Phases: 16: Lakeway Dr & Jersey St



HCM Signalized Intersection Capacity Analysis
16: Lakeway Dr & Jersey St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	WBL2	WBL	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0			4.0	4.0	
Lane Util. Factor	1.00	0.91			0.91	0.91			0.91	0.91	
Frt	0.91	0.85			1.00	0.89			1.00	1.00	
Flt Protected	0.98	1.00			0.95	1.00			0.95	0.98	
Satd. Flow (prot)	1607	2786			1572	2950			1430	3092	
Flt Permitted	0.98	1.00			0.95	1.00			0.95	0.98	
Satd. Flow (perm)	1607	2786			1572	2950			1430	3092	
Volume (vph)	145	30	885	100	5	615	340	995	670	410	20
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	145	30	885	100	5	615	340	995	670	410	20
RTOR Reduction (vph)	0	0	12	0	0	0	359	0	0	0	0
Lane Group Flow (vph)	0	437	711	0	0	555	1041	0	335	765	0
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	1%	1%	11%	1%	1%
Turn Type	Split	Prot			Split	Split			Split		
Protected Phases	8	8	8		2	2	2		6	6	
Permitted Phases											
Actuated Green, G (s)	25.0	25.0			34.0	34.0			25.4	25.4	
Effective Green, g (s)	26.0	26.0			35.0	35.0			26.4	26.4	
Actuated g/C Ratio	0.26	0.26			0.35	0.35			0.27	0.27	
Clearance Time (s)	5.0	5.0			5.0	5.0			5.0	5.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0			2.0	2.0	
Lane Grp Cap (vph)	420	729			554	1039			380	821	
v/s Ratio Prot	c0.27	0.26			c0.35	0.35			0.23	c0.25	
v/s Ratio Perm											
v/c Ratio	1.04	0.98			1.00	1.14dr			0.88	0.93	
Uniform Delay, d1	36.7	36.4			32.2	32.2			35.0	35.6	
Progression Factor	1.00	1.00			1.00	1.00			1.00	1.00	
Incremental Delay, d2	54.8	27.0			38.7	28.4			20.1	16.9	
Delay (s)	91.5	63.4			70.9	60.6			55.1	52.5	
Level of Service	F	E			E	E			E	D	
Approach Delay (s)	74.0					63.5				53.3	
Approach LOS	E					E				D	

Intersection Summary

HCM Average Control Delay	63.7	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	99.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	15		
dr	Defacto Right Lane. Recode with 1 though lane as a right lane.		
c	Critical Lane Group		

Timings
17: Lakeway Dr & I-5 SB Ramps

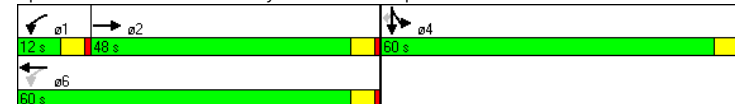
Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBT	WBL	WBT	SBT	SBR
Lane Configurations					
Volume (vph)	1325	200	870	225	335
Turn Type	pm+pt			Perm	
Protected Phases	2	1	6	4	
Permitted Phases		6			4
Detector Phases	2	1	6	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	10.0	23.0	28.0	28.0
Total Split (s)	48.0	12.0	60.0	60.0	60.0
Total Split (%)	40.0%	10.0%	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None
Act Effct Green (s)	44.0	56.0	56.0	56.0	56.0
Actuated g/C Ratio	0.37	0.47	0.47	0.47	0.47
v/c Ratio	1.26	1.15	0.55	1.15	0.43
Control Delay	157.4	141.2	24.5	112.8	17.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	157.4	141.2	24.5	112.8	17.1
LOS	F	F	C	F	B
Approach Delay	157.4		46.3	87.6	
Approach LOS	F		D	F	

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.26	
Intersection Signal Delay: 104.4	Intersection LOS: F
Intersection Capacity Utilization 117.1%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 17: Lakeway Dr & I-5 SB Ramps



HCM Signalized Intersection Capacity Analysis
17: Lakeway Dr & I-5 SB Ramps

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑↑						↔	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		0.95		1.00	0.95						1.00	1.00
Frt		0.98		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.96	1.00
Satd. Flow (prot)		3373		1711	3421						1752	1546
Flt Permitted		1.00		0.08	1.00						0.96	1.00
Satd. Flow (perm)		3373		150	3421						1752	1546
Volume (vph)	0	1325	250	200	870	0	0	0	0	715	225	335
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1325	250	200	870	0	0	0	0	715	225	335
RTOR Reduction (vph)	0	13	0	0	0	0	0	0	0	0	0	49
Lane Group Flow (vph)	0	1562	0	200	870	0	0	0	0	0	940	286
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type		pm+pt								Split	Perm	
Protected Phases		2		1	6					4	4	
Permitted Phases				6								4
Actuated Green, G (s)		43.0		55.0	55.0					55.0	55.0	
Effective Green, g (s)		44.0		56.0	56.0					56.0	56.0	
Actuated g/C Ratio		0.37		0.47	0.47					0.47	0.47	
Clearance Time (s)		5.0		5.0	5.0					5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		1237		174	1596					818	721	
v/s Ratio Prot		c0.46		c0.08	0.25					c0.54		
v/s Ratio Perm				0.46							0.18	
v/c Ratio		1.26		1.15	0.55					1.15	0.40	
Uniform Delay, d1		38.0		58.2	22.9					32.0	20.9	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		125.0		114.1	0.4					81.1	0.4	
Delay (s)		163.0		172.3	23.3					113.1	21.3	
Level of Service		F		F	C					F	C	
Approach Delay (s)		163.0			51.1			0.0		89.0		
Approach LOS		F			D			A		F		

Intersection Summary

HCM Average Control Delay	108.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	117.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Timings
18: Lakeway Dr & King St

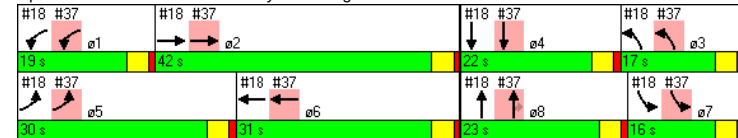
Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↑↑	↔	↑↑	↔	↑	↔	↑
Volume (vph)	505	1230	25	750	125	100	60	25
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	5	2	1	6	3	8	7	4
Permitted Phases								
Detector Phases	5	2	1	6	3	8	7	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	30.0	42.0	19.0	31.0	17.0	23.0	16.0	22.0
Total Split (%)	30.0%	42.0%	19.0%	31.0%	17.0%	23.0%	16.0%	22.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?								
Recall Mode	None	Min	None	None	None	Min	None	None
Act Effct Green (s)	26.0	38.0	15.0	27.0	13.2	19.0	12.0	17.8
Actuated g/C Ratio	0.26	0.38	0.15	0.27	0.13	0.19	0.12	0.18
v/c Ratio	1.11	1.13	0.10	1.11	0.54	0.43	0.29	0.57
Control Delay	112.5	97.2	40.5	77.3	50.2	34.7	44.2	11.5
Queue Delay	0.0	1.5	0.0	26.8	0.0	0.0	0.0	0.0
Total Delay	112.5	98.7	40.5	104.2	50.2	34.7	44.2	11.5
LOS	F	F	D	F	D	C	D	B
Approach Delay		102.2		102.7		41.8		17.2
Approach LOS		F		F		D		B

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.13
Intersection Signal Delay: 89.8
Intersection Capacity Utilization 95.5%
Analysis Period (min) 15
Intersection LOS: F
ICU Level of Service F

Splits and Phases: 18: Lakeway Dr & King St



HCM Signalized Intersection Capacity Analysis 18: Lakeway Dr & King St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.96		1.00	0.95		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	3403		1728	3312		1745	1745		1745	1585	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1745	3403		1728	3312		1745	1745		1745	1585	
Volume (vph)	505	1230	245	25	750	285	125	100	50	60	25	260
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	505	1230	245	25	750	285	125	100	50	60	25	260
RTOR Reduction (vph)	0	17	0	0	39	0	0	18	0	0	214	0
Lane Group Flow (vph)	505	1458	0	25	996	0	125	132	0	60	71	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	26.0	38.0		15.0	27.0		13.2	19.0		12.0	17.8	
Effective Green, g (s)	26.0	38.0		15.0	27.0		13.2	19.0		12.0	17.8	
Actuated g/C Ratio	0.26	0.38		0.15	0.27		0.13	0.19		0.12	0.18	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	454	1293		259	894		230	332		209	282	
v/s Ratio Prot	c0.29	c0.43		0.01	0.30		c0.07	c0.08		0.03	0.04	
v/s Ratio Perm												
v/c Ratio	1.11	1.13		0.10	1.11		0.54	0.40		0.29	0.25	
Uniform Delay, d1	37.0	31.0		36.7	36.5		40.6	35.5		40.1	35.4	
Progression Factor	1.00	1.00		1.09	0.65		1.00	1.00		1.00	1.00	
Incremental Delay, d2	76.5	67.9		0.0	55.5		2.6	0.8		0.8	0.5	
Delay (s)	113.5	98.9		39.8	79.3		43.2	36.3		40.9	35.9	
Level of Service	F	F		D	E		D	D		D	D	
Approach Delay (s)		102.6			78.4			39.4			36.7	
Approach LOS		F			E			D			D	
Intersection Summary												
HCM Average Control Delay		84.7										
HCM Volume to Capacity ratio		0.84										
Actuated Cycle Length (s)		100.0										
Intersection Capacity Utilization		95.5%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 24: E Chestnut St & Railroad Ave

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	95	1115	35	0	0	0	0	30	105	115	100	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	95	1115	35	0	0	0	0	30	105	115	100	0
Pedestrians					41			41			11	
Lane Width (ft)					0.0			11.0			11.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			3			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		353			350							
pX, platoon unblocked												
vC, conflicting volume	11			1191			1414	1374	471	734	1392	11
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	11			1191			1414	1374	471	734	1392	11
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			100	77	80	40	23	100
cM capacity (veh/h)	1600			575			33	133	527	190	129	1065
Direction, Lane #												
Volume Total	374	558	314	135	215							
Volume Left	95	0	0	0	115							
Volume Right	0	0	35	105	0							
cSH	1600	1700	1700	317	156							
Volume to Capacity	0.06	0.33	0.18	0.43	1.38							
Queue Length 95th (ft)	5	0	0	51	335							
Control Delay (s)	2.3	0.0	0.0	24.5	259.7							
Lane LOS	A			C	F							
Approach Delay (s)	0.7			24.5	259.7							
Approach LOS				C	F							
Intersection Summary												
Average Delay				37.6								
Intersection Capacity Utilization				58.6%								
Analysis Period (min)				15								

Timings
25: E Chestnut St & N State St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	→	↗	↓
Lane Group	EBT	SBL	SBT
Lane Configurations	↑↑↑	↗	↑↑
Volume (vph)	995	220	755
Turn Type	Split		
Protected Phases	2	4	4
Permitted Phases			
Detector Phases	2	4	4
Minimum Initial (s)	6.0	6.0	6.0
Minimum Split (s)	22.0	20.0	20.0
Total Split (s)	56.0	44.0	44.0
Total Split (%)	56.0%	44.0%	44.0%
Yellow Time (s)	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	Max	Max	Max
Act Effct Green (s)	52.0	40.0	40.0
Actuated g/C Ratio	0.52	0.40	0.40
v/c Ratio	0.60	0.30	0.55
Control Delay	27.6	13.3	24.9
Queue Delay	0.0	0.0	0.0
Total Delay	27.6	13.3	24.9
LOS	C	B	C
Approach Delay	27.6		22.3
Approach LOS	C		C

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 13 (13%), Referenced to phase 4:SBTL, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 25.5
Intersection LOS: C
Intersection Capacity Utilization 58.2%
ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 25: E Chestnut St & N State St



HCM Signalized Intersection Capacity Analysis
25: E Chestnut St & N State St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Intersection Summary

HCM Average Control Delay	27.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
26: E Chestnut St & N Forest St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	→	↑
Lane Group	EBT	NBT
Lane Configurations	↑↑↑	↑↑
Volume (vph)	945	875
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phases	2	4
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	22.0	21.0
Total Split (s)	53.0	47.0
Total Split (%)	53.0%	47.0%
Yellow Time (s)	3.0	3.0
All-Red Time (s)	1.0	1.0
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	Max
Act Effct Green (s)	49.0	43.0
Actuated g/C Ratio	0.49	0.43
v/c Ratio	0.51	0.83
Control Delay	7.9	30.0
Queue Delay	0.2	0.0
Total Delay	8.1	30.0
LOS	A	C
Approach Delay	8.1	30.0
Approach LOS	A	C

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 21 (21%), Referenced to phase 4:NBT, Start of Green
Natural Cycle: 50
Control Type: Pretimed
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 18.7
Intersection Capacity Utilization 66.1%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service C

Splits and Phases: 26: E Chestnut St & N Forest St



HCM Signalized Intersection Capacity Analysis
26: E Chestnut St & N Forest St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↗	↖	←	↖	↗	↑	↖	↗	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑↑				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0				
Lane Util. Factor		0.91						0.95				
Frpb, ped/bikes		1.00						0.98				
Flpb, ped/bikes		1.00						1.00				
Frt		1.00						0.96				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		4951						3222				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		4951						3222				
Volume (vph)	320	945	0	0	0	0	0	875	300	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	320	945	0	0	0	0	0	875	300	0	0	0
RTOR Reduction (vph)	0	37	0	0	0	0	0	34	0	0	0	0
Lane Group Flow (vph)	0	1228	0	0	0	0	0	1141	0	0	0	0
Confl. Peds. (#/hr)	40								40			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	Split											
Protected Phases	2	2						4				
Permitted Phases												
Actuated Green, G (s)		49.0						43.0				
Effective Green, g (s)		49.0						43.0				
Actuated g/C Ratio		0.49						0.43				
Clearance Time (s)		4.0						4.0				
Lane Grp Cap (vph)		2426						1385				
v/s Ratio Prot		c0.25						c0.35				
v/s Ratio Perm												
v/c Ratio		0.51						0.82				
Uniform Delay, d1		17.3						25.2				
Progression Factor		0.44						1.00				
Incremental Delay, d2		0.7						5.7				
Delay (s)		8.3						30.8				
Level of Service		A						C				
Approach Delay (s)		8.3			0.0			30.8			0.0	
Approach LOS		A			A			C			A	

Intersection Summary

HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
27: E Chestnut St & Ellis St

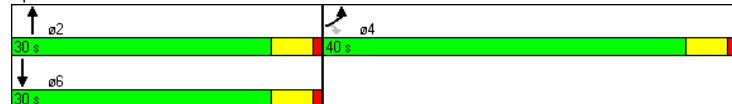
Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	↗	↖	↗
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations	↖↗	↖	↖↗↗	↖↗
Volume (vph)	945	845	970	495
Turn Type	Perm			
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phases	4	4	2	6
Minimum Initial (s)	6.0	6.0	6.0	6.0
Minimum Split (s)	30.0	30.0	12.0	30.0
Total Split (s)	40.0	40.0	30.0	30.0
Total Split (%)	57.1%	57.1%	42.9%	42.9%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	36.2	36.2	21.9	21.9
Actuated g/C Ratio	0.55	0.55	0.33	0.33
v/c Ratio	0.52	0.97	0.59	0.43
Control Delay	11.6	39.4	19.7	18.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.6	39.4	19.7	18.1
LOS	B	D	B	B
Approach Delay	24.7		19.7	18.1
Approach LOS	C		B	B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 66.2
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 22.2
Intersection Capacity Utilization 77.2%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service D

Splits and Phases: 27: E Chestnut St & Ellis St



HCM Signalized Intersection Capacity Analysis
27: E Chestnut St & Ellis St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	↗	↖	↗	↖	↗
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↖		↖↗↗	↖↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.91	0.95	
Frbp, ped/bikes	1.00	0.94		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3319	1441		4964	3490	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3319	1441		4964	3490	
Volume (vph)	945	845	0	970	495	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	945	845	0	970	495	0
RTOR Reduction (vph)	0	86	0	0	0	0
Lane Group Flow (vph)	945	759	0	970	495	0
Confl. Peds. (#/hr)	60	60				
Heavy Vehicles (%)	2%	2%	1%	1%	0%	0%
Turn Type	Perm					
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	35.2	35.2		20.9	20.9	
Effective Green, g (s)	36.2	36.2		21.9	21.9	
Actuated g/C Ratio	0.55	0.55		0.33	0.33	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1818	789		1645	1156	
v/s Ratio Prot	0.28			0.20	0.14	
v/s Ratio Perm		0.53				
v/c Ratio	0.52	0.96		0.59	0.43	
Uniform Delay, d1	9.5	14.3		18.4	17.2	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	23.0		0.5	0.3	
Delay (s)	9.7	37.3		18.9	17.5	
Level of Service	A	D		B	B	
Approach Delay (s)	22.7			18.9	17.5	
Approach LOS	C			B	B	

Intersection Summary

HCM Average Control Delay	20.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	66.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Laurel St & N State St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											  	
Sign Control	Stop				Stop		Free				Free	
Grade	0%				0%		0%				0%	
Volume (veh/h)	0	295	250	25	425	0	0	0	0	5	1115	100
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	295	250	25	425	0	0	0	0	5	1115	100
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (ft)	1046											
pX, platoon unblocked												
vC, conflicting volume	1388	1175	422	779	1225	0	1215	0				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1388	1175	422	779	1225	0	1215	0				
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	0	0	57	0	0	100	100	100				
cM capacity (veh/h)	0	190	581	0	177	1091	570	1629				
Direction, Lane #	EB 1	WB 1	SB 1	SB 2	SB 3							
Volume Total	545	450	284	558	379							
Volume Left	0	25	5	0	0							
Volume Right	250	0	0	0	100							
cSH	274	0	1629	1700	1700							
Volume to Capacity	1.99	Err	0.00	0.33	0.22							
Queue Length 95th (ft)	976	Err	0	0	0							
Control Delay (s)	487.0	Err	0.2	0.0	0.0							
Lane LOS	F	F	A									
Approach Delay (s)	487.0	Err	0.0									
Approach LOS	F	F										
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization	73.3%				ICU Level of Service				D			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
29: Laurel St & N Forest St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Volume (veh/h)	250	70	0	0	180	105	260	875	30	0	0	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	250	70	0	0	180	105	260	875	30	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)	1032											
pX, platoon unblocked												
vC, conflicting volume	1152	1425	0	1445	1410	452	0	905				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1152	1425	0	1445	1410	452	0	905				
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	0	38	100	100	0	81	84	100				
cM capacity (veh/h)	0	113	1084	42	117	560	1622	760				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	320	285	698	468								
Volume Left	250	0	260	0								
Volume Right	0	105	0	30								
cSH	0	166	1622	1700								
Volume to Capacity	Err	1.72	0.16	0.28								
Queue Length 95th (ft)	Err	506	14	0								
Control Delay (s)	Err	397.1	3.9	0.0								
Lane LOS	F	F	A									
Approach Delay (s)	Err	397.1	2.3									
Approach LOS	F	F										
Intersection Summary												
Average Delay	Err											
Intersection Capacity Utilization	76.1%			ICU Level of Service			D					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 30: N State St & Wharf Street

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL2	EBT	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SEL	SER
Right Turn Channelized											
Volume (veh/h)	40	725	20	0	200	60	200	700	45	395	70
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	40	725	20	0	200	60	200	700	45	395	70
Approach Volume (veh/h)	765		220			1005				465	
Crossing Volume (veh/h)	725		1220#			60				960	
High Capacity (veh/h)	779		519			1321				643	
High v/c (veh/h)	0.98		0.42			0.76				0.72	
Low Capacity (veh/h)	618		395			1104				501	
Low v/c (veh/h)	1.24		0.56			0.91				0.93	

Intersection Summary

Maximum v/c High	0.98
Maximum v/c Low	1.24
Intersection Capacity Utilization	148.1%
ICU Level of Service	H
# Crossing flow exceeds 1200, method is not applicable	

Timings

31: Bill McDonald Pkwy & Samish Way

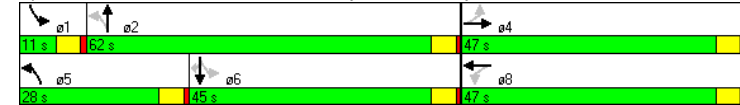
Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↰	↱	↰	↱	↰
Volume (vph)	345	55	50	55	370	660	35	955	395
Turn Type	Perm		Perm		pm+pt		pm+pt		Perm
Protected Phases		4		8	5	2	1	6	
Permitted Phases	4		8		2		6		6
Detector Phases	4	4	8	8	5	2	1	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	11.0	30.0	30.0	11.0	28.0	11.0	29.0	29.0
Total Split (s)	47.0	47.0	47.0	47.0	28.0	62.0	11.0	45.0	45.0
Total Split (%)	39.2%	39.2%	39.2%	39.2%	23.3%	51.7%	9.2%	37.5%	37.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	34.5	34.5		34.5	59.3	53.6	39.7	32.6	32.6
Actuated g/C Ratio	0.34	0.34		0.34	0.58	0.52	0.37	0.32	0.32
v/c Ratio	0.88	0.57		0.38	0.84	0.40	0.11	0.86	0.52
Control Delay	58.5	11.3		27.7	47.1	17.5	14.0	42.6	5.5
Queue Delay	0.0	0.7		0.5	11.4	1.1	0.0	3.0	0.0
Total Delay	58.5	12.1		28.2	58.5	18.6	14.0	45.6	5.5
LOS	E	B		C	E	B	B	D	A
Approach Delay		33.1		28.2		32.2		33.4	
Approach LOS		C		C		C		C	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 102.5
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 32.7
Intersection Capacity Utilization 93.1%
ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 31: Bill McDonald Pkwy & Samish Way



HCM Signalized Intersection Capacity Analysis
31: Bill McDonald Pkwy & Samish Way

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87			0.97		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	1566			1744		1728	3415		1745	3490	1561
Flt Permitted	0.64	1.00			0.58		0.10	1.00		0.38	1.00	1.00
Satd. Flow (perm)	1159	1566			1024		185	3415		698	3490	1561
Volume (vph)	345	55	360	50	55	35	370	660	55	35	955	395
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	345	55	360	50	55	35	370	660	55	35	955	395
RTOR Reduction (vph)	0	205	0	0	11	0	0	5	0	0	0	260
Lane Group Flow (vph)	345	210	0	0	129	0	370	710	0	35	955	135
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm			Perm		pm+pt			pm+pt		Perm	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	33.4	33.4			33.4		60.6	52.5		37.4	34.3	34.3
Effective Green, g (s)	34.4	34.4			34.4		61.6	53.5		39.4	35.3	35.3
Actuated g/C Ratio	0.33	0.33			0.33		0.59	0.51		0.38	0.34	0.34
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		2.0	2.0		3.0	2.0	2.0
Lane Grp Cap (vph)	383	518			339		440	1757		306	1185	530
v/s Ratio Prot		0.13					c0.18	0.21		0.00	0.27	
v/s Ratio Perm	c0.30				0.13		c0.32			0.04		0.09
v/c Ratio	0.90	0.41			0.38		0.84	0.40		0.11	0.81	0.25
Uniform Delay, d1	33.2	26.9			26.7		27.9	15.5		20.5	31.2	24.8
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	23.5	0.5			0.7		13.0	0.1		0.2	3.9	0.1
Delay (s)	56.7	27.4			27.4		40.9	15.5		20.6	35.1	24.9
Level of Service	E	C			C		D	B		C	D	C
Approach Delay (s)		40.7			27.4			24.2			31.8	
Approach LOS		D			C			C			C	

Intersection Summary

HCM Average Control Delay	31.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	104.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	93.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings

32: Samish Way & I-5 SB Off-Ramp

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	ø8
Lane Configurations	↱	↰	↰	↱	↰	↱	↰	↱	↰	
Volume (vph)	1030	315	290	635	185	495	310	270	255	
Turn Type		Perm	pm+pt		Protcustom		Split		Prot	
Protected Phases	6		5	2	4	4	3	3	3	8
Permitted Phases		6	2							
Detector Phases	6	6	5	2	4	4	3	3	3	
Minimum Initial (s)	7.0	7.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0	20.0
Minimum Split (s)	22.0	22.0	9.5	22.0	12.0	12.0	11.5	11.5	11.5	25.0
Total Split (s)	40.0	40.0	18.0	58.0	15.0	15.0	22.0	22.0	22.0	25.0
Total Split (%)	33.3%	33.3%	15.0%	48.3%	12.5%	12.5%	18.3%	18.3%	18.3%	21%
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	4.0	3.5	3.5	3.5	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lead	Lead	Lead	
Lead-Lag Optimize?										
Recall Mode	Min	Min	None	Min	None	None	None	None	None	None
Act Effct Green (s)	35.8	35.8	53.8	53.8	11.0	11.0	18.0	18.0	18.0	
Actuated g/C Ratio	0.38	0.38	0.57	0.57	0.12	0.12	0.19	0.19	0.19	
v/c Ratio	0.79	0.42	0.88	0.32	0.92	0.85	0.93	0.77	0.51	
Control Delay	31.5	5.9	49.8	11.4	89.7	20.8	74.9	53.0	8.4	
Queue Delay	107.6	0.9	0.0	0.0	1.4	0.0	0.0	0.0	0.1	
Total Delay	139.1	6.8	49.8	11.5	91.1	20.8	74.9	53.0	8.5	
LOS	F	A	D	B	F	C	E	D	A	
Approach Delay	108.1			23.5				47.6		
Approach LOS	F			C				D		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 94.8
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 61.8
Intersection Capacity Utilization 86.3%
Analysis Period (min) 15
Intersection LOS: E
ICU Level of Service E

Splits and Phases: 32: Samish Way & I-5 SB Off-Ramp

↰ ø2	↱ ø3	↰ ø4	↱ ø8
58 s	22 s	15 s	25 s
↱ ø5	↰ ø6		
18 s	40 s		

HCM Signalized Intersection Capacity Analysis
32: Samish Way & I-5 SB Off-Ramp

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3455	1546	1728	3455	1728	1728	1546	1745	1837	1561	1837	1561
Flt Permitted	1.00	1.00	0.10	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3455	1546	183	3455	1728	1728	1546	1745	1837	1561	1837	1561
Volume (vph)	0	1030	315	290	635	0	185	0	495	310	270	255
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1030	315	290	635	0	185	0	495	310	270	255
RTOR Reduction (vph)	0	0	171	0	0	0	0	0	405	0	0	207
Lane Group Flow (vph)	0	1030	144	290	635	0	185	0	90	310	270	48
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Perm pm+pt			Prot			custom			Split		Prot
Protected Phases	6			5			4			4		3
Permitted Phases	6			2			4			3		3
Actuated Green, G (s)	34.8	34.8	52.8	52.8	10.0	10.0	10.0	17.5	17.5	17.5	17.5	17.5
Effective Green, g (s)	35.8	35.8	53.8	53.8	11.0	11.0	11.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.38	0.38	0.57	0.57	0.12	0.12	0.12	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	5.0	5.0	4.5	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1305	584	332	1961	201	179	331	349	296	296	296	296
v/s Ratio Prot	0.30		c0.13	0.18	c0.11	0.06	c0.18	0.15	0.03	0.03	0.03	0.03
v/s Ratio Perm		0.09	c0.37									
v/c Ratio	0.79	0.25	0.87	0.32	0.92	0.50	0.94	0.77	0.16	0.16	0.16	0.16
Uniform Delay, d1	26.2	20.3	25.0	10.9	41.5	39.3	37.8	36.5	32.1	32.1	32.1	32.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.4	0.3	21.9	0.1	42.2	2.6	33.4	10.8	0.4	0.4	0.4	0.4
Delay (s)	29.5	20.5	46.9	11.0	83.7	42.0	71.2	47.3	32.5	32.5	32.5	32.5
Level of Service	C	C	D	B	F	D	E	D	C	C	C	C
Approach Delay (s)	27.4			22.2	53.3			51.6				
Approach LOS	C			C	D			D				

Intersection Summary

HCM Average Control Delay	36.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	94.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings

33: Samish Way & Lincoln St

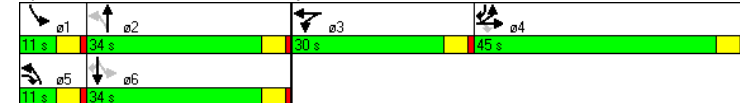
Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Volume (vph)	775	540	385	5	175	395	265	25	125	420
Turn Type	custom	pm+ov	custom	pm+pt	pm+pt	pm+ov	pm+pt	pm+ov	pm+ov	pm+ov
Protected Phases	4	4	5	3	3	5	2	1	6	4
Permitted Phases	4		4	3		2		6		6
Detector Phases	4	4	5	3	3	5	2	1	6	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	33.0	33.0	11.0	30.0	30.0	11.0	24.0	11.0	33.0	33.0
Total Split (s)	45.0	45.0	11.0	30.0	30.0	11.0	34.0	11.0	34.0	45.0
Total Split (%)	37.5%	37.5%	9.2%	25.0%	25.0%	9.2%	28.3%	9.2%	28.3%	37.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	Min	None	Min	None
Act Effct Green (s)	41.9	41.9	53.2	19.4	19.4	27.2	23.4	25.4	18.1	60.0
Actuated g/C Ratio	0.41	0.41	0.52	0.19	0.19	0.26	0.23	0.24	0.18	0.58
v/c Ratio	0.96	0.97	0.40	0.02	0.80	1.17	0.69	0.12	0.39	0.40
Control Delay	59.7	60.8	5.1	36.4	56.3	137.5	47.6	28.4	41.0	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.7	60.8	5.1	36.4	56.3	137.5	47.6	28.4	41.0	2.8
LOS	E	E	A	D	E	F	D	C	D	A
Approach Delay	47.8			56.0		99.8		12.3		
Approach LOS	D			E		F		B		

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 103	
Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.17	
Intersection Signal Delay: 53.2	Intersection LOS: D
Intersection Capacity Utilization 92.5%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 33: Samish Way & Lincoln St



HCM Signalized Intersection Capacity Analysis
33: Samish Way & Lincoln St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1641	1711	1546	1694	1689		1728	1799		1728	1818	1546
Flt Permitted	0.95	0.99	1.00	0.95	1.00		0.53	1.00		0.34	1.00	1.00
Satd. Flow (perm)	1641	1711	1546	1694	1689		957	1799		626	1818	1546
Volume (vph)	775	540	385	5	175	95	395	265	20	25	125	420
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	775	540	385	5	175	95	395	265	20	25	125	420
RTOR Reduction (vph)	0	0	177	0	17	0	0	2	0	0	0	133
Lane Group Flow (vph)	641	674	208	5	253	0	395	283	0	25	125	287
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	custom		pm+ov custom		pm+pt		pm+pt		pm+ov			
Protected Phases	4	4	5	3	3		5	2		1	6	4
Permitted Phases	4		4	3			2			6		6
Actuated Green, G (s)	40.9	40.9	47.0	18.4	18.4		28.5	22.4		22.7	19.5	60.4
Effective Green, g (s)	41.9	41.9	49.0	19.4	19.4		30.5	23.4		24.7	20.5	62.4
Actuated g/C Ratio	0.40	0.40	0.47	0.18	0.18		0.29	0.22		0.24	0.20	0.59
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	655	683	781	313	312		330	401		192	355	920
v/s Ratio Prot	0.39	c0.39	0.02	0.00	c0.15		c0.08	0.16		0.01	0.07	0.12
v/s Ratio Perm			0.12				c0.27			0.03		0.06
v/c Ratio	0.98	0.99	0.27	0.02	0.81		1.20	0.70		0.13	0.35	0.31
Uniform Delay, d1	31.1	31.2	17.0	34.9	41.0		37.0	37.6		31.5	36.5	10.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	29.4	30.8	0.1	0.0	14.0		114.3	4.6		0.1	0.2	0.1
Delay (s)	60.4	62.0	17.1	35.0	54.9		151.3	42.1		31.6	36.7	10.6
Level of Service	E	E	B	C	D		F	D		C	D	B
Approach Delay (s)	51.2				54.6		105.6		17.3			
Approach LOS	D				D		F		B			

Intersection Summary

HCM Average Control Delay	57.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	104.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	92.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings

34: Old Fairhaven Pkwy & 12th St

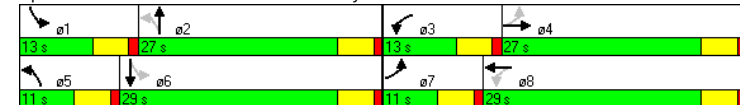
Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	15	180	340	135	25	210	225	305
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	27.0	11.0	27.0	11.0	27.0	11.0	27.0
Total Split (s)	11.0	27.0	13.0	29.0	11.0	27.0	13.0	29.0
Total Split (%)	13.8%	33.8%	16.3%	36.3%	13.8%	33.8%	16.3%	36.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)	21.6	14.4	27.1	25.5	30.1	23.1	35.4	32.0
Actuated g/C Ratio	0.27	0.20	0.38	0.36	0.38	0.32	0.49	0.45
v/c Ratio	0.05	0.56	0.73	0.50	0.07	0.74	0.67	0.41
Control Delay	15.9	30.5	27.7	16.1	12.3	28.2	24.5	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	30.5	27.7	16.1	12.3	28.2	24.5	18.0
LOS	B	C	C	B	B	C	C	B
Approach Delay	29.5		21.9		27.4		20.6	
Approach LOS	C		C		C		C	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 71.6
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 23.7
Intersection Capacity Utilization 81.4%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service D

Splits and Phases: 34: Old Fairhaven Pkwy & 12th St



HCM Signalized Intersection Capacity Analysis
34: Old Fairhaven Pkwy & 12th St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr't	1.00	0.98		1.00	0.91		1.00	0.92		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1703	1766		1787	1713		1805	1747		1787	1852	
Flt Permitted	0.52	1.00		0.42	1.00		0.53	1.00		0.21	1.00	
Satd. Flow (perm)	932	1766		793	1713		1013	1747		387	1852	
Volume (vph)	15	180	20	340	135	200	25	210	245	225	305	35
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	180	20	340	135	200	25	210	245	225	305	35
RTOR Reduction (vph)	0	5	0	0	66	0	0	49	0	0	5	0
Lane Group Flow (vph)	15	195	0	340	269	0	25	406	0	225	335	0
Heavy Vehicles (%)	6%	6%	6%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7		4	3		8	5		2	1		6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.7	17.6		30.6	24.5		27.4	25.2		38.2	31.0	
Effective Green, g (s)	20.7	18.6		31.6	25.5		29.4	26.2		39.2	32.0	
Actuated g/C Ratio	0.26	0.24		0.40	0.32		0.37	0.33		0.50	0.41	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	265	417		432	554		410	581		352	752	
v/s Ratio Prot	0.00	0.11		c0.09	0.16		0.00	0.23		c0.07	0.18	
v/s Ratio Perm	0.01			c0.23			0.02			c0.24		
v/c Ratio	0.06	0.47		0.79	0.49		0.06	0.70		0.64	0.45	
Uniform Delay, d1	21.6	25.8		19.2	21.4		15.7	22.9		14.0	17.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.8		9.2	0.7		0.1	6.8		3.8	1.9	
Delay (s)	21.7	26.7		28.4	22.1		15.8	29.7		17.8	18.9	
Level of Service	C	C		C	C		B	C		B	B	
Approach Delay (s)	26.3			25.3			29.0			18.5		
Approach LOS	C			C			C			B		

Intersection Summary			
HCM Average Control Delay	24.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	78.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

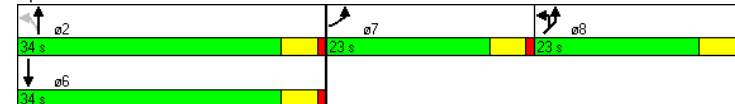
Timings
35: Hawthorne & 12th St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

					
Lane Group	EBL	NBL	NBT	SBT	NEL
Lane Configurations					
Volume (vph)	170	10	335	365	75
Turn Type	Perm				
Protected Phases	7		2	6	8
Permitted Phases	2				
Detector Phases	7	2	2	6	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	23.0	26.0	26.0	26.0	23.0
Total Split (s)	23.0	34.0	34.0	34.0	23.0
Total Split (%)	28.8%	42.5%	42.5%	42.5%	28.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	Max	None
Act Effct Green (s)	12.6		30.9	30.9	9.3
Actuated g/C Ratio	0.20		0.50	0.50	0.14
v/c Ratio	0.52		0.54	0.75	0.32
Control Delay	28.3		18.1	21.9	27.2
Queue Delay	0.0		0.0	0.0	0.0
Total Delay	28.3		18.1	21.9	27.2
LOS	C		B	C	C
Approach Delay	28.3		18.1	21.9	27.2
Approach LOS	C		B	C	C

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 62.2	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 22.2	Intersection LOS: C
Intersection Capacity Utilization 63.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 35: Hawthorne & 12th St



HCM Signalized Intersection Capacity Analysis
35: Hawthorne & 12th St

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBR	EBR2	NBL	NBT	SBT	SBR	SBR2	NEL	NER
Lane Configurations	↰	↱	↱	↰	↰	↱	↱	↱	↰	↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0				4.0	4.0			4.0	
Lane Util. Factor	1.00				1.00	1.00			1.00	
Frt	0.99				1.00	0.94			0.98	
Flt Protected	0.96				1.00	1.00			0.96	
Satd. Flow (prot)	1775				1860	1782			1791	
Flt Permitted	0.96				0.98	1.00			0.96	
Satd. Flow (perm)	1775				1827	1782			1791	
Volume (vph)	170	10	10	10	335	365	65	245	75	10
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	170	10	10	10	335	365	65	245	75	10
RTOR Reduction (vph)	2	0	0	0	0	21	0	0	7	0
Lane Group Flow (vph)	188	0	0	0	345	654	0	0	78	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	0%	0%	0%	0%	0%
Turn Type	Perm									
Protected Phases	7				2	6			8	
Permitted Phases				2						
Actuated Green, G (s)	11.6				29.8	29.8			6.7	
Effective Green, g (s)	12.6				30.8	30.8			7.7	
Actuated g/C Ratio	0.20				0.49	0.49			0.12	
Clearance Time (s)	5.0				5.0	5.0			5.0	
Vehicle Extension (s)	3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)	354				892	870			219	
v/s Ratio Prot	c0.11					c0.37			c0.04	
v/s Ratio Perm					0.19					
v/c Ratio	0.53				0.39	0.75			0.36	
Uniform Delay, d1	22.6				10.2	13.1			25.4	
Progression Factor	1.00				1.00	1.00			1.00	
Incremental Delay, d2	1.4				0.3	5.9			1.0	
Delay (s)	24.0				10.5	19.0			26.4	
Level of Service	C				B	B			C	
Approach Delay (s)	24.0				10.5	19.0			26.4	
Approach LOS	C				B	B			C	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	63.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

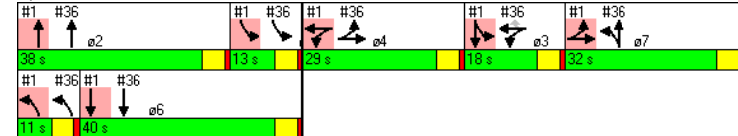
Timings
36: Birchwood Ave & Meridian Street

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT	ø2	ø5	ø7
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱			
Volume (vph)	275	185	250	365	130	1120	170	970			
Turn Type	Split			Perm	Prot		Prot				
Protected Phases	4	4	3		5 7	2 7	1	6	2	5	7
Permitted Phases				3							
Detector Phases	4	4	3	3	5 7	2 7	1	6			
Minimum Initial (s)	6.0	6.0	6.0	6.0			6.0	10.0	10.0	6.0	6.0
Minimum Split (s)	29.0	29.0	11.0	11.0			11.0	23.0	23.0	11.0	29.0
Total Split (s)	29.0	29.0	18.0	18.0	43.0	70.0	13.0	40.0	38.0	11.0	32.0
Total Split (%)	22.3%	22.3%	13.8%	13.8%	33.1%	53.8%	10.0%	30.8%	29%	8%	25%
Yellow Time (s)	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lead	Lag	Lag			Lag	Lag	Lead	Lead	
Lead-Lag Optimize?											
Recall Mode	None	None	None	None			None	None	Max	None	None
Act Effct Green (s)	23.1	23.1	14.0	14.0	39.0	66.1	9.0	36.0			
Actuated g/C Ratio	0.18	0.18	0.11	0.11	0.30	0.52	0.07	0.28			
v/c Ratio	0.85	0.77	1.59	1.08	0.24	0.64	1.38	1.32			
Control Delay	73.8	62.8	321.4	98.3	49.2	5.5	258.5	188.6			
Queue Delay	0.0	0.0	126.7	0.0	1.8	2.1	0.0	0.0			
Total Delay	73.8	62.8	448.1	98.3	51.0	7.6	258.5	188.6			
LOS	E	E	F	F	D	A	F	F			
Approach Delay		68.5	263.1			12.0		196.8			
Approach LOS		E	F			B		F			

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 128.2	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.59	
Intersection Signal Delay: 130.8	Intersection LOS: F
Intersection Capacity Utilization 90.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 36: Birchwood Ave & Meridian Street



HCM Signalized Intersection Capacity Analysis
36: Birchwood Ave & Meridian Street

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1818			1878	1615	1787	3554		1752	3376	
Flt Permitted	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	1818			1878	1615	1787	3554		1752	3376	
Volume (vph)	275	185	75	75	250	365	130	1120	45	170	970	315
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	275	185	75	75	250	365	130	1120	45	170	970	315
RTOR Reduction (vph)	0	11	0	0	0	162	0	2	0	0	24	0
Lane Group Flow (vph)	275	249	0	0	325	203	130	1163	0	170	1261	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split		Perm	Prot			Prot		
Protected Phases	4	4		3	3		5 7	2 7		1	6	
Permitted Phases						3						
Actuated Green, G (s)	22.1	22.1			13.0	13.0	38.0	65.0		8.0	35.0	
Effective Green, g (s)	23.1	23.1			14.0	14.0	39.0	66.0		9.0	36.0	
Actuated g/C Ratio	0.18	0.18			0.11	0.11	0.30	0.52		0.07	0.28	
Clearance Time (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Vehicle Extension (s)	3.0	3.0			2.0	2.0				2.0	2.0	
Lane Grp Cap (vph)	325	328			205	177	544	1831		123	949	
v/s Ratio Prot	c0.15	0.14			c0.17		0.07	c0.33		0.10	c0.37	
v/s Ratio Perm						0.13						
v/c Ratio	0.85	0.76			1.59	1.15	0.24	0.64		1.38	1.33	
Uniform Delay, d1	50.8	49.8			57.0	57.0	33.4	22.4		59.6	46.0	
Progression Factor	1.00	1.00			1.00	1.00	1.42	0.22		1.00	1.00	
Incremental Delay, d2	18.0	9.6			285.4	112.5	0.0	0.2		214.4	155.4	
Delay (s)	68.8	59.5			342.4	169.5	47.5	5.2		274.0	201.4	
Level of Service	E	E			F	F	D	A		F	F	
Approach Delay (s)		64.2			251.0		9.4			209.9		
Approach LOS		E			F		A			F		

Intersection Summary

HCM Average Control Delay	132.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	128.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
37: Lakeway Dr & Lincoln Street

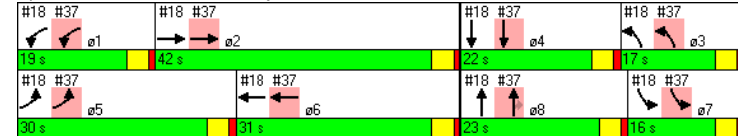
Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲
Volume (vph)	60	1100	275	835	210	175	565	220	240
Turn Type	Prot		Prot		Prot		Perm	Prot	
Protected Phases	5	2	1	6	3	8		7	4
Permitted Phases							8		
Detector Phases	5	2	1	6	3	8		7	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	30.0	42.0	19.0	31.0	17.0	23.0	23.0	16.0	22.0
Total Split (%)	30.0%	42.0%	19.0%	31.0%	17.0%	23.0%	23.0%	16.0%	22.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?									
Recall Mode	None	Min	None	None	None	Min	Min	None	None
Act Effct Green (s)	26.0	38.0	15.0	27.0	13.2	19.0	19.0	12.0	17.8
Actuated g/C Ratio	0.26	0.38	0.15	0.27	0.13	0.19	0.19	0.12	0.18
v/c Ratio	0.13	0.93	1.07	1.01	0.93	0.51	1.06	1.07	0.92
Control Delay	53.6	16.9	118.0	69.4	88.6	42.4	75.9	127.0	75.0
Queue Delay	0.0	27.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.6	44.5	118.0	69.4	88.6	42.4	75.9	127.0	75.0
LOS	D	D	F	E	F	D	E	F	E
Approach Delay		44.9		80.5		72.5			97.2
Approach LOS		D		F		E			F

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.13
Intersection Signal Delay: 69.3
Intersection Capacity Utilization 90.9%
Analysis Period (min) 15
Intersection LOS: E
ICU Level of Service E

Splits and Phases: 37: Lakeway Dr & Lincoln Street



HCM Signalized Intersection Capacity Analysis
37: Lakeway Dr & Lincoln Street

Alternative 1 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	3377		1711	3369		1711	1801	1531	1711	1750	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1711	3377		1711	3369		1711	1801	1531	1711	1750	
Volume (vph)	60	1100	105	275	835	95	210	175	565	220	240	55
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	1100	105	275	835	95	210	175	565	220	240	55
RTOR Reduction (vph)	0	7	0	0	9	0	0	0	242	0	8	0
Lane Group Flow (vph)	60	1198	0	275	921	0	210	175	323	220	287	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			
Actuated Green, G (s)	26.0	38.0		15.0	27.0		13.2	19.0	19.0	12.0	17.8	
Effective Green, g (s)	26.0	38.0		15.0	27.0		13.2	19.0	19.0	12.0	17.8	
Actuated g/C Ratio	0.26	0.38		0.15	0.27		0.13	0.19	0.19	0.12	0.18	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	445	1283		257	910		226	342	291	205	312	
v/s Ratio Prot	0.04	c0.35		c0.16	0.27		0.12	0.10		c0.13	0.16	
v/s Ratio Perm									c0.21			
v/c Ratio	0.13	0.93		1.07	1.01		0.93	0.51	1.11	1.07	0.92	
Uniform Delay, d1	28.4	29.8		42.5	36.5		42.9	36.3	40.5	44.0	40.4	
Progression Factor	1.85	0.47		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	1.5		75.9	32.9		40.3	1.3	85.4	83.6	30.5	
Delay (s)	52.6	15.5		118.4	69.4		83.2	37.6	125.9	127.6	70.9	
Level of Service	D	B		F	E		F	D	F	F	E	
Approach Delay (s)		17.2			80.6			100.2			95.1	
Approach LOS		B			F			F			F	
Intersection Summary												
HCM Average Control Delay			66.9			HCM Level of Service			E			
HCM Volume to Capacity ratio			1.02									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			90.9%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												



Movement Summary

North State Street / North Forrest Street

Alternative 1: 2026

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	% HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95 % Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
North Forrest Street										
17L	L	63	1.6	0.808	14.3	LOS B	370	0.53	0.58	28.1
14T	T	211	1.9	0.808	6.0	LOS A	370	0.53	0.44	31.9
14R	R	784	2.0	0.808	6.0	LOS A	370	0.53	0.43	31.9
Approach		1058	2.0	0.809	6.5	LOS A	370	0.53	0.44	31.6
Wharf Street										
15L	L	417	1.9	1.315	185.4	LOS F	1338	1.00	2.72	6.5
12R	R	75	1.4	1.321	180.6	LOS F	1338	1.00	2.72	6.4
Approach		491	1.8	1.316	184.7	LOS F	1338	1.00	2.72	6.5
Boulevard Street										
5L	L	43	2.3	1.387	206.3	LOS F	2255	1.00	3.57	6.2
2T	T	763	2.0	1.392	198.1	LOS F	2255	1.00	3.57	5.9
2R	R	1	50.0	2.000	199.7	LOS F	2255	1.00	3.25	5.8
Approach		808	2.1	1.393	198.5	LOS F	2255	1.00	3.57	5.9
North State Street										
13L	L	22	4.3	0.605	28.6	LOS C	152	0.94	1.11	22.6
18T	T	1	50.0	0.667	21.4	LOS C	152	0.94	1.08	24.6
18R	R	211	1.9	0.609	21.4	LOS C	152	0.94	1.05	24.6
Approach		235	2.6	0.610	22.1	LOS C	152	0.94	1.06	24.4
All Vehicles		2592	2.0	2.000	101.5	LOS F	2255	0.80	1.90	10.1

Symbols which may appear in this table:

Following Degree of Saturation

x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

Following LOS

- Based on density for continuous movements

Following Queue

- Density for continuous movement

Timings
19: Roeder Ave & F St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Volume (vph)	230	545	5	515	50	70	50	185
Turn Type	Prot		Prot		Split		Perm	
Protected Phases	1	6	5	2	3	3	4	
Permitted Phases								4
Detector Phases	1	6	5	2	3	3	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	28.0	24.0	24.0	24.0	28.0	28.0
Total Split (s)	24.0	45.0	28.0	49.0	24.0	24.0	28.0	28.0
Total Split (%)	19.2%	36.0%	22.4%	39.2%	19.2%	19.2%	22.4%	22.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	5.0	1.0	1.0	1.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?								
Recall Mode	Min	Max	None	None	None	None	None	None
Act Effct Green (s)	19.3	64.7	11.2	44.5	19.0	19.0	23.9	23.9
Actuated g/C Ratio	0.16	0.53	0.09	0.36	0.15	0.15	0.19	0.19
v/c Ratio	0.89	0.63	0.03	0.95	0.23	0.33	0.61	0.43
Control Delay	83.9	25.7	52.2	62.8	48.8	49.5	51.5	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.4	2.8	0.3
Total Delay	83.9	25.7	52.2	62.8	48.8	49.9	54.3	11.2
LOS	F	C	D	E	D	D	D	B
Approach Delay		42.5		62.7		49.5	33.3	
Approach LOS		D		E		D	C	

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 122.8

Natural Cycle: 125

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 47.3

Intersection LOS: D

Intersection Capacity Utilization 71.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 19: Roeder Ave & F St



HCM Signalized Intersection Capacity Analysis
19: Roeder Ave & F St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.99		1.00	0.98		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.96	1.00
Satd. Flow (prot)	1728	1807		1711	1771		1479	1542			1736	1531
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.96	1.00
Satd. Flow (perm)	1728	1807		1711	1771		1479	1542			1736	1531
Volume (vph)	230	545	25	5	515	65	50	70	5	145	50	185
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	242	574	26	5	542	68	53	74	5	153	53	195
RTOR Reduction (vph)	0	1	0	0	4	0	0	2	0	0	0	159
Lane Group Flow (vph)	242	599	0	5	606	0	53	77	0	0	206	36
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	18%	18%	18%	2%	2%	2%
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	18.3	63.7		1.4	50.8		18.0	18.0			18.9	18.9
Effective Green, g (s)	19.3	64.7		6.4	51.8		19.0	19.0			23.9	23.9
Actuated g/C Ratio	0.15	0.50		0.05	0.40		0.15	0.15			0.18	0.18
Clearance Time (s)	5.0	5.0		9.0	5.0		5.0	5.0			9.0	9.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	257	899		84	706		216	225			319	281
v/s Ratio Prot	c0.14	0.33		0.00	c0.34		0.04	c0.05			c0.12	
v/s Ratio Perm												0.02
v/c Ratio	0.94	0.67		0.06	0.86		0.25	0.34			0.65	0.13
Uniform Delay, d1	54.8	24.5		58.9	35.8		49.2	49.9			49.1	44.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			0.95	1.35
Incremental Delay, d2	40.3	3.9		0.3	10.2		0.6	0.9			4.1	0.2
Delay (s)	95.1	28.4		59.2	45.9		49.7	50.8			50.7	60.2
Level of Service	F	C		E	D		D	D			D	E
Approach Delay (s)		47.6			46.0			50.4			55.3	
Approach LOS		D			D			D			E	

Intersection Summary

HCM Average Control Delay 48.9 HCM Level of Service D

HCM Volume to Capacity ratio 0.74

Actuated Cycle Length (s) 130.0 Sum of lost time (s) 16.0

Intersection Capacity Utilization 71.1% ICU Level of Service C

Analysis Period (min) 15

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
20: Roeder Ave & C St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

																	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR					
Lane Configurations																	
Sign Control	Free				Free		Stop				Stop						
Grade	0%				0%		0%				0%						
Volume (veh/h)	30	675	20	75	480	25	25	30	110	30	20	40					
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95					
Hourly flow rate (vph)	32	711	21	79	505	26	26	32	116	32	21	42					
Pedestrians																	
Lane Width (ft)																	
Walking Speed (ft/s)																	
Percent Blockage																	
Right turn flare (veh)																	
Median type	None								None								
Median storage (veh)																	
Upstream signal (ft)	735																
pX, platoon unblocked				0.74			0.74			0.74							
vC, conflicting volume	532				732			1513	1474	721	1592	1471					
vC1, stage 1 conf vol																	
vC2, stage 2 conf vol																	
vCu, unblocked vol	532				639			1689	1636	625	1795	1633					
tC, single (s)	4.1				4.1			7.1	6.5	6.2	7.1	6.5					
tC, 2 stage (s)																	
tF (s)	2.2				2.2			3.5	4.0	3.3	3.5	4.0					
p0 queue free %	97				89			24	52	68	0	68					
cM capacity (veh/h)	1046				710			35	65	363	18	66					
Direction, Lane #	EB 1	WB 1	NB 1	SB 1													
Volume Total	763	611	174	95													
Volume Left	32	79	26	32													
Volume Right	21	26	116	42													
cSH	1046	710	112	44													
Volume to Capacity	0.03	0.11	1.56	2.16													
Queue Length 95th (ft)	2	9	321	248													
Control Delay (s)	0.8	2.9	358.5	731.7													
Lane LOS	A	A	F	F													
Approach Delay (s)	0.8	2.9	358.5	731.7													
Approach LOS			F	F													
Intersection Summary																	
Average Delay			81.6														
Intersection Capacity Utilization			74.6%	ICU Level of Service				D									
Analysis Period (min)			15														

HCM Unsignalized Intersection Capacity Analysis
21: E Chestnut St & Bay St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	775	20	15	245	25	205	45	10	365	75	70
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	816	21	16	258	26	216	47	11	384	79	74
Pedestrians		10									10	
Lane Width (ft)		11.0									11.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		1									1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)					356							
pX, platoon unblocked	0.98						0.98	0.98		0.98	0.98	0.98
vC, conflicting volume	294			837			1273	1173	826	1184	1171	291
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	278			837			1279	1177	826	1188	1174	275
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			0	74	97	0	56	90
cM capacity (veh/h)	1252			797			80	180	372	122	181	740
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total	11	837	300	274	537							
Volume Left	11	0	16	216	384							
Volume Right	0	21	26	11	74							
cSH	1252	1700	797	92	146							
Volume to Capacity	0.01	0.49	0.02	2.98	3.69							
Queue Length 95th (ft)	1	0	2	665	Err							
Control Delay (s)	7.9	0.0	0.7	993.0	Err							
Lane LOS	A		A	F	F							
Approach Delay (s)	0.1		0.7	993.0	Err							
Approach LOS				F	F							
Intersection Summary												
Average Delay			2880.6									
Intersection Capacity Utilization			79.0%		ICU Level of Service		D					
Analysis Period (min)			15									

Timings
22: E Chestnut St & Commercial St

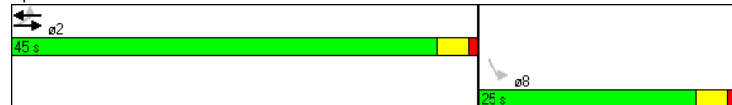
Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBT	SBL
Lane Group	EBL	EBT	WBT	SBL
Lane Configurations	↔	↕	↕	↕
Volume (vph)	100	955	270	150
Turn Type	Perm			
Protected Phases		2	2	
Permitted Phases	2			8
Detector Phases	2	2	2	8
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	26.0	26.0	26.0	19.0
Total Split (s)	45.0	45.0	45.0	25.0
Total Split (%)	64.3%	64.3%	64.3%	35.7%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)		41.0	41.0	21.0
Actuated g/C Ratio		0.59	0.59	0.30
v/c Ratio		0.63	0.34	0.45
Control Delay		11.5	18.3	20.3
Queue Delay		0.0	1.2	0.0
Total Delay		11.5	19.5	20.3
LOS		B	B	C
Approach Delay		11.5	19.5	20.3
Approach LOS		B	B	C

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.63
Intersection Signal Delay: 14.4
Intersection Capacity Utilization 70.7%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service C

Splits and Phases: 22: E Chestnut St & Commercial St



HCM Signalized Intersection Capacity Analysis
22: E Chestnut St & Commercial St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		0.95	1.00		1.00	
Frpb, ped/bikes		1.00	0.99		0.98	
Flpb, ped/bikes		1.00	1.00		0.98	
Frt		1.00	0.97		0.96	
Flt Protected		1.00	1.00		0.97	
Satd. Flow (prot)		3433	1736		1604	
Flt Permitted		0.87	1.00		0.97	
Satd. Flow (perm)		3013	1736		1604	
Volume (vph)	100	955	270	65	150	65
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	1005	284	68	158	68
RTOR Reduction (vph)	0	0	12	0	22	0
Lane Group Flow (vph)	0	1110	340	0	204	0
Confl. Peds. (#/hr)		20		20	20	20
Heavy Vehicles (%)	1%	1%	2%	2%	2%	2%
Turn Type	Perm					
Protected Phases		2	2			
Permitted Phases	2				8	
Actuated Green, G (s)		41.0	41.0		21.0	
Effective Green, g (s)		41.0	41.0		21.0	
Actuated g/C Ratio		0.59	0.59		0.30	
Clearance Time (s)		4.0	4.0		4.0	
Lane Grp Cap (vph)		1765	1017		481	
v/s Ratio Prot			0.20			
v/s Ratio Perm		c0.37			c0.13	
v/c Ratio		0.63	0.33		0.42	
Uniform Delay, d1		9.5	7.5		19.6	
Progression Factor		1.00	2.51		1.00	
Incremental Delay, d2		1.7	0.6		2.7	
Delay (s)		11.2	19.4		22.4	
Level of Service		B	B		C	
Approach Delay (s)		11.2	19.4		22.4	
Approach LOS		B	B		C	

Intersection Summary

HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
23: E Chestnut St & Cornwall Ave

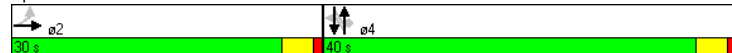
Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	→	↖	↑	↗	↘	↓
Lane Group	EBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↔↔		↔	↗		↔↔
Volume (vph)	755	300	145	55	115	45
Turn Type	Perm			Perm	Perm	
Protected Phases	2		4		4	
Permitted Phases	4			4	4	
Detector Phases	2	4	4	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	26.0	19.0	19.0	19.0	19.0	19.0
Total Split (s)	30.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	57.1%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	26.0		36.0	36.0		36.0
Actuated g/C Ratio	0.37		0.51	0.51		0.51
v/c Ratio	0.90		0.77	0.08		0.38
Control Delay	24.1		24.3	4.3		9.3
Queue Delay	1.2		0.0	0.0		0.0
Total Delay	25.3		24.3	4.3		9.3
LOS	C		C	A		A
Approach Delay	25.3		22.1			9.3
Approach LOS	C		C			A

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 55
Control Type: Pretimed
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 22.7
Intersection Capacity Utilization 78.1%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service D

Splits and Phases: 23: E Chestnut St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
23: E Chestnut St & Cornwall Ave

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0		4.0	
Lane Util. Factor		0.95						1.00	1.00		1.00	
Frpb, ped/bikes		0.98						1.00	0.92		0.98	
Flpb, ped/bikes		1.00						0.94	1.00		0.98	
Frt		0.97						1.00	0.85		0.98	
Flt Protected		1.00						0.97	1.00		0.97	
Satd. Flow (prot)		3236						1645	1407		1689	
Flt Permitted		1.00						0.70	1.00		0.56	
Satd. Flow (perm)		3236						1191	1407		973	
Volume (vph)	60	755	245	0	0	0	300	145	55	115	45	25
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	795	258	0	0	0	316	153	58	121	47	26
RTOR Reduction (vph)	0	40	0	0	0	0	0	0	21	0	8	0
Lane Group Flow (vph)	0	1076	0	0	0	0	0	469	37	0	186	0
Confl. Peds. (#/hr)	50		50				50		50	50		50
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	Perm							Perm		Perm	Perm	
Protected Phases	2							4			4	
Permitted Phases	2						4		4	4		
Actuated Green, G (s)	26.0							36.0		36.0	36.0	
Effective Green, g (s)	26.0							36.0		36.0	36.0	
Actuated g/C Ratio	0.37							0.51		0.51	0.51	
Clearance Time (s)	4.0							4.0		4.0	4.0	
Lane Grp Cap (vph)	1202							613		724	500	
v/s Ratio Prot												
v/s Ratio Perm	0.33							0.39		0.03	0.19	
v/c Ratio	0.89							0.77		0.05	0.37	
Uniform Delay, d1	20.7							13.6		8.5	10.2	
Progression Factor	0.71							1.00		1.00	0.75	
Incremental Delay, d2	8.6							8.8		0.1	1.8	
Delay (s)	23.4							22.4		8.6	9.4	
Level of Service	C							C		A	A	
Approach Delay (s)	23.4			0.0				20.9			9.4	
Approach LOS	C			A				C			A	

Intersection Summary

HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

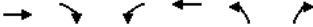
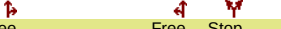
HCM Unsignalized Intersection Capacity Analysis
38: Roeder Ave & Central Ave

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Sign Control	Free				Free				Stop					
Grade	0%				0%				0%					
Volume (veh/h)	75	565	150	5	310	95	100	50	10	255	95	235		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Hourly flow rate (vph)	79	595	158	5	326	100	105	53	11	268	100	247		
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)														
Median type	None								None					
Median storage (veh)														
Upstream signal (ft)	1113													
pX, platoon unblocked														
vC, conflicting volume	426				753				1516	1268	674	1255	1297	376
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	426				753				1516	1268	674	1255	1297	376
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93				99				0	66	98	0	33	63
cM capacity (veh/h)	1133				857				27	156	455	101	150	670
Direction, Lane #	EB 1	WB 1	NB 1	SB 1										
Volume Total	832	432	168	616										
Volume Left	79	5	105	268										
Volume Right	158	100	11	247										
cSH	1133	857	40	167										
Volume to Capacity	0.07	0.01	4.25	3.69										
Queue Length 95th (ft)	6	0	Err	Err										
Control Delay (s)	1.8	0.2	Err	Err										
Lane LOS	A	A	F	F										
Approach Delay (s)	1.8	0.2	Err	Err										
Approach LOS			F	F										
Intersection Summary														
Average Delay	3830.7													
Intersection Capacity Utilization	111.4%			ICU Level of Service						H				
Analysis Period (min)	15													

HCM Unsignalized Intersection Capacity Analysis
39: Roeder Ave & Hilton Ave

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	830	60	50	690	60	50
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	874	63	53	726	63	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	544					
pX, platoon unblocked	0.69					
vC, conflicting volume			937	1737		905
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			937	2063		905
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			93	0		84
cM capacity (veh/h)			731	39		335
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	937	779	116			
Volume Left	0	53	63			
Volume Right	63	0	53			
cSH	1700	731	65			
Volume to Capacity	0.55	0.07	1.79			
Queue Length 95th (ft)	0	6	263			
Control Delay (s)	0.0	1.9	515.2			
Lane LOS		A	F			
Approach Delay (s)	0.0	1.9	515.2			
Approach LOS			F			
Intersection Summary						
Average Delay	33.4					
Intersection Capacity Utilization	90.5%		ICU Level of Service		E	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
45: Laurel St & Bay St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	30	265	10	345	90	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	279	11	363	95	11
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	311	374	105			
Volume Left (vph)	32	0	95			
Volume Right (vph)	0	363	11			
Hadj (s)	0.05	-0.55	0.15			
Departure Headway (s)	4.6	4.0	5.5			
Degree Utilization, x	0.40	0.42	0.16			
Capacity (veh/h)	743	863	577			
Control Delay (s)	10.7	9.9	9.6			
Approach Delay (s)	10.7	9.9	9.6			
Approach LOS	B	A	A			
Intersection Summary						
Delay			10.1			
HCM Level of Service			B			
Intersection Capacity Utilization			51.3%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
46: Wharf St/Pine St & Cornwall Ave

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	85	10	110	45	25	10	10	55	30	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	89	11	116	47	26	11	11	58	32	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	74			100			424	421	95	471	413	61
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	74			100			424	421	95	471	413	61
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			92			98	98	94	93	98	99
cM capacity (veh/h)	1526			1493			492	480	962	435	485	1005
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	111	189	79	53								
Volume Left	11	116	11	32								
Volume Right	11	26	58	11								
cSH	1526	1493	763	502								
Volume to Capacity	0.01	0.08	0.10	0.10								
Queue Length 95th (ft)	1	6	9	9								
Control Delay (s)	0.8	4.9	10.3	13.0								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.8	4.9	10.3	13.0								
Approach LOS			B	B								
Intersection Summary												
Average Delay			5.8									
Intersection Capacity Utilization			32.3%	ICU Level of Service	A							
Analysis Period (min)			15									

Timings
1: Squalicum Pkwy & Meridian Street

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBT	NBL	NBT	SBL	SBT	ø1	ø3	ø6
Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT			
Lane Configurations	↔	↔	↔	↔	↔	↔	↔			
Volume (vph)	295	5	10	5	660	25	595			
Turn Type	Split			Prot		Prot				
Protected Phases	7	7	4	5	2	13	3 6	1	3	6
Permitted Phases										
Detector Phases	7	7	4	5	2	13	3 6			
Minimum Initial (s)	6.0	6.0	6.0	6.0	10.0			6.0	6.0	10.0
Minimum Split (s)	29.0	29.0	29.0	11.0	23.0			11.0	11.0	23.0
Total Split (s)	29.0	29.0	29.0	11.0	35.0	37.0	61.0	16.0	21.0	40.0
Total Split (%)	22.3%	22.3%	22.3%	8.5%	26.9%	28.5%	46.9%	12%	16%	31%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0			1.0	1.0	1.0
Lead/Lag			Lead	Lead	Lead			Lag	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Max			None	None	None
Act Effct Green (s)	25.0	25.0	22.7	7.0	31.0	29.0	53.0			
Actuated g/C Ratio	0.20	0.20	0.18	0.05	0.24	0.23	0.42			
v/c Ratio	0.94	0.08	0.18	0.05	0.81	0.07	0.63			
Control Delay	88.1	20.2	22.1	59.6	54.6	11.9	6.4			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.3			
Total Delay	88.1	20.2	22.1	59.6	54.6	11.9	6.7			
LOS	F	C	C	E	D	B	A			
Approach Delay		82.9	22.1		54.6		6.9			
Approach LOS		F	C		D		A			

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 127.7

Natural Cycle: 135

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 36.6

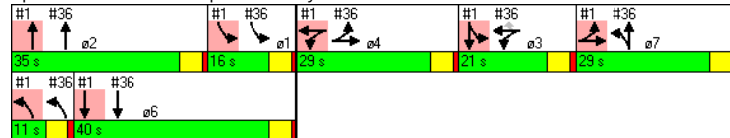
Intersection LOS: D

Intersection Capacity Utilization 54.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Squalicum Pkwy & Meridian Street



HCM Signalized Intersection Capacity Analysis
1: Squalicum Pkwy & Meridian Street

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.88			0.92		1.00	1.00		1.00	0.95	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1561			1723		1787	3566		1752	3345	
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1687	1561			1723		1787	3566		1752	3345	
Volume (vph)	295	5	20	10	10	35	5	660	10	25	595	260
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	311	5	21	11	11	37	5	695	11	26	626	274
RTOR Reduction (vph)	0	17	0	0	30	0	0	1	0	0	37	0
Lane Group Flow (vph)	311	9	0	0	29	0	5	705	0	26	863	0
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split			Prot			Prot		
Protected Phases	7	7		4	4		5	2		13	3 6	
Permitted Phases												
Actuated Green, G (s)	24.0	24.0			21.7		6.0	30.0		27.0	51.0	
Effective Green, g (s)	25.0	25.0			22.7		7.0	31.0		29.0	53.0	
Actuated g/C Ratio	0.20	0.20			0.18		0.05	0.24		0.23	0.42	
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0				
Vehicle Extension (s)	3.0	3.0			3.0		2.0	2.0				
Lane Grp Cap (vph)	330	306			306		98	866		398	1388	
v/s Ratio Prot	c0.18	0.01			c0.02		0.00	c0.20		0.01	c0.26	
v/s Ratio Perm												
v/c Ratio	0.94	0.03			0.09		0.05	0.81		0.07	0.62	
Uniform Delay, d1	50.6	41.5			43.9		57.2	45.6		38.7	29.4	
Progression Factor	1.00	1.00			1.00		1.00	1.00		0.53	0.43	
Incremental Delay, d2	34.6	0.0			0.1		0.1	8.3		0.0	0.1	
Delay (s)	85.2	41.6			44.0		57.3	53.9		20.5	12.8	
Level of Service	F	D			D		E	D		C	B	
Approach Delay (s)		81.8			44.0			54.0			13.0	
Approach LOS		F			D			D			B	

Intersection Summary

HCM Average Control Delay 39.6 HCM Level of Service D

HCM Volume to Capacity ratio 0.63

Actuated Cycle Length (s) 127.7 Sum of lost time (s) 16.0

Intersection Capacity Utilization 54.4% ICU Level of Service A

Analysis Period (min) 15

c Critical Lane Group

Timings
2: Meridian Street & Broadway St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	35	270	40	380	180	135	30	95
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	1	6	5	2	7	4	3	8
Permitted Phases								
Detector Phases	1	6	5	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	25.0	11.0	25.0	11.0	25.0	11.0	25.0
Total Split (s)	11.0	28.0	11.0	28.0	16.0	30.0	11.0	25.0
Total Split (%)	13.8%	35.0%	13.8%	35.0%	20.0%	37.5%	13.8%	31.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	7.5	27.1	7.5	27.1	11.1	16.7	7.5	10.6
Actuated g/C Ratio	0.12	0.48	0.12	0.48	0.19	0.28	0.12	0.17
v/c Ratio	0.18	0.47	0.20	0.49	0.58	0.38	0.15	0.33
Control Delay	32.1	18.3	32.4	19.6	31.8	16.8	32.0	24.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.1	18.3	32.4	19.6	31.8	16.8	32.0	24.3
LOS	C	B	C	B	C	B	C	C
Approach Delay		19.5		20.7		24.2		26.1
Approach LOS		B		C		C		C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 56.5
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 21.8
Intersection Capacity Utilization 56.9%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service B

Splits and Phases: 2: Meridian Street & Broadway St

⬅️ e1	⬅️ e2	⬅️ e3	⬅️ e4
11 s	28 s	11 s	30 s
⬅️ e5	⬅️ e6	⬅️ e7	⬅️ e8
11 s	28 s	16 s	25 s

HCM Signalized Intersection Capacity Analysis
2: Meridian Street & Broadway St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1731		1728	1799		1728	1731		1745	1822	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1728	1731		1728	1799		1728	1731		1745	1822	
Volume (vph)	35	270	110	40	380	25	180	135	50	30	95	5
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	284	116	42	400	26	189	142	53	32	100	5
RTOR Reduction (vph)	0	15	0	0	2	0	0	19	0	0	3	0
Lane Group Flow (vph)	37	385	0	42	424	0	189	176	0	32	102	0
Confl. Peds. (#/hr)			5			5			5			5
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	1.8	25.2		1.8	25.2		8.6	14.0		1.8	7.2	
Effective Green, g (s)	2.8	26.2		2.8	26.2		9.6	15.0		2.8	8.2	
Actuated g/C Ratio	0.04	0.42		0.04	0.42		0.15	0.24		0.04	0.13	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	77	722		77	751		264	413		78	238	
v/s Ratio Prot	0.02	0.22		c0.02	c0.24		c0.11	c0.10		0.02	0.06	
v/s Ratio Perm												
v/c Ratio	0.48	0.53		0.55	0.56		0.72	0.43		0.41	0.43	
Uniform Delay, d1	29.3	13.7		29.4	13.9		25.3	20.3		29.2	25.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	0.4		4.2	0.6		7.5	0.3		1.3	0.5	
Delay (s)	31.0	14.1		33.6	14.5		32.8	20.5		30.5	25.6	
Level of Service	C	B		C	B		C	C		C	C	
Approach Delay (s)		15.5			16.2			26.5			26.7	
Approach LOS		B			B			C			C	

Intersection Summary

HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	62.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
3: Ohio St & N State St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	340	335	250	130	35	925	45	625
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	24.0	24.0	23.0	23.0	8.0	21.0	8.0	21.0
Total Split (s)	26.0	26.0	23.0	23.0	8.0	33.0	8.0	33.0
Total Split (%)	28.9%	28.9%	25.6%	25.6%	8.9%	36.7%	8.9%	36.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	20.6	21.0	17.3	17.7	4.0	27.8	4.0	29.3
Actuated g/C Ratio	0.24	0.25	0.21	0.21	0.05	0.33	0.05	0.35
v/c Ratio	0.85	0.89	0.75	0.50	0.46	0.92	0.58	0.67
Control Delay	51.9	55.1	47.5	32.9	61.6	42.4	71.2	27.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.9	55.1	47.5	32.9	61.6	42.4	71.2	27.0
LOS	D	E	D	C	E	D	E	C
Approach Delay	53.6		41.4		43.1		29.5	
Approach LOS	D		D		D		C	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 84.3

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

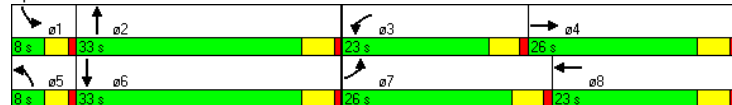
Maximum v/c Ratio: 0.92

Intersection Signal Delay: 41.7 Intersection LOS: D

Intersection Capacity Utilization 78.5% ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 3: Ohio St & N State St



HCM Signalized Intersection Capacity Analysis
3: Ohio St & N State St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.96		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1786		1711	1725		1728	3421		1728	3363	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1728	1786		1711	1725		1728	3421		1728	3363	
Volume (vph)	340	335	45	250	130	50	35	925	65	45	625	135
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	358	353	47	263	137	53	37	974	68	47	658	142
RTOR Reduction (vph)	0	5	0	0	16	0	0	5	0	0	20	0
Lane Group Flow (vph)	358	395	0	263	174	0	37	1037	0	47	780	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	19.5	20.0		16.2	16.7		2.2	27.5		3.0	28.3	
Effective Green, g (s)	20.5	21.0		17.2	17.7		2.2	28.5		3.0	29.3	
Actuated g/C Ratio	0.24	0.25		0.20	0.21		0.03	0.33		0.04	0.34	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	413	438		343	356		44	1138		60	1150	
v/s Ratio Prot	c0.21	c0.22		0.15	0.10		0.02	c0.30		c0.03	0.23	
v/s Ratio Perm												
v/c Ratio	0.87	0.90		0.77	0.49		0.84	0.91		0.78	0.68	
Uniform Delay, d1	31.3	31.3		32.4	30.0		41.6	27.4		41.0	24.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.6	21.7		10.4	1.4		77.3	10.9		47.5	1.6	
Delay (s)	48.9	53.0		42.8	31.5		118.9	38.3		88.6	25.8	
Level of Service	D	D		D	C		F	D		F	C	
Approach Delay (s)	51.1		38.0		41.0		29.3					
Approach LOS	D		D		D		C					

Intersection Summary

HCM Average Control Delay	39.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	85.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
4: Iowa St & James Street

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	←	←	↙	↓	↘	↗	→
Lane Group	WBL	WBT	SBL	SBT	SBR	NEL	NER
Lane Configurations							
Volume (vph)	405	50	175	140	440	475	715
Turn Type	Split		Perm		Over		pt+ov
Protected Phases	3	3		1	2	2	2 3
Permitted Phases			1				
Detector Phases	3	3	1	1	2	2	2 3
Minimum Initial (s)	6.0	6.0	8.0	8.0	6.0	6.0	
Minimum Split (s)	11.0	11.0	20.0	20.0	17.0	17.0	
Total Split (s)	13.0	13.0	47.0	47.0	20.0	20.0	33.0
Total Split (%)	16.3%	16.3%	58.8%	58.8%	25.0%	25.0%	41.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag			Lead	Lead	Lag	Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	
Act Effct Green (s)	9.0	9.0		43.0	16.0	16.0	29.0
Actuated g/C Ratio	0.11	0.11		0.54	0.20	0.20	0.36
v/c Ratio	1.57	1.54		3.64	0.87	1.10	1.07
Control Delay	308.6	290.2		1226.9	49.2	99.9	87.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.8
Total Delay	308.6	290.2		1226.9	49.2	99.9	88.6
LOS	F	F		F	D	F	F
Approach Delay		299.0		533.4		95.0	
Approach LOS		F		F		F	

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 3.64

Intersection Signal Delay: 273.2

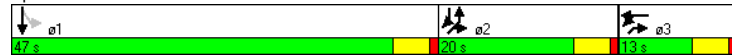
Intersection LOS: F

Intersection Capacity Utilization 64.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Iowa St & James Street



HCM Signalized Intersection Capacity Analysis
4: Iowa St & James Street

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	←	←	↙	↓	↘	↗	→	↖	↗	↘
Movement	WBL	WBT	WBR	SBL	SBT	SBR	SBR2	NEL	NER	NER2
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95			1.00	0.88		0.97	0.91	
Frt	1.00	0.94			1.00	0.85		0.95	0.85	
Flt Protected	0.95	0.98			0.97	1.00		0.97	1.00	
Satd. Flow (prot)	1641	1587			1769	2720		3254	1407	
Flt Permitted	0.95	0.98			0.09	1.00		0.97	1.00	
Satd. Flow (perm)	1641	1587			169	2720		3254	1407	
Volume (vph)	405	50	125	175	140	440	10	475	715	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	426	53	132	184	147	463	11	500	753	11
RTOR Reduction (vph)	0	31	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	290	290	0	0	331	472	0	718	546	0
Heavy Vehicles (%)	1%	1%		1%	1%	1%		1%	1%	1%
Turn Type	Split			Perm		Over			pt+ov	
Protected Phases	3	3			1	2		2	2 3	
Permitted Phases				1						
Actuated Green, G (s)	8.0	8.0			42.0	15.0		15.0	28.0	
Effective Green, g (s)	9.0	9.0			43.0	16.0		16.0	29.0	
Actuated g/C Ratio	0.11	0.11			0.54	0.20		0.20	0.36	
Clearance Time (s)	5.0	5.0			5.0	5.0		5.0		
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0		
Lane Grp Cap (vph)	185	179			91	544		651	510	
v/s Ratio Prot	0.18	c0.18				0.17		0.22	c0.39	
v/s Ratio Perm					c1.96					
v/c Ratio	1.57	1.62			3.64	0.87		1.10	1.07	
Uniform Delay, d1	35.5	35.5			18.5	31.0		32.0	25.5	
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	279.9	303.1			1213.5	13.7		66.8	60.1	
Delay (s)	315.4	338.6			1232.0	44.7		98.8	85.6	
Level of Service	F	F			F	D		F	F	
Approach Delay (s)		327.6			532.9			93.1		
Approach LOS		F			F			F		

Intersection Summary

HCM Average Control Delay	278.7	HCM Level of Service	F
HCM Volume to Capacity ratio	2.79		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Iowa St & King St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱	↰
Volume (vph)	35	815	235	470	35	150	500	95	125
Turn Type	pm+pt		pm+pt		pm+pt		pm+ov	pm+pt	
Protected Phases	5	2	1	6	3	8	1	7	4
Permitted Phases	2		6		8		8	4	
Detector Phases	5	2	1	6	3	8	1	7	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	28.0	11.0	26.0	11.0	28.0	11.0	11.0	28.0
Total Split (s)	11.0	28.0	13.0	30.0	11.0	28.0	13.0	11.0	28.0
Total Split (%)	13.8%	35.0%	16.3%	37.5%	13.8%	35.0%	16.3%	13.8%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	Min	None	Min	None	None	None	None	None
Act Effct Green (s)	28.5	21.5	35.5	34.2	17.6	12.4	22.6	19.0	16.5
Actuated g/C Ratio	0.42	0.35	0.58	0.56	0.26	0.20	0.37	0.30	0.26
v/c Ratio	0.09	0.72	0.62	0.30	0.10	0.44	0.78	0.24	0.35
Control Delay	10.4	23.3	21.7	12.9	16.7	28.8	21.5	16.9	21.6
Queue Delay	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.4	23.6	21.7	12.9	16.7	28.8	21.5	16.9	21.6
LOS	B	C	C	B	B	C	C	B	C
Approach Delay		23.1		15.6		22.8			19.9
Approach LOS		C		B		C			B

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 61

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 20.4 Intersection LOS: C

Intersection Capacity Utilization 69.4% ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: Iowa St & King St

↰ ø1	↱ ø2	↰ ø3	↱ ø4
13 s	28 s	11 s	23 s
↰ ø5	↱ ø6	↰ ø7	↱ ø8
11 s	30 s	11 s	23 s

HCM Signalized Intersection Capacity Analysis
5: Iowa St & King St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱	↰	↱	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1728	3443		1711	3355		1728	1818	1546	1745	1776	
Flt Permitted	0.44	1.00		0.16	1.00		0.65	1.00	1.00	0.49	1.00	
Satd. Flow (perm)	797	3443		288	3355		1183	1818	1546	893	1776	
Volume (vph)	35	815	20	235	470	70	35	150	500	95	125	35
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	858	21	247	495	74	37	158	526	100	132	37
RTOR Reduction (vph)	0	2	0	0	12	0	0	0	111	0	14	0
Lane Group Flow (vph)	37	877	0	247	557	0	37	158	415	100	155	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	0%	0%	0%
Turn Type	pm+pt			pm+pt			pm+pt		pm+ov	pm+pt		
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	26.4	24.4		38.3	31.3		12.8	10.8	19.7	17.2	13.0	
Effective Green, g (s)	28.4	25.4		39.3	32.3		14.8	11.8	21.7	19.2	14.0	
Actuated g/C Ratio	0.42	0.37		0.58	0.47		0.22	0.17	0.32	0.28	0.20	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.6		3.0	3.0		3.6	3.6	3.0	3.0	3.0	
Lane Grp Cap (vph)	372	1280		372	1587		280	314	582	316	364	
v/s Ratio Prot	0.00	0.25		0.10	0.17		0.01	0.09	c0.10	c0.02	0.09	
v/s Ratio Perm	0.04			c0.29			0.02		0.17	0.06		
v/c Ratio	0.10	0.69		0.66	0.35		0.13	0.50	0.71	0.32	0.42	
Uniform Delay, d1	11.9	18.1		10.0	11.4		21.4	25.6	20.6	18.8	23.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.6		4.4	0.1		0.3	1.5	4.1	0.6	0.8	
Delay (s)	12.0	19.7		14.4	11.5		21.7	27.1	24.7	19.4	24.4	
Level of Service	B	B		B	B		C	C	C	B	C	
Approach Delay (s)		19.4			12.4			25.1			22.6	
Approach LOS		B			B			C			C	

Intersection Summary

HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	68.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
6: Iowa St & Moore St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	35	830	205	600	135	55	115	95
Turn Type	Prot		Prot		Perm		Perm	
Protected Phases	1	6	5	2		4		8
Permitted Phases					4		8	
Detector Phases	1	6	5	2	4	4	8	8
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	27.0	12.0	27.0	21.0	21.0	21.0	21.0
Total Split (s)	12.0	37.0	16.0	41.0	27.0	27.0	27.0	27.0
Total Split (%)	15.0%	46.3%	20.0%	51.3%	33.8%	33.8%	33.8%	33.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	8.0	33.0	12.0	41.8		23.0		23.0
Actuated g/C Ratio	0.09	0.41	0.15	0.52		0.29		0.29
v/c Ratio	0.23	0.97	0.84	0.38		1.07		0.91
Control Delay	37.3	37.9	62.4	13.0		89.8		66.4
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	37.3	37.9	62.4	13.0		89.8		66.4
LOS	D	D	E	B		F		E
Approach Delay		37.9		25.0		89.8		66.4
Approach LOS		D		C		F		E

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.07
Intersection Signal Delay: 44.4
Intersection Capacity Utilization 89.3%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service E

Splits and Phases: 6: Iowa St & Moore St



HCM Signalized Intersection Capacity Analysis
6: Iowa St & Moore St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.94		1.00	0.99			0.92			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1728	3257		1711	3393			1605			1671	
Flt Permitted	0.95	1.00		0.95	1.00			0.80			0.53	
Satd. Flow (perm)	1728	3257		1711	3393			1304			899	
Volume (vph)	35	830	515	205	600	35	135	55	255	115	95	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	874	542	216	632	37	142	58	268	121	100	21
RTOR Reduction (vph)	0	118	0	0	5	0	0	61	0	0	4	0
Lane Group Flow (vph)	37	1299	0	216	664	0	0	407	0	0	238	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	4%	4%	4%	6%	6%	6%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	4.2	34.0		11.0	40.8			22.0			22.0	
Effective Green, g (s)	5.2	35.0		12.0	41.8			23.0			23.0	
Actuated g/C Ratio	0.06	0.43		0.15	0.51			0.28			0.28	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.5			3.5	
Lane Grp Cap (vph)	110	1390		250	1730			366			252	
v/s Ratio Prot	0.02	c0.40		c0.13	0.20							
v/s Ratio Perm								c0.31			0.26	
v/c Ratio	0.34	0.93		0.86	0.38			1.11			0.94	
Uniform Delay, d1	36.7	22.4		34.2	12.3			29.5			28.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.8	11.7		25.2	0.1			80.7			41.4	
Delay (s)	38.6	34.1		59.4	12.4			110.2			70.3	
Level of Service	D	C		E	B			F			E	
Approach Delay (s)		34.2			23.9			110.2			70.3	
Approach LOS		C			C			F			E	

Intersection Summary

HCM Average Control Delay	45.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	82.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Elm Street & Broadway St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	5	230	50	400	185	155	50	125
Turn Type	Perm		Perm		Prot		Prot	
Protected Phases		2		2	7	4	3	8
Permitted Phases	2		2					
Detector Phases	2	2	2	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	26.0	26.0	26.0	26.0	8.0	26.0	8.0	26.0
Total Split (s)	38.0	38.0	38.0	38.0	16.0	32.0	10.0	26.0
Total Split (%)	47.5%	47.5%	47.5%	47.5%	20.0%	40.0%	12.5%	32.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	21.8	21.8	21.8	21.8	11.3	18.5	7.4	12.5
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.21	0.34	0.13	0.23
v/c Ratio	0.02	0.43	0.15	0.71	0.54	0.34	0.23	0.34
Control Delay	12.2	14.1	13.3	20.4	32.5	17.4	32.8	24.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	14.1	13.3	20.4	32.5	17.4	32.8	24.3
LOS	B	B	B	C	C	B	C	C
Approach Delay		14.1		19.7		24.8		26.6
Approach LOS		B		B		C		C

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 52.1

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 20.8

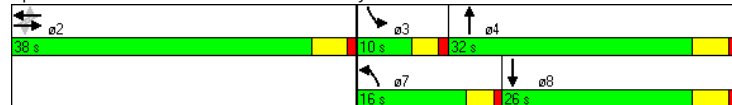
Intersection LOS: C

Intersection Capacity Utilization 63.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: Elm Street & Broadway St



HCM Signalized Intersection Capacity Analysis
7: Elm Street & Broadway St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1692	1726		1707	1751		1728	1753		1728	1794	
Flt Permitted	0.27	1.00		0.52	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	488	1726		925	1751		1728	1753		1728	1794	
Volume (vph)	5	230	55	50	400	80	185	155	40	50	125	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	242	58	53	421	84	195	163	42	53	132	11
RTOR Reduction (vph)	0	12	0	0	10	0	0	12	0	0	4	0
Lane Group Flow (vph)	5	288	0	53	495	0	195	193	0	53	139	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		2			2		7	4		3	8	
Permitted Phases	2			2								
Actuated Green, G (s)	16.5	16.5		16.5	16.5		7.7	13.6		2.8	8.7	
Effective Green, g (s)	17.5	17.5		17.5	17.5		7.7	14.6		2.8	9.7	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.16	0.31		0.06	0.21	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	182	644		345	653		284	546		103	371	
v/s Ratio Prot		0.17			c0.28		c0.11	c0.11		0.03	0.08	
v/s Ratio Perm	0.01			0.06								
v/c Ratio	0.03	0.45		0.15	0.76		0.69	0.35		0.51	0.37	
Uniform Delay, d1	9.3	11.1		9.8	12.8		18.5	12.5		21.4	16.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.5		0.2	5.0		6.7	0.4		4.3	0.6	
Delay (s)	9.4	11.6		10.0	17.9		25.2	12.9		25.7	16.6	
Level of Service	A	B		A	B		C	B		C	B	
Approach Delay (s)		11.5			17.1			18.9			19.1	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	16.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	46.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Flora St & Cornwall Ave

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↗	←	↖	↗	↖	↗	↖
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations		↕↕		↕↕	↕↕	↕↕	↕↕	↕↕	↕↕
Volume (vph)	135	385	30	145	165	20	315	140	255
Turn Type	Perm		Perm		Perm	Prot		Prot	
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8				
Detector Phases	4	4	8	8	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	11.0	27.0	11.0	27.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	11.0	32.0	11.0	32.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	15.7%	45.7%	15.7%	45.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		16.9		16.9	16.9	7.2	20.3	7.4	30.1
Actuated g/C Ratio		0.30		0.30	0.30	0.11	0.35	0.13	0.53
v/c Ratio		0.73		0.40	0.32	0.11	0.83	0.67	0.37
Control Delay		24.6		20.3	5.1	32.0	28.3	48.5	10.9
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		24.6		20.3	5.1	32.0	28.3	48.5	10.9
LOS	C		C		A	C		D	B
Approach Delay	24.6		12.9				28.4		22.4
Approach LOS	C		B				C		C

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 57.2
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 22.9
Intersection Capacity Utilization 82.1%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service E

Splits and Phases: 8: Flora St & Cornwall Ave

↖ e1	↖ e2	↖ e4
11 s	32 s	27 s
↖ e5	↖ e6	↖ e8
11 s	32 s	27 s

HCM Signalized Intersection Capacity Analysis
8: Flora St & Cornwall Ave

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.93	1.00	0.99		1.00	0.99	
Flpb, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.95		1.00	0.97	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3316			1797	1441	1694	1666		1694	1705	
Flt Permitted		0.80			0.85	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		2675			1534	1441	1694	1666		1694	1705	
Volume (vph)	135	385	25	30	145	165	20	315	170	140	255	65
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	142	405	26	32	153	174	21	332	179	147	268	68
RTOR Reduction (vph)	0	5	0	0	0	126	0	27	0	0	11	0
Lane Group Flow (vph)	0	568	0	0	185	48	21	484	0	147	325	0
Confl. Peds. (#/hr)	35		35	35		35			35			35
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	3%	3%	3%
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		15.8			15.8	15.8	1.0	23.8		6.3	29.1	
Effective Green, g (s)		16.8			16.8	16.8	2.0	24.8		7.3	30.1	
Actuated g/C Ratio		0.28			0.28	0.28	0.03	0.41		0.12	0.49	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		738			423	398	56	678		203	843	
v/s Ratio Prot							0.01	c0.29		c0.09	0.19	
v/s Ratio Perm		c0.21			0.12	0.03						
v/c Ratio		0.77			0.44	0.12	0.38	0.71		0.72	0.39	
Uniform Delay, d1		20.3			18.2	16.5	28.8	15.1		25.8	9.6	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		4.4			0.3	0.0	1.5	3.0		10.3	0.1	
Delay (s)		24.6			18.4	16.6	30.4	18.1		36.1	9.7	
Level of Service		C			B	B	C	B		D	A	
Approach Delay (s)	24.6				17.5			18.5			17.8	
Approach LOS	C				B			B			B	

Intersection Summary

HCM Average Control Delay	20.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	60.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
9: York St & N State St

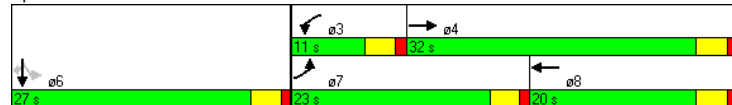
Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	SBT	SBR
Lane Configurations	↰	↰↱	↰	↰↱	↰↱	↰
Volume (vph)	360	370	65	215	640	145
Turn Type	Prot		Prot		Perm	
Protected Phases	7	4	3	8	6	
Permitted Phases						6
Detector Phases	7	4	3	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	21.0	21.0
Total Split (s)	23.0	32.0	11.0	20.0	27.0	27.0
Total Split (%)	32.9%	45.7%	15.7%	28.6%	38.6%	38.6%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag		
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	16.5	24.5	6.6	9.8	20.4	20.4
Actuated g/C Ratio	0.28	0.41	0.10	0.17	0.35	0.35
v/c Ratio	0.80	0.36	0.39	0.50	0.81	0.24
Control Delay	36.1	12.9	35.0	23.7	25.3	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.1	12.9	35.0	23.7	25.3	4.4
LOS	D	B	C	C	C	A
Approach Delay		22.9		25.9	22.4	
Approach LOS		C		C	C	

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 59.1
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 23.1
Intersection Capacity Utilization 62.6%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service B

Splits and Phases: 9: York St & N State St



HCM Signalized Intersection Capacity Analysis
9: York St & N State St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	↰	↰↱	↰	↰	↰↱	↰	↰	↰	↰	↰	↰↱	↰
Lane Configurations	↰	↰↱		↰	↰↱						↰↱	↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95						0.95	1.00
Frt	1.00	0.97		1.00	0.97						1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (prot)	1694	3275		1646	3198						3373	1531
Flt Permitted	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (perm)	1694	3275		1646	3198						3373	1531
Volume (vph)	360	370	105	65	215	50	0	0	0	255	640	145
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	379	389	111	68	226	53	0	0	0	268	674	153
RTOR Reduction (vph)	0	38	0	0	31	0	0	0	0	0	0	102
Lane Group Flow (vph)	379	462	0	68	248	0	0	0	0	0	942	51
Heavy Vehicles (%)	3%	3%	3%	6%	6%	6%	0%	0%	0%	2%	2%	2%
Turn Type	Prot			Prot						Perm		Perm
Protected Phases	7	4		3	8						6	
Permitted Phases										6		6
Actuated Green, G (s)	16.5	24.5		3.8	11.8						20.4	20.4
Effective Green, g (s)	16.5	24.5		3.8	11.8						20.4	20.4
Actuated g/C Ratio	0.27	0.40		0.06	0.19						0.34	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)	460	1322		103	622						1134	515
v/s Ratio Prot	c0.22	c0.14		0.04	0.08							
v/s Ratio Perm											0.28	0.03
v/c Ratio	0.82	0.35		0.66	0.40						0.83	0.10
Uniform Delay, d1	20.7	12.6		27.8	21.4						18.6	13.8
Progression Factor	1.00	1.00		1.00	1.00						1.00	1.00
Incremental Delay, d2	11.4	0.2		14.7	0.4						5.3	0.1
Delay (s)	32.1	12.7		42.6	21.8						23.9	13.9
Level of Service	C	B		D	C						C	B
Approach Delay (s)		21.1			25.8			0.0			22.5	
Approach LOS		C			C			A			C	

Intersection Summary

HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	60.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
10: York St & N Forest St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	←	↖	↑	↗	↘	↓	↙	↘
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	NEL	NET
Lane Configurations	↖	↖	↖	↖	↖	↖	↖	↖
Volume (vph)	95	80	155	330	135	470	70	595
Turn Type	Prot		Split		Split		custom	
Protected Phases	8	8	5	5	2	2		4
Permitted Phases							4	
Detector Phases	8	8	5	5	2	2	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	9.0	27.0	27.0	27.0	27.0	29.0	29.0
Total Split (s)	17.0	17.0	27.0	27.0	27.0	27.0	29.0	29.0
Total Split (%)	17.0%	17.0%	27.0%	27.0%	27.0%	27.0%	29.0%	29.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	Min	Min	Min	Min	None	None
Act Effct Green (s)	11.7	11.7	20.9	20.9	19.0	19.0	23.5	23.5
Actuated g/C Ratio	0.13	0.13	0.23	0.23	0.21	0.21	0.26	0.26
v/c Ratio	0.45	0.75	0.85	0.79	0.44	0.70	0.17	0.88
Control Delay	46.8	50.6	57.3	50.0	37.2	40.0	30.2	47.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	46.8	50.6	57.3	50.0	37.2	40.0	30.2	47.2
LOS	D	D	E	D	D	D	C	D
Approach Delay	49.3		53.9			39.4		45.7
Approach LOS	D		D			D		D

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 91.5
Natural Cycle: 95
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 46.4
Intersection Capacity Utilization 68.6%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service C

Splits and Phases: 10: York St & N Forest St



HCM Signalized Intersection Capacity Analysis
10: York St & N Forest St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	←	↖	↖	↑	↗	↘	↘	↓	↙	↘	↘	↘
Movement	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL2	SBL	SBT	NEL	NET	NER
Lane Configurations	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95			1.00	0.95	1.00	0.95	
Frt	1.00	0.85		0.93	0.85			1.00	1.00	1.00	0.98	
Flt Protected	0.95	1.00		1.00	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1728	1546		1605	1468			1711	3421	1678	3277	
Flt Permitted	0.95	1.00		1.00	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (perm)	1728	1546		1605	1468			1711	3421	1678	3277	
Volume (vph)	95	80	90	155	330	70	15	135	470	70	595	100
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	84	95	163	347	74	16	142	495	74	626	105
RTOR Reduction (vph)	0	41	0	0	13	0	0	0	0	0	1	0
Lane Group Flow (vph)	100	138	0	310	261	0	0	158	495	74	741	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	4%	4%	4%
Turn Type	Prot		Split		Split		Split		custom		Prot	
Protected Phases	8	8		5	5		2	2	2		4	
Permitted Phases												
Actuated Green, G (s)	10.6	10.6		19.8	19.8			18.0	18.0	22.5	22.5	
Effective Green, g (s)	11.6	11.6		20.8	20.8			19.0	19.0	23.5	23.5	
Actuated g/C Ratio	0.13	0.13		0.23	0.23			0.21	0.21	0.26	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	221	197		367	336			358	715	434	847	
v/s Ratio Prot	0.06	c0.09		c0.19	0.18			0.09	c0.14		c0.23	
v/s Ratio Perm										0.04		
v/c Ratio	0.45	0.70		0.84	0.78			0.44	0.69	0.17	0.88	
Uniform Delay, d1	36.7	38.0		33.5	32.9			31.3	33.2	26.1	32.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.5	10.7		16.1	10.7			0.9	2.9	0.2	10.0	
Delay (s)	38.2	48.7		49.6	43.6			32.2	36.2	26.3	42.3	
Level of Service	D	D		D	D			C	D	C	D	
Approach Delay (s)	44.9			46.8					35.2		40.9	
Approach LOS	D			D					D		D	

Intersection Summary

HCM Average Control Delay	41.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
10: York St & N Forest St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

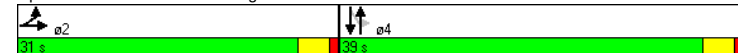
	
Movement	NER2
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	10
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	11
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	4%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings
11: E Magnolia St & Cornwall Ave

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

→ ↑ ↶ ↓				
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	495	430	90	230
Turn Type	Perm			
Protected Phases	2	4		4
Permitted Phases			4	
Detector Phases	2	4	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	23.0	23.0	23.0
Total Split (s)	31.0	39.0	39.0	39.0
Total Split (%)	44.3%	55.7%	55.7%	55.7%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	27.0	35.0		35.0
Actuated g/C Ratio	0.39	0.50		0.50
v/c Ratio	0.53	0.59		0.56
Control Delay	18.0	12.6		16.7
Queue Delay	0.0	0.0		0.0
Total Delay	18.0	12.6		16.7
LOS	B	B		B
Approach Delay	18.0	12.6		16.7
Approach LOS	B	B		B
Intersection Summary				
Cycle Length: 70				
Actuated Cycle Length: 70				
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green				
Natural Cycle: 45				
Control Type: Pretimed				
Maximum v/c Ratio: 0.59				
Intersection Signal Delay: 15.9			Intersection LOS: B	
Intersection Capacity Utilization 73.3%			ICU Level of Service D	
Analysis Period (min) 15				

Splits and Phases: 11: E Magnolia St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
11: E Magnolia St & Cornwall Ave

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		0.95						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			0.99	
Frt		0.99						0.98			1.00	
Flt Protected		0.99						1.00			0.99	
Satd. Flow (prot)		3290						1763			1743	
Flt Permitted		0.99						1.00			0.68	
Satd. Flow (perm)		3290						1763			1202	
Volume (vph)	90	495	65	0	0	0	0	430	65	90	230	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	521	68	0	0	0	0	453	68	95	242	0
RTOR Reduction (vph)	0	12	0	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	672	0	0	0	0	0	514	0	0	337	0
Confl. Peds. (#/hr)	80		80						80	80		
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split									Perm		
Protected Phases	2		2						4		4	
Permitted Phases									4			
Actuated Green, G (s)	27.0								35.0		35.0	
Effective Green, g (s)	27.0								35.0		35.0	
Actuated g/C Ratio	0.39								0.50		0.50	
Clearance Time (s)	4.0								4.0		4.0	
Lane Grp Cap (vph)	1269								882		601	
v/s Ratio Prot	c0.20								c0.29			
v/s Ratio Perm											0.28	
v/c Ratio	0.53								0.58		0.56	
Uniform Delay, d1	16.6								12.3		12.2	
Progression Factor	1.00								0.81		1.00	
Incremental Delay, d2	1.6								2.4		3.8	
Delay (s)	18.2								12.4		15.9	
Level of Service	B								B		B	
Approach Delay (s)	18.2		0.0						12.4		15.9	
Approach LOS	B		A						B		B	
Intersection Summary												
HCM Average Control Delay	15.7		HCM Level of Service						B			
HCM Volume to Capacity ratio	0.56											
Actuated Cycle Length (s)	70.0		Sum of lost time (s)						8.0			
Intersection Capacity Utilization	73.3%		ICU Level of Service						D			
Analysis Period (min)	15											
c Critical Lane Group												

c Critical Lane Group

Timings
12: W Holly St & Broadway St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

							
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations							
Volume (vph)	80	415	5	495	5	165	0
Turn Type	Perm		Perm			Perm	
Protected Phases		2		2	4		4
Permitted Phases	2		2			4	
Detector Phases	2	2	2	2	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	54.0	54.0	54.0	54.0	26.0	26.0	26.0
Total Split (%)	67.5%	67.5%	67.5%	67.5%	32.5%	32.5%	32.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None
Act Effct Green (s)		32.0		32.0	13.3	13.3	13.3
Actuated g/C Ratio		0.67		0.67	0.26	0.26	0.26
v/c Ratio		0.53		0.64	0.02	0.48	0.12
Control Delay		9.4		10.3	15.3	24.5	0.4
Queue Delay		0.0		0.0	0.0	0.0	0.0
Total Delay		9.4		10.3	15.3	24.5	0.4
LOS		A		B	B	C	A
Approach Delay		9.4		10.3	15.3		17.0
Approach LOS		A		B	B		B
Intersection Summary							
Cycle Length: 80							
Actuated Cycle Length: 48							
Natural Cycle: 60							
Control Type: Actuated-Uncoordinated							
Maximum v/c Ratio: 0.64							
Intersection Signal Delay: 11.1				Intersection LOS: B			
Intersection Capacity Utilization 90.7%				ICU Level of Service E			
Analysis Period (min) 15							

Splits and Phases: 12: W Holly St & Broadway St



HCM Signalized Intersection Capacity Analysis
12: W Holly St & Broadway St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00			0.99		1.00	0.97	
Flpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	
Frt		1.00			0.96			0.93		1.00	0.85	
Flt Protected		0.99			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1804			1723			1699		1721	1505	
Flt Permitted		0.82			1.00			1.00		0.75	1.00	
Satd. Flow (perm)		1498			1718			1699		1361	1505	
Volume (vph)	80	415	0	5	495	200	0	5	5	165	0	75
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	437	0	5	521	211	0	5	5	174	0	79
RTOR Reduction (vph)	0	0	0	0	19	0	0	4	0	0	62	0
Lane Group Flow (vph)	0	521	0	0	718	0	0	6	0	174	17	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		27.8			27.8			9.3		9.3	9.3	
Effective Green, g (s)		28.8			28.8			10.3		10.3	10.3	
Actuated g/C Ratio		0.61			0.61			0.22		0.22	0.22	
Clearance Time (s)		5.0			5.0			5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		916			1050			372		298	329	
v/s Ratio Prot								0.00			0.01	
v/s Ratio Perm		0.35			c0.42					c0.13		
v/c Ratio		0.57			0.68			0.02		0.58	0.05	
Uniform Delay, d1		5.5			6.1			14.4		16.5	14.5	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.8			1.9			0.0		2.9	0.1	
Delay (s)		6.3			8.0			14.4		19.4	14.6	
Level of Service		A			A			B		B	B	
Approach Delay (s)		6.3			8.0			14.4			17.9	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	47.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

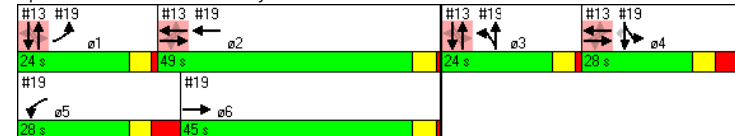
Timings
13: W Holly St & F St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø1	ø2	ø3	ø4
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔				
Volume (vph)	45	405	55	620	40	315	50	200				
Turn Type	Perm		Perm		Perm		Perm					
Protected Phases		2 4		2 4		1 3		1 3	1	2	3	4
Permitted Phases	2 4		2 4		1 3		1 3					
Detector Phases	2 4	2 4	2 4	2 4	1 3	1 3	1 3	1 3				
Minimum Initial (s)									6.0	6.0	6.0	6.0
Minimum Split (s)									24.0	24.0	24.0	28.0
Total Split (s)	77.0	77.0	77.0	77.0	48.0	48.0	48.0	48.0	24.0	49.0	24.0	28.0
Total Split (%)	61.6%	61.6%	61.6%	61.6%	38.4%	38.4%	38.4%	38.4%	19%	39%	19%	22%
Yellow Time (s)									4.0	4.0	4.0	4.0
All-Red Time (s)									1.0	1.0	1.0	5.0
Lead/Lag									Lead	Lag	Lead	Lag
Lead-Lag Optimize?												
Recall Mode									Min	None	None	None
Act Effct Green (s)	68.4	68.4	68.4	68.4		38.4		38.4				
Actuated g/C Ratio	0.56	0.56	0.56	0.56		0.31		0.31				
v/c Ratio	0.23	0.58	0.19	0.73		0.76		0.40				
Control Delay	10.5	11.3	8.7	16.0		25.8		18.1				
Queue Delay	0.0	0.1	0.0	0.0		0.1		0.0				
Total Delay	10.5	11.4	8.7	16.0		25.8		18.1				
LOS	B	B	A	B		C		B				
Approach Delay		11.3		15.5		25.8		18.1				
Approach LOS		B		B		C		B				

Intersection Summary	
Cycle Length: 125	
Actuated Cycle Length: 122.8	
Natural Cycle: 125	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 16.6	Intersection LOS: B
Intersection Capacity Utilization 84.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 13: W Holly St & F St



Timings
13: W Holly St & F St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	ø5	ø6
Lane Configurations		
Volume (vph)		
Turn Type		
Protected Phases	5	6
Permitted Phases		
Detector Phases		
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	28.0	24.0
Total Split (s)	28.0	45.0
Total Split (%)	22%	36%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	5.0	1.0
Lead/Lag	Lead	Lag
Lead-Lag Optimize?		
Recall Mode	None	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

HCM Signalized Intersection Capacity Analysis
13: W Holly St & F St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			0.95	
Frt	1.00	0.96		1.00	0.98			0.99			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1728	1750		1711	1773			1793			3308	
Flt Permitted	0.22	1.00		0.33	1.00			0.93			0.71	
Satd. Flow (perm)	401	1750		586	1773			1673			2380	
Volume (vph)	45	405	135	55	620	70	40	315	25	50	200	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	426	142	58	653	74	42	332	26	53	211	53
RTOR Reduction (vph)	0	9	0	0	3	0	0	2	0	0	14	0
Lane Group Flow (vph)	47	559	0	58	724	0	0	398	0	0	303	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2 4			2 4			1 3			1 3	
Permitted Phases	2 4			2 4			1 3			1 3		
Actuated Green, G (s)	69.7	69.7		69.7	69.7			36.3			36.3	
Effective Green, g (s)	75.7	75.7		75.7	75.7			38.3			38.3	
Actuated g/C Ratio	0.58	0.58		0.58	0.58			0.29			0.29	
Clearance Time (s)												
Vehicle Extension (s)												
Lane Grp Cap (vph)	234	1019		341	1032			493			701	
v/s Ratio Prot		0.32			c0.41							
v/s Ratio Perm	0.12			0.10				c0.24			0.13	
v/c Ratio	0.20	0.55		0.17	0.70			0.81			0.43	
Uniform Delay, d1	12.8	16.7		12.6	19.2			42.4			37.1	
Progression Factor	1.00	1.00		1.00	1.00			0.90			1.00	
Incremental Delay, d2	0.4	0.6		0.2	2.2			6.1			0.4	
Delay (s)	13.3	17.3		12.8	21.4			44.2			37.5	
Level of Service	B	B		B	C			D			D	
Approach Delay (s)		17.0			20.7			44.2			37.5	
Approach LOS		B			C			D			D	
Intersection Summary												
HCM Average Control Delay		26.6			HCM Level of Service			C				
HCM Volume to Capacity ratio		0.74										
Actuated Cycle Length (s)		130.0			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		84.1%			ICU Level of Service			E				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 14: W Holly St & C St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Sign Control	Free			Free			Stop			Stop					
Grade	0%			0%			0%			0%					
Volume (veh/h)	15	475	35	50	710	50	20	20	50	45	20	5			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Hourly flow rate (vph)	16	500	37	53	747	53	21	21	53	47	21	5			
Pedestrians															
Lane Width (ft)															
Walking Speed (ft/s)															
Percent Blockage															
Right turn flare (veh)															
Median type							None			None					
Median storage (veh)															
Upstream signal (ft)	753														
pX, platoon unblocked				0.85			0.85			0.85	0.85	0.85			
vC, conflicting volume	800				537			1445			1455	518	1492	1447	774
vC1, stage 1 conf vol															
vC2, stage 2 conf vol															
vCu, unblocked vol	800				456			1523			1535	434	1578	1526	774
tC, single (s)	4.1				4.1			7.1			6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)															
tF (s)	2.2				2.2			3.5			4.0	3.3	3.5	4.0	3.3
p0 queue free %	98				94			67			77	90	12	78	99
cM capacity (veh/h)	827				945			64			93	533	54	94	402
Direction, Lane #	EB 1	WB 1	NB 1	SB 1											
Volume Total	553	853	95	74											
Volume Left	16	53	21	47											
Volume Right	37	53	53	5											
cSH	827	945	145	66											
Volume to Capacity	0.02	0.06	0.65	1.12											
Queue Length 95th (ft)	1	4	90	145											
Control Delay (s)	0.5	1.4	67.6	255.9											
Lane LOS	A	A	F	F											
Approach Delay (s)	0.5	1.4	67.6	255.9											
Approach LOS				F	F										
Intersection Summary															
Average Delay				17.0											
Intersection Capacity Utilization	79.3%			ICU Level of Service			D								
Analysis Period (min)	15														

Timings 15: W Holly St & Cornwall Ave

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

				
Lane Group	WBT	NBL	NBT	SBT
Lane Configurations	 		 	 
Volume (vph)	985	50	175	185
Turn Type	Perm			
Protected Phases	2		4	4
Permitted Phases	4			
Detector Phases	2	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0
Minimum Split (s)	21.0	23.0	23.0	23.0
Total Split (s)	40.0	30.0	30.0	30.0
Total Split (%)	57.1%	42.9%	42.9%	42.9%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	36.0		26.0	26.0
Actuated g/C Ratio	0.51		0.37	0.37
v/c Ratio	0.79		0.40	0.48
Control Delay	17.6		14.6	10.2
Queue Delay	0.0		0.0	0.0
Total Delay	17.6		14.6	10.2
LOS	B		B	B
Approach Delay	17.6		14.6	10.2
Approach LOS	B		B	B
Intersection Summary				
Cycle Length: 70				
Actuated Cycle Length: 70				
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green				
Natural Cycle: 55				
Control Type: Pretimed				
Maximum v/c Ratio: 0.79				
Intersection Signal Delay: 16.0			Intersection LOS: B	
Intersection Capacity Utilization 77.3%			ICU Level of Service D	
Analysis Period (min) 15				

Splits and Phases: 15: W Holly St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
15: W Holly St & Cornwall Ave

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.97			1.00			0.96	
Flpb, ped/bikes					1.00			0.99			1.00	
Frt					0.97			1.00			0.95	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					3244			1778			1651	
Flt Permitted					1.00			0.88			1.00	
Satd. Flow (perm)					3244			1577			1651	
Volume (vph)	0	0	0	60	985	230	50	175	0	0	185	105
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	63	1037	242	53	184	0	0	195	111
RTOR Reduction (vph)	0	0	0	0	27	0	0	0	0	0	30	0
Lane Group Flow (vph)	0	0	0	0	1315	0	0	237	0	0	276	0
Confl. Peds. (#/hr)				80		80	80					80
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type				Split		Perm						
Protected Phases				2	2			4			4	
Permitted Phases							4					
Actuated Green, G (s)					36.0			26.0			26.0	
Effective Green, g (s)					36.0			26.0			26.0	
Actuated g/C Ratio					0.51			0.37			0.37	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					1668			586			613	
v/s Ratio Prot					c0.41						c0.17	
v/s Ratio Perm								0.15				
v/c Ratio					0.79			0.40			0.45	
Uniform Delay, d1					13.9			16.3			16.6	
Progression Factor					1.00			0.78			0.56	
Incremental Delay, d2					3.9			1.4			2.0	
Delay (s)					17.8			14.1			11.3	
Level of Service					B			B			B	
Approach Delay (s)		0.0			17.8			14.1			11.3	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
16: Lakeway Dr & Jersey St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	WBL	WBR	NBL	NBT	SBL	SBT
Lane Configurations						
Volume (vph)	30	775	410	280	575	350
Turn Type		Prot	Split		Split	
Protected Phases	8	8	2	2	6	6
Permitted Phases						
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	34.0	34.0	35.0	35.0	31.0	31.0
Total Split (%)	34.0%	34.0%	35.0%	35.0%	31.0%	31.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
Act Effct Green (s)	25.7	25.7	27.5	27.5	23.8	23.8
Actuated g/C Ratio	0.29	0.29	0.31	0.31	0.26	0.26
v/c Ratio	0.87	0.81	0.87	0.95dr	0.80	0.84
Control Delay	52.4	39.1	51.0	22.1	50.0	43.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.4	39.1	51.0	22.1	50.0	43.4
LOS	D	D	D	C	D	D
Approach Delay	44.1			29.8		45.4
Approach LOS	D			C		D

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 89.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 38.3	Intersection LOS: D
Intersection Capacity Utilization 82.0%	ICU Level of Service E
Analysis Period (min) 15	
dr Defacto Right Lane. Recode with 1 though lane as a right lane.	

Splits and Phases: 16: Lakeway Dr & Jersey St



HCM Signalized Intersection Capacity Analysis
16: Lakeway Dr & Jersey St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	WBL2	WBL	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0			4.0	4.0	
Lane Util. Factor	1.00	0.91			0.91	0.91			0.91	0.91	
Frt	0.91	0.85			1.00	0.89			1.00	1.00	
Flt Protected	0.98	1.00			0.95	1.00			0.95	0.98	
Satd. Flow (prot)	1603	2786			1572	2948			1430	3090	
Flt Permitted	0.98	1.00			0.95	1.00			0.95	0.98	
Satd. Flow (perm)	1603	2786			1572	2948			1430	3090	
Volume (vph)	115	30	775	85	5	410	280	780	575	350	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	121	32	816	89	5	432	295	821	605	368	21
RTOR Reduction (vph)	0	0	12	0	0	0	416	0	0	0	0
Lane Group Flow (vph)	0	399	647	0	0	417	720	0	303	691	0
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	1%	1%	11%	1%	1%
Turn Type	Split	Prot			Split	Split			Split		
Protected Phases	8	8	8		2	2	2		6	6	
Permitted Phases											
Actuated Green, G (s)	24.7	24.7			26.4	26.4			22.8	22.8	
Effective Green, g (s)	25.7	25.7			27.4	27.4			23.8	23.8	
Actuated g/C Ratio	0.29	0.29			0.31	0.31			0.27	0.27	
Clearance Time (s)	5.0	5.0			5.0	5.0			5.0	5.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0			2.0	2.0	
Lane Grp Cap (vph)	463	805			485	909			383	827	
v/s Ratio Prot	c0.25	0.23			c0.27	0.24			0.21	c0.22	
v/s Ratio Perm											
v/c Ratio	0.86	0.80			0.86	0.95dr			0.79	0.84	
Uniform Delay, d1	29.9	29.3			28.9	28.1			30.2	30.7	
Progression Factor	1.00	1.00			1.00	1.00			1.00	1.00	
Incremental Delay, d2	14.7	5.5			13.7	4.5			10.0	7.0	
Delay (s)	44.6	34.8			42.6	32.6			40.2	37.7	
Level of Service	D	C			D	C			D	D	
Approach Delay (s)	38.5				35.3				38.5		
Approach LOS	D				D				D		

Intersection Summary

HCM Average Control Delay	37.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	88.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	E
Analysis Period (min)	15		
dr	Defacto Right Lane. Recode with 1 though lane as a right lane.		
c	Critical Lane Group		

Timings
17: Lakeway Dr & I-5 SB Ramps

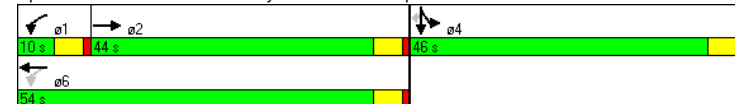
Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBT	WBL	WBT	SBT	SBR
Lane Configurations					
Volume (vph)	1120	165	760	20	315
Turn Type	pm+pt			Perm	
Protected Phases	2	1	6	4	
Permitted Phases		6			4
Detector Phases	2	1	6	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	10.0	23.0	28.0	28.0
Total Split (s)	44.0	10.0	54.0	46.0	46.0
Total Split (%)	44.0%	10.0%	54.0%	46.0%	46.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None
Act Effct Green (s)	40.0	50.0	50.0	41.2	41.2
Actuated g/C Ratio	0.40	0.50	0.50	0.42	0.42
v/c Ratio	1.00	0.99	0.46	0.96	0.46
Control Delay	54.8	86.7	17.2	53.9	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	54.8	86.7	17.2	53.9	14.5
LOS	D	F	B	D	B
Approach Delay	54.8		29.6	41.1	
Approach LOS	D		C	D	

Intersection Summary

Cycle Length: 100	
Actuated Cycle Length: 99.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 43.4	Intersection LOS: D
Intersection Capacity Utilization 92.4%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 17: Lakeway Dr & I-5 SB Ramps



HCM Signalized Intersection Capacity Analysis
17: Lakeway Dr & I-5 SB Ramps

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑		↑	↑↑					↑	↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0	4.0	
Lane Util. Factor		0.95		1.00	0.95					1.00	1.00	
Frt		0.98		1.00	1.00					1.00	0.85	
Flt Protected		1.00		0.95	1.00					0.95	1.00	
Satd. Flow (prot)		3380		1711	3421					1734	1546	
Flt Permitted		1.00		0.09	1.00					0.95	1.00	
Satd. Flow (perm)		3380		164	3421					1734	1546	
Volume (vph)	0	1120	190	165	760	0	0	0	0	635	20	315
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1179	200	174	800	0	0	0	0	668	21	332
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	0	0	0	77
Lane Group Flow (vph)	0	1365	0	174	800	0	0	0	0	689	255	
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type				pm+pt						Split	Perm	
Protected Phases		2		1	6					4	4	
Permitted Phases				6								4
Actuated Green, G (s)		39.0		49.0	49.0					40.1	40.1	
Effective Green, g (s)		40.0		50.0	50.0					41.1	41.1	
Actuated g/C Ratio		0.40		0.50	0.50					0.41	0.41	
Clearance Time (s)		5.0		5.0	5.0					5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		1364		176	1726					719	641	
v/s Ratio Prot		0.40		c0.06	0.23					c0.40		
v/s Ratio Perm				c0.44							0.16	
v/c Ratio		1.00		0.99	0.46					0.96	0.40	
Uniform Delay, d1		29.6		23.9	15.9					28.2	20.3	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		24.6		63.9	0.2					23.5	0.4	
Delay (s)		54.1		87.8	16.1					51.7	20.7	
Level of Service		D		F	B					D	C	
Approach Delay (s)		54.1			28.9			0.0		41.6		
Approach LOS		D			C			A		D		

Intersection Summary

HCM Average Control Delay	43.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	99.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
18: Lakeway Dr & King St

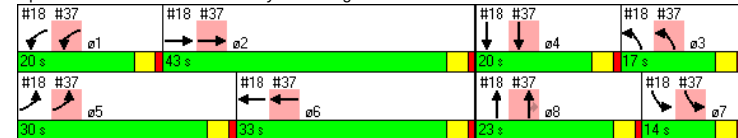
Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑↑	↑	↑	↑	↑
Volume (vph)	410	1080	20	655	120	80	50	25
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	5	2	1	6	3	8	7	4
Permitted Phases								
Detector Phases	5	2	1	6	3	8	7	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	30.0	43.0	20.0	33.0	17.0	23.0	14.0	20.0
Total Split (%)	30.0%	43.0%	20.0%	33.0%	17.0%	23.0%	14.0%	20.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?								
Recall Mode	None	Min	None	None	None	Min	None	None
Act Effct Green (s)	25.8	39.0	16.0	29.2	13.0	16.4	12.6	16.0
Actuated g/C Ratio	0.26	0.39	0.16	0.29	0.13	0.16	0.13	0.16
v/c Ratio	0.96	1.00	0.08	0.90	0.56	0.46	0.24	0.57
Control Delay	71.3	55.9	38.6	26.7	51.0	33.4	44.8	12.8
Queue Delay	0.0	6.1	0.0	3.7	0.0	0.0	0.0	0.0
Total Delay	71.3	61.9	38.6	30.5	51.0	33.4	44.8	12.8
LOS	E	E	D	C	D	C	D	B
Approach Delay		64.2		30.6		41.7		18.4
Approach LOS		E		C		D		B

Intersection Summary

Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 48.6	Intersection LOS: D
Intersection Capacity Utilization 81.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 18: Lakeway Dr & King St



HCM Signalized Intersection Capacity Analysis 18: Lakeway Dr & King St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.96		1.00	0.94		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	3408		1728	3334		1745	1724		1745	1590	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1745	3408		1728	3334		1745	1724		1745	1590	
Volume (vph)	410	1080	200	20	655	200	120	80	55	50	25	215
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	432	1137	211	21	689	211	126	84	58	53	26	226
RTOR Reduction (vph)	0	15	0	0	29	0	0	26	0	0	190	0
Lane Group Flow (vph)	432	1333	0	21	871	0	126	116	0	53	62	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	25.8	39.0		16.0	29.2		13.0	16.4		12.6	16.0	
Effective Green, g (s)	25.8	39.0		16.0	29.2		13.0	16.4		12.6	16.0	
Actuated g/C Ratio	0.26	0.39		0.16	0.29		0.13	0.16		0.13	0.16	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	450	1329		276	974		227	283		220	254	
v/s Ratio Prot	c0.25	c0.39		0.01	0.26		c0.07	c0.07		0.03	0.04	
v/s Ratio Perm												
v/c Ratio	0.96	1.00		0.08	0.89		0.56	0.41		0.24	0.24	
Uniform Delay, d1	36.6	30.5		35.7	33.9		40.8	37.5		39.4	36.7	
Progression Factor	1.00	1.00		1.06	0.56		1.00	1.00		1.00	1.00	
Incremental Delay, d2	32.2	25.4		0.1	6.2		2.9	1.0		0.6	0.5	
Delay (s)	68.8	55.9		37.9	25.2		43.7	38.4		40.0	37.2	
Level of Service	E	E		D	C		D	D		D	D	
Approach Delay (s)		59.0			25.5			40.9			37.7	
Approach LOS		E			C			D			D	
Intersection Summary												
HCM Average Control Delay		46.1										
HCM Volume to Capacity ratio		0.77										
Actuated Cycle Length (s)		100.0										
Intersection Capacity Utilization		81.8%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 24: E Chestnut St & Railroad Ave

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	80	910	35	0	0	0	0	50	60	95	80	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	84	958	37	0	0	0	0	53	63	100	84	0
Pedestrians					41			41			11	
Lane Width (ft)					0.0			11.0			11.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			3			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		353			350							
pX, platoon unblocked												
vC, conflicting volume	11			1036			1228	1197	420	629	1215	11
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	11			1036			1228	1197	420	629	1215	11
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			100	69	89	57	49	100
cM capacity (veh/h)	1600			658			75	171	569	233	166	1065
Direction, Lane #												
Volume Total	324	479		276	116		184					
Volume Left	84	0		0	0		100					
Volume Right	0	0		37	63		0					
cSH	1600	1700		1700	276		197					
Volume to Capacity	0.05	0.28		0.16	0.42		0.94					
Queue Length 95th (ft)	4	0		0	49		189					
Control Delay (s)	2.3	0.0		0.0	27.1		97.9					
Lane LOS	A			D	F							
Approach Delay (s)	0.7			27.1	97.9							
Approach LOS				D	F							
Intersection Summary												
Average Delay					15.9							
Intersection Capacity Utilization		42.9%					ICU Level of Service			A		
Analysis Period (min)		15										

Timings
25: E Chestnut St & N State St

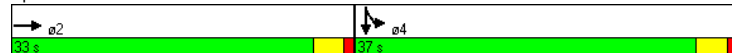
Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	→	↘	↓
Lane Group	EBT	SBL	SBT
Lane Configurations	↑↑↑	↘	↑↑
Volume (vph)	645	260	850
Turn Type	Split		
Protected Phases	2	4	4
Permitted Phases			
Detector Phases	2	4	4
Minimum Initial (s)	6.0	6.0	6.0
Minimum Split (s)	22.0	20.0	20.0
Total Split (s)	33.0	37.0	37.0
Total Split (%)	47.1%	52.9%	52.9%
Yellow Time (s)	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	Max	Max	Max
Act Effct Green (s)	29.0	33.0	33.0
Actuated g/C Ratio	0.41	0.47	0.47
v/c Ratio	0.58	0.31	0.55
Control Delay	16.9	7.1	14.8
Queue Delay	0.0	0.0	0.0
Total Delay	16.9	7.1	14.8
LOS	B	A	B
Approach Delay	16.9		13.0
Approach LOS	B		B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 4:SBTL, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 14.9
Intersection Capacity Utilization 53.6%
Analysis Period (min) 15

Splits and Phases: 25: E Chestnut St & N State St



HCM Signalized Intersection Capacity Analysis
25: E Chestnut St & N State St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0								4.0	4.0	
Lane Util. Factor		0.91								1.00	0.95	
Frpb, ped/bikes		0.98								1.00	1.00	
Flpb, ped/bikes		1.00								1.00	1.00	
Frt		0.94								1.00	1.00	
Flt Protected		1.00								0.95	1.00	
Satd. Flow (prot)		4559								1728	3455	
Flt Permitted		1.00								0.95	1.00	
Satd. Flow (perm)		4559								1728	3455	
Volume (vph)	0	645	430	0	0	0	0	0	0	260	850	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	679	453	0	0	0	0	0	0	274	895	0
RTOR Reduction (vph)	0	52	0	0	0	0	0	0	0	66	0	0
Lane Group Flow (vph)	0	1080	0	0	0	0	0	0	0	208	895	0
Confl. Peds. (#/hr)			40							40		
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Turn Type										Split		
Protected Phases		2								4	4	
Permitted Phases												
Actuated Green, G (s)		29.0								33.0	33.0	
Effective Green, g (s)		29.0								33.0	33.0	
Actuated g/C Ratio		0.41								0.47	0.47	
Clearance Time (s)		4.0								4.0	4.0	
Lane Grp Cap (vph)		1889								815	1629	
v/s Ratio Prot		c0.24								0.12	c0.26	
v/s Ratio Perm												
v/c Ratio		0.57								0.26	0.55	
Uniform Delay, d1		15.7								11.1	13.2	
Progression Factor		1.08								1.00	1.00	
Incremental Delay, d2		1.0								0.8	1.3	
Delay (s)		18.0								11.9	14.5	
Level of Service		B								B	B	
Approach Delay (s)		18.0			0.0			0.0			13.9	
Approach LOS		B			A			A			B	

Intersection Summary

HCM Average Control Delay	15.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
26: E Chestnut St & N Forest St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	→	↑
Lane Group	EBT	NBT
Lane Configurations	↑↑↑	↑↑
Volume (vph)	685	725
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phases	2	4
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	22.0	21.0
Total Split (s)	38.0	32.0
Total Split (%)	54.3%	45.7%
Yellow Time (s)	3.0	3.0
All-Red Time (s)	1.0	1.0
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	Max
Act Effct Green (s)	34.0	28.0
Actuated g/C Ratio	0.49	0.40
v/c Ratio	0.39	0.68
Control Delay	4.7	19.6
Queue Delay	0.0	0.0
Total Delay	4.7	19.6
LOS	A	B
Approach Delay	4.7	19.6
Approach LOS	A	B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 11.9
Intersection Capacity Utilization 49.6%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service A

Splits and Phases: 26: E Chestnut St & N Forest St



HCM Signalized Intersection Capacity Analysis
26: E Chestnut St & N Forest St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕↕↕						↕↕					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0						4.0					
Lane Util. Factor		0.91						0.95					
Frpb, ped/bikes		1.00						0.99					
Flpb, ped/bikes		1.00						1.00					
Frt		1.00						0.98					
Flt Protected		0.99						1.00					
Satd. Flow (prot)		4952						3306					
Flt Permitted		0.99						1.00					
Satd. Flow (perm)		4952						3306					
Volume (vph)	230	685	0	0	0	0	0	725	140	0	0	0	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	242	721	0	0	0	0	0	763	147	0	0	0	
RTOR Reduction (vph)	0	45	0	0	0	0	0	23	0	0	0	0	
Lane Group Flow (vph)	0	918	0	0	0	0	0	887	0	0	0	0	
Confl. Peds. (#/hr)	40								40				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	0%	0%	0%	
Turn Type	Split												
Protected Phases	2	2						4					
Permitted Phases													
Actuated Green, G (s)		34.0						28.0					
Effective Green, g (s)		34.0						28.0					
Actuated g/C Ratio		0.49						0.40					
Clearance Time (s)		4.0						4.0					
Lane Grp Cap (vph)		2405						1322					
v/s Ratio Prot		c0.19						c0.27					
v/s Ratio Perm													
v/c Ratio		0.38						0.67					
Uniform Delay, d1		11.4						17.2					
Progression Factor		0.42						1.00					
Incremental Delay, d2		0.4						2.7					
Delay (s)		5.1						20.0					
Level of Service		A						B					
Approach Delay (s)		5.1			0.0			20.0			0.0		
Approach LOS		A			A			B			A		

Intersection Summary

HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
27: E Chestnut St & Ellis St

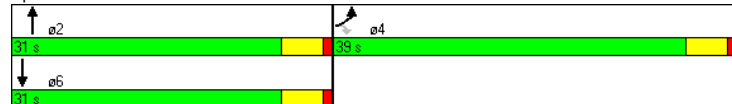
Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	↖	↗	↖	↗
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations	↖↗	↖	↖↗↗	↖↗
Volume (vph)	760	465	670	435
Turn Type	Perm			
Protected Phases	4		2	6
Permitted Phases	4			
Detector Phases	4	4	2	6
Minimum Initial (s)	6.0	6.0	6.0	6.0
Minimum Split (s)	30.0	30.0	12.0	30.0
Total Split (s)	39.0	39.0	31.0	31.0
Total Split (%)	55.7%	55.7%	44.3%	44.3%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	22.4	22.4	18.5	18.5
Actuated g/C Ratio	0.45	0.45	0.37	0.37
v/c Ratio	0.54	0.63	0.39	0.36
Control Delay	12.1	10.2	12.7	13.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.1	10.2	12.7	13.0
LOS	B	B	B	B
Approach Delay	11.4		12.7	13.0
Approach LOS	B		B	B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 50.1
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.63
Intersection Signal Delay: 12.1
Intersection Capacity Utilization 52.0%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service A

Splits and Phases: 27: E Chestnut St & Ellis St



HCM Signalized Intersection Capacity Analysis
27: E Chestnut St & Ellis St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	↖	↗	↖	↗	↖	↗
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↖	↖↗	↖↗↗	↖↗	↖↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.91	0.95	
Frbp, ped/bikes	1.00	0.95		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3319	1460		4964	3490	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3319	1460		4964	3490	
Volume (vph)	760	465	0	670	435	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	800	489	0	705	458	0
RTOR Reduction (vph)	0	125	0	0	0	0
Lane Group Flow (vph)	800	364	0	705	458	0
Confl. Peds. (#/hr)	60	60				
Heavy Vehicles (%)	2%	2%	1%	1%	0%	0%
Turn Type	Perm					
Protected Phases	4			2	6	
Permitted Phases	4					
Actuated Green, G (s)	21.3	21.3		17.3	17.3	
Effective Green, g (s)	22.3	22.3		18.3	18.3	
Actuated g/C Ratio	0.46	0.46		0.38	0.38	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1523	670		1869	1314	
v/s Ratio Prot	0.24			0.14	0.13	
v/s Ratio Perm	0.25					
v/c Ratio	0.53	0.54		0.38	0.35	
Uniform Delay, d1	9.4	9.5		11.0	10.9	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.9		0.1	0.2	
Delay (s)	9.7	10.4		11.1	11.0	
Level of Service	A	B		B	B	
Approach Delay (s)	10.0			11.1	11.0	
Approach LOS	A			B	B	

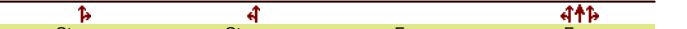
Intersection Summary

HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	48.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

28: Laurel St & N State St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Volume (veh/h)	0	200	195	40	270	0	0	0	0	45	1035	100
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	211	205	42	284	0	0	0	0	47	1089	105
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage veh												
Upstream signal (ft)	1046											
pX, platoon unblocked												
vC, conflicting volume	1379	1237	416	768	1289	0	1195				0	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1379	1237	416	768	1289	0	1195				0	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	0	0	65	0	0	100	100				97	
cM capacity (veh/h)	0	170	586	0	158	1091	580				1629	
Direction, Lane #	EB 1	WB 1	SB 1	SB 2	SB 3							
Volume Total	416	326	320	545	378							
Volume Left	0	42	47	0	0							
Volume Right	205	0	0	0	105							
cSH	261	0	1629	1700	1700							
Volume to Capacity	1.59	Err	0.03	0.32	0.22							
Queue Length 95th (ft)	636	Err	2	0	0							
Control Delay (s)	318.2	Err	1.3	0.0	0.0							
Lane LOS	F	F	A									
Approach Delay (s)	318.2	Err	0.3									
Approach LOS	F	F										
Intersection Summary												
Average Delay				Err								
Intersection Capacity Utilization	72.0%			ICU Level of Service					C			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Volume (veh/h)	160	60	0	0	135	95	170	720	20	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	168	63	0	0	142	100	179	758	21	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)	1032											
pX, platoon unblocked												
vC, conflicting volume	908	1137	0	1158	1126	389	0	779				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	908	1137	0	1158	1126	389	0	779				
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	0	65	100	100	23	84	89	100				
cM capacity (veh/h)	65	178	1084	103	184	615	1622	847				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	232	242	558	400								
Volume Left	168	0	179	0								
Volume Right	0	100	0	21								
cSH	79	259	1622	1700								
Volume to Capacity	2.94	0.94	0.11	0.24								
Queue Length 95th (ft)	573	214	9	0								
Control Delay (s)	989.5	82.5	3.1	0.0								
Lane LOS	F	F	A									
Approach Delay (s)	989.5	82.5	1.8									
Approach LOS	F	F										
Intersection Summary												
Average Delay	175.2											
Intersection Capacity Utilization	60.4%			ICU Level of Service				B				
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 30: N Forrest St & N State St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	0	640	0	0	0	0	0	0	165	50	165	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	674	0	0	0	0	0	0	174	53	174	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			674			761	674	674	847	674	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			674			761	674	674	847	674	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	62	70	54	100
cM capacity (veh/h)	1623			917			206	376	455	174	376	1085

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	674	174	53	174
Volume Left	0	0	53	0
Volume Right	0	174	0	0
cSH	1700	455	174	376
Volume to Capacity	0.40	0.38	0.30	0.46
Queue Length 95th (ft)	0	44	30	59
Control Delay (s)	0.0	17.7	34.4	22.5
Lane LOS	C	D	C	
Approach Delay (s)	0.0	17.7	25.3	
Approach LOS	C	D		

Intersection Summary			
Average Delay	8.2		
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

Timings 31: Bill McDonald Pkwy & Samish Way

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↙	↗	↙	↗	↙	↗	↙	↗	↙
Volume (vph)	290	45	45	45	320	485	25	610	325
Turn Type	Perm		Perm		pm+pt		pm+pt		Perm
Protected Phases	4		8		5		1		6
Permitted Phases	4		8		2		6		6
Detector Phases	4	4	8	8	5	2	1	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	11.0	30.0	30.0	11.0	28.0	11.0	29.0	29.0
Total Split (s)	50.0	50.0	50.0	50.0	34.0	59.0	11.0	36.0	36.0
Total Split (%)	41.7%	41.7%	41.7%	41.7%	28.3%	49.2%	9.2%	30.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	26.4	26.4		26.4	44.6	41.4	27.4	20.1	20.1
Actuated g/C Ratio	0.33	0.33		0.33	0.55	0.51	0.31	0.25	0.25
v/c Ratio	0.77	0.58		0.34	0.64	0.32	0.08	0.73	0.53
Control Delay	40.6	7.3		23.8	21.4	14.4	14.9	36.0	7.1
Queue Delay	0.0	0.4		0.2	0.5	0.4	0.0	0.2	0.0
Total Delay	40.6	7.7		24.0	21.9	14.8	14.9	36.2	7.1
LOS	D	A		C	C	B	B	D	A
Approach Delay	20.8		24.0		17.5		25.8		
Approach LOS	C		C		B		C		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 80.4	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 21.7	Intersection LOS: C
Intersection Capacity Utilization 80.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 31: Bill McDonald Pkwy & Samish Way



HCM Signalized Intersection Capacity Analysis
31: Bill McDonald Pkwy & Samish Way

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87			0.97		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	1558			1749		1728	3411		1745	3490	1561
Flt Permitted	0.69	1.00			0.53		0.22	1.00		0.44	1.00	1.00
Satd. Flow (perm)	1235	1558			940		394	3411		813	3490	1561
Volume (vph)	290	45	390	45	45	25	320	485	45	25	610	325
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	305	47	411	47	47	26	337	511	47	26	642	342
RTOR Reduction (vph)	0	280	0	0	9	0	0	5	0	0	0	240
Lane Group Flow (vph)	305	178	0	0	111	0	337	553	0	26	642	102
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm			Perm			pm+pt			pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.2	25.2			25.2		46.9	40.2		25.1	23.4	23.4
Effective Green, g (s)	26.2	26.2			26.2		47.9	41.2		27.1	24.4	24.4
Actuated g/C Ratio	0.32	0.32			0.32		0.58	0.50		0.33	0.30	0.30
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		2.0	2.0		3.0	2.0	2.0
Lane Grp Cap (vph)	394	497			300		547	1712		299	1037	464
v/s Ratio Prot		0.11					c0.15	0.16		0.00	0.18	
v/s Ratio Perm	c0.25				0.12		c0.21			0.03		0.07
v/c Ratio	0.77	0.36			0.37		0.62	0.32		0.09	0.62	0.22
Uniform Delay, d1	25.3	21.5			21.6		10.8	12.2		18.7	24.8	21.7
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	9.2	0.4			0.8		1.5	0.0		0.1	0.8	0.1
Delay (s)	34.4	21.9			22.4		12.3	12.2		18.8	25.6	21.8
Level of Service	C	C			C		B	B		B	C	C
Approach Delay (s)		26.9			22.4			12.2			24.1	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	82.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings

32: Samish Way & I-5 SB Off-Ramp

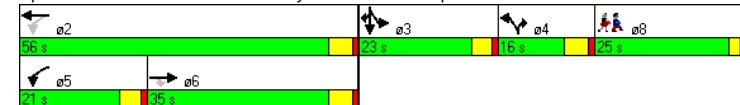
Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	ø8
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱	↰	
Volume (vph)	795	265	265	445	160	450	245	260	240	
Turn Type		Perm	pm+pt		Protcustom		Split		Prot	
Protected Phases	6		5	2	4	4	3	3	3	8
Permitted Phases		6	2							
Detector Phases	6	6	5	2	4	4	3	3	3	
Minimum Initial (s)	7.0	7.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0	20.0
Minimum Split (s)	22.0	22.0	9.5	22.0	12.0	12.0	11.5	11.5	11.5	25.0
Total Split (s)	35.0	35.0	21.0	56.0	16.0	16.0	23.0	23.0	23.0	25.0
Total Split (%)	29.2%	29.2%	17.5%	46.7%	13.3%	13.3%	19.2%	19.2%	19.2%	21%
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	4.0	3.5	3.5	3.5	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lead	Lead	Lead	
Lead-Lag Optimize?										
Recall Mode	Min	Min	None	Min	None	None	None	None	None	None
Act Effct Green (s)	29.3	29.3	50.2	50.2	12.0	12.0	18.5	18.5	18.5	
Actuated g/C Ratio	0.32	0.32	0.54	0.54	0.13	0.13	0.20	0.20	0.20	
v/c Ratio	0.77	0.41	0.72	0.25	0.75	0.77	0.74	0.75	0.49	
Control Delay	34.1	5.0	31.3	11.7	61.7	13.7	49.6	49.4	8.0	
Queue Delay	55.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	89.3	5.6	31.3	11.7	61.7	13.7	49.6	49.4	8.0	
LOS	F	A	C	B	E	B	D	D	A	
Approach Delay	68.4			19.0			36.1			
Approach LOS	E			B			D			

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 92.8
Natural Cycle: 110
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 41.3
Intersection Capacity Utilization 73.4%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service D

Splits and Phases: 32: Samish Way & I-5 SB Off-Ramp



HCM Signalized Intersection Capacity Analysis
32: Samish Way & I-5 SB Off-Ramp

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3455	1546	1728	3455	1728	1728	1546	1745	1837	1561	1561	1561
Flt Permitted	1.00	1.00	0.13	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3455	1546	236	3455	1728	1728	1546	1745	1837	1561	1561	1561
Volume (vph)	0	795	265	265	445	0	160	0	450	245	260	240
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	837	279	279	468	0	168	0	474	258	274	253
RTOR Reduction (vph)	0	0	191	0	0	0	0	0	413	0	0	203
Lane Group Flow (vph)	0	837	88	279	468	0	168	0	61	258	274	50
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Perm pm+pt			Prot			custom			Split		Prot
Protected Phases	6			5			4			4		3
Permitted Phases	6			2			4			3		3
Actuated Green, G (s)	28.4	28.4	49.2	49.2	11.0	11.0	18.0	18.0	18.0	18.0	18.0	18.0
Effective Green, g (s)	29.4	29.4	50.2	50.2	12.0	12.0	18.5	18.5	18.5	18.5	18.5	18.5
Actuated g/C Ratio	0.32	0.32	0.54	0.54	0.13	0.13	0.20	0.20	0.20	0.20	0.20	0.20
Clearance Time (s)	5.0	5.0	4.5	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1096	490	398	1871	224	200	348	367	312	312	312	312
v/s Ratio Prot	c0.24	c0.13	0.14	c0.10	0.04	0.15	c0.15	0.03	0.03	0.03	0.03	0.03
v/s Ratio Perm	0.06	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
v/c Ratio	0.76	0.18	0.70	0.25	0.75	0.31	0.74	0.75	0.16	0.16	0.16	0.16
Uniform Delay, d1	28.5	22.9	18.5	11.3	38.9	36.6	34.9	34.9	30.7	30.7	30.7	30.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.3	0.2	5.7	0.1	13.6	1.0	8.8	8.5	0.3	0.3	0.3	0.3
Delay (s)	31.8	23.1	24.2	11.4	52.5	37.6	43.6	43.4	31.0	31.0	31.0	31.0
Level of Service	C	C	C	B	D	D	D	D	D	D	D	C
Approach Delay (s)	29.7	16.1	41.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5
Approach LOS	C	B	D	D	D	D	D	D	D	D	D	D

Intersection Summary

HCM Average Control Delay	31.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	92.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings

33: Samish Way & Lincoln St

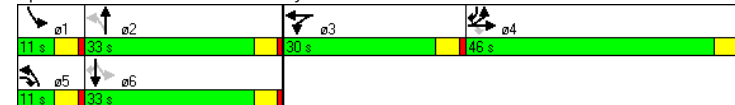
Alternative 2 (2016) PM Peak Hour
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Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Volume (vph)	865	300	340	5	90	350	315	20	110	340
Turn Type	custom	pm+ov	custom	pm+pt	pm+pt	pm+ov	pm+ov	pm+ov	pm+ov	pm+ov
Protected Phases	4	4	5	3	3	5	2	1	6	4
Permitted Phases	4	4	3	2	6	6	6	6	6	6
Detector Phases	4	4	5	3	3	5	2	1	6	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	33.0	33.0	11.0	30.0	30.0	11.0	24.0	11.0	33.0	33.0
Total Split (s)	46.0	46.0	11.0	30.0	30.0	11.0	33.0	11.0	33.0	46.0
Total Split (%)	38.3%	38.3%	9.2%	25.0%	25.0%	9.2%	27.5%	9.2%	27.5%	38.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	Min	None	Min	None
Act Effct Green (s)	43.0	43.0	54.2	13.4	13.4	26.2	23.8	23.7	16.3	59.3
Actuated g/C Ratio	0.45	0.45	0.56	0.14	0.14	0.27	0.25	0.23	0.17	0.62
v/c Ratio	0.81	0.84	0.35	0.02	0.66	1.04	0.79	0.12	0.38	0.33
Control Delay	37.4	38.7	3.5	38.6	45.8	92.2	48.7	27.4	38.6	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.4	38.7	3.5	38.6	45.8	92.2	48.7	27.4	38.6	1.4
LOS	D	D	A	D	D	F	D	C	D	A
Approach Delay	30.2	45.6	70.9	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Approach LOS	C	D	E	B	B	B	B	B	B	B

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 96.2	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 37.8	Intersection LOS: D
Intersection Capacity Utilization 76.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 33: Samish Way & Lincoln St



HCM Signalized Intersection Capacity Analysis
33: Samish Way & Lincoln St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1641	1686	1546	1694	1666		1728	1802		1728	1818	1546
Flt Permitted	0.95	0.98	1.00	0.95	1.00		0.52	1.00		0.26	1.00	1.00
Satd. Flow (perm)	1641	1686	1546	1694	1666		954	1802		479	1818	1546
Volume (vph)	865	300	340	5	90	70	350	315	20	20	110	340
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	911	316	358	5	95	74	368	332	21	21	116	358
RTOR Reduction (vph)	0	0	166	0	26	0	0	2	0	0	0	132
Lane Group Flow (vph)	597	630	192	5	143	0	368	351	0	21	116	226
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	custom		pm+ov custom		pm+pt		pm+pt		pm+ov			
Protected Phases	4	4	5	3	3		5	2		1	6	4
Permitted Phases	4		4	3			2			6		6
Actuated Green, G (s)	41.9	41.9	48.0	12.4	12.4		28.9	22.8		20.7	18.7	60.6
Effective Green, g (s)	42.9	42.9	50.0	13.4	13.4		30.8	23.8		22.7	19.7	62.6
Actuated g/C Ratio	0.43	0.43	0.50	0.14	0.14		0.31	0.24		0.23	0.20	0.63
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	710	730	842	229	225		352	433		148	361	977
v/s Ratio Prot	0.36	c0.37	0.02	0.00	c0.09		c0.07	0.19		0.00	0.06	0.10
v/s Ratio Perm			0.11				c0.25			0.03		0.05
v/c Ratio	0.84	0.86	0.23	0.02	0.64		1.05	0.81		0.14	0.32	0.23
Uniform Delay, d1	25.1	25.4	13.7	37.2	40.5		34.1	35.5		30.4	34.0	7.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	8.5	10.0	0.1	0.0	4.3		60.3	10.1		0.2	0.2	0.0
Delay (s)	33.6	35.4	13.8	37.2	44.8		94.4	45.7		30.5	34.2	7.9
Level of Service	C	D	B	D	D		F	D		C	C	A
Approach Delay (s)	29.8				44.6		70.5		15.0			
Approach LOS	C				D		E		B			

Intersection Summary

HCM Average Control Delay	38.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	99.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings

34: Old Fairhaven Pkwy & 12th St

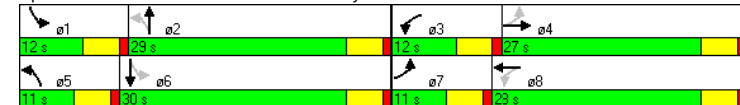
Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	10	150	275	110	20	195	200	260
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	27.0	11.0	27.0	11.0	27.0	11.0	27.0
Total Split (s)	11.0	27.0	12.0	28.0	11.0	29.0	12.0	30.0
Total Split (%)	13.8%	33.8%	15.0%	35.0%	13.8%	36.3%	15.0%	37.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)	20.7	13.4	25.0	23.5	32.0	25.1	36.0	33.0
Actuated g/C Ratio	0.26	0.19	0.35	0.33	0.41	0.36	0.51	0.47
v/c Ratio	0.04	0.51	0.63	0.47	0.05	0.62	0.55	0.34
Control Delay	16.3	29.7	24.4	15.4	11.1	21.6	16.5	16.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	29.7	24.4	15.4	11.1	21.6	16.5	16.1
LOS	B	C	C	B	B	C	B	B
Approach Delay	28.9		19.8		21.1		16.2	
Approach LOS	C		B		C		B	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 70.6
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.63
Intersection Signal Delay: 20.1
Intersection Capacity Utilization 71.0%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service C

Splits and Phases: 34: Old Fairhaven Pkwy & 12th St



HCM Signalized Intersection Capacity Analysis
34: Old Fairhaven Pkwy & 12th St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.91		1.00	0.92		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1703	1768		1787	1708		1805	1755		1787	1857	
Flt Permitted	0.54	1.00		0.45	1.00		0.57	1.00		0.28	1.00	
Satd. Flow (perm)	977	1768		854	1708		1086	1755		525	1857	
Volume (vph)	10	150	15	275	110	175	20	195	200	200	260	25
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	158	16	289	116	184	21	205	211	211	274	26
RTOR Reduction (vph)	0	5	0	0	71	0	0	43	0	0	3	0
Lane Group Flow (vph)	11	169	0	289	229	0	21	373	0	211	297	0
Heavy Vehicles (%)	6%	6%	6%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.7	16.6		28.6	22.5		29.6	27.3		39.0	32.0	
Effective Green, g (s)	19.7	17.6		29.6	23.5		31.6	28.3		40.3	33.0	
Actuated g/C Ratio	0.25	0.23		0.38	0.30		0.41	0.36		0.52	0.42	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	267	399		420	515		471	638		401	787	
v/s Ratio Prot	0.00	0.10		c0.07	0.13		0.00	c0.21		c0.05	0.16	
v/s Ratio Perm	0.01			c0.19			0.02			0.22		
v/c Ratio	0.04	0.42		0.69	0.44		0.04	0.59		0.53	0.38	
Uniform Delay, d1	21.9	25.8		19.0	21.9		13.9	20.1		12.1	15.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.7		4.6	0.6		0.0	3.9		1.2	1.4	
Delay (s)	22.0	26.5		23.6	22.5		14.0	24.0		13.4	16.8	
Level of Service	C	C		C	C		B	C		B	B	
Approach Delay (s)		26.3			23.1			23.5			15.4	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	77.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

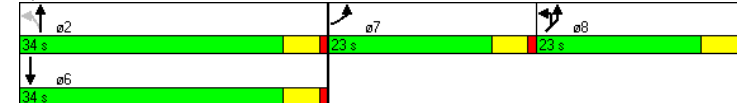
Timings
35: Hawthorne & 12th St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	NBL	NBT	SBT	NEL
Lane Configurations	↰		↱	↱	↰
Volume (vph)	155	10	275	360	60
Turn Type	Perm				
Protected Phases	7		2	6	8
Permitted Phases		2			
Detector Phases	7	2	2	6	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	23.0	26.0	26.0	26.0	23.0
Total Split (s)	23.0	34.0	34.0	34.0	23.0
Total Split (%)	28.8%	42.5%	42.5%	42.5%	28.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead				Lag
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	Max	None
Act Effct Green (s)	12.2		31.1	31.1	8.8
Actuated g/C Ratio	0.21		0.53	0.53	0.14
v/c Ratio	0.50		0.45	0.70	0.29
Control Delay	26.6		15.0	19.0	25.9
Queue Delay	0.0		0.0	0.0	0.0
Total Delay	26.6		15.0	19.0	25.9
LOS	C		B	B	C
Approach Delay	26.6		15.0	19.0	25.9
Approach LOS	C		B	B	C

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 59	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 19.6	Intersection LOS: B
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 35: Hawthorne & 12th St



HCM Signalized Intersection Capacity Analysis
35: Hawthorne & 12th St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBR	EBR2	NBL	NBT	SBT	SBR	SBR2	NEL	NER
Lane Configurations	↰	↱	↱	↰	↰	↱	↱	↱	↰	↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0				4.0	4.0			4.0	
Lane Util. Factor	1.00				1.00	1.00			1.00	
Flt	0.98				1.00	0.94			0.98	
Flt Protected	0.96				1.00	1.00			0.96	
Satd. Flow (prot)	1773				1859	1789			1786	
Flt Permitted	0.96				0.98	1.00			0.96	
Satd. Flow (perm)	1773				1817	1789			1786	
Volume (vph)	155	10	10	10	275	360	55	220	60	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	163	11	11	11	289	379	58	232	63	11
RTOR Reduction (vph)	3	0	0	0	0	19	0	0	9	0
Lane Group Flow (vph)	182	0	0	0	300	650	0	0	65	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	0%	0%	0%	0%	0%
Turn Type	Perm									
Protected Phases	7				2	6			8	
Permitted Phases				2						
Actuated Green, G (s)	11.1				30.1	30.1			4.8	
Effective Green, g (s)	12.1				31.1	31.1			5.8	
Actuated g/C Ratio	0.20				0.51	0.51			0.10	
Clearance Time (s)	5.0				5.0	5.0			5.0	
Vehicle Extension (s)	3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)	352				926	912			170	
v/s Ratio Prot	c0.10				c0.36				c0.04	
v/s Ratio Perm					0.17					
v/c Ratio	0.52				0.32	0.71			0.38	
Uniform Delay, d1	21.8				8.8	11.5			25.9	
Progression Factor	1.00				1.00	1.00			1.00	
Incremental Delay, d2	1.3				0.2	4.7			1.4	
Delay (s)	23.1				9.0	16.2			27.4	
Level of Service	C				A	B			C	
Approach Delay (s)	23.1				9.0	16.2			27.4	
Approach LOS	C				A	B			C	

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

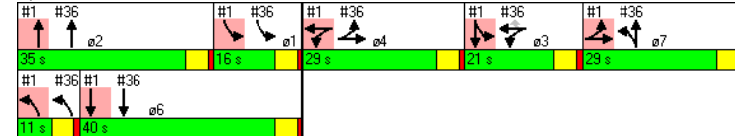
Timings
36: Birchwood Ave & Meridian Street

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT	ø2	ø5	ø7
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱			
Volume (vph)	250	140	185	260	100	855	115	745			
Turn Type	Split			Perm	Prot		Prot				
Protected Phases	4	4	3		5 7	2 7	1	6	2	5	7
Permitted Phases				3							
Detector Phases	4	4	3	3	5 7	2 7	1	6			
Minimum Initial (s)	6.0	6.0	6.0	6.0			6.0	10.0	10.0	6.0	6.0
Minimum Split (s)	29.0	29.0	11.0	11.0			11.0	23.0	23.0	11.0	29.0
Total Split (s)	29.0	29.0	21.0	21.0	40.0	64.0	16.0	40.0	35.0	11.0	29.0
Total Split (%)	22.3%	22.3%	16.2%	16.2%	30.8%	49.2%	12.3%	30.8%	27%	8%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lead	Lag	Lag			Lag	Lag	Lead	Lead	
Lead-Lag Optimize?											
Recall Mode	None	None	None	None			None	None	Max	None	None
Act Effct Green (s)	22.7	22.7	17.0	17.0	36.0	60.0	12.0	36.0			
Actuated g/C Ratio	0.18	0.18	0.13	0.13	0.28	0.47	0.09	0.28			
v/c Ratio	0.82	0.63	1.10	0.64	0.21	0.56	0.73	1.07			
Control Delay	71.4	53.9	136.8	17.3	56.6	7.0	82.3	92.7			
Queue Delay	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0			
Total Delay	71.4	53.9	136.8	17.3	56.6	7.9	82.3	92.7			
LOS	E	D	F	B	E	A	F	F			
Approach Delay	63.6	77.0			12.8		91.6				
Approach LOS	E	E			B		F				

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 127.7	
Natural Cycle: 135	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.10	
Intersection Signal Delay: 59.6	Intersection LOS: E
Intersection Capacity Utilization 75.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 36: Birchwood Ave & Meridian Street



HCM Signalized Intersection Capacity Analysis
36: Birchwood Ave & Meridian Street

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↰	↱	↰	↱	↱	↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1814			1873	1615	1787	3553		1752	3373	
Flt Permitted	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	1814			1873	1615	1787	3553		1752	3373	
Volume (vph)	250	140	60	75	185	260	100	855	35	115	745	250
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	263	147	63	79	195	274	105	900	37	121	784	263
RTOR Reduction (vph)	0	12	0	0	0	210	0	2	0	0	25	0
Lane Group Flow (vph)	263	198	0	0	274	64	105	935	0	121	1022	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split		Perm	Prot			Prot		
Protected Phases	4	4		3	3		5 7	2 7		1	6	
Permitted Phases						3						
Actuated Green, G (s)	21.7	21.7			16.0	16.0	35.0	59.0		11.0	35.0	
Effective Green, g (s)	22.7	22.7			17.0	17.0	36.0	60.0		12.0	36.0	
Actuated g/C Ratio	0.18	0.18			0.13	0.13	0.28	0.47		0.09	0.28	
Clearance Time (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Vehicle Extension (s)	3.0	3.0			2.0	2.0				2.0	2.0	
Lane Grp Cap (vph)	321	322			249	215	504	1669		165	951	
v/s Ratio Prot	c0.15	0.11			c0.15		0.06	c0.26		0.07	c0.30	
v/s Ratio Perm						0.04						
v/c Ratio	0.82	0.61			1.10	0.30	0.21	0.56		0.73	1.07	
Uniform Delay, d1	50.5	48.5			55.4	50.0	35.0	24.4		56.3	45.8	
Progression Factor	1.00	1.00			1.00	1.00	1.55	0.25		1.00	1.00	
Incremental Delay, d2	14.9	3.5			86.5	0.3	0.0	0.2		13.5	51.4	
Delay (s)	65.5	51.9			141.9	50.3	54.4	6.4		69.8	97.2	
Level of Service	E	D			F	D	D	A		E	F	
Approach Delay (s)		59.5			96.1		11.2				94.4	
Approach LOS		E			F		B				F	

Intersection Summary

HCM Average Control Delay	62.7	HCM Level of Service	E
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	127.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
37: Lakeway Dr & Lincoln Street

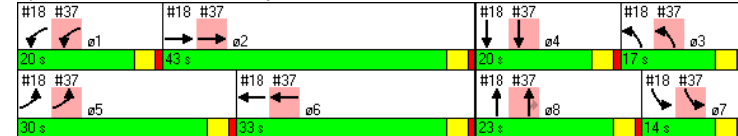
Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↱	↰	↱
Volume (vph)	45	1010	260	635	210	135	465	145	195
Turn Type	Prot		Prot		Prot		Perm	Prot	
Protected Phases	5	2	1	6	3	8		7	4
Permitted Phases							8		
Detector Phases	5	2	1	6	3	8	8	7	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	30.0	43.0	20.0	33.0	17.0	23.0	23.0	14.0	20.0
Total Split (%)	30.0%	43.0%	20.0%	33.0%	17.0%	23.0%	23.0%	14.0%	20.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?									
Recall Mode	None	Min	None	None	None	Min	Min	None	None
Act Effct Green (s)	25.8	39.0	16.0	29.2	13.0	16.4	16.4	12.6	16.0
Actuated g/C Ratio	0.26	0.39	0.16	0.29	0.13	0.16	0.16	0.13	0.16
v/c Ratio	0.11	0.89	1.00	0.75	1.00	0.48	0.93	0.71	0.93
Control Delay	52.0	16.9	98.1	37.1	104.6	42.7	40.1	63.4	78.2
Queue Delay	0.0	8.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.0	25.1	98.1	37.1	104.6	42.7	40.1	63.4	78.2
LOS	D	C	F	D	F	D	D	E	E
Approach Delay		26.1		53.6		57.2			72.8
Approach LOS		C		D		E			E

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 47.2
Intersection Capacity Utilization 84.9%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service E

Splits and Phases: 37: Lakeway Dr & Lincoln Street



HCM Signalized Intersection Capacity Analysis
37: Lakeway Dr & Lincoln Street

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00		0.85	1.00	0.96
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		1.00	0.95	1.00
Satd. Flow (prot)	1711	3369		1711	3370		1711	1801		1531	1711	1737
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		1.00	0.95	1.00
Satd. Flow (perm)	1711	3369		1711	3370		1711	1801		1531	1711	1737
Volume (vph)	45	1010	115	260	635	70	210	135	465	145	195	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	1063	121	274	668	74	221	142	489	153	205	63
RTOR Reduction (vph)	0	9	0	0	8	0	0	0	273	0	11	0
Lane Group Flow (vph)	47	1175	0	274	734	0	221	142	216	153	257	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases								8				
Actuated Green, G (s)	25.8	39.0		16.0	29.2		13.0	16.4	16.4	12.6	16.0	
Effective Green, g (s)	25.8	39.0		16.0	29.2		13.0	16.4	16.4	12.6	16.0	
Actuated g/C Ratio	0.26	0.39		0.16	0.29		0.13	0.16	0.16	0.13	0.16	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	441	1314		274	984		222	295	251	216	278	
v/s Ratio Prot	0.03	c0.35		c0.16	0.22		c0.13	0.08		0.09	c0.15	
v/s Ratio Perm								0.14				
v/c Ratio	0.11	0.89		1.00	0.75		1.00	0.48	0.86	0.71	0.92	
Uniform Delay, d1	28.3	28.6		42.0	32.0		43.5	37.9	40.7	41.9	41.4	
Progression Factor	1.81	0.43		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	3.0		54.4	3.1		58.8	1.2	24.9	10.1	34.4	
Delay (s)	51.4	15.4		96.4	35.1		102.2	39.2	65.6	52.1	75.8	
Level of Service	D	B		F	D		F	D	E	D	E	
Approach Delay (s)		16.8			51.7			70.7			67.2	
Approach LOS		B			D			E			E	
Intersection Summary												
HCM Average Control Delay		45.9										
HCM Volume to Capacity ratio		0.89										
Actuated Cycle Length (s)		100.0						12.0				
Intersection Capacity Utilization		84.9%						ICU Level of Service		E		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
40: Wharf St/Pine St & N State St

Alternative 2 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↰	↱		↰	↱
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	170	85	0	915	95
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	179	89	0	963	100
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None				
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1192	1013	1063			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1192	1013	1063			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	38	86			
cM capacity (veh/h)	179	290	655			
Direction, Lane #						
Volume Total	179	89	1063			
Volume Left	0	89	0			
Volume Right	179	0	100			
cSH	290	655	1700			
Volume to Capacity	0.62	0.14	0.63			
Queue Length 95th (ft)	95	12	0			
Control Delay (s)	35.5	11.4	0.0			
Lane LOS	E	B				
Approach Delay (s)	35.5	11.4	0.0			
Approach LOS	E					
Intersection Summary						
Average Delay		5.5				
Intersection Capacity Utilization		71.1%			ICU Level of Service	C
Analysis Period (min)		15				

Timings
19: Roeder Ave & F St

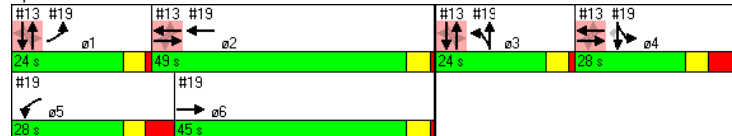
Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Volume (vph)	215	695	10	775	45	140	90	225
Turn Type	Prot		Prot		Split		Perm	
Protected Phases	1	6	5	2	3	3	4	
Permitted Phases								4
Detector Phases	1	6	5	2	3	3	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	28.0	24.0	24.0	24.0	28.0	28.0
Total Split (s)	24.0	45.0	28.0	49.0	24.0	24.0	28.0	28.0
Total Split (%)	19.2%	36.0%	22.4%	39.2%	19.2%	19.2%	22.4%	22.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	5.0	1.0	1.0	1.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?								
Recall Mode	Min	Max	None	None	None	None	None	None
Act Effct Green (s)	20.0	65.7	11.5	45.0	20.0	20.0	24.0	24.0
Actuated g/C Ratio	0.16	0.53	0.09	0.36	0.16	0.16	0.19	0.19
v/c Ratio	0.78	0.76	0.06	1.42	0.19	0.60	0.81	0.47
Control Delay	70.3	31.1	52.4	231.9	47.9	59.5	62.9	9.9
Queue Delay	36.7	0.0	0.0	49.5	0.0	6.9	18.6	0.4
Total Delay	107.0	31.1	52.4	281.4	47.9	66.4	81.5	10.3
LOS	F	C	D	F	D	E	F	B
Approach Delay		48.5		278.9		62.1	49.1	
Approach LOS		D		F		E	D	

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.42
Intersection Signal Delay: 132.8
Intersection Capacity Utilization 96.9%
Analysis Period (min) 15
Intersection LOS: F
ICU Level of Service F

Splits and Phases: 19: Roeder Ave & F St



HCM Signalized Intersection Capacity Analysis
19: Roeder Ave & F St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.99		1.00	0.98		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (prot)	1728	1807		1711	1761		1479	1541			1743	1531
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (perm)	1728	1807		1711	1761		1479	1541			1743	1531
Volume (vph)	215	695	30	10	775	135	45	140	10	180	90	225
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	215	695	30	10	775	135	45	140	10	180	90	225
RTOR Reduction (vph)	0	1	0	0	5	0	0	2	0	0	0	184
Lane Group Flow (vph)	215	724	0	10	905	0	45	148	0	0	270	41
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	18%	18%	18%	2%	2%	2%
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	19.0	64.7		1.5	51.2		19.0	19.0			19.0	19.0
Effective Green, g (s)	20.0	65.7		6.5	52.2		20.0	20.0			24.0	24.0
Actuated g/C Ratio	0.15	0.50		0.05	0.39		0.15	0.15			0.18	0.18
Clearance Time (s)	5.0	5.0		9.0	5.0		5.0	5.0			9.0	9.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	261	898		84	695		224	233			316	278
v/s Ratio Prot	c0.12	0.40		0.01	c0.51		0.03	c0.10			c0.15	
v/s Ratio Perm												0.03
v/c Ratio	0.82	0.81		0.12	1.30		0.20	0.64			0.85	0.15
Uniform Delay, d1	54.4	27.9		60.1	40.0		49.1	52.7			52.4	45.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			0.96	1.26
Incremental Delay, d2	18.6	7.7		0.6	146.4		0.4	5.6			17.1	0.2
Delay (s)	73.0	35.6		60.7	186.4		49.5	58.3			67.2	57.3
Level of Service	E	D		E	F		D	E			E	E
Approach Delay (s)		44.1			185.1			56.3			62.7	
Approach LOS		D			F			E			E	

Intersection Summary

HCM Average Control Delay	99.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	132.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis 20: Roeder Ave & C St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control	Free			Free			Stop			Stop			
Grade	0%			0%			0%			0%			
Volume (veh/h)	45	860	25	110	840	55	35	40	170	40	55	40	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly flow rate (vph)	45	860	25	110	840	55	35	40	170	40	55	40	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (ft)	735												
pX, platoon unblocked				0.65			0.65			0.65			
vC, conflicting volume	895				885			2118			2078		
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	895				822			2731			2669		
tC, single (s)	4.1				4.1			7.1			6.5		
tC, 2 stage (s)													
tF (s)	2.2				2.2			3.5			4.0		
p0 queue free %	94				79			0			0		
cM capacity (veh/h)	767				527			0			11		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	930	1005	245	135									
Volume Left	45	110	35	40									
Volume Right	25	55	170	40									
cSH	767	527	0	0									
Volume to Capacity	0.06	0.21	Err	Err									
Queue Length 95th (ft)	5	19	Err	Err									
Control Delay (s)	1.6	6.8	Err	Err									
Lane LOS	A	A	F	F									
Approach Delay (s)	1.6	6.8	Err	Err									
Approach LOS				F	F								
Intersection Summary													
Average Delay				Err									
Intersection Capacity Utilization	110.8%			ICU Level of Service			H						
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis 21: E Chestnut St & Bay St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Sign Control		Free			Free			Stop			Stop				
Grade		0%			0%			0%			0%				
Volume (veh/h)	10	790	30	20	360	35	305	250	35	225	125	40			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Hourly flow rate (vph)	10	790	30	20	360	35	305	250	35	225	125	40			
Pedestrians		10									10				
Lane Width (ft)		11.0									11.0				
Walking Speed (ft/s)		4.0									4.0				
Percent Blockage		1									1				
Right turn flare (veh)															
Median type								None			None				
Median storage (veh)															
Upstream signal (ft)					356										
pX, platoon unblocked	0.94						0.94	0.94		0.94	0.94	0.94			
vC, conflicting volume	405			820			1355	1270	805	1398	1268	398			
vC1, stage 1 conf vol															
vC2, stage 2 conf vol															
vCu, unblocked vol	368			820			1377	1287	805	1422	1284	360			
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2			
tC, 2 stage (s)															
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3			
p0 queue free %	99			98			0	0	91	0	16	94			
cM capacity (veh/h)	1117			809			31	148	382	0	149	639			
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1										
Volume Total	10	820	415	590	390										
Volume Left	10	0	20	305	225										
Volume Right	0	30	35	35	40										
cSH	1117	1700	809	50	0										
Volume to Capacity	0.01	0.48	0.02	11.75	Err										
Queue Length 95th (ft)	1	0	2	Err	Err										
Control Delay (s)	8.3	0.0	0.8	Err	Err										
Lane LOS	A		A	F	F										
Approach Delay (s)	0.1		0.8	Err	Err										
Approach LOS				F	F										
Intersection Summary															
Average Delay			Err												
Intersection Capacity Utilization		87.7%		ICU Level of Service			E								
Analysis Period (min)			15												

Timings
22: E Chestnut St & Commercial St

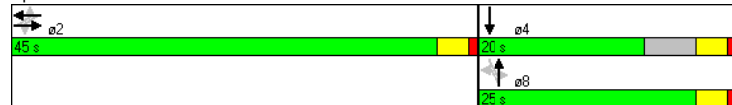
Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↗	↖	↗	↖	↗	↖	↗
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations		↖↗		↖↗	↖↗	↖↗	↖↗	↖↗	
Volume (vph)	145	930	75	395	15	295	185	125	
Turn Type	Perm		Perm		Perm		D.Pm		
Protected Phases		2		2		8		4	
Permitted Phases	2		2		8		8		
Detector Phases	2	2	2	2	8	8	8	4	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	26.0	26.0	26.0	26.0	19.0	19.0	19.0	20.0	
Total Split (s)	45.0	45.0	45.0	45.0	25.0	25.0	25.0	20.0	
Total Split (%)	64.3%	64.3%	64.3%	64.3%	35.7%	35.7%	35.7%	28.6%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	
Act Effct Green (s)		41.0		41.0	21.0	21.0	21.0	21.0	
Actuated g/C Ratio		0.59		0.59	0.30	0.30	0.30	0.30	
v/c Ratio		0.70		0.68	0.05	0.92	1.81	0.41	
Control Delay		13.1		24.2	18.2	47.3	425.1	17.2	
Queue Delay		2.6		6.5	0.0	7.7	42.0	0.0	
Total Delay		15.7		30.7	18.2	55.0	467.1	17.2	
LOS		B		C	B	D	F	B	
Approach Delay		15.7		30.7		53.9		222.7	
Approach LOS		B		C		D		F	

Intersection Summary

Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green	
Natural Cycle: 55	
Control Type: Pretimed	
Maximum v/c Ratio: 1.81	
Intersection Signal Delay: 59.0	Intersection LOS: E
Intersection Capacity Utilization 111.6%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 22: E Chestnut St & Commercial St



HCM Signalized Intersection Capacity Analysis
22: E Chestnut St & Commercial St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↗	↖	↗	↖	↗	↖	↗	↖	↗	↖	↗
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↖↗			↖↗		↖↗	↖↗		↖↗	↖↗	↖↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0		
Lane Util. Factor		0.95			1.00		1.00	1.00		1.00	1.00		
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	0.97		
Flpb, ped/bikes		1.00			1.00		1.00	1.00		0.99	1.00		
Frt		0.99			0.99		1.00	0.94		1.00	0.94		
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00		
Satd. Flow (prot)		3403			1753		1711	1690		1699	1638		
Flt Permitted		0.80			0.74		0.54	1.00		0.19	1.00		
Satd. Flow (perm)		2726			1310		968	1690		341	1638		
Volume (vph)	145	930	50	75	395	55	15	295	205	185	125	95	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	145	930	50	75	395	55	15	295	205	185	125	95	
RTOR Reduction (vph)	0	5	0	0	6	0	0	36	0	0	39	0	
Lane Group Flow (vph)	0	1120	0	0	519	0	15	464	0	185	181	0	
Confl. Peds. (#/hr)		20				20				20			
Heavy Vehicles (%)	1%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	
Turn Type	Perm			Perm			Perm			D.Pm			
Protected Phases		2			2			8			4		
Permitted Phases	2			2			8			8			
Actuated Green, G (s)		41.0			41.0		21.0	21.0		21.0	21.0		
Effective Green, g (s)		41.0			41.0		21.0	21.0		21.0	21.0		
Actuated g/C Ratio		0.59			0.59		0.30	0.30		0.30	0.30		
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0		
Lane Grp Cap (vph)		1597			767		290	507		102	491		
v/s Ratio Prot								0.27			0.11		
v/s Ratio Perm		c0.41			0.40		0.02			c0.54			
v/c Ratio		0.70			0.68		0.05	0.92		1.81	0.37		
Uniform Delay, d1		10.2			9.9		17.4	23.6		24.5	19.3		
Progression Factor		1.00			2.13		1.00	1.00		1.00	1.00		
Incremental Delay, d2		2.6			1.9		0.3	23.7		402.0	2.1		
Delay (s)		12.8			23.1		17.8	47.4		426.5	21.4		
Level of Service		B			C		B	D		F	C		
Approach Delay (s)		12.8			23.1			46.5			206.4		
Approach LOS		B			C			D			F		

Intersection Summary

HCM Average Control Delay	52.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	111.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
23: E Chestnut St & Cornwall Ave

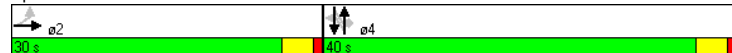
Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	→	↖	↑	↗	↘	↓
Lane Group	EBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↔↔		↖	↗		↔↔
Volume (vph)	1040	380	230	70	100	100
Turn Type	Perm			Perm	Perm	
Protected Phases	2		4		4	
Permitted Phases	4			4	4	
Detector Phases	2	4	4	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	26.0	19.0	19.0	19.0	19.0	19.0
Total Split (s)	30.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	57.1%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	26.0		36.0	36.0		36.0
Actuated g/C Ratio	0.37		0.51	0.51		0.51
v/c Ratio	1.12		1.08	0.10		0.60
Control Delay	81.2		81.4	7.4		11.7
Queue Delay	20.9		27.0	0.0		0.5
Total Delay	102.1		108.4	7.4		12.2
LOS	F		F	A		B
Approach Delay	102.1		98.0			12.2
Approach LOS	F		F			B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 55
Control Type: Pretimed
Maximum v/c Ratio: 1.12
Intersection Signal Delay: 89.1
Intersection Capacity Utilization 103.1%
Analysis Period (min) 15
Intersection LOS: F
ICU Level of Service G

Splits and Phases: 23: E Chestnut St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
23: E Chestnut St & Cornwall Ave

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↘	↗	←	↖	↗	↑	↘	↗	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↖	↗		↔↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0		4.0	
Lane Util. Factor		0.95						1.00	1.00		1.00	
Frpb, ped/bikes		0.98						1.00	0.92		0.95	
Flpb, ped/bikes		1.00						0.96	1.00		0.99	
Frt		0.97						1.00	0.85		0.95	
Flt Protected		1.00						0.97	1.00		0.98	
Satd. Flow (prot)		3262						1678	1407		1626	
Flt Permitted		1.00						0.64	1.00		0.58	
Satd. Flow (perm)		3262						1101	1407		956	
Volume (vph)	75	1040	280	0	0	0	380	230	70	100	100	115
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	75	1040	280	0	0	0	380	230	70	100	100	115
RTOR Reduction (vph)	0	31	0	0	0	0	0	0	8	0	30	0
Lane Group Flow (vph)	0	1364	0	0	0	0	0	610	62	0	285	0
Confl. Peds. (#/hr)	50		50				50		50	50		50
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	Perm						Perm		Perm	Perm		
Protected Phases	2						4		4	4	4	
Permitted Phases	2						4		4	4		
Actuated Green, G (s)		26.0						36.0	36.0		36.0	
Effective Green, g (s)		26.0						36.0	36.0		36.0	
Actuated g/C Ratio		0.37						0.51	0.51		0.51	
Clearance Time (s)		4.0						4.0	4.0		4.0	
Lane Grp Cap (vph)		1212						566	724		492	
v/s Ratio Prot												
v/s Ratio Perm		0.42						0.55	0.04		0.30	
v/c Ratio		1.13						1.08	0.09		0.58	
Uniform Delay, d1		22.0						17.0	8.6		11.8	
Progression Factor		0.80						1.00	1.00		0.76	
Incremental Delay, d2		62.4						60.5	0.2		3.8	
Delay (s)		80.0						77.5	8.9		12.7	
Level of Service		F						E	A		B	
Approach Delay (s)		80.0			0.0			70.4			12.7	
Approach LOS		F			A			E			B	

Intersection Summary

HCM Average Control Delay	68.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	103.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
38: Roeder Ave & Central Ave

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	75	595	330	0	520	155	335	270	25	175	210	235
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	75	595	330	0	520	155	335	270	25	175	210	235
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)					1113							
pX, platoon unblocked												
vC, conflicting volume	675			925			1848	1585	760	1668	1672	598
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	675			925			1848	1585	760	1668	1672	598
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			0	0	94	0	0	53
cM capacity (veh/h)	916			739			0	99	406	0	88	503
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	1000	675	630	620								
Volume Left	75	0	335	175								
Volume Right	330	155	25	235								
cSH	916	739	0	0								
Volume to Capacity	0.08	0.00	Err	Err								
Queue Length 95th (ft)	7	0	Err	Err								
Control Delay (s)	2.2	0.0	Err	Err								
Lane LOS	A		F	F								
Approach Delay (s)	2.2	0.0	Err	Err								
Approach LOS			F	F								
Intersection Summary												
Average Delay	Err											
Intersection Capacity Utilization	164.4%		ICU Level of Service				H					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
39: Roeder Ave & Hilton Ave

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻↻↻↻↻↻					
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	965	70	10	995	90	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	965	70	10	995	90	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	544					
pX, platoon unblocked	0.62					
vC, conflicting volume	1035			2015	1000	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1035			2650	1000	
tC, single (s)	4.1			6.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	99			0	100	
cM capacity (veh/h)	672			15	295	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	1035	1005	90			
Volume Left	0	10	90			
Volume Right	70	0	0			
cSH	1700	672	15			
Volume to Capacity	0.61	0.01	5.85			
Queue Length 95th (ft)	0	1	Err			
Control Delay (s)	0.0	0.5	Err			
Lane LOS		A	F			
Approach Delay (s)	0.0	0.5	Err			
Approach LOS			F			
Intersection Summary						
Average Delay	422.7					
Intersection Capacity Utilization	72.0%			ICU Level of Service		C
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
41: Chesnut St & C St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

									
Movement	EBL	EBR	NBL	NBT	SBT	SBR			
Lane Configurations									
Sign Control	Stop			Free	Free				
Grade	0%			0%	0%				
Volume (veh/h)	185	50	70	50	40	150			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00			
Hourly flow rate (vph)	185	50	70	50	40	150			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type	None								
Median storage (veh)									
Upstream signal (ft)									
pX, platoon unblocked									
vC, conflicting volume	305	115	190						
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	305	115	190						
tC, single (s)	6.4	6.2	4.1						
tC, 2 stage (s)									
tF (s)	3.5	3.3	2.2						
p0 queue free %	72	95	95						
cM capacity (veh/h)	652	937	1384						
Direction, Lane #	EB 1	NB 1	SB 1						
Volume Total	235	120	190						
Volume Left	185	70	0						
Volume Right	50	0	150						
cSH	697	1384	1700						
Volume to Capacity	0.34	0.05	0.11						
Queue Length 95th (ft)	37	4	0						
Control Delay (s)	12.8	4.7	0.0						
Lane LOS	B	A							
Approach Delay (s)	12.8	4.7	0.0						
Approach LOS	B								
Intersection Summary									
Average Delay	6.5								
Intersection Capacity Utilization	41.1%		ICU Level of Service		A				
Analysis Period (min)	15								

HCM Unsignalized Intersection Capacity Analysis
42: Chesnut St & F St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

									
Movement	WBL	WBR	NBT	NBR	SBL	SBT			
Lane Configurations									
Sign Control	Stop		Free			Free			
Grade	0%		0%			0%			
Volume (veh/h)	105	145	95	170	100	90			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00			
Hourly flow rate (vph)	105	145	95	170	100	90			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type	None								
Median storage (veh)									
Upstream signal (ft)					281				
pX, platoon unblocked									
vC, conflicting volume	470	180			265				
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	470	180			265				
tC, single (s)	6.4	6.2			4.1				
tC, 2 stage (s)									
tF (s)	3.5	3.3			2.2				
p0 queue free %	79	83			92				
cM capacity (veh/h)	509	863			1299				
Direction, Lane #	WB 1	NB 1	SB 1						
Volume Total	250	265	190						
Volume Left	105	0	100						
Volume Right	145	170	0						
cSH	668	1700	1299						
Volume to Capacity	0.37	0.16	0.08						
Queue Length 95th (ft)	43	0	6						
Control Delay (s)	13.6	0.0	4.5						
Lane LOS	B		A						
Approach Delay (s)	13.6	0.0	4.5						
Approach LOS	B								
Intersection Summary									
Average Delay	6.0								
Intersection Capacity Utilization	50.4%		ICU Level of Service		A				
Analysis Period (min)	15								

HCM Unsignalized Intersection Capacity Analysis
43: Maple St & F St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	170	20	25	95	70	125
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	170	20	25	95	70	125
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)				600		
pX, platoon unblocked						
vC, conflicting volume	278	132	195			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	278	132	195			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	76	98	98			
cM capacity (veh/h)	699	917	1378			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	190	120	195			
Volume Left	170	25	0			
Volume Right	20	0	125			
cSH	717	1378	1700			
Volume to Capacity	0.26	0.02	0.11			
Queue Length 95th (ft)	27	1	0			
Control Delay (s)	11.8	1.7	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.8	1.7	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		4.9				
Intersection Capacity Utilization		38.4%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
44: Maple St & Hilton Ave

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	60	55	35	85	45	25
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	60	55	35	85	45	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	192	78			120	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	192	78			120	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	94			97	
cM capacity (veh/h)	772	983			1468	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	115	120	70			
Volume Left	60	0	45			
Volume Right	55	85	0			
cSH	860	1700	1468			
Volume to Capacity	0.13	0.07	0.03			
Queue Length 95th (ft)	12	0	2			
Control Delay (s)	9.8	0.0	4.9			
Lane LOS	A		A			
Approach Delay (s)	9.8	0.0	4.9			
Approach LOS	A					
Intersection Summary						
Average Delay		4.8				
Intersection Capacity Utilization		23.8%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
45: Laurel St & Bay St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	95	200	270	490	310	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	95	200	270	490	310	15
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total (vph)	162	133	180	580	325	
Volume Left (vph)	95	0	0	0	310	
Volume Right (vph)	0	0	0	490	15	
Hadj (s)	0.33	0.03	0.03	-0.56	0.20	
Departure Headway (s)	7.0	6.7	6.2	5.6	6.4	
Degree Utilization, x	0.32	0.25	0.31	0.90	0.58	
Capacity (veh/h)	491	514	566	636	536	
Control Delay (s)	12.1	10.8	10.8	37.8	17.9	
Approach Delay (s)	11.5		31.4		17.9	
Approach LOS	B		D		C	
Intersection Summary						
Delay	24.0					
HCM Level of Service	C					
Intersection Capacity Utilization	59.6%		ICU Level of Service		B	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
46: Pine Street & Cornwall Ave

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

																				
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR								
Lane Configurations																				
Sign Control	Free			Free			Stop			Stop										
Grade	0%			0%			0%			0%										
Volume (veh/h)	145	255	10	75	60	25	10	50	70	85	25	65								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00								
Hourly flow rate (vph)	145	255	10	75	60	25	10	50	70	85	25	65								
Pedestrians																				
Lane Width (ft)																				
Walking Speed (ft/s)																				
Percent Blockage																				
Right turn flare (veh)																				
Median type							None			None										
Median storage (veh)																				
Upstream signal (ft)																				
pX, platoon unblocked																				
vC, conflicting volume	85			265			850	785	260	868	778	72								
vC1, stage 1 conf vol																				
vC2, stage 2 conf vol																				
vCu, unblocked vol	85			265			850	785	260	868	778	72								
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2								
tC, 2 stage (s)																				
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3								
p0 queue free %	90			94			95	82	91	55	91	93								
cM capacity (veh/h)	1512			1299			217	276	779	190	279	990								
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																
Volume Total	410	160	130	175																
Volume Left	145	75	10	85																
Volume Right	10	25	70	65																
cSH	1512	1299	410	291																
Volume to Capacity	0.10	0.06	0.32	0.60																
Queue Length 95th (ft)	8	5	34	91																
Control Delay (s)	3.3	4.0	17.8	34.5																
Lane LOS	A	A	C	D																
Approach Delay (s)	3.3	4.0	17.8	34.5																
Approach LOS			C	D																
Intersection Summary																				
Average Delay	11.8																			
Intersection Capacity Utilization	48.9%		ICU Level of Service		A															
Analysis Period (min)	15																			

HCM Unsignalized Intersection Capacity Analysis 47: Maple St & Commercial St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	100	45	30	555	225	25
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	100	45	30	555	225	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)				507		
pX, platoon unblocked						
vC, conflicting volume	852	238	250			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	852	238	250			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	69	94	98			
cM capacity (veh/h)	322	801	1316			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	145	585	250			
Volume Left	100	30	0			
Volume Right	45	0	25			
cSH	396	1316	1700			
Volume to Capacity	0.37	0.02	0.15			
Queue Length 95th (ft)	41	2	0			
Control Delay (s)	19.3	0.7	0.0			
Lane LOS	C	A				
Approach Delay (s)	19.3	0.7	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		3.2				
Intersection Capacity Utilization		62.5%		ICU Level of Service	B	
Analysis Period (min)		15				

Timings 48: Maple St & Bay St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	40	85	10	130	10	535	15	75
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phases	4	4	8	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	22.0	22.0	22.0	22.0	28.0	28.0	28.0	28.0
Total Split (%)	44.0%	44.0%	44.0%	44.0%	56.0%	56.0%	56.0%	56.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	None	None
Act Effct Green (s)		11.0		11.0		31.0		31.0
Actuated g/C Ratio		0.22		0.22		0.62		0.62
v/c Ratio		0.72		0.44		0.53		0.12
Control Delay		15.2		16.1		9.0		4.8
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		15.2		16.1		9.0		4.8
LOS		B		B		A		A
Approach Delay		15.2		16.1		9.0		4.8
Approach LOS		B		B		A		A
Intersection Summary								
Cycle Length: 50								
Actuated Cycle Length: 50								
Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green								
Natural Cycle: 50								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.72								
Intersection Signal Delay: 11.4					Intersection LOS: B			
Intersection Capacity Utilization 73.2%					ICU Level of Service D			
Analysis Period (min) 15								
Splits and Phases: 48: Maple St & Bay St								
	ø2					ø4		
28 s					22 s			
	ø6					ø8		
28 s					22 s			

HCM Signalized Intersection Capacity Analysis
48: Maple St & Bay St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.91			0.97			0.99			0.97	
Flt Protected		0.99			1.00			1.00			0.99	
Satd. Flow (prot)		1630			1747			1783			1729	
Flt Permitted		0.96			0.96			1.00			0.94	
Satd. Flow (perm)		1572			1688			1778			1629	
Volume (vph)	40	85	250	10	130	35	10	535	40	15	75	30
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	85	250	10	130	35	10	535	40	15	75	30
RTOR Reduction (vph)	0	176	0	0	22	0	0	4	0	0	11	0
Lane Group Flow (vph)	0	200	0	0	153	0	0	581	0	0	109	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		11.0			11.0			31.0			31.0	
Effective Green, g (s)		11.0			11.0			31.0			31.0	
Actuated g/C Ratio		0.22			0.22			0.62			0.62	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		346			371			1102			1010	
v/s Ratio Prot												
v/s Ratio Perm		c0.13			0.09			c0.33			0.07	
v/c Ratio		0.58			0.41			0.53			0.11	
Uniform Delay, d1		17.4			16.7			5.4			3.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.3			0.7			1.8			0.0	
Delay (s)		19.7			17.5			7.2			3.9	
Level of Service		B			B			A			A	
Approach Delay (s)		19.7			17.5			7.2			3.9	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM Average Control Delay		12.1			HCM Level of Service			B				
HCM Volume to Capacity ratio		0.54										
Actuated Cycle Length (s)		50.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		73.2%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
50: Maple St & Central Ave

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	5	60	430	20	295	160
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	60	430	20	295	160
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1190	440			450	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1190	440			450	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	90			73	
cM capacity (veh/h)	152	617			1110	
Direction, Lane #						
Volume Total	65	450			455	
Volume Left	5	0			295	
Volume Right	60	20			0	
cSH	500	1700			1110	
Volume to Capacity	0.13	0.26			0.27	
Queue Length 95th (ft)	11	0			27	
Control Delay (s)	13.3	0.0			7.1	
Lane LOS	B				A	
Approach Delay (s)	13.3	0.0			7.1	
Approach LOS	B					
Intersection Summary						
Average Delay		4.2				
Intersection Capacity Utilization		62.6%			ICU Level of Service	B
Analysis Period (min)		15				



Movement Summary

New Whatcom

Alternative 2 2026

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	% HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95 % Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
Laurel Street										
11L	L	20	4.8	1.000	61.1	LOS E	725	1.00	2.03	12.7
16T	T	375	1.9	1.016	54.8	LOS D	725	1.00	2.03	13.0
16R	R	160	1.9	1.019	56.4	LOS E	725	1.00	1.99	12.8
Approach		556	2.0	1.016	55.5	LOS E	725	1.00	2.02	12.9
Commercial Street										
17L	L	110	1.8	0.547	17.8	LOS B	142	0.89	1.06	21.6
14T	T	120	1.7	0.545	10.6	LOS B	142	0.89	1.01	23.9
14R	R	80	2.5	0.548	11.4	LOS B	142	0.89	0.93	23.6
Approach		310	1.9	0.546	13.3	LOS B	142	0.89	1.01	22.9
Laurel Street										
15L	L	25	3.8	0.667	13.6	LOS B	221	0.84	0.89	23.1
12T	T	405	2.0	0.664	6.4	LOS A	221	0.84	0.81	25.7
12R	R	135	2.2	0.665	8.4	LOS A	221	0.84	0.79	25.0
Approach		566	2.1	0.664	7.2	LOS A	221	0.84	0.81	25.4
Log Pond										
5L	L	290	2.1	0.611	19.3	LOS B	181	0.95	1.13	21.1
2R	R	70	1.4	0.609	12.0	LOS B	181	0.95	1.11	23.3
Approach		360	1.9	0.610	17.9	LOS B	181	0.95	1.13	21.4
Commercial Street										
13L	L	210	1.9	1.061	84.1	LOS F	794	1.00	2.27	10.5
18T	T	225	2.2	1.061	77.4	LOS E	794	1.00	2.27	10.5
18R	R	60	1.7	1.053	79.0	LOS E	794	1.00	2.25	10.4
Approach		496	2.0	1.059	80.5	LOS F	794	1.00	2.27	10.5
All Vehicles		2288	2.0	1.061	37.3	LOS D	794	0.94	1.50	16.0

Symbols which may appear in this table:

Following Degree of Saturation

Timings
1: Squalicum Pkwy & Meridian Street

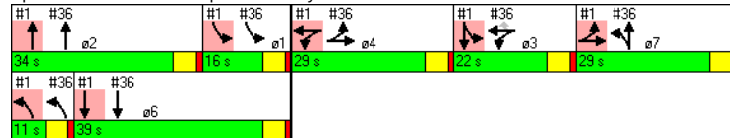
Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBT	NBL	NBT	SBL	SBT	ø1	ø3	ø6
Lane Configurations	↰	↱	↰	↰	↰	↰	↰			
Volume (vph)	445	5	10	5	775	30	705			
Turn Type	Split			Prot		Prot				
Protected Phases	7	7	4	5	2	13	3 6	1	3	6
Permitted Phases										
Detector Phases	7	7	4	5	2	13	3 6			
Minimum Initial (s)	6.0	6.0	6.0	6.0	10.0			6.0	6.0	10.0
Minimum Split (s)	29.0	29.0	29.0	11.0	23.0			11.0	11.0	23.0
Total Split (s)	29.0	29.0	29.0	11.0	34.0	38.0	61.0	16.0	22.0	39.0
Total Split (%)	22.3%	22.3%	22.3%	8.5%	26.2%	29.2%	46.9%	12%	17%	30%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0			1.0	1.0	1.0
Lead/Lag			Lead	Lead	Lead			Lag	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Max			None	None	None
Act Effct Green (s)	25.0	25.0	23.1	7.0	30.0	30.0	53.0			
Actuated g/C Ratio	0.20	0.20	0.18	0.05	0.23	0.23	0.41			
v/c Ratio	1.35	0.08	0.18	0.05	0.94	0.07	0.76			
Control Delay	217.5	20.8	20.8	59.6	67.9	11.4	10.3			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	1.0			
Total Delay	217.5	20.8	20.8	59.6	67.9	11.4	11.3			
LOS	F	C	C	E	E	B	B			
Approach Delay	207.0		20.8		67.8		11.3			
Approach LOS		F	C		E		B			

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 128.2
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.35
Intersection Signal Delay: 67.8
Intersection Capacity Utilization 69.5%
Analysis Period (min) 15
Intersection LOS: E
ICU Level of Service C

Splits and Phases: 1: Squalicum Pkwy & Meridian Street



HCM Signalized Intersection Capacity Analysis
1: Squalicum Pkwy & Meridian Street

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.88			0.91		1.00	1.00		1.00	0.95	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1563			1715		1787	3567		1752	3322	
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1687	1563			1715		1787	3567		1752	3322	
Volume (vph)	445	5	20	10	10	40	5	775	10	30	705	375
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	445	5	20	10	10	40	5	775	10	30	705	375
RTOR Reduction (vph)	0	16	0	0	33	0	0	1	0	0	53	0
Lane Group Flow (vph)	445	9	0	0	27	0	5	784	0	30	1027	0
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split			Prot			Prot		
Protected Phases	7	7		4	4		5	2		13	3 6	
Permitted Phases												
Actuated Green, G (s)	24.0	24.0			22.1		6.0	29.0		28.0	51.0	
Effective Green, g (s)	25.0	25.0			23.1		7.0	30.0		30.0	53.0	
Actuated g/C Ratio	0.20	0.20			0.18		0.05	0.23		0.23	0.41	
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0				
Vehicle Extension (s)	3.0	3.0			3.0		2.0	2.0				
Lane Grp Cap (vph)	329	305			309		98	835		410	1374	
v/s Ratio Prot	c0.26	0.01			c0.02		0.00	c0.22		0.02	c0.31	
v/s Ratio Perm												
v/c Ratio	1.35	0.03			0.09		0.05	0.94		0.07	0.75	
Uniform Delay, d1	51.6	41.7			43.7		57.4	48.2		38.2	31.9	
Progression Factor	1.00	1.00			1.00		1.00	1.00		0.52	0.63	
Incremental Delay, d2	177.4	0.0			0.1		0.1	19.5		0.0	0.2	
Delay (s)	229.0	41.8			43.9		57.5	67.6		19.7	20.3	
Level of Service	F	D			D		E	E		B	C	
Approach Delay (s)	219.0				43.9		67.6				20.3	
Approach LOS		F			D		E				C	

Intersection Summary

HCM Average Control Delay	74.7	HCM Level of Service	E
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	128.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Meridian Street & Broadway St

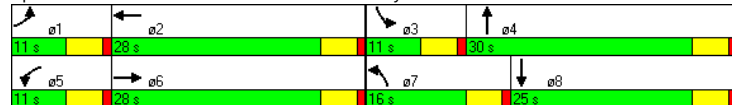
Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	105	340	40	390	180	215	35	205
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	1	6	5	2	7	4	3	8
Permitted Phases								
Detector Phases	1	6	5	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	25.0	11.0	25.0	11.0	25.0	11.0	25.0
Total Split (s)	11.0	28.0	11.0	28.0	16.0	30.0	11.0	25.0
Total Split (%)	13.8%	35.0%	13.8%	35.0%	20.0%	37.5%	13.8%	31.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	7.9	30.0	8.0	27.7	11.1	21.8	8.1	14.4
Actuated g/C Ratio	0.12	0.48	0.12	0.44	0.17	0.34	0.12	0.22
v/c Ratio	0.50	0.53	0.20	0.53	0.61	0.49	0.17	0.62
Control Delay	43.8	24.0	35.4	25.4	40.1	20.4	36.1	31.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.8	24.0	35.4	25.4	40.1	20.4	36.1	31.2
LOS	D	C	D	C	D	C	D	C
Approach Delay		27.7		26.3		27.9		31.8
Approach LOS		C		C		C		C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 62.6
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 28.0
Intersection Capacity Utilization 67.1%
Analysis Period (min) 15

Splits and Phases: 2: Meridian Street & Broadway St



HCM Signalized Intersection Capacity Analysis
2: Meridian Street & Broadway St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1745		1728	1795		1728	1731		1745	1782	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1728	1745		1728	1795		1728	1731		1745	1782	
Volume (vph)	105	340	110	40	390	30	180	215	80	35	205	45
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	105	340	110	40	390	30	180	215	80	35	205	45
RTOR Reduction (vph)	0	13	0	0	3	0	0	18	0	0	10	0
Lane Group Flow (vph)	105	437	0	40	417	0	180	277	0	35	240	0
Confl. Peds. (#/hr)			5			5			5			5
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	4.1	26.2		2.9	25.0		7.3	17.6		1.9	12.2	
Effective Green, g (s)	5.1	27.2		3.9	26.0		8.3	18.6		2.9	13.2	
Actuated g/C Ratio	0.07	0.40		0.06	0.38		0.12	0.27		0.04	0.19	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	128	692		98	680		209	469		74	343	
v/s Ratio Prot	c0.06	c0.25		0.02	0.23		c0.10	c0.16		0.02	0.13	
v/s Ratio Perm												
v/c Ratio	0.82	0.63		0.41	0.61		0.86	0.59		0.47	0.70	
Uniform Delay, d1	31.3	16.7		31.2	17.2		29.6	21.7		32.1	25.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	31.3	1.4		1.0	1.2		27.7	1.3		1.7	4.9	
Delay (s)	62.6	18.1		32.2	18.4		57.3	23.0		33.8	30.8	
Level of Service	E	B		C	B		E	C		C	C	
Approach Delay (s)		26.5			19.6			36.0			31.2	
Approach LOS		C			B			D			C	

Intersection Summary

HCM Average Control Delay	28.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	68.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
3: Ohio St & N State St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	485	445	285	140	40	1160	40	1005
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	24.0	24.0	23.0	23.0	8.0	21.0	8.0	21.0
Total Split (s)	26.0	26.0	23.0	23.0	8.0	33.0	8.0	33.0
Total Split (%)	28.9%	28.9%	25.6%	25.6%	8.9%	36.7%	8.9%	36.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	22.1	22.1	17.9	17.9	4.0	29.1	4.0	29.1
Actuated g/C Ratio	0.26	0.26	0.21	0.21	0.04	0.34	0.04	0.34
v/c Ratio	1.09	1.07	0.80	0.53	0.51	1.22	0.51	1.09
Control Delay	102.7	95.7	51.0	33.2	65.9	134.9	65.9	82.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	102.7	95.7	51.0	33.2	65.9	134.9	65.9	82.5
LOS	F	F	D	C	E	F	E	F
Approach Delay	99.1		43.6		133.0		82.0	
Approach LOS	F		D		F		F	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 85.7
Natural Cycle: 130
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.22
Intersection Signal Delay: 99.2
Intersection Capacity Utilization 92.9%
Analysis Period (min) 15
Intersection LOS: F
ICU Level of Service F

Splits and Phases: 3: Ohio St & N State St

↰	↱	↰	↱	↰	↱	↰	↱
8 s	33 s	23 s	26 s	8 s	33 s	23 s	26 s
↰	↱	↰	↱	↰	↱	↰	↱
8 s	33 s	23 s	26 s	8 s	33 s	23 s	26 s

HCM Signalized Intersection Capacity Analysis
3: Ohio St & N State St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.96		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1788		1711	1720		1728	3360		1728	3349	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1728	1788		1711	1720		1728	3360		1728	3349	
Volume (vph)	485	445	55	285	140	60	40	1160	260	40	1005	260
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	485	445	55	285	140	60	40	1160	260	40	1005	260
RTOR Reduction (vph)	0	5	0	0	17	0	0	21	0	0	25	0
Lane Group Flow (vph)	485	495	0	285	183	0	40	1399	0	40	1240	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	21.1	21.1		16.9	16.9		2.3	28.1		2.3	28.1	
Effective Green, g (s)	22.1	22.1		17.9	17.9		2.3	29.1		2.3	29.1	
Actuated g/C Ratio	0.25	0.25		0.20	0.20		0.03	0.33		0.03	0.33	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	437	452		350	352		45	1119		45	1115	
v/s Ratio Prot	c0.28	c0.28		0.17	0.11		c0.02	c0.42		0.02	0.37	
v/s Ratio Perm												
v/c Ratio	1.11	1.09		0.81	0.52		0.89	1.25		0.89	1.11	
Uniform Delay, d1	32.6	32.6		33.2	30.9		42.4	29.2		42.4	29.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	76.4	70.4		14.2	1.7		91.4	120.0		91.4	63.1	
Delay (s)	109.0	103.1		47.3	32.6		133.8	149.2		133.8	92.3	
Level of Service	F	F		D	C		F	F		F	F	
Approach Delay (s)	106.0			41.3			148.7			93.5		
Approach LOS	F			D			F			F		

Intersection Summary

HCM Average Control Delay	109.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	87.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
4: Iowa St & James Street

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	←	←	↙	↓	↘	↗	→
Lane Group	WBL	WBT	SBL	SBT	SBR	NEL	NER
Lane Configurations							
Volume (vph)	510	70	220	170	830	780	790
Turn Type	Split		Perm		Over		pt+ov
Protected Phases	3	3		1	2	2	2 3
Permitted Phases			1				
Detector Phases	3	3	1	1	2	2	2 3
Minimum Initial (s)	6.0	6.0	8.0	8.0	6.0	6.0	
Minimum Split (s)	11.0	11.0	20.0	20.0	17.0	17.0	
Total Split (s)	13.0	13.0	47.0	47.0	20.0	20.0	33.0
Total Split (%)	16.3%	16.3%	58.8%	58.8%	25.0%	25.0%	41.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag			Lead	Lead	Lag	Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	
Act Effct Green (s)	9.0	9.0		43.0	16.0	16.0	29.0
Actuated g/C Ratio	0.11	0.11		0.54	0.20	0.20	0.36
v/c Ratio	1.55	1.59		4.29	1.54	1.36	1.34
Control Delay	299.7	317.7		1515.7	279.8	200.5	192.9
Queue Delay	0.0	0.0		0.0	0.0	3.7	30.9
Total Delay	299.7	317.7		1515.7	279.8	204.2	223.8
LOS	F	F		F	F	F	F
Approach Delay		308.9		671.6		212.7	
Approach LOS		F		F		F	

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 4.29

Intersection Signal Delay: 395.3

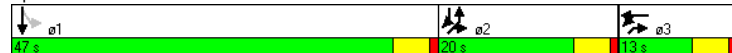
Intersection LOS: F

Intersection Capacity Utilization 77.9%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 4: Iowa St & James Street



HCM Signalized Intersection Capacity Analysis
4: Iowa St & James Street

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	←	←	↙	↓	↘	↗	→	↖	↗	↘
Movement	WBL	WBT	WBR	SBL	SBT	SBR	SBR2	NEL	NER	NER2
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95			1.00	0.88		0.97	0.91	
Frt	1.00	1.00			1.00	0.85		0.98	0.85	
Flt Protected	0.95	0.96			0.97	1.00		0.96	1.00	
Satd. Flow (prot)	1641	1661			1769	2720		3314	1407	
Flt Permitted	0.95	0.96			0.09	1.00		0.96	1.00	
Satd. Flow (perm)	1641	1661			169	2720		3314	1407	
Volume (vph)	510	70	5	220	170	830	10	780	790	15
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	510	70	5	220	170	830	10	780	790	15
RTOR Reduction (vph)	0	1	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	286	298	0	0	390	839	0	900	685	0
Heavy Vehicles (%)	1%	1%		1%	1%	1%		1%	1%	1%
Turn Type	Split			Perm		Over			pt+ov	
Protected Phases	3	3			1	2		2	2 3	
Permitted Phases				1						
Actuated Green, G (s)	8.0	8.0			42.0	15.0		15.0	28.0	
Effective Green, g (s)	9.0	9.0			43.0	16.0		16.0	29.0	
Actuated g/C Ratio	0.11	0.11			0.54	0.20		0.20	0.36	
Clearance Time (s)	5.0	5.0			5.0	5.0		5.0		
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0		
Lane Grp Cap (vph)	185	187			91	544		663	510	
v/s Ratio Prot	0.17	0.18				c0.31		0.27	c0.49	
v/s Ratio Perm					c2.31					
v/c Ratio	1.55	1.59			4.29	1.54		1.36	1.34	
Uniform Delay, d1	35.5	35.5			18.5	32.0		32.0	25.5	
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	270.7	291.1			1503.9	253.3		170.6	167.2	
Delay (s)	306.2	326.6			1522.4	285.3		202.6	192.7	
Level of Service	F	F			F	F		F	F	
Approach Delay (s)		316.6			677.5			198.3		
Approach LOS		F			F			F		

Intersection Summary

HCM Average Control Delay	392.0	HCM Level of Service	F
HCM Volume to Capacity ratio	3.12		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
5: Iowa St & King St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↗	↖	↗	↖	↗	↖	↗
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↖	↖↗	↖	↖↗	↖	↖	↖	↖	↖
Volume (vph)	45	915	275	600	40	185	710	115	150
Turn Type	pm+pt		pm+pt		pm+pt		pm+ov	pm+pt	
Protected Phases	5	2	1	6	3	8	1	7	4
Permitted Phases	2		6		8		8	4	
Detector Phases	5	2	1	6	3	8	1	7	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	28.0	11.0	26.0	11.0	28.0	11.0	11.0	28.0
Total Split (s)	11.0	28.0	13.0	30.0	11.0	28.0	13.0	11.0	28.0
Total Split (%)	13.8%	35.0%	16.3%	37.5%	13.8%	35.0%	16.3%	13.8%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	Min	None	Min	None	None	None	None	None
Act Effct Green (s)	30.4	23.9	36.9	33.6	18.5	13.3	23.4	19.2	15.3
Actuated g/C Ratio	0.45	0.37	0.58	0.53	0.27	0.20	0.37	0.29	0.23
v/c Ratio	0.13	0.80	0.73	0.39	0.11	0.51	1.08	0.30	0.46
Control Delay	10.5	26.8	28.7	15.7	15.7	29.7	76.7	17.5	24.7
Queue Delay	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.5	27.5	28.7	15.7	15.7	29.7	76.7	17.5	24.7
LOS	B	C	C	B	B	C	E	B	C
Approach Delay		26.8		19.4		64.8			22.1
Approach LOS		C		B		E			C

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 63.9

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.08

Intersection Signal Delay: 35.0

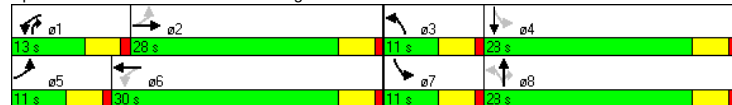
Intersection LOS: D

Intersection Capacity Utilization 89.0%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 5: Iowa St & King St



HCM Signalized Intersection Capacity Analysis
5: Iowa St & King St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↗	↖	↗	↖	↗	↖	↗	↖	↗	↖	↗
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↖↗		↖	↖↗		↖	↖	↖	↖	↖	↖	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0		
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00		
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	0.97		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1728	3402		1711	3358		1728	1818	1546	1745	1773		
Flt Permitted	0.39	1.00		0.13	1.00		0.54	1.00	1.00	0.46	1.00		
Satd. Flow (perm)	711	3402		235	3358		986	1818	1546	847	1773		
Volume (vph)	45	915	105	275	600	85	40	185	710	115	150	45	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	45	915	105	275	600	85	40	185	710	115	150	45	
RTOR Reduction (vph)	0	10	0	0	11	0	0	0	99	0	15	0	
Lane Group Flow (vph)	45	1010	0	275	674	0	40	185	611	115	180	0	
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	0%	0%	0%	
Turn Type	pm+pt			pm+pt			pm+pt		pm+ov	pm+pt			
Protected Phases	5	2		1	6		3	8	1	7	4		
Permitted Phases	2			6			8		8	4			
Actuated Green, G (s)	28.8	25.6		39.3	31.1		14.3	11.1	19.8	16.5	12.2		
Effective Green, g (s)	30.8	26.6		40.3	32.1		16.3	12.1	21.8	18.5	13.2		
Actuated g/C Ratio	0.44	0.38		0.58	0.46		0.23	0.17	0.31	0.27	0.19		
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.6		3.0	3.0		3.6	3.6	3.0	3.0	3.0		
Lane Grp Cap (vph)	375	1298		341	1547		275	316	572	293	336		
v/s Ratio Prot	0.01	0.30		0.11	0.20		0.01	0.10	c0.15	c0.03	0.10		
v/s Ratio Perm	0.05			c0.35			0.03		0.25	0.07			
v/c Ratio	0.12	0.78		0.81	0.44		0.15	0.59	1.07	0.39	0.53		
Uniform Delay, d1	11.1	19.0		14.0	12.7		21.0	26.5	24.0	20.2	25.5		
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.1	3.1		13.0	0.2		0.3	3.0	57.2	0.9	1.6		
Delay (s)	11.3	22.1		27.1	12.9		21.3	29.5	81.1	21.1	27.1		
Level of Service	B	C		C	B		C	C	F	C	C		
Approach Delay (s)		21.6			16.9			68.3			24.9		
Approach LOS		C			B			E			C		

Intersection Summary

HCM Average Control Delay	33.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	69.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
6: Iowa St & Moore St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	45	1145	205	790	155	65	140	115
Turn Type	Prot		Prot		Perm		Perm	
Protected Phases	1	6	5	2		4		8
Permitted Phases					4		8	
Detector Phases	1	6	5	2	4	4	8	8
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	27.0	12.0	27.0	21.0	21.0	21.0	21.0
Total Split (s)	12.0	37.0	16.0	41.0	27.0	27.0	27.0	27.0
Total Split (%)	15.0%	46.3%	20.0%	51.3%	33.8%	33.8%	33.8%	33.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	8.0	33.0	11.8	41.6		23.0		23.0
Actuated g/C Ratio	0.09	0.41	0.15	0.52		0.29		0.29
v/c Ratio	0.27	1.18	0.81	0.47		1.12		1.02
Control Delay	38.5	111.4	58.3	14.1		105.5		90.7
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	38.5	111.4	58.3	14.1		105.5		90.7
LOS	D	F	E	B		F		F
Approach Delay		109.5		22.8		105.5		90.7
Approach LOS		F		C		F		F

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 79.8
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.18
Intersection Signal Delay: 81.8
Intersection Capacity Utilization 100.2%
Analysis Period (min) 15
Intersection LOS: F
ICU Level of Service G

Splits and Phases: 6: Iowa St & Moore St



HCM Signalized Intersection Capacity Analysis
6: Iowa St & Moore St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.95		1.00	0.99			0.93			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1728	3289		1711	3394			1614			1673	
Flt Permitted	0.95	1.00		0.95	1.00			0.78			0.54	
Satd. Flow (perm)	1728	3289		1711	3394			1273			920	
Volume (vph)	45	1145	540	205	790	45	155	65	245	140	115	20
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	45	1145	540	205	790	45	155	65	245	140	115	20
RTOR Reduction (vph)	0	68	0	0	5	0	0	50	0	0	4	0
Lane Group Flow (vph)	45	1617	0	205	830	0	0	415	0	0	271	0
Heavy Vehicles (%)	1%	1%		2%	2%		2%	4%	4%	6%	6%	6%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	4.2	34.1		10.8	40.7			22.0			22.0	
Effective Green, g (s)	5.2	35.1		11.8	41.7			23.0			23.0	
Actuated g/C Ratio	0.06	0.43		0.14	0.51			0.28			0.28	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.5			3.5	
Lane Grp Cap (vph)	110	1410		247	1728			357			258	
v/s Ratio Prot	0.03	c0.49		c0.12	0.24							
v/s Ratio Perm								c0.33			0.30	
v/c Ratio	0.41	1.15		0.83	0.48			1.16			1.05	
Uniform Delay, d1	36.9	23.4		34.1	13.1			29.4			29.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.5	74.9		20.1	0.2			99.2			70.3	
Delay (s)	39.3	98.3		54.1	13.3			128.7			99.8	
Level of Service	D	F		D	B			F			F	
Approach Delay (s)		96.7			21.3			128.7			99.8	
Approach LOS		F			C			F			F	

Intersection Summary

HCM Average Control Delay	78.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	81.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	100.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Elm Street & Broadway St

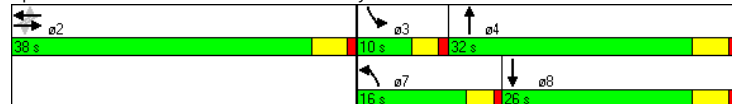
Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	10	265	55	335	225	265	50	295
Turn Type	Perm		Perm		Prot		Prot	
Protected Phases		2		2	7	4	3	8
Permitted Phases	2		2					
Detector Phases	2	2	2	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	26.0	26.0	26.0	26.0	8.0	26.0	8.0	26.0
Total Split (s)	38.0	38.0	38.0	38.0	16.0	32.0	10.0	26.0
Total Split (%)	47.5%	47.5%	47.5%	47.5%	20.0%	40.0%	12.5%	32.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	20.5	20.5	20.5	20.5	11.6	26.4	6.0	15.7
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.19	0.43	0.09	0.26
v/c Ratio	0.04	0.58	0.21	0.69	0.68	0.43	0.31	0.66
Control Delay	14.5	19.8	16.9	23.3	40.2	17.1	36.9	29.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	19.8	16.9	23.3	40.2	17.1	36.9	29.1
LOS	B	B	B	C	D	B	D	C
Approach Delay		19.7		22.6		26.4		30.2
Approach LOS		B		C		C		C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 60.7
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 24.8
Intersection Capacity Utilization 69.9%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service C

Splits and Phases: 7: Elm Street & Broadway St



HCM Signalized Intersection Capacity Analysis
7: Elm Street & Broadway St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1691	1715		1707	1743		1728	1751		1728	1803	
Flt Permitted	0.31	1.00		0.40	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	545	1715		713	1743		1728	1751		1728	1803	
Volume (vph)	10	265	80	55	335	80	225	265	70	50	295	15
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	265	80	55	335	80	225	265	70	50	295	15
RTOR Reduction (vph)	0	16	0	0	13	0	0	10	0	0	2	0
Lane Group Flow (vph)	10	329	0	55	402	0	225	325	0	50	308	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		2			2		7	4		3	8	
Permitted Phases	2			2								
Actuated Green, G (s)	19.5	19.5		19.5	19.5		11.6	25.3		3.1	16.8	
Effective Green, g (s)	20.5	20.5		20.5	20.5		11.6	26.3		3.1	17.8	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.19	0.42		0.05	0.29	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	180	568		236	577		324	744		87	518	
v/s Ratio Prot		0.19			c0.23		c0.13	0.19		0.03	c0.17	
v/s Ratio Perm	0.02			0.08								
v/c Ratio	0.06	0.58		0.23	0.70		0.69	0.44		0.57	0.59	
Uniform Delay, d1	14.1	17.1		15.0	18.0		23.5	12.6		28.8	18.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.4		0.5	3.7		6.3	0.4		8.9	1.8	
Delay (s)	14.2	18.6		15.5	21.7		29.8	13.0		37.6	20.8	
Level of Service	B	B		B	C		C	B		D	C	
Approach Delay (s)		18.4			20.9			19.7			23.1	
Approach LOS		B			C			B			C	

Intersection Summary

HCM Average Control Delay	20.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	61.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Flora St & Cornwall Ave

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations		 		 	 	 		 	 
Volume (vph)	245	550	30	205	180	25	425	175	375
Turn Type	Perm		Perm		Perm	Prot		Prot	
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8				
Detector Phases	4	4	8	8	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	11.0	27.0	11.0	27.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	11.0	32.0	11.0	32.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	15.7%	45.7%	15.7%	45.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		23.0		23.0	23.0	7.0	27.3	7.0	33.9
Actuated g/C Ratio		0.33		0.33	0.33	0.09	0.39	0.10	0.49
v/c Ratio		1.00		0.52	0.30	0.16	0.95	1.02	0.54
Control Delay		57.4		23.8	4.6	32.6	46.2	111.5	16.2
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		57.4		23.8	4.6	32.6	46.2	111.5	16.2
LOS		E		C	A	C	D	F	B
Approach Delay		57.4		15.5			45.7		42.7
Approach LOS		E		B			D		D

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 69.3
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 43.8
Intersection Capacity Utilization 99.9%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service F

Splits and Phases: 8: Flora St & Cornwall Ave

↖ e1	↖ e2	↖ e4
11 s	32 s	27 s
↖ e5	↖ e6	↖ e8
11 s	32 s	27 s

HCM Signalized Intersection Capacity Analysis
8: Flora St & Cornwall Ave

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 				 	 	 		 	 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.92	1.00	0.98		1.00	0.99	
Flpb, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00			1.00	0.85	1.00	0.95		1.00	0.97	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3309			1804	1428	1694	1664		1694	1713	
Flt Permitted		0.73			0.72	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		2441			1314	1428	1694	1664		1694	1713	
Volume (vph)	245	550	25	30	205	180	25	425	225	175	375	80
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	245	550	25	30	205	180	25	425	225	175	375	80
RTOR Reduction (vph)	0	3	0	0	0	123	0	26	0	0	10	0
Lane Group Flow (vph)	0	817	0	0	235	57	25	624	0	175	445	0
Confl. Peds. (#/hr)	35		35	35		35			35			35
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	3%	3%	3%
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		22.0			22.0	22.0	2.4	29.3		6.0	32.9	
Effective Green, g (s)		23.0			23.0	23.0	3.4	30.3		7.0	33.9	
Actuated g/C Ratio		0.32			0.32	0.32	0.05	0.42		0.10	0.47	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		777			418	454	80	697		164	803	
v/s Ratio Prot							0.01	c0.37		c0.10	c0.26	
v/s Ratio Perm		c0.33			0.18	0.04						
v/c Ratio		1.05			0.56	0.13	0.31	0.90		1.07	0.55	
Uniform Delay, d1		24.6			20.5	17.5	33.3	19.5		32.6	13.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		46.5			1.0	0.0	0.8	13.7		89.2	0.5	
Delay (s)		71.1			21.5	17.6	34.1	33.2		121.9	14.3	
Level of Service		E			C	B	C	C		F	B	
Approach Delay (s)		71.1			19.8			33.3			44.2	
Approach LOS		E			B			C			D	

Intersection Summary

HCM Average Control Delay	46.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	72.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	99.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
9: York St & N State St

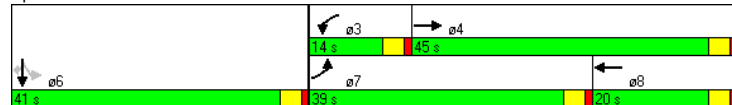
Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↘	↙	↓	↗
Lane Group	EBL	EBT	WBL	WBT	SBT	SBR
Lane Configurations	↖	↖↗	↖	↖↗	↖↗	↖
Volume (vph)	625	435	80	265	925	185
Turn Type	Prot		Prot		Perm	
Protected Phases	7	4	3	8	6	
Permitted Phases						6
Detector Phases	7	4	3	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	21.0	21.0
Total Split (s)	39.0	45.0	14.0	20.0	41.0	41.0
Total Split (%)	39.0%	45.0%	14.0%	20.0%	41.0%	41.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag		
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	35.0	42.0	8.9	13.8	37.0	37.0
Actuated g/C Ratio	0.36	0.43	0.09	0.14	0.38	0.38
v/c Ratio	1.03	0.38	0.54	0.69	0.99	0.27
Control Delay	77.4	19.3	57.2	45.3	55.3	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.9	0.0
Total Delay	77.4	19.3	57.2	45.3	56.2	5.1
LOS	E	B	E	D	E	A
Approach Delay		50.5		47.6	49.7	
Approach LOS		D		D	D	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 97.8
Natural Cycle: 110
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.03
Intersection Signal Delay: 49.7
Intersection Capacity Utilization 89.5%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service E

Splits and Phases: 9: York St & N State St



HCM Signalized Intersection Capacity Analysis
9: York St & N State St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95						0.95	1.00
Frt	1.00	0.97		1.00	0.97						1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (prot)	1694	3289		1646	3201						3375	1531
Flt Permitted	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (perm)	1694	3289		1646	3201						3375	1531
Volume (vph)	625	435	105	80	265	60	0	0	0	345	925	185
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	625	435	105	80	265	60	0	0	0	345	925	185
RTOR Reduction (vph)	0	21	0	0	20	0	0	0	0	0	0	109
Lane Group Flow (vph)	625	519	0	80	305	0	0	0	0	0	1270	76
Heavy Vehicles (%)	3%	3%	3%	6%	6%	6%	0%	0%	0%	2%	2%	2%
Turn Type	Prot			Prot						Perm		Perm
Protected Phases	7	4		3	8						6	
Permitted Phases										6		6
Actuated Green, G (s)	35.0	42.0		7.6	14.6						37.0	37.0
Effective Green, g (s)	35.0	42.0		7.6	14.6						37.0	37.0
Actuated g/C Ratio	0.35	0.43		0.08	0.15						0.38	0.38
Clearance Time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)	601	1401		127	474						1266	575
v/s Ratio Prot	c0.37	0.16		0.05	c0.10							
v/s Ratio Perm											0.38	0.05
v/c Ratio	1.04	0.37		0.63	0.64						1.00	0.13
Uniform Delay, d1	31.8	19.3		44.1	39.6						30.8	20.3
Progression Factor	1.00	1.00		1.00	1.00						1.00	1.00
Incremental Delay, d2	47.5	0.2		9.4	3.0						26.1	0.1
Delay (s)	79.3	19.5		53.5	42.6						56.9	20.4
Level of Service	E	B		D	D						E	C
Approach Delay (s)		51.6			44.7			0.0			52.2	
Approach LOS		D			D			A			D	

Intersection Summary

HCM Average Control Delay	51.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

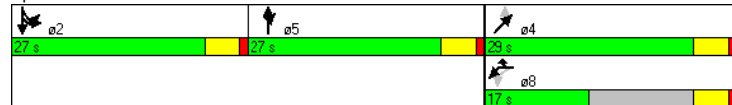
Timings
10: York St & N Forest St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	←	↖	↑	↗	↘	↓	↙	↘
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	NEL	NET
Lane Configurations								
Volume (vph)	0	95	200	345	165	650	70	905
Turn Type	Prot	Split	Split	Split	custom	Prot		
Protected Phases	8!	8!	5	5	2	2		4!
Permitted Phases							4	
Detector Phases	8	8	5	5	2	2	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	9.0	27.0	27.0	27.0	27.0	29.0	29.0
Total Split (s)	17.0	17.0	27.0	27.0	27.0	27.0	29.0	29.0
Total Split (%)	20.5%	20.5%	32.5%	32.5%	32.5%	32.5%	34.9%	34.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	Min	Min	Min	Min	None	None
Act Effct Green (s)	25.3	25.3	20.0	20.0	20.2	20.2	25.3	25.3
Actuated g/C Ratio	0.33	0.33	0.26	0.26	0.26	0.26	0.33	0.33
v/c Ratio	0.21	0.37	0.80	0.75	0.42	0.73	0.13	0.96
Control Delay	22.4	16.7	43.5	37.7	27.5	31.9	21.7	49.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	22.4	16.7	43.5	37.7	27.5	32.3	21.7	49.2
LOS	C	B	D	D	C	C	C	D
Approach Delay	18.8		40.8			31.2		47.4
Approach LOS	B		D			C		D

Intersection Summary	
Cycle Length: 83	
Actuated Cycle Length: 77.6	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 38.1	Intersection LOS: D
Intersection Capacity Utilization 84.8%	ICU Level of Service E
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 10: York St & N Forest St



HCM Signalized Intersection Capacity Analysis
10: York St & N Forest St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	WBL2	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL2	SBL	SBT	NEL	NET
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		0.95	0.95			1.00	0.95	1.00	0.95
Frt		1.00	0.85		0.94	0.85			1.00	1.00	1.00	0.98
Flt Protected		0.95	1.00		1.00	1.00			0.95	1.00	0.95	1.00
Satd. Flow (prot)		1728	1546		1623	1468			1711	3421	1678	3292
Flt Permitted		0.95	1.00		1.00	1.00			0.95	1.00	0.95	1.00
Satd. Flow (perm)		1728	1546		1623	1468			1711	3421	1678	3292
Volume (vph)	120	0	95	110	200	345	90	20	165	650	70	905
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	120	0	95	110	200	345	90	20	165	650	70	905
RTOR Reduction (vph)	0	0	48	0	0	19	0	0	0	0	0	1
Lane Group Flow (vph)	0	120	157	0	336	280	0	0	185	650	70	1034
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%	4%	4%
Turn Type	Perm		Prot		Split			Split	Split		custom	Prot
Protected Phases		8!	8!		5	5		2	2	2		4!
Permitted Phases	8											4
Actuated Green, G (s)		24.3	24.3		19.0	19.0			19.2	19.2	24.3	24.3
Effective Green, g (s)		25.3	25.3		20.0	20.0			20.2	20.2	25.3	25.3
Actuated g/C Ratio		0.33	0.33		0.26	0.26			0.26	0.26	0.33	0.33
Clearance Time (s)		5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		564	505		419	379			446	892	548	1075
v/s Ratio Prot			0.10		c0.21	0.19			0.11	c0.19		c0.31
v/s Ratio Perm	0.07										0.04	
v/c Ratio	0.21	0.31		0.80	0.74				0.41	0.73	0.13	0.96
Uniform Delay, d1	18.9	19.6		26.9	26.3				23.8	26.1	18.3	25.6
Progression Factor	1.00	1.00		1.00	1.00				1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.4		10.6	7.3				0.6	3.0	0.1	18.9
Delay (s)	19.1	19.9		37.5	33.7				24.4	29.2	18.5	44.5
Level of Service	B	B		D	C				C	C	B	D
Approach Delay (s)	19.6			35.7					28.1			42.9
Approach LOS	B			D					C			D

Intersection Summary	
HCM Average Control Delay	34.4 HCM Level of Service C
HCM Volume to Capacity ratio	0.84
Actuated Cycle Length (s)	77.5 Sum of lost time (s) 12.0
Intersection Capacity Utilization	84.8% ICU Level of Service E
Analysis Period (min)	15
! Phase conflict between lane groups.	
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
10: York St & N Forest St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

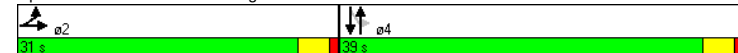
		
Movement	NER	NER2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Volume (vph)	120	10
Peak-hour factor, PHF	1.00	1.00
Adj. Flow (vph)	120	10
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	0	0
Heavy Vehicles (%)	4%	4%
Turn Type		
Protected Phases		
Permitted Phases		
Actuated Green, G (s)		
Effective Green, g (s)		
Actuated g/C Ratio		
Clearance Time (s)		
Vehicle Extension (s)		
Lane Grp Cap (vph)		
v/s Ratio Prot		
v/s Ratio Perm		
v/c Ratio		
Uniform Delay, d1		
Progression Factor		
Incremental Delay, d2		
Delay (s)		
Level of Service		
Approach Delay (s)		
Approach LOS		
Intersection Summary		

Timings
11: E Magnolia St & Cornwall Ave

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

				
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	675	600	110	310
Turn Type	Perm			
Protected Phases	2	4		4
Permitted Phases			4	
Detector Phases	2	4	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	23.0	23.0	23.0
Total Split (s)	31.0	39.0	39.0	39.0
Total Split (%)	44.3%	55.7%	55.7%	55.7%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	27.0	35.0		35.0
Actuated g/C Ratio	0.39	0.50		0.50
v/c Ratio	0.68	0.74		0.93
Control Delay	20.6	17.8		48.9
Queue Delay	0.0	0.0		0.0
Total Delay	20.6	17.9		48.9
LOS	C	B		D
Approach Delay	20.6	17.9		48.9
Approach LOS	C	B		D
Intersection Summary				
Cycle Length: 70				
Actuated Cycle Length: 70				
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green				
Natural Cycle: 60				
Control Type: Pretimed				
Maximum v/c Ratio: 0.93				
Intersection Signal Delay: 25.8			Intersection LOS: C	
Intersection Capacity Utilization 93.1%			ICU Level of Service F	
Analysis Period (min) 15				

Splits and Phases: 11: E Magnolia St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
11: E Magnolia St & Cornwall Ave

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		0.95						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			0.99	
Frt		0.98						0.99			1.00	
Flt Protected		0.99						1.00			0.99	
Satd. Flow (prot)		3283						1780			1751	
Flt Permitted		0.99						1.00			0.51	
Satd. Flow (perm)		3283						1780			898	
Volume (vph)	95	675	95	0	0	0	0	600	60	110	310	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	95	675	95	0	0	0	0	600	60	110	310	0
RTOR Reduction (vph)	0	14	0	0	0	0	0	5	0	0	0	0
Lane Group Flow (vph)	0	851	0	0	0	0	0	655	0	0	420	0
Confl. Peds. (#/hr)	80		80						80	80		
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split								Perm			
Protected Phases	2		2						4		4	
Permitted Phases									4			
Actuated Green, G (s)	27.0								35.0		35.0	
Effective Green, g (s)	27.0								35.0		35.0	
Actuated g/C Ratio	0.39								0.50		0.50	
Clearance Time (s)	4.0								4.0		4.0	
Lane Grp Cap (vph)	1266								890		449	
v/s Ratio Prot	c0.26								0.37			
v/s Ratio Perm											c0.47	
v/c Ratio	0.67								0.74		0.94	
Uniform Delay, d1	17.8								13.8		16.4	
Progression Factor	1.00								0.92		1.00	
Incremental Delay, d2	2.9								4.5		29.0	
Delay (s)	20.7								17.3		45.5	
Level of Service	C								B		D	
Approach Delay (s)	20.7				0.0				17.3		45.5	
Approach LOS	C				A				B		D	
Intersection Summary												
HCM Average Control Delay	24.9				HCM Level of Service				C			
HCM Volume to Capacity ratio	0.82											
Actuated Cycle Length (s)	70.0				Sum of lost time (s)				8.0			
Intersection Capacity Utilization	93.1%				ICU Level of Service				F			
Analysis Period (min)	15											
c Critical Lane Group												

Timings
12: W Holly St & Broadway St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

							
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations							
Volume (vph)	90	590	5	685	5	200	0
Turn Type	Perm		Perm			Perm	
Protected Phases		2		2	4		4
Permitted Phases	2		2			4	
Detector Phases	2	2	2	2	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	54.0	54.0	54.0	54.0	26.0	26.0	26.0
Total Split (%)	67.5%	67.5%	67.5%	67.5%	32.5%	32.5%	32.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None
Act Effect Green (s)		44.4		44.4	15.4	15.4	15.4
Actuated g/C Ratio		0.71		0.71	0.24	0.24	0.24
v/c Ratio		0.66		0.78	0.02	0.61	0.15
Control Delay		12.6		16.0	16.9	33.6	0.6
Queue Delay		0.0		0.0	0.0	0.0	0.0
Total Delay		12.6		16.0	16.9	33.6	0.6
LOS		B		B	B	C	A
Approach Delay		12.6		16.0	16.9		23.8
Approach LOS		B		B	B		C
Intersection Summary							
Cycle Length: 80							
Actuated Cycle Length: 62.1							
Natural Cycle: 75							
Control Type: Actuated-Uncoordinated							
Maximum v/c Ratio: 0.78							
Intersection Signal Delay: 15.9				Intersection LOS: B			
Intersection Capacity Utilization 117.3%				ICU Level of Service H			
Analysis Period (min) 15							

Splits and Phases: 12: W Holly St & Broadway St



HCM Signalized Intersection Capacity Analysis
12: W Holly St & Broadway St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00			0.99		1.00	0.97	
Flpb, ped/bikes		1.00			1.00			1.00		0.99	1.00	
Frt		1.00			0.96			0.93		1.00	0.85	
Flt Protected		0.99			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1806			1721			1698		1719	1502	
Flt Permitted		0.80			1.00			1.00		0.75	1.00	
Satd. Flow (perm)		1452			1718			1698		1359	1502	
Volume (vph)	90	590	0	5	685	280	0	5	5	200	0	85
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	90	590	0	5	685	280	0	5	5	200	0	85
RTOR Reduction (vph)	0	0	0	0	16	0	0	4	0	0	68	0
Lane Group Flow (vph)	0	680	0	0	954	0	0	6	0	200	17	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		40.6			40.6			11.4		11.4	11.4	
Effective Green, g (s)		41.6			41.6			12.4		12.4	12.4	
Actuated g/C Ratio		0.67			0.67			0.20		0.20	0.20	
Clearance Time (s)		5.0			5.0			5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		974			1153			340		272	300	
v/s Ratio Prot								0.00			0.01	
v/s Ratio Perm		0.47			c0.56					c0.15		
v/c Ratio		0.70			0.83			0.02		0.74	0.06	
Uniform Delay, d1		6.3			7.5			19.9		23.3	20.1	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		2.2			5.0			0.0		9.9	0.1	
Delay (s)		8.5			12.5			19.9		33.1	20.1	
Level of Service		A			B			B		C	C	
Approach Delay (s)		8.5			12.5			19.9			29.3	
Approach LOS		A			B			B			C	

Intersection Summary

HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	62.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	117.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Timings
13: W Holly St & F St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø1	ø2	ø3	ø4
Lane Configurations												
Volume (vph)	65	555	65	765	75	435	75	240				
Turn Type	Perm		Perm		Perm		Perm					
Protected Phases		2 4		2 4		1 3		1 3	1	2	3	4
Permitted Phases	2 4		2 4		1 3		1 3					
Detector Phases	2 4	2 4	2 4	2 4	1 3	1 3	1 3	1 3				
Minimum Initial (s)									6.0	6.0	6.0	6.0
Minimum Split (s)									24.0	24.0	24.0	28.0
Total Split (s)	77.0	77.0	77.0	77.0	48.0	48.0	48.0	48.0	24.0	49.0	24.0	28.0
Total Split (%)	61.6%	61.6%	61.6%	61.6%	38.4%	38.4%	38.4%	38.4%	19%	39%	19%	22%
Yellow Time (s)									4.0	4.0	4.0	4.0
All-Red Time (s)									1.0	1.0	1.0	5.0
Lead/Lag									Lead	Lag	Lead	Lag
Lead-Lag Optimize?												
Recall Mode									Min	None	None	None
Act Effct Green (s)	69.0	69.0	69.0	69.0		40.0		40.0				
Actuated g/C Ratio	0.55	0.55	0.55	0.55		0.32		0.32				
v/c Ratio	0.53	0.73	0.32	0.85		1.13		0.55				
Control Delay	27.5	15.9	12.3	23.6		95.4		21.1				
Queue Delay	0.0	0.2	0.1	0.0		0.0		0.2				
Total Delay	27.5	16.1	12.4	23.6		95.4		21.3				
LOS	C	B	B	C		F		C				
Approach Delay		17.0		22.8		95.4		21.3				
Approach LOS		B		C		F		C				

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.42
Intersection Signal Delay: 35.9
Intersection Capacity Utilization 102.7%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service G

Splits and Phases: 13: W Holly St & F St



Timings
13: W Holly St & F St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	ø5	ø6
Lane Configurations		
Volume (vph)		
Turn Type		
Protected Phases	5	6
Permitted Phases		
Detector Phases		
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	28.0	24.0
Total Split (s)	28.0	45.0
Total Split (%)	22%	36%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	5.0	1.0
Lead/Lag	Lead	Lag
Lead-Lag Optimize?		
Recall Mode	None	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

HCM Signalized Intersection Capacity Analysis
13: W Holly St & F St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			0.95	
Frt	1.00	0.97		1.00	0.99			0.99			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1728	1757		1711	1777			1792			3306	
Flt Permitted	0.14	1.00		0.22	1.00			0.80			0.60	
Satd. Flow (perm)	261	1757		402	1777			1439			2003	
Volume (vph)	65	555	160	65	765	75	75	435	30	75	240	60
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	65	555	160	65	765	75	75	435	30	75	240	60
RTOR Reduction (vph)	0	8	0	0	3	0	0	1	0	0	13	0
Lane Group Flow (vph)	65	707	0	65	837	0	0	539	0	0	362	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2 4			2 4			1 3			1 3	
Permitted Phases	2 4			2 4			1 3			1 3		
Actuated Green, G (s)	70.2	70.2		70.2	70.2			38.0			38.0	
Effective Green, g (s)	76.2	76.2		76.2	76.2			40.0			40.0	
Actuated g/C Ratio	0.58	0.58		0.58	0.58			0.30			0.30	
Clearance Time (s)												
Vehicle Extension (s)												
Lane Grp Cap (vph)	150	1013		232	1024			435			606	
v/s Ratio Prot		0.40			c0.47							
v/s Ratio Perm	0.25			0.16				c0.37			0.18	
v/c Ratio	0.43	0.70		0.28	0.82			1.24			0.60	
Uniform Delay, d1	15.8	19.8		14.1	22.4			46.1			39.2	
Progression Factor	1.00	1.00		1.00	1.00			0.82			1.00	
Incremental Delay, d2	2.0	2.1		0.7	5.2			117.7			1.6	
Delay (s)	17.8	22.0		14.8	27.6			155.5			40.8	
Level of Service	B	C		B	C			F			D	
Approach Delay (s)		21.6			26.7			155.5			40.8	
Approach LOS		C			C			F			D	
Intersection Summary												
HCM Average Control Delay		54.0			HCM Level of Service			D				
HCM Volume to Capacity ratio		0.96										
Actuated Cycle Length (s)		132.2			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		102.7%			ICU Level of Service			G				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 14: W Holly St & C St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free				Free		Stop				Stop	
Grade	0%				0%		0%				0%	
Volume (veh/h)	5	670	45	85	960	70	25	35	80	50	20	5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	670	45	85	960	70	25	35	80	50	20	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None								None			
Median storage (veh)												
Upstream signal (ft)	753											
pX, platoon unblocked				0.75			0.75			0.75		
vC, conflicting volume	1030				715			1882			1902	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1030				618			2184			2211	
tC, single (s)	4.1				4.1			7.1			6.5	
tC, 2 stage (s)												
tF (s)	2.2				2.2			3.5			4.0	
p0 queue free %	99				88			0			0	
cM capacity (veh/h)	678				721			10			29	
							382			0		
							30			300		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	720	1115	140	75								
Volume Left	5	85	25	50								
Volume Right	45	70	80	5								
cSH	678	721	37	0								
Volume to Capacity	0.01	0.12	3.82	Err								
Queue Length 95th (ft)	1	10	Err	Err								
Control Delay (s)	0.2	3.8	Err	Err								
Lane LOS	A	A	F	F								
Approach Delay (s)	0.2	3.8	Err	Err								
Approach LOS			F	F								
Intersection Summary												
Average Delay	Err											
Intersection Capacity Utilization	118.5%		ICU Level of Service		H							
Analysis Period (min)	15											

Timings 15: W Holly St & Cornwall Ave

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

				
Lane Group	WBT	NBL	NBT	SBT
Lane Configurations				
Volume (vph)	1050	100	270	230
Turn Type	Perm			
Protected Phases	2		4	4
Permitted Phases		4		
Detector Phases	2	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0
Minimum Split (s)	21.0	23.0	23.0	23.0
Total Split (s)	40.0	30.0	30.0	30.0
Total Split (%)	57.1%	42.9%	42.9%	42.9%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	36.0		26.0	26.0
Actuated g/C Ratio	0.51		0.37	0.37
v/c Ratio	0.81		0.79	0.55
Control Delay	18.5		24.8	14.0
Queue Delay	0.0		0.0	0.0
Total Delay	18.5		24.9	14.0
LOS	B		C	B
Approach Delay	18.5		24.9	14.0
Approach LOS	B		C	B
Intersection Summary				
Cycle Length: 70				
Actuated Cycle Length: 70				
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green				
Natural Cycle: 55				
Control Type: Pretimed				
Maximum v/c Ratio: 0.81				
Intersection Signal Delay: 18.9			Intersection LOS: B	
Intersection Capacity Utilization 91.3%			ICU Level of Service F	
Analysis Period (min) 15				
Splits and Phases: 15: W Holly St & Cornwall Ave				
 ø2  ø4 40 s 30 s				

HCM Signalized Intersection Capacity Analysis
15: W Holly St & Cornwall Ave

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.97			1.00			0.97	
Flpb, ped/bikes					1.00			0.99			1.00	
Frt					0.98			1.00			0.95	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					3279			1773			1655	
Flt Permitted					1.00			0.70			1.00	
Satd. Flow (perm)					3279			1256			1655	
Volume (vph)	0	0	0	135	1050	195	100	270	0	0	230	125
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	135	1050	195	100	270	0	0	230	125
RTOR Reduction (vph)	0	0	0	0	19	0	0	0	0	0	28	0
Lane Group Flow (vph)	0	0	0	0	1361	0	0	370	0	0	327	0
Confl. Peds. (#/hr)				80		80	80					80
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type				Split		Perm						
Protected Phases				2	2			4			4	
Permitted Phases							4					
Actuated Green, G (s)					36.0			26.0			26.0	
Effective Green, g (s)					36.0			26.0			26.0	
Actuated g/C Ratio					0.51			0.37			0.37	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					1686			467			615	
v/s Ratio Prot					c0.42						0.20	
v/s Ratio Perm								c0.29				
v/c Ratio					0.81			0.79			0.53	
Uniform Delay, d1					14.1			19.6			17.2	
Progression Factor					1.00			0.86			0.79	
Incremental Delay, d2					4.3			5.8			1.5	
Delay (s)					18.4			22.6			15.2	
Level of Service					B			C			B	
Approach Delay (s)		0.0			18.4			22.6			15.2	
Approach LOS		A			B			C			B	

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
16: Lakeway Dr & Jersey St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	WBL	WBR	NBL	NBT	SBL	SBT
Lane Configurations						
Volume (vph)	30	875	610	335	655	420
Turn Type		Prot	Split		Split	
Protected Phases	8	8	2	2	6	6
Permitted Phases						
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	34.0	34.0	35.0	35.0	31.0	31.0
Total Split (%)	34.0%	34.0%	35.0%	35.0%	31.0%	31.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
Act Effct Green (s)	28.3	28.3	31.1	31.1	25.9	25.9
Actuated g/C Ratio	0.29	0.29	0.32	0.32	0.27	0.27
v/c Ratio	0.93	0.87	1.03	1.12dr	0.87	0.92
Control Delay	61.8	45.0	83.2	57.3	58.8	53.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.8	45.0	83.2	57.3	58.8	53.4
LOS	E	D	F	E	E	D
Approach Delay	51.3			64.3		55.1
Approach LOS	D			E		E

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 97.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 58.3	Intersection LOS: E
Intersection Capacity Utilization 97.1%	ICU Level of Service F
Analysis Period (min) 15	
dr Defacto Right Lane. Recode with 1 though lane as a right lane.	

Splits and Phases: 16: Lakeway Dr & Jersey St



HCM Signalized Intersection Capacity Analysis
16: Lakeway Dr & Jersey St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	WBL2	WBL	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0				4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91				0.91	0.91		0.91	0.91	
Frt	0.91	0.85				1.00	0.90		1.00	1.00	
Flt Protected	0.98	1.00				0.95	1.00		0.95	0.98	
Satd. Flow (prot)	1607	2786				1572	2956		1430	3098	
Flt Permitted	0.98	1.00				0.95	1.00		0.95	0.98	
Satd. Flow (perm)	1607	2786				1572	2956		1430	3098	
Volume (vph)	145	30	875	100	5	610	335	970	655	420	20
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	145	30	875	100	5	610	335	970	655	420	20
RTOR Reduction (vph)	0	0	12	0	0	0	400	0	0	0	0
Lane Group Flow (vph)	0	433	705	0	0	517	1003	0	332	763	0
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	1%	1%	11%	1%	1%
Turn Type	Split	Prot			Split	Split			Split		
Protected Phases	8	8	8		2	2	2		6	6	
Permitted Phases											
Actuated Green, G (s)	27.3	27.3				30.1	30.1		24.9	24.9	
Effective Green, g (s)	28.3	28.3				31.1	31.1		25.9	25.9	
Actuated g/C Ratio	0.29	0.29				0.32	0.32		0.27	0.27	
Clearance Time (s)	5.0	5.0				5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0				2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	467	810				502	945		381	825	
v/s Ratio Prot	c0.27	0.25				0.33	c0.34		0.23	c0.25	
v/s Ratio Perm											
v/c Ratio	0.93	0.87				1.03	1.12dr		0.87	0.92	
Uniform Delay, d1	33.5	32.8				33.1	33.1		34.1	34.8	
Progression Factor	1.00	1.00				1.00	1.00		1.00	1.00	
Incremental Delay, d2	24.2	9.8				48.0	47.0		18.6	15.7	
Delay (s)	57.7	42.5				81.1	80.1		52.7	50.5	
Level of Service	E	D				F	F		D	D	
Approach Delay (s)	48.2						80.4			51.1	
Approach LOS	D						F			D	

Intersection Summary

HCM Average Control Delay	63.8	HCM Level of Service	E
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	97.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		
dr	Defacto Right Lane. Recode with 1 though lane as a right lane.		
c	Critical Lane Group		

Timings
17: Lakeway Dr & I-5 SB Ramps

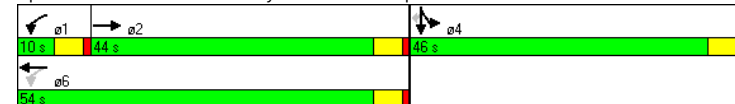
Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBT	WBL	WBT	SBT	SBR
Lane Configurations					
Volume (vph)	1285	200	860	195	330
Turn Type	pm+pt			Perm	
Protected Phases	2	1	6	4	
Permitted Phases		6			4
Detector Phases	2	1	6	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	10.0	23.0	28.0	28.0
Total Split (s)	44.0	10.0	54.0	46.0	46.0
Total Split (%)	44.0%	10.0%	54.0%	46.0%	46.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None
Act Effct Green (s)	40.0	50.0	50.0	42.0	42.0
Actuated g/C Ratio	0.40	0.50	0.50	0.42	0.42
v/c Ratio	1.12	1.14	0.50	1.24	0.46
Control Delay	95.5	134.0	18.0	147.0	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	95.5	134.0	18.0	147.0	15.8
LOS	F	F	B	F	B
Approach Delay	95.5		39.9	112.1	
Approach LOS	F		D	F	

Intersection Summary

Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.24	
Intersection Signal Delay: 85.5	Intersection LOS: F
Intersection Capacity Utilization 114.4%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 17: Lakeway Dr & I-5 SB Ramps



HCM Signalized Intersection Capacity Analysis 17: Lakeway Dr & I-5 SB Ramps

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖↗		↖↗	↖↗						↖↗	↖↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		0.95		1.00	0.95						1.00	1.00
Frt		0.98		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.96	1.00
Satd. Flow (prot)		3371		1711	3421						1750	1546
Flt Permitted		1.00		0.09	1.00						0.96	1.00
Satd. Flow (perm)		3371		164	3421						1750	1546
Volume (vph)	0	1285	250	200	860	0	0	0	0	715	195	330
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1285	250	200	860	0	0	0	0	715	195	330
RTOR Reduction (vph)	0	16	0	0	0	0	0	0	0	0	0	65
Lane Group Flow (vph)	0	1519	0	200	860	0	0	0	0	0	910	265
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type		pm+pt								Split	Perm	
Protected Phases		2		1	6					4	4	
Permitted Phases				6								4
Actuated Green, G (s)		39.0		49.0	49.0					41.0	41.0	
Effective Green, g (s)		40.0		50.0	50.0					42.0	42.0	
Actuated g/C Ratio		0.40		0.50	0.50					0.42	0.42	
Clearance Time (s)		5.0		5.0	5.0					5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		1348		175	1711					735	649	
v/s Ratio Prot		0.45		c0.07	0.25					c0.52		
v/s Ratio Perm				c0.50							0.17	
v/c Ratio		1.13		1.14	0.50					1.24	0.41	
Uniform Delay, d1		30.0		49.2	16.7					29.0	20.3	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		67.1		111.7	0.2					118.6	0.4	
Delay (s)		97.1		160.9	16.9					147.6	20.7	
Level of Service		F		F	B					F	C	
Approach Delay (s)		97.1			44.1			0.0		113.9		
Approach LOS		F			D			A		F		

Intersection Summary

HCM Average Control Delay	87.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	114.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Timings 18: Lakeway Dr & King St

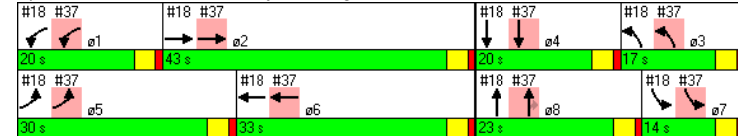
Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗
Volume (vph)	500	1210	25	720	125	100	60	25
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	5	2	1	6	3	8	7	4
Permitted Phases								
Detector Phases	5	2	1	6	3	8	7	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	30.0	43.0	20.0	33.0	17.0	23.0	14.0	20.0
Total Split (%)	30.0%	43.0%	20.0%	33.0%	17.0%	23.0%	14.0%	20.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?								
Recall Mode	None	Min	None	None	None	Min	None	None
Act Effct Green (s)	26.0	39.0	16.0	29.0	13.0	19.0	10.0	16.0
Actuated g/C Ratio	0.26	0.39	0.16	0.29	0.13	0.19	0.10	0.16
v/c Ratio	1.10	1.08	0.09	1.00	0.55	0.43	0.34	0.60
Control Delay	108.9	80.2	39.8	39.7	50.8	34.7	47.9	12.7
Queue Delay	0.0	0.0	0.0	25.0	0.0	0.0	0.0	0.0
Total Delay	108.9	80.2	39.8	64.7	50.8	34.7	47.9	12.7
LOS	F	F	D	E	D	C	D	B
Approach Delay		87.6		64.1		42.0		18.8
Approach LOS		F		E		D		B

Intersection Summary

Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.23	
Intersection Signal Delay: 70.8	Intersection LOS: E
Intersection Capacity Utilization 94.4%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 18: Lakeway Dr & King St



HCM Signalized Intersection Capacity Analysis 18: Lakeway Dr & King St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.95		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	3402		1728	3308		1745	1745		1745	1585	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1745	3402		1728	3308		1745	1745		1745	1585	
Volume (vph)	500	1210	245	25	720	285	125	100	50	60	25	260
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	500	1210	245	25	720	285	125	100	50	60	25	260
RTOR Reduction (vph)	0	17	0	0	42	0	0	18	0	0	218	0
Lane Group Flow (vph)	500	1438	0	25	963	0	125	132	0	60	67	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	26.0	39.0		16.0	29.0		13.0	19.0		10.0	16.0	
Effective Green, g (s)	26.0	39.0		16.0	29.0		13.0	19.0		10.0	16.0	
Actuated g/C Ratio	0.26	0.39		0.16	0.29		0.13	0.19		0.10	0.16	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	454	1327		276	959		227	332		175	254	
v/s Ratio Prot	c0.29	c0.42		0.01	0.29		c0.07	c0.08		0.03	0.04	
v/s Ratio Perm												
v/c Ratio	1.10	1.08		0.09	1.00		0.55	0.40		0.34	0.26	
Uniform Delay, d1	37.0	30.5		35.8	35.5		40.8	35.5		41.9	36.8	
Progression Factor	1.00	1.00		1.09	0.61		1.00	1.00		1.00	1.00	
Incremental Delay, d2	72.6	50.7		0.0	17.7		2.9	0.8		1.2	0.6	
Delay (s)	109.6	81.2		39.2	39.2		43.6	36.3		43.1	37.4	
Level of Service	F	F		D	D		D	D		D	D	
Approach Delay (s)		88.5			39.2			39.6			38.4	
Approach LOS		F			D			D			D	
Intersection Summary												
HCM Average Control Delay		65.9										
HCM Volume to Capacity ratio		0.87										
Actuated Cycle Length (s)		100.0										
Intersection Capacity Utilization		94.4%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 24: E Chestnut St & Railroad Ave

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	95	1170	35	0	0	0	0	60	95	115	100	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	95	1170	35	0	0	0	0	60	95	115	100	0
Pedestrians					41			41			11	
Lane Width (ft)					0.0			11.0			11.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			3			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		353			350							
pX, platoon unblocked												
vC, conflicting volume	11			1246			1468	1430	490	757	1447	11
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	11			1246			1468	1430	490	757	1447	11
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			100	51	81	18	17	100
cM capacity (veh/h)	1600			548			25	123	513	139	120	1065
Direction, Lane #												
Volume Total	388	585	328	155	215							
Volume Left	95	0	0	0	115							
Volume Right	0	0	35	95	0							
cSH	1600	1700	1700	230	130							
Volume to Capacity	0.06	0.34	0.19	0.67	1.66							
Queue Length 95th (ft)	5	0	0	106	395							
Control Delay (s)	2.2	0.0	0.0	47.9	387.6							
Lane LOS	A			E	F							
Approach Delay (s)	0.7			47.9	387.6							
Approach LOS				E	F							
Intersection Summary												
Average Delay				54.9								
Intersection Capacity Utilization				59.8%								
Analysis Period (min)				15								

Timings
25: E Chestnut St & N State St

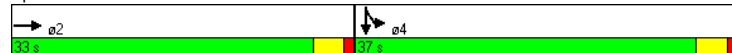
Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	→	↘	↓
Lane Group	EBT	SBL	SBT
Lane Configurations	↑↑↑	↘	↑↑
Volume (vph)	1015	235	750
Turn Type	Split		
Protected Phases	2	4	4
Permitted Phases			
Detector Phases	2	4	4
Minimum Initial (s)	6.0	6.0	6.0
Minimum Split (s)	22.0	20.0	20.0
Total Split (s)	33.0	37.0	37.0
Total Split (%)	47.1%	52.9%	52.9%
Yellow Time (s)	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	Max	Max	Max
Act Effct Green (s)	29.0	33.0	33.0
Actuated g/C Ratio	0.41	0.47	0.47
v/c Ratio	0.74	0.28	0.46
Control Delay	18.2	10.3	13.7
Queue Delay	0.0	0.0	0.0
Total Delay	18.2	10.3	13.7
LOS	B	B	B
Approach Delay	18.2		12.9
Approach LOS	B		B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 4:SBTL, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 16.1
Intersection Capacity Utilization 58.5%
Analysis Period (min) 15

Splits and Phases: 25: E Chestnut St & N State St



HCM Signalized Intersection Capacity Analysis
25: E Chestnut St & N State St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Intersection Summary

HCM Average Control Delay	17.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
26: E Chestnut St & N Forest St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	→	↑
Lane Group	EBT	NBT
Lane Configurations	↑↑↑	↑↑
Volume (vph)	990	910
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phases	2	4
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	22.0	21.0
Total Split (s)	38.0	32.0
Total Split (%)	54.3%	45.7%
Yellow Time (s)	3.0	3.0
All-Red Time (s)	1.0	1.0
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	Max
Act Effct Green (s)	34.0	28.0
Actuated g/C Ratio	0.49	0.40
v/c Ratio	0.53	0.86
Control Delay	6.5	26.6
Queue Delay	0.1	0.0
Total Delay	6.7	26.6
LOS	A	C
Approach Delay	6.7	26.6
Approach LOS	A	C

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Green
Natural Cycle: 50
Control Type: Pretimed
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 16.1
Intersection LOS: B
Intersection Capacity Utilization 65.8%
ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 26: E Chestnut St & N Forest St



HCM Signalized Intersection Capacity Analysis
26: E Chestnut St & N Forest St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕↕↕						↕↕					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0						4.0					
Lane Util. Factor		0.91						0.95					
Frpb, ped/bikes		1.00						0.99					
Flpb, ped/bikes		1.00						1.00					
Frt		1.00						0.97					
Flt Protected		0.99						1.00					
Satd. Flow (prot)		4955						3270					
Flt Permitted		0.99						1.00					
Satd. Flow (perm)		4955						3270					
Volume (vph)	310	990	0	0	0	0	0	910	245	0	0	0	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	310	990	0	0	0	0	0	910	245	0	0	0	
RTOR Reduction (vph)	0	27	0	0	0	0	0	35	0	0	0	0	
Lane Group Flow (vph)	0	1273	0	0	0	0	0	1120	0	0	0	0	
Confl. Peds. (#/hr)	40								40				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	0%	0%	0%	
Turn Type	Split												
Protected Phases	2	2						4					
Permitted Phases													
Actuated Green, G (s)		34.0						28.0					
Effective Green, g (s)		34.0						28.0					
Actuated g/C Ratio		0.49						0.40					
Clearance Time (s)		4.0						4.0					
Lane Grp Cap (vph)		2407						1308					
v/s Ratio Prot		c0.26						c0.34					
v/s Ratio Perm													
v/c Ratio		0.53						0.86					
Uniform Delay, d1		12.5						19.2					
Progression Factor		0.49						1.00					
Incremental Delay, d2		0.7						7.4					
Delay (s)		6.7						26.5					
Level of Service		A						C					
Approach Delay (s)		6.7			0.0			26.5			0.0		
Approach LOS		A			A			C			A		

Intersection Summary

HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
27: E Chestnut St & Ellis St

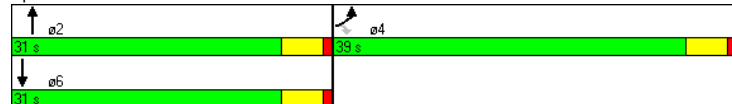
Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	↗	↖	↗
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations	↖↗	↖↗	↖↗↖↗	↖↗↖↗
Volume (vph)	920	800	960	505
Turn Type	Perm			
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phases	4	4	2	6
Minimum Initial (s)	6.0	6.0	6.0	6.0
Minimum Split (s)	30.0	30.0	12.0	30.0
Total Split (s)	39.0	39.0	31.0	31.0
Total Split (%)	55.7%	55.7%	44.3%	44.3%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	34.7	34.7	21.7	21.7
Actuated g/C Ratio	0.54	0.54	0.34	0.34
v/c Ratio	0.51	0.92	0.58	0.43
Control Delay	11.6	31.3	18.9	17.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.6	31.3	18.9	17.6
LOS	B	C	B	B
Approach Delay	20.8		18.9	17.6
Approach LOS	C		B	B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 64.5
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 19.7
Intersection Capacity Utilization 74.6%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service D

Splits and Phases: 27: E Chestnut St & Ellis St



HCM Signalized Intersection Capacity Analysis
27: E Chestnut St & Ellis St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	↗	↖	↗	↖	↗
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↖↗	↖↗	↖↗↖↗	↖↗↖↗	↖↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.91	0.95	
Frbp, ped/bikes	1.00	0.94		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3319	1443		4964	3490	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3319	1443		4964	3490	
Volume (vph)	920	800	0	960	505	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	920	800	0	960	505	0
RTOR Reduction (vph)	0	91	0	0	0	0
Lane Group Flow (vph)	920	709	0	960	505	0
Confl. Peds. (#/hr)	60	60				
Heavy Vehicles (%)	2%	2%	1%	1%	0%	0%
Turn Type	Perm					
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	33.7	33.7		20.7	20.7	
Effective Green, g (s)	34.7	34.7		21.7	21.7	
Actuated g/C Ratio	0.54	0.54		0.34	0.34	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1788	778		1673	1176	
v/s Ratio Prot	0.28			0.19	0.14	
v/s Ratio Perm		0.49				
v/c Ratio	0.51	0.91		0.57	0.43	
Uniform Delay, d1	9.5	13.5		17.5	16.6	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	14.9		0.5	0.3	
Delay (s)	9.7	28.3		18.0	16.8	
Level of Service	A	C		B	B	
Approach Delay (s)	18.4			18.0	16.8	
Approach LOS	B			B	B	

Intersection Summary

HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	64.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Laurel St & N State St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											 	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	410	235	25	390	0	0	0	0	95	1115	165
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	410	235	25	390	0	0	0	0	95	1115	165
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)											1046	
pX, platoon unblocked												
vC, conflicting volume	1582	1388	454	1002	1470	0	1280			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1582	1388	454	1002	1470	0	1280			0		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	58	0	0	100	100			94		
cM capacity (veh/h)	0	133	553	0	119	1091	538			1629		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2	SB 3							
Volume Total	645	415	374	558	444							
Volume Left	0	25	95	0	0							
Volume Right	235	0	0	0	165							
cSH	184	0	1629	1700	1700							
Volume to Capacity	3.50	Err	0.06	0.33	0.26							
Queue Length 95th (ft)	Err	Err	5	0	0							
Control Delay (s)	Err	Err	2.2	0.0	0.0							
Lane LOS	F	F	A									
Approach Delay (s)	Err	Err	0.6									
Approach LOS	F	F										
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization	74.8%		ICU Level of Service			D						
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
29: Laurel St & N Forest St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								 				
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	365	160	0	0	140	110	265	825	25	0	0	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	365	160	0	0	140	110	265	825	25	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)										1032		
pX, platoon unblocked												
vC, conflicting volume	1122	1380	0	1448	1368	425	0			850		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1122	1380	0	1448	1368	425	0			850		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	100	0	0	81	84			100		
cM capacity (veh/h)	0	120	1084	0	124	583	1622			797		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	525	250	678	438								
Volume Left	365	0	265	0								
Volume Right	0	110	0	25								
cSH	0	190	1622	1700								
Volume to Capacity	Err	1.32	0.16	0.26								
Queue Length 95th (ft)	Err	354	15	0								
Control Delay (s)	Err	223.4	4.0	0.0								
Lane LOS	F	F	A									
Approach Delay (s)	Err	223.4	2.4									
Approach LOS	F	F										
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization		84.0%		ICU Level of Service		E						
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis 30: N State St &

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	0	730	0	0	0	0	0	0	200	60	200	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	730	0	0	0	0	0	0	200	60	200	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			730			830	730	730	930	730	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			730			830	730	730	930	730	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	53	54	43	100
cM capacity (veh/h)	1623			874			158	349	422	130	349	1085

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	730	200	60	200
Volume Left	0	0	60	0
Volume Right	0	200	0	0
cSH	1700	422	130	349
Volume to Capacity	0.43	0.47	0.46	0.57
Queue Length 95th (ft)	0	62	52	85
Control Delay (s)	0.0	21.0	54.3	28.3
Lane LOS	C	F	D	
Approach Delay (s)	0.0	21.0	34.3	
Approach LOS	C	D		

Intersection Summary			
Average Delay	11.0		
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

Timings 31: Bill McDonald Pkwy & Samish Way

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↙	↗	↙	↗	↙	↗	↙	↗	↙
Volume (vph)	350	55	50	55	370	660	35	935	390
Turn Type	Perm		Perm		pm+pt		pm+pt		Perm
Protected Phases	4		8		5		2		6
Permitted Phases	4		8		2		6		6
Detector Phases	4	4	8	8	5	2	1	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	11.0	30.0	30.0	11.0	28.0	11.0	29.0	29.0
Total Split (s)	50.0	50.0	50.0	50.0	34.0	59.0	11.0	36.0	36.0
Total Split (%)	41.7%	41.7%	41.7%	41.7%	28.3%	49.2%	9.2%	30.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	35.8	35.8		35.8	60.5	54.7	38.3	31.7	31.7
Actuated g/C Ratio	0.34	0.34		0.34	0.58	0.52	0.35	0.30	0.30
v/c Ratio	0.88	0.54		0.34	0.78	0.40	0.11	0.89	0.54
Control Delay	56.3	9.9		25.4	37.8	18.4	16.1	48.9	8.5
Queue Delay	0.0	0.9		0.5	12.8	1.3	0.0	28.9	0.0
Total Delay	56.3	10.8		25.9	50.6	19.7	16.1	77.8	8.5
LOS	E	B		C	D	B	B	E	A
Approach Delay	32.0		25.9		30.2		56.3		
Approach LOS	C		C		C		E		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 104.7	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 41.1	Intersection LOS: D
Intersection Capacity Utilization 91.7%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 31: Bill McDonald Pkwy & Samish Way



HCM Signalized Intersection Capacity Analysis
31: Bill McDonald Pkwy & Samish Way

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87			0.97		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	1568			1744		1728	3415		1745	3490	1561
Flt Permitted	0.64	1.00			0.61		0.10	1.00		0.38	1.00	1.00
Satd. Flow (perm)	1159	1568			1075		190	3415		698	3490	1561
Volume (vph)	350	55	345	50	55	35	370	660	55	35	935	390
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	350	55	345	50	55	35	370	660	55	35	935	390
RTOR Reduction (vph)	0	203	0	0	11	0	0	4	0	0	0	242
Lane Group Flow (vph)	350	197	0	0	129	0	370	711	0	35	935	148
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm			Perm			pm+pt			pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	34.8	34.8			34.8		61.8	53.6		36.4	33.2	33.2
Effective Green, g (s)	35.8	35.8			35.8		62.8	54.6		38.4	34.2	34.2
Actuated g/C Ratio	0.34	0.34			0.34		0.59	0.51		0.36	0.32	0.32
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		2.0	2.0		3.0	2.0	2.0
Lane Grp Cap (vph)	389	527			361		467	1749		293	1120	501
v/s Ratio Prot		0.13					c0.18	0.21		0.00	0.27	
v/s Ratio Perm	c0.30				0.12		c0.28			0.04		0.09
v/c Ratio	0.90	0.37			0.36		0.79	0.41		0.12	0.83	0.29
Uniform Delay, d1	33.7	26.9			26.7		27.4	16.0		22.3	33.6	27.2
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	22.7	0.4			0.6		8.4	0.1		0.2	5.3	0.1
Delay (s)	56.4	27.3			27.3		35.8	16.1		22.4	38.8	27.3
Level of Service	E	C			C		D	B		C	D	C
Approach Delay (s)		40.9			27.3			22.8			35.1	
Approach LOS		D			C			C			D	

Intersection Summary

HCM Average Control Delay	32.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	106.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings

32: Samish Way & I-5 SB Off-Ramp

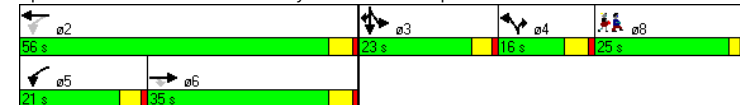
Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	ø8
Lane Configurations	↱	↰	↰	↱	↰	↱	↰	↱	↰	
Volume (vph)	1010	295	290	630	185	500	305	270	250	
Turn Type		Perm	pm+pt		Protcustom		Split		Prot	
Protected Phases	6		5	2	4	4	3	3	3	8
Permitted Phases		6	2							
Detector Phases	6	6	5	2	4	4	3	3	3	
Minimum Initial (s)	7.0	7.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0	20.0
Minimum Split (s)	22.0	22.0	9.5	22.0	12.0	12.0	11.5	11.5	11.5	25.0
Total Split (s)	35.0	35.0	21.0	56.0	16.0	16.0	23.0	23.0	23.0	25.0
Total Split (%)	29.2%	29.2%	17.5%	46.7%	13.3%	13.3%	19.2%	19.2%	19.2%	21%
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	4.0	3.5	3.5	3.5	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lead	Lead	Lead	
Lead-Lag Optimize?										
Recall Mode	Min	Min	None	Min	None	None	None	None	None	None
Act Effct Green (s)	31.0	31.0	52.0	52.0	12.0	12.0	19.0	19.0	19.0	
Actuated g/C Ratio	0.33	0.33	0.55	0.55	0.13	0.13	0.20	0.20	0.20	
v/c Ratio	0.90	0.44	0.75	0.33	0.85	0.79	0.87	0.74	0.49	
Control Delay	42.4	7.6	33.8	12.5	74.0	14.1	63.2	49.0	8.0	
Queue Delay	137.8	0.8	0.0	0.0	0.7	0.0	0.0	0.0	0.2	
Total Delay	180.2	8.4	33.8	12.5	74.7	14.1	63.2	49.0	8.1	
LOS	F	A	C	B	E	B	E	D	A	
Approach Delay	141.3			19.3				41.9		
Approach LOS	F			B				D		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 95
Natural Cycle: 140
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 69.0
Intersection Capacity Utilization 85.8%
Analysis Period (min) 15
Intersection LOS: E
ICU Level of Service E

Splits and Phases: 32: Samish Way & I-5 SB Off-Ramp



HCM Signalized Intersection Capacity Analysis 32: Samish Way & I-5 SB Off-Ramp

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations		↕↕	↗		↕↕		↗		↗	↗	↕	↕	↕		↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0		4.0		4.0	4.0	4.0	4.0		4.0
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00		1.00	1.00	1.00	1.00	1.00		1.00
Frt		1.00	0.85	1.00	1.00		1.00		0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00	0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)		3455	1546	1728	3455		1728		1546	1745	1837	1561			
Flt Permitted		1.00	1.00	0.11	1.00		0.95		1.00	0.95	1.00	1.00		1.00	1.00
Satd. Flow (perm)		3455	1546	208	3455		1728		1546	1745	1837	1561			
Volume (vph)	0	1010	295	290	630	0	185	0	500	305	270	250			
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00
Adj. Flow (vph)	0	1010	295	290	630	0	185	0	500	305	270	250			1.50
RTOR Reduction (vph)	0	0	166	0	0	0	0	0	437	0	0	200			
Lane Group Flow (vph)	0	1010	129	290	630	0	185	0	63	305	270	50			
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%			
Turn Type	Perm			pm+pt		Prot			custom		Split		Prot		
Protected Phases	6			5		2		4		4		3		3	
Permitted Phases	6			2											
Actuated Green, G (s)	30.0	30.0	51.0	51.0			11.0		11.0	18.5	18.5	18.5			18.5
Effective Green, g (s)	31.0	31.0	52.0	52.0			12.0		12.0	19.0	19.0	19.0			19.0
Actuated g/C Ratio	0.33	0.33	0.55	0.55			0.13		0.13	0.20	0.20	0.20			0.20
Clearance Time (s)	5.0	5.0	4.5	5.0			5.0		5.0	4.5	4.5	4.5			4.5
Vehicle Extension (s)	3.5	3.5	3.5	3.5			3.5		3.5	4.0	4.0	4.0			4.0
Lane Grp Cap (vph)	1127	504	386	1891			218		195	349	367	312			
v/s Ratio Prot	c0.29		c0.13	0.18			c0.11		0.04	c0.17	0.15	0.03			
v/s Ratio Perm		0.08	0.28												
v/c Ratio	0.90	0.26	0.75	0.33			0.85		0.32	0.87	0.74	0.16			
Uniform Delay, d1	30.5	23.5	22.6	11.9			40.6		37.8	36.8	35.6	31.4			
Progression Factor	1.00	1.00	1.00	1.00			1.00		1.00	1.00	1.00	1.00			
Incremental Delay, d2	9.6	0.3	8.3	0.1			25.7		1.1	21.3	8.0	0.3			
Delay (s)	40.1	23.8	30.8	12.0			66.3		38.9	58.1	43.6	31.7			
Level of Service	D	C	C	B			E		D	E	D	C			
Approach Delay (s)	36.4			18.0			46.3				45.4				
Approach LOS	D			B			D				D				
Intersection Summary															
HCM Average Control Delay	35.7			HCM Level of Service						D					
HCM Volume to Capacity ratio	0.85														
Actuated Cycle Length (s)	95.0			Sum of lost time (s)						16.0					
Intersection Capacity Utilization	85.8%			ICU Level of Service						E					
Analysis Period (min)	15														
c Critical Lane Group															

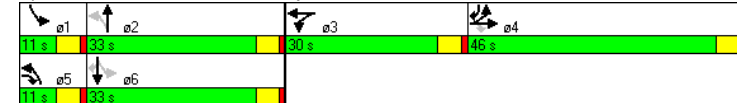
Timings

33: Samish Way & Lincoln St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	915	530	440	5	175	395	270	25	125	425
Turn Type	custom	pm+ov custom			pm+pt		pm+pt		pm+ov	
Protected Phases	4	4	5	3	3	5	2	1	6	4
Permitted Phases	4		4	3		2		6		6
Detector Phases	4	4	5	3	3	5	2	1	6	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	33.0	33.0	11.0	30.0	30.0	11.0	24.0	11.0	33.0	33.0
Total Split (s)	46.0	46.0	11.0	30.0	30.0	11.0	33.0	11.0	33.0	46.0
Total Split (%)	38.3%	38.3%	9.2%	25.0%	25.0%	9.2%	27.5%	9.2%	27.5%	38.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	Min	None	Min	None
Act Effct Green (s)	42.9	42.9	54.2	19.6	19.6	27.2	23.4	25.5	18.1	61.0
Actuated g/C Ratio	0.41	0.41	0.52	0.19	0.19	0.26	0.22	0.24	0.17	0.59
v/c Ratio	1.04	1.06	0.45	0.02	0.81	1.19	0.71	0.12	0.39	0.41
Control Delay	79.0	82.6	6.2	36.8	57.1	144.3	49.2	29.0	41.6	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.0	82.6	6.2	36.8	57.1	144.3	49.2	29.0	41.6	2.8
LOS	E	F	A	D	E	F	D	C	D	A
Approach Delay	63.4			56.7			104.0		12.4	
Approach LOS	E			E			F		B	
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 104.1										
Natural Cycle: 150										
Control Type: Actuated-Uncoordinated										
Maximum v/c Ratio: 1.19										
Intersection Signal Delay: 62.4					Intersection LOS: E					
Intersection Capacity Utilization 96.1%					ICU Level of Service F					
Analysis Period (min) 15										

Splits and Phases: 33: Samish Way & Lincoln St



HCM Signalized Intersection Capacity Analysis
33: Samish Way & Lincoln St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1641	1703	1546	1694	1689		1728	1800		1728	1818	1546
Flt Permitted	0.95	0.99	1.00	0.95	1.00		0.52	1.00		0.33	1.00	1.00
Satd. Flow (perm)	1641	1703	1546	1694	1689		953	1800		596	1818	1546
Volume (vph)	915	530	440	5	175	95	395	270	20	25	125	425
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	915	530	440	5	175	95	395	270	20	25	125	425
RTOR Reduction (vph)	0	0	185	0	17	0	0	2	0	0	0	132
Lane Group Flow (vph)	704	741	255	5	253	0	395	288	0	25	125	293
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	custom		pm+ov custom				pm+pt			pm+pt		pm+ov
Protected Phases	4	4	5	3	3		5	2		1	6	4
Permitted Phases	4		4	3			2			6		6
Actuated Green, G (s)	41.9	41.9	48.0	18.5	18.5		28.5	22.4		22.7	19.5	61.4
Effective Green, g (s)	42.9	42.9	50.0	19.5	19.5		30.5	23.4		24.7	20.5	63.4
Actuated g/C Ratio	0.40	0.40	0.47	0.18	0.18		0.29	0.22		0.23	0.19	0.60
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	664	689	788	312	311		326	397		184	352	925
v/s Ratio Prot	0.43	c0.44	0.02	0.00	c0.15		c0.08	0.16		0.01	0.07	0.13
v/s Ratio Perm			0.14				c0.27			0.03		0.06
v/c Ratio	1.06	1.08	0.32	0.02	0.81		1.21	0.72		0.14	0.36	0.32
Uniform Delay, d1	31.6	31.6	17.5	35.4	41.5		37.6	38.3		32.0	37.0	10.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	52.0	56.4	0.1	0.0	14.2		120.3	5.5		0.1	0.2	0.1
Delay (s)	83.5	87.9	17.5	35.4	55.7		157.9	43.8		32.1	37.3	10.6
Level of Service	F	F	B	D	E		F	D		C	D	B
Approach Delay (s)	69.9						55.3			109.6		17.4
Approach LOS	E						E			F		B

Intersection Summary

HCM Average Control Delay	67.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings

34: Old Fairhaven Pkwy & 12th St

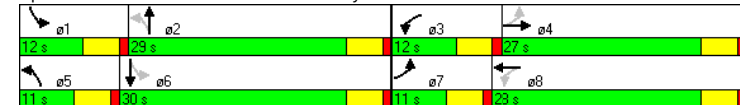
Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	15	180	340	135	25	210	220	300
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	27.0	11.0	27.0	11.0	27.0	11.0	27.0
Total Split (s)	11.0	27.0	12.0	28.0	11.0	29.0	12.0	30.0
Total Split (%)	13.8%	33.8%	15.0%	35.0%	13.8%	36.3%	15.0%	37.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)	21.6	14.4	25.9	24.5	32.0	25.1	36.0	33.0
Actuated g/C Ratio	0.27	0.20	0.36	0.34	0.41	0.35	0.50	0.46
v/c Ratio	0.06	0.56	0.76	0.51	0.06	0.69	0.63	0.39
Control Delay	16.5	30.6	31.0	17.0	11.7	24.2	21.6	17.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.5	30.6	31.0	17.0	11.7	24.2	21.6	17.0
LOS	B	C	C	B	B	C	C	B
Approach Delay	29.6		24.1		23.5		18.8	
Approach LOS	C		C		C		B	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 71.6
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 23.1
Intersection Capacity Utilization 81.1%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service D

Splits and Phases: 34: Old Fairhaven Pkwy & 12th St



HCM Signalized Intersection Capacity Analysis
34: Old Fairhaven Pkwy & 12th St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.91		1.00	0.92		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1703	1766		1787	1714		1805	1747		1787	1852	
Flt Permitted	0.49	1.00		0.42	1.00		0.53	1.00		0.23	1.00	
Satd. Flow (perm)	882	1766		793	1714		999	1747		441	1852	
Volume (vph)	15	180	20	340	135	195	25	210	245	220	300	35
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	180	20	340	135	195	25	210	245	220	300	35
RTOR Reduction (vph)	0	5	0	0	64	0	0	49	0	0	5	0
Lane Group Flow (vph)	15	195	0	340	266	0	25	406	0	220	330	0
Heavy Vehicles (%)	6%	6%	6%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7		4		3		8		5		2	
Permitted Phases	4				8				2		6	
Actuated Green, G (s)	18.7		17.6		29.6		23.5		29.4		27.2	
Effective Green, g (s)	20.7		18.6		30.6		24.5		31.4		28.2	
Actuated g/C Ratio	0.26		0.24		0.39		0.31		0.40		0.36	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	254		417		409		533		431		625	
v/s Ratio Prot	0.00		0.11		c0.08		0.16		0.00		0.23	
v/s Ratio Perm	0.01				c0.24				0.02		c0.25	
v/c Ratio	0.06		0.47		0.83		0.50		0.06		0.65	
Uniform Delay, d1	21.6		25.8		20.8		22.1		14.5		21.2	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.1		0.8		13.4		0.7		0.1		5.2	
Delay (s)	21.7		26.7		34.2		22.9		14.5		26.3	
Level of Service	C		C		C		C		B		C	
Approach Delay (s)			26.3				28.6				25.7	
Approach LOS			C				C				C	

Intersection Summary			
HCM Average Control Delay	24.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	78.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

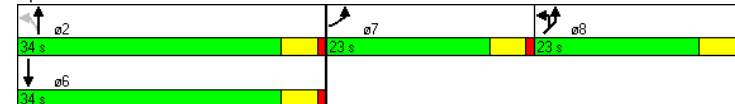
Timings
35: Hawthorne & 12th St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

					
Lane Group	EBL	NBL	NBT	SBT	NEL
Lane Configurations					
Volume (vph)	170	10	335	365	75
Turn Type	Perm				
Protected Phases	7		2	6	8
Permitted Phases		2			
Detector Phases	7	2	2	6	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	23.0	26.0	26.0	26.0	23.0
Total Split (s)	23.0	34.0	34.0	34.0	23.0
Total Split (%)	28.8%	42.5%	42.5%	42.5%	28.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	Max	None
Act Effct Green (s)	12.6		30.9	30.9	9.3
Actuated g/C Ratio	0.20		0.50	0.50	0.14
v/c Ratio	0.52		0.54	0.75	0.32
Control Delay	28.3		18.1	21.9	27.2
Queue Delay	0.0		0.0	0.0	0.0
Total Delay	28.3		18.1	21.9	27.2
LOS	C		B	C	C
Approach Delay	28.3		18.1	21.9	27.2
Approach LOS	C		B	C	C

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 62.2	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 22.2	Intersection LOS: C
Intersection Capacity Utilization 63.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 35: Hawthorne & 12th St



HCM Signalized Intersection Capacity Analysis
35: Hawthorne & 12th St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBR	EBR2	NBL	NBT	SBT	SBR	SBR2	NEL	NER
Lane Configurations	↰	↱	↱	↰	↰	↱	↱	↱	↰	↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0				4.0	4.0			4.0	
Lane Util. Factor	1.00				1.00	1.00			1.00	
Frt	0.99				1.00	0.94			0.98	
Flt Protected	0.96				1.00	1.00			0.96	
Satd. Flow (prot)	1775				1860	1782			1791	
Flt Permitted	0.96				0.98	1.00			0.96	
Satd. Flow (perm)	1775				1827	1782			1791	
Volume (vph)	170	10	10	10	335	365	65	245	75	10
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	170	10	10	10	335	365	65	245	75	10
RTOR Reduction (vph)	2	0	0	0	0	21	0	0	7	0
Lane Group Flow (vph)	188	0	0	0	345	654	0	0	78	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	0%	0%	0%	0%	0%
Turn Type	Perm									
Protected Phases	7				2	6			8	
Permitted Phases				2						
Actuated Green, G (s)	11.6				29.8	29.8			6.7	
Effective Green, g (s)	12.6				30.8	30.8			7.7	
Actuated g/C Ratio	0.20				0.49	0.49			0.12	
Clearance Time (s)	5.0				5.0	5.0			5.0	
Vehicle Extension (s)	3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)	354				892	870			219	
v/s Ratio Prot	c0.11					c0.37			c0.04	
v/s Ratio Perm					0.19					
v/c Ratio	0.53				0.39	0.75			0.36	
Uniform Delay, d1	22.6				10.2	13.1			25.4	
Progression Factor	1.00				1.00	1.00			1.00	
Incremental Delay, d2	1.4				0.3	5.9			1.0	
Delay (s)	24.0				10.5	19.0			26.4	
Level of Service	C				B	B			C	
Approach Delay (s)	24.0				10.5	19.0			26.4	
Approach LOS	C				B	B			C	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	63.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

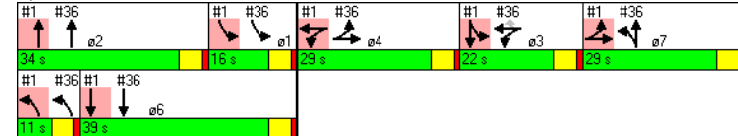
Timings
36: Birchwood Ave & Meridian Street

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT	ø2	ø5	ø7
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱			
Volume (vph)	275	185	240	375	130	1085	170	955			
Turn Type	Split			Perm	Prot		Prot				
Protected Phases	4	4	3		5 7	2 7	1	6	2	5	7
Permitted Phases				3							
Detector Phases	4	4	3	3	5 7	2 7	1	6			
Minimum Initial (s)	6.0	6.0	6.0	6.0			6.0	10.0	10.0	6.0	6.0
Minimum Split (s)	29.0	29.0	11.0	11.0			11.0	23.0	23.0	11.0	29.0
Total Split (s)	29.0	29.0	22.0	22.0	40.0	63.0	16.0	39.0	34.0	11.0	29.0
Total Split (%)	22.3%	22.3%	16.9%	16.9%	30.8%	48.5%	12.3%	30.0%	26%	8%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lead	Lag	Lag			Lag	Lag	Lead	Lead	
Lead-Lag Optimize?											
Recall Mode	None	None	None	None			None	None	Max	None	None
Act Effct Green (s)	23.1	23.1	18.0	18.0	36.0	59.0	12.0	35.0			
Actuated g/C Ratio	0.18	0.18	0.14	0.14	0.28	0.46	0.09	0.27			
v/c Ratio	0.85	0.77	1.21	0.91	0.26	0.69	1.04	1.34			
Control Delay	73.8	62.8	171.7	49.0	51.9	8.5	136.1	196.8			
Queue Delay	0.0	0.0	75.4	0.0	1.9	5.0	0.0	0.6			
Total Delay	73.8	62.8	247.1	49.0	53.8	13.5	136.1	197.5			
LOS	E	E	F	D	D	B	F	F			
Approach Delay	68.5	140.2			17.7		190.2				
Approach LOS	E	F			B		F				

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 128.2	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.35	
Intersection Signal Delay: 109.5	Intersection LOS: F
Intersection Capacity Utilization 89.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 36: Birchwood Ave & Meridian Street



HCM Signalized Intersection Capacity Analysis
36: Birchwood Ave & Meridian Street

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↰	↱	↰	↱	↱	↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1818			1877	1615	1787	3553		1752	3374	
Flt Permitted	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	1818			1877	1615	1787	3553		1752	3374	
Volume (vph)	275	185	75	80	240	375	130	1085	45	170	955	315
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	275	185	75	80	240	375	130	1085	45	170	955	315
RTOR Reduction (vph)	0	11	0	0	0	187	0	2	0	0	25	0
Lane Group Flow (vph)	275	249	0	0	320	188	130	1128	0	170	1245	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split		Perm	Prot			Prot		
Protected Phases	4	4		3	3		5 7	2 7		1	6	
Permitted Phases						3						
Actuated Green, G (s)	22.1	22.1			17.0	17.0	35.0	58.0		11.0	34.0	
Effective Green, g (s)	23.1	23.1			18.0	18.0	36.0	59.0		12.0	35.0	
Actuated g/C Ratio	0.18	0.18			0.14	0.14	0.28	0.46		0.09	0.27	
Clearance Time (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Vehicle Extension (s)	3.0	3.0			2.0	2.0				2.0	2.0	
Lane Grp Cap (vph)	325	328			264	227	502	1636		164	922	
v/s Ratio Prot	c0.15	0.14			c0.17		0.07	c0.32		0.10	c0.37	
v/s Ratio Perm						0.12						
v/c Ratio	0.85	0.76			1.21	0.83	0.26	0.69		1.04	1.35	
Uniform Delay, d1	50.8	49.8			55.0	53.5	35.7	27.3		58.0	46.5	
Progression Factor	1.00	1.00			1.00	1.00	1.41	0.30		1.00	1.00	
Incremental Delay, d2	18.0	9.6			125.2	20.3	0.0	0.1		80.3	165.0	
Delay (s)	68.8	59.5			180.2	73.8	50.4	8.3		138.3	211.5	
Level of Service	E	E			F	E	D	A		F	F	
Approach Delay (s)		64.2			122.8		12.6			202.9		
Approach LOS		E			F		B			F		

Intersection Summary

HCM Average Control Delay	108.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	128.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
37: Lakeway Dr & Lincoln Street

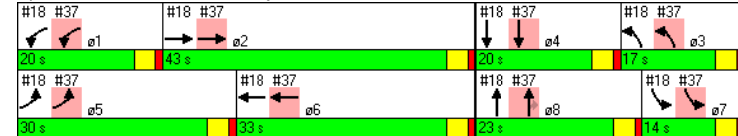
Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↱	↰	↱
Volume (vph)	60	1090	275	835	210	160	565	210	240
Turn Type	Prot		Prot		Prot		Perm	Prot	
Protected Phases	5	2	1	6	3	8		7	4
Permitted Phases							8		
Detector Phases	5	2	1	6	3	8	8	7	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	30.0	43.0	20.0	33.0	17.0	23.0	23.0	14.0	20.0
Total Split (%)	30.0%	43.0%	20.0%	33.0%	17.0%	23.0%	23.0%	14.0%	20.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?									
Recall Mode	None	Min	None	None	None	Min	Min	None	None
Act Effct Green (s)	26.0	39.0	16.0	29.0	13.0	19.0	19.0	10.0	16.0
Actuated g/C Ratio	0.26	0.39	0.16	0.29	0.13	0.19	0.19	0.10	0.16
v/c Ratio	0.13	0.90	1.00	0.94	0.95	0.47	1.04	1.23	1.02
Control Delay	52.2	15.1	98.9	52.9	92.8	41.2	68.9	182.9	100.9
Queue Delay	0.0	17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.2	32.6	98.9	52.9	92.8	41.2	68.9	182.9	100.9
LOS	D	C	F	D	F	D	E	F	F
Approach Delay		33.5		63.4		69.5			135.0
Approach LOS		C		E		E			F

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.23
Intersection Signal Delay: 64.5
Intersection Capacity Utilization 90.1%
Analysis Period (min) 15
Intersection LOS: E
ICU Level of Service E

Splits and Phases: 37: Lakeway Dr & Lincoln Street



HCM Signalized Intersection Capacity Analysis
37: Lakeway Dr & Lincoln Street

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	1.00		0.85	1.00	0.97
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		1.00	0.95	1.00
Satd. Flow (prot)	1711	3376		1711	3369		1711	1801		1531	1711	1750
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		1.00	0.95	1.00
Satd. Flow (perm)	1711	3376		1711	3369		1711	1801		1531	1711	1750
Volume (vph)	60	1090	105	275	835	95	210	160	565	210	240	55
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	1090	105	275	835	95	210	160	565	210	240	55
RTOR Reduction (vph)	0	7	0	0	9	0	0	0	252	0	8	0
Lane Group Flow (vph)	60	1188	0	275	921	0	210	160	313	210	287	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			
Actuated Green, G (s)	26.0	39.0		16.0	29.0		13.0	19.0	19.0	10.0	16.0	
Effective Green, g (s)	26.0	39.0		16.0	29.0		13.0	19.0	19.0	10.0	16.0	
Actuated g/C Ratio	0.26	0.39		0.16	0.29		0.13	0.19	0.19	0.10	0.16	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	445	1317		274	977		222	342	291	171	280	
v/s Ratio Prot	0.04	c0.35		c0.16	0.27		c0.12	0.09		c0.12	0.16	
v/s Ratio Perm									c0.20			
v/c Ratio	0.13	0.90		1.00	0.94		0.95	0.47	1.08	1.23	1.02	
Uniform Delay, d1	28.4	28.7		42.0	34.7		43.2	36.0	40.5	45.0	42.0	
Progression Factor	1.81	0.45		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.9		55.3	16.7		45.0	1.0	74.4	143.2	60.0	
Delay (s)	51.3	14.0		97.3	51.4		88.2	37.0	114.9	188.2	102.0	
Level of Service	D	B		F	D		F	D	F	F	F	
Approach Delay (s)		15.8			61.9			95.6			137.8	
Approach LOS		B			E			F			F	
Intersection Summary												
HCM Average Control Delay		65.0										
HCM Volume to Capacity ratio		1.04										
Actuated Cycle Length (s)		100.0						20.0				
Intersection Capacity Utilization		90.1%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
40: Pine Street & N State St

Alternative 2 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↰	↱		↰	↱
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	410	130	0	1060	30
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	410	130	0	1060	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None				
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1335	1075	1090			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1335	1075	1090			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	80			
cM capacity (veh/h)	135	267	640			
Direction, Lane #						
Volume Total	410	130	1090			
Volume Left	0	130	0			
Volume Right	410	0	30			
cSH	267	640	1700			
Volume to Capacity	1.54	0.20	0.64			
Queue Length 95th (ft)	606	19	0			
Control Delay (s)	293.7	12.1	0.0			
Lane LOS	F	B				
Approach Delay (s)	293.7	12.1	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay		74.8				
Intersection Capacity Utilization		89.7%				
Analysis Period (min)		15				
ICU Level of Service		E				

Timings
19: Roeder Ave & F St

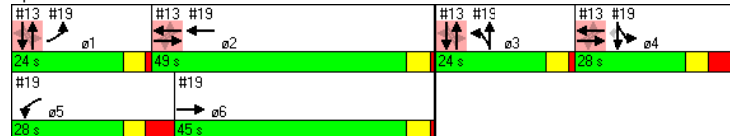
Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Volume (vph)	215	480	5	505	50	70	50	185
Turn Type	Prot		Prot		Split		Perm	
Protected Phases	1	6	5	2	3	3	4	
Permitted Phases								4
Detector Phases	1	6	5	2	3	3	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	28.0	24.0	24.0	24.0	28.0	28.0
Total Split (s)	24.0	45.0	28.0	49.0	24.0	24.0	28.0	28.0
Total Split (%)	19.2%	36.0%	22.4%	39.2%	19.2%	19.2%	22.4%	22.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	5.0	1.0	1.0	1.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?								
Recall Mode	Min	Max	None	None	None	None	None	None
Act Effct Green (s)	18.9	63.9	11.2	44.1	19.1	19.1	23.7	23.7
Actuated g/C Ratio	0.16	0.52	0.09	0.36	0.16	0.16	0.19	0.19
v/c Ratio	0.85	0.56	0.03	0.94	0.23	0.33	0.61	0.43
Control Delay	77.7	23.7	52.2	61.9	48.8	49.4	51.4	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.4	2.6	0.3
Total Delay	77.7	23.7	52.2	61.9	48.8	49.8	54.0	10.8
LOS	E	C	D	E	D	D	D	B
Approach Delay		39.8		61.8		49.4	33.0	
Approach LOS		D		E		D	C	

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 121.9
Natural Cycle: 115
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 46.1
Intersection Capacity Utilization 70.1%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service C

Splits and Phases: 19: Roeder Ave & F St



HCM Signalized Intersection Capacity Analysis
19: Roeder Ave & F St

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.99		1.00	0.98		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.96	1.00
Satd. Flow (prot)	1728	1805		1711	1768		1479	1542			1736	1531
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.96	1.00
Satd. Flow (perm)	1728	1805		1711	1768		1479	1542			1736	1531
Volume (vph)	215	480	25	5	505	70	50	70	5	145	50	185
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	226	505	26	5	532	74	53	74	5	153	53	195
RTOR Reduction (vph)	0	1	0	0	4	0	0	2	0	0	0	159
Lane Group Flow (vph)	226	530	0	5	602	0	53	77	0	0	206	36
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	18%	18%	18%	2%	2%	2%
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	17.9	62.9		1.3	50.3		18.1	18.1			18.7	18.7
Effective Green, g (s)	18.9	63.9		6.3	51.3		19.1	19.1			23.7	23.7
Actuated g/C Ratio	0.15	0.50		0.05	0.40		0.15	0.15			0.18	0.18
Clearance Time (s)	5.0	5.0		9.0	5.0		5.0	5.0			9.0	9.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	253	894		84	703		219	228			319	281
v/s Ratio Prot	c0.13	0.29		0.00	c0.34		0.04	c0.05			c0.12	
v/s Ratio Perm												0.02
v/c Ratio	0.89	0.59		0.06	0.86		0.24	0.34			0.65	0.13
Uniform Delay, d1	54.1	23.3		58.5	35.5		48.6	49.3			48.8	44.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			0.95	1.30
Incremental Delay, d2	30.1	2.9		0.3	10.1		0.6	0.9			4.0	0.2
Delay (s)	84.2	26.1		58.8	45.6		49.1	50.2			50.5	57.2
Level of Service	F	C		E	D		D	D			D	E
Approach Delay (s)		43.5			45.7			49.8			53.7	
Approach LOS		D			D			D			D	

Intersection Summary

HCM Average Control Delay	46.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	129.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis 20: Roeder Ave & C St

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control	Free			Free			Stop			Stop			
Grade	0%			0%			0%			0%			
Volume (veh/h)	35	585	20	75	495	15	25	25	120	25	25	20	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	37	616	21	79	521	16	26	26	126	26	26	21	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (ft)	735												
pX, platoon unblocked				0.79			0.79			0.79	0.79	0.79	
vC, conflicting volume	537				637				1421	1395	626	1526	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	537				540				1533	1500	527	1666	
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1	
tC, 2 stage (s)													
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	
p0 queue free %	96				90				48	69	71	13	
cM capacity (veh/h)	1041				820				50	85	438	30	
												84	
												554	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	674	616	179	74									
Volume Left	37	79	26	26									
Volume Right	21	16	126	21									
cSH	1041	820	160	60									
Volume to Capacity	0.04	0.10	1.12	1.22									
Queue Length 95th (ft)	3	8	237	154									
Control Delay (s)	0.9	2.5	165.0	303.6									
Lane LOS	A	A	F	F									
Approach Delay (s)	0.9	2.5	165.0	303.6									
Approach LOS					F	F							
Intersection Summary													
Average Delay	35.0												
Intersection Capacity Utilization	70.5%			ICU Level of Service					C				
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis 21: E Chestnut St & Bay St

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	595	20	15	375	25	45	45	35	360	40	70
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	626	21	16	395	26	47	47	37	379	42	74
Pedestrians		10									10	
Lane Width (ft)		11.0									11.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		1									1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)					356							
pX, platoon unblocked	0.90						0.90	0.90		0.90	0.90	0.90
vC, conflicting volume	431			647			1202	1121	637	1157	1118	428
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	370			647			1224	1133	637	1174	1131	366
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			52	73	92	0	76	88
cM capacity (veh/h)	1070			938			98	177	477	109	178	608
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1	SB 2						
Volume Total	11	647	437	132	379	116						
Volume Left	11	0	16	47	379	0						
Volume Right	0	21	26	37	0	74						
cSH	1070	1700	938	159	109	323						
Volume to Capacity	0.01	0.38	0.02	0.83	3.48	0.36						
Queue Length 95th (ft)	1	0	1	138	Err	39						
Control Delay (s)	8.4	0.0	0.5	89.0	Err	22.2						
Lane LOS	A		A	F	F	C						
Approach Delay (s)	0.1		0.5	89.0	7664.0							
Approach LOS				F	F							
Intersection Summary												
Average Delay			2210.1									
Intersection Capacity Utilization			66.8%	ICU Level of Service				C				
Analysis Period (min)			15									

Timings
22: E Chestnut St & Commercial St

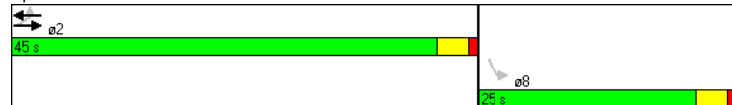
Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBT	SBL
Lane Group	EBL	EBT	WBT	SBL
Lane Configurations		↔↔	↔	↔
Volume (vph)	90	925	370	150
Turn Type	Perm			
Protected Phases		2	2	
Permitted Phases	2			8
Detector Phases	2	2	2	8
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	26.0	26.0	26.0	19.0
Total Split (s)	45.0	45.0	45.0	25.0
Total Split (%)	64.3%	64.3%	64.3%	35.7%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)		41.0	41.0	21.0
Actuated g/C Ratio		0.59	0.59	0.30
v/c Ratio		0.61	0.40	0.50
Control Delay		11.2	19.3	20.5
Queue Delay		0.1	2.4	0.0
Total Delay		11.3	21.8	20.5
LOS		B	C	C
Approach Delay		11.3	21.8	20.5
Approach LOS		B	C	C

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 15.2
Intersection LOS: B
Intersection Capacity Utilization 74.2%
ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 22: E Chestnut St & Commercial St



HCM Signalized Intersection Capacity Analysis
22: E Chestnut St & Commercial St

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔		↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		0.95	1.00		1.00	
Frpb, ped/bikes		1.00	1.00		0.98	
Flpb, ped/bikes		1.00	1.00		0.98	
Frt		1.00	0.99		0.95	
Flt Protected		1.00	1.00		0.97	
Satd. Flow (prot)		3435	1775		1588	
Flt Permitted		0.87	1.00		0.97	
Satd. Flow (perm)		3002	1775		1588	
Volume (vph)	90	925	370	30	150	90
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	974	389	32	158	95
RTOR Reduction (vph)	0	0	4	0	31	0
Lane Group Flow (vph)	0	1069	417	0	222	0
Confl. Peds. (#/hr)		20		20	20	20
Heavy Vehicles (%)	1%	1%	2%	2%	2%	2%
Turn Type	Perm					
Protected Phases		2	2			
Permitted Phases	2				8	
Actuated Green, G (s)		41.0	41.0		21.0	
Effective Green, g (s)		41.0	41.0		21.0	
Actuated g/C Ratio		0.59	0.59		0.30	
Clearance Time (s)		4.0	4.0		4.0	
Lane Grp Cap (vph)		1758	1040		476	
v/s Ratio Prot			0.23			
v/s Ratio Perm		c0.36			c0.14	
v/c Ratio		0.61	0.40		0.47	
Uniform Delay, d1		9.3	7.9		19.9	
Progression Factor		1.00	2.37		1.00	
Incremental Delay, d2		1.6	0.5		3.3	
Delay (s)		10.9	19.1		23.2	
Level of Service		B	B		C	
Approach Delay (s)		10.9	19.1		23.2	
Approach LOS		B	B		C	

Intersection Summary

HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
23: E Chestnut St & Cornwall Ave

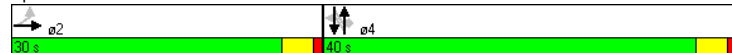
Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

	→	↖	↑	↗	↘	↓
Lane Group	EBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↔↔		↔	↔		↔↔
Volume (vph)	845	365	165	55	100	110
Turn Type	Perm			Perm	Perm	
Protected Phases	2		4		4	
Permitted Phases	4			4	4	
Detector Phases	2	4	4	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	26.0	19.0	19.0	19.0	19.0	19.0
Total Split (s)	30.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	57.1%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	26.0		36.0	36.0		36.0
Actuated g/C Ratio	0.37		0.51	0.51		0.51
v/c Ratio	0.96		0.96	0.08		0.47
Control Delay	31.8		48.5	5.5		9.8
Queue Delay	2.6		2.6	0.0		0.0
Total Delay	34.3		51.1	5.5		9.9
LOS	C		D	A		A
Approach Delay	34.3		46.8			9.9
Approach LOS	C		D			A

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 65
Control Type: Pretimed
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 35.1
Intersection Capacity Utilization 85.2%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service E

Splits and Phases: 23: E Chestnut St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
23: E Chestnut St & Cornwall Ave

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↘	↗	←	↖	↗	↑	↘	↗	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔	↔		↔↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0		4.0	
Lane Util. Factor		0.95						1.00	1.00		1.00	
Frpb, ped/bikes		0.98						1.00	0.92		0.99	
Flpb, ped/bikes		1.00						0.95	1.00		0.99	
Frt		0.97						1.00	0.85		0.99	
Flt Protected		1.00						0.97	1.00		0.98	
Satd. Flow (prot)		3264						1653	1407		1733	
Flt Permitted		1.00						0.66	1.00		0.58	
Satd. Flow (perm)		3264						1129	1407		1018	
Volume (vph)	60	845	225	0	0	0	365	165	55	100	110	25
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	889	237	0	0	0	384	174	58	105	116	26
RTOR Reduction (vph)	0	31	0	0	0	0	0	0	15	0	6	0
Lane Group Flow (vph)	0	1158	0	0	0	0	0	558	43	0	241	0
Confl. Peds. (#/hr)	50		50				50		50	50		50
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	Perm						Perm		Perm	Perm		
Protected Phases	2						4		4	4	4	
Permitted Phases	2						4		4	4	4	
Actuated Green, G (s)	26.0						36.0		36.0		36.0	
Effective Green, g (s)	26.0						36.0		36.0		36.0	
Actuated g/C Ratio	0.37						0.51		0.51		0.51	
Clearance Time (s)	4.0						4.0		4.0		4.0	
Lane Grp Cap (vph)	1212						581		724		524	
v/s Ratio Prot							c0.49		0.03		0.24	
v/s Ratio Perm	0.35						0.96		0.06		0.46	
Uniform Delay, d1	21.4						16.3		8.5		10.8	
Progression Factor	0.71						1.00		1.00		0.68	
Incremental Delay, d2	15.1						28.8		0.2		2.3	
Delay (s)	30.2						45.1		8.7		9.7	
Level of Service	C						D		A		A	
Approach Delay (s)	30.2		0.0		41.6					9.7		
Approach LOS	C		A		D					A		

Intersection Summary

HCM Average Control Delay	31.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 38: Roeder Ave & Central Ave

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free				Free		Stop				Stop	
Grade	0%				0%		0%				0%	
Volume (veh/h)	80	525	50	5	350	40	110	35	15	175	45	190
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	84	553	53	5	368	42	116	37	16	184	47	200
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None								None			
Median storage (veh)												
Upstream signal (ft)	1113											
pX, platoon unblocked												
vC, conflicting volume	411			605			1371	1168	579	1182	1174	389
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	411			605			1371	1168	579	1182	1174	389
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			99			0	79	97	0	73	70
cM capacity (veh/h)	1148			973			64	178	515	128	177	659
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	689	416	168	432								
Volume Left	84	5	116	184								
Volume Right	53	42	16	200								
cSH	1148	973	83	215								
Volume to Capacity	0.07	0.01	2.04	2.01								
Queue Length 95th (ft)	6	0	374	804								
Control Delay (s)	1.9	0.2	590.1	507.6								
Lane LOS	A	A	F	F								
Approach Delay (s)	1.9	0.2	590.1	507.6								
Approach LOS	F				F							
Intersection Summary												
Average Delay			187.6									
Intersection Capacity Utilization			90.6%	ICU Level of Service		E						
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 39: Roeder Ave & Hilton Ave

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕↕↕↕↕					
Sign Control	Free			Free		Stop
Grade	0%			0%		0%
Volume (veh/h)	705	55	50	715	55	45
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	742	58	53	753	58	47
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	544					
pX, platoon unblocked	0.70					
vC, conflicting volume			800	1629		771
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			800	1904		771
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			94	0		88
cM capacity (veh/h)			823	49		400
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	800	805	105			
Volume Left	0	53	58			
Volume Right	58	0	47			
cSH	1700	823	81			
Volume to Capacity	0.47	0.06	1.30			
Queue Length 95th (ft)	0	5	199			
Control Delay (s)	0.0	1.7	289.6			
Lane LOS		A	F			
Approach Delay (s)	0.0	1.7	289.6			
Approach LOS				F		
Intersection Summary						
Average Delay			18.6			
Intersection Capacity Utilization	91.2%		ICU Level of Service		F	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
45: Laurel St & Bay St

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	60	75	5	85	15	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	63	79	5	89	16	11
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	142	95	26			
Volume Left (vph)	63	0	16			
Volume Right (vph)	0	89	11			
Hadj (s)	0.12	-0.53	-0.09			
Departure Headway (s)	4.2	3.6	4.3			
Degree Utilization, x	0.16	0.09	0.03			
Capacity (veh/h)	851	991	787			
Control Delay (s)	8.0	6.9	7.4			
Approach Delay (s)	8.0	6.9	7.4			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.5			
HCM Level of Service			A			
Intersection Capacity Utilization		23.9%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
46: Pine Street & Cornwall Ave

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	75	45	20	65	45	20	10	45	30	25	65	35
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	79	47	21	68	47	21	11	47	32	26	68	37
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	68			68			482	421	58	466	421	58
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	68			68			482	421	58	466	421	58
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			96			97	90	97	94	86	96
cM capacity (veh/h)	1533			1533			394	475	1008	422	475	1008
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	147	137	89	132								
Volume Left	79	68	11	26								
Volume Right	21	21	32	37								
cSH	1533	1533	567	541								
Volume to Capacity	0.05	0.04	0.16	0.24								
Queue Length 95th (ft)	4	4	14	24								
Control Delay (s)	4.2	3.9	12.5	13.8								
Lane LOS	A	A	B	B								
Approach Delay (s)	4.2	3.9	12.5	13.8								
Approach LOS			B	B								
Intersection Summary												
Average Delay		8.1										
Intersection Capacity Utilization		27.8%		ICU Level of Service					A			
Analysis Period (min)		15										

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

										
Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	ø1	ø3	ø6
Lane Configurations										
Volume (vph)	325	5	10	5	615	25	630			
Turn Type	Split			Prot		Prot				
Protected Phases	7	7	4	5	2	13	36	1	3	6
Permitted Phases										
Detector Phases	7	7	4	5	2	13	36			
Minimum Initial (s)	6.0	6.0	6.0	6.0	10.0			6.0	6.0	10.0
Minimum Split (s)	29.0	29.0	29.0	11.0	23.0			11.0	11.0	23.0
Total Split (s)	29.0	29.0	29.0	11.0	34.0	38.0	61.0	16.0	22.0	39.0
Total Split (%)	22.3%	22.3%	22.3%	8.5%	26.2%	29.2%	46.9%	12%	17%	30%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0			1.0	1.0	1.0
Lead/Lag			Lead	Lead	Lead			Lag	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Max			None	None	None
Act Effct Green (s)	25.0	25.0	23.1	7.0	30.0	30.0	53.0			
Actuated g/C Ratio	0.20	0.20	0.18	0.05	0.23	0.23	0.41			
v/c Ratio	1.04	0.08	0.17	0.05	0.79	0.06	0.64			
Control Delay	110.2	20.2	22.0	59.6	54.1	11.8	7.0			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.4			
Total Delay	110.2	20.2	22.0	59.6	54.1	11.8	7.4			
LOS	F	C	C	E	D	B	A			
Approach Delay		103.8	22.0		54.1		7.5			
Approach LOS		F	C		D		A			

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 128.1

Natural Cycle: 145

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.11

Intersection Signal Delay: 40.6

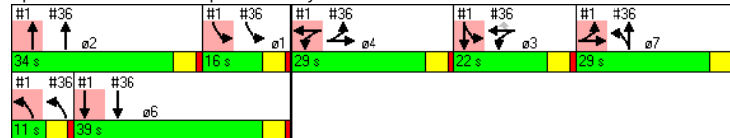
Intersection LOS: D

Intersection Capacity Utilization 56.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: Squalicum Pkwy & Meridian Street



HCM Signalized Intersection Capacity Analysis

1: Squalicum Pkwy & Meridian Street

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.88			0.92		1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1561			1723		1787	3565		1752	3360	
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1687	1561			1723		1787	3565		1752	3360	
Volume (vph)	325	5	20	10	10	35	5	615	10	25	630	240
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	342	5	21	11	11	37	5	647	11	26	663	253
RTOR Reduction (vph)	0	17	0	0	30	0	0	1	0	0	30	0
Lane Group Flow (vph)	342	9	0	0	29	0	5	657	0	26	886	0
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split			Prot			Prot		
Protected Phases	7	7		4	4		5	2		13	36	
Permitted Phases												
Actuated Green, G (s)	24.0	24.0			22.1		6.0	29.0		28.0	51.0	
Effective Green, g (s)	25.0	25.0			23.1		7.0	30.0		30.0	53.0	
Actuated g/C Ratio	0.20	0.20			0.18		0.05	0.23		0.23	0.41	
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0				
Vehicle Extension (s)	3.0	3.0			3.0		2.0	2.0				
Lane Grp Cap (vph)	329	305			311		98	835		410	1390	
v/s Ratio Prot	c0.20	0.01			c0.02		0.00	c0.18		0.01	c0.26	
v/s Ratio Perm												
v/c Ratio	1.04	0.03			0.09		0.05	0.79		0.06	0.64	
Uniform Delay, d1	51.6	41.7			43.8		57.4	46.1		38.1	29.9	
Progression Factor	1.00	1.00			1.00		1.00	1.00		0.53	0.46	
Incremental Delay, d2	60.3	0.0			0.1		0.1	7.4		0.0	0.1	
Delay (s)	111.8	41.8			43.9		57.5	53.5		20.4	13.8	
Level of Service	F	D			D		E	D		C	B	
Approach Delay (s)		106.9			43.9			53.5			14.0	
Approach LOS		F			D			D			B	

Intersection Summary

HCM Average Control Delay	44.6	HCM Level of Service	D

HCM Volume to Capacity ratio

Actuated Cycle Length (s)	128.1	Sum of lost time (s)	16.0

Intersection Capacity Utilization	56.4%	ICU Level of Service	B

Analysis Period (min)	15

c Critical Lane Group

Timings
2: Meridian Street & Broadway St

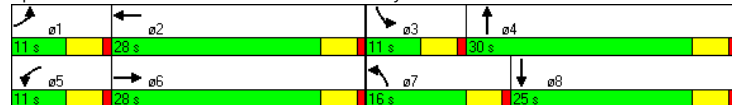
Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	90	270	35	380	175	65	30	140
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	1	6	5	2	7	4	3	8
Permitted Phases								
Detector Phases	1	6	5	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	25.0	11.0	25.0	11.0	25.0	11.0	25.0
Total Split (s)	11.0	28.0	11.0	28.0	16.0	30.0	11.0	25.0
Total Split (%)	13.8%	35.0%	13.8%	35.0%	20.0%	37.5%	13.8%	31.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	7.2	37.1	7.1	32.1	11.0	21.2	7.1	12.2
Actuated g/C Ratio	0.10	0.52	0.09	0.45	0.15	0.29	0.09	0.17
v/c Ratio	0.57	0.44	0.24	0.53	0.71	0.24	0.20	0.50
Control Delay	45.6	18.2	36.4	23.4	43.8	12.0	35.6	29.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.6	18.2	36.4	23.4	43.8	12.0	35.6	29.8
LOS	D	B	D	C	D	B	D	C
Approach Delay	23.5		24.5		30.9		30.8	
Approach LOS	C		C		C		C	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 71.5
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 26.3
Intersection Capacity Utilization 58.6%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service B

Splits and Phases: 2: Meridian Street & Broadway St



HCM Signalized Intersection Capacity Analysis
2: Meridian Street & Broadway St

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.93		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1730		1728	1799		1728	1670		1745	1827	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1728	1730		1728	1799		1728	1670		1745	1827	
Volume (vph)	90	270	110	35	380	25	175	65	55	30	140	5
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	284	116	37	400	26	184	68	58	32	147	5
RTOR Reduction (vph)	0	14	0	0	2	0	0	43	0	0	2	0
Lane Group Flow (vph)	95	386	0	37	424	0	184	83	0	32	150	0
Confl. Peds. (#/hr)			5			5			5			5
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	5.0	35.3		2.3	32.6		8.7	18.6		2.3	12.2	
Effective Green, g (s)	6.0	36.3		3.3	33.6		9.7	19.6		3.3	13.2	
Actuated g/C Ratio	0.08	0.46		0.04	0.43		0.12	0.25		0.04	0.17	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	132	800		73	770		214	417		73	307	
v/s Ratio Prot	c0.05	c0.22		0.02	c0.24		c0.11	0.05		0.02	c0.08	
v/s Ratio Perm												
v/c Ratio	0.72	0.48		0.51	0.55		0.86	0.20		0.44	0.49	
Uniform Delay, d1	35.4	14.6		36.8	16.8		33.7	23.3		36.7	29.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.5	0.2		2.0	0.5		26.5	0.1		1.5	0.4	
Delay (s)	49.9	14.8		38.8	17.3		60.2	23.3		38.2	30.0	
Level of Service	D	B		D	B		E	C		D	C	
Approach Delay (s)	21.5		19.0		45.2		31.5					
Approach LOS	C		B		D		C					

Intersection Summary

HCM Average Control Delay	27.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	78.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Elm Street & Broadway St

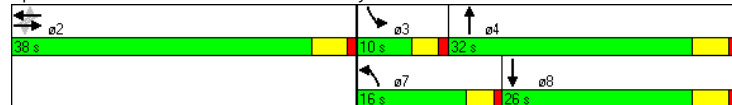
Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	5	230	45	400	185	185	45	185
Turn Type	Perm		Perm		Prot		Prot	
Protected Phases		2		2	7	4	3	8
Permitted Phases	2		2					
Detector Phases	2	2	2	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	26.0	26.0	26.0	26.0	8.0	26.0	8.0	26.0
Total Split (s)	38.0	38.0	38.0	38.0	16.0	32.0	10.0	26.0
Total Split (%)	47.5%	47.5%	47.5%	47.5%	20.0%	40.0%	12.5%	32.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	22.2	22.2	22.2	22.2	11.4	19.9	7.4	13.8
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.20	0.35	0.13	0.25
v/c Ratio	0.02	0.45	0.14	0.71	0.55	0.48	0.21	0.46
Control Delay	12.6	14.9	13.8	21.2	34.0	18.3	33.6	25.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	14.9	13.8	21.2	34.0	18.3	33.6	25.7
LOS	B	B	B	C	C	B	C	C
Approach Delay		14.9		20.6		24.5		27.2
Approach LOS		B		C		C		C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 53.9
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 21.7
Intersection Capacity Utilization 65.5%
Analysis Period (min) 15

Splits and Phases: 7: Elm Street & Broadway St



HCM Signalized Intersection Capacity Analysis
7: Elm Street & Broadway St

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1692	1719		1707	1754		1728	1707		1728	1801	
Flt Permitted	0.27	1.00		0.50	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	482	1719		891	1754		1728	1707		1728	1801	
Volume (vph)	5	230	65	45	400	75	185	185	100	45	185	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	242	68	47	421	79	195	195	105	47	195	11
RTOR Reduction (vph)	0	14	0	0	9	0	0	25	0	0	3	0
Lane Group Flow (vph)	5	296	0	47	491	0	195	275	0	47	203	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		2			2		7	4		3	8	
Permitted Phases	2			2								
Actuated Green, G (s)	16.8	16.8		16.8	16.8		7.7	14.8		2.8	9.9	
Effective Green, g (s)	17.8	17.8		17.8	17.8		7.7	15.8		2.8	10.9	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.16	0.33		0.06	0.23	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	177	632		328	645		275	557		100	406	
v/s Ratio Prot		0.17			c0.28		c0.11	c0.16		0.03	0.11	
v/s Ratio Perm	0.01			0.05								
v/c Ratio	0.03	0.47		0.14	0.76		0.71	0.49		0.47	0.50	
Uniform Delay, d1	9.8	11.7		10.2	13.4		19.3	13.1		22.1	16.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.6		0.2	5.3		8.1	0.7		3.5	1.0	
Delay (s)	9.8	12.2		10.4	18.7		27.4	13.8		25.5	17.3	
Level of Service	A	B		B	B		C	B		C	B	
Approach Delay (s)		12.2			18.0			19.1			18.9	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	48.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
12: W Holly St & Broadway St

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations							
Volume (vph)	80	450	5	460	5	165	0
Turn Type	Perm		Perm			Perm	
Protected Phases		2		2	4		4
Permitted Phases	2		2			4	
Detector Phases	2	2	2	2	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	54.0	54.0	54.0	54.0	26.0	26.0	26.0
Total Split (%)	67.5%	67.5%	67.5%	67.5%	32.5%	32.5%	32.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None
Act Effct Green (s)		32.0		32.0	13.3	13.3	13.3
Actuated g/C Ratio		0.67		0.67	0.27	0.27	0.27
v/c Ratio		0.56		0.63	0.02	0.48	0.11
Control Delay		9.9		10.1	15.2	24.4	0.3
Queue Delay		0.0		0.0	0.0	0.0	0.0
Total Delay		9.9		10.1	15.2	24.4	0.3
LOS		A		B	B	C	A
Approach Delay		9.9		10.1	15.2		16.9
Approach LOS		A		B	B		B

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 47.9
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.63
Intersection Signal Delay: 11.2
Intersection Capacity Utilization 92.6%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service F

Splits and Phases: 12: W Holly St & Broadway St



HCM Signalized Intersection Capacity Analysis
12: W Holly St & Broadway St

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99			0.99		1.00	0.97	
Flpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	
Frt		1.00			0.96			0.93		1.00	0.85	
Flt Protected		0.99			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1805			1711			1699		1721	1505	
Flt Permitted		0.83			1.00			1.00		0.75	1.00	
Satd. Flow (perm)		1517			1706			1699		1361	1505	
Volume (vph)	80	450	0	5	460	230	0	5	5	165	0	75
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	474	0	5	484	242	0	5	5	174	0	79
RTOR Reduction (vph)	0	0	0	0	23	0	0	4	0	0	62	0
Lane Group Flow (vph)	0	558	0	0	708	0	0	6	0	174	17	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		27.7			27.7			9.3		9.3	9.3	
Effective Green, g (s)		28.7			28.7			10.3		10.3	10.3	
Actuated g/C Ratio		0.61			0.61			0.22		0.22	0.22	
Clearance Time (s)		5.0			5.0			5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		926			1042			372		298	330	
v/s Ratio Prot								0.00			0.01	
v/s Ratio Perm		0.37			0.42					0.13		
v/c Ratio		0.60			0.68			0.02		0.58	0.05	
Uniform Delay, d1		5.6			6.1			14.4		16.4	14.5	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		1.1			1.8			0.0		2.9	0.1	
Delay (s)		6.7			7.9			14.4		19.3	14.6	
Level of Service		A			A			B		B	B	
Approach Delay (s)		6.7			7.9			14.4			17.8	
Approach LOS		A			A			B			B	

Intersection Summary

HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	47.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
13: W Holly St & F St

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø1	ø2	ø3	ø4
Lane Configurations												
Volume (vph)	45	450	55	585	45	320	55	190				
Turn Type	Perm		Perm		Perm		Perm					
Protected Phases		2 4		2 4		1 3		1 3	1	2	3	4
Permitted Phases	2 4		2 4		1 3		1 3					
Detector Phases	2 4	2 4	2 4	2 4	1 3	1 3	1 3	1 3				
Minimum Initial (s)									6.0	6.0	6.0	6.0
Minimum Split (s)									24.0	24.0	24.0	28.0
Total Split (s)	77.0	77.0	77.0	77.0	48.0	48.0	48.0	48.0	24.0	49.0	24.0	28.0
Total Split (%)	61.6%	61.6%	61.6%	61.6%	38.4%	38.4%	38.4%	38.4%	19%	39%	19%	22%
Yellow Time (s)									4.0	4.0	4.0	4.0
All-Red Time (s)									1.0	1.0	1.0	5.0
Lead/Lag									Lead	Lag	Lead	Lag
Lead-Lag Optimize?												
Recall Mode									Min	None	None	None
Act Effct Green (s)	67.9	67.9	67.9	67.9		38.0		38.0				
Actuated g/C Ratio	0.56	0.56	0.56	0.56		0.31		0.31				
v/c Ratio	0.20	0.63	0.21	0.69		0.79		0.41				
Control Delay	9.6	12.3	9.3	14.3		27.5		18.2				
Queue Delay	0.0	0.1	0.0	0.0		0.0		0.0				
Total Delay	9.6	12.4	9.3	14.3		27.6		18.2				
LOS	A	B	A	B		C		B				
Approach Delay		12.2		14.0		27.6		18.2				
Approach LOS		B		B		C		B				

Intersection Summary	
Cycle Length: 125	
Actuated Cycle Length: 121.9	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 16.6	Intersection LOS: B
Intersection Capacity Utilization 82.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 13: W Holly St & F St



Timings
13: W Holly St & F St

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	ø5	ø6
Lane Configurations		
Volume (vph)		
Turn Type		
Protected Phases	5	6
Permitted Phases		
Detector Phases		
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	28.0	24.0
Total Split (s)	28.0	45.0
Total Split (%)	22%	36%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	5.0	1.0
Lead/Lag	Lead	Lag
Lead-Lag Optimize?		
Recall Mode	None	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

HCM Signalized Intersection Capacity Analysis 13: W Holly St & F St

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱			↰	↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			0.95	
Frt	1.00	0.97		1.00	0.99			0.99			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1728	1756		1711	1774			1793			3303	
Flt Permitted	0.25	1.00		0.29	1.00			0.92			0.69	
Satd. Flow (perm)	451	1756		527	1774			1660			2294	
Volume (vph)	45	450	135	55	585	65	45	320	25	55	190	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	474	142	58	616	68	47	337	26	58	200	53
RTOR Reduction (vph)	0	8	0	0	3	0	0	2	0	0	14	0
Lane Group Flow (vph)	47	608	0	58	681	0	0	408	0	0	297	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2 4			2 4			1 3			1 3	
Permitted Phases	2 4			2 4			1 3			1 3		
Actuated Green, G (s)	69.0	69.0		69.0	69.0			36.0			36.0	
Effective Green, g (s)	75.0	75.0		75.0	75.0			38.0			38.0	
Actuated g/C Ratio	0.58	0.58		0.58	0.58			0.29			0.29	
Clearance Time (s)												
Vehicle Extension (s)												
Lane Grp Cap (vph)	262	1021		306	1031			489			676	
v/s Ratio Prot		0.35			c0.38							
v/s Ratio Perm	0.10			0.11				c0.25			0.13	
v/c Ratio	0.18	0.60		0.19	0.66			0.83			0.44	
Uniform Delay, d1	12.6	17.3		12.7	18.3			42.6			36.9	
Progression Factor	1.00	1.00		1.00	1.00			0.87			1.00	
Incremental Delay, d2	0.3	0.9		0.3	1.6			8.5			0.5	
Delay (s)	12.9	18.2		13.0	20.0			45.5			37.3	
Level of Service	B	B		B	B			D			D	
Approach Delay (s)		17.9			19.4			45.5			37.3	
Approach LOS		B			B			D			D	
Intersection Summary												
HCM Average Control Delay		26.6			HCM Level of Service			C				
HCM Volume to Capacity ratio		0.72										
Actuated Cycle Length (s)		129.0			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		82.4%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 14: W Holly St & C St

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↰			↰			↰	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	15	505	35	35	700	55	20	15	55	55	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	16	532	37	37	737	58	21	16	58	58	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None				None	
Median storage (veh)												
Upstream signal (ft)		753										
pX, platoon unblocked				0.82			0.82	0.82	0.82	0.82	0.82	
vC, conflicting volume	795			568			1437	1450	550	1487	1439	766
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	795			472			1535	1551	449	1596	1538	766
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			96			68	82	88	0	88	97
cM capacity (veh/h)	831			895			66	88	502	52	90	406
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	584	832	95	79								
Volume Left	16	37	21	58								
Volume Right	37	58	58	11								
cSH	831	895	155	63								
Volume to Capacity	0.02	0.04	0.61	1.26								
Queue Length 95th (ft)	1	3	82	164								
Control Delay (s)	0.5	1.1	59.2	310.4								
Lane LOS	A	A	F	F								
Approach Delay (s)	0.5	1.1	59.2	310.4								
Approach LOS		F	F									
Intersection Summary												
Average Delay		19.7										
Intersection Capacity Utilization		73.9%			ICU Level of Service			D				
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
24: E Chestnut St & Railroad Ave

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  										
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	80	970	35	0	0	0	0	50	60	95	80	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	84	1021	37	0	0	0	0	53	63	100	84	0
Pedestrians					41			41			11	
Lane Width (ft)					0.0			11.0			11.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			3			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		353			350							
pX, platoon unblocked												
vC, conflicting volume	11			1099				1291	1260	441	650	11
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	11			1099				1291	1260	441	650	11
tC, single (s)	4.1			4.1				7.5	6.5	6.9	7.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2				3.5	4.0	3.3	3.5	4.0
p0 queue free %	95			100				100	66	89	54	100
cM capacity (veh/h)	1600			623				63	156	552	217	1065
Direction, Lane #	EB 1	EB 2	EB 3	NB 1	SB 1							
Volume Total	339	511	292	116	184							
Volume Left	84	0	0	0	100							
Volume Right	0	0	37	63	0							
cSH	1600	1700	1700	257	182							
Volume to Capacity	0.05	0.30	0.17	0.45	1.01							
Queue Length 95th (ft)	4	0	0	55	211							
Control Delay (s)	2.2	0.0	0.0	30.0	122.5							
Lane LOS	A			D	F							
Approach Delay (s)	0.6			30.0	122.5							
Approach LOS				D	F							
Intersection Summary												
Average Delay	18.6											
Intersection Capacity Utilization	44.1%			ICU Level of Service			A					
Analysis Period (min)	15											

Timings
25: E Chestnut St & N State St

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

	→	↘	↓
Lane Group	EBT	SBL	SBT
Lane Configurations	↑↑↑	↘	↑↑
Volume (vph)	720	240	850
Turn Type		Split	
Protected Phases	2	4	4
Permitted Phases			
Detector Phases	2	4	4
Minimum Initial (s)	6.0	6.0	6.0
Minimum Split (s)	22.0	20.0	20.0
Total Split (s)	33.0	37.0	37.0
Total Split (%)	47.1%	52.9%	52.9%
Yellow Time (s)	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	Max	Max	Max
Act Effct Green (s)	29.0	33.0	33.0
Actuated g/C Ratio	0.41	0.47	0.47
v/c Ratio	0.59	0.29	0.55
Control Delay	17.0	7.9	14.8
Queue Delay	0.0	0.0	0.0
Total Delay	17.0	7.9	14.8
LOS	B	A	B
Approach Delay	17.0		13.3
Approach LOS	B		B
Intersection Summary			
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 0 (0%), Referenced to phase 4:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 15.2		Intersection LOS: B	
Intersection Capacity Utilization 53.9%		ICU Level of Service A	
Analysis Period (min) 15			
Splits and Phases: 25: E Chestnut St & N State St			
→ ø2 ↘ ø4 33 s 37 s			

HCM Signalized Intersection Capacity Analysis
25: E Chestnut St & N State St

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑	↑↑↑								↓	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0								4.0	4.0	
Lane Util. Factor		0.91								1.00	0.95	
Frpb, ped/bikes		0.98								1.00	1.00	
Flpb, ped/bikes		1.00								1.00	1.00	
Frt		0.95								1.00	1.00	
Flt Protected		1.00								0.95	1.00	
Satd. Flow (prot)		4611								1728	3455	
Flt Permitted		1.00								0.95	1.00	
Satd. Flow (perm)		4611								1728	3455	
Volume (vph)	0	720	385	0	0	0	0	0	0	240	850	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	758	405	0	0	0	0	0	0	253	895	0
RTOR Reduction (vph)	0	52	0	0	0	0	0	0	0	51	0	0
Lane Group Flow (vph)	0	1111	0	0	0	0	0	0	0	202	895	0
Confl. Peds. (#/hr)		40								40		
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Turn Type										Split		
Protected Phases		2								4	4	
Permitted Phases												
Actuated Green, G (s)		29.0								33.0	33.0	
Effective Green, g (s)		29.0								33.0	33.0	
Actuated g/C Ratio		0.41								0.47	0.47	
Clearance Time (s)		4.0								4.0	4.0	
Lane Grp Cap (vph)		1910								815	1629	
v/s Ratio Prot		c0.24								0.12	c0.26	
v/s Ratio Perm												
v/c Ratio		0.58								0.25	0.55	
Uniform Delay, d1		15.8								11.1	13.2	
Progression Factor		1.09								1.00	1.00	
Incremental Delay, d2		0.9								0.7	1.3	
Delay (s)		18.1								11.8	14.5	
Level of Service		B								B	B	
Approach Delay (s)		18.1			0.0			0.0			13.9	
Approach LOS		B			A			A			B	
Intersection Summary												
HCM Average Control Delay		16.0									B	
HCM Volume to Capacity ratio		0.56										
Actuated Cycle Length (s)		70.0								8.0		
Intersection Capacity Utilization		53.9%									A	
Analysis Period (min)		15										
c Critical Lane Group												

Timings
26: E Chestnut St & N Forest St

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBT	NBT
Lane Configurations	↑↑↑	↑↑
Volume (vph)	785	695
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phases	2	4
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	22.0	21.0
Total Split (s)	38.0	32.0
Total Split (%)	54.3%	45.7%
Yellow Time (s)	3.0	3.0
All-Red Time (s)	1.0	1.0
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	Max
Act Effct Green (s)	34.0	28.0
Actuated g/C Ratio	0.49	0.40
v/c Ratio	0.43	0.67
Control Delay	4.6	19.2
Queue Delay	0.0	0.0
Total Delay	4.6	19.2
LOS	A	B
Approach Delay	4.6	19.2
Approach LOS	A	B
Intersection Summary		
Cycle Length: 70		
Actuated Cycle Length: 70		
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Green		
Natural Cycle: 45		
Control Type: Pretimed		
Maximum v/c Ratio: 0.67		
Intersection Signal Delay: 11.3		Intersection LOS: B
Intersection Capacity Utilization 51.2%		ICU Level of Service A
Analysis Period (min) 15		

Splits and Phases: 26: E Chestnut St & N Forest St



HCM Signalized Intersection Capacity Analysis 26: E Chestnut St & N Forest St

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0				
Lane Util. Factor		0.91						0.95				
Frpb, ped/bikes		1.00						0.99				
Flpb, ped/bikes		1.00						1.00				
Frt		1.00						0.97				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		4959						3291				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		4959						3291				
Volume (vph)	225	785	0	0	0	0	0	695	155	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	237	826	0	0	0	0	0	732	163	0	0	0
RTOR Reduction (vph)	0	49	0	0	0	0	0	27	0	0	0	0
Lane Group Flow (vph)	0	1014	0	0	0	0	0	868	0	0	0	0
Confl. Peds. (#/hr)	40								40			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	Split											
Protected Phases	2		2				4					
Permitted Phases												
Actuated Green, G (s)	34.0						28.0					
Effective Green, g (s)	34.0						28.0					
Actuated g/C Ratio	0.49						0.40					
Clearance Time (s)	4.0						4.0					
Lane Grp Cap (vph)	2409						1316					
v/s Ratio Prot	c0.20						c0.26					
v/s Ratio Perm												
v/c Ratio	0.42						0.66					
Uniform Delay, d1	11.6						17.1					
Progression Factor	0.38						1.00					
Incremental Delay, d2	0.5						2.6					
Delay (s)	4.9						19.7					
Level of Service	A						B					
Approach Delay (s)	4.9				0.0		19.7				0.0	
Approach LOS	A				A		B				A	
Intersection Summary												
HCM Average Control Delay			11.7		HCM Level of Service				B			
HCM Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			70.0		Sum of lost time (s)				8.0			
Intersection Capacity Utilization			51.2%		ICU Level of Service				A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 28: Laurel St & N State St

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											  	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	130	50	45	60	0	0	0	0	45	1120	55
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	137	53	47	63	0	0	0	0	47	1179	58
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)											1046	
pX, platoon unblocked												
vC, conflicting volume	1334	1303	422	609	1332	0	1237			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1334	1303	422	609	1332	0	1237			0		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	12	91	43	58	100	100			97		
cM capacity (veh/h)	73	155	580	83	149	1091	559			1629		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2	SB 3							
Volume Total	189	111	342	589	353							
Volume Left	0	47	47	0	0							
Volume Right	53	0	0	0	58							
cSH	194	111	1629	1700	1700							
Volume to Capacity	0.97	0.99	0.03	0.35	0.21							
Queue Length 95th (ft)	203	160	2	0	0							
Control Delay (s)	108.1	156.7	1.2	0.0	0.0							
Lane LOS	F	F	A									
Approach Delay (s)	108.1	156.7	0.3									
Approach LOS	F	F										
Intersection Summary												
Average Delay	24.1											
Intersection Capacity Utilization	49.3%		ICU Level of Service		A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 29: Laurel St & N Forest St

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

																				
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR								
Lane Configurations																				
Sign Control	Stop				Stop		Free				Free									
Grade	0%				0%		0%				0%									
Volume (veh/h)	155	15	0	0	75	105	40	720	45	0	0	0								
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95								
Hourly flow rate (vph)	163	16	0	0	79	111	42	758	47	0	0	0								
Pedestrians																				
Lane Width (ft)																				
Walking Speed (ft/s)																				
Percent Blockage																				
Right turn flare (veh)																				
Median type	None				None															
Median storage (veh)																				
Upstream signal (ft)	1032																			
pX, platoon unblocked																				
vC, conflicting volume	613	889	0	874	866	403	0	805												
vC1, stage 1 conf vol																				
vC2, stage 2 conf vol																				
vCu, unblocked vol	613	889	0	874	866	403	0	805												
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1												
tC, 2 stage (s)																				
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2												
p0 queue free %	31	94	100	100	72	82	97	100												
cM capacity (veh/h)	237	273	1084	232	286	603	1622	828												
Direction, Lane #	EB 1	WB 1	NB 1	NB 2																
Volume Total	179	189	421	426																
Volume Left	163	0	42	0																
Volume Right	0	111	0	47																
cSH	240	412	1622	1700																
Volume to Capacity	0.75	0.46	0.03	0.25																
Queue Length 95th (ft)	130	59	2	0																
Control Delay (s)	53.9	20.9	0.9	0.0																
Lane LOS	F	C	A																	
Approach Delay (s)	53.9	20.9	0.5																	
Approach LOS	F	C																		
Intersection Summary																				
Average Delay	11.5																			
Intersection Capacity Utilization	52.3%		ICU Level of Service				A													
Analysis Period (min)	15																			

Timings 36: Birchwood Ave & Meridian Street

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

											
Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT	ø2	ø5	ø7
Lane Configurations											
Volume (vph)	260	135	185	260	100	825	115	750			
Turn Type	Split			Perm	Prot		Prot				
Protected Phases	4	4	3		5 7	2 7	1	6	2	5	7
Permitted Phases	3										
Detector Phases	4	4	3	3	5 7	2 7	1	6			
Minimum Initial (s)	6.0	6.0	6.0	6.0			6.0	10.0	10.0	6.0	6.0
Minimum Split (s)	29.0	29.0	11.0	11.0			11.0	23.0	23.0	11.0	29.0
Total Split (s)	29.0	29.0	22.0	22.0	40.0	63.0	16.0	39.0	34.0	11.0	29.0
Total Split (%)	22.3%	22.3%	16.9%	16.9%	30.8%	48.5%	12.3%	30.0%	26%	8%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lead	Lag	Lag			Lag	Lag	Lead	Lead	
Lead-Lag Optimize?											
Recall Mode	None	None	None	None			None	None	Max	None	None
Act Effct Green (s)	23.1	23.1	18.0	18.0	36.0	59.0	12.0	35.0			
Actuated g/C Ratio	0.18	0.18	0.14	0.14	0.28	0.46	0.09	0.27			
v/c Ratio	0.84	0.60	1.04	0.63	0.21	0.55	0.74	1.11			
Control Delay	73.7	52.8	119.8	16.4	54.1	6.6	82.8	104.8			
Queue Delay	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0			
Total Delay	73.7	52.8	119.8	16.4	54.1	7.6	82.8	104.8			
LOS	E	D	F	B	D	A	F	F			
Approach Delay	64.7		68.1		12.4		102.5				
Approach LOS	E		E		B		F				
Intersection Summary											
Cycle Length: 130											
Actuated Cycle Length: 128.1											
Natural Cycle: 145											
Control Type: Actuated-Uncoordinated											
Maximum v/c Ratio: 1.11											
Intersection Signal Delay: 62.6						Intersection LOS: E					
Intersection Capacity Utilization 75.7%						ICU Level of Service D					
Analysis Period (min) 15											
Splits and Phases: 36: Birchwood Ave & Meridian Street											
											
34 s			16 s			29 s			22 s		
											
11 s			39 s								

HCM Signalized Intersection Capacity Analysis
36: Birchwood Ave & Meridian Street

Alternative 2A (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1812			1873	1615	1787	3552		1752	3375	
Flt Permitted	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	1812			1873	1615	1787	3552		1752	3375	
Volume (vph)	260	135	60	75	185	260	100	825	35	115	750	245
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	274	142	63	79	195	274	105	868	37	121	789	258
RTOR Reduction (vph)	0	12	0	0	0	209	0	2	0	0	24	0
Lane Group Flow (vph)	274	193	0	0	274	65	105	903	0	121	1023	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split		Perm	Prot			Prot		
Protected Phases	4	4		3	3		5 7	2 7		1	6	
Permitted Phases						3						
Actuated Green, G (s)	22.1	22.1			17.0	17.0	35.0	58.0		11.0	34.0	
Effective Green, g (s)	23.1	23.1			18.0	18.0	36.0	59.0		12.0	35.0	
Actuated g/C Ratio	0.18	0.18			0.14	0.14	0.28	0.46		0.09	0.27	
Clearance Time (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Vehicle Extension (s)	3.0	3.0			2.0	2.0				2.0	2.0	
Lane Grp Cap (vph)	325	327			263	227	502	1636		164	922	
v/s Ratio Prot	c0.15	0.11			c0.15		0.06	c0.25		0.07	c0.30	
v/s Ratio Perm						0.04						
v/c Ratio	0.84	0.59			1.04	0.29	0.21	0.55		0.74	1.11	
Uniform Delay, d1	50.7	48.1			55.0	49.3	35.2	25.0		56.5	46.5	
Progression Factor	1.00	1.00			1.00	1.00	1.48	0.23		1.00	1.00	
Incremental Delay, d2	17.7	2.7			66.8	0.3	0.0	0.2		13.8	64.4	
Delay (s)	68.4	50.9			121.9	49.6	52.1	6.0		70.3	111.0	
Level of Service	E	D			F	D	D	A		E	F	
Approach Delay (s)		60.9			85.7		10.8				106.8	
Approach LOS		E			F		B				F	
Intersection Summary												
HCM Average Control Delay		66.1										
HCM Volume to Capacity ratio		0.87										
Actuated Cycle Length (s)		128.1										
Intersection Capacity Utilization		75.7%										
Analysis Period (min)		15										
c Critical Lane Group												

Timings
19: Roeder Ave & F St

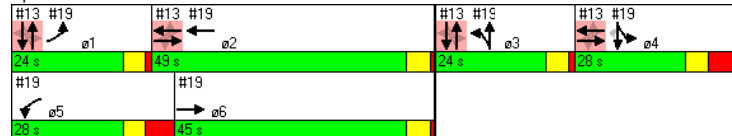
Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Volume (vph)	215	680	10	715	40	135	90	225
Turn Type	Prot		Prot		Split		Perm	
Protected Phases	1	6	5	2	3	3	4	
Permitted Phases								4
Detector Phases	1	6	5	2	3	3	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	28.0	24.0	24.0	24.0	28.0	28.0
Total Split (s)	24.0	45.0	28.0	49.0	24.0	24.0	28.0	28.0
Total Split (%)	19.2%	36.0%	22.4%	39.2%	19.2%	19.2%	22.4%	22.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	5.0	1.0	1.0	1.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?								
Recall Mode	Min	Max	None	None	None	None	None	None
Act Effct Green (s)	20.0	65.7	11.5	45.0	20.0	20.0	24.0	24.0
Actuated g/C Ratio	0.16	0.53	0.09	0.36	0.16	0.16	0.19	0.19
v/c Ratio	0.78	0.74	0.06	1.35	0.17	0.58	0.81	0.47
Control Delay	70.3	30.2	52.4	200.0	47.5	58.0	62.8	9.8
Queue Delay	36.7	0.0	0.0	54.6	0.0	9.8	18.6	0.4
Total Delay	107.0	30.2	52.4	254.6	47.5	67.8	81.4	10.2
LOS	F	C	D	F	D	E	F	B
Approach Delay		48.1		252.3		63.4	49.1	
Approach LOS		D		F		E	D	

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.35
Intersection Signal Delay: 121.4
Intersection Capacity Utilization 94.1%
Analysis Period (min) 15
Intersection LOS: F
ICU Level of Service F

Splits and Phases: 19: Roeder Ave & F St



HCM Signalized Intersection Capacity Analysis
19: Roeder Ave & F St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (prot)	1728	1809		1711	1755		1479	1540			1743	1531
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (perm)	1728	1809		1711	1755		1479	1540			1743	1531
Volume (vph)	215	680	25	10	715	145	40	135	10	180	90	225
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	215	680	25	10	715	145	40	135	10	180	90	225
RTOR Reduction (vph)	0	1	0	0	5	0	0	3	0	0	0	184
Lane Group Flow (vph)	215	704	0	10	855	0	40	142	0	0	270	41
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	18%	18%	18%	2%	2%	2%
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	19.0	64.7		1.5	51.2		19.0	19.0			19.0	19.0
Effective Green, g (s)	20.0	65.7		6.5	52.2		20.0	20.0			24.0	24.0
Actuated g/C Ratio	0.15	0.50		0.05	0.39		0.15	0.15			0.18	0.18
Clearance Time (s)	5.0	5.0		9.0	5.0		5.0	5.0			9.0	9.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	261	899		84	693		224	233			316	278
v/s Ratio Prot	c0.12	0.39		0.01	c0.49		0.03	c0.09			c0.15	
v/s Ratio Perm												0.03
v/c Ratio	0.82	0.78		0.12	1.23		0.18	0.61			0.85	0.15
Uniform Delay, d1	54.4	27.4		60.1	40.0		48.9	52.5			52.4	45.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			0.95	1.24
Incremental Delay, d2	18.6	6.8		0.6	117.2		0.4	4.7			17.1	0.2
Delay (s)	73.0	34.1		60.7	157.2		49.3	57.2			67.1	56.5
Level of Service	E	C		E	F		D	E			E	E
Approach Delay (s)		43.2			156.1			55.5			62.3	
Approach LOS		D			F			E			E	

Intersection Summary

HCM Average Control Delay	87.7	HCM Level of Service	F
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	132.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	94.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
20: Roeder Ave & C St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control	Free			Free			Stop			Stop			
Grade	0%			0%			0%			0%			
Volume (veh/h)	50	840	25	100	770	70	35	45	165	35	60	55	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly flow rate (vph)	50	840	25	100	770	70	35	45	165	35	60	55	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (ft)	735												
pX, platoon unblocked				0.66			0.66			0.66			
vC, conflicting volume	840				865			2042			1992		
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	840				796			2575			2500		
tC, single (s)	4.1				4.1			7.1			6.5		
tC, 2 stage (s)													
tF (s)	2.2				2.2			3.5			4.0		
p0 queue free %	94				82			0			0		
cM capacity (veh/h)	804				552			0			15		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	915	940	245	150									
Volume Left	50	100	35	35									
Volume Right	25	70	165	55									
cSH	804	552	0	0									
Volume to Capacity	0.06	0.18	Err	Err									
Queue Length 95th (ft)	5	16	Err	Err									
Control Delay (s)	1.7	5.5	Err	Err									
Lane LOS	A	A	F	F									
Approach Delay (s)	1.7	5.5	Err	Err									
Approach LOS			F	F									
Intersection Summary													
Average Delay	Err												
Intersection Capacity Utilization	102.6%			ICU Level of Service			G						
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis
21: E Chestnut St & Bay St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

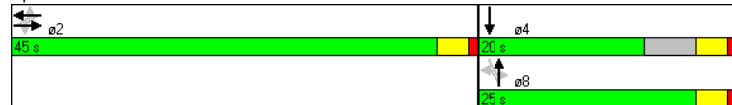
Timings
22: E Chestnut St & Commercial St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Volume (vph)	150	945	55	350	140	195	185	110
Turn Type	Perm	Perm	Perm	Perm	Perm	D.Pm	Perm	Perm
Protected Phases	2	2	2	2	8	8	4	4
Permitted Phases	2	2	2	2	8	8	8	4
Detector Phases	2	2	2	2	8	8	8	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	26.0	26.0	26.0	26.0	19.0	19.0	19.0	20.0
Total Split (s)	45.0	45.0	45.0	45.0	25.0	25.0	25.0	20.0
Total Split (%)	64.3%	64.3%	64.3%	64.3%	35.7%	35.7%	35.7%	28.6%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	41.0	41.0	41.0	41.0	21.0	21.0	21.0	21.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.30	0.30	0.30	0.30
v/c Ratio	0.70	0.52	0.52	0.52	1.14	0.93	0.36	0.36
Control Delay	12.9	21.2	112.6	78.1	16.0	16.0	16.0	16.0
Queue Delay	0.5	2.7	2.2	0.0	0.0	0.0	0.0	0.0
Total Delay	13.4	23.9	114.8	78.1	16.0	16.0	16.0	16.0
LOS	B	C	F	E	B	B	B	B
Approach Delay	13.4	23.9	114.8	78.1	16.0	16.0	16.0	16.0
Approach LOS	B	C	F	E	B	B	B	B

Intersection Summary								
Cycle Length: 70								
Actuated Cycle Length: 70								
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green								
Natural Cycle: 50								
Control Type: Pretimed								
Maximum v/c Ratio: 1.14								
Intersection Signal Delay: 40.4								
Intersection LOS: D								
Intersection Capacity Utilization 108.7%								
ICU Level of Service G								
Analysis Period (min) 15								

Splits and Phases: 22: E Chestnut St & Commercial St



HCM Signalized Intersection Capacity Analysis
22: E Chestnut St & Commercial St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	3402	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Flt Permitted	0.82	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Satd. Flow (perm)	2803	1399	1399	1399	1399	1399	1399	1399	1399	1399	1399	1399
Volume (vph)	150	945	50	55	350	25	140	195	145	185	110	80
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	150	945	50	55	350	25	140	195	145	185	110	80
RTOR Reduction (vph)	0	5	0	0	3	0	0	22	0	0	37	0
Lane Group Flow (vph)	0	1140	0	0	427	0	0	458	0	185	153	0
Confl. Peds. (#/hr)	20	20	20	20	20	20	20	20	20	20	20	20
Heavy Vehicles (%)	1%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	8	8	8	8	4	4
Permitted Phases	2	2	2	2	2	2	8	8	8	8	4	4
Actuated Green, G (s)	41.0	41.0	41.0	41.0	41.0	41.0	21.0	21.0	21.0	21.0	21.0	21.0
Effective Green, g (s)	41.0	41.0	41.0	41.0	41.0	41.0	21.0	21.0	21.0	21.0	21.0	21.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59	0.30	0.30	0.30	0.30	0.30	0.30
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1642	819	819	819	819	819	400	400	400	198	493	493
v/s Ratio Prot												0.09
v/s Ratio Perm	c0.41	0.31	0.31	0.31	0.31	0.31	c0.34	0.28	0.28	0.28	0.28	0.28
v/c Ratio	0.69	0.52	0.52	0.52	0.52	0.52	1.14	0.93	0.31	0.31	0.31	0.31
Uniform Delay, d1	10.1	8.6	8.6	8.6	8.6	8.6	24.5	23.8	18.9	18.9	18.9	18.9
Progression Factor	1.00	2.34	2.34	2.34	2.34	2.34	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	0.2	0.2	0.2	0.2	0.2	90.4	48.8	1.6	1.6	1.6	1.6
Delay (s)	12.6	20.4	20.4	20.4	20.4	20.4	114.9	72.6	20.5	20.5	20.5	20.5
Level of Service	B	C	C	C	C	C	F	E	C	C	C	C
Approach Delay (s)	12.6	20.4	20.4	20.4	20.4	20.4	114.9	72.6	20.5	20.5	20.5	20.5
Approach LOS	B	C	C	C	C	C	F	E	C	C	C	C

Intersection Summary			
HCM Average Control Delay	39.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	108.7%	ICU Level of Service	G
Analysis Period (min)	15		

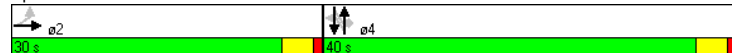
c Critical Lane Group

Timings
23: E Chestnut St & Cornwall Ave

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Lane Group	EBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	995	395	335	70	125	200
Turn Type	Perm			Perm	Perm	
Protected Phases	2		4		4	
Permitted Phases	4			4	4	
Detector Phases	2	4	4	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	26.0	19.0	19.0	19.0	19.0	19.0
Total Split (s)	30.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	57.1%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	26.0		36.0	36.0		36.0
Actuated g/C Ratio	0.37		0.51	0.51		0.51
v/c Ratio	1.05		1.32	0.10		1.10
Control Delay	54.1		179.7	7.1		87.9
Queue Delay	17.9		14.2	0.0		14.3
Total Delay	72.0		193.9	7.1		102.2
LOS	E		F	A		F
Approach Delay	72.0		177.6			102.2
Approach LOS	E		F			F
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green						
Natural Cycle: 75						
Control Type: Pretimed						
Maximum v/c Ratio: 1.32						
Intersection Signal Delay: 110.4				Intersection LOS: F		
Intersection Capacity Utilization 111.6%				ICU Level of Service H		
Analysis Period (min) 15						

Splits and Phases: 23: E Chestnut St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
23: E Chestnut St & Cornwall Ave

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↘	↗	←	↖	↗	↑	↘	↗	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔	↗		↔↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0		4.0	
Lane Util. Factor		0.95						1.00	1.00		1.00	
Frpb, ped/bikes		0.98						1.00	0.92		0.97	
Flpb, ped/bikes		1.00						0.97	1.00		1.00	
Frt		0.97						1.00	0.85		0.97	
Flt Protected		1.00						0.97	1.00		0.99	
Satd. Flow (prot)		3263						1706	1407		1705	
Flt Permitted		1.00						0.61	1.00		0.41	
Satd. Flow (perm)		3263						1073	1407		708	
Volume (vph)	35	995	280	0	0	0	395	335	70	125	200	90
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	35	995	280	0	0	0	395	335	70	125	200	90
RTOR Reduction (vph)	0	35	0	0	0	0	0	0	10	0	14	0
Lane Group Flow (vph)	0	1275	0	0	0	0	0	730	60	0	401	0
Confl. Peds. (#/hr)	50		50				50		50	50		50
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	Perm						Perm			Perm	Perm	
Protected Phases	2						4			4		4
Permitted Phases	2						4			4		
Actuated Green, G (s)		26.0						36.0	36.0		36.0	
Effective Green, g (s)		26.0						36.0	36.0		36.0	
Actuated g/C Ratio		0.37						0.51	0.51		0.51	
Clearance Time (s)		4.0						4.0	4.0		4.0	
Lane Grp Cap (vph)		1212						552	724		364	
v/s Ratio Prot												
v/s Ratio Perm		0.39						0.68	0.04		0.57	
v/c Ratio		1.05						1.32	0.08		1.10	
Uniform Delay, d1		22.0						17.0	8.6		17.0	
Progression Factor		0.78						1.00	1.00		0.82	
Incremental Delay, d2		35.7						157.4	0.2		71.0	
Delay (s)		52.9						174.4	8.9		85.0	
Level of Service		D						F	A		F	
Approach Delay (s)		52.9			0.0			159.9			85.0	
Approach LOS		D			A			F			F	
Intersection Summary												
HCM Average Control Delay		92.1									F	
HCM Volume to Capacity ratio		1.21										
Actuated Cycle Length (s)		70.0							8.0			
Intersection Capacity Utilization		111.6%									H	
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 38: Roeder Ave & Central Ave

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free				Free		Stop				Stop	
Grade	0%				0%		0%				0%	
Volume (veh/h)	70	660	285	10	525	140	355	200	25	165	235	150
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	70	660	285	10	525	140	355	200	25	165	235	150
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (ft)	1113											
pX, platoon unblocked												
vC, conflicting volume	665			945			1825	1628	802	1682	1700	595
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	665			945			1825	1628	802	1682	1700	595
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			99			0	0	93	0	0	70
cM capacity (veh/h)	924			726			0	93	384	0	84	504
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	1015	675	580	550								
Volume Left	70	10	355	165								
Volume Right	285	140	25	150								
cSH	924	726	0	0								
Volume to Capacity	0.08	0.01	Err	Err								
Queue Length 95th (ft)	6	1	Err	Err								
Control Delay (s)	2.1	0.4	Err	Err								
Lane LOS	A	A	F	F								
Approach Delay (s)	2.1	0.4	Err	Err								
Approach LOS			F	F								
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization	161.5%		ICU Level of Service		H							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 39: Roeder Ave & Hilton Ave

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕↕↕↕↕					
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Volume (veh/h)	945	70	10	935	90	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	945	70	10	935	90	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	544					
pX, platoon unblocked	0.62					
vC, conflicting volume			1015	1935		980
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1015	2518		980
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			99	0		100
cM capacity (veh/h)			683	19		303
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	1015	945	90			
Volume Left	0	10	90			
Volume Right	70	0	0			
cSH	1700	683	19			
Volume to Capacity	0.60	0.01	4.80			
Queue Length 95th (ft)	0	1	Err			
Control Delay (s)	0.0	0.4	Err			
Lane LOS		A	F			
Approach Delay (s)	0.0	0.4	Err			
Approach LOS			F			
Intersection Summary						
Average Delay			439.2			
Intersection Capacity Utilization	68.8%		ICU Level of Service		C	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
45: Laurel St & Bay St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	125	165	215	450	150	25
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	125	165	215	450	150	25
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total (vph)	180	110	143	522	175	
Volume Left (vph)	125	0	0	0	150	
Volume Right (vph)	0	0	0	450	25	
Hadj (s)	0.38	0.03	0.03	-0.57	0.12	
Departure Headway (s)	6.2	5.8	5.5	4.9	6.0	
Degree Utilization, x	0.31	0.18	0.22	0.71	0.29	
Capacity (veh/h)	557	592	636	718	543	
Control Delay (s)	10.7	8.9	8.8	17.5	11.5	
Approach Delay (s)	10.0		15.6		11.5	
Approach LOS	B		C		B	
Intersection Summary						
Delay			13.5			
HCM Level of Service			B			
Intersection Capacity Utilization			48.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
46: Wharf St/Pine St & Cornwall Ave

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	245	225	10	60	65	35	10	30	25	20	60	60
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	245	225	10	60	65	35	10	30	25	20	60	60
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	100			235			1012	940	230	962	928	82
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	100			235			1012	940	230	962	928	82
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	84			95			93	86	97	88	72	94
cM capacity (veh/h)	1493			1332			136	210	809	172	214	977
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	480	160	65	140								
Volume Left	245	60	10	20								
Volume Right	10	35	25	60								
cSH	1493	1332	263	306								
Volume to Capacity	0.16	0.05	0.25	0.46								
Queue Length 95th (ft)	15	4	24	57								
Control Delay (s)	4.8	3.2	23.1	26.3								
Lane LOS	A	A	C	D								
Approach Delay (s)	4.8	3.2	23.1	26.3								
Approach LOS			C	D								
Intersection Summary												
Average Delay			9.4									
Intersection Capacity Utilization			49.7%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
47: Oak Street & Cornwall Ave

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	25	115	215	80	20	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	25	115	215	80	20	15
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	140	295	35			
Volume Left (vph)	25	215	0			
Volume Right (vph)	115	0	15			
Hadj (s)	-0.42	0.18	-0.22			
Departure Headway (s)	4.2	4.4	4.3			
Degree Utilization, x	0.16	0.36	0.04			
Capacity (veh/h)	784	788	782			
Control Delay (s)	8.1	10.0	7.5			
Approach Delay (s)	8.1	10.0	7.5			
Approach LOS	A	A	A			
Intersection Summary						
Delay			9.2			
HCM Level of Service			A			
Intersection Capacity Utilization			37.9%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
50: Maple St & Commercial St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

									
Movement	EBL	EBR	NBL	NBT	SBT	SBR			
Lane Configurations									
Sign Control	Stop			Free	Free				
Grade	0%			0%	0%				
Volume (veh/h)	125	195	50	485	175	40			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00			
Hourly flow rate (vph)	125	195	50	485	175	40			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type	None								
Median storage (veh)									
Upstream signal (ft)	468								
pX, platoon unblocked									
vC, conflicting volume	780	195	215						
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	780	195	215						
tC, single (s)	6.4	6.2	4.1						
tC, 2 stage (s)									
tF (s)	3.5	3.3	2.2						
p0 queue free %	64	77	96						
cM capacity (veh/h)	350	846	1355						
Direction, Lane #	EB 1	NB 1	SB 1						
Volume Total	320	535	215						
Volume Left	125	50	0						
Volume Right	195	0	40						
cSH	545	1355	1700						
Volume to Capacity	0.59	0.04	0.13						
Queue Length 95th (ft)	94	3	0						
Control Delay (s)	20.6	1.1	0.0						
Lane LOS	C	A							
Approach Delay (s)	20.6	1.1	0.0						
Approach LOS	C								
Intersection Summary									
Average Delay			6.7						
Intersection Capacity Utilization			68.8%	ICU Level of Service	C				
Analysis Period (min)			15						

Timings
51: Maple St & Bay St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↗	←	↖	↑	↗	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕		↕		↕		↕
Volume (vph)	45	205	10	30	15	400	50	45
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phases	4	4	8	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	22.0	22.0	22.0	22.0	23.0	23.0	23.0	23.0
Total Split (%)	48.9%	48.9%	48.9%	48.9%	51.1%	51.1%	51.1%	51.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	None	None
Act Effct Green (s)		11.6		11.6		15.6		15.6
Actuated g/C Ratio		0.33		0.33		0.44		0.44
v/c Ratio		0.62		0.16		0.61		0.20
Control Delay		13.4		5.7		12.4		6.9
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		13.4		5.7		12.4		6.9
LOS		B		A		B		A
Approach Delay		13.4		5.7		12.4		6.9
Approach LOS		B		A		B		A

Intersection Summary	
Cycle Length: 45	
Actuated Cycle Length: 35.5	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 11.5	Intersection LOS: B
Intersection Capacity Utilization 65.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 51: Maple St & Bay St

↖ e2	→ e4
23 s	22 s
↗ e6	← e8
23 s	22 s

HCM Signalized Intersection Capacity Analysis
51: Maple St & Bay St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.96			0.92			0.98			0.97	
Flt Protected		0.99			0.99			1.00			0.98	
Satd. Flow (prot)		1714			1656			1765			1708	
Flt Permitted		0.96			0.95			0.99			0.77	
Satd. Flow (perm)		1647			1577			1753			1347	
Volume (vph)	45	205	115	10	30	50	15	400	65	50	45	30
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	45	205	115	10	30	50	15	400	65	50	45	30
RTOR Reduction (vph)	0	41	0	0	34	0	0	12	0	0	17	0
Lane Group Flow (vph)	0	324	0	0	56	0	0	468	0	0	108	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		11.6			11.6			15.6			15.6	
Effective Green, g (s)		11.6			11.6			15.6			15.6	
Actuated g/C Ratio		0.33			0.33			0.44			0.44	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		543			520			777			597	
v/s Ratio Prot												
v/s Ratio Perm		c0.20			0.04			c0.27			0.08	
v/c Ratio		0.60			0.11			0.60			0.18	
Uniform Delay, d1		9.8			8.2			7.4			5.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.8			0.1			1.3			0.1	
Delay (s)		11.6			8.3			8.8			6.1	
Level of Service		B			A			A			A	
Approach Delay (s)		11.6			8.3			8.8			6.1	
Approach LOS		B			A			A			A	

Intersection Summary	
HCM Average Control Delay	9.4 HCM Level of Service A
HCM Volume to Capacity ratio	0.60
Actuated Cycle Length (s)	35.2 Sum of lost time (s) 8.0
Intersection Capacity Utilization	65.4% ICU Level of Service C
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
53: Maple St & Central Ave

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	5	65	385	25	280	155
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	65	385	25	280	155
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1112	398			410	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1112	398			410	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	90			76	
cM capacity (veh/h)	175	652			1149	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	70	410	435			
Volume Left	5	0	280			
Volume Right	65	25	0			
cSH	545	1700	1149			
Volume to Capacity	0.13	0.24	0.24			
Queue Length 95th (ft)	11	0	24			
Control Delay (s)	12.6	0.0	6.8			
Lane LOS	B		A			
Approach Delay (s)	12.6	0.0	6.8			
Approach LOS	B					
Intersection Summary						
Average Delay	4.2					
Intersection Capacity Utilization	59.7%		ICU Level of Service		B	
Analysis Period (min)	15					



Movement Summary

New Whatcom

Alternative 2A 2026

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	% HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95 % Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
Laurel Street										
11L	L	15	6.2	0.842	29.9	LOS C	404	1.00	1.45	18.0
16T	T	345	2.0	0.863	23.8	LOS C	404	1.00	1.45	19.1
16R	R	170	1.8	0.863	25.4	LOS C	404	1.00	1.38	18.6
Approach		531	2.1	0.862	24.5	LOS C	404	1.00	1.43	18.9
Commercial Street										
17L	L	165	1.8	0.589	17.1	LOS B	164	0.89	1.06	21.8
14T	T	120	1.7	0.588	10.4	LOS B	164	0.89	1.01	24.0
14R	R	85	2.4	0.590	10.4	LOS B	164	0.89	0.92	24.0
Approach		370	1.9	0.589	13.4	LOS B	164	0.89	1.01	22.9
Laurel Street										
15L	L	10	9.1	0.500	12.3	LOS B	118	0.76	0.84	23.6
12T	T	285	2.1	0.491	5.6	LOS A	118	0.76	0.69	25.8
12R	R	80	2.5	0.491	7.4	LOS A	118	0.76	0.71	25.3
Approach		376	2.4	0.491	6.2	LOS A	118	0.76	0.70	25.6
Long Pond Road										
5L	L	310	1.9	0.629	19.0	LOS B	184	0.90	1.12	21.4
2R	R	80	2.5	0.630	12.9	LOS B	184	0.90	1.08	22.9
Approach		390	2.1	0.628	17.7	LOS B	184	0.90	1.11	21.7
Commercial Street										
13L	L	170	1.8	0.651	24.2	LOS C	195	0.95	1.19	19.6
18T	T	150	2.0	0.652	17.5	LOS B	195	0.95	1.17	21.2
18R	R	10	9.1	0.647	19.1	LOS B	195	0.95	1.12	20.6
Approach		331	2.1	0.652	21.0	LOS C	195	0.95	1.18	20.3
All Vehicles		1998	2.1	0.863	17.1	LOS B	404	0.91	1.11	21.4

Symbols which may appear in this table:

Following Degree of Saturation

Timings
1: Squalicum Pkwy & Meridian Street

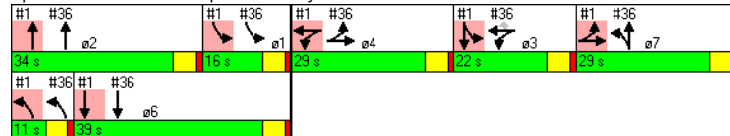
Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBT	NBL	NBT	SBL	SBT	ø1	ø3	ø6
Lane Configurations	↰	↱	↰	↰	↰	↰	↰			
Volume (vph)	435	5	10	5	765	30	730			
Turn Type	Split		Prot		Prot					
Protected Phases	7	7	4	5	2	13	3 6	1	3	6
Permitted Phases										
Detector Phases	7	7	4	5	2	13	3 6			
Minimum Initial (s)	6.0	6.0	6.0	6.0	10.0			6.0	6.0	10.0
Minimum Split (s)	29.0	29.0	29.0	11.0	23.0			11.0	11.0	23.0
Total Split (s)	29.0	29.0	29.0	11.0	34.0	38.0	61.0	16.0	22.0	39.0
Total Split (%)	22.3%	22.3%	22.3%	8.5%	26.2%	29.2%	46.9%	12%	17%	30%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0			1.0	1.0	1.0
Lead/Lag			Lead	Lead	Lead			Lag	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Max			None	None	None
Act Effct Green (s)	25.0	25.0	23.3	7.0	30.0	30.0	53.0			
Actuated g/C Ratio	0.19	0.19	0.18	0.05	0.23	0.23	0.41			
v/c Ratio	1.33	0.08	0.17	0.05	0.93	0.07	0.77			
Control Delay	206.3	20.8	20.7	59.6	66.4	11.4	10.9			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	1.2			
Total Delay	206.3	20.8	20.7	59.6	66.4	11.4	12.1			
LOS	F	C	C	E	E	B	B			
Approach Delay		196.2	20.7		66.4		12.1			
Approach LOS		F	C		E		B			

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 128.4
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.36
Intersection Signal Delay: 64.7
Intersection Capacity Utilization 69.3%
Analysis Period (min) 15
Intersection LOS: E
ICU Level of Service C

Splits and Phases: 1: Squalicum Pkwy & Meridian Street



HCM Signalized Intersection Capacity Analysis
1: Squalicum Pkwy & Meridian Street

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.88			0.91		1.00	1.00		1.00	0.95	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1563			1715		1787	3567		1752	3330	
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1687	1563			1715		1787	3567		1752	3330	
Volume (vph)	435	5	20	10	10	40	5	765	10	30	730	365
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	435	5	20	10	10	40	5	765	10	30	730	365
RTOR Reduction (vph)	0	16	0	0	33	0	0	1	0	0	48	0
Lane Group Flow (vph)	435	9	0	0	27	0	5	774	0	30	1047	0
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split			Prot			Prot		
Protected Phases	7	7		4	4		5	2		13	3 6	
Permitted Phases												
Actuated Green, G (s)	24.0	24.0			22.3		6.0	29.0		28.0	51.0	
Effective Green, g (s)	25.0	25.0			23.3		7.0	30.0		30.0	53.0	
Actuated g/C Ratio	0.19	0.19			0.18		0.05	0.23		0.23	0.41	
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0				
Vehicle Extension (s)	3.0	3.0			3.0		2.0	2.0				
Lane Grp Cap (vph)	329	305			311		97	834		410	1376	
v/s Ratio Prot	c0.26	0.01			c0.02		0.00	c0.22		0.02	c0.31	
v/s Ratio Perm												
v/c Ratio	1.32	0.03			0.09		0.05	0.93		0.07	0.76	
Uniform Delay, d1	51.6	41.8			43.7		57.5	48.1		38.3	32.2	
Progression Factor	1.00	1.00			1.00		1.00	1.00		0.51	0.66	
Incremental Delay, d2	164.7	0.0			0.1		0.1	18.0		0.0	0.2	
Delay (s)	216.4	41.9			43.8		57.6	66.1		19.7	21.3	
Level of Service	F	D			D		E	E		B	C	
Approach Delay (s)		206.9			43.8		66.0				21.3	
Approach LOS		F			D		E				C	

Intersection Summary

HCM Average Control Delay	71.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	128.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Meridian Street & Broadway St

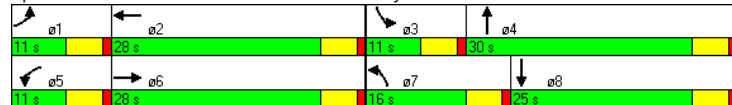
Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	80	360	45	390	180	260	35	225
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	1	6	5	2	7	4	3	8
Permitted Phases								
Detector Phases	1	6	5	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	25.0	11.0	25.0	11.0	25.0	11.0	25.0
Total Split (s)	11.0	28.0	11.0	28.0	16.0	30.0	11.0	25.0
Total Split (%)	13.8%	35.0%	13.8%	35.0%	20.0%	37.5%	13.8%	31.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	8.0	30.0	8.1	27.8	11.2	22.4	8.2	15.0
Actuated g/C Ratio	0.12	0.48	0.12	0.44	0.17	0.34	0.12	0.23
v/c Ratio	0.38	0.56	0.22	0.53	0.60	0.52	0.17	0.64
Control Delay	39.2	25.2	36.2	25.8	40.3	21.5	36.4	32.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.2	25.2	36.2	25.8	40.3	21.5	36.4	32.0
LOS	D	C	D	C	D	C	D	C
Approach Delay		27.2		26.8		28.3		32.5
Approach LOS		C		C		C		C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 63
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 28.3
Intersection Capacity Utilization 69.3%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service C

Splits and Phases: 2: Meridian Street & Broadway St



HCM Signalized Intersection Capacity Analysis
2: Meridian Street & Broadway St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1745		1728	1795		1728	1758		1745	1786	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1728	1745		1728	1795		1728	1758		1745	1786	
Volume (vph)	80	360	115	45	390	30	180	260	60	35	225	45
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	80	360	115	45	390	30	180	260	60	35	225	45
RTOR Reduction (vph)	0	13	0	0	3	0	0	11	0	0	10	0
Lane Group Flow (vph)	80	462	0	45	417	0	180	309	0	35	260	0
Confl. Peds. (#/hr)			5			5			5			5
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	4.1	26.0		2.9	24.8		7.2	18.0		1.9	12.7	
Effective Green, g (s)	5.1	27.0		3.9	25.8		8.2	19.0		2.9	13.7	
Actuated g/C Ratio	0.07	0.39		0.06	0.38		0.12	0.28		0.04	0.20	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	128	685		98	673		206	485		74	356	
v/s Ratio Prot	c0.05	c0.26		0.03	0.23		c0.10	c0.18		0.02	0.15	
v/s Ratio Perm												
v/c Ratio	0.62	0.67		0.46	0.62		0.87	0.64		0.47	0.73	
Uniform Delay, d1	30.9	17.3		31.4	17.5		29.8	21.9		32.2	25.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.7	2.1		1.2	1.2		30.2	2.0		1.7	6.5	
Delay (s)	37.6	19.3		32.7	18.7		60.0	23.9		33.9	32.4	
Level of Service	D	B		C	B		E	C		C	C	
Approach Delay (s)		22.0			20.1			36.9			32.5	
Approach LOS		C			C			D			C	

Intersection Summary

HCM Average Control Delay	27.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	68.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Elm Street & Broadway St

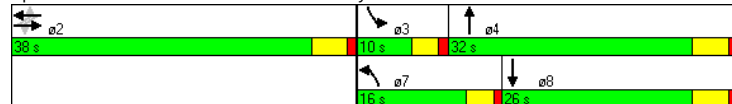
Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	10	255	55	485	225	255	50	280
Turn Type	Perm		Perm		Prot		Prot	
Protected Phases		2		2	7	4	3	8
Permitted Phases	2		2					
Detector Phases	2	2	2	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	26.0	26.0	26.0	26.0	8.0	26.0	8.0	26.0
Total Split (s)	38.0	38.0	38.0	38.0	16.0	32.0	10.0	26.0
Total Split (%)	47.5%	47.5%	47.5%	47.5%	20.0%	40.0%	12.5%	32.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	25.8	25.8	25.8	25.8	11.6	26.8	6.0	16.2
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.17	0.40	0.09	0.24
v/c Ratio	0.06	0.49	0.17	0.82	0.75	0.46	0.34	0.67
Control Delay	14.8	17.2	15.6	29.0	48.1	19.6	40.5	32.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.8	17.2	15.6	29.0	48.1	19.6	40.5	32.1
LOS	B	B	B	C	D	B	D	C
Approach Delay		17.2		27.8		31.1		33.4
Approach LOS		B		C		C		C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 66.3
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 27.8
Intersection Capacity Utilization 77.0%
Analysis Period (min) 15

Splits and Phases: 7: Elm Street & Broadway St



HCM Signalized Intersection Capacity Analysis
7: Elm Street & Broadway St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1692	1712		1706	1758		1728	1745		1728	1802	
Flt Permitted	0.19	1.00		0.44	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	331	1712		787	1758		1728	1745		1728	1802	
Volume (vph)	10	255	80	55	485	80	225	255	75	50	280	15
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	255	80	55	485	80	225	255	75	50	280	15
RTOR Reduction (vph)	0	15	0	0	8	0	0	12	0	0	2	0
Lane Group Flow (vph)	10	320	0	55	557	0	225	318	0	50	293	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		2			2		7	4		3	8	
Permitted Phases	2			2								
Actuated Green, G (s)	24.7	24.7		24.7	24.7		11.6	25.7		3.1	17.2	
Effective Green, g (s)	25.7	25.7		25.7	25.7		11.6	26.7		3.1	18.2	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.17	0.40		0.05	0.27	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	126	652		300	669		297	690		79	486	
v/s Ratio Prot		0.19			c0.32		c0.13	0.18		0.03	c0.16	
v/s Ratio Perm	0.03			0.07								
v/c Ratio	0.08	0.49		0.18	0.83		0.76	0.46		0.63	0.60	
Uniform Delay, d1	13.3	15.9		13.9	18.9		26.6	15.1		31.6	21.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.6		0.3	8.7		10.5	0.5		15.4	2.1	
Delay (s)	13.6	16.5		14.2	27.7		37.1	15.6		47.0	23.6	
Level of Service	B	B		B	C		D	B		D	C	
Approach Delay (s)	16.4			26.5			24.3			27.0		
Approach LOS	B			C			C			C		

Intersection Summary

HCM Average Control Delay	24.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	67.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
12: W Holly St & Broadway St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Volume (vph)	90	590	5	720	5	200	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases		2		2	4		4
Permitted Phases	2		2			4	
Detector Phases	2	2	2	2	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	54.0	54.0	54.0	54.0	26.0	26.0	26.0
Total Split (%)	67.5%	67.5%	67.5%	67.5%	32.5%	32.5%	32.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None
Act Effct Green (s)		46.2		46.2	15.6	15.6	15.6
Actuated g/C Ratio		0.72		0.72	0.24	0.24	0.24
v/c Ratio		0.66		0.80	0.02	0.63	0.17
Control Delay		12.7		17.2	17.0	34.7	0.7
Queue Delay		0.0		0.0	0.0	0.0	0.0
Total Delay		12.7		17.2	17.0	34.7	0.7
LOS		B		B	B	C	A
Approach Delay		12.7		17.2	17.0		24.2
Approach LOS		B		B	B		C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 64.1
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 16.7
Intersection Capacity Utilization 119.1%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service H

Splits and Phases: 12: W Holly St & Broadway St



HCM Signalized Intersection Capacity Analysis
12: W Holly St & Broadway St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00			0.99		1.00	0.97	
Flpb, ped/bikes		1.00			1.00			1.00		0.99	1.00	
Frt		1.00			0.96			0.93		1.00	0.85	
Flt Protected		0.99			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1806			1724			1698		1718	1501	
Flt Permitted		0.79			1.00			1.00		0.75	1.00	
Satd. Flow (perm)		1438			1720			1698		1359	1501	
Volume (vph)	90	590	0	5	720	280	0	5	5	200	0	90
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	90	590	0	5	720	280	0	5	5	200	0	90
RTOR Reduction (vph)	0	0	0	0	15	0	0	4	0	0	72	0
Lane Group Flow (vph)	0	680	0	0	990	0	0	6	0	200	18	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases		2			2			4		4		4
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		42.6			42.6			11.7		11.7		11.7
Effective Green, g (s)		43.6			43.6			12.7		12.7		12.7
Actuated g/C Ratio		0.68			0.68			0.20		0.20		0.20
Clearance Time (s)		5.0			5.0			5.0		5.0		5.0
Vehicle Extension (s)		3.0			3.0			3.0		3.0		3.0
Lane Grp Cap (vph)		975			1166			335		268		296
v/s Ratio Prot								0.00				0.01
v/s Ratio Perm		0.47			0.58					0.15		
v/c Ratio		0.70			0.85			0.02		0.75		0.06
Uniform Delay, d1		6.3			7.9			20.8		24.3		21.0
Progression Factor		1.00			1.00			1.00		1.00		1.00
Incremental Delay, d2		2.2			5.9			0.0		10.8		0.1
Delay (s)		8.5			13.8			20.8		35.0		21.0
Level of Service		A			B			C		D		C
Approach Delay (s)		8.5			13.8			20.8		30.7		
Approach LOS		A			B			C				C

Intersection Summary

HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	64.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	119.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Timings
13: W Holly St & F St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø1	ø2	ø3	ø4
Lane Configurations												
Volume (vph)	55	545	65	760	110	400	85	235				
Turn Type	Perm		Perm		Perm		Perm					
Protected Phases		2 4		2 4		1 3		1 3	1	2	3	4
Permitted Phases	2 4		2 4		1 3		1 3					
Detector Phases	2 4	2 4	2 4	2 4	1 3	1 3	1 3	1 3				
Minimum Initial (s)									6.0	6.0	6.0	6.0
Minimum Split (s)									24.0	24.0	24.0	28.0
Total Split (s)	77.0	77.0	77.0	77.0	48.0	48.0	48.0	48.0	24.0	49.0	24.0	28.0
Total Split (%)	61.6%	61.6%	61.6%	61.6%	38.4%	38.4%	38.4%	38.4%	19%	39%	19%	22%
Yellow Time (s)									4.0	4.0	4.0	4.0
All-Red Time (s)									1.0	1.0	1.0	5.0
Lead/Lag									Lead	Lag	Lead	Lag
Lead-Lag Optimize?												
Recall Mode									Min	None	None	None
Act Effct Green (s)	69.0	69.0	69.0	69.0		40.0		40.0				
Actuated g/C Ratio	0.55	0.55	0.55	0.55		0.32		0.32				
v/c Ratio	0.52	0.72	0.31	0.88		1.30		0.56				
Control Delay	30.2	15.5	11.9	26.5		169.3		21.6				
Queue Delay	0.0	0.2	0.1	0.0		0.0		0.2				
Total Delay	30.2	15.7	12.0	26.5		169.3		21.8				
LOS	C	B	B	C		F		C				
Approach Delay		16.7		25.5		169.3		21.8				
Approach LOS		B		C		F		C				

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 125

Natural Cycle: 145

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.35

Intersection Signal Delay: 52.2

Intersection LOS: D

Intersection Capacity Utilization 103.7%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 13: W Holly St & F St



Timings
13: W Holly St & F St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	ø5	ø6
Lane Configurations		
Volume (vph)		
Turn Type		
Protected Phases	5	6
Permitted Phases		
Detector Phases		
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	28.0	24.0
Total Split (s)	28.0	45.0
Total Split (%)	22%	36%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	5.0	1.0
Lead/Lag	Lead	Lag
Lead-Lag Optimize?		
Recall Mode	None	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		

Intersection Summary

HCM Signalized Intersection Capacity Analysis 13: W Holly St & F St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱			↰	↱	↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			0.95	
Frt	1.00	0.97		1.00	0.98			0.99			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1728	1757		1711	1768			1787			3308	
Flt Permitted	0.13	1.00		0.23	1.00			0.69			0.59	
Satd. Flow (perm)	232	1757		414	1768			1245			1977	
Volume (vph)	55	545	160	65	760	105	110	400	30	85	235	55
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	545	160	65	760	105	110	400	30	85	235	55
RTOR Reduction (vph)	0	8	0	0	4	0	0	1	0	0	11	0
Lane Group Flow (vph)	55	697	0	65	861	0	0	539	0	0	364	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2 4			2 4			1 3			1 3	
Permitted Phases	2 4			2 4			1 3			1 3		
Actuated Green, G (s)	70.2	70.2		70.2	70.2			38.0			38.0	
Effective Green, g (s)	76.2	76.2		76.2	76.2			40.0			40.0	
Actuated g/C Ratio	0.58	0.58		0.58	0.58			0.30			0.30	
Clearance Time (s)												
Vehicle Extension (s)												
Lane Grp Cap (vph)	134	1013		239	1019			377			598	
v/s Ratio Prot		0.40			c0.49							
v/s Ratio Perm	0.24			0.16				c0.43			0.18	
v/c Ratio	0.41	0.69		0.27	0.85			1.43			0.61	
Uniform Delay, d1	15.5	19.7		14.1	23.1			46.1			39.4	
Progression Factor	1.00	1.00		1.00	1.00			0.86			1.00	
Incremental Delay, d2	2.0	2.0		0.6	6.6			201.2			1.8	
Delay (s)	17.6	21.6		14.7	29.7			241.0			41.2	
Level of Service	B	C		B	C			F			D	
Approach Delay (s)		21.3			28.6			241.0			41.2	
Approach LOS		C			C			F			D	
Intersection Summary												
HCM Average Control Delay		72.3										
HCM Volume to Capacity ratio		1.05										
Actuated Cycle Length (s)		132.2						16.0				
Intersection Capacity Utilization		103.7%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 14: W Holly St & C St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↰			↰			↰	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	680	45	105	970	85	25	25	85	55	20	5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	680	45	105	970	85	25	25	85	55	20	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		753										
pX, platoon unblocked				0.75			0.75	0.75	0.75	0.75	0.75	
vC, conflicting volume	1055			725			1950	1978	702	2032	1958	1012
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1055			635			2260	2297	605	2370	2270	1012
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			85			0	1	77	0	23	98
cM capacity (veh/h)	664			718			7	25	378	1	26	293
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	730	1160	135	80								
Volume Left	5	105	25	55								
Volume Right	45	85	85	5								
cSH	664	718	29	1								
Volume to Capacity	0.01	0.15	4.64	88.35								
Queue Length 95th (ft)	1	13	Err	Err								
Control Delay (s)	0.2	4.8	Err	Err								
Lane LOS	A	A	F	F								
Approach Delay (s)	0.2	4.8	Err	Err								
Approach LOS		F	F	F								
Intersection Summary												
Average Delay		1024.0										
Intersection Capacity Utilization		121.9%										
ICU Level of Service										H		
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
24: E Chestnut St & Railroad Ave

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔↔						↕			↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	95	1120	35	0	0	0	0	60	65	115	100	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	95	1120	35	0	0	0	0	60	65	115	100	0
Pedestrians					41			41			11	
Lane Width (ft)					0.0			11.0			11.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			3			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		353			350							
pX, platoon unblocked												
vC, conflicting volume	11			1196			1418	1380	473	710	1397	11
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	11			1196			1418	1380	473	710	1397	11
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			100	54	88	32	22	100
cM capacity (veh/h)	1600			572			32	132	526	169	129	1065
Direction, Lane #	EB 1	EB 2	EB 3	NB 1	SB 1							
Volume Total	375	560	315	125	215							
Volume Left	95	0	0	0	115							
Volume Right	0	0	35	65	0							
cSH	1600	1700	1700	216	147							
Volume to Capacity	0.06	0.33	0.19	0.58	1.46							
Queue Length 95th (ft)	5	0	0	80	354							
Control Delay (s)	2.3	0.0	0.0	42.4	295.9							
Lane LOS	A			E	F							
Approach Delay (s)	0.7			42.4	295.9							
Approach LOS				E	F							
Intersection Summary												
Average Delay	43.9											
Intersection Capacity Utilization	58.3%			ICU Level of Service			B					
Analysis Period (min)	15											

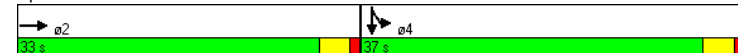
Timings

25: E Chestnut St & N State St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

			
Lane Group	EBT	SBL	SBT
Lane Configurations	↑↑↑	↑	↑↑
Volume (vph)	945	240	750
Turn Type	Split		
Protected Phases	2	4	4
Permitted Phases			
Detector Phases	2	4	4
Minimum Initial (s)	6.0	6.0	6.0
Minimum Split (s)	22.0	20.0	20.0
Total Split (s)	33.0	37.0	37.0
Total Split (%)	47.1%	52.9%	52.9%
Yellow Time (s)	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	Max	Max	Max
Act Effct Green (s)	29.0	33.0	33.0
Actuated g/C Ratio	0.41	0.47	0.47
v/c Ratio	0.71	0.29	0.46
Control Delay	17.4	9.8	13.7
Queue Delay	0.0	0.0	0.0
Total Delay	17.4	9.8	13.7
LOS	B	A	B
Approach Delay	17.4	12.7	
Approach LOS	B	B	
Intersection Summary			
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 0 (0%), Referenced to phase 4:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 15.5		Intersection LOS: B	
Intersection Capacity Utilization 57.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 25: E Chestnut St & N State St



HCM Signalized Intersection Capacity Analysis
25: E Chestnut St & N State St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑	↑↑↑								↓	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0								4.0	4.0	
Lane Util. Factor		0.91								1.00	0.95	
Frpb, ped/bikes		0.98								1.00	1.00	
Flpb, ped/bikes		1.00								1.00	1.00	
Frt		0.95								1.00	1.00	
Flt Protected		1.00								0.95	1.00	
Satd. Flow (prot)		4629								1728	3455	
Flt Permitted		1.00								0.95	1.00	
Satd. Flow (perm)		4629								1728	3455	
Volume (vph)	0	945	465	0	0	0	0	0	0	240	750	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	945	465	0	0	0	0	0	0	240	750	0
RTOR Reduction (vph)	0	78	0	0	0	0	0	0	0	27	0	0
Lane Group Flow (vph)	0	1332	0	0	0	0	0	0	0	213	750	0
Confl. Peds. (#/hr)		40								40		
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Turn Type										Split		
Protected Phases		2								4	4	
Permitted Phases												
Actuated Green, G (s)		29.0								33.0	33.0	
Effective Green, g (s)		29.0								33.0	33.0	
Actuated g/C Ratio		0.41								0.47	0.47	
Clearance Time (s)		4.0								4.0	4.0	
Lane Grp Cap (vph)		1918								815	1629	
v/s Ratio Prot		c0.29								0.12	c0.22	
v/s Ratio Perm												
v/c Ratio		0.69								0.26	0.46	
Uniform Delay, d1		16.9								11.2	12.5	
Progression Factor		1.04								1.00	1.00	
Incremental Delay, d2		1.3								0.8	0.9	
Delay (s)		18.9								11.9	13.4	
Level of Service		B								B	B	
Approach Delay (s)		18.9			0.0			0.0			13.1	
Approach LOS		B			A			A			B	
Intersection Summary												
HCM Average Control Delay		16.5										
HCM Volume to Capacity ratio		0.57										
Actuated Cycle Length (s)		70.0								8.0		
Intersection Capacity Utilization		57.2%										
Analysis Period (min)		15										
c Critical Lane Group												

Timings
26: E Chestnut St & N Forest St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

	→	↑
Lane Group	EBT	NBT
Lane Configurations	↕↕↕	↕↕
Volume (vph)	955	725
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phases	2	4
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	22.0	21.0
Total Split (s)	38.0	32.0
Total Split (%)	54.3%	45.7%
Yellow Time (s)	3.0	3.0
All-Red Time (s)	1.0	1.0
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	Max
Act Effct Green (s)	34.0	28.0
Actuated g/C Ratio	0.49	0.40
v/c Ratio	0.50	0.71
Control Delay	5.8	19.8
Queue Delay	0.1	0.0
Total Delay	5.9	19.8
LOS	A	B
Approach Delay	5.9	19.8
Approach LOS	A	B
Intersection Summary		
Cycle Length: 70		
Actuated Cycle Length: 70		
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Green		
Natural Cycle: 45		
Control Type: Pretimed		
Maximum v/c Ratio: 0.71		
Intersection Signal Delay: 11.9		Intersection LOS: B
Intersection Capacity Utilization 58.9%		ICU Level of Service B
Analysis Period (min) 15		

Splits and Phases: 26: E Chestnut St & N Forest St



HCM Signalized Intersection Capacity Analysis
26: E Chestnut St & N Forest St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑↑						↑↑				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0				
Lane Util. Factor		0.91						0.95				
Frpb, ped/bikes		1.00						0.99				
Flpb, ped/bikes		1.00						1.00				
Frt		1.00						0.96				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		4959						3250				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		4959						3250				
Volume (vph)	275	955	0	0	0	0	0	725	230	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	275	955	0	0	0	0	0	725	230	0	0	0
RTOR Reduction (vph)	0	51	0	0	0	0	0	43	0	0	0	0
Lane Group Flow (vph)	0	1179	0	0	0	0	0	912	0	0	0	0
Confl. Peds. (#/hr)	40								40			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	Split											
Protected Phases	2	2						4				
Permitted Phases												
Actuated Green, G (s)		34.0						28.0				
Effective Green, g (s)		34.0						28.0				
Actuated g/C Ratio		0.49						0.40				
Clearance Time (s)		4.0						4.0				
Lane Grp Cap (vph)		2409						1300				
v/s Ratio Prot		c0.24						c0.28				
v/s Ratio Perm												
v/c Ratio		0.49						0.70				
Uniform Delay, d1		12.1						17.5				
Progression Factor		0.46						1.00				
Incremental Delay, d2		0.6						3.2				
Delay (s)		6.2						20.7				
Level of Service		A						C				
Approach Delay (s)		6.2			0.0			20.7			0.0	
Approach LOS		A			A			C			A	
Intersection Summary												
HCM Average Control Delay			12.5			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			58.9%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
28: Laurel St & N State St

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											  	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	370	215	30	435	0	0	0	0	5	1125	85
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	370	215	30	435	0	0	0	0	5	1125	85
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)											1046	
pX, platoon unblocked												
vC, conflicting volume	1395	1178	418	785	1220	0	1210			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1395	1178	418	785	1220	0	1210			0		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	63	0	0	100	100			100		
cM capacity (veh/h)	0	189	584	0	178	1091	572			1629		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2	SB 3							
Volume Total	585	465	286	562	366							
Volume Left	0	30	5	0	0							
Volume Right	215	0	0	0	85							
cSH	252	0	1629	1700	1700							
Volume to Capacity	2.33	Err	0.00	0.33	0.22							
Queue Length 95th (ft)	1160	Err	0	0	0							
Control Delay (s)	640.1	Err	0.2	0.0	0.0							
Lane LOS	F	F	A									
Approach Delay (s)	640.1	Err	0.0									
Approach LOS	F	F										
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization			77.9%		ICU Level of Service				D			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 29: Laurel St & N Forest St

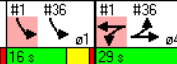
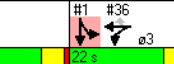
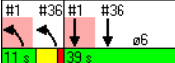
Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	335	70	0	0	185	110	260	675	30	0	0	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	335	70	0	0	185	110	260	675	30	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)											1032	
pX, platoon unblocked												
vC, conflicting volume	1060	1225	0	1245	1210	352	0			705		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1060	1225	0	1245	1210	352	0			705		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	53	100	100	0	83	84			100		
cM capacity (veh/h)	0	149	1084	74	155	650	1622			902		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	405	295	598	368								
Volume Left	335	0	260	0								
Volume Right	0	110	0	30								
cSH	0	216	1622	1700								
Volume to Capacity	Err	1.37	0.16	0.22								
Queue Length 95th (ft)	Err	414	14	0								
Control Delay (s)	Err	234.5	4.2	0.0								
Lane LOS	F	F	A									
Approach Delay (s)	Err	234.5	2.6									
Approach LOS	F	F										
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization			75.8%		ICU Level of Service				D			
Analysis Period (min)			15									

Timings

36: Birchwood Ave & Meridian Street

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT	ø2	ø5	ø7
Lane Configurations											
Volume (vph)	280	185	240	365	95	1095	165	970			
Turn Type	Split			Perm	Prot		Prot				
Protected Phases	4	4	3		5 7	2 7	1	6	2	5	7
Permitted Phases				3							
Detector Phases	4	4	3	3	5 7	2 7	1	6			
Minimum Initial (s)	6.0	6.0	6.0	6.0			6.0	10.0	10.0	6.0	6.0
Minimum Split (s)	29.0	29.0	11.0	11.0			11.0	23.0	23.0	11.0	29.0
Total Split (s)	29.0	29.0	22.0	22.0	40.0	63.0	16.0	39.0	34.0	11.0	29.0
Total Split (%)	22.3%	22.3%	16.9%	16.9%	30.8%	48.5%	12.3%	30.0%	26%	8%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lead	Lag	Lag			Lag	Lag	Lead	Lead	
Lead-Lag Optimize?											
Recall Mode	None	None	None	None			None	None	Max	None	None
Act Effect Green (s)	23.3	23.3	18.0	18.0	36.0	59.0	12.0	35.0			
Actuated g/C Ratio	0.18	0.18	0.14	0.14	0.28	0.46	0.09	0.27			
v/c Ratio	0.85	0.76	1.22	0.89	0.19	0.70	1.01	1.36			
Control Delay	74.8	62.2	172.4	45.7	51.7	8.6	129.8	204.9			
Queue Delay	0.0	0.5	76.1	0.0	0.0	4.6	0.0	0.6			
Total Delay	74.8	62.7	248.6	45.7	51.7	13.2	129.8	205.6			
LOS	E	E	F	D	D	B	F	F			
Approach Delay	69.0		140.5		16.2		197.0				
Approach LOS	E		F		B		F				
Intersection Summary											
Cycle Length: 130											
Actuated Cycle Length: 128.4											
Natural Cycle: 145											
Control Type: Actuated-Uncoordinated											
Maximum v/c Ratio: 1.36											
Intersection Signal Delay: 112.3						Intersection LOS: F					
Intersection Capacity Utilization 88.0%						ICU Level of Service E					
Analysis Period (min) 15											
Splits and Phases: 36: Birchwood Ave & Meridian Street											
											
34 s			16 s			29 s			22 s		
											
11 s			39 s								

HCM Signalized Intersection Capacity Analysis
36: Birchwood Ave & Meridian Street

Alternative 2A (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1818			1877	1615	1787	3553		1752	3376	
Flt Permitted	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	1818			1877	1615	1787	3553		1752	3376	
Volume (vph)	280	185	75	80	240	365	95	1095	45	165	970	315
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	280	185	75	80	240	365	95	1095	45	165	970	315
RTOR Reduction (vph)	0	11	0	0	0	186	0	2	0	0	24	0
Lane Group Flow (vph)	280	249	0	0	320	179	95	1138	0	165	1261	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split		Perm	Prot			Prot		
Protected Phases	4	4		3	3		5 7	2 7		1	6	
Permitted Phases						3						
Actuated Green, G (s)	22.3	22.3			17.0	17.0	35.0	58.0		11.0	34.0	
Effective Green, g (s)	23.3	23.3			18.0	18.0	36.0	59.0		12.0	35.0	
Actuated g/C Ratio	0.18	0.18			0.14	0.14	0.28	0.46		0.09	0.27	
Clearance Time (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Vehicle Extension (s)	3.0	3.0			2.0	2.0				2.0	2.0	
Lane Grp Cap (vph)	328	330			263	227	501	1634		164	921	
v/s Ratio Prot	c0.16	0.14			c0.17		0.05	c0.32		0.09	c0.37	
v/s Ratio Perm						0.11						
v/c Ratio	0.85	0.75			1.22	0.79	0.19	0.70		1.01	1.37	
Uniform Delay, d1	50.8	49.8			55.2	53.3	35.1	27.5		58.2	46.7	
Progression Factor	1.00	1.00			1.00	1.00	1.43	0.30		1.00	1.00	
Incremental Delay, d2	18.9	9.4			127.0	15.4	0.0	0.1		71.9	173.1	
Delay (s)	69.8	59.1			182.2	68.7	50.1	8.3		130.0	219.7	
Level of Service	E	E			F	E	D	A		F	F	
Approach Delay (s)		64.6			121.7		11.6			209.5		
Approach LOS		E			F		B			F		
Intersection Summary												
HCM Average Control Delay		111.6										F
HCM Volume to Capacity ratio		1.03										
Actuated Cycle Length (s)		128.3							16.0			
Intersection Capacity Utilization		88.0%										E
Analysis Period (min)		15										
c Critical Lane Group												

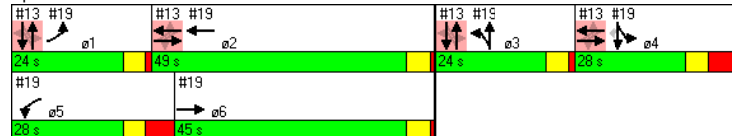
Timings
19: Roeder Ave & F St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Volume (vph)	220	470	5	510	30	30	10	185
Turn Type	Prot		Prot		Split		Perm	
Protected Phases	1	6	5	2	3	3	4	
Permitted Phases								4
Detector Phases	1	6	5	2	3	3	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	28.0	24.0	24.0	24.0	28.0	28.0
Total Split (s)	24.0	45.0	28.0	49.0	24.0	24.0	28.0	28.0
Total Split (%)	19.2%	36.0%	22.4%	39.2%	19.2%	19.2%	22.4%	22.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	5.0	1.0	1.0	1.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?								
Recall Mode	Min	Max	None	None	None	None	None	None
Act Effct Green (s)	18.7	62.2	11.3	42.5	17.7	17.7	23.6	23.6
Actuated g/C Ratio	0.16	0.52	0.10	0.36	0.15	0.15	0.20	0.20
v/c Ratio	0.85	0.54	0.03	0.91	0.14	0.16	0.48	0.42
Control Delay	77.4	23.0	52.2	57.1	47.1	42.4	46.5	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1	1.0	0.3
Total Delay	77.4	23.0	52.2	57.1	47.1	42.6	47.5	10.4
LOS	E	C	D	E	D	D	D	B
Approach Delay		39.8		57.0		44.7	27.3	
Approach LOS		D		E		D	C	

Intersection Summary	
Cycle Length: 125	
Actuated Cycle Length: 118.7	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 43.2	Intersection LOS: D
Intersection Capacity Utilization 67.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 19: Roeder Ave & F St



HCM Signalized Intersection Capacity Analysis
19: Roeder Ave & F St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.99		1.00	0.99		1.00	0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.96	1.00
Satd. Flow (prot)	1728	1807		1711	1779		1479	1525			1720	1531
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.96	1.00
Satd. Flow (perm)	1728	1807		1711	1779		1479	1525			1720	1531
Volume (vph)	220	470	20	5	510	45	30	30	5	145	10	185
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	232	495	21	5	537	47	32	32	5	153	11	195
RTOR Reduction (vph)	0	1	0	0	2	0	0	4	0	0	0	159
Lane Group Flow (vph)	232	515	0	5	582	0	32	33	0	0	164	36
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	18%	18%	18%	2%	2%	2%
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	17.7	61.2		1.3	48.8		16.7	16.7			18.5	18.5
Effective Green, g (s)	18.7	62.2		6.3	49.8		17.7	17.7			23.5	23.5
Actuated g/C Ratio	0.15	0.49		0.05	0.40		0.14	0.14			0.19	0.19
Clearance Time (s)	5.0	5.0		9.0	5.0		5.0	5.0			9.0	9.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	257	894		86	705		208	215			322	286
v/s Ratio Prot	c0.13	0.28		0.00	c0.33		c0.02	0.02			c0.10	
v/s Ratio Perm												0.02
v/c Ratio	0.90	0.58		0.06	0.82		0.15	0.15			0.51	0.13
Uniform Delay, d1	52.6	22.4		56.9	34.0		47.4	47.4			45.9	42.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			0.94	1.23
Incremental Delay, d2	31.7	2.7		0.3	7.8		0.3	0.3			1.2	0.2
Delay (s)	84.3	25.1		57.2	41.8		47.8	47.7			44.4	52.6
Level of Service	F	C		E	D		D	D			D	D
Approach Delay (s)		43.5			42.0			47.8			48.8	
Approach LOS		D			D			D			D	

Intersection Summary	
HCM Average Control Delay	44.2
HCM Volume to Capacity ratio	0.66
Actuated Cycle Length (s)	125.7
Intersection Capacity Utilization	67.0%
Analysis Period (min)	15
c Critical Lane Group	

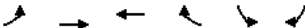
HCM Unsignalized Intersection Capacity Analysis
20: Roeder Ave & C St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control	Free				Free				Stop		Stop		
Grade	0%				0%				0%		0%		
Volume (veh/h)	15	620	20	55	530	15	25	20	75	30	10	15	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	16	653	21	58	558	16	26	21	79	32	11	16	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type							None			None			
Median storage (veh)													
Upstream signal (ft)	735												
pX, platoon unblocked				0.80			0.80			0.80			
vC, conflicting volume	574				674			1397			1384		
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	574				591			1498			1482		
tC, single (s)	4.1				4.1			7.1			6.5		
tC, 2 stage (s)													
tF (s)	2.2				2.2			3.5			4.0		
p0 queue free %	98				93			61			77		
cM capacity (veh/h)	1009				793			67			92		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	689	632	126	58									
Volume Left	16	58	26	32									
Volume Right	21	16	79	16									
cSH	1009	793	156	67									
Volume to Capacity	0.02	0.07	0.81	0.86									
Queue Length 95th (ft)	1	6	132	103									
Control Delay (s)	0.4	1.9	86.9	174.3									
Lane LOS	A	A	F	F									
Approach Delay (s)	0.4	1.9	86.9	174.3									
Approach LOS			F	F									
Intersection Summary													
Average Delay			15.0										
Intersection Capacity Utilization			70.9%	ICU Level of Service				C					
Analysis Period (min)			15										

HCM Unsignalized Intersection Capacity Analysis
21: E Chestnut St & Bay St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	640	425	25	380	55
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	674	447	26	400	58
Pedestrians		10			10	
Lane Width (ft)		11.0			11.0	
Walking Speed (ft/s)		4.0			4.0	
Percent Blockage		1			1	
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			356			
pX, platoon unblocked	0.89				0.89	0.89
vC, conflicting volume	484				1165	481
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	417				1187	413
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				0	90
cM capacity (veh/h)	1008				183	561
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	11	674	474	458		
Volume Left	11	0	0	400		
Volume Right	0	0	26	58		
cSH	1008	1700	1700	200		
Volume to Capacity	0.01	0.40	0.28	2.29		
Queue Length 95th (ft)	1	0	0	923		
Control Delay (s)	8.6	0.0	0.0	634.9		
Lane LOS	A			F		
Approach Delay (s)	0.1		0.0	634.9		
Approach LOS				F		
Intersection Summary						
Average Delay			180.0			
Intersection Capacity Utilization	64.9%			ICU Level of Service	C	
Analysis Period (min)			15			

Timings
22: E Chestnut St & Commercial St

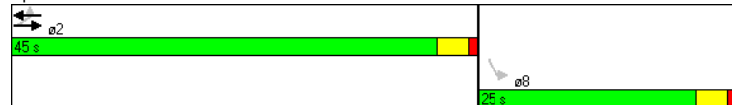
Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations		↕↕	↕	↕
Volume (vph)	85	910	405	150
Turn Type	Perm			
Protected Phases		2	2	
Permitted Phases	2			8
Detector Phases	2	2	2	8
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	26.0	26.0	26.0	19.0
Total Split (s)	45.0	45.0	45.0	25.0
Total Split (%)	64.3%	64.3%	64.3%	35.7%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)		41.0	41.0	21.0
Actuated g/C Ratio		0.59	0.59	0.30
v/c Ratio		0.60	0.44	0.51
Control Delay		11.0	19.7	20.6
Queue Delay		0.1	3.9	0.0
Total Delay		11.1	23.6	20.6
LOS		B	C	C
Approach Delay		11.1	23.6	20.6
Approach LOS		B	C	C

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 15.8
Intersection Capacity Utilization 75.8%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service D

Splits and Phases: 22: E Chestnut St & Commercial St



HCM Signalized Intersection Capacity Analysis
22: E Chestnut St & Commercial St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕		↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		0.95	1.00		1.00	
Frpb, ped/bikes		1.00	1.00		0.97	
Flpb, ped/bikes		1.00	1.00		0.98	
Frt		1.00	0.99		0.95	
Flt Protected		1.00	1.00		0.97	
Satd. Flow (prot)		3436	1777		1586	
Flt Permitted		0.87	1.00		0.97	
Satd. Flow (perm)		3001	1777		1586	
Volume (vph)	85	910	405	30	150	95
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	89	958	426	32	158	100
RTOR Reduction (vph)	0	0	4	0	32	0
Lane Group Flow (vph)	0	1047	454	0	226	0
Confl. Peds. (#/hr)		20		20	20	20
Heavy Vehicles (%)	1%	1%	2%	2%	2%	2%
Turn Type	Perm					
Protected Phases		2	2			
Permitted Phases	2				8	
Actuated Green, G (s)		41.0	41.0		21.0	
Effective Green, g (s)		41.0	41.0		21.0	
Actuated g/C Ratio		0.59	0.59		0.30	
Clearance Time (s)		4.0	4.0		4.0	
Lane Grp Cap (vph)		1758	1041		476	
v/s Ratio Prot			0.26			
v/s Ratio Perm		c0.35			c0.14	
v/c Ratio		0.60	0.44		0.47	
Uniform Delay, d1		9.2	8.1		20.0	
Progression Factor		1.00	2.39		1.00	
Incremental Delay, d2		1.5	0.1		3.4	
Delay (s)		10.7	19.4		23.4	
Level of Service		B	B		C	
Approach Delay (s)		10.7	19.4		23.4	
Approach LOS		B	B		C	

Intersection Summary

HCM Average Control Delay	14.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
23: E Chestnut St & Cornwall Ave

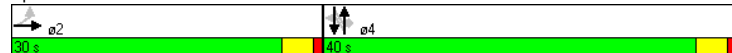
Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	→	↖	↑	↗	↘	↓
Lane Group	EBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↔↔		↔	↗		↔↔
Volume (vph)	800	410	215	55	100	95
Turn Type	Perm			Perm	Perm	
Protected Phases	2		4		4	
Permitted Phases	4			4	4	
Detector Phases	2	4	4	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	26.0	19.0	19.0	19.0	19.0	19.0
Total Split (s)	30.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	57.1%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	26.0		36.0	36.0		36.0
Actuated g/C Ratio	0.37		0.51	0.51		0.51
v/c Ratio	0.94		1.10	0.08		0.53
Control Delay	29.4		87.5	4.9		12.9
Queue Delay	1.7		18.9	0.0		0.2
Total Delay	31.0		106.4	4.9		13.1
LOS	C		F	A		B
Approach Delay	31.0		98.2			13.1
Approach LOS	C		F			B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 60
Control Type: Pretimed
Maximum v/c Ratio: 1.10
Intersection Signal Delay: 51.8
Intersection Capacity Utilization 89.4%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service E

Splits and Phases: 23: E Chestnut St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
23: E Chestnut St & Cornwall Ave

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↘	↗	←	↖	↗	↑	↘	↗	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔	↗		↔↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0		4.0	
Lane Util. Factor		0.95						1.00	1.00		1.00	
Frpb, ped/bikes		0.98						1.00	0.92		0.98	
Flpb, ped/bikes		1.00						0.95	1.00		1.00	
Frt		0.97						1.00	0.85		0.98	
Flt Protected		1.00						0.97	1.00		0.98	
Satd. Flow (prot)		3239						1657	1407		1742	
Flt Permitted		1.00						0.68	1.00		0.47	
Satd. Flow (perm)		3239						1166	1407		837	
Volume (vph)	60	800	255	0	0	0	410	215	55	100	95	25
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	842	268	0	0	0	432	226	58	105	100	26
RTOR Reduction (vph)	0	40	0	0	0	0	0	0	17	0	6	0
Lane Group Flow (vph)	0	1133	0	0	0	0	0	658	41	0	225	0
Confl. Peds. (#/hr)	50		50				50		50	50		50
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	Perm						Perm			Perm	Perm	
Protected Phases	2						4			4	4	
Permitted Phases	2						4			4		
Actuated Green, G (s)		26.0						36.0	36.0		36.0	
Effective Green, g (s)		26.0						36.0	36.0		36.0	
Actuated g/C Ratio		0.37						0.51	0.51		0.51	
Clearance Time (s)		4.0						4.0	4.0		4.0	
Lane Grp Cap (vph)		1203						600	724		430	
v/s Ratio Prot												
v/s Ratio Perm		0.35						0.56	0.03		0.27	
v/c Ratio		0.94						1.10	0.06		0.52	
Uniform Delay, d1		21.3						17.0	8.5		11.3	
Progression Factor		0.69						1.00	1.00		0.78	
Incremental Delay, d2		13.5						65.9	0.1		3.8	
Delay (s)		28.2						82.9	8.6		12.6	
Level of Service		C						F	A		B	
Approach Delay (s)		28.2			0.0			76.9			12.6	
Approach LOS		C			A			E			B	

Intersection Summary

HCM Average Control Delay	42.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

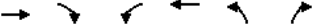
HCM Unsignalized Intersection Capacity Analysis
38: Roeder Ave & Central Ave

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control	Free				Free				Stop				
Grade	0%				0%				0%				
Volume (veh/h)	55	590	20	5	450	15	10	5	5	100	30	210	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	58	621	21	5	474	16	11	5	5	105	32	221	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type									None		None		
Median storage (veh)													
Upstream signal (ft)	1113												
pX, platoon unblocked													
vC, conflicting volume	489			642				1476	1247	632	1247	482	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	489			642				1476	1247	632	1247	482	
tC, single (s)	4.1			4.1				7.1	6.5	6.2	7.1	6.2	
tC, 2 stage (s)													
tF (s)	2.2			2.2				3.5	4.0	3.3	3.5	3.3	
p0 queue free %	95			99				80	97	99	24	62	
cM capacity (veh/h)	1074			942				53	163	481	138	585	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	700	495	21	358									
Volume Left	58	5	11	105									
Volume Right	21	16	5	221									
cSH	1074	942	87	268									
Volume to Capacity	0.05	0.01	0.24	1.33									
Queue Length 95th (ft)	4	0	22	461									
Control Delay (s)	1.4	0.2	59.3	210.2									
Lane LOS	A	A	F	F									
Approach Delay (s)	1.4	0.2	59.3	210.2									
Approach LOS					F	F							
Intersection Summary													
Average Delay					49.3								
Intersection Capacity Utilization	92.0%				ICU Level of Service				F				
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis
39: Roeder Ave & Hilton Ave

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	710	30	30	670	35	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	747	32	32	705	37	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	544					
pX, platoon unblocked	0.71					
vC, conflicting volume				779	1532	763
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol				779	1745	763
tC, single (s)				4.1	6.4	6.2
tC, 2 stage (s)						
tF (s)				2.2	3.5	3.3
p0 queue free %				96	43	92
cM capacity (veh/h)				838	65	404
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	779	737	68			
Volume Left	0	32	37			
Volume Right	32	0	32			
cSH	1700	838	106			
Volume to Capacity	0.46	0.04	0.64			
Queue Length 95th (ft)	0	3	81			
Control Delay (s)	0.0	1.0	86.1			
Lane LOS		A	F			
Approach Delay (s)	0.0	1.0	86.1			
Approach LOS				F		
Intersection Summary						
Average Delay				4.2		
Intersection Capacity Utilization	70.1%			ICU Level of Service		C
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
47: Wharf St/Pine St & Cornwall Ave

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Sign Control	Free			Free			Stop			Stop				
Grade	0%			0%			0%			0%				
Volume (veh/h)	50	25	10	45	35	35	10	20	10	10	30	15		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Hourly flow rate (vph)	53	26	11	47	37	37	11	21	11	11	32	16		
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)														
Median type							None			None				
Median storage (veh)														
Upstream signal (ft)														
pX, platoon unblocked														
vC, conflicting volume	74				37				318	305	32	308	292	55
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	74				37				318	305	32	308	292	55
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97				97				98	96	99	98	95	98
cM capacity (veh/h)	1526				1574				570	570	1042	590	579	1012
Direction, Lane #	EB 1	WB 1	NB 1	SB 1										
Volume Total	89	121	42	58										
Volume Left	53	47	11	11										
Volume Right	11	37	11	16										
cSH	1526	1574	642	658										
Volume to Capacity	0.03	0.03	0.07	0.09										
Queue Length 95th (ft)	3	2	5	7										
Control Delay (s)	4.5	3.0	11.0	11.0										
Lane LOS	A	A	B	B										
Approach Delay (s)	4.5	3.0	11.0	11.0										
Approach LOS				B				B						
Intersection Summary														
Average Delay				6.0										
Intersection Capacity Utilization	17.7%			ICU Level of Service					A					
Analysis Period (min)	15													

Timings
1: Squalicum Pkwy & Meridian Street

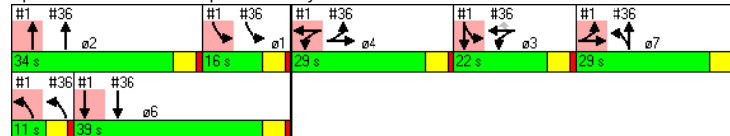
Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBT	NBL	NBT	SBL	SBT	ø1	ø3	ø6
Lane Configurations	↰	↱	↰	↰	↰	↰	↰			
Volume (vph)	285	5	10	5	660	25	620			
Turn Type	Split			Prot		Prot				
Protected Phases	7	7	4	5	2	13	3 6	1	3	6
Permitted Phases										
Detector Phases	7	7	4	5	2	13	3 6			
Minimum Initial (s)	6.0	6.0	6.0	6.0	10.0			6.0	6.0	10.0
Minimum Split (s)	29.0	29.0	29.0	11.0	23.0			11.0	11.0	23.0
Total Split (s)	29.0	29.0	29.0	11.0	34.0	38.0	61.0	16.0	22.0	39.0
Total Split (%)	22.3%	22.3%	22.3%	8.5%	26.2%	29.2%	46.9%	12%	17%	30%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0			1.0	1.0	1.0
Lead/Lag			Lead	Lead	Lead			Lag	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Max			None	None	None
Act Effct Green (s)	24.9	24.9	22.8	7.0	30.0	30.0	53.0			
Actuated g/C Ratio	0.19	0.19	0.18	0.05	0.23	0.23	0.41			
v/c Ratio	0.91	0.08	0.17	0.05	0.84	0.06	0.63			
Control Delay	82.8	20.2	22.1	59.6	57.2	11.6	6.8			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.3			
Total Delay	82.8	20.2	22.1	59.6	57.2	11.6	7.1			
LOS	F	C	C	E	E	B	A			
Approach Delay		77.8	22.1		57.3		7.2			
Approach LOS		E	C		E		A			

Intersection Summary

Cycle Length: 130	
Actuated Cycle Length: 127.8	
Natural Cycle: 135	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.09	
Intersection Signal Delay: 36.6	Intersection LOS: D
Intersection Capacity Utilization 53.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Squalicum Pkwy & Meridian Street



HCM Signalized Intersection Capacity Analysis
1: Squalicum Pkwy & Meridian Street

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.88			0.92		1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1561			1723		1787	3566		1752	3361	
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1687	1561			1723		1787	3566		1752	3361	
Volume (vph)	285	5	20	10	35	5	660	10	25	620	235	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	300	5	21	11	37	5	695	11	26	653	247	
RTOR Reduction (vph)	0	17	0	0	30	0	0	1	0	0	30	0
Lane Group Flow (vph)	300	9	0	0	29	0	5	705	0	26	870	0
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split			Prot			Prot		
Protected Phases	7	7		4	4		5	2		13	3 6	
Permitted Phases												
Actuated Green, G (s)	23.9	23.9			21.8		6.0	29.0		28.0	51.0	
Effective Green, g (s)	24.9	24.9			22.8		7.0	30.0		30.0	53.0	
Actuated g/C Ratio	0.19	0.19			0.18		0.05	0.23		0.23	0.42	
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0				
Vehicle Extension (s)	3.0	3.0			3.0		2.0	2.0				
Lane Grp Cap (vph)	329	304			308		98	838		412	1395	
v/s Ratio Prot	c0.18	0.01			c0.02		0.00	c0.20		0.01	c0.26	
v/s Ratio Perm												
v/c Ratio	0.91	0.03			0.09		0.05	0.84		0.06	0.62	
Uniform Delay, d1	50.3	41.6			43.8		57.2	46.6		37.9	29.5	
Progression Factor	1.00	1.00			1.00		1.00	1.00		0.53	0.45	
Incremental Delay, d2	28.3	0.0			0.1		0.1	10.0		0.0	0.1	
Delay (s)	78.6	41.7			43.9		57.3	56.6		20.0	13.3	
Level of Service	E	D			D		E	E		B	B	
Approach Delay (s)		75.7			43.9			56.6			13.5	
Approach LOS		E			D			E			B	

Intersection Summary

HCM Average Control Delay	39.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	127.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Meridian Street & Broadway St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	30	265	40	380	175	135	30	130
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	1	6	5	2	7	4	3	8
Permitted Phases								
Detector Phases	1	6	5	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	25.0	11.0	25.0	11.0	25.0	11.0	25.0
Total Split (s)	11.0	28.0	11.0	28.0	16.0	30.0	11.0	25.0
Total Split (%)	13.8%	35.0%	13.8%	35.0%	20.0%	37.5%	13.8%	31.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	7.2	28.8	7.2	31.0	10.7	20.5	7.2	11.5
Actuated g/C Ratio	0.10	0.45	0.11	0.49	0.16	0.31	0.10	0.17
v/c Ratio	0.18	0.50	0.23	0.49	0.66	0.35	0.18	0.45
Control Delay	34.4	20.8	34.0	20.3	38.7	17.0	34.4	27.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.4	20.8	34.0	20.3	38.7	17.0	34.4	27.5
LOS	C	C	C	C	D	B	C	C
Approach Delay		21.8		21.6		27.6		28.8
Approach LOS		C		C		C		C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 63.8
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 24.1
Intersection Capacity Utilization 58.2%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service B

Splits and Phases: 2: Meridian Street & Broadway St

⬅️ e1	➡️ e2	⬅️ e3	➡️ e4
11 s	28 s	11 s	30 s
⬅️ e5	➡️ e6	⬅️ e7	➡️ e8
11 s	28 s	16 s	25 s

HCM Signalized Intersection Capacity Analysis
2: Meridian Street & Broadway St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1730		1728	1799		1728	1731		1745	1826	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1728	1730		1728	1799		1728	1731		1745	1826	
Volume (vph)	30	265	110	40	380	25	175	135	50	30	130	5
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	279	116	42	400	26	184	142	53	32	137	5
RTOR Reduction (vph)	0	16	0	0	2	0	0	18	0	0	2	0
Lane Group Flow (vph)	32	379	0	42	424	0	184	177	0	32	140	0
Confl. Peds. (#/hr)			5			5			5			5
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	2.0	27.9		3.2	29.1		8.2	17.8		2.0	11.6	
Effective Green, g (s)	3.0	28.9		4.2	30.1		9.2	18.8		3.0	12.6	
Actuated g/C Ratio	0.04	0.41		0.06	0.42		0.13	0.27		0.04	0.18	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	73	705		102	764		224	459		74	325	
v/s Ratio Prot	0.02	0.22		c0.02	c0.24		c0.11	c0.10		0.02	0.08	
v/s Ratio Perm												
v/c Ratio	0.44	0.54		0.41	0.55		0.82	0.38		0.43	0.43	
Uniform Delay, d1	33.1	15.9		32.2	15.4		30.0	21.3		33.1	26.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.4		1.0	0.5		20.0	0.2		1.5	0.3	
Delay (s)	34.7	16.3		33.1	15.9		50.1	21.5		34.6	26.3	
Level of Service	C	B		C	B		D	C		C	C	
Approach Delay (s)		17.7			17.4			35.4			27.8	
Approach LOS		B			B			D			C	

Intersection Summary

HCM Average Control Delay	23.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	70.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
3: Ohio St & N State St

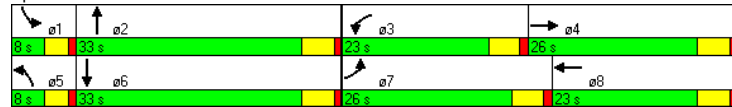
Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	335	335	230	130	35	890	35	640
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	24.0	24.0	23.0	23.0	8.0	21.0	8.0	21.0
Total Split (s)	26.0	26.0	23.0	23.0	8.0	33.0	8.0	33.0
Total Split (%)	28.9%	28.9%	25.6%	25.6%	8.9%	36.7%	8.9%	36.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	20.2	20.9	16.4	17.2	4.1	27.3	4.1	27.3
Actuated g/C Ratio	0.25	0.26	0.20	0.21	0.05	0.34	0.05	0.34
v/c Ratio	0.82	0.86	0.70	0.50	0.45	0.88	0.45	0.71
Control Delay	48.1	50.4	43.6	32.3	59.4	36.8	59.4	27.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.1	50.4	43.6	32.3	59.4	36.8	59.4	27.8
LOS	D	D	D	C	E	D	E	C
Approach Delay		49.3		38.6		37.6		29.2
Approach LOS		D		D		D		C

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 81.4
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 38.3
Intersection Capacity Utilization 72.2%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service C

Splits and Phases: 3: Ohio St & N State St



HCM Signalized Intersection Capacity Analysis
3: Ohio St & N State St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.96		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1786		1711	1725		1728	3417		1728	3368	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1728	1786		1711	1725		1728	3417		1728	3368	
Volume (vph)	335	335	45	230	130	50	35	890	70	35	640	130
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	353	353	47	242	137	53	37	937	74	37	674	137
RTOR Reduction (vph)	0	5	0	0	16	0	0	7	0	0	19	0
Lane Group Flow (vph)	353	395	0	242	174	0	37	1004	0	37	792	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	19.2	19.9		15.4	16.1		2.2	26.3		2.2	26.3	
Effective Green, g (s)	20.2	20.9		16.4	17.1		2.2	27.3		2.2	27.3	
Actuated g/C Ratio	0.24	0.25		0.20	0.21		0.03	0.33		0.03	0.33	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	422	451		339	356		46	1127		46	1110	
v/s Ratio Prot	c0.20	c0.22		0.14	0.10		c0.02	c0.29		0.02	0.24	
v/s Ratio Perm												
v/c Ratio	0.84	0.88		0.71	0.49		0.80	0.89		0.80	0.71	
Uniform Delay, d1	29.7	29.7		31.0	29.0		40.1	26.3		40.1	24.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.0	17.5		7.4	1.4		63.5	9.1		63.5	2.2	
Delay (s)	43.7	47.2		38.4	30.4		103.6	35.4		103.6	26.5	
Level of Service	D	D		D	C		F	D		F	C	
Approach Delay (s)		45.5			34.9			37.8			29.9	
Approach LOS		D			C			D			C	

Intersection Summary

HCM Average Control Delay	37.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	82.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
4: Iowa St & James Street

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	←	←	↙	↓	↘	↗	→
Lane Group	WBL	WBT	SBL	SBT	SBR	NEL	NER
Lane Configurations							
Volume (vph)	395	45	180	140	445	480	665
Turn Type	Split	Perm		Over		pt+ov	
Protected Phases	3	3		1	2	2	2 3
Permitted Phases			1				
Detector Phases	3	3	1	1	2	2	2 3
Minimum Initial (s)	6.0	6.0	8.0	8.0	6.0	6.0	
Minimum Split (s)	11.0	11.0	20.0	20.0	17.0	17.0	
Total Split (s)	13.0	13.0	47.0	47.0	20.0	20.0	33.0
Total Split (%)	16.3%	16.3%	58.8%	58.8%	25.0%	25.0%	41.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag			Lead	Lead	Lag	Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	
Act Effct Green (s)	9.0	9.0		43.0	16.0	16.0	29.0
Actuated g/C Ratio	0.11	0.11		0.54	0.20	0.20	0.36
v/c Ratio	1.52	1.48		3.69	0.87	1.06	1.03
Control Delay	290.8	268.1		1251.3	49.3	83.8	76.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	1.3
Total Delay	290.8	268.1		1251.3	49.3	83.8	77.5
LOS	F	F		F	D	F	E
Approach Delay				278.8		81.1	
Approach LOS				F		F	

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 3.69

Intersection Signal Delay: 270.3

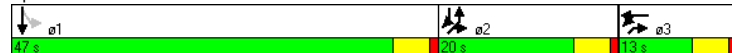
Intersection LOS: F

Intersection Capacity Utilization 64.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Iowa St & James Street



HCM Signalized Intersection Capacity Analysis
4: Iowa St & James Street

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	←	←	↙	↓	↘	↗	→	↖	↗	↘
Movement	WBL	WBT	WBR	SBL	SBT	SBR	SBR2	NEL	NER	NER2
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95			1.00	0.88		0.97	0.91	
Frt	1.00	0.94			1.00	0.85		0.96	0.85	
Flt Protected	0.95	0.98			0.97	1.00		0.96	1.00	
Satd. Flow (prot)	1641	1584			1769	2720		3266	1407	
Flt Permitted	0.95	0.98			0.09	1.00		0.96	1.00	
Satd. Flow (perm)	1641	1584			169	2720		3266	1407	
Volume (vph)	395	45	125	180	140	445	5	480	665	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	416	47	132	189	147	468	5	505	700	11
RTOR Reduction (vph)	0	33	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	282	280	0	0	336	472	0	690	526	0
Heavy Vehicles (%)	1%	1%		1%	1%	1%		1%	1%	1%
Turn Type	Split			Perm		Over			pt+ov	
Protected Phases	3	3			1	2		2	2 3	
Permitted Phases				1						
Actuated Green, G (s)	8.0	8.0			42.0	15.0		15.0	28.0	
Effective Green, g (s)	9.0	9.0			43.0	16.0		16.0	29.0	
Actuated g/C Ratio	0.11	0.11			0.54	0.20		0.20	0.36	
Clearance Time (s)	5.0	5.0			5.0	5.0		5.0		
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0		
Lane Grp Cap (vph)	185	178			91	544		653	510	
v/s Ratio Prot	0.17	c0.18				0.17		0.21	c0.37	
v/s Ratio Perm					c1.99					
v/c Ratio	1.52	1.57			3.69	0.87		1.06	1.03	
Uniform Delay, d1	35.5	35.5			18.5	31.0		32.0	25.5	
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	261.5	283.5			1238.1	13.7		51.1	48.1	
Delay (s)	297.0	319.0			1256.6	44.7		83.1	73.6	
Level of Service	F	F			F	D		F	E	
Approach Delay (s)		308.6			548.0			79.0		
Approach LOS		F			F			E		

Intersection Summary

HCM Average Control Delay	276.0	HCM Level of Service	F
HCM Volume to Capacity ratio	2.81		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Iowa St & King St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	35	670	240	470	35	150	510	95	125
Turn Type	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+ov	pm+pt	pm+pt	pm+pt
Protected Phases	5	2	1	6	3	8	1	7	4
Permitted Phases	2		6		8		8	4	
Detector Phases	5	2	1	6	3	8	1	7	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	28.0	11.0	26.0	11.0	28.0	11.0	28.0	28.0
Total Split (s)	11.0	28.0	13.0	30.0	11.0	28.0	13.0	11.0	28.0
Total Split (%)	13.8%	35.0%	16.3%	37.5%	13.8%	35.0%	16.3%	13.8%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	Min	None	Min	None	None	None	None	None
Act Effct Green (s)	27.0	19.9	34.1	32.9	17.5	12.3	22.7	18.9	16.5
Actuated g/C Ratio	0.41	0.33	0.57	0.55	0.26	0.20	0.38	0.31	0.27
v/c Ratio	0.10	0.68	0.62	0.31	0.10	0.44	0.77	0.24	0.35
Control Delay	10.5	22.0	21.4	13.0	16.4	28.1	19.7	16.5	21.1
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.5	22.1	21.4	13.0	16.4	28.1	19.7	16.5	21.1
LOS	B	C	C	B	B	C	B	B	C
Approach Delay		21.6		15.6		21.4			19.4
Approach LOS		C		B		C			B

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 59.6
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 19.4
Intersection Capacity Utilization 67.6%
Analysis Period (min) 15

Splits and Phases: 5: Iowa St & King St

ø1	ø2	ø3	ø4
13 s	28 s	11 s	23 s
ø5	ø6	ø7	ø8
11 s	30 s	11 s	23 s

HCM Signalized Intersection Capacity Analysis
5: Iowa St & King St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1728	3406		1711	3355		1728	1818	1546	1745	1776	
Flt Permitted	0.44	1.00		0.19	1.00		0.65	1.00	1.00	0.49	1.00	
Satd. Flow (perm)	797	3406		350	3355		1183	1818	1546	904	1776	
Volume (vph)	35	670	70	240	470	70	35	150	510	95	125	35
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	705	74	253	495	74	37	158	537	100	132	37
RTOR Reduction (vph)	0	9	0	0	12	0	0	0	122	0	14	0
Lane Group Flow (vph)	37	770	0	253	557	0	37	158	415	100	155	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	0%	0%	0%
Turn Type	pm+pt			pm+pt			pm+pt		pm+ov	pm+pt		
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	24.9	22.9		37.0	30.0		12.8	10.8	19.9	17.2	13.0	
Effective Green, g (s)	26.9	23.9		38.0	31.0		14.8	11.8	21.9	19.2	14.0	
Actuated g/C Ratio	0.40	0.36		0.57	0.46		0.22	0.18	0.33	0.29	0.21	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.6		3.0	3.0		3.6	3.6	3.0	3.0	3.0	
Lane Grp Cap (vph)	362	1215		404	1552		286	320	598	324	371	
v/s Ratio Prot	0.00	0.23		0.09	0.17		0.01	0.09	c0.10	c0.02	0.09	
v/s Ratio Perm	0.04			c0.26			0.02		0.16	0.06		
v/c Ratio	0.10	0.63		0.63	0.36		0.13	0.49	0.69	0.31	0.42	
Uniform Delay, d1	12.3	17.9		9.4	11.6		20.8	24.9	19.6	18.2	23.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.2		3.0	0.1		0.3	1.5	3.5	0.5	0.8	
Delay (s)	12.4	19.1		12.4	11.7		21.0	26.4	23.1	18.7	23.7	
Level of Service	B	B		B	B		C	C	C	B	C	
Approach Delay (s)		18.8			11.9			23.7			21.9	
Approach LOS		B			B			C			C	

Intersection Summary

HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	67.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Iowa St & Moore St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	35	820	205	600	130	55	115	95
Turn Type	Prot		Prot		Perm		Perm	
Protected Phases	1	6	5	2		4		8
Permitted Phases					4		8	
Detector Phases	1	6	5	2	4	4	8	8
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	27.0	12.0	27.0	21.0	21.0	21.0	21.0
Total Split (s)	12.0	37.0	16.0	41.0	27.0	27.0	27.0	27.0
Total Split (%)	15.0%	46.3%	20.0%	51.3%	33.8%	33.8%	33.8%	33.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	8.0	32.5	12.0	41.3		23.0		23.0
Actuated g/C Ratio	0.10	0.41	0.15	0.52		0.29		0.29
v/c Ratio	0.22	0.95	0.84	0.38		1.05		0.91
Control Delay	37.3	35.0	61.8	13.0		81.8		65.8
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	37.3	35.0	61.8	13.0		81.8		65.8
LOS	D	C	E	B		F		E
Approach Delay		35.1		24.9		81.8		65.8
Approach LOS		D		C		F		E

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 79.4
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.05
Intersection Signal Delay: 41.8
Intersection Capacity Utilization 87.3%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service E

Splits and Phases: 6: Iowa St & Moore St



HCM Signalized Intersection Capacity Analysis
6: Iowa St & Moore St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.94		1.00	0.99			0.92			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1728	3265		1711	3393			1604			1671	
Flt Permitted	0.95	1.00		0.95	1.00			0.80			0.52	
Satd. Flow (perm)	1728	3265		1711	3393			1310			897	
Volume (vph)	35	820	475	205	600	35	130	55	255	115	95	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	863	500	216	632	37	137	58	268	121	100	21
RTOR Reduction (vph)	0	101	0	0	5	0	0	62	0	0	4	0
Lane Group Flow (vph)	37	1262	0	216	664	0	0	401	0	0	238	0
Heavy Vehicles (%)	1%	1%		2%	2%		2%	4%	4%	6%	6%	6%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	4.2	33.5		11.0	40.3			22.0			22.0	
Effective Green, g (s)	5.2	34.5		12.0	41.3			23.0			23.0	
Actuated g/C Ratio	0.06	0.42		0.15	0.51			0.28			0.28	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.5			3.5	
Lane Grp Cap (vph)	110	1382		252	1719			370			253	
v/s Ratio Prot	0.02	c0.39		c0.13	0.20							
v/s Ratio Perm								c0.31			0.26	
v/c Ratio	0.34	0.91		0.86	0.39			1.08			0.94	
Uniform Delay, d1	36.5	22.1		33.9	12.3			29.3			28.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.8	9.4		23.8	0.1			70.7			40.2	
Delay (s)	38.3	31.5		57.7	12.5			99.9			68.8	
Level of Service	D	C		E	B			F			E	
Approach Delay (s)		31.7			23.5			99.9			68.8	
Approach LOS		C			C			F			E	

Intersection Summary

HCM Average Control Delay	42.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	81.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Elm Street & Broadway St

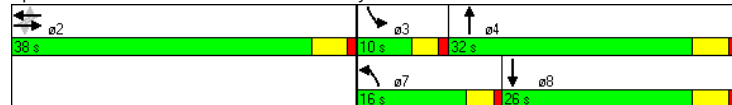
Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	5	230	45	400	165	190	50	180
Turn Type	Perm		Perm		Prot		Prot	
Protected Phases		2		2	7	4	3	8
Permitted Phases	2		2					
Detector Phases	2	2	2	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	26.0	26.0	26.0	26.0	8.0	26.0	8.0	26.0
Total Split (s)	38.0	38.0	38.0	38.0	16.0	32.0	10.0	26.0
Total Split (%)	47.5%	47.5%	47.5%	47.5%	20.0%	40.0%	12.5%	32.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	22.3	22.3	22.3	22.3	11.0	19.5	7.4	13.7
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.20	0.35	0.13	0.25
v/c Ratio	0.02	0.44	0.14	0.71	0.51	0.40	0.24	0.45
Control Delay	12.6	14.7	13.6	21.0	32.6	18.3	33.8	25.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	14.7	13.6	21.0	32.6	18.3	33.8	25.5
LOS	B	B	B	C	C	B	C	C
Approach Delay		14.6		20.4		24.2		27.2
Approach LOS		B		C		C		C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 53.6
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 21.4
Intersection Capacity Utilization 64.5%
Analysis Period (min) 15

Splits and Phases: 7: Elm Street & Broadway St



HCM Signalized Intersection Capacity Analysis
7: Elm Street & Broadway St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1692	1719		1707	1751		1728	1758		1728	1801	
Flt Permitted	0.27	1.00		0.50	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	477	1719		894	1751		1728	1758		1728	1801	
Volume (vph)	5	230	65	45	400	80	165	190	45	50	180	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	242	68	47	421	84	174	200	47	53	189	11
RTOR Reduction (vph)	0	14	0	0	10	0	0	11	0	0	3	0
Lane Group Flow (vph)	5	296	0	47	495	0	174	236	0	53	197	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		2			2		7	4		3	8	
Permitted Phases	2			2								
Actuated Green, G (s)	16.8	16.8		16.8	16.8		7.5	14.5		2.8	9.8	
Effective Green, g (s)	17.8	17.8		17.8	17.8		7.5	15.5		2.8	10.8	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.16	0.32		0.06	0.22	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	177	636		331	648		269	567		101	404	
v/s Ratio Prot		0.17			c0.28		c0.10	c0.13		0.03	0.11	
v/s Ratio Perm	0.01			0.05								
v/c Ratio	0.03	0.47		0.14	0.76		0.65	0.42		0.52	0.49	
Uniform Delay, d1	9.6	11.5		10.1	13.3		19.1	12.8		22.0	16.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.5		0.2	5.3		5.3	0.5		4.8	0.9	
Delay (s)	9.7	12.1		10.3	18.6		24.3	13.3		26.9	17.2	
Level of Service	A	B		B	B		C	B		C	B	
Approach Delay (s)		12.0			17.9			17.8			19.2	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	48.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Flora St & Cornwall Ave

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↗	←	↖	↗	↖	↗	↖
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations		↖↗		↖↗	↖↗	↖↗	↖↗	↖↗	↖↗
Volume (vph)	135	350	30	150	170	20	350	145	240
Turn Type	Perm		Perm		Perm	Prot		Prot	
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8				
Detector Phases	4	4	8	8	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	11.0	27.0	11.0	27.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	11.0	32.0	11.0	32.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	15.7%	45.7%	15.7%	45.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	16.7		16.7	16.7	7.2	21.2	7.4	30.9	
Actuated g/C Ratio	0.29		0.29	0.29	0.11	0.37	0.13	0.53	
v/c Ratio	0.71		0.42	0.33	0.11	0.84	0.71	0.34	
Control Delay	24.3		20.8	5.2	32.0	29.6	51.6	10.5	
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	24.3		20.8	5.2	32.0	29.6	51.6	10.5	
LOS	C		C	A	C	C	D	B	
Approach Delay	24.3		13.2			29.7		23.9	
Approach LOS	C		B			C		C	

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 57.8
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 23.7
Intersection Capacity Utilization 83.2%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service E

Splits and Phases: 8: Flora St & Cornwall Ave

↖ e1	↖ e2	↖ e4
11 s	32 s	27 s
↖ e5	↖ e6	↖ e8
11 s	32 s	27 s

HCM Signalized Intersection Capacity Analysis
8: Flora St & Cornwall Ave

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.93	1.00	0.99		1.00	0.99	
Flpb, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.95		1.00	0.97	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3309			1797	1441	1694	1678		1694	1706	
Flt Permitted		0.78			0.86	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		2625			1556	1441	1694	1678		1694	1706	
Volume (vph)	135	350	25	30	150	170	20	350	160	145	240	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	142	368	26	32	158	179	21	368	168	153	253	63
RTOR Reduction (vph)	0	6	0	0	0	131	0	23	0	0	10	0
Lane Group Flow (vph)	0	530	0	0	190	48	21	513	0	153	306	0
Confl. Peds. (#/hr)	35		35	35		35			35			35
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	3%	3%	3%
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		15.6			15.6	15.6	1.0	24.6		6.3	29.9	
Effective Green, g (s)		16.6			16.6	16.6	2.0	25.6		7.3	30.9	
Actuated g/C Ratio		0.27			0.27	0.27	0.03	0.42		0.12	0.50	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		709			420	389	55	698		201	857	
v/s Ratio Prot							0.01	c0.31		c0.09	0.18	
v/s Ratio Perm		c0.20			0.12	0.03						
v/c Ratio		0.75			0.45	0.12	0.38	0.74		0.76	0.36	
Uniform Delay, d1		20.5			18.7	17.0	29.1	15.1		26.3	9.3	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		3.8			0.3	0.1	1.6	3.5		14.1	0.1	
Delay (s)		24.3			19.0	17.0	30.8	18.6		40.4	9.4	
Level of Service		C			B	B	C	B		D	A	
Approach Delay (s)		24.3			18.0			19.0			19.5	
Approach LOS		C			B			B			B	

Intersection Summary

HCM Average Control Delay	20.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	61.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
9: York St & N State St

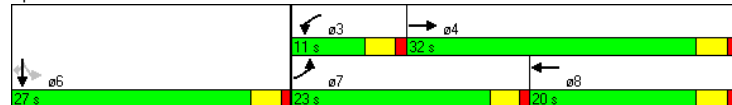
Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↖	↗
Volume (vph)	315	305	65	220	640	145
Turn Type	Prot		Prot		Perm	
Protected Phases	7	4	3	8	6	
Permitted Phases						6
Detector Phases	7	4	3	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	21.0	21.0
Total Split (s)	23.0	32.0	11.0	20.0	27.0	27.0
Total Split (%)	32.9%	45.7%	15.7%	28.6%	38.6%	38.6%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag		
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	15.2	23.4	6.6	9.8	19.9	19.9
Actuated g/C Ratio	0.26	0.41	0.11	0.17	0.35	0.35
v/c Ratio	0.74	0.31	0.38	0.49	0.79	0.24
Control Delay	32.1	11.7	34.3	23.3	24.0	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.1	11.7	34.3	23.3	24.0	4.4
LOS	C	B	C	C	C	A
Approach Delay		20.6		25.4	21.3	
Approach LOS		C		C	C	

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 57.5
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 21.7
Intersection Capacity Utilization 59.8%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service B

Splits and Phases: 9: York St & N State St



HCM Signalized Intersection Capacity Analysis
9: York St & N State St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗					↖	↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95						0.95	1.00
Frt	1.00	0.96		1.00	0.97						1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (prot)	1694	3257		1646	3200						3375	1531
Flt Permitted	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (perm)	1694	3257		1646	3200						3375	1531
Volume (vph)	315	305	105	65	220	50	0	0	0	240	640	145
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	332	321	111	68	232	53	0	0	0	253	674	153
RTOR Reduction (vph)	0	49	0	0	29	0	0	0	0	0	0	101
Lane Group Flow (vph)	332	383	0	68	256	0	0	0	0	0	927	52
Heavy Vehicles (%)	3%	3%		6%	6%		0%	0%	0%	2%	2%	2%
Turn Type	Prot			Prot						Perm		Perm
Protected Phases	7	4		3	8						6	
Permitted Phases										6		6
Actuated Green, G (s)	15.2	23.4		3.7	11.9						19.9	19.9
Effective Green, g (s)	15.2	23.4		3.7	11.9						19.9	19.9
Actuated g/C Ratio	0.26	0.40		0.06	0.20						0.34	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)	436	1292		103	645						1138	516
v/s Ratio Prot	c0.20	0.12		0.04	c0.08							
v/s Ratio Perm											0.27	0.03
v/c Ratio	0.76	0.30		0.66	0.40						0.81	0.10
Uniform Delay, d1	20.2	12.2		27.0	20.4						17.9	13.4
Progression Factor	1.00	1.00		1.00	1.00						1.00	1.00
Incremental Delay, d2	7.7	0.1		14.7	0.4						4.6	0.1
Delay (s)	27.9	12.3		41.8	20.8						22.4	13.5
Level of Service	C	B		D	C						C	B
Approach Delay (s)		19.1			24.9			0.0			21.2	
Approach LOS		B			C			A			C	

Intersection Summary

HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

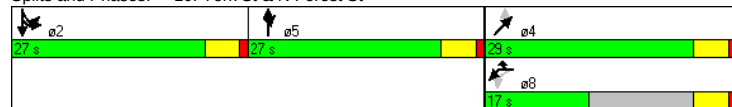
Timings
10: York St & N Forest St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	←	↖	↑	↗	↘	↓	↙	↘
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	NEL	NET
Lane Configurations	↖	↖	↖	↖	↖	↖	↖	↖
Volume (vph)	0	80	155	320	135	465	70	605
Turn Type	Prot	Split	Split	Split	Split	custom	Prot	Prot
Protected Phases	8!	8!	5	5	2	2	4!	4!
Permitted Phases							4	
Detector Phases	8	8	5	5	2	2	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	9.0	27.0	27.0	27.0	27.0	29.0	29.0
Total Split (s)	17.0	17.0	27.0	27.0	27.0	27.0	29.0	29.0
Total Split (%)	20.5%	20.5%	32.5%	32.5%	32.5%	32.5%	34.9%	34.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	Min	Min	Min	Min	None	None
Act Effct Green (s)	20.3	20.3	17.4	17.4	16.1	16.1	20.3	20.3
Actuated g/C Ratio	0.30	0.30	0.26	0.26	0.24	0.24	0.30	0.30
v/c Ratio	0.19	0.35	0.73	0.67	0.38	0.59	0.14	0.75
Control Delay	20.8	15.1	35.4	31.2	26.5	27.0	20.4	27.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.8	15.1	35.4	31.2	26.5	27.0	20.4	27.8
LOS	C	B	D	C	C	C	C	C
Approach Delay	17.1		33.4			26.8		27.1
Approach LOS	B		C			C		C

Intersection Summary	
Cycle Length: 83	
Actuated Cycle Length: 66.7	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 27.4	Intersection LOS: C
Intersection Capacity Utilization 68.8%	ICU Level of Service C
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 10: York St & N Forest St



HCM Signalized Intersection Capacity Analysis
10: York St & N Forest St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

															
Movement	WBL2	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL2	SBL	SBT	NEL	NET			
Lane Configurations															
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		0.95	0.95			1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frt		1.00	0.85		0.93	0.85			1.00	1.00	1.00	0.98	1.00	0.98	1.00
Flt Protected		0.95	1.00		1.00	1.00			0.95	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1728	1546		1607	1468			1711	3421	1678	3278	1678	3278	3278
Flt Permitted		0.95	1.00		1.00	1.00			0.95	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1728	1546		1607	1468			1711	3421	1678	3278	1678	3278	3278
Volume (vph)	95	0	80	95	155	320	70	15	135	465	70	605	605	70	605
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	0	84	100	163	337	74	16	142	489	74	637	637	74	637
RTOR Reduction (vph)	0	0	51	0	0	17	0	0	0	0	0	0	0	0	1
Lane Group Flow (vph)	0	100	133	0	305	252	0	0	158	489	74	752	752	74	752
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%	4%	4%	4%	4%	4%
Turn Type	Perm		Prot		Split			Split	Split		custom	Prot			
Protected Phases		8!	8!		5	5		2	2	2		4!			
Permitted Phases	8											4			
Actuated Green, G (s)		19.3	19.3		16.4	16.4			15.1	15.1	19.3	19.3	19.3	19.3	19.3
Effective Green, g (s)		20.3	20.3		17.4	17.4			16.1	16.1	20.3	20.3	20.3	20.3	20.3
Actuated g/C Ratio		0.31	0.31		0.26	0.26			0.24	0.24	0.31	0.31	0.31	0.31	0.31
Clearance Time (s)		5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		533	477		425	388			419	837	518	1011	1011	518	1011
v/s Ratio Prot			0.09		c0.19	0.17			0.09	c0.14		c0.23	c0.23		
v/s Ratio Perm		0.06										0.04	0.04		
v/c Ratio		0.19	0.28		0.72	0.65			0.38	0.58	0.14	0.74	0.74	0.14	0.74
Uniform Delay, d1		16.7	17.2		22.0	21.5			20.7	21.9	16.5	20.4	20.4	16.5	20.4
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2	0.3		5.7	3.7			0.6	1.0	0.1	3.0	3.0	0.1	3.0
Delay (s)		16.9	17.5		27.7	25.2			21.2	22.9	16.6	23.4	23.4	16.6	23.4
Level of Service		B	B		C	C			C	C	B	C	C	B	C
Approach Delay (s)		17.3			26.5					22.5		22.8	22.8		22.8
Approach LOS		B			C					C		C	C		C

Intersection Summary	
HCM Average Control Delay	23.0 HCM Level of Service C
HCM Volume to Capacity ratio	0.69
Actuated Cycle Length (s)	65.8 Sum of lost time (s) 12.0
Intersection Capacity Utilization	68.8% ICU Level of Service C
Analysis Period (min)	15
! Phase conflict between lane groups.	
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
10: York St & N Forest St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

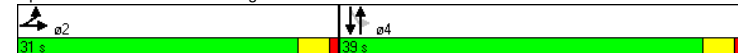
		
Movement	NER	NER2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Volume (vph)	100	10
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	105	11
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	0	0
Heavy Vehicles (%)	4%	4%
Turn Type		
Protected Phases		
Permitted Phases		
Actuated Green, G (s)		
Effective Green, g (s)		
Actuated g/C Ratio		
Clearance Time (s)		
Vehicle Extension (s)		
Lane Grp Cap (vph)		
v/s Ratio Prot		
v/s Ratio Perm		
v/c Ratio		
Uniform Delay, d1		
Progression Factor		
Incremental Delay, d2		
Delay (s)		
Level of Service		
Approach Delay (s)		
Approach LOS		
Intersection Summary		

Timings
11: E Magnolia St & Cornwall Ave

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

				
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	560	455	95	230
Turn Type	Perm			
Protected Phases	2	4		4
Permitted Phases			4	
Detector Phases	2	4	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	23.0	23.0	23.0
Total Split (s)	31.0	39.0	39.0	39.0
Total Split (%)	44.3%	55.7%	55.7%	55.7%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	27.0	35.0		35.0
Actuated g/C Ratio	0.39	0.50		0.50
v/c Ratio	0.59	0.61		0.61
Control Delay	19.0	14.2		18.4
Queue Delay	0.0	0.0		0.0
Total Delay	19.0	14.2		18.4
LOS	B	B		B
Approach Delay	19.0	14.2		18.4
Approach LOS	B	B		B
Intersection Summary				
Cycle Length: 70				
Actuated Cycle Length: 70				
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green				
Natural Cycle: 50				
Control Type: Pretimed				
Maximum v/c Ratio: 0.61				
Intersection Signal Delay: 17.3			Intersection LOS: B	
Intersection Capacity Utilization 76.8%			ICU Level of Service D	
Analysis Period (min) 15				

Splits and Phases: 11: E Magnolia St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
11: E Magnolia St & Cornwall Ave

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		0.95						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			0.99	
Frt		0.99						0.98			1.00	
Flt Protected		0.99						1.00			0.99	
Satd. Flow (prot)		3294						1766			1743	
Flt Permitted		0.99						1.00			0.64	
Satd. Flow (perm)		3294						1766			1125	
Volume (vph)	90	560	70	0	0	0	0	455	65	95	230	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	589	74	0	0	0	0	479	68	100	242	0
RTOR Reduction (vph)	0	12	0	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	746	0	0	0	0	0	540	0	0	342	0
Confl. Peds. (#/hr)	80		80						80	80		
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split									Perm		
Protected Phases	2		2						4		4	
Permitted Phases									4			
Actuated Green, G (s)	27.0								35.0		35.0	
Effective Green, g (s)	27.0								35.0		35.0	
Actuated g/C Ratio	0.39								0.50		0.50	
Clearance Time (s)	4.0								4.0		4.0	
Lane Grp Cap (vph)	1271								883		563	
v/s Ratio Prot	c0.23								c0.31			
v/s Ratio Perm											0.30	
v/c Ratio	0.59								0.61		0.61	
Uniform Delay, d1	17.1								12.6		12.6	
Progression Factor	1.00								0.90		1.00	
Incremental Delay, d2	2.0								2.7		4.8	
Delay (s)	19.1								14.0		17.4	
Level of Service	B								B		B	
Approach Delay (s)	19.1		0.0						14.0		17.4	
Approach LOS	B		A						B		B	
Intersection Summary												
HCM Average Control Delay	17.0		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.60											
Actuated Cycle Length (s)	70.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	76.8%		ICU Level of Service				D					
Analysis Period (min)	15											
c Critical Lane Group												

Timings
12: W Holly St & Broadway St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

							
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations							
Volume (vph)	80	435	5	490	5	165	0
Turn Type	Perm		Perm			Perm	
Protected Phases	2		2		4		4
Permitted Phases	2		2		4		4
Detector Phases	2		2		4		4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	54.0	54.0	54.0	54.0	26.0	26.0	26.0
Total Split (%)	67.5%	67.5%	67.5%	67.5%	32.5%	32.5%	32.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None
Act Effct Green (s)	32.0		32.0		13.4	13.4	13.4
Actuated g/C Ratio	0.67		0.67		0.27	0.27	0.27
v/c Ratio	0.54		0.63		0.02	0.48	0.12
Control Delay	9.6		10.2		15.2	24.4	0.4
Queue Delay	0.0		0.0		0.0	0.0	0.0
Total Delay	9.6		10.2		15.2	24.4	0.4
LOS	A		B		B	C	A
Approach Delay	9.6		10.2		15.2	16.9	
Approach LOS	A		B		B	B	
Intersection Summary							
Cycle Length: 80							
Actuated Cycle Length: 48							
Natural Cycle: 60							
Control Type: Actuated-Uncoordinated							
Maximum v/c Ratio: 0.63							
Intersection Signal Delay: 11.1				Intersection LOS: B			
Intersection Capacity Utilization 91.5%				ICU Level of Service F			
Analysis Period (min) 15							

Splits and Phases: 12: W Holly St & Broadway St



HCM Signalized Intersection Capacity Analysis
12: W Holly St & Broadway St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00			0.99		1.00	0.97	
Flpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	
Frt		1.00			0.96			0.93		1.00	0.85	
Flt Protected		0.99			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1804			1722			1699		1721	1505	
Flt Permitted		0.83			1.00			1.00		0.75	1.00	
Satd. Flow (perm)		1509			1718			1699		1361	1505	
Volume (vph)	80	435	0	5	490	200	0	5	5	165	0	75
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	458	0	5	516	211	0	5	5	174	0	79
RTOR Reduction (vph)	0	0	0	0	19	0	0	4	0	0	62	0
Lane Group Flow (vph)	0	542	0	0	713	0	0	6	0	174	17	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		27.8			27.8			9.3		9.3	9.3	
Effective Green, g (s)		28.8			28.8			10.3		10.3	10.3	
Actuated g/C Ratio		0.61			0.61			0.22		0.22	0.22	
Clearance Time (s)		5.0			5.0			5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		923			1050			372		298	329	
v/s Ratio Prot								0.00			0.01	
v/s Ratio Perm		0.36			c0.42					c0.13		
v/c Ratio		0.59			0.68			0.02		0.58	0.05	
Uniform Delay, d1		5.5			6.1			14.4		16.5	14.5	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		1.0			1.8			0.0		2.9	0.1	
Delay (s)		6.5			7.8			14.4		19.4	14.6	
Level of Service		A			A			B		B	B	
Approach Delay (s)		6.5			7.8			14.4			17.9	
Approach LOS		A			A			B			B	

Intersection Summary

HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	47.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
13: W Holly St & F St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø1	ø2	ø3	ø4
Lane Configurations												
Volume (vph)	50	420	55	615	35	270	55	160				
Turn Type	Perm		Perm		Perm		Perm					
Protected Phases		2 4		2 4		1 3		1 3	1	2	3	4
Permitted Phases	2 4		2 4		1 3		1 3					
Detector Phases	2 4	2 4	2 4	2 4	1 3	1 3	1 3	1 3				
Minimum Initial (s)									6.0	6.0	6.0	6.0
Minimum Split (s)									24.0	24.0	24.0	28.0
Total Split (s)	77.0	77.0	77.0	77.0	48.0	48.0	48.0	48.0	24.0	49.0	24.0	28.0
Total Split (%)	61.6%	61.6%	61.6%	61.6%	38.4%	38.4%	38.4%	38.4%	19%	39%	19%	22%
Yellow Time (s)									4.0	4.0	4.0	4.0
All-Red Time (s)									1.0	1.0	1.0	5.0
Lead/Lag									Lead	Lag	Lead	Lag
Lead-Lag Optimize?												
Recall Mode									Min	None	None	None
Act Effct Green (s)	66.1	66.1	66.1	66.1		36.5		36.5				
Actuated g/C Ratio	0.56	0.56	0.56	0.56		0.31		0.31				
v/c Ratio	0.25	0.59	0.20	0.72		0.67		0.36				
Control Delay	10.6	11.4	8.8	15.1		22.7		17.0				
Queue Delay	0.0	0.0	0.0	0.0		0.1		0.0				
Total Delay	10.6	11.4	8.8	15.1		22.7		17.0				
LOS	B	B	A	B		C		B				
Approach Delay		11.4		14.6		22.7		17.0				
Approach LOS		B		B		C		B				

Intersection Summary

Cycle Length: 125	
Actuated Cycle Length: 118.7	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 15.3	Intersection LOS: B
Intersection Capacity Utilization 79.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 13: W Holly St & F St



Timings
13: W Holly St & F St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	ø5	ø6
Lane Configurations		
Volume (vph)		
Turn Type		
Protected Phases	5	6
Permitted Phases		
Detector Phases		
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	28.0	24.0
Total Split (s)	28.0	45.0
Total Split (%)	22%	36%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	5.0	1.0
Lead/Lag	Lead	Lag
Lead-Lag Optimize?		
Recall Mode	None	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

HCM Signalized Intersection Capacity Analysis
13: W Holly St & F St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			0.95	
Frt	1.00	0.96		1.00	0.99			0.99			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1728	1752		1711	1777			1791			3290	
Flt Permitted	0.23	1.00		0.32	1.00			0.94			0.71	
Satd. Flow (perm)	423	1752		569	1777			1683			2357	
Volume (vph)	50	420	135	55	615	60	35	270	25	55	160	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	442	142	58	647	63	37	284	26	58	168	53
RTOR Reduction (vph)	0	9	0	0	3	0	0	2	0	0	17	0
Lane Group Flow (vph)	53	575	0	58	707	0	0	345	0	0	262	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2 4			2 4			1 3			1 3	
Permitted Phases	2 4			2 4			1 3			1 3		
Actuated Green, G (s)	67.3	67.3		67.3	67.3			34.4			34.4	
Effective Green, g (s)	73.3	73.3		73.3	73.3			36.4			36.4	
Actuated g/C Ratio	0.58	0.58		0.58	0.58			0.29			0.29	
Clearance Time (s)												
Vehicle Extension (s)												
Lane Grp Cap (vph)	247	1022		332	1036			487			683	
v/s Ratio Prot		0.33			c0.40							
v/s Ratio Perm	0.13			0.10				c0.20			0.11	
v/c Ratio	0.21	0.56		0.17	0.68			0.71			0.38	
Uniform Delay, d1	12.5	16.3		12.2	18.1			39.9			35.7	
Progression Factor	1.00	1.00		1.00	1.00			0.93			1.00	
Incremental Delay, d2	0.4	0.7		0.3	1.9			3.3			0.4	
Delay (s)	12.9	17.0		12.4	20.0			40.2			36.0	
Level of Service	B	B		B	C			D			D	
Approach Delay (s)		16.6			19.5			40.2			36.0	
Approach LOS		B			B			D			D	
Intersection Summary												
HCM Average Control Delay		24.4			HCM Level of Service			C				
HCM Volume to Capacity ratio		0.69										
Actuated Cycle Length (s)		125.7			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		79.6%			ICU Level of Service			D				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
14: W Holly St & C St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Sign Control	Free			Free			Stop			Stop					
Grade	0%			0%			0%			0%					
Volume (veh/h)	10	490	35	15	705	55	20	15	30	50	20	5			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Hourly flow rate (vph)	11	516	37	16	742	58	21	16	32	53	21	5			
Pedestrians															
Lane Width (ft)															
Walking Speed (ft/s)															
Percent Blockage															
Right turn flare (veh)															
Median type							None			None					
Median storage (veh)															
Upstream signal (ft)	753														
pX, platoon unblocked				0.84			0.84			0.84	0.84	0.84			
vC, conflicting volume	800				553			1374			1387	534	1397	1376	771
vC1, stage 1 conf vol															
vC2, stage 2 conf vol															
vCu, unblocked vol	800				469			1444			1459	447	1472	1447	771
tC, single (s)	4.1				4.1			7.1			6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)															
tF (s)	2.2				2.2			3.5			4.0	3.3	3.5	4.0	3.3
p0 queue free %	99				98			73			85	94	28	81	99
cM capacity (veh/h)	827				925			77			107	519	73	108	403
Direction, Lane #	EB 1	WB 1	NB 1	SB 1											
Volume Total	563	816	68	79											
Volume Left	11	16	21	53											
Volume Right	37	58	32	5											
cSH	827	925	142	85											
Volume to Capacity	0.01	0.02	0.48	0.93											
Queue Length 95th (ft)	1	1	56	127											
Control Delay (s)	0.3	0.5	52.1	165.9											
Lane LOS	A	A	F	F											
Approach Delay (s)	0.3	0.5	52.1	165.9											
Approach LOS				F	F										
Intersection Summary															
Average Delay	11.3														
Intersection Capacity Utilization	63.1%				ICU Level of Service								B		
Analysis Period (min)	15														

Timings
15: W Holly St & Cornwall Ave

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

				
Lane Group	WBT	NBL	NBT	SBT
Lane Configurations				
Volume (vph)	1050	95	195	190
Turn Type	Perm			
Protected Phases	2		4	4
Permitted Phases	4			
Detector Phases	2	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0
Minimum Split (s)	21.0	23.0	23.0	23.0
Total Split (s)	40.0	30.0	30.0	30.0
Total Split (%)	57.1%	42.9%	42.9%	42.9%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	36.0		26.0	26.0
Actuated g/C Ratio	0.51		0.37	0.37
v/c Ratio	0.80		0.62	0.49
Control Delay	18.2		16.4	11.5
Queue Delay	0.0		0.0	0.0
Total Delay	18.2		16.4	11.5
LOS	B		B	B
Approach Delay	18.2		16.4	11.5
Approach LOS	B		B	B
Intersection Summary				
Cycle Length: 70				
Actuated Cycle Length: 70				
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green				
Natural Cycle: 55				
Control Type: Pretimed				
Maximum v/c Ratio: 0.80				
Intersection Signal Delay: 16.9			Intersection LOS: B	
Intersection Capacity Utilization 81.6%			ICU Level of Service D	
Analysis Period (min) 15				

Splits and Phases: 15: W Holly St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
15: W Holly St & Cornwall Ave

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.97			1.00			0.96	
Flpb, ped/bikes					1.00			0.98			1.00	
Frt					0.98			1.00			0.95	
Flt Protected					1.00			0.98			1.00	
Satd. Flow (prot)					3279			1760			1654	
Flt Permitted					1.00			0.73			1.00	
Satd. Flow (perm)					3279			1314			1654	
Volume (vph)	0	0	0	60	1050	195	95	195	0	0	190	105
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	63	1105	205	100	205	0	0	200	111
RTOR Reduction (vph)	0	0	0	0	20	0	0	0	0	0	25	0
Lane Group Flow (vph)	0	0	0	0	1353	0	0	305	0	0	286	0
Confl. Peds. (#/hr)				80		80	80					80
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type				Split		Perm						
Protected Phases				2	2			4			4	
Permitted Phases							4					
Actuated Green, G (s)					36.0			26.0			26.0	
Effective Green, g (s)					36.0			26.0			26.0	
Actuated g/C Ratio					0.51			0.37			0.37	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					1686			488			614	
v/s Ratio Prot					c0.41						0.17	
v/s Ratio Perm								c0.23				
v/c Ratio					0.80			0.62			0.47	
Uniform Delay, d1					14.1			18.0			16.7	
Progression Factor					1.00			0.84			0.62	
Incremental Delay, d2					4.1			0.6			2.0	
Delay (s)					18.2			15.6			12.4	
Level of Service					B			B			B	
Approach Delay (s)		0.0			18.2			15.6			12.4	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
16: Lakeway Dr & Jersey St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	WBL	WBR	NBL	NBT	SBL	SBT
Lane Configurations						
Volume (vph)	30	765	395	285	570	370
Turn Type		Prot	Split		Split	
Protected Phases	8	8	2	2	6	6
Permitted Phases						
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	34.0	34.0	35.0	35.0	31.0	31.0
Total Split (%)	34.0%	34.0%	35.0%	35.0%	31.0%	31.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
Act Effct Green (s)	25.7	25.7	27.4	27.4	24.0	24.0
Actuated g/C Ratio	0.29	0.29	0.30	0.30	0.27	0.27
v/c Ratio	0.87	0.81	0.86	0.94dr	0.80	0.85
Control Delay	52.2	39.0	50.3	21.5	50.3	43.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.2	39.0	50.3	21.5	50.3	43.9
LOS	D	D	D	C	D	D
Approach Delay	44.0			29.2		45.8
Approach LOS	D			C		D

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 89.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 38.2	Intersection LOS: D
Intersection Capacity Utilization 81.9%	ICU Level of Service D
Analysis Period (min) 15	
dr Defacto Right Lane. Recode with 1 though lane as a right lane.	

Splits and Phases: 16: Lakeway Dr & Jersey St



HCM Signalized Intersection Capacity Analysis
16: Lakeway Dr & Jersey St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	WBL2	WBL	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0				4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91				0.91	0.91		0.91	0.91	
Frt	0.91	0.85				1.00	0.89		1.00	1.00	
Flt Protected	0.98	1.00				0.95	1.00		0.95	0.98	
Satd. Flow (prot)	1604	2786				1572	2948		1430	3099	
Flt Permitted	0.98	1.00				0.95	1.00		0.95	0.98	
Satd. Flow (perm)	1604	2786				1572	2948		1430	3099	
Volume (vph)	115	30	765	90	5	395	285	775	570	370	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	121	32	805	95	5	416	300	816	600	389	21
RTOR Reduction (vph)	0	0	13	0	0	0	417	0	0	0	0
Lane Group Flow (vph)	0	397	643	0	0	412	708	0	306	704	0
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	1%	1%	11%	1%	1%
Turn Type	Split	Prot			Split	Split			Split		
Protected Phases	8	8	8		2	2	2		6	6	
Permitted Phases											
Actuated Green, G (s)	24.6	24.6				26.3	26.3		22.9	22.9	
Effective Green, g (s)	25.6	25.6				27.3	27.3		23.9	23.9	
Actuated g/C Ratio	0.29	0.29				0.31	0.31		0.27	0.27	
Clearance Time (s)	5.0	5.0				5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0				2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	462	803				483	906		385	834	
v/s Ratio Prot	c0.25	0.23				c0.26	0.24		0.21	c0.23	
v/s Ratio Perm											
v/c Ratio	0.86	0.80				0.85	0.94dr		0.79	0.84	
Uniform Delay, d1	29.9	29.2				28.9	28.0		30.2	30.7	
Progression Factor	1.00	1.00				1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.2	5.4				13.2	4.1		10.1	7.5	
Delay (s)	44.1	34.7				42.0	32.1		40.3	38.2	
Level of Service	D	C				D	C		D	D	
Approach Delay (s)	38.2						34.8			38.8	
Approach LOS	D						C			D	

Intersection Summary

HCM Average Control Delay	36.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	88.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		
dr	Defacto Right Lane. Recode with 1 though lane as a right lane.		
c	Critical Lane Group		

Timings
17: Lakeway Dr & I-5 SB Ramps

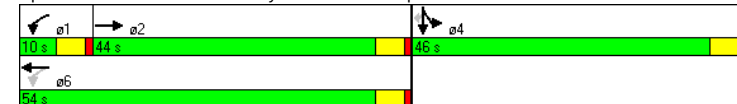
Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBT	WBL	WBT	SBT	SBR
Lane Configurations					
Volume (vph)	1105	165	755	170	320
Turn Type	pm+pt			Perm	
Protected Phases	2	1	6	4	
Permitted Phases		6			4
Detector Phases	2	1	6	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	10.0	23.0	28.0	28.0
Total Split (s)	44.0	10.0	54.0	46.0	46.0
Total Split (%)	44.0%	10.0%	54.0%	46.0%	46.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None
Act Effct Green (s)	40.0	50.0	50.0	42.0	42.0
Actuated g/C Ratio	0.40	0.50	0.50	0.42	0.42
v/c Ratio	1.00	0.99	0.46	1.02	0.46
Control Delay	54.3	89.1	17.4	67.5	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	54.3	89.1	17.4	67.5	14.5
LOS	D	F	B	E	B
Approach Delay	54.3		30.3	51.0	
Approach LOS	D		C	D	

Intersection Summary

Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 46.5	Intersection LOS: D
Intersection Capacity Utilization 94.6%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 17: Lakeway Dr & I-5 SB Ramps



HCM Signalized Intersection Capacity Analysis
17: Lakeway Dr & I-5 SB Ramps

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑↑						↑↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		0.95		1.00	0.95						1.00	1.00
Frt		0.98		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.96	1.00
Satd. Flow (prot)		3379		1711	3421						1752	1546
Flt Permitted		1.00		0.09	1.00						0.96	1.00
Satd. Flow (perm)		3379		164	3421						1752	1546
Volume (vph)	0	1105	190	165	755	0	0	0	0	540	170	320
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1163	200	174	795	0	0	0	0	568	179	337
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	0	0	0	78
Lane Group Flow (vph)	0	1349	0	174	795	0	0	0	0	0	747	259
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type				pm+pt						Split		Perm
Protected Phases		2		1	6					4	4	
Permitted Phases				6								4
Actuated Green, G (s)		39.0		49.0	49.0					41.0	41.0	
Effective Green, g (s)		40.0		50.0	50.0					42.0	42.0	
Actuated g/C Ratio		0.40		0.50	0.50					0.42	0.42	
Clearance Time (s)		5.0		5.0	5.0					5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		1352		175	1711					736	649	
v/s Ratio Prot		0.40		c0.06	0.23					c0.43		
v/s Ratio Perm				c0.44								0.17
v/c Ratio		1.00		0.99	0.46					1.01	0.40	
Uniform Delay, d1		30.0		24.2	16.3					29.0	20.2	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		23.8		66.0	0.2					37.0	0.4	
Delay (s)		53.8		90.2	16.5					66.0	20.6	
Level of Service		D		F	B					E	C	
Approach Delay (s)		53.8			29.7			0.0		51.9		
Approach LOS		D			C			A		D		

Intersection Summary

HCM Average Control Delay	46.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
18: Lakeway Dr & King St

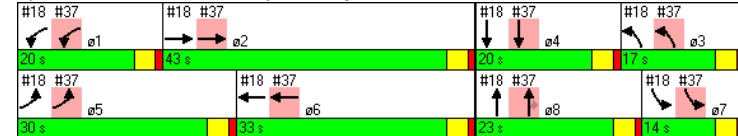
Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑↑	↑	↑	↑	↑
Volume (vph)	410	1075	20	650	140	80	50	25
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	5	2	1	6	3	8	7	4
Permitted Phases								
Detector Phases	5	2	1	6	3	8	7	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	30.0	43.0	20.0	33.0	17.0	23.0	14.0	20.0
Total Split (%)	30.0%	43.0%	20.0%	33.0%	17.0%	23.0%	14.0%	20.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?								
Recall Mode	None	Min	None	None	None	Min	None	None
Act Effct Green (s)	25.8	39.0	16.0	29.2	13.0	16.4	12.4	15.8
Actuated g/C Ratio	0.26	0.39	0.16	0.29	0.13	0.16	0.12	0.16
v/c Ratio	0.96	1.00	0.08	0.92	0.65	0.46	0.24	0.57
Control Delay	70.9	54.7	38.6	29.3	55.6	33.4	44.8	12.9
Queue Delay	0.0	5.7	0.0	4.5	0.0	0.0	0.0	0.0
Total Delay	70.9	60.3	38.6	33.8	55.6	33.4	44.8	12.9
LOS	E	E	D	C	E	C	D	B
Approach Delay		62.9		33.9		44.7		18.5
Approach LOS		E		C		D		B

Intersection Summary

Cycle Length: 100	
Actuated Cycle Length: 99.8	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 48.9	Intersection LOS: D
Intersection Capacity Utilization 83.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 18: Lakeway Dr & King St



HCM Signalized Intersection Capacity Analysis 18: Lakeway Dr & King St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.96		1.00	0.94		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	3407		1728	3318		1745	1724		1745	1590	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1745	3407		1728	3318		1745	1724		1745	1590	
Volume (vph)	410	1075	200	20	650	235	140	80	55	50	25	215
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	432	1132	211	21	684	247	147	84	58	53	26	226
RTOR Reduction (vph)	0	15	0	0	37	0	0	26	0	0	190	0
Lane Group Flow (vph)	432	1328	0	21	894	0	147	116	0	53	62	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	25.8	39.0		16.0	29.2		13.0	16.4		12.4	15.8	
Effective Green, g (s)	25.8	39.0		16.0	29.2		13.0	16.4		12.4	15.8	
Actuated g/C Ratio	0.26	0.39		0.16	0.29		0.13	0.16		0.12	0.16	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	451	1331		277	971		227	283		217	252	
v/s Ratio Prot	c0.25	c0.39		0.01	0.27		c0.08	c0.07		0.03	0.04	
v/s Ratio Perm												
v/c Ratio	0.96	1.00		0.08	0.92		0.65	0.41		0.24	0.25	
Uniform Delay, d1	36.5	30.4		35.6	34.2		41.2	37.4		39.5	36.8	
Progression Factor	1.00	1.00		1.06	0.56		1.00	1.00		1.00	1.00	
Incremental Delay, d2	31.4	23.9		0.1	8.6		6.2	1.0		0.6	0.5	
Delay (s)	67.9	54.3		37.8	27.7		47.4	38.3		40.1	37.3	
Level of Service	E	D		D	C		D	D		D	D	
Approach Delay (s)		57.6			27.9			43.0			37.8	
Approach LOS		E			C			D			D	
Intersection Summary												
HCM Average Control Delay		46.0										
HCM Volume to Capacity ratio		0.78										
Actuated Cycle Length (s)		99.8							8.0			
Intersection Capacity Utilization		83.9%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 24: E Chestnut St & Railroad Ave

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	80	925	35	0	0	0	0	30	60	95	80	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	84	974	37	0	0	0	0	32	63	100	84	0
Pedestrians					41			41			11	
Lane Width (ft)					0.0			11.0			11.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			3			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		353			350							
pX, platoon unblocked												
vC, conflicting volume	11			1052			1244	1213	425	624	1231	11
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	11			1052			1244	1213	425	624	1231	11
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			100	81	89	62	48	100
cM capacity (veh/h)	1600			649			72	167	565	263	163	1065
Direction, Lane #												
Volume Total	328	487	280	95	184							
Volume Left	84	0	0	0	100							
Volume Right	0	0	37	63	0							
cSH	1600	1700	1700	315	205							
Volume to Capacity	0.05	0.29	0.16	0.30	0.90							
Queue Length 95th (ft)	4	0	0	31	178							
Control Delay (s)	2.2	0.0	0.0	21.3	86.8							
Lane LOS	A			C	F							
Approach Delay (s)	0.7			21.3	86.8							
Approach LOS				C	F							
Intersection Summary												
Average Delay				13.6								
Intersection Capacity Utilization				43.2%								
Analysis Period (min)				15								

Timings
25: E Chestnut St & N State St

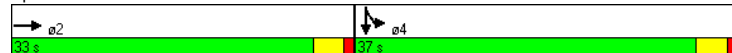
Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	→	↗	↓
Lane Group	EBT	SBL	SBT
Lane Configurations	↑↑↑	↗	↑↑
Volume (vph)	635	250	865
Turn Type	Split		
Protected Phases	2	4	4
Permitted Phases			
Detector Phases	2	4	4
Minimum Initial (s)	6.0	6.0	6.0
Minimum Split (s)	22.0	20.0	20.0
Total Split (s)	33.0	37.0	37.0
Total Split (%)	47.1%	52.9%	52.9%
Yellow Time (s)	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	Max	Max	Max
Act Effct Green (s)	29.0	33.0	33.0
Actuated g/C Ratio	0.41	0.47	0.47
v/c Ratio	0.55	0.30	0.56
Control Delay	16.0	6.7	14.9
Queue Delay	0.0	0.0	0.0
Total Delay	16.0	6.7	14.9
LOS	B	A	B
Approach Delay	16.0		13.1
Approach LOS	B		B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 4:SBTL, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.56
Intersection Signal Delay: 14.5
Intersection Capacity Utilization 52.5%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service A

Splits and Phases: 25: E Chestnut St & N State St



HCM Signalized Intersection Capacity Analysis
25: E Chestnut St & N State St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕↕↕								↘	↕↕		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0								4.0	4.0		
Lane Util. Factor		0.91								1.00	0.95		
Frbp, ped/bikes		0.98								1.00	1.00		
Flpb, ped/bikes		1.00								1.00	1.00		
Frt		0.94								1.00	1.00		
Flt Protected		1.00								0.95	1.00		
Satd. Flow (prot)		4587								1728	3455		
Flt Permitted		1.00								0.95	1.00		
Satd. Flow (perm)		4587								1728	3455		
Volume (vph)	0	635	375	0	0	0	0	0	0	250	865	0	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	668	395	0	0	0	0	0	0	263	911	0	
RTOR Reduction (vph)	0	49	0	0	0	0	0	0	0	69	0	0	
Lane Group Flow (vph)	0	1014	0	0	0	0	0	0	0	194	911	0	
Confl. Peds. (#/hr)			40							40			
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	1%	1%	1%	
Turn Type										Split			
Protected Phases		2								4	4		
Permitted Phases													
Actuated Green, G (s)		29.0								33.0	33.0		
Effective Green, g (s)		29.0								33.0	33.0		
Actuated g/C Ratio		0.41								0.47	0.47		
Clearance Time (s)		4.0								4.0	4.0		
Lane Grp Cap (vph)		1900								815	1629		
v/s Ratio Prot		c0.22								0.11	c0.26		
v/s Ratio Perm													
v/c Ratio		0.53								0.24	0.56		
Uniform Delay, d1		15.4								11.0	13.3		
Progression Factor		1.06								1.00	1.00		
Incremental Delay, d2		0.8								0.7	1.4		
Delay (s)		17.2								11.7	14.7		
Level of Service		B								B	B		
Approach Delay (s)		17.2			0.0			0.0			14.0		
Approach LOS		B			A			A			B		

Intersection Summary

HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
26: E Chestnut St & N Forest St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	→	↑
Lane Group	EBT	NBT
Lane Configurations	↑↑↑	↑↑
Volume (vph)	710	710
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phases	2	4
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	22.0	21.0
Total Split (s)	38.0	32.0
Total Split (%)	54.3%	45.7%
Yellow Time (s)	3.0	3.0
All-Red Time (s)	1.0	1.0
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	Max
Act Effct Green (s)	34.0	28.0
Actuated g/C Ratio	0.49	0.40
v/c Ratio	0.40	0.68
Control Delay	4.9	19.5
Queue Delay	0.0	0.0
Total Delay	4.9	19.5
LOS	A	B
Approach Delay	4.9	19.5
Approach LOS	A	B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 11.9
Intersection Capacity Utilization 50.1%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service A

Splits and Phases: 26: E Chestnut St & N Forest St



HCM Signalized Intersection Capacity Analysis
26: E Chestnut St & N Forest St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕↕↕						↕↕					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0						4.0					
Lane Util. Factor		0.91						0.95					
Frpb, ped/bikes		1.00						0.99					
Flpb, ped/bikes		1.00						1.00					
Frt		1.00						0.97					
Flt Protected		0.99						1.00					
Satd. Flow (prot)		4954						3293					
Flt Permitted		0.99						1.00					
Satd. Flow (perm)		4954						3293					
Volume (vph)	225	710	0	0	0	0	0	710	155	0	0	0	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	237	747	0	0	0	0	0	747	163	0	0	0	
RTOR Reduction (vph)	0	47	0	0	0	0	0	26	0	0	0	0	
Lane Group Flow (vph)	0	937	0	0	0	0	0	884	0	0	0	0	
Confl. Peds. (#/hr)	40								40				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	0%	0%	0%	
Turn Type	Split												
Protected Phases	2	2						4					
Permitted Phases													
Actuated Green, G (s)		34.0						28.0					
Effective Green, g (s)		34.0						28.0					
Actuated g/C Ratio		0.49						0.40					
Clearance Time (s)		4.0						4.0					
Lane Grp Cap (vph)		2406						1317					
v/s Ratio Prot		c0.19						c0.27					
v/s Ratio Perm													
v/c Ratio		0.39						0.67					
Uniform Delay, d1		11.4						17.2					
Progression Factor		0.42						1.00					
Incremental Delay, d2		0.4						2.7					
Delay (s)		5.3						20.0					
Level of Service		A						B					
Approach Delay (s)		5.3			0.0			20.0			0.0		
Approach LOS		A			A			B			A		

Intersection Summary

HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
27: E Chestnut St & Ellis St

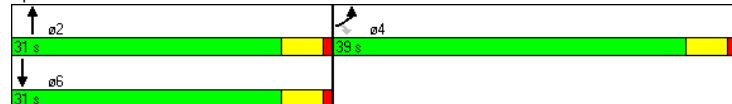
Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	↖	↗	↖	↗
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations	↖↖	↗	↖↖↖	↖↖
Volume (vph)	755	425	665	455
Turn Type	Perm			
Protected Phases	4		2	6
Permitted Phases	4			
Detector Phases	4	4	2	6
Minimum Initial (s)	6.0	6.0	6.0	6.0
Minimum Split (s)	30.0	30.0	12.0	30.0
Total Split (s)	39.0	39.0	31.0	31.0
Total Split (%)	55.7%	55.7%	44.3%	44.3%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	21.9	21.9	18.4	18.4
Actuated g/C Ratio	0.44	0.44	0.37	0.37
v/c Ratio	0.54	0.59	0.38	0.37
Control Delay	12.2	9.5	12.5	12.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.2	9.5	12.5	12.9
LOS	B	A	B	B
Approach Delay	11.2		12.5	12.9
Approach LOS	B		B	B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 49.6
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.59
Intersection Signal Delay: 11.9
Intersection Capacity Utilization 50.0%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service A

Splits and Phases: 27: E Chestnut St & Ellis St



HCM Signalized Intersection Capacity Analysis
27: E Chestnut St & Ellis St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

	↖	↗	↖	↗	↖	↗
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↖	↗		↖↖↖	↖↖	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.91	0.95	
Frbp, ped/bikes	1.00	0.95		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3319	1460		4964	3490	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3319	1460		4964	3490	
Volume (vph)	755	425	0	665	455	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	795	447	0	700	479	0
RTOR Reduction (vph)	0	118	0	0	0	0
Lane Group Flow (vph)	795	329	0	700	479	0
Confl. Peds. (#/hr)	60	60				
Heavy Vehicles (%)	2%	2%	1%	1%	0%	0%
Turn Type	Perm					
Protected Phases	4			2	6	
Permitted Phases	4					
Actuated Green, G (s)	20.8	20.8		17.3	17.3	
Effective Green, g (s)	21.8	21.8		18.3	18.3	
Actuated g/C Ratio	0.45	0.45		0.38	0.38	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1504	662		1889	1328	
v/s Ratio Prot	c0.24			c0.14	0.14	
v/s Ratio Perm		0.23				
v/c Ratio	0.53	0.50		0.37	0.36	
Uniform Delay, d1	9.5	9.3		10.7	10.7	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.6		0.1	0.2	
Delay (s)	9.8	9.9		10.9	10.9	
Level of Service	A	A		B	B	
Approach Delay (s)	9.8			10.9	10.9	
Approach LOS	A			B	B	

Intersection Summary

HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	48.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Laurel St & N State St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											  	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	20	10	40	20	0	0	0	0	55	1120	55
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	21	11	42	21	0	0	0	0	58	1179	58
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)											1046	
pX, platoon unblocked												
vC, conflicting volume	1334	1324	422	530	1353	0	1237			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1334	1324	422	530	1353	0	1237			0		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	86	98	89	85	100	100			96		
cM capacity (veh/h)	97	149	580	372	143	1091	559			1629		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2	SB 3							
Volume Total	32	63	353	589	353							
Volume Left	0	42	58	0	0							
Volume Right	11	0	0	0	58							
cSH	198	243	1629	1700	1700							
Volume to Capacity	0.16	0.26	0.04	0.35	0.21							
Queue Length 95th (ft)	14	25	3	0	0							
Control Delay (s)	26.5	24.9	1.5	0.0	0.0							
Lane LOS	D	C	A									
Approach Delay (s)	26.5	24.9	0.4									
Approach LOS	D	C										
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			40.6%	ICU Level of Service		A						
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
29: Laurel St & N Forest St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱			↰↱				
Sign Control	Stop				Stop		Free				Free	
Grade	0%				0%		0%				0%	
Volume (veh/h)	55	30	0	0	50	105	15	720	40	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	58	32	0	0	53	111	16	758	42	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)	1032											
pX, platoon unblocked												
vC, conflicting volume	547	832	0	826	811	400	0	800				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	547	832	0	826	811	400	0	800				
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	80	89	100	100	83	82	99	100				
cM capacity (veh/h)	297	301	1084	244	313	605	1622	832				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	89	163	395	421								
Volume Left	58	0	16	0								
Volume Right	0	111	0	42								
cSH	298	465	1622	1700								
Volume to Capacity	0.30	0.35	0.01	0.25								
Queue Length 95th (ft)	31	39	1	0								
Control Delay (s)	22.2	16.9	0.4	0.0								
Lane LOS	C	C	A									
Approach Delay (s)	22.2	16.9	0.2									
Approach LOS	C	C										
Intersection Summary												
Average Delay	4.6											
Intersection Capacity Utilization	45.3%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 30: N Forrest St & N State St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑							↑	↑	↑	
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	0	560	0	0	0	0	0	0	165	50	165	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	589	0	0	0	0	0	0	174	53	174	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			589			676	589	589	763	589	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			589			676	589	589	763	589	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	66	75	59	100
cM capacity (veh/h)	1623			986			249	420	508	211	420	1085

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	589	174	53	174
Volume Left	0	0	53	0
Volume Right	0	174	0	0
cSH	1700	508	211	420
Volume to Capacity	0.35	0.34	0.25	0.41
Queue Length 95th (ft)	0	38	24	50
Control Delay (s)	0.0	15.7	27.6	19.5
Lane LOS	C	D	C	
Approach Delay (s)	0.0	15.7	21.4	
Approach LOS	C	C	C	

Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		

Timings 31: Bill McDonald Pkwy & Samish Way

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↖	↗	↖	↗	↖
Volume (vph)	275	45	45	45	330	445	25	530	310
Turn Type	Perm		Perm		pm+pt		pm+pt		Perm
Protected Phases	4		8		5		1		6
Permitted Phases	4		8		2		6		6
Detector Phases	4	4	8	8	5	2	1	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	11.0	30.0	30.0	11.0	28.0	11.0	29.0	29.0
Total Split (s)	50.0	50.0	50.0	50.0	34.0	59.0	11.0	36.0	36.0
Total Split (%)	41.7%	41.7%	41.7%	41.7%	28.3%	49.2%	9.2%	30.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	24.4	24.4		24.4	41.6	38.4	25.0	17.7	17.7
Actuated g/C Ratio	0.32	0.32		0.32	0.55	0.51	0.30	0.23	0.23
v/c Ratio	0.74	0.59		0.34	0.62	0.30	0.08	0.68	0.53
Control Delay	37.1	7.2		22.7	17.3	13.9	14.7	33.9	7.4
Queue Delay	0.0	0.1		0.1	0.5	0.3	0.0	0.1	0.0
Total Delay	37.1	7.3		22.7	17.8	14.1	14.7	34.0	7.4
LOS	D	A		C	B	B	B	C	A
Approach Delay	18.8		22.7		15.6		23.9		
Approach LOS	B		C		B		C		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 75.4	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 19.7	Intersection LOS: B
Intersection Capacity Utilization 79.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 31: Bill McDonald Pkwy & Samish Way



HCM Signalized Intersection Capacity Analysis
31: Bill McDonald Pkwy & Samish Way

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87			0.97		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	1558			1749		1728	3408		1745	3490	1561
Flt Permitted	0.69	1.00			0.52		0.26	1.00		0.46	1.00	1.00
Satd. Flow (perm)	1245	1558			934		471	3408		848	3490	1561
Volume (vph)	275	45	390	45	45	25	330	445	45	25	530	310
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	289	47	411	47	47	26	347	468	47	26	558	326
RTOR Reduction (vph)	0	282	0	0	9	0	0	6	0	0	0	233
Lane Group Flow (vph)	289	176	0	0	111	0	347	509	0	26	558	93
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm			Perm			pm+pt			pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	23.2	23.2			23.2		43.9	37.2		22.6	20.9	20.9
Effective Green, g (s)	24.2	24.2			24.2		44.9	38.2		24.6	21.9	21.9
Actuated g/C Ratio	0.31	0.31			0.31		0.58	0.50		0.32	0.28	0.28
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		2.0	2.0		3.0	2.0	2.0
Lane Grp Cap (vph)	391	489			293		584	1689		302	991	443
v/s Ratio Prot		0.11					c0.15	0.15		0.00	0.16	
v/s Ratio Perm	c0.23				0.12		c0.20			0.02		0.06
v/c Ratio	0.74	0.36			0.38		0.59	0.30		0.09	0.56	0.21
Uniform Delay, d1	23.6	20.5			20.6		9.7	11.5		18.1	23.5	21.0
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	7.2	0.5			0.8		1.1	0.0		0.1	0.4	0.1
Delay (s)	30.8	20.9			21.4		10.8	11.6		18.3	24.0	21.1
Level of Service	C	C			C		B	B		B	C	C
Approach Delay (s)		24.7			21.4			11.3			22.8	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	19.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	77.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings

32: Samish Way & I-5 SB Off-Ramp

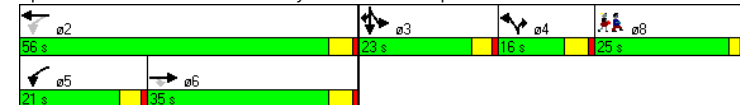
Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	ø8
Lane Configurations	↱	↰	↰	↱	↰	↱	↰	↱	↰	
Volume (vph)	710	255	265	445	155	450	250	250	250	
Turn Type	Perm	pm+pt		Protcustom		Split	Prot			
Protected Phases	6		5	2	4	4	3	3	3	8
Permitted Phases		6	2							
Detector Phases	6	6	5	2	4	4	3	3	3	
Minimum Initial (s)	7.0	7.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0	20.0
Minimum Split (s)	22.0	22.0	9.5	22.0	12.0	12.0	11.5	11.5	11.5	25.0
Total Split (s)	35.0	35.0	21.0	56.0	16.0	16.0	23.0	23.0	23.0	25.0
Total Split (%)	29.2%	29.2%	17.5%	46.7%	13.3%	13.3%	19.2%	19.2%	19.2%	21%
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	4.0	3.5	3.5	3.5	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lead	Lead	Lead	
Lead-Lag Optimize?										
Recall Mode	Min	Min	None	Min	None	None	None	None	None	None
Act Effct Green (s)	26.3	26.3	47.1	47.1	12.1	12.1	18.5	18.5	18.5	
Actuated g/C Ratio	0.29	0.29	0.53	0.53	0.13	0.13	0.21	0.21	0.21	
v/c Ratio	0.74	0.42	0.71	0.26	0.70	0.77	0.73	0.69	0.50	
Control Delay	33.4	5.2	31.0	12.0	56.4	13.3	47.7	45.0	7.9	
Queue Delay	8.1	0.4	0.0	0.0	0.1	0.0	0.0	0.0	0.1	
Total Delay	41.5	5.6	31.0	12.0	56.5	13.3	47.7	45.0	7.9	
LOS	D	A	C	B	E	B	D	D	A	
Approach Delay	32.0			19.1			33.5			
Approach LOS	C			B			C			

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 89.7
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 27.8
Intersection Capacity Utilization 71.3%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service C

Splits and Phases: 32: Samish Way & I-5 SB Off-Ramp



HCM Signalized Intersection Capacity Analysis
32: Samish Way & I-5 SB Off-Ramp

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3455	1546	1728	3455	1728	1728	1546	1745	1837	1561	1561	1561
Flt Permitted	1.00	1.00	0.15	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3455	1546	280	3455	1728	1728	1546	1745	1837	1561	1561	1561
Volume (vph)	0	710	255	265	445	0	155	0	450	250	250	250
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	747	268	279	468	0	163	0	474	263	263	263
RTOR Reduction (vph)	0	0	189	0	0	0	0	0	410	0	0	209
Lane Group Flow (vph)	0	747	79	279	468	0	163	0	64	263	263	54
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Perm pm+pt			Prot			custom			Split		Prot
Protected Phases	6			5			4			4		3
Permitted Phases	6			2			4			3		3
Actuated Green, G (s)	25.4	25.4	46.1	46.1	11.1	11.1	18.0	18.0	18.0	18.0	18.0	18.0
Effective Green, g (s)	26.4	26.4	47.1	47.1	12.1	12.1	18.5	18.5	18.5	18.5	18.5	18.5
Actuated g/C Ratio	0.29	0.29	0.53	0.53	0.13	0.13	0.21	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	5.0	5.0	4.5	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1017	455	417	1814	233	209	360	379	322	322	322	322
v/s Ratio Prot	c0.22		c0.12	0.14	c0.09	0.04	c0.15	0.14	0.03	0.03	0.03	0.03
v/s Ratio Perm		0.05	0.23									
v/c Ratio	0.73	0.17	0.67	0.26	0.70	0.31	0.73	0.69	0.17	0.17	0.17	0.17
Uniform Delay, d1	28.5	23.5	15.1	11.7	37.1	35.0	33.3	33.0	29.3	29.3	29.3	29.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.9	0.2	4.2	0.1	9.2	1.0	7.9	5.8	0.3	0.3	0.3	0.3
Delay (s)	31.4	23.8	19.3	11.8	46.2	36.0	41.2	38.8	29.6	29.6	29.6	29.6
Level of Service	C	C	B	B	D	D	D	D	C	C	C	C
Approach Delay (s)	29.4			14.6	38.6			36.5				
Approach LOS	C			B	D			D				

Intersection Summary

HCM Average Control Delay	29.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	89.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings

33: Samish Way & Lincoln St

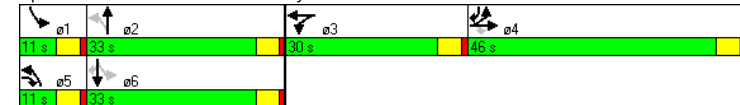
Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↰	↱	↰	↱	↱
Volume (vph)	865	300	340	5	90	345	315	20	110	340
Turn Type	custom	pm+ov custom			pm+pt	pm+pt			pm+ov	
Protected Phases	4	4	5	3	3	5	2	1	6	4
Permitted Phases	4		4	3		2		6		6
Detector Phases	4	4	5	3	3	5	2	1	6	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	33.0	33.0	11.0	30.0	30.0	11.0	24.0	11.0	33.0	33.0
Total Split (s)	46.0	46.0	11.0	30.0	30.0	11.0	33.0	11.0	33.0	46.0
Total Split (%)	38.3%	38.3%	9.2%	25.0%	25.0%	9.2%	27.5%	9.2%	27.5%	38.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	Min	None	Min	None
Act Effct Green (s)	43.0	43.0	54.2	13.4	13.4	26.2	23.8	23.7	16.3	59.3
Actuated g/C Ratio	0.45	0.45	0.56	0.14	0.14	0.27	0.25	0.23	0.17	0.62
v/c Ratio	0.81	0.84	0.35	0.02	0.66	1.02	0.79	0.12	0.38	0.33
Control Delay	37.4	38.7	3.5	38.6	45.8	88.5	48.7	27.4	38.6	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.4	38.7	3.5	38.6	45.8	88.5	48.7	27.4	38.6	1.4
LOS	D	D	A	D	D	F	D	C	D	A
Approach Delay	30.2			45.6		68.9		11.2		
Approach LOS	C			D		E		B		

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 96.2	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 37.3	Intersection LOS: D
Intersection Capacity Utilization 76.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 33: Samish Way & Lincoln St



HCM Signalized Intersection Capacity Analysis
33: Samish Way & Lincoln St

Alternative 3 (2016) PM Peak Hour
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1641	1686	1546	1694	1666		1728	1802		1728	1818	1546
Flt Permitted	0.95	0.98	1.00	0.95	1.00		0.52	1.00		0.26	1.00	1.00
Satd. Flow (perm)	1641	1686	1546	1694	1666		954	1802		479	1818	1546
Volume (vph)	865	300	340	5	90	70	345	315	20	20	110	340
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	911	316	358	5	95	74	363	332	21	21	116	358
RTOR Reduction (vph)	0	0	166	0	26	0	0	2	0	0	0	132
Lane Group Flow (vph)	597	630	192	5	143	0	363	351	0	21	116	226
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	custom		pm+ov custom		pm+pt		pm+pt		pm+ov			
Protected Phases	4	4	5	3	3		5	2		1	6	4
Permitted Phases	4		4	3			2			6		6
Actuated Green, G (s)	41.9	41.9	48.0	12.4	12.4		28.9	22.8		20.7	18.7	60.6
Effective Green, g (s)	42.9	42.9	50.0	13.4	13.4		30.8	23.8		22.7	19.7	62.6
Actuated g/C Ratio	0.43	0.43	0.50	0.14	0.14		0.31	0.24		0.23	0.20	0.63
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	710	730	842	229	225		352	433		148	361	977
v/s Ratio Prot	0.36	c0.37	0.02	0.00	c0.09		c0.07	0.19		0.00	0.06	0.10
v/s Ratio Perm			0.11				c0.25			0.03		0.05
v/c Ratio	0.84	0.86	0.23	0.02	0.64		1.03	0.81		0.14	0.32	0.23
Uniform Delay, d1	25.1	25.4	13.7	37.2	40.5		34.1	35.5		30.4	34.0	7.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	8.5	10.0	0.1	0.0	4.3		56.2	10.1		0.2	0.2	0.0
Delay (s)	33.6	35.4	13.8	37.2	44.8		90.3	45.7		30.5	34.2	7.9
Level of Service	C	D	B	D	D		F	D		C	C	A
Approach Delay (s)	29.8				44.6		68.3		15.0			
Approach LOS	C				D		E		B			

Intersection Summary

HCM Average Control Delay	37.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	99.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings

34: Old Fairhaven Pkwy & 12th St

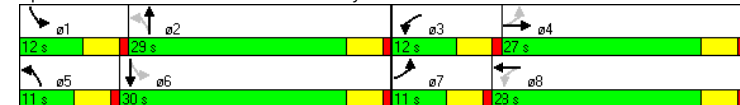
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Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Volume (vph)	10	150	275	110	20	195	200	255
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	27.0	11.0	27.0	11.0	27.0	11.0	27.0
Total Split (s)	11.0	27.0	12.0	28.0	11.0	29.0	12.0	30.0
Total Split (%)	13.8%	33.8%	15.0%	35.0%	13.8%	36.3%	15.0%	37.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)	20.6	13.4	24.9	23.5	32.1	25.1	36.0	33.0
Actuated g/C Ratio	0.26	0.19	0.35	0.33	0.42	0.36	0.51	0.47
v/c Ratio	0.04	0.51	0.63	0.46	0.05	0.62	0.55	0.34
Control Delay	16.3	29.8	24.5	15.4	11.0	21.5	16.4	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	29.8	24.5	15.4	11.0	21.5	16.4	16.0
LOS	B	C	C	B	B	C	B	B
Approach Delay	29.0		19.9		21.0		16.1	
Approach LOS	C		B		C		B	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 70.6
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.63
Intersection Signal Delay: 20.1
Intersection Capacity Utilization 71.0%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service C

Splits and Phases: 34: Old Fairhaven Pkwy & 12th St



HCM Signalized Intersection Capacity Analysis
34: Old Fairhaven Pkwy & 12th St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.91		1.00	0.92		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1703	1768		1787	1710		1805	1755		1787	1856	
Flt Permitted	0.55	1.00		0.45	1.00		0.58	1.00		0.28	1.00	
Satd. Flow (perm)	994	1768		854	1710		1100	1755		525	1856	
Volume (vph)	10	150	15	275	110	170	20	195	200	200	255	25
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	158	16	289	116	179	21	205	211	211	268	26
RTOR Reduction (vph)	0	5	0	0	69	0	0	43	0	0	3	0
Lane Group Flow (vph)	11	169	0	289	226	0	21	373	0	211	291	0
Heavy Vehicles (%)	6%	6%	6%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.7	16.6		28.6	22.5		29.6	27.3		39.0	32.0	
Effective Green, g (s)	19.7	17.6		29.6	23.5		31.6	28.3		40.3	33.0	
Actuated g/C Ratio	0.25	0.23		0.38	0.30		0.41	0.36		0.52	0.42	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	270	399		420	516		476	638		401	786	
v/s Ratio Prot	0.00	0.10		c0.07	0.13		0.00	c0.21		c0.05	0.16	
v/s Ratio Perm	0.01			c0.19			0.02			0.22		
v/c Ratio	0.04	0.42		0.69	0.44		0.04	0.59		0.53	0.37	
Uniform Delay, d1	21.9	25.8		19.0	21.9		13.9	20.1		12.1	15.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.7		4.6	0.6		0.0	3.9		1.2	1.3	
Delay (s)	21.9	26.5		23.6	22.5		14.0	24.0		13.4	16.7	
Level of Service	C	C		C	C		B	C		B	B	
Approach Delay (s)		26.3			23.1			23.5			15.3	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	77.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

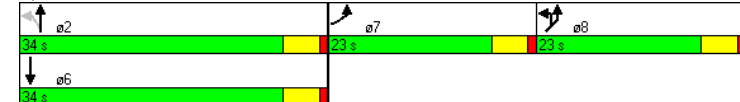
Timings
35: Hawthorne & 12th St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	NBL	NBT	SBT	NEL
Lane Configurations	↰		↱	↱	↰
Volume (vph)	155	10	275	360	60
Turn Type	Perm				
Protected Phases	7		2	6	8
Permitted Phases		2			
Detector Phases	7	2	2	6	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	23.0	26.0	26.0	26.0	23.0
Total Split (s)	23.0	34.0	34.0	34.0	23.0
Total Split (%)	28.8%	42.5%	42.5%	42.5%	28.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead				Lag
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	Max	None
Act Effct Green (s)	12.2		31.1	31.1	8.8
Actuated g/C Ratio	0.21		0.53	0.53	0.14
v/c Ratio	0.50		0.45	0.70	0.29
Control Delay	26.6		15.0	19.0	25.9
Queue Delay	0.0		0.0	0.0	0.0
Total Delay	26.6		15.0	19.0	25.9
LOS	C		B	B	C
Approach Delay	26.6		15.0	19.0	25.9
Approach LOS	C		B	B	C

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 59	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 19.6	Intersection LOS: B
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 35: Hawthorne & 12th St



HCM Signalized Intersection Capacity Analysis 35: Hawthorne & 12th St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBR	EBR2	NBL	NBT	SBT	SBR	SBR2	NEL	NER
Lane Configurations	↰	↱	↱	↰	↰	↱	↱	↱	↰	↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0				4.0	4.0			4.0	
Lane Util. Factor	1.00				1.00	1.00			1.00	
Fr _t	0.98				1.00	0.94			0.98	
Flt Protected	0.96				1.00	1.00			0.96	
Satd. Flow (prot)	1773				1859	1789			1786	
Flt Permitted	0.96				0.98	1.00			0.96	
Satd. Flow (perm)	1773				1817	1789			1786	
Volume (vph)	155	10	10	10	275	360	55	220	60	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	163	11	11	11	289	379	58	232	63	11
RTOR Reduction (vph)	3	0	0	0	0	19	0	0	9	0
Lane Group Flow (vph)	182	0	0	0	300	650	0	0	65	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	0%	0%	0%	0%	0%
Turn Type	Perm									
Protected Phases	7				2		6			
Permitted Phases					2					
Actuated Green, G (s)	11.1				30.1		30.1			
Effective Green, g (s)	12.1				31.1		31.1			
Actuated g/C Ratio	0.20				0.51		0.51			
Clearance Time (s)	5.0				5.0		5.0			
Vehicle Extension (s)	3.0				3.0		3.0			
Lane Grp Cap (vph)	352				926		912			
v/s Ratio Prot	c0.10						c0.36			
v/s Ratio Perm					0.17					
v/c Ratio	0.52				0.32		0.71			
Uniform Delay, d1	21.8				8.8		11.5			
Progression Factor	1.00				1.00		1.00			
Incremental Delay, d2	1.3				0.2		4.7			
Delay (s)	23.1				9.0		16.2			
Level of Service	C				A		B			
Approach Delay (s)	23.1				9.0		16.2			
Approach LOS	C				A		B			

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

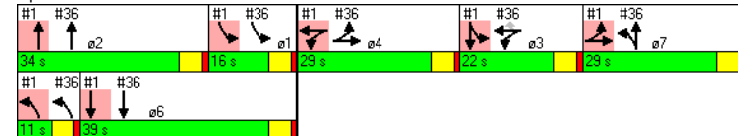
Timings 36: Birchwood Ave & Meridian Street

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT	ø2	ø5	ø7
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱			
Volume (vph)	255	140	185	260	110	835	115	745			
Turn Type	Split			Perm	Prot		Prot				
Protected Phases	4	4	3		5 7	2 7	1	6	2	5	7
Permitted Phases				3							
Detector Phases	4	4	3	3	5 7	2 7	1	6			
Minimum Initial (s)	6.0	6.0	6.0	6.0			6.0	10.0	10.0	6.0	6.0
Minimum Split (s)	29.0	29.0	11.0	11.0			11.0	23.0	23.0	11.0	29.0
Total Split (s)	29.0	29.0	22.0	22.0	40.0	63.0	16.0	39.0	34.0	11.0	29.0
Total Split (%)	22.3%	22.3%	16.9%	16.9%	30.8%	48.5%	12.3%	30.0%	26%	8%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lead	Lag	Lag			Lag	Lag	Lead	Lead	
Lead-Lag Optimize?											
Recall Mode	None	None	None	None			None	None	Max	None	None
Act Effct Green (s)	22.8	22.8	18.0	18.0	35.9	58.9	12.0	35.0			
Actuated g/C Ratio	0.18	0.18	0.14	0.14	0.28	0.46	0.09	0.27			
v/c Ratio	0.83	0.62	1.04	0.63	0.23	0.56	0.73	1.09			
Control Delay	72.4	53.7	119.0	16.3	57.7	8.0	82.4	97.9			
Queue Delay	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0			
Total Delay	72.4	53.7	119.0	16.3	57.7	9.2	82.4	97.9			
LOS	E	D	F	B	E	A	F	F			
Approach Delay	64.2		67.7		14.6		96.3				
Approach LOS	E		E		B		F				

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 127.8	
Natural Cycle: 135	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.09	
Intersection Signal Delay: 60.4	Intersection LOS: E
Intersection Capacity Utilization 75.5%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 36: Birchwood Ave & Meridian Street



HCM Signalized Intersection Capacity Analysis
36: Birchwood Ave & Meridian Street

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1814			1873	1615	1787	3553		1752	3379	
Flt Permitted	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	1814			1873	1615	1787	3553		1752	3379	
Volume (vph)	255	140	60	75	185	260	110	835	35	115	745	235
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	268	147	63	79	195	274	116	879	37	121	784	247
RTOR Reduction (vph)	0	12	0	0	0	209	0	2	0	0	23	0
Lane Group Flow (vph)	268	198	0	0	274	65	116	914	0	121	1008	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split		Perm	Prot			Prot		
Protected Phases	4	4		3	3		5 7	2 7		1	6	
Permitted Phases						3						
Actuated Green, G (s)	21.8	21.8			17.0	17.0	34.9	57.9		11.0	34.0	
Effective Green, g (s)	22.8	22.8			18.0	18.0	35.9	58.9		12.0	35.0	
Actuated g/C Ratio	0.18	0.18			0.14	0.14	0.28	0.46		0.09	0.27	
Clearance Time (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Vehicle Extension (s)	3.0	3.0			2.0	2.0				2.0	2.0	
Lane Grp Cap (vph)	322	324			264	228	502	1639		165	926	
v/s Ratio Prot	c0.15	0.11			c0.15		0.06	c0.26		0.07	c0.30	
v/s Ratio Perm						0.04						
v/c Ratio	0.83	0.61			1.04	0.29	0.23	0.56		0.73	1.09	
Uniform Delay, d1	50.6	48.4			54.8	49.1	35.3	24.9		56.3	46.4	
Progression Factor	1.00	1.00			1.00	1.00	1.57	0.29		1.00	1.00	
Incremental Delay, d2	16.6	3.4			65.6	0.3	0.0	0.2		13.5	56.6	
Delay (s)	67.2	51.7			120.4	49.4	55.4	7.4		69.8	102.9	
Level of Service	E	D			F	D	E	A		E	F	
Approach Delay (s)		60.4			84.9		12.8				99.4	
Approach LOS		E			F		B				F	

Intersection Summary

HCM Average Control Delay	63.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	127.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
37: Lakeway Dr & Lincoln Street

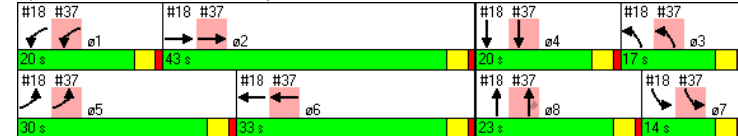
Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↱	↰	↱
Volume (vph)	45	1010	260	625	210	135	465	145	190
Turn Type	Prot		Prot		Prot		Perm	Prot	
Protected Phases	5	2	1	6	3	8		7	4
Permitted Phases							8		
Detector Phases	5	2	1	6	3	8	8	7	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	30.0	43.0	20.0	33.0	17.0	23.0	23.0	14.0	20.0
Total Split (%)	30.0%	43.0%	20.0%	33.0%	17.0%	23.0%	23.0%	14.0%	20.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?									
Recall Mode	None	Min	None	None	None	Min	Min	None	None
Act Effct Green (s)	25.8	39.0	16.0	29.2	13.0	16.4	16.4	12.4	15.8
Actuated g/C Ratio	0.26	0.39	0.16	0.29	0.13	0.16	0.16	0.12	0.16
v/c Ratio	0.11	0.89	1.00	0.74	1.00	0.48	0.93	0.72	0.92
Control Delay	52.0	16.8	97.7	36.8	104.0	42.6	40.0	64.2	75.9
Queue Delay	0.0	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.0	24.6	97.7	36.8	104.0	42.6	40.0	64.2	75.9
LOS	D	C	F	D	F	D	D	E	E
Approach Delay		25.7		53.3		57.1			71.6
Approach LOS		C		D		E			E

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 99.8
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 46.7
Intersection Capacity Utilization 84.6%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service E

Splits and Phases: 37: Lakeway Dr & Lincoln Street



HCM Signalized Intersection Capacity Analysis
37: Lakeway Dr & Lincoln Street

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	1.00		0.85	1.00	0.96
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		1.00	0.95	1.00
Satd. Flow (prot)	1711	3369		1711	3366		1711	1801		1531	1711	1736
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		1.00	0.95	1.00
Satd. Flow (perm)	1711	3369		1711	3366		1711	1801		1531	1711	1736
Volume (vph)	45	1010	115	260	625	75	210	135	465	145	190	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	1063	121	274	658	79	221	142	489	153	200	63
RTOR Reduction (vph)	0	9	0	0	9	0	0	0	272	0	12	0
Lane Group Flow (vph)	47	1175	0	274	728	0	221	142	217	153	251	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases								8				
Actuated Green, G (s)	25.8	39.0		16.0	29.2		13.0	16.4	16.4	12.4	15.8	
Effective Green, g (s)	25.8	39.0		16.0	29.2		13.0	16.4	16.4	12.4	15.8	
Actuated g/C Ratio	0.26	0.39		0.16	0.29		0.13	0.16	0.16	0.12	0.16	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	442	1317		274	985		223	296	252	213	275	
v/s Ratio Prot	0.03	c0.35		c0.16	0.22		c0.13	0.08		0.09	c0.14	
v/s Ratio Perm								0.14				
v/c Ratio	0.11	0.89		1.00	0.74		0.99	0.48	0.86	0.72	0.91	
Uniform Delay, d1	28.2	28.4		41.9	31.9		43.3	37.8	40.6	42.0	41.3	
Progression Factor	1.81	0.43		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	3.0		54.4	2.9		57.5	1.2	24.0	11.0	32.3	
Delay (s)	51.2	15.3		96.3	34.8		100.9	39.1	64.6	53.0	73.7	
Level of Service	D	B		F	C		F	D	E	D	E	
Approach Delay (s)		16.7			51.5			69.8			66.1	
Approach LOS		B			D			E			E	
Intersection Summary												
HCM Average Control Delay		45.4										
HCM Volume to Capacity ratio		0.89										
Actuated Cycle Length (s)		99.8						12.0				
Intersection Capacity Utilization		84.6%						ICU Level of Service		E		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
40: Wharf St/Pine St & N State St

Alternative 3 (2016) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↰	↱		↰	↱
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	45	85	0	920	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	47	89	0	968	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1163	984	1000			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1163	984	1000			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	84	87			
cM capacity (veh/h)	187	301	692			
Direction, Lane #						
Volume Total	47	89	1000			
Volume Left	0	89	0			
Volume Right	47	0	32			
cSH	301	692	1700			
Volume to Capacity	0.16	0.13	0.59			
Queue Length 95th (ft)	14	11	0			
Control Delay (s)	19.2	11.0	0.0			
Lane LOS	C	B				
Approach Delay (s)	19.2	11.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		1.7				
Intersection Capacity Utilization		61.6%			ICU Level of Service	B
Analysis Period (min)		15				

Timings
19: Roeder Ave & F St

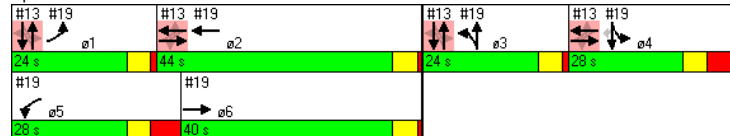
Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Volume (vph)	240	655	10	755	30	65	35	225
Turn Type	Prot		Prot		Split		Perm	
Protected Phases	1	6	5	2	3	3	4	
Permitted Phases								4
Detector Phases	1	6	5	2	3	3	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	28.0	24.0	24.0	24.0	28.0	28.0
Total Split (s)	24.0	40.0	28.0	44.0	24.0	24.0	28.0	28.0
Total Split (%)	20.0%	33.3%	23.3%	36.7%	20.0%	20.0%	23.3%	23.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	5.0	1.0	1.0	1.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?								
Recall Mode	Min	Max	None	None	None	None	None	None
Act Effct Green (s)	19.4	60.1	11.5	40.0	19.6	19.6	24.0	24.0
Actuated g/C Ratio	0.16	0.51	0.10	0.34	0.16	0.16	0.20	0.20
v/c Ratio	0.85	0.73	0.06	1.45	0.12	0.29	0.62	0.46
Control Delay	75.4	30.3	49.9	245.2	44.1	43.7	49.3	9.3
Queue Delay	2.5	0.0	0.0	17.9	0.0	0.6	2.8	0.3
Total Delay	78.0	30.3	49.9	263.1	44.1	44.4	52.1	9.6
LOS	E	C	D	F	D	D	D	A
Approach Delay		42.9		260.7		44.3	30.4	
Approach LOS		D		F		D	C	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 119
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.45
Intersection Signal Delay: 122.7
Intersection Capacity Utilization 88.5%
Analysis Period (min) 15
Intersection LOS: F
ICU Level of Service E

Splits and Phases: 19: Roeder Ave & F St



HCM Signalized Intersection Capacity Analysis
19: Roeder Ave & F St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.96	1.00
Satd. Flow (prot)	1728	1812		1711	1765		1479	1525			1728	1531
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.96	1.00
Satd. Flow (perm)	1728	1812		1711	1765		1479	1525			1728	1531
Volume (vph)	240	655	15	10	755	115	30	65	10	180	35	225
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	240	655	15	10	755	115	30	65	10	180	35	225
RTOR Reduction (vph)	0	1	0	0	4	0	0	5	0	0	0	182
Lane Group Flow (vph)	240	669	0	10	866	0	30	70	0	0	215	43
Heavy Vehicles (%)	1%	1%		2%	2%		18%	18%		2%	2%	2%
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	18.4	59.1		1.5	46.2		18.6	18.6			19.0	19.0
Effective Green, g (s)	19.4	60.1		6.5	47.2		19.6	19.6			24.0	24.0
Actuated g/C Ratio	0.15	0.48		0.05	0.37		0.16	0.16			0.19	0.19
Clearance Time (s)	5.0	5.0		9.0	5.0		5.0	5.0			9.0	9.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	266	863		88	660		230	237			329	291
v/s Ratio Prot	c0.14	0.37		0.01	c0.49		0.02	c0.05			c0.12	
v/s Ratio Perm												0.03
v/c Ratio	0.90	0.78		0.11	1.31		0.13	0.30			0.65	0.15
Uniform Delay, d1	52.5	27.5		57.1	39.5		46.0	47.2			47.3	42.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			0.96	1.23
Incremental Delay, d2	30.8	6.8		0.6	150.9		0.3	0.7			3.9	0.2
Delay (s)	83.3	34.2		57.7	190.4		46.2	47.9			49.3	52.6
Level of Service	F	C		E	F		D	D			D	D
Approach Delay (s)		47.2			188.9			47.4			51.0	
Approach LOS		D			F			D			D	

Intersection Summary

HCM Average Control Delay	101.3	HCM Level of Service	F
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	126.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis 20: Roeder Ave & C St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control	Free			Free			Stop			Stop			
Grade	0%			0%			0%			0%			
Volume (veh/h)	30	845	25	65	775	90	35	30	100	35	30	35	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly flow rate (vph)	30	845	25	65	775	90	35	30	100	35	30	35	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (ft)	735												
pX, platoon unblocked				0.68			0.68			0.68	0.68	0.68	
vC, conflicting volume	865				870			1918	1912	858	1982	1880	820
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	865				808			2358	2351	789	2454	2302	820
tC, single (s)	4.1				4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)													
tF (s)	2.2				2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96				88			0	0	62	0	0	91
cM capacity (veh/h)	787				558			0	21	266	0	22	378
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	900	930	165	100									
Volume Left	30	65	35	35									
Volume Right	25	90	100	35									
cSH	787	558	0	0									
Volume to Capacity	0.04	0.12	Err	Err									
Queue Length 95th (ft)	3	10	Err	Err									
Control Delay (s)	1.1	3.6	Err	Err									
Lane LOS	A	A	F	F									
Approach Delay (s)	1.1	3.6	Err	Err									
Approach LOS			F	F									
Intersection Summary													
Average Delay				Err									
Intersection Capacity Utilization	92.1%			ICU Level of Service			F						
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis 21: E Chestnut St & Bay St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Timings
22: E Chestnut St & Commercial St

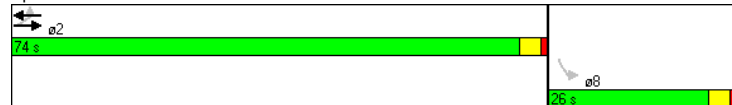
Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBT	SBL
Lane Group	EBL	EBT	WBT	SBL
Lane Configurations	↔	↕	↕	↕
Volume (vph)	155	1110	460	85
Turn Type	Perm			
Protected Phases		2	2	
Permitted Phases	2			8
Detector Phases	2	2	2	8
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	26.0	26.0	26.0	19.0
Total Split (s)	74.0	74.0	74.0	26.0
Total Split (%)	74.0%	74.0%	74.0%	26.0%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)		70.0	70.0	22.0
Actuated g/C Ratio		0.70	0.70	0.22
v/c Ratio		0.69	0.43	0.57
Control Delay		11.3	13.1	29.3
Queue Delay		3.0	21.7	6.2
Total Delay		14.3	34.7	35.5
LOS		B	C	D
Approach Delay		14.3	34.7	35.5
Approach LOS		B	C	D

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green
Natural Cycle: 60
Control Type: Pretimed
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 22.0
Intersection LOS: C
Intersection Capacity Utilization 87.8%
ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 22: E Chestnut St & Commercial St



HCM Signalized Intersection Capacity Analysis
22: E Chestnut St & Commercial St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		0.95	1.00		1.00	
Frlpb, ped/bikes		1.00	0.99		0.95	
Flpb, ped/bikes		1.00	1.00		0.98	
Frt		1.00	0.98		0.92	
Flt Protected		0.99	1.00		0.98	
Satd. Flow (prot)		3427	1756		1512	
Flt Permitted		0.75	1.00		0.98	
Satd. Flow (perm)		2603	1756		1512	
Volume (vph)	155	1110	460	65	85	135
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	155	1110	460	65	85	135
RTOR Reduction (vph)	0	0	5	0	57	0
Lane Group Flow (vph)	0	1265	520	0	163	0
Confl. Peds. (#/hr)		20		20	20	20
Heavy Vehicles (%)	1%	1%	2%	2%	2%	2%
Turn Type	Perm					
Protected Phases		2	2			
Permitted Phases	2				8	
Actuated Green, G (s)		70.0	70.0		22.0	
Effective Green, g (s)		70.0	70.0		22.0	
Actuated g/C Ratio		0.70	0.70		0.22	
Clearance Time (s)		4.0	4.0		4.0	
Lane Grp Cap (vph)		1822	1229		333	
v/s Ratio Prot			0.30			
v/s Ratio Perm		c0.49			c0.11	
v/c Ratio		0.69	0.42		0.49	
Uniform Delay, d1		8.8	6.4		34.1	
Progression Factor		1.00	2.04		1.00	
Incremental Delay, d2		2.2	0.1		5.1	
Delay (s)		11.0	13.2		39.2	
Level of Service		B	B		D	
Approach Delay (s)		11.0	13.2		39.2	
Approach LOS		B	B		D	

Intersection Summary

HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
23: E Chestnut St & Cornwall Ave

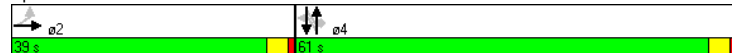
Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	→	↖	↑	↗	↘	↓
Lane Group	EBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↔↔		↔	↗		↔↔
Volume (vph)	1030	460	315	65	125	270
Turn Type	Perm			Perm	Perm	
Protected Phases	2		4		4	
Permitted Phases	4			4	4	
Detector Phases	2	4	4	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	26.0	19.0	19.0	19.0	19.0	19.0
Total Split (s)	39.0	61.0	61.0	61.0	61.0	61.0
Total Split (%)	39.0%	61.0%	61.0%	61.0%	61.0%	61.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	35.0		57.0	57.0		57.0
Actuated g/C Ratio	0.35		0.57	0.57		0.57
v/c Ratio	1.25		1.40	0.08		1.13
Control Delay	144.2		213.5	8.4		98.8
Queue Delay	42.1		15.0	0.0		11.6
Total Delay	186.3		228.5	8.4		110.4
LOS	F		F	A		F
Approach Delay	186.3		211.5			110.4
Approach LOS	F		F			F

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 90
Control Type: Pretimed
Maximum v/c Ratio: 1.40
Intersection Signal Delay: 181.1
Intersection Capacity Utilization 120.1%
Analysis Period (min) 15

Splits and Phases: 23: E Chestnut St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
23: E Chestnut St & Cornwall Ave

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↘	↗	←	↖	↗	↑	↘	↗	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔	↗		↔↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0		4.0	
Lane Util. Factor		0.95						1.00	1.00		1.00	
Frpb, ped/bikes		0.97						1.00	0.89		0.97	
Flpb, ped/bikes		0.99						0.97	1.00		1.00	
Frt		0.97						1.00	0.85		0.98	
Flt Protected		1.00						0.97	1.00		0.99	
Satd. Flow (prot)		3208						1689	1362		1726	
Flt Permitted		1.00						0.56	1.00		0.41	
Satd. Flow (perm)		3208						972	1362		712	
Volume (vph)	75	1030	330	0	0	0	460	315	65	125	270	70
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	75	1030	330	0	0	0	460	315	65	125	270	70
RTOR Reduction (vph)	0	28	0	0	0	0	0	0	6	0	6	0
Lane Group Flow (vph)	0	1407	0	0	0	0	0	775	59	0	459	0
Confl. Peds. (#/hr)	50		50				50		50	50		50
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	Perm						Perm			Perm	Perm	
Protected Phases	2						4			4		4
Permitted Phases	2						4		4	4		
Actuated Green, G (s)		35.0						57.0	57.0		57.0	
Effective Green, g (s)		35.0						57.0	57.0		57.0	
Actuated g/C Ratio		0.35						0.57	0.57		0.57	
Clearance Time (s)		4.0						4.0	4.0		4.0	
Lane Grp Cap (vph)		1123						554	776		406	
v/s Ratio Prot												
v/s Ratio Perm		0.44						0.80	0.04		0.64	
v/c Ratio		1.25						1.40	0.08		1.13	
Uniform Delay, d1		32.5						21.5	9.7		21.5	
Progression Factor		0.87						1.00	1.00		0.72	
Incremental Delay, d2		120.1						190.3	0.2		80.0	
Delay (s)		148.2						211.8	9.9		95.5	
Level of Service		F						F	A		F	
Approach Delay (s)		148.2			0.0			196.1			95.5	
Approach LOS		F			A			F			F	

Intersection Summary

HCM Average Control Delay	153.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	120.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

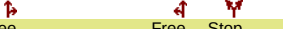
HCM Unsignalized Intersection Capacity Analysis
38: Roeder Ave & Central Ave

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	75	700	155	20	505	110	280	145	30	150	140	195
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	75	700	155	20	505	110	280	145	30	150	140	195
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (ft)	1113											
pX, platoon unblocked												
vC, conflicting volume	615				855				1792	1582	778	1630
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	615				855				1792	1582	778	1630
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1
tC, 2 stage (s)												
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5
p0 queue free %	92				97				0	0	92	0
cM capacity (veh/h)	965				785				0	98	397	0
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	930	635	455	485								
Volume Left	75	20	280	150								
Volume Right	155	110	30	195								
cSH	965	785	0	0								
Volume to Capacity	0.08	0.03	Err	Err								
Queue Length 95th (ft)	6	2	Err	Err								
Control Delay (s)	2.0	0.7	Err	Err								
Lane LOS	A	A	F	F								
Approach Delay (s)	2.0	0.7	Err	Err								
Approach LOS				F	F							
Intersection Summary												
Average Delay				Err								
Intersection Capacity Utilization	133.6%			ICU Level of Service			H					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
39: Roeder Ave & Hilton Ave

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	885	40	0	910	50	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	885	40	0	910	50	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	550					
pX, platoon unblocked	0.64					
vC, conflicting volume	925			1815		905
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	925			2281		905
tC, single (s)	4.1			6.4		6.2
tC, 2 stage (s)						
tF (s)	2.2			3.5		3.3
p0 queue free %	100			0		100
cM capacity (veh/h)	739			28		335
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	925	910	50			
Volume Left	0	0	50			
Volume Right	40	0	0			
cSH	1700	739	28			
Volume to Capacity	0.54	0.00	1.79			
Queue Length 95th (ft)	0	0	148			
Control Delay (s)	0.0	0.0	682.2			
Lane LOS				F		
Approach Delay (s)	0.0	0.0	682.2			
Approach LOS				F		
Intersection Summary						
Average Delay	18.1					
Intersection Capacity Utilization	59.0%			ICU Level of Service		B
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
49: Maple St & Central Ave

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	10	40	290	20	40	155
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	10	40	290	20	40	155
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	535	300			310	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	535	300			310	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	95			97	
cM capacity (veh/h)	490	740			1250	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	50	310	195			
Volume Left	10	0	40			
Volume Right	40	20	0			
cSH	671	1700	1250			
Volume to Capacity	0.07	0.18	0.03			
Queue Length 95th (ft)	6	0	2			
Control Delay (s)	10.8	0.0	1.9			
Lane LOS	B		A			
Approach Delay (s)	10.8	0.0	1.9			
Approach LOS	B					
Intersection Summary						
Average Delay		1.6				
Intersection Capacity Utilization		40.2%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
50: Maple St & Bay St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	70	10	10	470	65	30
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	70	10	10	470	65	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	570	80	95			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	570	80	95			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	99	99			
cM capacity (veh/h)	480	980	1499			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	80	480	95			
Volume Left	70	10	0			
Volume Right	10	0	30			
cSH	512	1499	1700			
Volume to Capacity	0.16	0.01	0.06			
Queue Length 95th (ft)	14	1	0			
Control Delay (s)	13.3	0.2	0.0			
Lane LOS	B	A				
Approach Delay (s)	13.3	0.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.8				
Intersection Capacity Utilization		43.1%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
51: Laurel St & Bay St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	110	175	135	365	55	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	110	175	135	365	55	10
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	285	500	65			
Volume Left (vph)	110	0	55			
Volume Right (vph)	0	365	10			
Hadj (s)	0.11	-0.40	0.11			
Departure Headway (s)	4.7	4.0	5.7			
Degree Utilization, x	0.37	0.56	0.10			
Capacity (veh/h)	745	875	552			
Control Delay (s)	10.4	11.9	9.3			
Approach Delay (s)	10.4	11.9	9.3			
Approach LOS	B	B	A			
Intersection Summary						
Delay			11.2			
HCM Level of Service			B			
Intersection Capacity Utilization			58.5%	ICU Level of Service	B	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
52: Laurel St & Log Pond Rd

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	125	105	100	160	340	205
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	125	105	100	160	340	205
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total (vph)	230	260	545			
Volume Left (vph)	0	100	340			
Volume Right (vph)	105	0	205			
Hadj (s)	-0.24	0.11	-0.07			
Departure Headway (s)	5.7	6.0	5.3			
Degree Utilization, x	0.36	0.43	0.80			
Capacity (veh/h)	580	559	669			
Control Delay (s)	12.0	13.5	25.4			
Approach Delay (s)	12.0	13.5	25.4			
Approach LOS	B	B	D			
Intersection Summary						
Delay			19.4			
HCM Level of Service			C			
Intersection Capacity Utilization			68.3%	ICU Level of Service	C	
Analysis Period (min)			15			

Timings
1: Squalicum Pkwy & Meridian Street

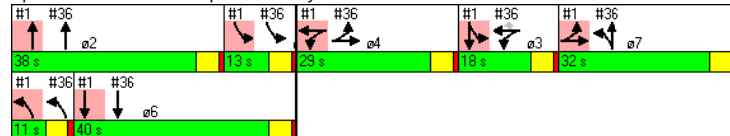
Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBT	NBL	NBT	SBL	SBT	ø1	ø3	ø6
Lane Configurations	↰	↱	↰	↰	↰	↰	↰			
Volume (vph)	420	5	10	5	760	30	705			
Turn Type	Split		Prot		Prot					
Protected Phases	7	7	4	5	2	13	3 6	1	3	6
Permitted Phases										
Detector Phases	7	7	4	5	2	13	3 6			
Minimum Initial (s)	6.0	6.0	6.0	6.0	10.0			6.0	6.0	10.0
Minimum Split (s)	29.0	29.0	29.0	11.0	23.0			11.0	11.0	23.0
Total Split (s)	32.0	32.0	29.0	11.0	38.0	31.0	58.0	13.0	18.0	40.0
Total Split (%)	24.6%	24.6%	22.3%	8.5%	29.2%	23.8%	44.6%	10%	14%	31%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0			1.0	1.0	1.0
Lead/Lag			Lead	Lead	Lead			Lag	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Max			None	None	None
Act Effct Green (s)	28.0	28.0	23.7	7.0	34.0	23.0	50.0			
Actuated g/C Ratio	0.22	0.22	0.18	0.05	0.26	0.18	0.39			
v/c Ratio	1.14	0.07	0.17	0.05	0.82	0.10	0.79			
Control Delay	137.9	19.6	20.6	59.6	52.8	13.9	10.6			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	1.8			
Total Delay	137.9	19.6	20.6	59.6	52.8	13.9	12.3			
LOS	F	B	C	E	D	B	B			
Approach Delay		131.3	20.6		52.8		12.4			
Approach LOS		F	C		D		B			

Intersection Summary

Cycle Length: 130	
Actuated Cycle Length: 128.8	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.54	
Intersection Signal Delay: 48.1	Intersection LOS: D
Intersection Capacity Utilization 67.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Squalicum Pkwy & Meridian Street



HCM Signalized Intersection Capacity Analysis
1: Squalicum Pkwy & Meridian Street

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.88			0.91		1.00	1.00		1.00	0.95	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1563			1715		1787	3567		1752	3327	
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1687	1563			1715		1787	3567		1752	3327	
Volume (vph)	420	5	20	10	10	40	5	760	10	30	705	360
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	420	5	20	10	10	40	5	760	10	30	705	360
RTOR Reduction (vph)	0	16	0	0	33	0	0	1	0	0	50	0
Lane Group Flow (vph)	420	9	0	0	27	0	5	769	0	30	1015	0
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split			Prot			Prot		
Protected Phases	7	7		4	4		5	2		1 3	3 6	
Permitted Phases												
Actuated Green, G (s)	27.0	27.0			22.7		6.0	33.0		21.0	48.0	
Effective Green, g (s)	28.0	28.0			23.7		7.0	34.0		23.0	50.0	
Actuated g/C Ratio	0.22	0.22			0.18		0.05	0.26		0.18	0.39	
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0				
Vehicle Extension (s)	3.0	3.0			3.0		2.0	2.0				
Lane Grp Cap (vph)	367	340			316		97	942		313	1293	
v/s Ratio Prot	c0.25	0.01			c0.02		0.00	c0.22		0.02	c0.31	
v/s Ratio Perm												
v/c Ratio	1.14	0.03			0.09		0.05	0.82		0.10	0.79	
Uniform Delay, d1	50.3	39.6			43.5		57.7	44.4		44.2	34.6	
Progression Factor	1.00	1.00			1.00		1.00	1.00		0.53	0.54	
Incremental Delay, d2	92.3	0.0			0.1		0.1	7.8		0.0	0.3	
Delay (s)	142.7	39.7			43.6		57.8	52.2		23.6	19.0	
Level of Service	F	D			D		E	D		C	B	
Approach Delay (s)		136.9			43.6			52.2			19.1	
Approach LOS		F			D			D			B	

Intersection Summary

HCM Average Control Delay	52.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	128.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Meridian Street & Broadway St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	85	350	45	395	180	235	35	220
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	1	6	5	2	7	4	3	8
Permitted Phases								
Detector Phases	1	6	5	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	25.0	11.0	25.0	11.0	25.0	11.0	25.0
Total Split (s)	14.0	42.0	11.0	39.0	20.0	36.0	11.0	27.0
Total Split (%)	14.0%	42.0%	11.0%	39.0%	20.0%	36.0%	11.0%	27.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	9.9	35.7	8.5	31.8	13.2	23.3	8.5	16.1
Actuated g/C Ratio	0.14	0.50	0.11	0.45	0.18	0.32	0.11	0.22
v/c Ratio	0.36	0.52	0.23	0.53	0.58	0.53	0.18	0.66
Control Delay	42.8	23.7	43.7	27.2	42.4	25.9	42.9	38.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.8	23.7	43.7	27.2	42.4	25.9	42.9	38.0
LOS	D	C	D	C	D	C	D	D
Approach Delay		26.6		28.8		32.1		38.5
Approach LOS		C		C		C		D

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 70.8

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

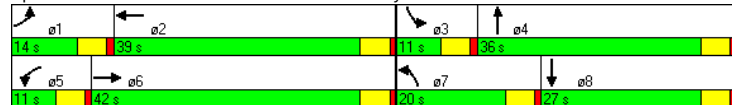
Maximum v/c Ratio: 0.66

Intersection Signal Delay: 30.6 Intersection LOS: C

Intersection Capacity Utilization 68.6% ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: Meridian Street & Broadway St



HCM Signalized Intersection Capacity Analysis
2: Meridian Street & Broadway St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1743		1728	1796		1728	1748		1745	1785	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1728	1743		1728	1796		1728	1748		1745	1785	
Volume (vph)	85	350	115	45	395	30	180	235	65	35	220	45
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	85	350	115	45	395	30	180	235	65	35	220	45
RTOR Reduction (vph)	0	11	0	0	2	0	0	11	0	0	8	0
Lane Group Flow (vph)	85	454	0	45	423	0	180	289	0	35	257	0
Confl. Peds. (#/hr)			5			5			5			5
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	5.5	31.1		2.8	28.4		8.7	18.5		2.8	12.6	
Effective Green, g (s)	6.5	32.1		3.8	29.4		9.7	19.5		3.8	13.6	
Actuated g/C Ratio	0.09	0.43		0.05	0.39		0.13	0.26		0.05	0.18	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	149	744		87	702		223	453		88	323	
v/s Ratio Prot	c0.05	c0.26		0.03	0.24		c0.10	0.17		0.02	c0.14	
v/s Ratio Perm												
v/c Ratio	0.57	0.61		0.52	0.60		0.81	0.64		0.40	0.80	
Uniform Delay, d1	33.0	16.7		34.8	18.2		31.8	24.7		34.6	29.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.3	1.0		2.2	1.0		17.9	2.2		1.1	11.9	
Delay (s)	36.3	17.8		37.0	19.2		49.8	26.9		35.7	41.3	
Level of Service	D	B		D	B		D	C		D	D	
Approach Delay (s)		20.6			20.9			35.5			40.7	
Approach LOS		C			C			D			D	

Intersection Summary

HCM Average Control Delay	28.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	75.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
3: Ohio St & N State St

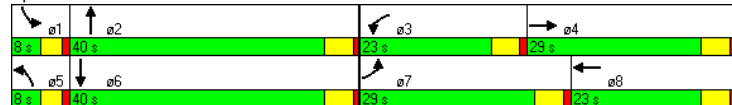
Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	465	445	245	125	40	1140	45	990
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	24.0	24.0	23.0	23.0	8.0	21.0	8.0	21.0
Total Split (s)	29.0	29.0	23.0	23.0	8.0	40.0	8.0	40.0
Total Split (%)	29.0%	29.0%	23.0%	23.0%	8.0%	40.0%	8.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	25.1	25.1	17.8	17.8	4.0	36.1	4.0	37.7
Actuated g/C Ratio	0.26	0.26	0.18	0.18	0.04	0.37	0.04	0.39
v/c Ratio	1.04	1.07	0.78	0.56	0.58	1.05	0.64	0.94
Control Delay	92.1	99.2	56.6	39.4	80.3	71.4	87.0	43.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	92.1	99.2	56.6	39.4	80.3	71.4	87.0	43.8
LOS	F	F	E	D	F	E	F	D
Approach Delay		95.8		49.2		71.7		45.3
Approach LOS		F		D		E		D

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 97.3
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.07
Intersection Signal Delay: 66.7
Intersection Capacity Utilization 88.1%
Analysis Period (min) 15
Intersection LOS: E
ICU Level of Service E

Splits and Phases: 3: Ohio St & N State St



HCM Signalized Intersection Capacity Analysis
3: Ohio St & N State St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.95		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	1788		1711	1713		1728	3379		1728	3351	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1728	1788		1711	1713		1728	3379		1728	3351	
Volume (vph)	465	445	55	245	125	60	40	1140	195	45	990	250
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	465	445	55	245	125	60	40	1140	195	45	990	250
RTOR Reduction (vph)	0	4	0	0	17	0	0	14	0	0	22	0
Lane Group Flow (vph)	465	496	0	245	168	0	40	1321	0	45	1218	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	24.1	24.1		16.8	16.8		2.3	35.9		3.1	36.7	
Effective Green, g (s)	25.1	25.1		17.8	17.8		2.3	36.9		3.1	37.7	
Actuated g/C Ratio	0.25	0.25		0.18	0.18		0.02	0.37		0.03	0.38	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	439	454		308	308		40	1261		54	1277	
v/s Ratio Prot	c0.27	c0.28		0.14	0.10		0.02	c0.39		c0.03	0.36	
v/s Ratio Perm												
v/c Ratio	1.06	1.09		0.80	0.54		1.00	1.05		0.83	0.95	
Uniform Delay, d1	36.9	36.9		38.8	36.9		48.3	31.0		47.6	29.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	59.5	69.3		13.9	2.5		142.3	38.8		65.0	15.4	
Delay (s)	96.4	106.2		52.7	39.3		190.6	69.8		112.6	45.2	
Level of Service	F	F		D	D		F	E		F	D	
Approach Delay (s)		101.5			47.0			73.3			47.5	
Approach LOS		F			D			E			D	

Intersection Summary

HCM Average Control Delay	69.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	98.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
4: Iowa St & James Street

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	←	←	↙	↓	↘	↗	→
Lane Group	WBL	WBT	SBL	SBT	SBR	NEL	NER
Lane Configurations							
Volume (vph)	485	65	210	170	835	745	785
Turn Type	Split		Perm		Over		pt+ov
Protected Phases	3	3		1	2	2	2 3
Permitted Phases			1				
Detector Phases	3	3	1	1	2	2	2 3
Minimum Initial (s)	6.0	6.0	8.0	8.0	6.0	6.0	
Minimum Split (s)	11.0	11.0	20.0	20.0	17.0	17.0	
Total Split (s)	13.0	13.0	45.0	45.0	22.0	22.0	35.0
Total Split (%)	16.3%	16.3%	56.3%	56.3%	27.5%	27.5%	43.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	
Lead/Lag			Lead	Lead	Lag	Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	
Act Effct Green (s)	9.0	9.0		41.0	18.0	18.0	31.0
Actuated g/C Ratio	0.11	0.11		0.51	0.22	0.22	0.39
v/c Ratio	1.47	1.51		4.18	1.38	1.21	1.19
Control Delay	268.7	282.5		1466.7	208.7	135.9	128.4
Queue Delay	0.0	0.0		0.0	0.0	31.9	65.9
Total Delay	268.7	282.5		1466.7	208.7	167.9	194.3
LOS	F	F		F	F	F	F
Approach Delay		275.7		598.9		178.9	
Approach LOS		F		F		F	

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 4.18

Intersection Signal Delay: 349.8

Intersection LOS: F

Intersection Capacity Utilization 75.5%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 4: Iowa St & James Street



HCM Signalized Intersection Capacity Analysis
4: Iowa St & James Street

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	←	←	↙	↓	↘	↗	→	↖	↗	↘
Movement	WBL	WBT	WBR	SBL	SBT	SBR	SBR2	NEL	NER	NER2
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95			1.00	0.88		0.97	0.91	
Frt	1.00	1.00			1.00	0.85		0.97	0.85	
Flt Protected	0.95	0.96			0.97	1.00		0.96	1.00	
Satd. Flow (prot)	1641	1660			1770	2720		3301	1407	
Flt Permitted	0.95	0.96			0.10	1.00		0.96	1.00	
Satd. Flow (perm)	1641	1660			177	2720		3301	1407	
Volume (vph)	485	65	5	210	170	835	10	745	785	15
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	485	65	5	210	170	835	10	745	785	15
RTOR Reduction (vph)	0	1	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	272	282	0	0	380	844	0	897	648	0
Heavy Vehicles (%)	1%	1%		1%	1%	1%		1%	1%	1%
Turn Type	Split			Perm		Over			pt+ov	
Protected Phases	3	3			1	2		2	2 3	
Permitted Phases				1						
Actuated Green, G (s)	8.0	8.0			40.0	17.0		17.0	30.0	
Effective Green, g (s)	9.0	9.0			41.0	18.0		18.0	31.0	
Actuated g/C Ratio	0.11	0.11			0.51	0.22		0.22	0.39	
Clearance Time (s)	5.0	5.0			5.0	5.0		5.0		
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0		
Lane Grp Cap (vph)	185	187			91	612		743	545	
v/s Ratio Prot	0.17	0.17				c0.31		0.27	c0.46	
v/s Ratio Perm					c2.14					
v/c Ratio	1.47	1.51			4.18	1.38		1.21	1.19	
Uniform Delay, d1	35.5	35.5			19.5	31.0		31.0	24.5	
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	238.6	254.6			1454.7	180.8		105.7	102.3	
Delay (s)	274.1	290.1			1474.2	211.8		136.7	126.8	
Level of Service	F	F			F	F		F	F	
Approach Delay (s)		282.2			603.4			132.6		
Approach LOS		F			F			F		

Intersection Summary

HCM Average Control Delay	331.0	HCM Level of Service	F
HCM Volume to Capacity ratio	2.92		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Iowa St & King St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↱	↰	↱
Volume (vph)	45	915	280	575	40	185	775	115	150
Turn Type	pm+pt		pm+pt		pm+pt		pm+ov	pm+pt	
Protected Phases	5	2	1	6	3	8	1	7	4
Permitted Phases	2		6		8		8	4	
Detector Phases	5	2	1	6	3	8	1	7	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	28.0	11.0	26.0	11.0	28.0	11.0	11.0	28.0
Total Split (s)	11.0	35.0	26.0	50.0	11.0	28.0	26.0	11.0	28.0
Total Split (%)	11.0%	35.0%	26.0%	50.0%	11.0%	28.0%	26.0%	11.0%	28.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	Min	None	Min	None	None	None	None	None
Act Effct Green (s)	36.6	29.7	56.1	49.9	21.1	15.6	42.0	21.9	17.8
Actuated g/C Ratio	0.40	0.34	0.64	0.57	0.23	0.18	0.48	0.24	0.20
v/c Ratio	0.12	0.88	0.55	0.35	0.15	0.57	0.98	0.40	0.53
Control Delay	11.1	38.7	20.6	13.1	24.8	41.6	50.0	28.9	36.0
Queue Delay	0.0	32.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.1	71.3	20.6	13.1	24.8	41.6	50.0	28.9	36.0
LOS	B	E	C	B	C	D	D	C	D
Approach Delay	68.7		15.3		47.4		33.4		
Approach LOS	E		B		D		C		

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 88.1

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 43.8

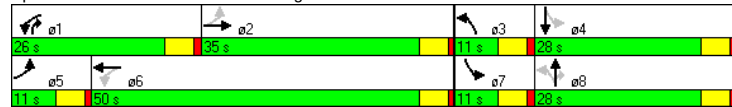
Intersection LOS: D

Intersection Capacity Utilization 92.8%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 5: Iowa St & King St



HCM Signalized Intersection Capacity Analysis
5: Iowa St & King St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱	↱	↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1728	3404		1711	3355		1728	1818	1546	1745	1773	
Flt Permitted	0.40	1.00		0.11	1.00		0.49	1.00	1.00	0.43	1.00	
Satd. Flow (perm)	729	3404		201	3355		885	1818	1546	787	1773	
Volume (vph)	45	915	100	280	575	85	40	185	775	115	150	45
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	45	915	100	280	575	85	40	185	775	115	150	45
RTOR Reduction (vph)	0	8	0	0	10	0	0	0	60	0	11	0
Lane Group Flow (vph)	45	1007	0	280	650	0	40	185	715	115	184	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	0%	0%	0%
Turn Type	pm+pt			pm+pt			pm+pt		pm+ov	pm+pt		
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	34.2	30.9		57.2	48.9		18.8	15.5	36.8	21.2	16.7	
Effective Green, g (s)	36.2	31.9		58.2	49.9		20.8	16.5	38.8	23.2	17.7	
Actuated g/C Ratio	0.39	0.35		0.63	0.54		0.23	0.18	0.42	0.25	0.19	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.6		3.0	3.0		3.6	3.6	3.0	3.0	3.0	
Lane Grp Cap (vph)	333	1178		492	1816		239	325	718	255	340	
v/s Ratio Prot	0.01	c0.30		0.14	0.19		0.01	0.10	c0.24	c0.03	0.10	
v/s Ratio Perm	0.05			0.22			0.03		0.22	0.09		
v/c Ratio	0.14	0.85		0.57	0.36		0.17	0.57	1.00	0.45	0.54	
Uniform Delay, d1	17.5	28.0		17.6	12.0		28.4	34.6	26.6	27.8	33.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	6.4		1.5	0.1		0.4	2.5	32.4	1.3	1.8	
Delay (s)	17.6	34.4		19.1	12.2		28.8	37.1	59.1	29.1	35.3	
Level of Service	B	C		B	B		C	D	E	C	D	
Approach Delay (s)	33.7		14.2		53.8		33.0					
Approach LOS	C		B		D		C					

Intersection Summary

HCM Average Control Delay	34.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	92.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
6: Iowa St & Moore St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	45	1260	205	775	150	65	140	115
Turn Type	Prot		Prot		Perm		Perm	
Protected Phases	1	6	5	2		4		8
Permitted Phases					4		8	
Detector Phases	1	6	5	2	4	4	8	8
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	27.0	12.0	27.0	21.0	21.0	21.0	21.0
Total Split (s)	12.0	51.0	17.0	56.0	32.0	32.0	32.0	32.0
Total Split (%)	12.0%	51.0%	17.0%	56.0%	32.0%	32.0%	32.0%	32.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	8.0	47.0	13.0	56.8		28.0		28.0
Actuated g/C Ratio	0.08	0.47	0.13	0.57		0.28		0.28
v/c Ratio	0.34	1.12	0.92	0.42		1.16		1.07
Control Delay	51.6	87.7	88.0	13.9		126.7		112.1
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	51.6	87.7	88.0	13.9		126.7		112.1
LOS	D	F	F	B		F		F
Approach Delay		86.8		28.7		126.7		112.1
Approach LOS		F		C		F		F

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.16
Intersection Signal Delay: 77.3
Intersection Capacity Utilization 102.5%
Analysis Period (min) 15
Intersection LOS: E
ICU Level of Service G

Splits and Phases: 6: Iowa St & Moore St



HCM Signalized Intersection Capacity Analysis
6: Iowa St & Moore St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.96		1.00	0.99			0.93			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1728	3303		1711	3393			1613			1673	
Flt Permitted	0.95	1.00		0.95	1.00			0.78			0.53	
Satd. Flow (perm)	1728	3303		1711	3393			1272			901	
Volume (vph)	45	1260	525	205	775	45	150	65	245	140	115	20
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	45	1260	525	205	775	45	150	65	245	140	115	20
RTOR Reduction (vph)	0	45	0	0	4	0	0	41	0	0	3	0
Lane Group Flow (vph)	45	1740	0	205	816	0	0	419	0	0	272	0
Heavy Vehicles (%)	1%	1%		2%	2%		2%	4%	4%	6%	6%	6%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	4.2	48.0		12.0	55.8			27.0			27.0	
Effective Green, g (s)	5.2	49.0		13.0	56.8			28.0			28.0	
Actuated g/C Ratio	0.05	0.48		0.13	0.56			0.27			0.27	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.5			3.5	
Lane Grp Cap (vph)	88	1587		218	1889			349			247	
v/s Ratio Prot	0.03	c0.53		c0.12	0.24							
v/s Ratio Perm								c0.33			0.30	
v/c Ratio	0.51	1.10		0.94	0.43			1.20			1.10	
Uniform Delay, d1	47.2	26.5		44.1	13.2			37.0			37.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	4.9	53.9		44.4	0.2			114.2			87.2	
Delay (s)	52.1	80.4		88.5	13.3			151.2			124.2	
Level of Service	D	F		F	B			F			F	
Approach Delay (s)		79.7			28.4			151.2			124.2	
Approach LOS		E			C			F			F	

Intersection Summary

HCM Average Control Delay	77.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	102.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	102.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Elm Street & Broadway St

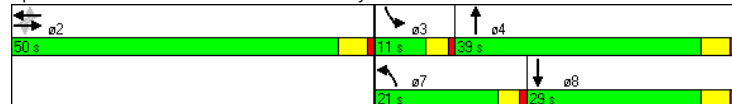
Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	10	240	55	485	225	240	50	265
Turn Type	Perm		Perm		Prot		Prot	
Protected Phases		2		2	7	4	3	8
Permitted Phases	2		2					
Detector Phases	2	2	2	2	7	4	3	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	26.0	26.0	26.0	26.0	8.0	26.0	8.0	26.0
Total Split (s)	50.0	50.0	50.0	50.0	21.0	39.0	11.0	29.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	21.0%	39.0%	11.0%	29.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	29.2	29.2	29.2	29.2	13.8	29.8	6.8	17.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.19	0.41	0.09	0.23
v/c Ratio	0.06	0.52	0.18	0.80	0.70	0.46	0.33	0.67
Control Delay	15.9	18.7	17.1	29.3	45.6	21.9	46.2	37.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	18.7	17.1	29.3	45.6	21.9	46.2	37.1
LOS	B	B	B	C	D	C	D	D
Approach Delay		18.6		28.2		31.5		38.5
Approach LOS		B		C		C		D

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 73.5
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 29.1
Intersection Capacity Utilization 76.3%
Analysis Period (min) 15

Splits and Phases: 7: Elm Street & Broadway St



HCM Signalized Intersection Capacity Analysis
7: Elm Street & Broadway St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1692	1684		1706	1758		1728	1730		1728	1801	
Flt Permitted	0.19	1.00		0.41	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	344	1684		735	1758		1728	1730		1728	1801	
Volume (vph)	10	240	120	55	485	80	225	240	90	50	265	15
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	240	120	55	485	80	225	240	90	50	265	15
RTOR Reduction (vph)	0	20	0	0	7	0	0	13	0	0	2	0
Lane Group Flow (vph)	10	340	0	55	558	0	225	317	0	50	278	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		2			2		7	4		3	8	
Permitted Phases	2			2								
Actuated Green, G (s)	28.1	28.1		28.1	28.1		13.8	28.7		3.5	18.4	
Effective Green, g (s)	29.1	29.1		29.1	29.1		13.8	29.7		3.5	19.4	
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.19	0.40		0.05	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	135	660		288	689		321	692		81	470	
v/s Ratio Prot		0.20			c0.32		c0.13	0.18		0.03	c0.15	
v/s Ratio Perm	0.03			0.07								
v/c Ratio	0.07	0.52		0.19	0.81		0.70	0.46		0.62	0.59	
Uniform Delay, d1	14.2	17.2		14.9	20.1		28.3	16.4		34.7	24.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.7		0.3	7.2		6.8	0.5		13.2	2.0	
Delay (s)	14.4	17.9		15.2	27.3		35.1	16.9		47.9	26.0	
Level of Service	B	B		B	C		D	B		D	C	
Approach Delay (s)		17.8			26.2			24.3			29.3	
Approach LOS		B			C			C			C	

Intersection Summary

HCM Average Control Delay	24.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	74.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Flora St & Cornwall Ave

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	265	490	30	185	190	25	420	190	355
Turn Type	Perm		Perm		Perm	Prot		Prot	
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8				
Detector Phases	4	4	8	8	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	11.0	27.0	11.0	27.0
Total Split (s)	34.0	34.0	34.0	34.0	34.0	11.0	41.0	15.0	45.0
Total Split (%)	37.8%	37.8%	37.8%	37.8%	37.8%	12.2%	45.6%	16.7%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		29.3		29.3	29.3	7.0	33.4	11.1	44.3
Actuated g/C Ratio		0.34		0.34	0.34	0.08	0.39	0.13	0.52
v/c Ratio		0.95		0.46	0.31	0.19	0.93	0.87	0.49
Control Delay		51.0		27.0	5.0	43.9	45.8	75.1	16.5
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		51.0		27.0	5.0	43.9	45.8	75.1	16.5
LOS		D		C	A	D	D	E	B
Approach Delay		51.0		16.7			45.7		34.3
Approach LOS		D		B			D		C

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 85.8
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 39.7
Intersection Capacity Utilization 97.4%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service F

Splits and Phases: 8: Flora St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
8: Flora St & Cornwall Ave

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.91	1.00	0.98		1.00	0.98	
Flpb, ped/bikes		0.98			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00			1.00	0.85	1.00	0.95		1.00	0.97	
Flt Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3284			1802	1408	1694	1668		1694	1706	
Flt Permitted		0.72			0.75	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		2402			1357	1408	1694	1668		1694	1706	
Volume (vph)	265	490	25	30	185	190	25	420	200	190	355	80
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	265	490	25	30	185	190	25	420	200	190	355	80
RTOR Reduction (vph)	0	3	0	0	0	128	0	19	0	0	9	0
Lane Group Flow (vph)	0	777	0	0	215	62	25	601	0	190	426	0
Confl. Peds. (#/hr)	35		35	35		35		35	35		35	
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	3%	3%	3%
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		28.2			28.2	28.2	2.3	35.5		10.1	43.3	
Effective Green, g (s)		29.2			29.2	29.2	3.3	36.5		11.1	44.3	
Actuated g/C Ratio		0.33			0.33	0.33	0.04	0.41		0.12	0.50	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		790			446	463	63	686		212	851	
v/s Ratio Prot							0.01	c0.36		c0.11	0.25	
v/s Ratio Perm		c0.32			0.16	0.04						
v/c Ratio		0.98			0.48	0.13	0.40	0.88		0.90	0.50	
Uniform Delay, d1		29.6			23.8	20.9	41.8	24.1		38.3	14.9	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		27.8			0.3	0.0	1.5	11.8		34.0	0.2	
Delay (s)		57.3			24.1	21.0	43.3	35.8		72.3	15.0	
Level of Service		E			C	C	D	D		E	B	
Approach Delay (s)		57.3			22.6		36.1			32.4		
Approach LOS		E			C		D			C		

Intersection Summary

HCM Average Control Delay	39.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	88.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
9: York St & N State St

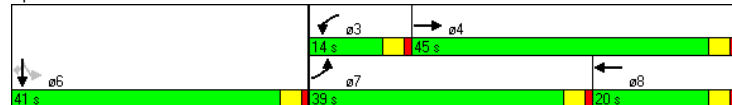
Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	WBL	WBT	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↖	↗
Volume (vph)	535	400	80	255	870	195
Turn Type	Prot		Prot		Perm	
Protected Phases	7	4	3	8	6	
Permitted Phases						6
Detector Phases	7	4	3	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	21.0	21.0
Total Split (s)	39.0	45.0	14.0	20.0	41.0	41.0
Total Split (%)	39.0%	45.0%	14.0%	20.0%	41.0%	41.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag		
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	32.2	39.1	8.7	13.3	37.2	37.2
Actuated g/C Ratio	0.34	0.41	0.09	0.14	0.39	0.39
v/c Ratio	0.93	0.37	0.54	0.67	0.95	0.27
Control Delay	55.1	19.1	56.2	43.6	45.8	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.5	0.0
Total Delay	55.1	19.2	56.2	43.6	46.3	4.9
LOS	E	B	E	D	D	A
Approach Delay		37.7		46.1	40.8	
Approach LOS		D		D	D	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 94.8
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 40.4
Intersection Capacity Utilization 84.0%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service E

Splits and Phases: 9: York St & N State St



HCM Signalized Intersection Capacity Analysis
9: York St & N State St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗					↖	↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95						0.95	1.00
Frt	1.00	0.97		1.00	0.97						1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00						0.98	1.00
Satd. Flow (prot)	1694	3282		1646	3198						3369	1531
Flt Permitted	0.95	1.00		0.95	1.00						0.98	1.00
Satd. Flow (perm)	1694	3282		1646	3198						3369	1531
Volume (vph)	535	400	105	80	255	60	0	0	0	390	870	195
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	535	400	105	80	255	60	0	0	0	390	870	195
RTOR Reduction (vph)	0	24	0	0	20	0	0	0	0	0	0	113
Lane Group Flow (vph)	535	481	0	80	295	0	0	0	0	0	1260	82
Heavy Vehicles (%)	3%	3%	3%	6%	6%	6%	0%	0%	0%	2%	2%	2%
Turn Type	Prot			Prot						Perm		Perm
Protected Phases	7	4		3	8						6	
Permitted Phases										6		6
Actuated Green, G (s)	32.2	39.1		7.4	14.3						37.2	37.2
Effective Green, g (s)	32.2	39.1		7.4	14.3						37.2	37.2
Actuated g/C Ratio	0.34	0.41		0.08	0.15						0.39	0.39
Clearance Time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)	570	1341		127	478						1310	595
v/s Ratio Prot	c0.32	0.15		0.05	c0.09							
v/s Ratio Perm											0.37	0.05
v/c Ratio	0.94	0.36		0.63	0.62						0.96	0.14
Uniform Delay, d1	30.8	19.6		42.8	38.1						28.6	18.9
Progression Factor	1.00	1.00		1.00	1.00						1.00	1.00
Incremental Delay, d2	23.3	0.2		9.4	2.4						16.5	0.1
Delay (s)	54.1	19.8		52.2	40.5						45.1	19.0
Level of Service	D	B		D	D						D	B
Approach Delay (s)		37.4			42.9			0.0			41.6	
Approach LOS		D			D			A			D	

Intersection Summary

HCM Average Control Delay	40.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	95.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

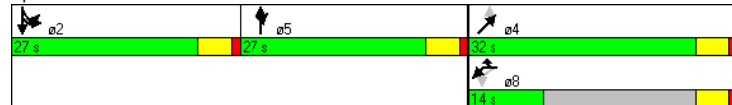
Timings
10: York St & N Forest St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	←	↖	↑	↗	↘	↓	↙	↘
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	NEL	NET
Lane Configurations	↖	↖	↖	↖	↖	↖	↖	↖
Volume (vph)	0	95	190	375	165	660	70	870
Turn Type	Prot	Split	Split	Split	Split	custom	Prot	Prot
Protected Phases	8!	8!	5	5	2	2		4!
Permitted Phases							4	
Detector Phases	8	8	5	5	2	2	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	9.0	27.0	27.0	27.0	27.0	29.0	29.0
Total Split (s)	14.0	14.0	27.0	27.0	27.0	27.0	32.0	32.0
Total Split (%)	16.3%	16.3%	31.4%	31.4%	31.4%	31.4%	37.2%	37.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	Min	Min	Min	Min	None	None
Act Effct Green (s)	26.8	26.8	20.5	20.5	20.4	20.4	26.8	26.8
Actuated g/C Ratio	0.34	0.34	0.26	0.26	0.26	0.26	0.34	0.34
v/c Ratio	0.21	0.36	0.84	0.78	0.42	0.76	0.12	0.91
Control Delay	21.9	16.2	48.4	41.6	29.2	34.3	21.0	39.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
Total Delay	21.9	16.2	48.4	41.6	29.2	34.7	21.0	39.9
LOS	C	B	D	D	C	C	C	D
Approach Delay	18.3		45.2			33.5		38.6
Approach LOS	B		D			C		D

Intersection Summary	
Cycle Length: 86	
Actuated Cycle Length: 79.9	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 36.3	Intersection LOS: D
Intersection Capacity Utilization 83.9%	ICU Level of Service E
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 10: York St & N Forest St



HCM Signalized Intersection Capacity Analysis
10: York St & N Forest St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	WBL2	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL2	SBL	SBT	NEL	NET
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		0.95	0.95			1.00	0.95	1.00	0.95
Frt		1.00	0.85		0.93	0.85			1.00	1.00	1.00	0.98
Flt Protected		0.95	1.00		1.00	1.00			0.95	1.00	0.95	1.00
Satd. Flow (prot)		1728	1546		1610	1468			1711	3421	1678	3290
Flt Permitted		0.95	1.00		1.00	1.00			0.95	1.00	0.95	1.00
Satd. Flow (perm)		1728	1546		1610	1468			1711	3421	1678	3290
Volume (vph)	120	0	95	110	190	375	90	20	165	660	70	870
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	120	0	95	110	190	375	90	20	165	660	70	870
RTOR Reduction (vph)	0	0	48	0	0	18	0	0	0	0	0	1
Lane Group Flow (vph)	0	120	157	0	347	290	0	0	185	660	70	999
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%	4%	4%
Turn Type	Perm		Prot		Split			Split	Split		custom	Prot
Protected Phases		8!	8!		5	5			2	2	2	4!
Permitted Phases	8											4
Actuated Green, G (s)		25.7	25.7		19.5	19.5			19.3	19.3	25.7	25.7
Effective Green, g (s)		26.7	26.7		20.5	20.5			20.3	20.3	26.7	26.7
Actuated g/C Ratio		0.34	0.34		0.26	0.26			0.26	0.26	0.34	0.34
Clearance Time (s)		5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	580	519		415	379			437	874	564	1105	
v/s Ratio Prot			0.10		c0.22	0.20			0.11	c0.19		c0.30
v/s Ratio Perm	0.07										0.04	
v/c Ratio	0.21	0.30		0.84	0.77			0.42	0.76	0.12	0.90	
Uniform Delay, d1	18.8	19.5		27.9	27.3			24.7	27.3	18.3	25.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.3		13.6	8.9			0.7	3.7	0.1	10.4	
Delay (s)	19.0	19.9		41.5	36.2			25.4	31.1	18.4	35.6	
Level of Service	B	B		D	D			C	C	B	D	
Approach Delay (s)	19.5			39.0					29.8		34.5	
Approach LOS	B			D					C		C	

Intersection Summary	
HCM Average Control Delay	32.5
HCM Volume to Capacity ratio	0.84
Actuated Cycle Length (s)	79.5
Intersection Capacity Utilization	83.9%
Analysis Period (min)	15
! Phase conflict between lane groups.	
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
10: York St & N Forest St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

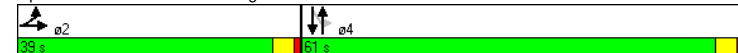
		
Movement	NER	NER2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Volume (vph)	120	10
Peak-hour factor, PHF	1.00	1.00
Adj. Flow (vph)	120	10
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	0	0
Heavy Vehicles (%)	4%	4%
Turn Type		
Protected Phases		
Permitted Phases		
Actuated Green, G (s)		
Effective Green, g (s)		
Actuated g/C Ratio		
Clearance Time (s)		
Vehicle Extension (s)		
Lane Grp Cap (vph)		
v/s Ratio Prot		
v/s Ratio Perm		
v/c Ratio		
Uniform Delay, d1		
Progression Factor		
Incremental Delay, d2		
Delay (s)		
Level of Service		
Approach Delay (s)		
Approach LOS		
Intersection Summary		

Timings
11: E Magnolia St & Cornwall Ave

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

				
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	765	575	125	370
Turn Type	Perm			
Protected Phases	2	4		4
Permitted Phases			4	
Detector Phases	2	4	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	23.0	23.0	23.0
Total Split (s)	39.0	61.0	61.0	61.0
Total Split (%)	39.0%	61.0%	61.0%	61.0%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	35.0	57.0		57.0
Actuated g/C Ratio	0.35	0.57		0.57
v/c Ratio	0.79	0.63		0.89
Control Delay	34.9	13.6		39.4
Queue Delay	0.0	0.5		0.0
Total Delay	34.9	14.1		39.4
LOS	C	B		D
Approach Delay	34.9	14.1		39.4
Approach LOS	C	B		D
Intersection Summary				
Cycle Length: 100				
Actuated Cycle Length: 100				
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green				
Natural Cycle: 60				
Control Type: Pretimed				
Maximum v/c Ratio: 0.89				
Intersection Signal Delay: 29.5				Intersection LOS: C
Intersection Capacity Utilization 97.0%				ICU Level of Service F
Analysis Period (min) 15				

Splits and Phases: 11: E Magnolia St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
11: E Magnolia St & Cornwall Ave

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		0.95						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.99						0.99			1.00	
Flt Protected		1.00						1.00			0.99	
Satd. Flow (prot)		3312						1772			1761	
Flt Permitted		1.00						1.00			0.55	
Satd. Flow (perm)		3312						1772			980	
Volume (vph)	90	765	65	0	0	0	0	575	60	125	370	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	90	765	65	0	0	0	0	575	60	125	370	0
RTOR Reduction (vph)	0	6	0	0	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	914	0	0	0	0	0	631	0	0	495	0
Confl. Peds. (#/hr)	80		80						80	80		
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split									Perm		
Protected Phases	2		2				4				4	
Permitted Phases									4			
Actuated Green, G (s)	35.0						57.0				57.0	
Effective Green, g (s)	35.0						57.0				57.0	
Actuated g/C Ratio	0.35						0.57				0.57	
Clearance Time (s)	4.0						4.0				4.0	
Lane Grp Cap (vph)	1159						1010				559	
v/s Ratio Prot	c0.28						0.36					
v/s Ratio Perm									c0.51			
v/c Ratio	0.79						0.62				0.89	
Uniform Delay, d1	29.2						14.4				18.7	
Progression Factor	1.00						0.76				1.00	
Incremental Delay, d2	5.5						2.4				18.4	
Delay (s)	34.7						13.4				37.0	
Level of Service	C						B				D	
Approach Delay (s)	34.7		0.0				13.4				37.0	
Approach LOS	C		A				B				D	
Intersection Summary												
HCM Average Control Delay	28.6		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.85											
Actuated Cycle Length (s)	100.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	97.0%		ICU Level of Service				F					
Analysis Period (min)	15											
c Critical Lane Group												

Timings
12: W Holly St & Broadway St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

							
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations							
Volume (vph)	90	610	5	715	5	200	0
Turn Type	Perm		Perm			Perm	
Protected Phases		2		2	4		4
Permitted Phases	2		2			4	
Detector Phases	2	2	2	2	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	73.0	73.0	73.0	73.0	27.0	27.0	27.0
Total Split (%)	73.0%	73.0%	73.0%	73.0%	27.0%	27.0%	27.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None
Act Effct Green (s)		52.9		52.9	16.8	16.8	16.8
Actuated g/C Ratio		0.74		0.74	0.23	0.23	0.23
v/c Ratio		0.66		0.78	0.03	0.65	0.16
Control Delay		11.9		14.9	22.7	42.2	0.6
Queue Delay		0.0		0.0	0.0	0.0	0.0
Total Delay		11.9		14.9	22.7	42.2	0.6
LOS		B		B	C	D	A
Approach Delay		11.9		14.9	22.7		29.3
Approach LOS		B		B	C		C
Intersection Summary							
Cycle Length: 100							
Actuated Cycle Length: 71.4							
Natural Cycle: 75							
Control Type: Actuated-Uncoordinated							
Maximum v/c Ratio: 0.78							
Intersection Signal Delay: 16.0				Intersection LOS: B			
Intersection Capacity Utilization 119.9%				ICU Level of Service H			
Analysis Period (min) 15							

Splits and Phases: 12: W Holly St & Broadway St



HCM Signalized Intersection Capacity Analysis

12: W Holly St & Broadway St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00			0.99		1.00	0.97	
Flpb, ped/bikes		1.00			1.00			1.00		0.99	1.00	
Frt		1.00			0.96			0.93		1.00	0.85	
Flt Protected		0.99			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1807			1724			1697		1718	1500	
Flt Permitted		0.79			1.00			1.00		0.75	1.00	
Satd. Flow (perm)		1443			1720			1697		1358	1500	
Volume (vph)	90	610	0	5	715	280	0	5	5	200	0	90
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	90	610	0	5	715	280	0	5	5	200	0	90
RTOR Reduction (vph)	0	0	0	0	14	0	0	4	0	0	73	0
Lane Group Flow (vph)	0	700	0	0	986	0	0	6	0	200	17	0
Conf. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		48.2			48.2			12.1		12.1	12.1	
Effective Green, g (s)		49.2			49.2			13.1		13.1	13.1	
Actuated g/C Ratio		0.70			0.70			0.19		0.19	0.19	
Clearance Time (s)		5.0			5.0			5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		1010			1204			316		253	280	
v/s Ratio Prot								0.00			0.01	
v/s Ratio Perm		0.49			0.57					0.15		
v/c Ratio		0.69			0.82			0.02		0.79	0.06	
Uniform Delay, d1		6.1			7.4			23.4		27.3	23.5	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		2.1			4.5			0.0		15.4	0.1	
Delay (s)		8.2			11.9			23.4		42.7	23.6	
Level of Service		A			B			C		D	C	
Approach Delay (s)		8.2			11.9			23.4			36.8	
Approach LOS		A			B			C			D	

Intersection Summary

HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	70.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	119.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Timings
13: W Holly St & F St

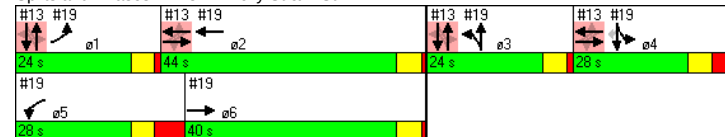
Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

															
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø1	ø2	ø3	ø4			
Lane Configurations															
Volume (vph)	60	575	65	815	50	370	90	200							
Turn Type	Perm		Perm		Perm		Perm								
Protected Phases		2 4		2 4		1 3		1 3	1	2	3	4			
Permitted Phases	2 4		2 4		1 3		1 3								
Detector Phases	2 4	2 4	2 4	2 4	1 3	1 3	1 3	1 3							
Minimum Initial (s)									6.0	6.0	6.0	6.0			
Minimum Split (s)									24.0	24.0	24.0	28.0			
Total Split (s)	72.0	72.0	72.0	72.0	48.0	48.0	48.0	48.0	24.0	44.0	24.0	28.0			
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%	20%	37%	20%	23%			
Yellow Time (s)									4.0	4.0	4.0	4.0			
All-Red Time (s)									1.0	1.0	1.0	5.0			
Lead/Lag									Lead	Lag	Lead	Lag			
Lead-Lag Optimize?															
Recall Mode									Min	None	None	None			
Act Effect Green (s)	64.0	64.0	64.0	64.0		39.0		39.0							
Actuated g/C Ratio	0.54	0.54	0.54	0.54		0.33		0.33							
v/c Ratio	0.98	0.77	0.38	0.95		0.83		0.50							
Control Delay	139.9	17.8	15.4	35.3		26.7		18.4							
Queue Delay	0.0	0.3	0.2	0.0		0.1		0.0							
Total Delay	139.9	18.1	15.6	35.3		26.9		18.4							
LOS	F	B	B	D		C		B							
Approach Delay		27.3		34.0		26.9		18.4							
Approach LOS		C		C		C		B							

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 119	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.45	
Intersection Signal Delay: 28.5	Intersection LOS: C
Intersection Capacity Utilization 98.1%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 13: W Holly St & F St



Timings
13: W Holly St & F St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	ø5	ø6
Lane Configurations		
Volume (vph)		
Turn Type		
Protected Phases	5	6
Permitted Phases		
Detector Phases		
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	28.0	24.0
Total Split (s)	28.0	40.0
Total Split (%)	23%	33%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	5.0	1.0
Lead/Lag	Lead	Lag
Lead-Lag Optimize?		
Recall Mode	None	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

HCM Signalized Intersection Capacity Analysis
13: W Holly St & F St

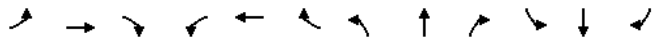
Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			0.95	
Frt	1.00	0.97		1.00	0.99			0.99			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1728	1759		1711	1774			1792			3291	
Flt Permitted	0.09	1.00		0.20	1.00			0.92			0.60	
Satd. Flow (perm)	165	1759		364	1774			1651			1990	
Volume (vph)	60	575	160	65	815	90	50	370	30	90	200	60
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	575	160	65	815	90	50	370	30	90	200	60
RTOR Reduction (vph)	0	8	0	0	3	0	0	2	0	0	15	0
Lane Group Flow (vph)	60	727	0	65	902	0	0	448	0	0	335	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2 4			2 4			1 3			1 3	
Permitted Phases	2 4			2 4			1 3			1 3		
Actuated Green, G (s)	65.2	65.2		65.2	65.2			37.0			37.0	
Effective Green, g (s)	71.2	71.2		71.2	71.2			39.0			39.0	
Actuated g/C Ratio	0.56	0.56		0.56	0.56			0.31			0.31	
Clearance Time (s)												
Vehicle Extension (s)												
Lane Grp Cap (vph)	93	992		205	1001			510			615	
v/s Ratio Prot		0.41			c0.51							
v/s Ratio Perm	0.36			0.18				c0.27			0.17	
v/c Ratio	0.65	0.73		0.32	0.90			0.88			0.54	
Uniform Delay, d1	18.8	20.4		14.6	24.4			41.3			36.2	
Progression Factor	1.00	1.00		1.00	1.00			0.94			1.00	
Incremental Delay, d2	14.3	2.8		0.9	11.0			8.2			1.0	
Delay (s)	33.2	23.3		15.5	35.4			47.0			37.2	
Level of Service	C	C		B	D			D			D	
Approach Delay (s)		24.0			34.1			47.0			37.2	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM Average Control Delay		33.6			HCM Level of Service			C				
HCM Volume to Capacity ratio		0.89										
Actuated Cycle Length (s)		126.2			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		98.1%			ICU Level of Service			F				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 14: W Holly St & C St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

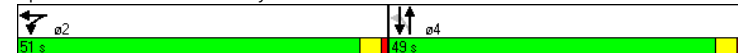
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free				Free		Stop				Stop	
Grade	0%				0%		0%				0%	
Volume (veh/h)	5	730	45	55	965	75	25	25	50	55	20	5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	730	45	55	965	75	25	25	50	55	20	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (ft)	753											
pX, platoon unblocked				0.72			0.72			0.72		
vC, conflicting volume	1040				775	1890			1912	752	1938	1898
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1040				688	2233			2264	657	2299	2244
tC, single (s)	4.1				4.1	7.1			6.5	6.2	7.1	6.5
tC, 2 stage (s)												
tF (s)	2.2				2.2	3.5			4.0	3.3	3.5	4.0
p0 queue free %	99				92	0			8	85	0	28
cM capacity (veh/h)	672				657	9			27	338	3	28
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	780	1095	100	80								
Volume Left	5	55	25	55								
Volume Right	45	75	50	5								
cSH	672	657	25	4								
Volume to Capacity	0.01	0.08	3.98	18.48								
Queue Length 95th (ft)	1	7	Err	Err								
Control Delay (s)	0.2	2.8	Err	Err								
Lane LOS	A	A	F	F								
Approach Delay (s)	0.2	2.8	Err	Err								
Approach LOS			F	F								
Intersection Summary												
Average Delay	877.4											
Intersection Capacity Utilization	110.6%			ICU Level of Service			H					
Analysis Period (min)	15											

Timings 15: W Holly St & Cornwall Ave

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

				
Lane Group	WBT	NBL	NBT	SBT
Lane Configurations	↔	↔	↔	↔
Volume (vph)	1245	75	280	255
Turn Type	Perm			
Protected Phases	2	4	4	4
Permitted Phases	4			
Detector Phases	2	4	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0
Minimum Split (s)	21.0	23.0	23.0	23.0
Total Split (s)	51.0	49.0	49.0	49.0
Total Split (%)	51.0%	49.0%	49.0%	49.0%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	47.0	45.0	45.0	45.0
Actuated g/C Ratio	0.47	0.45	0.45	0.45
v/c Ratio	1.03	0.55	0.51	0.51
Control Delay	58.8	15.7	12.4	12.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	58.8	15.7	12.4	12.4
LOS	E	B	B	B
Approach Delay	58.8	15.7	12.4	12.4
Approach LOS	E	B	B	B
Intersection Summary				
Cycle Length: 100				
Actuated Cycle Length: 100				
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green				
Natural Cycle: 60				
Control Type: Pretimed				
Maximum v/c Ratio: 1.03				
Intersection Signal Delay: 44.7	Intersection LOS: D			
Intersection Capacity Utilization 97.6%	ICU Level of Service F			
Analysis Period (min) 15				

Splits and Phases: 15: W Holly St & Cornwall Ave



HCM Signalized Intersection Capacity Analysis
15: W Holly St & Cornwall Ave

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.97			1.00			0.96	
Flpb, ped/bikes					1.00			0.99			1.00	
Frt					0.98			1.00			0.96	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					3272			1779			1644	
Flt Permitted					1.00			0.79			1.00	
Satd. Flow (perm)					3272			1422			1644	
Volume (vph)	0	0	0	160	1245	195	75	280	0	0	255	125
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	160	1245	195	75	280	0	0	255	125
RTOR Reduction (vph)	0	0	0	0	11	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	0	0	0	1589	0	0	355	0	0	370	0
Confl. Peds. (#/hr)				80		80	80					80
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type				Split		Perm						
Protected Phases				2	2			4			4	
Permitted Phases							4					
Actuated Green, G (s)					47.0			45.0			45.0	
Effective Green, g (s)					47.0			45.0			45.0	
Actuated g/C Ratio					0.47			0.45			0.45	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					1538			640			740	
v/s Ratio Prot					c0.49						0.22	
v/s Ratio Perm								c0.25				
v/c Ratio					1.03			0.55			0.50	
Uniform Delay, d1					26.5			20.2			19.5	
Progression Factor					1.00			0.74			0.59	
Incremental Delay, d2					32.0			0.3			1.1	
Delay (s)					58.5			15.1			12.7	
Level of Service					E			B			B	
Approach Delay (s)		0.0			58.5			15.1			12.7	
Approach LOS		A			E			B			B	

Intersection Summary			
HCM Average Control Delay	44.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	97.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

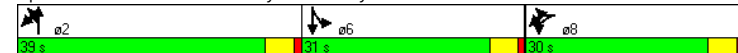
Timings
16: Lakeway Dr & Jersey St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	WBL	WBR	NBL	NBT	SBL	SBT
Lane Configurations						
Volume (vph)	30	855	595	355	640	465
Turn Type		Prot	Split		Split	
Protected Phases	8	8	2	2	6	6
Permitted Phases						
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	30.0	30.0	39.0	39.0	31.0	31.0
Total Split (%)	30.0%	30.0%	39.0%	39.0%	31.0%	31.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
Act Effct Green (s)	26.0	26.0	35.0	35.0	26.6	26.6
Actuated g/C Ratio	0.26	0.26	0.35	0.35	0.27	0.27
v/c Ratio	1.01	0.95	0.96	1.05dr	0.89	0.94
Control Delay	85.4	59.8	63.2	35.9	62.2	56.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.4	59.8	63.2	35.9	62.2	56.5
LOS	F	E	E	D	E	E
Approach Delay	69.5			43.6		58.2
Approach LOS	E			D		E

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 99.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 54.6	Intersection LOS: D
Intersection Capacity Utilization 96.1%	ICU Level of Service F
Analysis Period (min) 15	
dr Defacto Right Lane. Recode with 1 though lane as a right lane.	

Splits and Phases: 16: Lakeway Dr & Jersey St



HCM Signalized Intersection Capacity Analysis
16: Lakeway Dr & Jersey St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	WBL2	WBL	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0				4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91				0.91	0.91		0.91	0.91	
Frt	0.91	0.85				1.00	0.90		1.00	1.00	
Flt Protected	0.98	1.00				0.95	1.00		0.95	0.98	
Satd. Flow (prot)	1609	2786				1572	2962		1430	3118	
Flt Permitted	0.98	1.00				0.95	1.00		0.95	0.98	
Satd. Flow (perm)	1609	2786				1572	2962		1430	3118	
Volume (vph)	145	30	855	100	5	595	355	925	640	465	20
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	145	30	855	100	5	595	355	925	640	465	20
RTOR Reduction (vph)	0	0	13	0	0	0	362	0	0	0	0
Lane Group Flow (vph)	0	425	692	0	0	531	987	0	341	784	0
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	1%	1%	11%	1%	1%
Turn Type	Split	Prot			Split	Split			Split		
Protected Phases	8	8	8		2	2	2		6	6	
Permitted Phases											
Actuated Green, G (s)	25.0	25.0				34.0	34.0		25.6	25.6	
Effective Green, g (s)	26.0	26.0				35.0	35.0		26.6	26.6	
Actuated g/C Ratio	0.26	0.26				0.35	0.35		0.27	0.27	
Clearance Time (s)	5.0	5.0				5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0				2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	420	727				552	1041		382	833	
v/s Ratio Prot	c0.26	0.25				c0.34	0.33		0.24	c0.25	
v/s Ratio Perm											
v/c Ratio	1.01	0.95				0.96	1.05dr		0.89	0.94	
Uniform Delay, d1	36.8	36.2				31.6	31.4		35.1	35.7	
Progression Factor	1.00	1.00				1.00	1.00		1.00	1.00	
Incremental Delay, d2	46.9	22.2				28.6	16.5		21.7	18.3	
Delay (s)	83.7	58.4				60.3	47.9		56.8	54.0	
Level of Service	F	E				E	D		E	D	
Approach Delay (s)	67.9					51.4			54.8		
Approach LOS	E					D			D		

Intersection Summary

HCM Average Control Delay	56.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	99.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		
dr	Defacto Right Lane. Recode with 1 though lane as a right lane.		
c	Critical Lane Group		

Timings
17: Lakeway Dr & I-5 SB Ramps

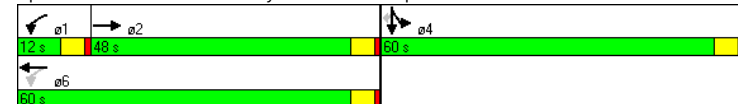
Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBT	WBL	WBT	SBT	SBR
Lane Configurations					
Volume (vph)	1225	200	845	290	325
Turn Type	pm+pt			Perm	
Protected Phases	2	1	6	4	
Permitted Phases		6			4
Detector Phases	2	1	6	4	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	10.0	23.0	28.0	28.0
Total Split (s)	48.0	12.0	60.0	60.0	60.0
Total Split (%)	40.0%	10.0%	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None
Act Effct Green (s)	44.0	56.0	56.0	56.0	56.0
Actuated g/C Ratio	0.37	0.47	0.47	0.47	0.47
v/c Ratio	1.18	1.15	0.53	1.23	0.42
Control Delay	122.9	141.2	24.2	142.6	16.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	122.9	141.2	24.2	142.6	16.2
LOS	F	F	C	F	B
Approach Delay	122.9		46.6	111.7	
Approach LOS	F		D	F	

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.23	
Intersection Signal Delay: 98.3	Intersection LOS: F
Intersection Capacity Utilization 117.6%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 17: Lakeway Dr & I-5 SB Ramps



HCM Signalized Intersection Capacity Analysis
17: Lakeway Dr & I-5 SB Ramps

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑↑						↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		0.95		1.00	0.95						1.00	1.00
Frt		0.98		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.97	1.00
Satd. Flow (prot)		3369		1711	3421						1756	1546
Flt Permitted		1.00		0.08	1.00						0.97	1.00
Satd. Flow (perm)		3369		150	3421						1756	1546
Volume (vph)	0	1225	245	200	845	0	0	0	0	715	290	325
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1225	245	200	845	0	0	0	0	715	290	325
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	0	0	0	53
Lane Group Flow (vph)	0	1456	0	200	845	0	0	0	0	0	1005	272
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type		pm+pt								Split	Perm	
Protected Phases		2		1	6					4	4	
Permitted Phases				6								4
Actuated Green, G (s)		43.0		55.0	55.0					55.0	55.0	
Effective Green, g (s)		44.0		56.0	56.0					56.0	56.0	
Actuated g/C Ratio		0.37		0.47	0.47					0.47	0.47	
Clearance Time (s)		5.0		5.0	5.0					5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)	1235		174	1596						819	721	
v/s Ratio Prot	0.43		c0.08	0.25						c0.57		
v/s Ratio Perm			c0.46								0.18	
v/c Ratio	1.18		1.15	0.53						1.23	0.38	
Uniform Delay, d1	38.0		58.2	22.7						32.0	20.7	
Progression Factor	1.00		1.00	1.00						1.00	1.00	
Incremental Delay, d2	89.2		114.1	0.3						112.9	0.3	
Delay (s)	127.2		172.3	23.0						144.9	21.0	
Level of Service	F		F	C						F	C	
Approach Delay (s)	127.2			51.6			0.0			114.7		
Approach LOS	F			D			A			F		

Intersection Summary

HCM Average Control Delay	102.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	117.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Timings
18: Lakeway Dr & King St

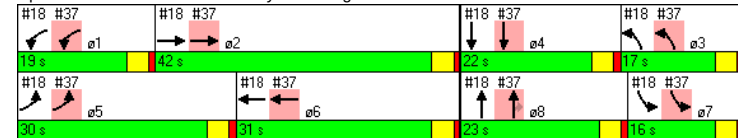
Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↑↑	↔	↑↑	↔	↔	↔	↔
Volume (vph)	490	1170	25	740	120	105	60	25
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	5	2	1	6	3	8	7	4
Permitted Phases								
Detector Phases	5	2	1	6	3	8	7	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	30.0	42.0	19.0	31.0	17.0	23.0	16.0	22.0
Total Split (%)	30.0%	42.0%	19.0%	31.0%	17.0%	23.0%	16.0%	22.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?								
Recall Mode	None	Min	None	None	None	Min	None	None
Act Effct Green (s)	26.0	38.0	15.0	27.0	13.2	19.0	12.0	17.8
Actuated g/C Ratio	0.26	0.38	0.15	0.27	0.13	0.19	0.12	0.18
v/c Ratio	1.08	1.08	0.10	1.10	0.52	0.44	0.29	0.57
Control Delay	102.0	79.0	40.8	73.2	49.4	35.5	44.2	11.5
Queue Delay	0.0	1.0	0.0	24.1	0.0	0.0	0.0	0.0
Total Delay	102.0	80.0	40.8	97.3	49.4	35.5	44.2	11.5
LOS	F	E	D	F	D	D	D	B
Approach Delay		85.7		95.9		41.5		17.2
Approach LOS		F		F		D		B

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.10
Intersection Signal Delay: 78.7
Intersection Capacity Utilization 94.1%
Analysis Period (min) 15
Intersection LOS: E
ICU Level of Service F

Splits and Phases: 18: Lakeway Dr & King St



HCM Signalized Intersection Capacity Analysis
18: Lakeway Dr & King St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.95		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	3401		1728	3311		1745	1748		1745	1585	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1745	3401		1728	3311		1745	1748		1745	1585	
Volume (vph)	490	1170	240	25	740	285	120	105	50	60	25	260
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	490	1170	240	25	740	285	120	105	50	60	25	260
RTOR Reduction (vph)	0	17	0	0	40	0	0	17	0	0	214	0
Lane Group Flow (vph)	490	1393	0	25	985	0	120	138	0	60	71	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	26.0	38.0		15.0	27.0		13.2	19.0		12.0	17.8	
Effective Green, g (s)	26.0	38.0		15.0	27.0		13.2	19.0		12.0	17.8	
Actuated g/C Ratio	0.26	0.38		0.15	0.27		0.13	0.19		0.12	0.18	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	454	1292		259	894		230	332		209	282	
v/s Ratio Prot	c0.28	c0.41		0.01	0.30		c0.07	c0.08		0.03	0.04	
v/s Ratio Perm												
v/c Ratio	1.08	1.08		0.10	1.10		0.52	0.42		0.29	0.25	
Uniform Delay, d1	37.0	31.0		36.7	36.5		40.5	35.6		40.1	35.4	
Progression Factor	1.00	1.00		1.09	0.64		1.00	1.00		1.00	1.00	
Incremental Delay, d2	65.2	48.9		0.0	51.2		2.1	0.8		0.8	0.5	
Delay (s)	102.2	79.9		40.1	74.5		42.6	36.5		40.9	35.9	
Level of Service	F	E		D	E		D	D		D	D	
Approach Delay (s)		85.6			73.6			39.1			36.7	
Approach LOS		F			E			D			D	
Intersection Summary												
HCM Average Control Delay		73.8										
HCM Volume to Capacity ratio		0.81										
Actuated Cycle Length (s)		100.0										
Intersection Capacity Utilization		94.1%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
24: E Chestnut St & Railroad Ave

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	95	1135	35	0	0	0	0	30	190	115	100	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	95	1135	35	0	0	0	0	30	190	115	100	0
Pedestrians					41			41			11	
Lane Width (ft)					0.0			11.0			11.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			3			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		353			350							
pX, platoon unblocked												
vC, conflicting volume	11			1211			1434	1394	478	825	1412	11
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	11			1211			1434	1394	478	825	1412	11
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			100	77	64	11	21	100
cM capacity (veh/h)	1600			565			30	129	522	129	126	1065
Direction, Lane #												
Volume Total	379	568	319	220	215							
Volume Left	95	0	0	0	115							
Volume Right	0	0	35	190	0							
cSH	1600	1700	1700	369	127							
Volume to Capacity	0.06	0.33	0.19	0.60	1.69							
Queue Length 95th (ft)	5	0	0	92	400							
Control Delay (s)	2.2	0.0	0.0	28.2	400.4							
Lane LOS	A			D	F							
Approach Delay (s)	0.7			28.2	400.4							
Approach LOS				D	F							
Intersection Summary												
Average Delay				54.8								
Intersection Capacity Utilization				62.6%								
Analysis Period (min)				15								
ICU Level of Service B												

Timings
25: E Chestnut St & N State St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	→	↘	↓
Lane Group	EBT	SBL	SBT
Lane Configurations	↑↑↑	↘	↑↑
Volume (vph)	990	260	735
Turn Type	Split		
Protected Phases	2	4	4
Permitted Phases			
Detector Phases	2	4	4
Minimum Initial (s)	6.0	6.0	6.0
Minimum Split (s)	22.0	20.0	20.0
Total Split (s)	56.0	44.0	44.0
Total Split (%)	56.0%	44.0%	44.0%
Yellow Time (s)	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	Max	Max	Max
Act Effct Green (s)	52.0	40.0	40.0
Actuated g/C Ratio	0.52	0.40	0.40
v/c Ratio	0.56	0.35	0.53
Control Delay	27.2	15.1	24.6
Queue Delay	0.0	0.0	0.0
Total Delay	27.3	15.1	24.6
LOS	C	B	C
Approach Delay	27.3		22.1
Approach LOS	C		C

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 13 (13%), Referenced to phase 4:SBTL, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.56
Intersection Signal Delay: 25.1
Intersection LOS: C
Intersection Capacity Utilization 56.0%
ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 25: E Chestnut St & N State St



HCM Signalized Intersection Capacity Analysis
25: E Chestnut St & N State St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑↑								↘	↑↑		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0								4.0	4.0		
Lane Util. Factor		0.91								1.00	0.95		
Frbp, ped/bikes		0.98								1.00	1.00		
Flpb, ped/bikes		1.00								1.00	1.00		
Frt		0.96								1.00	1.00		
Flt Protected		1.00								0.95	1.00		
Satd. Flow (prot)		4644								1728	3455		
Flt Permitted		1.00								0.95	1.00		
Satd. Flow (perm)		4644								1728	3455		
Volume (vph)	0	990	400	0	0	0	0	0	0	260	735	0	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	0	990	400	0	0	0	0	0	0	260	735	0	
RTOR Reduction (vph)	0	46	0	0	0	0	0	0	0	52	0	0	
Lane Group Flow (vph)	0	1344	0	0	0	0	0	0	0	208	735	0	
Confl. Peds. (#/hr)			40							40			
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	1%	1%	1%	
Turn Type										Split			
Protected Phases		2								4	4		
Permitted Phases													
Actuated Green, G (s)		52.0								40.0	40.0		
Effective Green, g (s)		52.0								40.0	40.0		
Actuated g/C Ratio		0.52								0.40	0.40		
Clearance Time (s)		4.0								4.0	4.0		
Lane Grp Cap (vph)		2415								691	1382		
v/s Ratio Prot		c0.29								0.12	c0.21		
v/s Ratio Perm													
v/c Ratio		0.56								0.30	0.53		
Uniform Delay, d1		16.2								20.5	22.9		
Progression Factor		1.77								1.00	1.00		
Incremental Delay, d2		0.4								1.1	1.5		
Delay (s)		29.1								21.6	24.3		
Level of Service		C								C	C		
Approach Delay (s)		29.1			0.0			0.0			23.6		
Approach LOS		C			A			A			C		

Intersection Summary

HCM Average Control Delay	26.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
26: E Chestnut St & N Forest St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	→	↑
Lane Group	EBT	NBT
Lane Configurations	↑↑↑	↑↑
Volume (vph)	905	880
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phases	2	4
Minimum Initial (s)	6.0	6.0
Minimum Split (s)	22.0	21.0
Total Split (s)	53.0	47.0
Total Split (%)	53.0%	47.0%
Yellow Time (s)	3.0	3.0
All-Red Time (s)	1.0	1.0
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	Max
Act Effct Green (s)	49.0	43.0
Actuated g/C Ratio	0.49	0.43
v/c Ratio	0.53	0.71
Control Delay	9.9	26.2
Queue Delay	0.2	0.0
Total Delay	10.2	26.2
LOS	B	C
Approach Delay	10.2	26.2
Approach LOS	B	C

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 21 (21%), Referenced to phase 4:NBT, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 17.2
Intersection Capacity Utilization 61.3%
Analysis Period (min) 15

Splits and Phases: 26: E Chestnut St & N Forest St



HCM Signalized Intersection Capacity Analysis
26: E Chestnut St & N Forest St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	→	↗	↖	←	↖	↗	↑	↖	↗	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑↑				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0				
Lane Util. Factor		0.91						0.95				
Frpb, ped/bikes		1.00						0.99				
Flpb, ped/bikes		1.00						1.00				
Frt		1.00						0.98				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		4940						3313				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		4940						3313				
Volume (vph)	390	905	0	0	0	0	0	880	140	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	390	905	0	0	0	0	0	880	140	0	0	0
RTOR Reduction (vph)	0	36	0	0	0	0	0	13	0	0	0	0
Lane Group Flow (vph)	0	1259	0	0	0	0	0	1007	0	0	0	0
Confl. Peds. (#/hr)	40								40			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	Split											
Protected Phases	2	2						4				
Permitted Phases												
Actuated Green, G (s)		49.0						43.0				
Effective Green, g (s)		49.0						43.0				
Actuated g/C Ratio		0.49						0.43				
Clearance Time (s)		4.0						4.0				
Lane Grp Cap (vph)		2421						1425				
v/s Ratio Prot		c0.25						c0.30				
v/s Ratio Perm												
v/c Ratio		0.52						0.71				
Uniform Delay, d1		17.5						23.3				
Progression Factor		0.56						1.00				
Incremental Delay, d2		0.7						3.0				
Delay (s)		10.4						26.3				
Level of Service		B						C				
Approach Delay (s)		10.4			0.0			26.3			0.0	
Approach LOS		B			A			C			A	

Intersection Summary

HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
27: E Chestnut St & Ellis St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	↗	↖	↗
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations	↖↗	↖↗	↖↗↖↗	↖↗↖↗
Volume (vph)	880	705	955	550
Turn Type	Perm			
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phases	4	4	2	6
Minimum Initial (s)	6.0	6.0	6.0	6.0
Minimum Split (s)	30.0	30.0	12.0	30.0
Total Split (s)	40.0	40.0	30.0	30.0
Total Split (%)	57.1%	57.1%	42.9%	42.9%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	30.4	30.4	20.3	20.3
Actuated g/C Ratio	0.51	0.51	0.34	0.34
v/c Ratio	0.52	0.87	0.56	0.46
Control Delay	11.4	24.6	17.7	17.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.4	24.6	17.7	17.2
LOS	B	C	B	B
Approach Delay	17.3		17.7	17.2
Approach LOS	B		B	B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 59.3
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 17.4
Intersection Capacity Utilization 70.0%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service C

Splits and Phases: 27: E Chestnut St & Ellis St

↖	↗	↖	↗
30 s	40 s	30 s	40 s
↖	↗	↖	↗
30 s	40 s	30 s	40 s

HCM Signalized Intersection Capacity Analysis
27: E Chestnut St & Ellis St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

	↖	↗	↖	↗	↖	↗
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↖↗	↖↗	↖↗↖↗	↖↗↖↗	↖↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.91	0.95	
Frpb, ped/bikes	1.00	0.95		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3319	1449		4964	3490	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3319	1449		4964	3490	
Volume (vph)	880	705	0	955	550	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	880	705	0	955	550	0
RTOR Reduction (vph)	0	75	0	0	0	0
Lane Group Flow (vph)	880	630	0	955	550	0
Confl. Peds. (#/hr)	60	60				
Heavy Vehicles (%)	2%	2%	1%	1%	0%	0%
Turn Type	Perm					
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	29.3	29.3		19.2	19.2	
Effective Green, g (s)	30.3	30.3		20.2	20.2	
Actuated g/C Ratio	0.52	0.52		0.35	0.35	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1719	751		1714	1205	
v/s Ratio Prot	0.27			0.19	0.16	
v/s Ratio Perm		0.43				
v/c Ratio	0.51	0.84		0.56	0.46	
Uniform Delay, d1	9.2	12.0		15.5	14.9	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	8.2		0.4	0.3	
Delay (s)	9.5	20.2		15.9	15.2	
Level of Service	A	C		B	B	
Approach Delay (s)	14.2			15.9	15.2	
Approach LOS	B			B	B	

Intersection Summary

HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	58.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Laurel St & N State St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

																				
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR								
Lane Configurations											  									
Sign Control		Stop			Stop			Free			Free									
Grade		0%			0%			0%			0%									
Volume (veh/h)	0	25	10	55	25	0	0	0	0	300	1305	65								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00								
Hourly flow rate (vph)	0	25	10	55	25	0	0	0	0	300	1305	65								
Pedestrians																				
Lane Width (ft)																				
Walking Speed (ft/s)																				
Percent Blockage																				
Right turn flare (veh)																				
Median type		None			None															
Median storage (veh)																				
Upstream signal (ft)											1046									
pX, platoon unblocked																				
vC, conflicting volume	1950	1938	468	1058	1970	0	1370			0										
vC1, stage 1 conf vol																				
vC2, stage 2 conf vol																				
vCu, unblocked vol	1950	1938	468	1058	1970	0	1370			0										
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1										
tC, 2 stage (s)																				
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2										
p0 queue free %	100	53	98	44	50	100	100			82										
cM capacity (veh/h)	21	53	542	98	50	1091	497			1629										
Direction, Lane #	EB 1	WB 1	SB 1	SB 2	SB 3															
Volume Total	35	80	626	652	391															
Volume Left	0	55	300	0	0															
Volume Right	10	0	0	0	65															
cSH	71	76	1629	1700	1700															
Volume to Capacity	0.49	1.06	0.18	0.38	0.23															
Queue Length 95th (ft)	50	144	17	0	0															
Control Delay (s)	96.9	216.9	4.6	0.0	0.0															
Lane LOS	F	F	A																	
Approach Delay (s)	96.9	216.9	1.7																	
Approach LOS	F	F																		
Intersection Summary																				
Average Delay			13.2																	
Intersection Capacity Utilization			50.4%			ICU Level of Service				A										
Analysis Period (min)			15																	

HCM Unsignalized Intersection Capacity Analysis
29: Laurel St & N Forest St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱			↰↱				
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	215	95	0	0	70	125	10	820	75	0	0	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	215	95	0	0	70	125	10	820	75	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)	1032											
pX, platoon unblocked												
vC, conflicting volume	590	915	0	925	878	448	0	895				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	590	915	0	925	878	448	0	895				
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	13	65	100	100	76	78	99	100				
cM capacity (veh/h)	246	270	1084	164	287	564	1622	767				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	310	195	420	485								
Volume Left	215	0	10	0								
Volume Right	0	125	0	75								
cSH	253	419	1622	1700								
Volume to Capacity	1.23	0.47	0.01	0.29								
Queue Length 95th (ft)	373	60	0	0								
Control Delay (s)	172.3	20.9	0.2	0.0								
Lane LOS	F	C	A									
Approach Delay (s)	172.3	20.9	0.1									
Approach LOS	F	C										
Intersection Summary												
Average Delay	40.8											
Intersection Capacity Utilization	63.6%			ICU Level of Service					B			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 30: N Forest St & N State St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	0	715	0	0	0	0	0	0	200	60	200	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	715	0	0	0	0	0	0	200	60	200	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0	715			815			715	715	915	715	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	715			815			715	715	915	715	0
tC, single (s)	4.1	4.1			7.1			6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2	2.2			3.5			4.0	3.3	3.5	4.0	3.3
p0 queue free %	100	100			100			100	54	56	44	100
cM capacity (veh/h)	1623	885			164			356	431	136	356	1085

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	715	200	60	200
Volume Left	0	0	60	0
Volume Right	0	200	0	0
cSH	1700	431	136	356
Volume to Capacity	0.42	0.46	0.44	0.56
Queue Length 95th (ft)	0	60	49	82
Control Delay (s)	0.0	20.4	51.0	27.3
Lane LOS	C	F	D	
Approach Delay (s)	0.0	20.4	32.8	
Approach LOS	C		D	

Intersection Summary			
Average Delay	10.7		
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

Timings 31: Bill McDonald Pkwy & Samish Way

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↙	↗		↕	↙	↗	↙	↗	↙
Volume (vph)	365	55	50	55	370	665	35	910	390
Turn Type	Perm		Perm		pm+pt		pm+pt		Perm
Protected Phases	4		8		5		1		6
Permitted Phases	4		8		2		6		6
Detector Phases	4	4	8	8	5	2	1	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	11.0	30.0	30.0	11.0	28.0	11.0	29.0	29.0
Total Split (s)	47.0	47.0	47.0	47.0	28.0	62.0	11.0	45.0	45.0
Total Split (%)	39.2%	39.2%	39.2%	39.2%	23.3%	51.7%	9.2%	37.5%	37.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	36.3	36.3		36.3	58.1	52.3	38.7	31.6	31.6
Actuated g/C Ratio	0.35	0.35		0.35	0.56	0.51	0.36	0.31	0.31
v/c Ratio	0.89	0.52		0.34	0.83	0.41	0.11	0.85	0.52
Control Delay	58.7	10.8		26.1	44.1	18.2	14.3	42.7	5.6
Queue Delay	0.0	0.6		0.4	10.8	1.1	0.0	2.1	0.0
Total Delay	58.7	11.4		26.4	54.9	19.4	14.3	44.8	5.6
LOS	E	B		C	D	B	B	D	A
Approach Delay	34.4		26.5		31.4		32.6		
Approach LOS	C		C		C		C		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 102.9	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 32.4	Intersection LOS: C
Intersection Capacity Utilization 90.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 31: Bill McDonald Pkwy & Samish Way



HCM Signalized Intersection Capacity Analysis
31: Bill McDonald Pkwy & Samish Way

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87			0.97		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	1569			1744		1728	3416		1745	3490	1561
Flt Permitted	0.65	1.00			0.65		0.10	1.00		0.38	1.00	1.00
Satd. Flow (perm)	1165	1569			1155		191	3416		694	3490	1561
Volume (vph)	365	55	330	50	55	35	370	665	55	35	910	390
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	365	55	330	50	55	35	370	665	55	35	910	390
RTOR Reduction (vph)	0	184	0	0	10	0	0	5	0	0	0	262
Lane Group Flow (vph)	365	201	0	0	130	0	370	715	0	35	910	128
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm			Perm			pm+pt			pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	35.2	35.2			35.2		59.4	51.2		36.5	33.3	33.3
Effective Green, g (s)	36.2	36.2			36.2		60.4	52.2		38.5	34.3	34.3
Actuated g/C Ratio	0.35	0.35			0.35		0.58	0.50		0.37	0.33	0.33
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		2.0	2.0		3.0	2.0	2.0
Lane Grp Cap (vph)	403	543			400		435	1705		298	1144	512
v/s Ratio Prot		0.13					c0.18	0.21		0.00	0.26	
v/s Ratio Perm	c0.31				0.11		c0.31			0.04		0.08
v/c Ratio	0.91	0.37			0.32		0.85	0.42		0.12	0.80	0.25
Uniform Delay, d1	32.6	25.7			25.2		28.1	16.6		21.3	32.0	25.7
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	23.3	0.4			0.5		14.2	0.1		0.2	3.6	0.1
Delay (s)	55.8	26.1			25.7		42.3	16.7		21.5	35.6	25.8
Level of Service	E	C			C		D	B		C	D	C
Approach Delay (s)		40.6			25.7			25.4			32.4	
Approach LOS		D			C			C			C	

Intersection Summary

HCM Average Control Delay	31.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	104.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings

32: Samish Way & I-5 SB Off-Ramp

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	ø8
Lane Configurations	↱	↰	↰	↱	↰	↱	↰	↱	↰	
Volume (vph)	980	290	290	635	185	500	310	275	250	
Turn Type		Perm	pm+pt		Protcustom		Split		Prot	
Protected Phases	6		5	2	4	4	3	3	3	8
Permitted Phases		6	2							
Detector Phases	6	6	5	2	4	4	3	3	3	
Minimum Initial (s)	7.0	7.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0	20.0
Minimum Split (s)	22.0	22.0	9.5	22.0	12.0	12.0	11.5	11.5	11.5	25.0
Total Split (s)	40.0	40.0	18.0	58.0	15.0	15.0	22.0	22.0	22.0	25.0
Total Split (%)	33.3%	33.3%	15.0%	48.3%	12.5%	12.5%	18.3%	18.3%	18.3%	21%
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	4.0	3.5	3.5	3.5	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lead	Lead	Lead	
Lead-Lag Optimize?										
Recall Mode	Min	Min	None	Min	None	None	None	None	None	None
Act Effct Green (s)	33.7	33.7	51.7	51.7	11.0	11.0	18.0	18.0	18.0	
Actuated g/C Ratio	0.36	0.36	0.56	0.56	0.12	0.12	0.19	0.19	0.19	
v/c Ratio	0.78	0.40	0.87	0.33	0.90	0.85	0.91	0.77	0.50	
Control Delay	31.3	5.3	48.6	11.6	84.7	21.2	70.3	52.1	8.3	
Queue Delay	88.5	0.8	0.0	0.0	1.2	0.0	0.0	0.0	0.1	
Total Delay	119.8	6.1	48.6	11.6	85.9	21.2	70.3	52.1	8.4	
LOS	F	A	D	B	F	C	E	D	A	
Approach Delay	93.9			23.2				45.8		
Approach LOS	F			C				D		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 92.8
Natural Cycle: 140
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 55.3
Intersection Capacity Utilization 85.2%
Analysis Period (min) 15
Intersection LOS: E
ICU Level of Service E

Splits and Phases: 32: Samish Way & I-5 SB Off-Ramp

↰ ø2	↱ ø3	↰ ø4	↱ ø8
58 s	22 s	15 s	25 s
↱ ø5	↰ ø6		
18 s	40 s		

HCM Signalized Intersection Capacity Analysis 32: Samish Way & I-5 SB Off-Ramp

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3455	1546	1728	3455	1728	1728	1546	1745	1837	1561	1561	1561
Flt Permitted	1.00	1.00	0.11	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3455	1546	197	3455	1728	1728	1546	1745	1837	1561	1561	1561
Volume (vph)	0	980	290	290	635	0	185	0	500	310	275	250
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	980	290	290	635	0	185	0	500	310	275	250
RTOR Reduction (vph)	0	0	169	0	0	0	0	0	405	0	0	201
Lane Group Flow (vph)	0	980	121	290	635	0	185	0	95	310	275	49
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Perm pm+pt			Prot			custom			Split		Prot
Protected Phases	6			5			4			4		3
Permitted Phases	6			2			4			3		3
Actuated Green, G (s)	32.7	32.7	50.7	50.7	10.0	10.0	10.0	17.5	17.5	17.5	17.5	17.5
Effective Green, g (s)	33.7	33.7	51.7	51.7	11.0	11.0	11.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.36	0.36	0.56	0.56	0.12	0.12	0.12	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	5.0	5.0	4.5	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1256	562	341	1927	205	183	339	357	303	303	303	303
v/s Ratio Prot	0.28		c0.13	0.18	c0.11	0.06	c0.18	0.15	0.03	0.03	0.03	0.03
v/s Ratio Perm		0.08	c0.34									
v/c Ratio	0.78	0.22	0.85	0.33	0.90	0.52	0.91	0.77	0.16	0.16	0.16	0.16
Uniform Delay, d1	26.2	20.4	23.2	11.1	40.3	38.4	36.6	35.4	31.1	31.1	31.1	31.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.3	0.2	18.4	0.1	37.6	3.0	28.5	10.4	0.3	0.3	0.3	0.3
Delay (s)	29.5	20.6	41.6	11.2	77.9	41.4	65.1	45.8	31.4	31.4	31.4	31.4
Level of Service	C	C	D	B	E	D	E	D	C	C	C	C
Approach Delay (s)	27.5			20.7	51.3			48.7				
Approach LOS	C			C	D			D				

Intersection Summary

HCM Average Control Delay	35.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	92.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings

33: Samish Way & Lincoln St

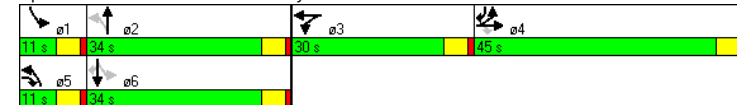
Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↰	↱	↰	↱	↱
Volume (vph)	910	520	415	5	170	390	270	25	125	425
Turn Type	custom	pm+ov custom			pm+pt	pm+pt			pm+ov	
Protected Phases	4	4	5	3	3	5	2	1	6	4
Permitted Phases	4		4	3		2		6		6
Detector Phases	4	4	5	3	3	5	2	1	6	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	33.0	33.0	11.0	30.0	30.0	11.0	24.0	11.0	33.0	33.0
Total Split (s)	45.0	45.0	11.0	30.0	30.0	11.0	34.0	11.0	34.0	45.0
Total Split (%)	37.5%	37.5%	9.2%	25.0%	25.0%	9.2%	28.3%	9.2%	28.3%	37.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	Min	None	Min	None
Act Effct Green (s)	41.9	41.9	53.2	19.2	19.2	27.3	23.5	25.6	18.2	60.1
Actuated g/C Ratio	0.41	0.41	0.52	0.19	0.19	0.27	0.23	0.24	0.18	0.58
v/c Ratio	1.04	1.05	0.43	0.02	0.80	1.15	0.70	0.12	0.39	0.41
Control Delay	79.2	82.6	6.2	36.6	56.1	129.7	47.7	28.2	40.7	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.2	82.6	6.2	36.6	56.1	129.7	47.7	28.2	40.7	2.7
LOS	E	F	A	D	E	F	D	C	D	A
Approach Delay	64.1				55.7		94.7		12.0	
Approach LOS	E				E		F		B	

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 102.8	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.15	
Intersection Signal Delay: 60.7	Intersection LOS: E
Intersection Capacity Utilization 95.1%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 33: Samish Way & Lincoln St



HCM Signalized Intersection Capacity Analysis
33: Samish Way & Lincoln St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95	1.00	1.00	0.99	1.00	1.00	0.85	1.00
Flt Protected	0.95	0.99	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1641	1703	1546	1694	1687	1728	1800	1728	1818	1546	1641	1703
Flt Permitted	0.95	0.99	1.00	0.95	1.00	0.53	1.00	0.34	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1641	1703	1546	1694	1687	960	1800	612	1818	1546	1641	1703
Volume (vph)	910	520	415	5	170	95	390	270	20	25	125	425
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	910	520	415	5	170	95	390	270	20	25	125	425
RTOR Reduction (vph)	0	0	176	0	17	0	0	2	0	0	0	137
Lane Group Flow (vph)	697	733	239	5	248	0	390	288	0	25	125	288
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	custom	pm+ov	custom				pm+pt			pm+pt		pm+ov
Protected Phases	4	4	5	3	3		5	2		1	6	4
Permitted Phases	4		4	3			2			6		6
Actuated Green, G (s)	40.9	40.9	47.0	18.1	18.1		28.6	22.5		22.8	19.6	60.5
Effective Green, g (s)	41.9	41.9	49.0	19.1	19.1		30.6	23.5		24.8	20.6	62.5
Actuated g/C Ratio	0.40	0.40	0.47	0.18	0.18		0.29	0.22		0.24	0.20	0.60
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	657	682	783	309	308		333	404		190	358	923
v/s Ratio Prot	0.42	c0.43	0.02	0.00	c0.15		c0.08	0.16		0.01	0.07	0.12
v/s Ratio Perm			0.13				c0.26			0.03		0.06
v/c Ratio	1.06	1.07	0.31	0.02	0.80		1.17	0.71		0.13	0.35	0.31
Uniform Delay, d1	31.4	31.4	17.3	35.1	41.0		36.9	37.5		31.3	36.3	10.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	52.4	56.3	0.1	0.0	13.4		104.3	4.9		0.1	0.2	0.1
Delay (s)	83.8	87.7	17.4	35.1	54.4		141.2	42.4		31.4	36.5	10.5
Level of Service	F	F	B	D	D		F	D		C	D	B
Approach Delay (s)		70.4			54.0			99.1			17.1	
Approach LOS		E			D			F			B	

Intersection Summary

HCM Average Control Delay	65.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	104.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	95.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings

34: Old Fairhaven Pkwy & 12th St

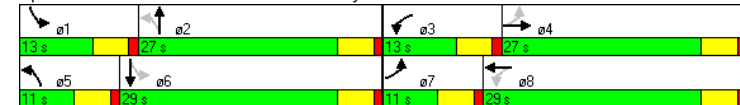
Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	15	180	340	135	25	205	220	295
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	27.0	11.0	27.0	11.0	27.0	11.0	27.0
Total Split (s)	11.0	27.0	13.0	29.0	11.0	27.0	13.0	29.0
Total Split (%)	13.8%	33.8%	16.3%	36.3%	13.8%	33.8%	16.3%	36.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)	21.5	14.3	27.0	25.3	30.0	23.1	35.3	31.9
Actuated g/C Ratio	0.27	0.20	0.38	0.35	0.38	0.32	0.49	0.45
v/c Ratio	0.05	0.56	0.73	0.47	0.06	0.73	0.66	0.40
Control Delay	15.9	30.7	27.8	16.0	12.2	27.5	23.4	17.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	30.7	27.8	16.0	12.2	27.5	23.4	17.7
LOS	B	C	C	B	B	C	C	B
Approach Delay		29.7		22.2		26.7		20.0
Approach LOS		C		C		C		B

Intersection Summary

Cycle Length: 80	
Actuated Cycle Length: 71.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 23.5	Intersection LOS: C
Intersection Capacity Utilization 80.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 34: Old Fairhaven Pkwy & 12th St



HCM Signalized Intersection Capacity Analysis
34: Old Fairhaven Pkwy & 12th St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.91		1.00	0.92		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1703	1766		1787	1720		1805	1745		1787	1851	
Flt Permitted	0.56	1.00		0.42	1.00		0.54	1.00		0.21	1.00	
Satd. Flow (perm)	998	1766		790	1720		1031	1745		402	1851	
Volume (vph)	15	180	20	340	135	180	25	205	245	220	295	35
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	180	20	340	135	180	25	205	245	220	295	35
RTOR Reduction (vph)	0	5	0	0	59	0	0	50	0	0	5	0
Lane Group Flow (vph)	15	195	0	340	256	0	25	400	0	220	325	0
Heavy Vehicles (%)	6%	6%	6%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7		4		3		8		5		2	
Permitted Phases	4				8		2		6		1	
Actuated Green, G (s)	18.5		17.4		30.4		24.3		27.6		25.3	
Effective Green, g (s)	20.5		18.4		31.4		25.3		29.6		26.3	
Actuated g/C Ratio	0.26		0.23		0.40		0.32		0.38		0.33	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	279		413		430		554		421		584	
v/s Ratio Prot	0.00		0.11		c0.09		0.15		0.00		c0.23	
v/s Ratio Perm	0.01				c0.23		0.02		0.24			
v/c Ratio	0.05		0.47		0.79		0.46		0.06		0.69	
Uniform Delay, d1	21.7		25.9		19.3		21.2		15.5		22.6	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.1		0.9		9.6		0.6		0.1		6.4	
Delay (s)	21.7		26.8		28.8		21.8		15.6		29.0	
Level of Service	C		C		C		C		B		C	
Approach Delay (s)			26.4				25.5				28.3	
Approach LOS			C				C				B	

Intersection Summary			
HCM Average Control Delay	24.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	78.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

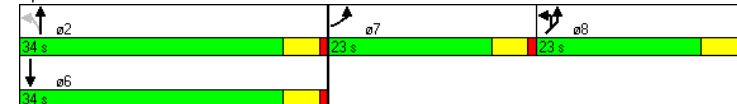
Timings
35: Hawthorne & 12th St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

					
Lane Group	EBL	NBL	NBT	SBT	NEL
Lane Configurations					
Volume (vph)	170	10	335	365	75
Turn Type	Perm				
Protected Phases	7		2	6	8
Permitted Phases		2			
Detector Phases	7	2	2	6	8
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	23.0	26.0	26.0	26.0	23.0
Total Split (s)	23.0	34.0	34.0	34.0	23.0
Total Split (%)	28.8%	42.5%	42.5%	42.5%	28.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	Max	None
Act Effct Green (s)	12.6		30.9	30.9	9.3
Actuated g/C Ratio	0.20		0.50	0.50	0.14
v/c Ratio	0.52		0.54	0.75	0.32
Control Delay	28.3		18.1	21.9	27.2
Queue Delay	0.0		0.0	0.0	0.0
Total Delay	28.3		18.1	21.9	27.2
LOS	C		B	C	C
Approach Delay	28.3		18.1	21.9	27.2
Approach LOS	C		B	C	C

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 62.2	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 22.2	Intersection LOS: C
Intersection Capacity Utilization 63.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 35: Hawthorne & 12th St



HCM Signalized Intersection Capacity Analysis
35: Hawthorne & 12th St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBR	EBR2	NBL	NBT	SBT	SBR	SBR2	NEL	NER
Lane Configurations	↰	↱	↱	↰	↰	↱	↱	↱	↰	↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0				4.0	4.0			4.0	
Lane Util. Factor	1.00				1.00	1.00			1.00	
Fr _t	0.99				1.00	0.94			0.98	
Fl _t Protected	0.96				1.00	1.00			0.96	
Satd. Flow (prot)	1775				1860	1782			1791	
Fl _t Permitted	0.96				0.98	1.00			0.96	
Satd. Flow (perm)	1775				1827	1782			1791	
Volume (vph)	170	10	10	10	335	365	65	245	75	10
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	170	10	10	10	335	365	65	245	75	10
RTOR Reduction (vph)	2	0	0	0	0	21	0	0	7	0
Lane Group Flow (vph)	188	0	0	0	345	654	0	0	78	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	0%	0%	0%	0%	0%
Turn Type	Perm									
Protected Phases	7				2	6			8	
Permitted Phases				2						
Actuated Green, G (s)	11.6				29.8	29.8			6.7	
Effective Green, g (s)	12.6				30.8	30.8			7.7	
Actuated g/C Ratio	0.20				0.49	0.49			0.12	
Clearance Time (s)	5.0				5.0	5.0			5.0	
Vehicle Extension (s)	3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)	354				892	870			219	
v/s Ratio Prot	c0.11					c0.37			c0.04	
v/s Ratio Perm					0.19					
v/c Ratio	0.53				0.39	0.75			0.36	
Uniform Delay, d1	22.6				10.2	13.1			25.4	
Progression Factor	1.00				1.00	1.00			1.00	
Incremental Delay, d2	1.4				0.3	5.9			1.0	
Delay (s)	24.0				10.5	19.0			26.4	
Level of Service	C				B	B			C	
Approach Delay (s)	24.0				10.5	19.0			26.4	
Approach LOS	C				B	B			C	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	63.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

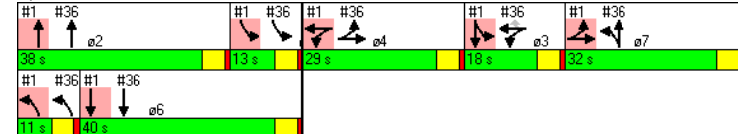
Timings
36: Birchwood Ave & Meridian Street

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT	ø2	ø5	ø7
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱			
Volume (vph)	290	180	235	360	95	1080	170	940			
Turn Type	Split			Perm	Prot		Prot				
Protected Phases	4	4	3		5 7	2 7	1	6	2	5	7
Permitted Phases				3							
Detector Phases	4	4	3	3	5 7	2 7	1	6			
Minimum Initial (s)	6.0	6.0	6.0	6.0			6.0	10.0	10.0	6.0	6.0
Minimum Split (s)	29.0	29.0	11.0	11.0			11.0	23.0	23.0	11.0	29.0
Total Split (s)	29.0	29.0	18.0	18.0	43.0	70.0	13.0	40.0	38.0	11.0	32.0
Total Split (%)	22.3%	22.3%	13.8%	13.8%	33.1%	53.8%	10.0%	30.8%	29%	8%	25%
Yellow Time (s)	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lead	Lag	Lag			Lag	Lag	Lead	Lead	
Lead-Lag Optimize?											
Recall Mode	None	None	None	None			None	None	Max	None	None
Act Effct Green (s)	23.7	23.7	14.0	14.0	39.0	66.0	9.0	36.0			
Actuated g/C Ratio	0.18	0.18	0.11	0.11	0.30	0.51	0.07	0.28			
v/c Ratio	0.87	0.73	1.54	1.07	0.18	0.62	1.39	1.30			
Control Delay	76.8	60.3	306.1	94.3	50.0	5.4	260.4	178.3			
Queue Delay	0.0	0.0	58.8	0.0	0.0	1.5	0.0	0.0			
Total Delay	76.8	60.3	364.9	94.3	50.0	6.9	260.4	178.3			
LOS	E	E	F	F	D	A	F	F			
Approach Delay	69.1	220.6			10.2		188.1				
Approach LOS	E	F			B		F				

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 128.8	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.54	
Intersection Signal Delay: 120.8	Intersection LOS: F
Intersection Capacity Utilization 87.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 36: Birchwood Ave & Meridian Street



HCM Signalized Intersection Capacity Analysis
36: Birchwood Ave & Meridian Street

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↰	↱	↰	↱	↱	↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1816			1876	1615	1787	3553		1752	3373	
Flt Permitted	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	1816			1876	1615	1787	3553		1752	3373	
Volume (vph)	290	180	75	80	235	360	95	1080	45	170	940	315
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	290	180	75	80	235	360	95	1080	45	170	940	315
RTOR Reduction (vph)	0	11	0	0	0	162	0	2	0	0	25	0
Lane Group Flow (vph)	290	244	0	0	315	198	95	1123	0	170	1230	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Turn Type	Split			Split		Perm	Prot			Prot		
Protected Phases	4	4		3	3		5 7	2 7		1	6	
Permitted Phases						3						
Actuated Green, G (s)	22.7	22.7			13.0	13.0	38.0	65.0		8.0	35.0	
Effective Green, g (s)	23.7	23.7			14.0	14.0	39.0	66.0		9.0	36.0	
Actuated g/C Ratio	0.18	0.18			0.11	0.11	0.30	0.51		0.07	0.28	
Clearance Time (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Vehicle Extension (s)	3.0	3.0			2.0	2.0				2.0	2.0	
Lane Grp Cap (vph)	332	334			204	176	542	1822		123	943	
v/s Ratio Prot	c0.16	0.13			c0.17		0.05	c0.32		0.10	c0.36	
v/s Ratio Perm						0.12						
v/c Ratio	0.87	0.73			1.54	1.12	0.18	0.62		1.38	1.30	
Uniform Delay, d1	51.0	49.5			57.4	57.4	33.0	22.3		59.8	46.3	
Progression Factor	1.00	1.00			1.00	1.00	1.47	0.21		1.00	1.00	
Incremental Delay, d2	21.5	7.8			267.8	105.0	0.0	0.3		214.4	144.6	
Delay (s)	72.6	57.2			325.1	162.3	48.4	5.0		274.3	191.0	
Level of Service	E	E			F	F	D	A		F	F	
Approach Delay (s)		65.4			238.3		8.3			200.9		
Approach LOS		E			F		A			F		

Intersection Summary

HCM Average Control Delay	127.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	128.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
37: Lakeway Dr & Lincoln Street

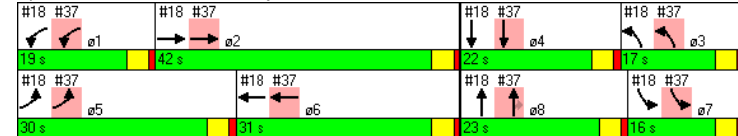
Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↱	↰	↱
Volume (vph)	55	1095	275	835	210	155	565	205	240
Turn Type	Prot		Prot		Prot		Perm	Prot	
Protected Phases	5	2	1	6	3	8		7	4
Permitted Phases							8		
Detector Phases	5	2	1	6	3	8	8	7	4
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	30.0	42.0	19.0	31.0	17.0	23.0	23.0	16.0	22.0
Total Split (%)	30.0%	42.0%	19.0%	31.0%	17.0%	23.0%	23.0%	16.0%	22.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?									
Recall Mode	None	Min	None	None	None	Min	Min	None	None
Act Effct Green (s)	26.0	38.0	15.0	27.0	13.2	19.0	19.0	12.0	17.8
Actuated g/C Ratio	0.26	0.38	0.15	0.27	0.13	0.19	0.19	0.12	0.18
v/c Ratio	0.12	0.93	1.07	0.98	0.93	0.45	1.05	1.00	0.92
Control Delay	53.1	16.4	118.0	63.1	88.6	40.8	73.7	108.8	75.0
Queue Delay	0.0	20.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.1	36.6	118.0	63.1	88.6	40.8	73.7	108.8	75.0
LOS	D	D	F	E	F	D	E	F	E
Approach Delay		37.3		75.9		71.6			88.8
Approach LOS		D		E		E			F

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.10
Intersection Signal Delay: 64.0
Intersection Capacity Utilization 89.8%
Analysis Period (min) 15
Intersection LOS: E
ICU Level of Service E

Splits and Phases: 37: Lakeway Dr & Lincoln Street



HCM Signalized Intersection Capacity Analysis
37: Lakeway Dr & Lincoln Street

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00		0.85	1.00	0.97
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		1.00	0.95	1.00
Satd. Flow (prot)	1711	3378		1711	3382		1711	1801		1531	1711	1750
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		1.00	0.95	1.00
Satd. Flow (perm)	1711	3378		1711	3382		1711	1801		1531	1711	1750
Volume (vph)	55	1095	100	275	835	70	210	155	565	205	240	55
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	1095	100	275	835	70	210	155	565	205	240	55
RTOR Reduction (vph)	0	7	0	0	7	0	0	0	245	0	8	0
Lane Group Flow (vph)	55	1188	0	275	898	0	210	155	320	205	287	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			
Actuated Green, G (s)	26.0	38.0		15.0	27.0		13.2	19.0	19.0	12.0	17.8	
Effective Green, g (s)	26.0	38.0		15.0	27.0		13.2	19.0	19.0	12.0	17.8	
Actuated g/C Ratio	0.26	0.38		0.15	0.27		0.13	0.19	0.19	0.12	0.18	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	445	1284		257	913		226	342	291	205	312	
v/s Ratio Prot	0.03	c0.35		c0.16	0.27		c0.12	0.09		0.12	0.16	
v/s Ratio Perm									c0.21			
v/c Ratio	0.12	0.93		1.07	0.98		0.93	0.45	1.10	1.00	0.92	
Uniform Delay, d1	28.3	29.6		42.5	36.3		42.9	35.9	40.5	44.0	40.4	
Progression Factor	1.85	0.46		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	1.3		75.9	25.7		40.3	1.0	81.6	62.9	30.5	
Delay (s)	52.2	15.0		118.4	62.0		83.2	36.9	122.1	106.9	70.9	
Level of Service	D	B		F	E		F	D	F	F	E	
Approach Delay (s)		16.7			75.1			99.1			85.7	
Approach LOS		B			E			F			F	
Intersection Summary												
HCM Average Control Delay		63.3										
HCM Volume to Capacity ratio		0.96										
Actuated Cycle Length (s)		100.0							12.0			
Intersection Capacity Utilization		89.8%							E			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
40: Wharf Street & N State St

Alternative 3 (2026) PM Peak Hour
New Whatcom Redevelopment Project

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↰	↱		↰	↱
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	215	90	0	1025	65
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	215	90	0	1025	65
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None				
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1238	1058	1090			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1238	1058	1090			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	21	86			
cM capacity (veh/h)	167	273	640			
Direction, Lane #						
Volume Total	215	90	1090			
Volume Left	0	90	0			
Volume Right	215	0	65			
cSH	273	640	1700			
Volume to Capacity	0.79	0.14	0.64			
Queue Length 95th (ft)	151	12	0			
Control Delay (s)	53.7	11.5	0.0			
Lane LOS	F	B				
Approach Delay (s)	53.7	11.5	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay			9.0			
Intersection Capacity Utilization		77.9%			ICU Level of Service	D
Analysis Period (min)		15				

Appendix N-4: Project Land Use and Trip Generation

Existing Trip Generation														
TAZ / Area	Land Use	Size	Units	ITE Code	Rate	In	PM Peak Hour Trips			Rate	In	AM Peak Hour Trips		
							Out	Total			Out	Total		
1	Light Industrial	353 employees		110	0.42		31	117	148	0.44		129	26	155
2	Light Industrial	230 employees		110	0.42		20	77	97	0.44		84	17	101
3	Light Industrial	0 employees		110	0.42		0	0	0	0.44		0	0	0
	Warehouse	0 employees		150	0.59		0	0	0	0.51		0	0	0
	Subtotal	0					0	0	0			0	0	0
4	Light Industrial	0 employees		110	0.42		0	0	0	0.44		0	0	0
5	Light Industrial	0 employees		110	0.42		0	0	0	0.44		0	0	0
6	Light Industrial - Encogen	20 employees		110	0.42		2	6	8	0.44		7	2	9
	Office	0 employees		710	0.46		0	0	0	0.48		0	0	0
	Subtotal	20					2	6	8			7	2	9
7	Warehouse	0 employees		150	0.59		0	0	0	0.51		0	0	0
8	Light Industrial	0 employees		110	0.42		0	0	0	0.44		0	0	0
9	Warehouse	25 employees		150	0.59		5	10	15	0.51		9	4	13
	Office	17 employees		710	0.46		1	7	8	0.48		7	1	8
	Subtotal	42					6	17	23			16	5	21
10	Light Industrial	0 employees		110	0.42		0	0	0	0.44		0	0	0
	Office	0 employees		710	0.46		0	0	0	0.48		0	0	0
	Subtotal						0	0	0			0	0	0
Existing Total Trips		645 employees					59	217	276			236	50	286

Potential Trip Generation with Existing Buildings Occupied														
TAZ / Area	Land Use	Size	Units	ITE Code	Rate	In	PM Peak Hour Trips			Rate	In	AM Peak Hour Trips		
							Out	Total				Out	Total	
1	Light Industrial	370,858 sf		110	0.98		44	319	363	0.92		300	41	
2	Light Industrial	236,809 sf		110	0.98		28	204	232	0.92		192	26	
3	Light Industrial	107,800 sf		110	0.98		13	93	106	0.92		87	12	
4	Light Industrial	107,200 sf		110	0.98		13	92	105	0.92		87	12	
5	Light Industrial	51,870 sf		110	0.98		6	45	51	0.92		42	6	
	Office - 921 Cornwall	5,800		710	1.49		2	7	9	1.55		8	1	
	Subtotal	57,670 sf					8	52	60			50	7	
6	Light Industrial - Encogen	60,356 sf		110	0.98		7	52	59	0.92		49	7	
7	Warehouse	48,000 sf		150	0.47		6	17	23	0.45		16	6	
9	Warehouse	86,581 sf		150	0.47		14	27	41	0.45		32	7	
	Office	18,635 sf		710	1.49		5	23	28	1.55		26	3	
	Subtotal	105,216 sf					19	50	69			58	10	
10	Light Industrial	61,149 sf		110	0.98		7	53	60	0.92		49	7	
Total Trips with Full Occupancy		1,155,058 sf					145	932	1,077			888	128	
Existing Trips							59	217	276			236	50	
Net New Trips							86	715	801			652	78	

No Action Estimated Trip Generation												
TAZ / Area	Land Use	Size	Units	ITE Code	PM	PM Peak Hour Trips			AM	AM Peak Hour Trips		
					Peak Rate	In	Out	Total	Peak Rate	In	Out	Total
1	Light Industrial	166,886 sf	110	0.98	20	144	164	0.92	136	18	154	
	Marine Industrial	12,500 sf	110	0.98	1	11	12	0.92	11	1	12	
	Boat Launch/Marina	600 berths	420	0.19	68	46	114	0.08	16	32	48	
	Sub-total				89	201	290		163	51	214	
	Existing Area Trips	353 emp			31	117	148		129	26	155	
	Net New Trips Subtotal				58	84	142		34	25	59	
2	Light Industrial	196,564 sf	110	0.98	23	170	193	0.92	159	22	181	
	Marine Industrial	25,000 sf	110	0.98	3	22	25	0.92	20	3	23	
	Warehouse	25,000 sf	150	0.47	3	9	12	0.45	9	2	11	
	Sub-total				29	201	230		188	27	215	
	Existing Area Trips	230 emp			20	77	97		84	17	101	
	Net New Trips Subtotal				9	124	133		104	10	114	
3	Light Industrial	53,900 sf	110	0.98	6	47	53	0.92	44	6	50	
4	Light Industrial	91,100 sf	110	0.98	11	78	89	0.92	74	10	84	
5	Light Industrial	25,935 sf	110	0.98	3	22	25	0.92	21	3	24	
	Office - 921 Cornwall	5,800 sf	710	1.49	2	7	9	1.55	8	1	9	
	Warehouse	45,000 sf	150	0.47	5	16	21	0.45	16	4	20	
	Sub-total				10	45	55		45	8	53	
6	Light Industrial - Encogen	60,356 sf	110	0.98	7	52	59	0.92	49	7	56	
	Existing Area Trips	20 emp			2	6	8		7	2	9	
	Net New Trips Subtotal				5	46	51		42	5	47	
7	Warehouse	24,000 sf	150	0.47	3	8	11	0.45	9	2	11	
	Light Industrial	25,000 sf	110	0.98	3	22	25	0.92	20	3	23	
	Sub-total				6	30	36		29	5	34	
8	Light Industrial	50,000 sf	110	0.98	6	43	49	0.92	40	6	46	
	Marine Industrial	75,000 sf	110	0.98	9	65	74	0.92	61	8	69	
	Warehouse	25,000 sf	150	0.47	4	8	12	0.45	9	2	11	
	Sub-total				19	116	135		110	16	126	
9	Warehouse	43,291 sf	150	0.47	7	13	20	0.45	16	3	19	
	Office	16,622 sf	710	1.49	4	21	25	1.55	23	3	26	
	Marine Industrial	100,000 sf	110	0.98	12	86	98	0.92	81	11	92	
	Sub-total				23	120	143		120	17	137	
	Existing Area Trips	42 emp			6	17	23		16	5	21	
	Net New Trips Subtotal				17	103	120		104	12	116	
10	Light Industrial	30,575 sf	110	0.98	4	26	30	0.92	25	3	28	
No Action Trip Summary												
	Proposed No Action	1,097,529 sf			204	916	1,120		847	150	997	
	Existing Uses	645 emp			59	217	276		236	50	286	
	Net New No Action Trips				145	699	844		611	100	711	

No Action Estimated Trip Generation												
TAZ / Area	Land Use	Size	Units	ITE Code	PM	PM Peak Hour Trips			AM	AM Peak Hour Trips		
					Peak Rate	In	Out	Total	Peak Rate	In	Out	Total
1	Light Industrial	370,858 sf		110	0.98	44	319	363	0.92	300	41	341
	Marine Industrial	25,000 sf		110	0.98	3	22	25	0.92	20	3	23
	Boat Launch/Marina	600 berths		420	0.19	68	46	114	0.08	16	32	48
	Sub-total					115	387	502		336	76	412
	Existing Area Trips	353 emp				<u>31</u>	<u>117</u>	<u>148</u>		<u>129</u>	<u>26</u>	<u>155</u>
	Net New Trips Subtotal					84	270	354		207	50	257
2	Light Industrial	436,809 sf		110	0.98	51	377	428	0.92	354	48	402
	Marine Industrial	50,000 sf		110	0.98	6	43	49	0.92	40	6	46
	Warehouse	50,000 sf		150	0.47	6	18	24	0.45	19	4	23
	Sub-total					63	438	501		413	58	471
	Existing Area Trips	230 emp				<u>20</u>	<u>77</u>	<u>97</u>		<u>84</u>	<u>17</u>	<u>101</u>
	Net New Trips Subtotal					43	361	404		329	41	370
3	Light Industrial	107,800 sf		110	0.98	13	93	106	0.92	87	12	99
4	Light Industrial	182,200 sf		110	0.98	21	158	179	0.92	148	20	168
5	Light Industrial	51,870 sf		110	0.98	6	45	51	0.92	42	6	48
	Office - 921 Cornwall	5,800 sf		710	1.49	2	7	9	1.55	8	1	9
	Warehouse	90,000 sf		150	0.47	11	31	42	0.45	34	7	41
	Sub-total					19	83	102		84	14	98
6	Light Industrial - Encogen	60,356 sf		110	0.98	7	52	59	0.92	49	7	56
	Existing Area Trips	20 emp				<u>2</u>	<u>6</u>	<u>8</u>		<u>7</u>	<u>2</u>	<u>9</u>
	Net New Trips Subtotal					5	46	51		42	5	47
7	Warehouse	48,000 sf		150	0.47	6	17	23	0.45	18	4	22
	Light Industrial	50,000 sf		110	0.98	6	43	49	0.92	40	6	46
	Sub-total					12	60	72		58	10	68
8	Light Industrial	100,000 sf		110	0.98	12	86	98	0.92	81	11	92
	Marine Industrial	150,000 sf		110	0.98	18	129	147	0.92	121	17	138
	Warehouse	50,000 sf		150	0.47	8	16	24	0.45	19	4	23
	Sub-total					38	231	269		221	32	253
9	Warehouse	86,581 sf		150	0.47	14	27	41	0.45	32	7	39
	Office	18,635 sf		710	1.49	5	23	28	1.55	26	3	29
	Marine Industrial	200,000 sf		110	0.98	24	172	196	0.92	162	22	184
	Sub-total					43	222	265		220	32	252
	Existing Area Trips	42 emp				<u>6</u>	<u>17</u>	<u>23</u>		<u>16</u>	<u>5</u>	<u>21</u>
	Net New Trips Subtotal					37	205	242		204	27	231
10	Light Industrial	61,149 sf		110	0.98	7	53	60	0.92	49	7	56
No Action Trip Summary												
	Proposed No Action	2,195,058 sf				338	1,777	2,115		1,665	268	1,933
	Existing Uses	645 emp				<u>59</u>	<u>217</u>	<u>276</u>		<u>236</u>	<u>50</u>	<u>286</u>
	Net New No Action Trips					279	1,560	1,839		1,429	218	1,647

Mode Split and Occupancy									
Mode	Census	Comp Plan		Office/					
		2015	Average	Institutional	Light Ind	Residential	Retail	Restaurant	Marina
Auto	84%	80%	81%	82%	82%	77%	77%	77%	92%
Transit	4%	4%	4%	4%	4%	5%	5%	5%	2%
Walk/Bike/									
Other	12%	16%	13%	14%	14%	15%	15%	15%	6%
AVO	1.08		1.30	1.1	1.3	1.2	1.2	1.52	1.5

Calculation of Daily Person Trip Rates			
Land Use	Vehicle	AVO	Person
Office	11.01	1.10	12.11
Institutional	8.11	1.10	8.92
Light Industrial	6.97	1.30	8.36
Low-Rise	6.72	1.20	8.06
Mid-Rise	6.72	1.20	8.06
High-Rise	6.72	1.20	8.06
Retail	42.94	1.20	51.53
Restaurant	127.15	1.52	193.27
Boat Launch	2.96	1.5	4.44

Percent of Daily Trips During Peak Hours		
Land Use	PM	AM
Office	14%	14%
Institutional	13%	15%
Light Industrial	14%	13%
Low-Rise	9%	8%
Mid-Rise	9%	8%
High-Rise	9%	8%
Retail	9%	2%
Restaurant	9%	9%
Marina	6%	3%

ITE Vehicle Trip Rates		
Land Use	PM	AM
Office	1.49	1.55
R&D	1.08	1.24
Light Industrial	0.98	0.92
Low-Rise	0.62	0.51
Mid-Rise	0.62	0.51
High-Rise	0.62	0.51
Retail	3.75	1.03
Restaurant	10.92	11.52
Marina	0.19	0.08

Note: Based on ratio of ITE daily trip rate to peak hour trip rate.

TAZ /					Daily Person Trips				PM Peak Hour Person Trips				PM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips			AM Peak Hour Person Trips				AM Peak Hour Vehicle Trips			AM Peak Hour Vehicle Trips		
					By Mode				By Mode				Based on Person Trips			Based on ITE			By Mode				Based on Person Trips			Based on ITE		
Area	Land Use	Size	Units		Auto	Transit	Walk/ Bike/Other	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total
1	Office	371,000 sf			3,684	180	629	4,493	516	25	88	629	80	389	469	94	459	553	516	25	88	629	413	56	469	506	69	575
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	225,000 sf			1,542	75	264	1,881	216	11	36	263	20	146	166	27	194	221	201	10	34	245	136	19	155	182	25	207
	Low-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mid-Rise	867 du			5,378	349	1,258	6,985	484	31	114	629	262	141	403	349	188	537	430	28	101	559	72	286	358	88	354	442
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Retail	68,000 sf			2,698	175	631	3,504	243	16	56	315	97	106	203	122	133	255	54	4	12	70	27	18	45	43	27	70
	Restaurant	20,000 sf			2,976	193	696	3,865	268	17	63	348	107	69	176	133	85	218	268	17	63	348	92	84	176	120	110	230
	Boat Launch	460 berths			1,879	41	122	2,042	113	2	8	123	45	30	75	52	35	87	56	1	4	61	12	25	37	12	25	37
	Existing Area Trips	353 emp			1,480	0	0	0	148	0	0	0	31	117	148	31	117	148	155	0	0	0	129	26	155	129	26	155
Internal Trips				2,323	138	492	2,953	232	14	49	295	99	99	198	66	65	131	157	9	31	197	67	68	135	48	47	95	
Net New Trips Subtotal				14,354	875	3,108	19,817	1,460	88	316	2,012	481	665	1,146	680	912	1,592	1,213	76	271	1,715	556	394	950	774	537	1,311	
2	Office	165,000 sf			1,638	80	280	1,998	230	11	39	280	36	173	209	42	204	246	230	11	39	280	184	25	209	225	31	256
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	83 du			517	34	121	672	46	3	11	60	25	13	38	34	18	52	42	3	9	54	7	28	35	9	34	43
	Mid-Rise	142 du			879	57	206	1,142	79	5	19	103	43	23	66	57	31	88	70	5	16	91	12	46	58	14	58	72
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	17,500 sf			695	45	162	902	62	4	15	81	25	27	52	32	34	66	14	1	3	18	7	5	12	11	7	18
	Restaurant	5,000 sf			744	48	174	966	67	4	16	87	27	17	44	34	21	55	67	4	16	87	23	21	44	30	28	58
	Existing Area Trips	230 emp			970	0	0	0	97	0	0	0	20	77	97	20	77	97	101	0	0	0	84	17	101	84	17	101
	Internal Trips				572	36	129	737	61	4	13	78	27	27	54	18	17	35	44	3	9	56	20	19	39	14	13	27
Net New Trips Subtotal				2,931	228	814	4,943	326	23	87	533	109	149	258	161	214	375	278	21	74	474	129	89	218	191	128	319	
3	Office	20,000 sf			198	10	34	242	28	1	5	34	4	21	25	5	25	30	28	1	5	34	22	3	25	27	4	31
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	8 du			52	3	12	67	5	0	1	6	3	1	4	3	2	5	4	0	1	5	1	2	3	1	3	4
	Mid-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	1,000 sf			40	3	9	52	4	0	1	5	1	2	3	2	2	4	1	0	0	1	1	0	1	1	0	1
	Restaurant	1,000 sf			149	10	34	193	13	1	3	17	5	4	9	7	4	11	13	1	3	17	5	4	9	6	6	12
	Existing Area Trips	0 emp			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Internal Trips				56	4	12	72	6	0	1	7	2	3	5	2	2	4	5	0	1	6	2	2	4	1	2	3
Net New Trips Subtotal				383	22	77	482	44	2	9	55	11	25	36	15	31	46	41	2	8	51	27	7	34	34	11	45	
4	Office	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Institutional	285,000 sf			2,084	102	356	2,542	271	13	46	330	37	209	246	46	262	308	312	15	54	381	236	48	284	293	60	353
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Low-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mid-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Retail	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Restaurant	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Existing Area Trips	0 emp			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Internal Trips				267	14	49	330	34	2	6	42	17	16	33	11	11	22	32	2	6	40	16	15	31	11	10	21
Net New Trips Subtotal				1,817	88	307	2,212	237	11	40	288	20	193	213	35	251	286	280	13	48	341	220	33	253	282	50	332	

TAZ /					Daily Person Trips				PM Peak Hour Person Trips				PM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips			AM Peak Hour Person Trips				AM Peak Hour Vehicle Trips			AM Peak Hour Vehicle Trips		
					By Mode				By Mode				Based on Person Trips			Based on ITE			By Mode				Based on Person Trips			Based on ITE		
Area	Land Use	Size	Units		Auto	Transit	Walk/ Bike/Other	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total
5	Office	12,000 sf			119	6	20	145	16	1	3	20	3	12	15	3	15	18	16	1	3	20	13	2	15	17	2	19
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	12 du			72	5	17	94	6	0	2	8	3	2	5	5	2	7	6	0	2	8	1	4	5	1	5	6
	Mid-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	1,000 sf			40	3	9	52	4	0	1	5	1	2	3	2	2	4	1	0	0	1	1	0	1	1	0	1
	Restaurant	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Existing Area Trips	0 emp			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Internal Trips				30	2	6	38	3	0	1	4	2	1	3	1	1	2	2	0	1	3	1	1	2	1	1	2
Net New Trips Subtotal				201	12	40	253	23	1	5	29	5	15	20	9	18	27	21	1	4	26	14	5	19	18	6	24	
6	Office	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mid-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Restaurant	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Existing Area Trips	20 emp			80	0	0	0	8	0	0	0	2	6	8	2	6	8	9	0	0	0	7	2	9	7	2	9
	Internal Trips				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Net New Trips Subtotal				-80	0	0	0	-8	0	0	0	-2	-6	-8	-2	-6	-8	-9	0	0	0	-7	-2	-9	-7	-2	-9	
7	Office	30,000 sf			298	15	50	363	42	2	7	51	6	32	38	8	37	45	42	2	7	51	33	5	38	41	6	47
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mid-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	8,000 sf			317	21	74	412	28	2	7	37	11	12	23	14	16	30	6	0	2	8	3	2	5	5	3	8
	Restaurant	2,000 sf			298	19	70	387	27	2	6	35	11	7	18	13	9	22	27	2	6	35	9	9	18	12	11	23
	Existing Area Trips	0 emp			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Internal Trips				117	7	26	150	12	1	3	16	5	5	10	3	4	7	8	0	2	10	4	3	7	2	3	5
Net New Trips Subtotal				796	48	168	1,012	85	5	17	107	23	46	69	32	58	90	67	4	13	84	41	13	54	56	17	73	
8	Office	28,000 sf			278	14	47	339	39	2	6	47	6	29	35	7	35	42	39	2	6	47	31	4	35	38	5	43
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	50 du			310	20	73	403	28	2	6	36	15	8	23	20	11	31	25	2	5	32	4	17	21	5	21	26
	Mid-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	8,000 sf			317	21	74	412	28	2	7	37	11	12	23	14	16	30	6	0	2	8	3	2	5	5	3	8
	Restaurant	2,000 sf			298	19	70	387	27	2	6	35	11	7	18	13	9	22	27	2	6	35	9	9	18	12	11	23
	Existing Area Trips	0 emp			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Internal Trips				154	10	36	200	15	1	3	19	6	7	13	5	4	9	10	1	2	13	5	4	9	3	3	6
Net New Trips Subtotal				1,049	64	228	1,341	107	7	22	136	37	49	86	49	67	116	87	5	17	109	42	28	70	57	37	94	
9	Office	65,000 sf			645	31	111	787	90	4	16	110	14	68	82	16	81	97	90	4	16	110	72	10	82	89	12	101
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	85,000 sf			583	28	100	711	82	4	14	100	8	55	63	10	73	83	75	4	13	92	51	7	58	69	9	78
	Low-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			

TAZ /					Daily Person Trips				PM Peak Hour Person Trips				PM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips			AM Peak Hour Person Trips				AM Peak Hour Vehicle Trips			AM Peak Hour Vehicle Trips		
					By Mode				By Mode				Based on Person Trips			Based on ITE			By Mode				Based on Person Trips			Based on ITE		
Area	Land Use	Size	Units		Auto	Transit	Walk/ Bike/Other	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total
<u>Sub-Total Project Trips</u>																												
	Office	691,000 sf			6,860	336	1,171	8,367	961	46	164	1,171	149	724	873	175	856	1,031	961	46	164	1,171	768	105	873	943	129	1,072
	Institutional	285,000 sf			2,084	102	356	2,542	271	13	46	330	37	209	246	46	262	308	312	15	54	381	236	48	284	293	60	353
	Light Industrial	310,000 sf			2,125	103	364	2,592	298	15	50	363	28	201	229	37	267	304	276	14	47	337	187	26	213	251	34	285
	Low-Rise	153 du			951	62	223	1,236	85	5	20	110	46	24	70	62	33	95	77	5	17	99	13	51	64	16	63	79
	Mid-Rise	1,456 du			9,037	587	2,113	11,737	814	52	191	1,057	441	237	678	586	316	902	722	47	170	939	122	480	602	148	595	743
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Retail	108,500 sf			4,306	281	1,005	5,592	387	25	91	503	153	169	322	195	213	408	86	5	20	111	44	28	72	69	42	111
	Restaurant	42,500 sf			6,325	410	1,479	8,214	569	37	133	739	228	147	375	282	182	464	569	37	133	739	195	180	375	255	235	490
	Boat Launch	460 berths			1,879	41	122	2,042	113	2	8	123	45	30	75	52	35	87	56	1	4	61	12	25	37	12	25	37
Total Project Trips					33,567	1,922	6,833	42,322	3,498	195	703	4,396	1,127	1,741	2,868	1,435	2,164	3,599	3,059	170	609	3,838	1,577	943	2,520	1,987	1,183	3,170
<u>Sub-Total Trip Reductions</u>																												
	Existing Area Trips	645 emp			2,760	0	0	0	276	0	0	0	59	217	276	59	217	276	286	0	0	0	236	50	286	236	50	286
	Internal Trips				4,295	261	933	5,489	442	26	94	562	190	190	380	127	125	252	315	18	63	396	140	135	275	97	96	193
<u>Net New Project Trips</u>					26,512	1,661	5,900	36,833	2,780	169	609	3,834	878	1,334	2,212	1,249	1,822	3,071	2,458	152	546	3,442	1,201	758	1,959	1,654	1,037	2,691

Mode Split and Occupancy									
Mode	Census	Comp Plan		Office/					
		2022	Average	Institutional	Light Ind	Residential	Retail	Restaurant	Marina
Auto	84%	75%	79%	80%	80%	75%	75%	75%	90%
Transit	4%	6%	5%	5%	5%	6%	5%	5%	5%
Walk/Bike/									
Other	12%	19%	16%	15%	15%	19%	20%	20%	5%
AVO	1.08		1.30	1.1	1.3	1.2	1.2	1.52	1.5

Calculation of Daily Person Trip Rates			
Land Use	Vehicle	AVO	Person
Office	11.01	1.10	12.11
Institutional	8.11	1.10	8.92
Light Industrial	6.97	1.30	8.36
Low-Rise	6.72	1.20	8.06
Mid-Rise	6.72	1.20	8.06
High-Rise	6.72	1.20	8.06
Retail	42.94	1.20	51.53
Restaurant	127.15	1.52	193.27
Boat Launch	2.96	1.5	4.44

Percent of Daily Trips During Peak Hours		
Land Use	PM	AM
Office	14%	14%
Institutional	13%	15%
Light Industrial	14%	13%
Low-Rise	9%	8%
Mid-Rise	9%	8%
High-Rise	9%	8%
Retail	9%	2%
Restaurant	9%	9%
Marina	6%	3%

ITE Vehicle Trip Rates		
Land Use	PM	AM
Office	1.49	1.55
R&D	1.08	1.24
Light Industrial	0.98	0.92
Low-Rise	0.62	0.51
Mid-Rise	0.62	0.51
High-Rise	0.62	0.51
Retail	3.75	1.03
Restaurant	10.92	11.52
Marina	0.19	0.08

Note: Based on ratio of ITE daily trip rate to peak hour trip rate.

TAZ /					Daily Person Trips By Mode				PM Peak Hour Person Trips By Mode				PM Peak Hour Vehicle Trips Based on Person Trips			PM Peak Hour Vehicle Trips Based on ITE			AM Peak Hour Person Trips By Mode				AM Peak Hour Vehicle Trips Based on Person Trips			AM Peak Hour Vehicle Trips Based on ITE		
Area	Land Use	Size	Units		Auto	Transit	Walk/ Bike/Other	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total
1	Office	380,000 sf			3,682	230	690	4,602	515	32	97	644	80	388	468	96	470	566	515	32	97	644	412	56	468	518	71	589
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	365,000 sf			2,441	153	457	3,051	342	21	64	427	32	231	263	43	315	358	318	20	59	397	216	29	245	296	40	336
	Low-Rise	91 du			549	44	139	732	50	4	12	66	27	15	42	36	20	56	44	4	11	59	7	30	37	9	37	46
	Mid-Rise	993 du			6,000	480	1,520	8,000	540	43	137	720	293	157	450	400	215	615	480	38	122	640	80	320	400	101	405	506
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Retail	80,000 sf			3,092	206	824	4,122	278	19	74	371	111	121	232	144	156	300	62	4	16	82	32	20	52	50	32	82
	Restaurant	30,000 sf			4,349	290	1,159	5,798	392	26	104	522	157	101	258	200	128	328	392	26	104	522	134	124	258	180	166	346
	Boat Launch	460 berths			1,838	102	102	2,042	111	6	6	123	44	30	74	52	35	87	55	3	3	61	12	25	37	12	25	37
	Existing Area Trips	353 emp			1,480	0	0	0	148	0	0	0	31	117	148	31	117	148	155	0	0	0	129	26	155	129	26	155
	Internal Trips				3,141	223	740	4,104	305	21	71	397	126	126	252	92	92	184	212	15	48	275	89	88	177	63	63	126
Net New Trips Subtotal				17,330	1,282	4,151	24,243	1,775	130	423	2,476	587	800	1,387	848	1,130	1,978	1,499	112	364	2,130	675	490	1,165	974	687	1,661	
2	Office	750,000 sf			7,266	454	1,363	9,083	1,018	64	190	1,272	157	768	925	190	928	1,118	1,018	64	190	1,272	814	111	925	1,023	140	1,163
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Low-Rise	63 du			378	30	96	504	34	3	8	45	18	10	28	25	14	39	30	2	8	40	5	20	25	6	26	32
	Mid-Rise	188 du			1,133	91	287	1,511	102	8	26	136	55	30	85	75	41	116	91	7	23	121	15	61	76	19	77	96
	High-Rise	500 du			3,023	242	765	4,030	272	22	69	363	148	79	227	202	108	310	242	19	61	322	40	162	202	51	204	255
	Retail	65,000 sf			2,512	167	670	3,349	226	15	60	301	90	98	188	117	127	244	50	3	14	67	26	16	42	41	26	67
	Restaurant	10,000 sf			1,450	97	386	1,933	131	9	34	174	52	34	86	66	43	109	131	9	34	174	45	41	86	60	55	115
	Existing Area Trips	230 emp			970	0	0	0	97	0	0	0	20	77	97	20	77	97	101	0	0	0	84	17	101	84	17	101
	Internal Trips				2,256	160	539	2,955	244	17	56	317	108	109	217	77	77	154	178	12	39	229	80	80	160	56	56	112
	Net New Trips Subtotal				12,536	921	3,028	17,455	1,442	104	331	1,974	392	833	1,225	578	1,107	1,685	1,283	92	291	1,767	781	314	1,095	1,060	455	1,515
3	Office	100,000 sf			969	61	181	1,211	136	9	25	170	21	103	124	25	124	149	136	9	25	170	109	15	124	136	19	155
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Low-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mid-Rise	83 du			504	40	128	672	45	4	11	60	25	13	38	34	18	52	41	3	10	54	7	27	34	9	34	43
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Retail	15,000 sf			580	39	154	773	53	4	13	70	21	23	44	27	29	56	11	1	3	15	5	4	9	9	6	15
	Restaurant	5,000 sf			725	48	193	966	65	4	18	87	26	17	43	34	21	55	65	4	18	87	22	21	43	30	28	58
	Existing Area Trips	0 emp			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Internal Trips				398	28	99	525	41	3	10	54	17	18	35	13	12	25	29	2	7	38	13	13	25	9	9	18
	Net New Trips Subtotal				2,380	160	557	3,097	258	18	57	333	76	138	214	107	180	287	224	15	49	288	130	54	185	175	78	253
4	Office	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Institutional	570,000 sf			4,067	254	763	5,084	529	33	99	661	72	409	481	92	524	616	610	38	115	763	461	94	555	587	120	707
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Low-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mid-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Retail	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Restaurant	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Existing Area Trips	0 emp			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Internal Trips				582	38	115	735	72	5	14	91	34	34	68	24	25	49	69	5	13	87	33	33	66	23	23	46
	Net New Trips Subtotal				3,485	216	648	4,349	457	28	85	570	38	375	413	68	499	567	541	33	102	676	428	61	489	564	97	661

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TAZ /					Daily Person Trips				PM Peak Hour Person Trips				PM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips			AM Peak Hour Person Trips				AM Peak Hour Vehicle Trips			AM Peak Hour Vehicle Trips		
					By Mode				By Mode				Based on Person Trips			Based on ITE			By Mode				Based on Person Trips			Based on ITE		
Area	Land Use	Size	Units		Auto	Transit	Walk/ Bike/Other	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total
<u>Sub-Total Project Trips</u>																												
	Office	2,345,000 sf			22,720	1,420	4,259	28,399					3,180	200	596	3,976												
	Institutional	570,000 sf			4,067	254	763	5,084					529	33	99	661												
	Light Industrial	450,000 sf			3,010	189	563	3,762					422	26	79	527												
	Low-Rise	153 du			927	74	235	1,236					84	7	20	111												
	Mid-Rise	2,422 du			14,640	1,169	3,710	19,519					1,318	105	333	1,756												
	High-Rise	500 du			3,023	242	765	4,030					272	22	69	363												
	Retail	355,000 sf			13,720	915	3,657	18,292					1,236	84	326	1,646												
	Restaurant	90,000 sf			13,049	871	3,475	17,395					1,177	79	310	1,566												
	Boat Launch	460 berths			1,838	102	102	2,042					111	6	6	123												
	Total Project Trips				76,994	5,236	17,529	99,759					8,329	562	1,838	10,729												
<u>Sub-Total Trip Reductions</u>																												
	Existing Area Trips	645 emp			2,760	0	0	0					276	0	0	0												
	Internal Trips				11,018	777	2,651	14,446					1,139	79	266	1,484												
	Net New Project Trips				63,216	4,459	14,878	85,313					6,914	483	1,572	9,245												

Mode Split and Occupancy									
Mode	Census	Comp Plan		Office/					
		2015	Average	Institutional	Light Ind	Residential	Retail	Restaurant	Marina
Auto	84%	75%	81%	82%	82%	77%	77%	77%	92%
Transit	4%	6%	4%	4%	4%	5%	5%	5%	2%
Walk/Bike/									
Other	12%	19%	13%	14%	14%	15%	15%	15%	6%
AVO	1.08		1.30	1.1	1.3	1.2	1.2	1.52	1.5

Calculation of Daily Person Trip Rates			
Land Use	Vehicle	AVO	Person
Office	11.01	1.10	12.11
Institutional	8.11	1.10	8.92
Light Industrial	6.97	1.30	8.36
Low-Rise	6.72	1.20	8.06
Mid-Rise	6.72	1.20	8.06
High-Rise	6.72	1.20	8.06
Retail	42.94	1.20	51.53
Restaurant	127.15	1.52	193.27
Boat Launch	2.96	1.5	4.44

Percent of Daily Trips During Peak Hours		
Land Use	PM	AM
Office	14%	14%
Institutional	13%	15%
Light Industrial	14%	13%
Low-Rise	9%	8%
Mid-Rise	9%	8%
High-Rise	9%	8%
Retail	9%	2%
Restaurant	9%	9%
Marina	6%	3%

ITE Vehicle Trip Rates		
Land Use	PM	AM
Office	1.49	1.55
R&D	1.08	1.24
Light Industrial	0.98	0.92
Low-Rise	0.62	0.51
Mid-Rise	0.62	0.51
High-Rise	0.62	0.51
Retail	3.75	1.03
Restaurant	10.92	11.52
Marina	0.19	0.08

Note: Based on ratio of ITE daily trip rate to peak hour trip rate.

TAZ /					Daily Person Trips By Mode				PM Peak Hour Person Trips By Mode				PM Peak Hour Vehicle Trips Based on Person Trips			PM Peak Hour Vehicle Trips Based on ITE			AM Peak Hour Person Trips By Mode				AM Peak Hour Vehicle Trips Based on Person Trips			AM Peak Hour Vehicle Trips Based on ITE		
Area	Land Use	Size	Units		Auto	Transit	Walk/ Bike/Other	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total
1	Office	255,000 sf			2,532	124	432	3,088	354	17	61	432	55	267	322	65	315	380	354	17	61	432	283	39	322	348	47	395
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	225,000 sf			1,542	75	264	1,881	216	11	36	263	20	146	166	27	194	221	201	10	34	245	136	19	155	182	25	207
	Low-Rise	333 du			2,069	134	484	2,687	186	12	44	242	101	54	155	135	72	207	166	11	38	215	28	110	138	34	136	170
	Mid-Rise	333 du			2,069	134	484	2,687	186	12	44	242	101	54	155	135	72	207	166	11	38	215	28	110	138	34	136	170
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Retail	50,000 sf			1,984	129	464	2,577	179	12	41	232	72	77	149	90	98	188	40	3	9	52	20	13	33	32	20	52
	Restaurant	22,000 sf			3,274	213	765	4,252	295	19	69	383	118	76	194	146	94	240	295	19	69	383	101	93	194	132	121	253
	Boat Launch	460 berths			1,879	41	122	2,042	113	2	8	123	45	30	75	52	35	87	56	1	4	61	12	25	37	12	25	37
	Existing Area Trips	353 emp			1,480	0	0	0	148	0	0	0	31	117	148	31	117	148	155	0	0	0	129	26	155	129	26	155
Internal Trips				2,030	121	429	2,580	201	12	42	255	85	84	169	54	54	108	135	8	27	170	57	57	114	40	40	80	
Net New Trips Subtotal				11,839	729	2,586	16,634	1,180	73	261	1,662	396	503	899	565	709	1,274	988	64	226	1,433	422	326	748	605	444	1,049	
2	Office	120,000 sf			1,191	58	204	1,453	166	8	29	203	26	125	151	30	149	179	166	8	29	203	133	18	151	164	22	186
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	83 du			517	34	121	672	46	3	11	60	25	13	38	34	18	52	42	3	9	54	7	28	35	9	34	43
	Mid-Rise	113 du			698	45	164	907	63	4	15	82	34	19	53	46	24	70	56	4	13	73	9	38	47	11	46	57
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	14,500 sf			575	37	135	747	52	3	12	67	21	22	43	26	28	54	12	1	2	15	6	4	10	9	6	15
	Restaurant	8,000 sf			1,190	77	279	1,546	107	7	25	139	43	27	70	53	34	87	107	7	25	139	36	34	70	48	44	92
	Existing Area Trips	230 emp			970	0	0	0	97	0	0	0	20	77	97	20	77	97	101	0	0	0	84	17	101	84	17	101
	Internal Trips				552	36	128	716	57	3	13	73	24	25	49	16	15	31	40	2	8	50	18	17	35	12	12	24
Net New Trips Subtotal				2,649	215	775	4,609	280	22	79	478	105	104	209	153	161	314	242	21	70	434	89	88	177	145	123	268	
3	Office	17,500 sf			174	8	30	212	25	1	4	30	4	19	23	4	22	26	25	1	4	30	20	3	23	24	3	27
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	8 du			49	3	12	64	5	0	1	6	3	1	4	3	2	5	4	0	1	5	1	2	3	1	3	4
	Mid-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	1,000 sf			40	3	9	52	4	0	1	5	1	2	3	2	2	4	1	0	0	1	1	0	1	1	0	1
	Restaurant	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Existing Area Trips	0 emp			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Internal Trips				35	2	7	44	4	0	1	5	2	2	4	1	1	2	3	0	1	4	2	2	3	1	1	2
Net New Trips Subtotal				228	12	44	284	30	1	5	36	6	20	26	8	25	33	27	1	4	32	20	3	24	25	5	30	
4	Office	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Institutional	285,000 sf			2,084	102	356	2,542	271	13	46	330	37	209	246	46	262	308	312	15	54	381	236	48	284	293	60	353
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mid-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Restaurant	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Existing Area Trips	0 emp			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Internal Trips				276	15	51	342	36	2	6	44	17	17	34	11	11	22	33	2	6	41	16	16	32	11	11	22
Net New Trips Subtotal				1,808	87	305	2,200	235	11	40	286	20	192	212	35	251	286	279	13	48	340	220	32	252	282	49	331	

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TAZ /					Daily Person Trips				PM Peak Hour Person Trips				PM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips			AM Peak Hour Person Trips				AM Peak Hour Vehicle Trips			AM Peak Hour Vehicle Trips		
					By Mode				By Mode				Based on Person Trips			Based on ITE			By Mode				Based on Person Trips			Based on ITE		
Area	Land Use	Size	Units		Auto	Transit	Walk/ Bike/Other	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total
<u>Sub-Total Project Trips</u>																												
	Office	488,500 sf			4,849	236	830	5,915	679	33	116	828	106	512	618	123	605	728	679	33	116	828	543	75	618	667	90	757
	Institutional	285,000 sf			2,084	102	356	2,542	271	13	46	330	37	209	246	46	262	308	312	15	54	381	236	48	284	293	60	353
	Light Industrial	310,000 sf			2,125	103	364	2,592	298	15	50	363	28	201	229	37	267	304	276	14	47	337	187	26	213	251	34	285
	Low-Rise	488 du			3,029	196	709	3,934	273	17	64	354	149	78	227	197	107	304	243	16	55	314	42	160	202	51	198	249
	Mid-Rise	746 du			4,629	300	1,083	6,012	417	27	98	542	226	122	348	302	161	463	371	25	85	481	62	247	309	76	304	380
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Retail	86,000 sf			3,412	221	799	4,432	309	19	71	399	124	133	257	155	169	324	70	4	15	89	36	23	59	55	34	89
	Restaurant	39,500 sf			5,878	382	1,374	7,634	529	34	124	687	212	136	348	263	168	431	529	34	124	687	181	167	348	237	218	455
	Boat Launch	460 berths			1,879	41	122	2,042	113	2	8	123	45	30	75	52	35	87	56	1	4	61	12	25	37	12	25	37
Total Project Trips					27,885	1,581	5,637	35,103	2,889	160	577	3,626	927	1,421	2,348	1,175	1,774	2,949	2,536	142	500	3,178	1,299	771	2,070	1,642	963	2,605
<u>Sub-Total Trip Reductions</u>																												
	Existing Area Trips	645 emp			2,760	0	0	0	276	0	0	0	59	217	276	59	217	276	286	0	0	0	236	50	286	236	50	286
	Internal Trips				3,688	225	802	4,715	379	22	80	481	164	162	326	105	104	209	268	15	54	337	117	117	233	81	80	161
<u>Net New Project Trips</u>					21,437	1,356	4,835	30,388	2,234	138	497	3,145	704	1,042	1,746	1,011	1,453	2,464	1,982	127	446	2,841	946	604	1,551	1,325	833	2,158

Mode Split and Occupancy									
Mode	Census	Comp Plan		Office/					
		2022	Average	Institutional	Light Ind	Residential	Retail	Restaurant	Marina
Auto	84%	75%	79%	80%	80%	75%	75%	75%	90%
Transit	4%	6%	5%	5%	5%	6%	5%	5%	5%
Walk/Bike/									
Other	12%	19%	16%	15%	15%	19%	20%	20%	5%
AVO	1.08		1.30	1.1	1.3	1.2	1.2	1.52	1.5

Calculation of Daily Person Trip Rates			
Land Use	Vehicle	AVO	Person
Office	11.01	1.10	12.11
Institutional	8.11	1.10	8.92
Light Industrial	6.97	1.30	8.36
Low-Rise	6.72	1.20	8.06
Mid-Rise	6.72	1.20	8.06
High-Rise	6.72	1.20	8.06
Retail	42.94	1.20	51.53
Restaurant	127.15	1.52	193.27
Boat Launch	2.96	1.5	4.44

Percent of Daily Trips During Peak Hours		
Land Use	PM	AM
Office	14%	14%
Institutional	13%	15%
Light Industrial	14%	13%
Low-Rise	9%	8%
Mid-Rise	9%	8%
High-Rise	9%	8%
Retail	9%	2%
Restaurant	9%	9%
Marina	6%	3%

ITE Vehicle Trip Rates		
Land Use	PM	AM
Office	1.49	1.55
R&D	1.08	1.24
Light Industrial	0.98	0.92
Low-Rise	0.62	0.51
Mid-Rise	0.62	0.51
High-Rise	0.62	0.51
Retail	3.75	1.03
Restaurant	10.92	11.52
Marina	0.19	0.08

Note: Based on ratio of ITE daily trip rate to peak hour trip rate.

TAZ /					Daily Person Trips By Mode				PM Peak Hour Person Trips By Mode				PM Peak Hour Vehicle Trips Based on Person Trips			PM Peak Hour Vehicle Trips Based on ITE			AM Peak Hour Person Trips By Mode				AM Peak Hour Vehicle Trips Based on Person Trips			AM Peak Hour Vehicle Trips Based on ITE		
Area	Land Use	Size	Units		Auto	Transit	Walk/ Bike/Other	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total
1	Office	235,000 sf			2,277	142	427	2,846	318	20	60	398	49	240	289	60	290	350	318	20	60	398	254	35	289	320	44	364
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	365,000 sf			2,441	153	457	3,051	342	21	64	427	32	231	263	43	315	358	318	20	59	397	216	29	245	296	40	336
	Low-Rise	333 du			2,015	161	511	2,687	182	15	45	242	99	53	152	135	72	207	161	13	41	215	27	107	134	34	136	170
	Mid-Rise	500 du			3,023	242	765	4,030	272	22	69	363	148	79	227	202	108	310	242	19	61	322	40	162	202	51	204	255
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Retail	70,000 sf			2,705	180	722	3,607	244	16	65	325	97	106	203	126	137	263	54	4	14	72	27	18	45	44	28	72
	Restaurant	20,000 sf			2,899	193	773	3,865	261	17	70	348	105	67	172	133	85	218	261	17	70	348	89	83	172	120	110	230
	Boat Launch	460 berths			1,838	102	102	2,042	111	6	6	123	44	30	74	52	35	87	55	3	3	61	12	25	37	12	25	37
	Existing Area Trips	353 emp			1,480	0	0	0	148	0	0	0	31	117	148	31	117	148	155	0	0	0	129	26	155	129	26	155
Internal Trips				2,467	175	574	3,216	237	17	55	309	98	97	195	71	71	142	163	12	37	212	68	67	135	46	45	91	
Net New Trips Subtotal				13,251	998	3,183	18,912	1,345	100	324	1,917	445	592	1,037	649	854	1,503	1,091	84	271	1,601	468	366	834	702	516	1,218	
2	Office	400,000 sf			3,875	242	727	4,844	542	34	102	678	84	409	493	101	495	596	542	34	102	678	434	59	493	546	74	620
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mid-Rise	195 du			1,179	94	299	1,572	106	8	27	141	57	31	88	79	42	121	95	8	23	126	16	63	79	20	79	99
	High-Rise	458 du			2,771	222	701	3,694	249	20	63	332	135	73	208	185	99	284	222	18	56	296	37	148	185	47	187	234
	Retail	65,000 sf			2,512	167	670	3,349	226	15	60	301	90	98	188	117	127	244	50	3	14	67	26	16	42	41	26	67
	Restaurant	10,000 sf			1,450	97	386	1,933	131	9	34	174	52	34	86	66	43	109	131	9	34	174	45	41	86	60	55	115
	Existing Area Trips	230 emp			970	0	0	0	97	0	0	0	20	77	97	20	77	97	101	0	0	0	84	17	101	84	17	101
	Internal Trips				1,691	123	425	2,239	172	12	41	225	75	75	150	54	53	107	121	9	27	157	53	53	106	35	35	70
Net New Trips Subtotal				9,126	699	2,358	13,153	985	74	245	1,401	323	493	816	474	676	1,150	818	63	202	1,184	421	257	678	595	369	964	
3	Office	175,000 sf			1,695	106	318	2,119	238	15	44	297	37	179	216	44	217	261	238	15	44	297	190	26	216	238	33	271
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mid-Rise	80 du			484	39	122	645	44	3	11	58	24	13	37	33	17	50	39	3	10	52	7	26	33	8	33	41
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	10,000 sf			386	26	103	515	35	2	9	46	14	15	29	18	20	38	8	1	1	10	4	3	7	6	4	10
	Restaurant	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Existing Area Trips	0 emp			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Internal Trips				368	26	83	477	43	3	9	55	20	20	40	14	14	28	33	2	7	42	16	16	31	10	10	20
Net New Trips Subtotal				2,197	145	460	2,802	274	17	55	346	55	187	242	81	240	321	252	17	48	317	185	39	225	242	60	302	
4	Office	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Institutional	570,000 sf			4,067	254	763	5,084	529	33	99	661	72	409	481	92	524	616	610	38	115	763	461	94	555	587	120	707
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mid-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Restaurant	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Existing Area Trips	0 emp			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Internal Trips				583	38	116	737	73	5	14	92	34	34	68	24	25	49	71	5	14	90	34	33	67	22	22	44
Net New Trips Subtotal				3,484	216	647	4,347	456	28	85	569	38	375	413	68	499	567	539	33	101	673	427	61	488	565	98	663	

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TAZ /					Daily Person Trips				PM Peak Hour Person Trips				PM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips			AM Peak Hour Person Trips				AM Peak Hour Vehicle Trips			AM Peak Hour Vehicle Trips		
					By Mode				By Mode				Based on Person Trips			Based on ITE			By Mode				Based on Person Trips			Based on ITE		
	Area	Land Use	Size	Units	Auto	Transit	Walk/ Bike/Other	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total
<u>Sub-Total Project Trips</u>																												
	Office	1,785,000 sf		17,295	1,080	3,242	21,617	2,420	151	455	3,026	375	1,824	2,199	453	2,207	2,660	2,420	151	455	3,026	1,935	264	2,199	2,435	332	2,767	
	Institutional	570,000 sf		4,067	254	763	5,084	529	33	99	661	72	409	481	92	524	616	610	38	115	763	461	94	555	587	120	707	
	Light Industrial	450,000 sf		3,010	189	563	3,762	422	26	79	527	39	286	325	53	388	441	392	25	72	489	266	36	302	365	49	414	
	Low-Rise	500 du		3,023	241	766	4,030	273	22	68	363	149	79	228	202	108	310	241	20	61	322	40	161	201	51	204	255	
	Mid-Rise	1,392 du		8,415	673	2,130	11,218	758	60	191	1,009	412	221	633	563	301	864	675	54	168	897	113	450	563	143	567	710	
	High-Rise	458 du		2,771	222	701	3,694	249	20	63	332	135	73	208	185	99	284	222	18	56	296	37	148	185	47	187	234	
	Retail	310,000 sf		11,981	798	3,195	15,974	1,080	71	286	1,437	431	467	898	559	606	1,165	240	16	63	319	122	79	201	195	124	319	
	Restaurant	65,000 sf		9,424	628	2,510	12,562	849	56	226	1,131	339	220	559	433	277	710	849	56	226	1,131	290	269	559	390	359	749	
	Boat Launch	460 berths		1,838	102	102	2,042	111	6	6	123	44	30	74	52	35	87	55	3	3	61	12	25	37	12	25	37	
Total Project Trips				61,824	4,187	13,972	79,983	6,691	445	1,473	8,609	1,996	3,609	5,605	2,592	4,545	7,137	5,704	381	1,219	7,304	3,276	1,526	4,802	4,225	1,967	6,192	
<u>Sub-Total Trip Reductions</u>																												
	Existing Area Trips	645 emp		2,760	0	0	0	276	0	0	0	59	217	276	59	217	276	286	0	0	0	236	50	286	236	50	286	
	Internal Trips			8,868	625	2,133	11,626	918	64	213	1,195	396	395	791	283	281	564	661	46	145	852	289	288	576	193	191	384	
<u>Net New Project Trips</u>				50,196	3,562	11,839	68,357	5,497	381	1,260	7,414	1,541	2,997	4,538	2,250	4,047	6,297	4,757	335	1,074	6,452	2,751	1,188	3,940	3,796	1,726	5,522	

Mode Split and Occupancy									
Mode	Census	Comp Plan		Office/					
		2015	Average	Institutional	Light Ind	Residential	Retail	Restaurant	Marina
Auto	84%	75%	81%	82%	82%	77%	77%	77%	92%
Transit	4%	6%	4%	4%	4%	5%	5%	5%	2%
Walk/Bike/									
Other	12%	19%	13%	14%	14%	15%	15%	15%	6%
AVO	1.08		1.30	1.1	1.3	1.2	1.2	1.52	1.5

Calculation of Daily Person Trip Rates			
Land Use	Vehicle	AVO	Person
Office	11.01	1.10	12.11
Institutional	8.11	1.10	8.92
Light Industrial	6.97	1.30	8.36
Low-Rise	6.72	1.20	8.06
Mid-Rise	6.72	1.20	8.06
High-Rise	6.72	1.20	8.06
Retail	42.94	1.20	51.53
Restaurant	127.15	1.52	193.27
Boat Launch	2.96	1.5	4.44

Percent of Daily Trips During Peak Hours		
Land Use	PM	AM
Office	14%	14%
Institutional	13%	15%
Light Industrial	14%	13%
Low-Rise	9%	8%
Mid-Rise	9%	8%
High-Rise	9%	8%
Retail	9%	2%
Restaurant	9%	9%
Marina	6%	3%

ITE Vehicle Trip Rates		
Land Use	PM	AM
Office	1.49	1.55
R&D	1.08	1.24
Light Industrial	0.98	0.92
Low-Rise	0.62	0.51
Mid-Rise	0.62	0.51
High-Rise	0.62	0.51
Retail	3.75	1.03
Restaurant	10.92	11.52
Marina	0.19	0.08

Note: Based on ratio of ITE daily trip rate to peak hour trip rate.

TAZ /	Daily Person Trips By Mode					PM Peak Hour Person Trips By Mode				PM Peak Hour Vehicle Trips Based on Person Trips			PM Peak Hour Vehicle Trips Based on ITE			AM Peak Hour Person Trips By Mode				AM Peak Hour Vehicle Trips Based on Person Trips			AM Peak Hour Vehicle Trips Based on ITE				
Area	Land Use	Size	Units	Auto	Transit	Walk/ Bike/Other	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total
1	Office	135,000 sf		1,341	65	229	1,635	188	9	32	229	29	142	171	34	167	201	188	9	32	229	150	21	171	184	25	209
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	225,000 sf		1,542	75	264	1,881	216	11	36	263	20	146	166	27	194	221	201	10	34	245	136	19	155	182	25	207
	Low-Rise	300 du		1,862	121	435	2,418	168	11	39	218	91	49	140	121	65	186	149	10	34	193	25	99	124	31	122	153
	Mid-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	40,000 sf		1,587	103	371	2,061	142	9	34	185	57	61	118	72	78	150	32	2	7	41	16	11	27	25	16	41
	Restaurant	8,000 sf		1,190	77	279	1,546	107	7	25	139	43	27	70	53	34	87	107	7	25	139	36	34	70	48	44	92
	Boat Launch	460 berths		1,879	41	122	2,042	113	2	8	123	45	30	75	52	35	87	56	1	4	61	12	25	37	12	25	37
	Existing Area Trips	353 emp		1,480	0	0	0	148	0	0	0	31	117	148	31	117	148	155	0	0	0	129	26	155	129	26	155
	Internal Trips			1,171	67	238	1,476	115	7	23	145	49	48	97	29	28	57	77	4	15	96	33	32	65	18	18	36
	Net New Trips Subtotal			6,750	415	1,462	10,107	671	42	151	1,012	205	290	495	299	428	727	501	35	121	812	213	151	364	335	213	548
2	Office	60,000 sf		596	29	102	727	84	4	14	102	13	63	76	15	74	89	84	4	14	102	67	9	76	82	11	93
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	65 du		403	26	95	524	36	2	9	47	20	10	30	26	14	40	32	2	8	42	5	22	27	7	26	33
	Mid-Rise	63 du		388	25	91	504	35	2	8	45	19	10	29	25	14	39	31	2	7	40	5	21	26	6	26	32
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	8,000 sf		317	21	74	412	28	2	7	37	11	12	23	14	16	30	6	0	2	8	3	2	5	5	3	8
	Restaurant	4,000 sf		595	39	139	773	54	4	12	70	22	14	36	27	17	44	54	4	12	70	19	17	36	24	22	46
	Existing Area Trips	230 emp		970	0	0	0	97	0	0	0	20	77	97	20	77	97	101	0	0	0	84	17	101	84	17	101
	Internal Trips			286	19	70	375	29	2	7	38	12	13	25	8	7	15	22	1	5	28	10	9	19	5	5	10
	Net New Trips Subtotal			1,043	121	431	2,565	111	12	43	263	53	19	72	79	51	130	84	11	38	234	5	45	50	35	66	101
3	Office	15,000 sf		149	7	26	182	21	1	3	25	3	16	19	4	18	22	21	1	3	25	17	2	19	20	3	23
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mid-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Restaurant	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Existing Area Trips	0 emp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Internal Trips			19	1	4	24	3	0	0	3	1	1	2	1	0	1	2	0	0	2	1	1	2	1	0	1
	Net New Trips Subtotal			130	6	22	158	18	1	3	22	2	15	17	3	18	21	19	1	3	23	16	1	17	19	3	22
4	Office	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Institutional	285,000 sf		2,084	102	356	2,542	271	13	46	330	37	209	246	46	262	308	312	15	54	381	236	48	284	293	60	353
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mid-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Restaurant	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Existing Area Trips	0 emp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Internal Trips			260	14	50	324	33	2	6	41	16	16	32	9	10	19	33	2	6	41	16	16	32	9	8	17
	Net New Trips Subtotal			1,824	88	306	2,218	238	11	40	289	21	193	214	37	252	289	279	13	48	340	220	32	252	284	52	330

TAZ /					Daily Person Trips By Mode				PM Peak Hour Person Trips By Mode				PM Peak Hour Vehicle Trips Based on Person Trips			PM Peak Hour Vehicle Trips Based on ITE			AM Peak Hour Person Trips By Mode				AM Peak Hour Vehicle Trips Based on Person Trips			AM Peak Hour Vehicle Trips Based on ITE		
Area	Land Use	Size	Units		Auto	Transit	Walk/ Bike/Other	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total
5	Office	10,000 sf			99	5	17	121	14	1	2	17	2	11	13	3	12	15	14	1	2	17	11	2	13	14	2	16
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	6 du			39	3	8	50	4	0	1	5	2	1	3	3	1	4	3	0	1	4	1	2	3	1	2	3
	Mid-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	500 sf			20	1	5	26	2	0	0	2	1	1	2	1	1	2	1	0	0	1	1	1	0	1	1	
	Restaurant	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Existing Area Trips	0 emp			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Internal Trips				20	1	4	25	2	0	0	2	1	1	2	0	1	1	2	2	0	0	2	1	1	0	1	
Net New Trips Subtotal				138	8	26	172	18	1	3	22	4	12	16	7	13	20	16	1	3	20	12	3	15	15	4	19	
6	Office	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mid-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Restaurant	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Existing Area Trips	20 emp			80	0	0	0	8	0	0	0	2	6	8	2	6	8	9	0	0	0	7	2	9	7	2	9
	Internal Trips				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Net New Trips Subtotal				-80	0	0	0	-8	0	0	0	-2	-6	-8	-2	-6	-8	-9	0	0	0	-7	-2	-9	-7	-2	-9	
7	Office	8,000 sf			80	4	13	97	11	1	2	14	2	8	10	2	10	12	11	1	2	14	9	1	10	11	1	12
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mid-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	4,000 sf			159	10	37	206	15	1	3	19	6	7	13	7	8	15	3	0	1	4	2	1	3	2	2	4
	Restaurant	1,000 sf			149	10	34	193	13	1	3	17	5	4	9	7	4	11	13	1	3	17	5	4	9	6	6	12
	Existing Area Trips	0 emp			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Internal Trips				48	3	12	63	5	0	1	6	2	2	4	1	1	2	3	0	1	4	1	1	2	0	1	1
Net New Trips Subtotal				340	21	72	433	34	3	7	44	11	17	28	15	21	36	24	2	5	31	15	5	20	19	8	27	
8	Office	20,000 sf			198	10	34	242	28	1	5	34	4	21	25	5	25	30	28	1	5	34	22	3	25	27	4	31
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	20 du			122	8	28	158	11	1	2	14	6	3	9	8	4	12	10	1	2	13	2	6	8	2	8	10
	Mid-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	8,000 sf			317	21	74	412	28	2	7	37	11	12	23	14	16	30	6	0	2	8	3	2	5	5	3	8
	Restaurant	2,000 sf			298	19	70	387	27	2	6	35	11	7	18	13	9	22	27	2	6	35	9	9	18	12	11	23
	Existing Area Trips	0 emp			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Internal Trips				117	8	29	154	12	1	3	16	5	5	10	3	3	6	7	0	2	9	3	3	6	2	2	4
Net New Trips Subtotal				818	50	177	1,045	82	5	17	104	27	38	65	37	51	88	64	4	13	81	33	17	50	44	24	68	
9	Office	15,000 sf			149	7	26	182	21	1	3	25	3	16	19	4	18	22	21	1	3	25	17	2	19	20	3	23
	Institutional	0 sf			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	85,000 sf			583	28	100	711	82	4	14	100	8	55	63	10	73	83	75	4	13	92	51	7	58	69	9	78
	Low-Rise	21 du			129	8	31	168	12	1	2	15	7	3	10	8	5	13	10	1	2	13	2	6	8	2	9	11
	Mid-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								

TAZ /					Daily Person Trips				PM Peak Hour Person Trips				PM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips			AM Peak Hour Person Trips				AM Peak Hour Vehicle Trips			AM Peak Hour Vehicle Trips		
					By Mode				By Mode				Based on Person Trips			Based on ITE			By Mode				Based on Person Trips			Based on ITE		
Area	Land Use	Size	Units		Auto	Transit	Walk/ Bike/Other	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total
<u>Sub-Total Project Trips</u>																												
	Office	263,000 sf			2,612	127	447	3,186	367	18	61	446	56	277	333	67	324	391	367	18	61	446	293	40	333	358	49	407
	Institutional	285,000 sf			2,084	102	356	2,542	271	13	46	330	37	209	246	46	262	308	312	15	54	381	236	48	284	293	60	353
	Light Industrial	310,000 sf			2,125	103	364	2,592	298	15	50	363	28	201	229	37	267	304	276	14	47	337	187	26	213	251	34	285
	Low-Rise	595 du			3,693	240	863	4,796	333	22	77	432	181	96	277	240	129	369	295	20	68	383	50	196	246	62	242	304
	Mid-Rise	63 du			388	25	91	504	35	2	8	45	19	10	29	25	14	39	31	2	7	40	5	21	26	6	26	32
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Retail	62,400 sf			2,475	161	579	3,215	222	14	53	289	88	97	185	111	123	234	50	2	12	64	27	16	43	40	24	64
	Restaurant	17,850 sf			2,656	172	622	3,450	239	16	55	310	96	62	158	118	77	195	239	16	55	310	82	76	158	107	99	206
	Boat Launch	460 berths			1,879	41	122	2,042	113	2	8	123	45	30	75	52	35	87	56	1	4	61	12	25	37	12	25	37
Total Project Trips					17,912	971	3,444	22,327	1,878	102	358	2,338	550	982	1,532	696	1,231	1,927	1,626	88	308	2,022	892	448	1,340	1,129	559	1,688
<u>Sub-Total Trip Reductions</u>																												
	Existing Area Trips	645 emp			2,760	0	0	0	276	0	0	0	59	217	276	59	217	276	286	0	0	0	236	50	286	236	50	286
	Internal Trips				2,232	135	482	2,849	232	14	48	294	101	100	201	59	58	117	170	9	35	214	75	74	149	42	40	82
<u>Net New Project Trips</u>					12,920	836	2,962	19,478	1,370	88	310	2,044	390	665	1,055	578	956	1,534	1,170	79	273	1,808	581	324	905	851	469	1,320

Mode Split and Occupancy									
Mode	Census	Comp Plan		Office/					
		2022	Average	Institutional	Light Ind	Residential	Retail	Restaurant	Marina
Auto	84%	75%	79%	80%	80%	75%	75%	75%	90%
Transit	4%	6%	5%	5%	5%	6%	5%	5%	5%
Walk/Bike/									
Other	12%	19%	16%	15%	15%	19%	20%	20%	5%
AVO	1.08		1.30	1.1	1.3	1.2	1.2	1.52	1.5

Calculation of Daily Person Trip Rates			
Land Use	Vehicle	AVO	Person
Office	11.01	1.10	12.11
Institutional	8.11	1.10	8.92
Light Industrial	6.97	1.30	8.36
Low-Rise	6.72	1.20	8.06
Mid-Rise	6.72	1.20	8.06
High-Rise	6.72	1.20	8.06
Retail	42.94	1.20	51.53
Restaurant	127.15	1.52	193.27
Boat Launch	2.96	1.5	4.44

Percent of Daily Trips During Peak Hours		
Land Use	PM	AM
Office	14%	14%
Institutional	13%	15%
Light Industrial	14%	13%
Low-Rise	9%	8%
Mid-Rise	9%	8%
High-Rise	9%	8%
Retail	9%	2%
Restaurant	9%	9%
Marina	6%	3%

ITE Vehicle Trip Rates		
Land Use	PM	AM
Office	1.49	1.55
R&D	1.08	1.24
Light Industrial	0.98	0.92
Low-Rise	0.62	0.51
Mid-Rise	0.62	0.51
High-Rise	0.62	0.51
Retail	3.75	1.03
Restaurant	10.92	11.52
Marina	0.19	0.08

Note: Based on ratio of ITE daily trip rate to peak hour trip rate.

TAZ /	Daily Person Trips By Mode					PM Peak Hour Person Trips By Mode				PM Peak Hour Vehicle Trips Based on Person Trips			PM Peak Hour Vehicle Trips Based on ITE			AM Peak Hour Person Trips By Mode				AM Peak Hour Vehicle Trips Based on Person Trips			AM Peak Hour Vehicle Trips Based on ITE				
Area	Land Use	Size	Units	Auto	Transit	Walk/ Bike/Other	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total
1	Office	85,000 sf		823	51	155	1,029	115	7	22	144	18	87	105	22	105	127	115	7	22	144	92	13	105	116	16	132
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	365,000 sf		2,441	153	457	3,051	342	21	64	427	32	231	263	43	315	358	318	20	59	397	216	29	245	296	40	336
	Low-Rise	375 du		2,267	181	575	3,023	204	16	52	272	111	59	170	151	82	233	182	15	45	242	30	122	152	38	153	191
	Mid-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	50,000 sf		1,933	129	515	2,577	174	12	46	232	70	75	145	90	98	188	39	3	10	52	20	13	33	32	20	52
	Restaurant	10,000 sf		1,450	97	386	1,933	131	9	34	174	52	34	86	66	43	109	131	9	34	174	45	41	86	60	55	115
	Boat Launch	460 berths		1,838	102	102	2,042	111	6	6	123	44	30	74	52	35	87	55	3	3	61	12	25	37	12	25	37
	Existing Area Trips	353 emp		1,480	0	0	0	148	0	0	0	31	117	148	31	117	148	155	0	0	0	129	26	155	129	26	155
	Internal Trips			1,580	110	349	2,039	151	10	34	195	61	61	122	43	42	85	99	7	21	127	41	40	81	26	26	52
Net New Trips Subtotal			7,692	603	1,841	11,616	778	61	190	1,177	235	338	573	350	519	869	586	50	152	943	245	177	422	399	257	656	
2	Office	200,000 sf		1,938	121	363	2,422	271	17	51	339	42	204	246	51	247	298	271	17	51	339	216	30	246	273	37	310
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	167 du		1,007	81	255	1,343	91	7	23	121	49	27	76	67	36	103	80	6	21	107	13	54	67	17	68	85
	Mid-Rise	258 du		1,562	125	395	2,082	140	11	36	187	76	41	117	104	56	160	125	10	32	167	21	83	104	26	106	132
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	30,000 sf		1,160	77	309	1,546	104	7	28	139	42	45	87	54	59	113	23	2	6	31	12	7	19	19	12	31
	Restaurant	10,000 sf		1,450	97	386	1,933	131	9	34	174	52	34	86	66	43	109	131	9	34	174	45	41	86	60	55	115
	Existing Area Trips	230 emp		970	0	0	0	97	0	0	0	20	77	97	20	77	97	101	0	0	0	84	17	101	84	17	101
	Internal Trips			1,046	78	272	1,396	103	7	26	136	44	44	88	30	31	61	74	5	18	97	32	32	64	20	20	40
	Net New Trips Subtotal			5,101	423	1,436	7,930	537	44	146	824	197	230	427	292	333	625	455	39	126	721	191	166	357	291	241	532
3	Office	150,000 sf		1,454	91	272	1,817	203	13	38	254	31	154	185	38	186	224	203	13	38	254	163	22	185	205	28	233
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mid-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Restaurant	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Existing Area Trips	0 emp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Internal Trips			214	14	43	271	28	2	6	36	13	14	27	9	8	17	24	2	5	31	12	12	23	7	7	14
	Net New Trips Subtotal			1,240	77	229	1,546	175	11	32	218	18	140	158	29	178	207	179	11	33	223	151	10	162	198	21	219
4	Office	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Institutional	570,000 sf		4,067	254	763	5,084	529	33	99	661	72	409	481	92	524	616	610	38	115	763	461	94	555	587	120	707
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mid-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Restaurant	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Existing Area Trips	0 emp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Internal Trips			598	39	121	758	74	5	15	94	35	34	69	24	24	48	72	5	14	91	34	34	68	21	21	42
	Net New Trips Subtotal			3,469	215	642	4,326	455	28	84	567	37	375	412	68	500	568	538	33	101	672	427	60	487	566	99	666

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TAZ /					Daily Person Trips				PM Peak Hour Person Trips				PM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips			AM Peak Hour Person Trips				AM Peak Hour Vehicle Trips			AM Peak Hour Vehicle Trips		
					By Mode				By Mode				Based on Person Trips			Based on ITE			By Mode				Based on Person Trips			Based on ITE		
Area	Land Use	Size	Units		Auto	Transit	Walk/ Bike/Other	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total	Auto	Transit	Walk/ Bike/Other	Total	In	Out	Total	In	Out	Total
<u>Sub-Total Project Trips</u>																												
	Office	1,130,000 sf			10,950	684	2,052	13,686	1,532	97	287	1,916	237	1,157	1,394	287	1,398	1,685	1,532	97	287	1,916	1,226	168	1,394	1,542	211	1,753
	Institutional	570,000 sf			4,067	254	763	5,084	529	33	99	661	72	409	481	92	524	616	610	38	115	763	461	94	555	587	120	707
	Light Industrial	450,000 sf			3,010	189	563	3,762	422	26	79	527	39	286	325	53	388	441	392	25	72	489	266	36	302	365	49	414
	Low-Rise	1,067 du			6,448	516	1,634	8,598	581	46	146	773	316	169	485	430	232	662	517	41	129	687	86	345	431	109	436	545
	Mid-Rise	258 du			1,562	125	395	2,082	140	11	36	187	76	41	117	104	56	160	125	10	32	167	21	83	104	26	106	132
	High-Rise	0 du			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Retail	214,500 sf			8,293	553	2,209	11,055	746	50	199	995	299	322	621	386	420	806	167	11	44	222	86	53	139	136	86	222
	Restaurant	45,500 sf			6,597	440	1,757	8,794	594	40	157	791	236	154	390	301	195	496	594	40	157	791	203	187	390	273	251	524
	Boat Launch	460 berths			1,838	102	102	2,042	111	6	6	123	44	30	74	52	35	87	55	3	3	61	12	25	37	12	25	37
Total Project Trips					42,765	2,863	9,475	55,103	4,655	309	1,009	5,973	1,319	2,568	3,887	1,705	3,248	4,953	3,992	265	839	5,096	2,361	991	3,352	3,050	1,284	4,334
<u>Sub-Total Trip Reductions</u>																												
	Existing Area Trips	645 emp			2,760	0	0	0	276	0	0	0	59	217	276	59	217	276	286	0	0	0	236	50	286	236	50	286
	Internal Trips				6,284	443	1,508	8,235	651	45	152	848	281	280	561	191	192	383	472	33	104	609	207	206	412	128	130	258
<u>Net New Project Trips</u>					33,721	2,420	7,967	46,868	3,728	264	857	5,125	979	2,071	3,050	1,455	2,839	4,294	3,234	232	735	4,487	1,918	735	2,654	2,686	1,104	3,790

Appendix N-5: Parking Calculations

Parking Demand based on Rates from ITE and Shared Parking																							
ITE #	Land Use	ITE Rate	Units	% Reduction	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 AM
701	Office	2.40	ksf		3%	20%	68%	90%	96%	95%	94%	96%	100%	99%	92%	62%	25%	10%	7%	3%	1%	0%	0%
110/130	Industrial / Warehouse	0.75	ksf		55%	55%	82%	88%	89%	90%	92%	97%	100%	95%	77%	62%	25%	10%	7%	3%	1%	0%	0%
420	Marina	0.27	slips		9%	16%	31%	38%	34%	38%	78%	94%	94%	78%	75%	100%	94%	78%	47%	47%	6%	6%	6%

Area	Land Use	Size	Units	Demand	Shared Parking Demand																		
					6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM	12:00 AM
1	Light Industrial	179,386 sf		135	4	27	92	122	130	128	127	130	135	134	124	84	34	14	9	4	1	0	0
	Marina	600 slips		162	15	26	50	62	55	62	126	152	152	126	122	162	152	126	76	76	10	10	10
	Total			297	19	53	142	184	185	190	253	282	287	260	246	246	186	140	85	80	11	10	10
2,3,5	Office	5,800 sf		14	0	3	10	13	13	13	13	13	14	14	13	9	4	1	1	0	0	0	0
	Light Industrial	371,399 sf		278	8	56	189	250	267	264	261	267	278	275	256	172	70	28	19	8	3	0	0
	Total			292	8	59	199	263	280	277	274	280	292	289	269	181	74	29	20	8	3	0	0
4,6,7,8	Light Industrial	350,456 sf		263	8	53	179	237	252	250	247	252	263	260	242	163	66	26	18	8	3	0	0
9	Office	16,622 sf		40	1	8	27	36	38	38	38	38	40	40	37	25	10	4	3	1	0	0	0
	Light Industrial	143,291 sf		107	3	21	73	96	103	102	101	103	107	106	98	66	27	11	7	3	1	0	0
	Total			147	4	29	100	132	141	140	139	141	147	146	135	91	37	15	10	4	1	0	0
10	Light Industrial	30,575 sf		23	1	5	16	21	22	22	22	22	23	23	21	14	6	2	2	1	0	0	0
	Grand Total			1,022	40	199	636	837	880	879	935	977	1,012	978	913	695	369	212	135	101	18	10	10

Summary of Parking Demand and Supply												
Parking Area	Demand		Supply				Recommended Supply Range		Surplus / Deficiency Range (with Proposed Parking Only)		Surplus / Deficiency Range (with On-Street Parking)	
	ITE Maximum	Shared Parking Maximum Hourly	Proposed Parking	Available On-Street	Total Supply	Proposed Practical Supply						
1	297	287	516	316	832	2.90	316	330	201	186	517	502
2,3,5	292	292	352	159	511	1.75	321	336	31	16	190	175
4,6,7,8	263	263	350	98	448	1.71	289	302	61	48	159	146
9	147	147	174		174	1.18	162	169	12	5	12	5
10	23	23	31		31	1.33	25	26	5	4	5	4
Total	1,022	1,012	1,423	573	1,996	1.97	1,113	1,164	310	259	883	832

Parking Demand based on Rates from ITE and Shared Parking																							
ITE #	Land Use	ITE Rate	Units	% Reduction	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 AM
701	Office	2.40	ksf		3%	20%	68%	90%	96%	95%	94%	96%	100%	99%	92%	62%	25%	10%	7%	3%	1%	0%	0%
110/130	Industrial / Warehouse	0.75	ksf		55%	55%	82%	88%	89%	90%	92%	97%	100%	95%	77%	62%	25%	10%	7%	3%	1%	0%	0%
420	Marina	0.27	slips		9%	16%	31%	38%	34%	38%	78%	94%	94%	78%	75%	100%	94%	78%	47%	47%	6%	6%	6%

Area	Land Use	Size	Units	Demand	Shared Parking Demand																		
					6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM	12:00 AM
1	Light Industrial	395,858 sf		297	9	59	202	267	285	282	279	285	297	294	273	184	74	30	21	9	3	0	0
	Marina	600 slips		162	15	26	50	62	55	62	126	152	152	126	122	162	152	126	76	76	10	10	10
	Total			459	24	85	252	329	340	344	405	437	449	420	395	346	226	156	97	85	13	10	10
2,3,5	Office	5,800 sf		14	0	3	10	13	13	13	13	13	14	14	13	9	4	1	1	0	0	0	0
	Light Industrial	786,479 sf		590	18	118	401	531	566	561	555	566	590	584	543	366	148	59	41	18	6	0	0
	Total			604	18	121	411	544	579	574	568	579	604	598	556	375	152	60	42	18	6	0	0
4,6,7,8	Light Industrial	640,556 sf		481	14	96	327	433	462	457	452	462	481	476	443	298	120	48	34	14	5	0	0
9	Office	18,635 sf		45	1	9	31	41	43	43	42	43	45	45	41	28	11	5	3	1	0	0	0
	Light Industrial	286,581 sf		215	6	43	146	194	206	204	202	206	215	213	198	133	54	22	15	6	2	0	0
	Total			260	7	52	177	235	249	247	244	249	260	258	239	161	65	27	18	7	2	0	0
10	Light Industrial	61,149 sf		46	1	9	31	41	44	44	43	44	46	46	42	29	12	5	3	1	0	0	0
	Grand Total			1,850	64	363	1,198	1,582	1,674	1,666	1,712	1,771	1,840	1,798	1,675	1,209	575	296	194	125	26	10	10

Summary of Parking Demand and Supply												
Parking Area	Demand		Supply				Recommended Supply Range		Surplus / Deficiency Range (with Proposed Parking Only)		Surplus / Deficiency Range (with On-Street Parking)	
	ITE Maximum	Shared Parking Maximum Hourly	Proposed Parking	Available On-Street	Total Supply	Proposed Practical Supply						
1	459	449	733	316	1,049	2.34	494	516	239	217	555	533
2,3,5	604	604	746	159	905	1.50	664	695	82	52	241	211
4,6,7,8	481	481	641	98	739	1.54	529	553	111	87	209	185
9	260	260	305		305	1.17	286	299	19	6	19	6
10	46	46	61		61	1.33	51	53	11	8	11	8
Total	1,850	1,840	2,486	573	3,059	1.66	2,024	2,116	462	370	1,035	943

Parking Demand based on Rates from ITE and Shared Parking																								
ITE #	Land Use	ITE Rate	Units	% Reduction	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 AM	
701	Office	2.40	ksf		3%	20%	68%	90%	96%	95%	94%	96%	100%	99%	92%	62%	25%	10%	7%	3%	1%	0%	0%	
701	Research / Institutional	2.40	ksf		3%	20%	68%	90%	96%	95%	94%	96%	100%	99%	92%	62%	25%	10%	7%	3%	1%	0%	0%	
110/130	Industrial / Warehouse	0.75	ksf		55%	55%	82%	88%	89%	90%	92%	97%	100%	95%	77%	62%	25%	10%	7%	3%	1%	0%	0%	
230/221	Residential - Assigned	1.00	du		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
230/221	Residential - Uassigned	0.46	du		92%	74%	64%	55%	50%	45%	40%	45%	45%	45%	44%	59%	69%	66%	75%	77%	92%	94%	100%	
820	Retail	2.65	ksf	10%	1%	5%	16%	34%	48%	77%	90%	88%	82%	77%	73%	51%	62%	74%	63%	38%	9%	12%	0%	
931/932	Restaurant	10.48	ksf	10%	22%	38%	49%	66%	73%	90%	90%	90%	46%	36%	36%	71%	73%	56%	57%	54%	41%	38%	32%	
420	Marina	0.27	slips		9%	16%	31%	38%	34%	38%	78%	94%	94%	78%	75%	100%	94%	78%	47%	47%	6%	6%	6%	
					Shared Parking Demand																			
Area	Land Use	Size	Units	Demand	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM	12:00 AM	
1	Office	371,000 sf		890	27	178	605	801	854	846	837	854	890	881	819	552	223	89	62	27	9	0	0	
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Light Industrial	225,000 sf		169	5	34	115	152	162	161	159	162	169	167	155	105	42	17	12	5	2	0		
	Low-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Mid-Rise	867 du		1,265	1,233	1,162	1,122	1,086	1,066	1,046	1,026	1,046	1,046	1,042	1,102	1,142	1,130	1,166	1,174	1,233	1,241	1,265		
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Retail	68,000 sf		180	2	9	29	61	86	139	162	158	148	139	131	92	112	133	113	68	16	22		
	Restaurant	20,000 sf		210	46	80	103	139	153	189	189	189	97	76	76	149	153	118	120	113	86	80		
	Marina	460 slips		124	11	20	38	47	42	47	97	117	117	97	93	124	117	97	58	58	7	7		
Total					2,838	1,324	1,483	2,012	2,286	2,363	2,428	2,470	2,526	2,467	2,406	2,316	2,124	1,789	1,584	1,531	1,445	1,353	1,350	
2,3,5	Office	197,000 sf		473	14	95	322	426	454	449	445	454	473	468	435	293	118	47	33	14	5	0		
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Low-Rise	103 du		151	147	139	134	129	127	125	122	125	125	125	124	131	136	135	139	140	147	148		
	Mid-Rise	142 du		207	202	190	183	178	174	171	168	171	171	171	170	180	187	185	191	192	202	203		
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Retail	19,500 sf		52	1	3	8	18	25	40	47	46	43	40	38	27	32	38	33	20	5	6		
	Restaurant	6,000 sf		62	14	24	30	41	45	56	56	56	29	22	22	44	45	35	35	33	25	24		
	Total					945	378	451	677	792	825	841	838	852	841	826	789	675	518	440	431	399	384	
4,6,7,8	Office	58,000 sf		139	4	28	95	125	133	132	131	133	139	138	128	86	35	14	10	4	1	0		
	Institutional	285,000 sf		684	21	137	465	616	657	650	643	657	684	677	629	424	171	68	48	21	7	0		
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Low-Rise	50 du		73	71	67	65	63	62	60	59	60	60	60	60	64	66	65	67	68	71	72		
	Mid-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Retail	16,000 sf		42	0	2	7	14	20	32	38	37	34	32	31	21	26	31	26	16	4	5		
	Restaurant	4,000 sf		42	9	16	21	28	31	38	38	38	19	15	15	30	31	24	24	23	17	16		
	Total					980	105	250	653	846	903	912	909	925	936	922	863	625	329	202	175	132		
9	Office	65,000 sf		156	5	31	106	140	150	148	147	150	156	154	144	97	39	16	11	5	2	0		
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Light Industrial	85,000 sf		64	2	13	44	58	61	61	60	61	64	63	59	40	16	6	4	2	1	0		
	Low-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Mid-Rise	31 du		46	44	42	40	39	38	38	37	38	38	38	38	40	41	41	42	42	44	45		
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Retail	5,000 sf		13	0	1	2	4	6	10	12	11	11	10	9	7	8	10	8	5	1	2		
	Restaurant	2,500 sf		26	6	10	13	17	19	23	23	23	12	9	9	18	19	15	15	14	11	10		
	Total					305	57	97	205	258	274	280	279	283	281	274	259	202	123	88	80	68		
10	Office	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Low-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Mid-Rise	417 du		608	593	559	539	522	513	503	493	503	503	503	501	530	549	543	560	564	593	597		
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Retail	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Restaurant	10,000 sf		105	23	40	51	69	77	95	95	95	48	38	38	75	77	59	60	57	43	40		
	Total					713	616	599	590	591	590	598	588	598	551	541	539	605	626	602	620	621		
Grand Total					5,781	2,480	2,880	4,137	4,773	4,955	5,059	5,084	5,184	5,076	4,969	4,766	4,231	3,385	2,916	2,837	2,665	2,532		

Summary of Parking Demand and Supply										
Parking Area	Demand		Supply							
	ITE Maximum	Shared Parking Maximum Hourly	Proposed Parking	Available On-Street	Total Supply	Proposed Practical Supply	Recommended Supply Range		Surplus / Deficiency Range (with Proposed Parking Only)	Surplus / Deficiency Range (with On-Street Parking)
1	2,838	2,526	3,530	316	3,846	1.52	2,779	2,905	751	625
2,3,5	945	852	1,109	159	1,268	1.49	937	980	171	129
4,6,7,8	980	936	894	98	992	1.06	1,030	1,076	-136	-182
9	305	283	359		359	1.27	311	325	47	33
10	713	642	780		780	1.21	706	738	74	42
Total	5,781	5,239	6,671	573	7,244	1.38	5,763	6,025	908	646

Parking Demand based on Rates from ITE and Shared Parking																								
ITE #	Land Use	ITE Rate	Units	% Reduction	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 AM	
701	Office	2.40	ksf		3%	20%	68%	90%	96%	95%	94%	96%	100%	99%	92%	62%	25%	10%	7%	3%	1%	0%	0%	
701	Research / Institutional	2.40	ksf		3%	20%	68%	90%	96%	95%	94%	96%	100%	99%	92%	62%	25%	10%	7%	3%	1%	0%	0%	
110/130	Industrial / Warehouse	0.75	ksf		55%	55%	82%	88%	89%	90%	92%	97%	100%	95%	77%	62%	25%	10%	7%	3%	1%	0%	0%	
230/221	Residential - Assigned	1.00	du		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
	Residential - Uassigned	0.46	du		92%	74%	64%	55%	50%	45%	40%	45%	45%	45%	44%	59%	69%	66%	75%	77%	92%	94%	100%	
820	Retail	2.65	ksf	10%	1%	5%	16%	34%	48%	77%	90%	88%	82%	77%	73%	51%	62%	74%	63%	38%	9%	12%	0%	
931/932	Restaurant	10.48	ksf	10%	22%	38%	49%	66%	73%	90%	90%	90%	46%	36%	36%	71%	73%	56%	57%	54%	41%	38%	32%	
420	Marina	0.27	slips		9%	16%	31%	38%	34%	38%	78%	94%	94%	78%	75%	100%	94%	78%	47%	47%	6%	6%	6%	
					Shared Parking Demand																			
Area	Land Use	Size	Units	Demand	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM	12:00 AM	
1	Office	380,000 sf		912	27	182	620	821	876	866	857	876	912	903	839	565	228	91	64	27	9	0	0	
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	365,000 sf		274	8	55	186	247	263	260	258	263	274	271	252	170	69	27	19	8	3	0	0	
	Low-Rise	91 du		133	129	122	118	114	112	110	108	110	110	110	109	115	120	118	122	123	129	130	133	
	Mid-Rise	993 du		1,449	1,413	1,330	1,285	1,244	1,221	1,198	1,175	1,198	1,198	1,198	1,193	1,262	1,308	1,294	1,335	1,344	1,413	1,422	1,449	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	80,000 sf		212	2	11	34	72	102	163	191	187	174	163	155	108	131	157	134	81	19	25	0	
	Restaurant	30,000 sf		314	69	119	154	207	229	283	283	283	144	113	113	223	229	176	179	170	129	119	100	
	Marina	460 slips		124	11	20	38	47	42	47	97	117	117	97	93	124	117	97	58	58	7	7	7	
Total					3,418	1,659	1,839	2,435	2,752	2,845	2,927	2,969	3,034	2,929	2,855	2,754	2,567	2,202	1,960	1,911	1,811	1,709	1,703	1,689
2,3,5	Office	970,000 sf		2,328	70	466	1,583	2,095	2,235	2,212	2,188	2,235	2,328	2,305	2,142	1,443	582	233	163	70	23	0	0	
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	63 du		91	89	84	81	78	77	75	74	75	75	75	75	79	82	81	84	85	89	90	91	
	Mid-Rise	388 du		566	551	519	502	486	477	468	459	468	468	468	466	493	510	505	521	525	551	555	566	
	High-Rise	500 du		730	712	670	647	627	615	604	592	604	604	604	601	636	659	652	673	677	712	716	730	
	Retail	90,000 sf		239	2	12	38	81	115	184	215	210	196	184	174	122	148	177	151	91	22	29	0	
	Restaurant	15,000 sf		157	35	60	77	104	115	141	141	141	72	57	57	111	115	88	89	85	64	60	50	
	Total					4,111	1,459	1,811	2,928	3,471	3,634	3,684	3,669	3,733	3,743	3,693	3,515	2,884	2,096	1,736	1,681	1,533	1,461	1,450
4,6,7,8	Office	480,000 sf		1,152	35	230	783	1,037	1,106	1,094	1,083	1,106	1,152	1,140	1,060	714	288	115	81	35	12	0	0	
	Institutional	570,000 sf		1,368	41	274	930	1,231	1,313	1,300	1,286	1,313	1,368	1,354	1,259	848	342	137	96	41	14	0	0	
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mid-Rise	500 du		730	712	670	647	627	615	604	592	604	604	604	601	636	659	652	673	677	712	716	730	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	165,000 sf		437	4	22	70	149	210	336	393	385	358	336	319	223	271	323	275	166	39	52	0	
	Restaurant	25,000 sf		262	58	100	128	173	191	236	236	236	121	94	94	186	191	147	149	141	107	100	84	
	Total					3,949	850	1,296	2,558	3,217	3,435	3,570	3,590	3,644	3,603	3,528	3,333	2,607	1,751	1,374	1,274	1,060	884	868
9	Office	515,000 sf		1,236	37	247	840	1,112	1,187	1,174	1,162	1,187	1,236	1,224	1,137	766	309	124	87	37	12	0	0	
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	85,000 sf		64	2	13	44	58	61	61	60	61	64	63	59	40	16	6	4	2	1	0	0	
	Low-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mid-Rise	125 du		183	178	168	162	157	154	151	148	151	151	151	150	159	165	163	168	169	178	179	183	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	20,000 sf		53	1	3	8	18	25	41	48	47	43	41	39	27	33	39	33	20	5	6	0	
	Restaurant	10,000 sf		105	23	40	51	69	77	95	95	95	48	38	38	75	77	59	60	57	43	40	34	
	Total					1,641	241	471	1,105	1,414	1,504	1,522	1,513	1,541	1,542	1,517	1,423	1,067	600	391	352	285	239	225
10	Office	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mid-Rise	417 du		608	593	559	539	522	513	503	493	503	503	503	501	530	549	543	560	564	593	597	608	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Restaurant	10,000 sf		105	23	40	51	69	77	95	95	95	48	38	38	75	77	59	60	57	43	40	34	
	Total					713	616	599	590	591	590	598	588	598	551	541	539	605	626	602	620	621	636	637
Grand Total				13,832	4,825	6,016	9,616	11,445	12,008	12,301	12,329	12,550	12,368	12,134	11,564	9,730	7,275	6,063	5,838	5,310	4,929	4,883	4,799	

Summary of Parking Demand and Supply										
Parking Area	Demand		Supply							
	ITE Maximum	Shared Parking Maximum Hourly	Proposed Parking	Available On-Street	Total Supply	Proposed Practical Supply	Recommended Supply Range		Surplus / Deficiency Range (with Proposed Parking Only)	Surplus / Deficiency Range (with On-Street Parking)
1	3,418	3,034	4,153	316	4,469	1.47	3,337	3,489	816	664
2,3,5	4,111	3,743	4,935	159	5,094	1.36	4,117	4,304	818	631
4,6,7,8	3,949	3,644	4,050	98	4,148	1.14	4,008	4,191	42	-141
9	1,641	1,542	1,945		1,945	1.26	1,696	1,773	249	172
10	713	642	780		780	1.21	706	738	74	42
Total	13,832	12,605	15,863	573	16,436	1.30	13,866	14,496	1,998	1,367

Parking Demand based on Rates from ITE and Shared Parking																								
ITE #	Land Use	ITE Rate	Units	% Reduction	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 AM	
701	Office	2.40	ksf		3%	20%	68%	90%	96%	95%	94%	96%	100%	99%	92%	62%	25%	10%	7%	3%	1%	0%	0%	
701	Research / Institutional	2.40	ksf		3%	20%	68%	90%	96%	95%	94%	96%	100%	99%	92%	62%	25%	10%	7%	3%	1%	0%	0%	
110/130	Industrial / Warehouse	0.75	ksf		55%	55%	82%	88%	89%	90%	92%	97%	100%	95%	77%	62%	25%	10%	7%	3%	1%	0%	0%	
230/221	Residential - Assigned	1.00	du		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
230/221	Residential - Uassigned	0.46	du		92%	74%	64%	55%	50%	45%	40%	45%	45%	45%	44%	59%	69%	66%	75%	77%	92%	94%	100%	
820	Retail	2.65	ksf	10%	1%	5%	16%	34%	48%	77%	90%	88%	82%	77%	73%	51%	62%	74%	63%	38%	9%	12%	0%	
931/932	Restaurant	10.48	ksf	10%	22%	38%	49%	66%	73%	90%	90%	90%	46%	36%	36%	71%	73%	56%	57%	54%	41%	38%	32%	
420	Marina	0.27	slips		9%	16%	31%	38%	34%	38%	78%	94%	94%	78%	75%	100%	94%	78%	47%	47%	6%	6%	6%	
					Shared Parking Demand																			
Area	Land Use	Size	Units	Demand	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM	12:00 AM	
1	Office	255,000 sf		612	18	122	416	551	588	581	575	588	612	606	563	379	153	61	43	18	6	0	0	
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	225,000 sf		169	5	34	115	152	162	161	159	162	169	167	155	105	42	17	12	5	2	0	0	
	Low-Rise	333 du		487	474	447	431	418	410	402	395	402	402	402	401	424	439	435	448	451	474	477	487	
	Mid-Rise	333 du		487	474	447	431	418	410	402	395	402	402	402	401	424	439	435	448	451	474	477	487	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	50,000 sf		133	1	7	21	45	64	102	120	117	109	102	97	68	82	98	84	51	12	16	0	
	Restaurant	22,000 sf		231	51	88	113	152	169	208	208	208	106	83	83	164	169	129	132	125	95	88	74	
	Marina	460 slips		124	11	20	38	47	42	47	97	117	117	97	93	124	117	97	58	58	7	7	7	
Total					2,243	1,034	1,165	1,565	1,783	1,845	1,903	1,949	1,996	1,917	1,859	1,793	1,688	1,441	1,272	1,225	1,159	1,070	1,065	1,055
2,3,5	Office	148,500 sf		356	11	71	242	320	342	338	335	342	356	352	328	221	89	36	25	11	4	0	0	
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	100 du		146	142	134	129	125	123	120	118	120	120	120	120	127	131	130	134	135	142	143	146	
	Mid-Rise	113 du		164	160	151	146	141	138	136	133	136	136	136	135	143	148	147	151	152	160	161	164	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	16,000 sf		42	0	2	7	14	20	32	38	37	34	32	31	21	26	31	26	16	4	5	0	
	Restaurant	8,000 sf		84	18	32	41	55	61	76	76	76	39	30	30	60	61	47	48	45	34	32	27	
	Total					792	331	390	565	655	684	702	700	711	685	670	644	572	455	391	384	359	344	341
4,6,7,8	Office	45,000 sf		108	3	22	73	97	104	103	102	104	108	107	99	67	27	11	8	3	1	0	0	
	Institutional	285,000 sf		684	21	137	465	616	657	650	643	657	684	677	629	424	171	68	48	21	7	0	0	
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	30 du		44	43	40	39	38	37	36	36	36	36	36	36	38	40	39	40	41	43	43	44	
	Mid-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	14,000 sf		37	0	2	6	13	18	28	33	33	30	28	27	19	23	27	23	14	3	4	0	
	Restaurant	3,500 sf		37	8	14	18	24	27	33	33	33	17	13	13	26	27	21	21	20	15	14	12	
	Total					910	75	215	601	788	843	850	847	863	875	861	804	574	288	166	140	99	69	61
9	Office	40,000 sf		96	3	19	65	86	92	91	90	92	96	95	88	60	24	10	7	3	1	0	0	
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	85,000 sf		64	2	13	44	58	61	61	60	61	64	63	59	40	16	6	4	2	1	0	0	
	Low-Rise	25 du		37	36	34	32	31	31	30	30	30	30	30	30	32	33	33	34	34	36	36	37	
	Mid-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	4,000 sf		11	0	1	2	4	5	8	10	10	9	8	8	6	7	8	7	4	1	1	0	
	Restaurant	1,000 sf		10	2	4	5	7	7	9	9	9	5	4	4	7	7	6	6	5	4	4	3	
	Total					218	43	71	148	186	196	199	202	204	200	189	145	87	63	58	48	43	41	40
10	Office	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mid-Rise	300 du		438	427	402	388	376	369	362	355	362	362	362	361	381	395	391	404	406	427	430	438	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	2,000 sf		5	0	0	1	2	2	4	5	4	4	4	4	3	3	4	3	2	0	1	0	
	Restaurant	5,000 sf		52	11	20	25	34	38	47	47	47	24	19	19	37	38	29	30	28	21	20	17	
	Total					495	438	422	414	412	409	413	407	413	390	385	384	421	436	424	437	436	448	451
Grand Total					4,658	1,921	2,263	3,293	3,824	3,977	4,067	4,102	4,185	4,071	3,975	3,814	3,400	2,707	2,316	2,244	2,101	1,974	1,959	1,943

Summary of Parking Demand and Supply										
Parking Area	Demand		Supply							
	ITE Maximum	Shared Parking Maximum Hourly	Proposed Parking	Available On-Street	Total Supply	Proposed Practical Supply	Recommended Supply Range		Surplus / Deficiency Range (with Proposed Parking Only)	Surplus / Deficiency Range (with On-Street Parking)
1	2,243	1,996	2,774	316	3,090	1.55	2,196	2,295	578	479
2,3,5	792	711	899	159	1,058	1.49	782	818	117	82
4,6,7,8	910	875	812	98	910	1.04	963	1,006	-151	-195
9	218	204	265		265	1.30	224	235	41	30
10	495	455	561		561	1.23	501	523	60	38
Total	4,658	4,241	5,311	573	5,884	1.39	4,665	4,877	646	434

Parking Demand based on Rates from ITE and Shared Parking																								
ITE #	Land Use	ITE Rate	Units	% Reduction	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 AM	
701	Office	2.40	ksf		3%	20%	68%	90%	96%	95%	94%	96%	100%	99%	92%	62%	25%	10%	7%	3%	1%	0%	0%	
701	Research / Institutional	2.40	ksf		3%	20%	68%	90%	96%	95%	94%	96%	100%	99%	92%	62%	25%	10%	7%	3%	1%	0%	0%	
110/130	Industrial / Warehouse	0.75	ksf		55%	55%	82%	88%	89%	90%	92%	97%	100%	95%	77%	62%	25%	10%	7%	3%	1%	0%	0%	
230/221	Residential - Assigned	1.00	du		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
230/221	Residential - Uassigned	0.46	du		92%	74%	64%	55%	50%	45%	40%	45%	45%	45%	44%	59%	69%	66%	75%	77%	92%	94%	100%	
820	Retail	2.65	ksf	10%	1%	5%	16%	34%	48%	77%	90%	88%	82%	77%	73%	51%	62%	74%	63%	38%	9%	12%	0%	
931/932	Restaurant	10.48	ksf	10%	22%	38%	49%	66%	73%	90%	90%	90%	46%	36%	36%	71%	73%	56%	57%	54%	41%	38%	32%	
420	Marina	0.27	slips		9%	16%	31%	38%	34%	38%	78%	94%	94%	78%	75%	100%	94%	78%	47%	47%	6%	6%	6%	
					Shared Parking Demand																			
Area	Land Use	Size	Units	Demand	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM	12:00 AM	
1	Office	235,000 sf		564	17	113	384	508	541	536	530	541	564	558	519	350	141	56	39	17	6	0	0	
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	365,000 sf		274	8	55	186	247	263	260	258	263	274	271	252	170	69	27	19	8	3	0	0	
	Low-Rise	333 du		487	474	447	431	418	410	402	395	402	402	402	401	424	439	435	448	451	474	477	487	
	Mid-Rise	500 du		730	712	670	647	627	615	604	592	604	604	604	601	636	659	652	673	677	712	716	730	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	70,000 sf		186	2	9	30	63	89	143	167	164	153	143	136	95	115	138	117	71	17	22	0	
	Restaurant	20,000 sf		210	46	80	103	139	153	189	189	189	97	76	76	149	153	118	120	113	86	80	67	
	Marina	460 slips		124	11	20	38	47	42	47	97	117	117	97	93	124	117	97	58	58	7	7	7	
Total					2,575	1,270	1,394	1,819	2,049	2,113	2,181	2,228	2,280	2,211	2,151	2,078	1,948	1,693	1,523	1,474	1,395	1,305	1,302	1,291
2,3,5	Office	685,000 sf		1,644	49	329	1,118	1,480	1,578	1,562	1,545	1,578	1,644	1,628	1,512	1,019	411	164	115	49	16	0	0	
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mid-Rise	358 du		523	510	480	464	449	441	433	424	433	433	433	431	456	472	467	482	485	510	513	523	
	High-Rise	458 du		669	652	614	593	574	564	553	543	553	553	551	583	604	597	616	621	652	657	669	669	
	Retail	80,000 sf		212	2	11	34	72	102	163	191	187	174	163	155	108	131	157	134	81	19	25	0	
	Restaurant	10,000 sf		105	23	40	51	69	77	95	95	95	48	38	38	75	77	59	60	57	43	40	34	
Total					3,153	1,236	1,474	2,260	2,644	2,762	2,806	2,798	2,846	2,852	2,815	2,687	2,241	1,695	1,444	1,407	1,293	1,240	1,235	1,226
4,6,7,8	Office	450,000 sf		1,080	32	216	734	972	1,037	1,026	1,015	1,037	1,080	1,069	994	670	270	108	76	32	11	0	0	
	Institutional	570,000 sf		1,368	41	274	930	1,231	1,313	1,300	1,286	1,313	1,368	1,354	1,259	848	342	137	96	41	14	0	0	
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	67 du		97	95	89	86	84	82	80	79	80	80	80	80	85	88	87	90	90	95	95	97	
	Mid-Rise	233 du		341	332	313	302	292	287	282	276	282	282	282	281	297	307	304	314	316	332	334	341	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	143,000 sf		379	4	19	61	129	182	292	341	334	311	292	277	193	235	280	239	144	34	45	0	
	Restaurant	25,000 sf		262	58	100	128	173	191	236	236	236	121	94	94	186	191	147	149	141	107	100	84	
Total					3,527	562	1,011	2,241	2,881	3,092	3,216	3,233	3,282	3,242	3,171	2,985	2,279	1,433	1,063	964	764	593	574	522
9	Office	415,000 sf		996	30	199	677	896	956	946	936	956	996	986	916	618	249	100	70	30	10	0	0	
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	85,000 sf		64	2	13	44	58	61	61	60	61	64	63	59	40	16	6	4	2	1	0	0	
	Low-Rise	100 du		146	142	134	129	125	123	121	118	121	121	121	120	127	132	130	135	135	142	143	146	
	Mid-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	15,000 sf		40	0	2	6	14	19	31	36	35	33	31	29	20	25	30	25	15	4	5	0	
	Restaurant	5,000 sf		52	11	20	25	34	38	47	47	47	24	19	19	37	38	29	30	28	21	20	17	
Total					1,298	185	368	881	1,127	1,197	1,206	1,197	1,220	1,238	1,220	1,143	842	460	295	264	210	178	168	163
10	Office	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mid-Rise	300 du		438	427	402	388	376	369	362	355	362	362	362	361	381	395	391	404	406	427	430	438	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	2,000 sf		5	0	0	1	2	2	4	5	4	4	4	4	3	3	4	3	2	0	1	0	
	Restaurant	5,000 sf		52	11	20	25	34	38	47	47	47	24	19	19	37	38	29	30	28	21	20	17	
Total					495	438	422	414	412	409	413	407	413	390	385	384	421	436	424	437	436	448	451	455
Grand Total				11,048	3,691	4,669	7,615	9,113	9,573	9,822	9,863	10,041	9,933	9,742	9,277	7,731	5,717	4,749	4,546	4,098	3,764	3,730	3,657	

Summary of Parking Demand and Supply										
Parking Area	Demand		Supply							
	ITE Maximum	Shared Parking Maximum Hourly	Proposed Parking	Available On-Street	Total Supply	Proposed Practical Supply	Recommended Supply Range		Surplus / Deficiency Range (with Proposed Parking Only)	Surplus / Deficiency Range (with On-Street Parking)
1	2,575	2,280	3,208	316	3,524	1.55	2,508	2,622	700	586
2,3,5	3,153	2,852	3,795	159	3,954	1.39	3,137	3,280	658	515
4,6,7,8	3,527	3,282	3,534	98	3,632	1.11	3,610	3,774	-76	-240
9	1,298	1,238	1,570		1,570	1.27	1,362	1,424	208	146
10	495	455	561		561	1.23	501	523	60	38
Total	11,048	10,107	12,668	573	13,241	1.31	11,118	11,623	1,550	1,045

Parking Demand based on Rates from ITE and Shared Parking																								
ITE #	Land Use	ITE Rate	Units	% Reduction	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 AM	
701	Office	2.40	ksf		3%	20%	68%	90%	96%	95%	94%	96%	100%	99%	92%	62%	25%	10%	7%	3%	1%	0%	0%	
701	Research / Institutional	2.40	ksf		3%	20%	68%	90%	96%	95%	94%	96%	100%	99%	92%	62%	25%	10%	7%	3%	1%	0%	0%	
110/130	Industrial / Warehouse	0.75	ksf		55%	55%	82%	88%	89%	90%	92%	97%	100%	95%	77%	62%	25%	10%	7%	3%	1%	0%	0%	
230/221	Residential - Assigned	1.00	du		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
	Residential - Uassigned	0.46	du		92%	74%	64%	55%	50%	45%	40%	45%	45%	45%	44%	59%	69%	66%	75%	77%	92%	94%	100%	
820	Retail	2.65	ksf	10%	1%	5%	16%	34%	48%	77%	90%	88%	82%	77%	73%	51%	62%	74%	63%	38%	9%	12%	0%	
931/932	Restaurant	10.48	ksf	10%	22%	38%	49%	66%	73%	90%	90%	90%	46%	36%	36%	71%	73%	56%	57%	54%	41%	38%	32%	
420	Marina	0.27	slips		9%	16%	31%	38%	34%	38%	78%	94%	94%	78%	75%	100%	94%	78%	47%	47%	6%	6%	6%	
					Shared Parking Demand																			
Area	Land Use	Size	Units	Demand	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM	12:00 AM	
1	Office	135,000 sf		324	10	65	220	292	311	308	305	311	324	321	298	201	81	32	23	10	3	0	0	
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	225,000 sf		169	5	34	115	152	162	161	159	162	169	167	155	105	42	17	12	5	2	0	0	
	Low-Rise	300 du		438	427	402	388	376	369	362	355	362	362	362	361	381	395	391	404	406	427	430	438	
	Mid-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	40,000 sf		106	1	5	17	36	51	82	95	93	87	82	77	54	66	78	67	40	10	13	0	
	Restaurant	8,000 sf		84	18	32	41	55	61	76	76	76	39	30	30	60	61	47	48	45	34	32	27	
	Marina	460 slips		124	11	20	38	47	42	47	97	117	117	97	93	124	117	97	58	58	7	7	7	
Total					1,245	472	558	819	958	996	1,036	1,087	1,121	1,098	1,059	1,014	925	762	662	612	564	483	482	472
2,3,5	Office	85,000 sf		204	6	41	139	184	196	194	192	196	204	202	188	126	51	20	14	6	2	0	0	
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	71 du		104	101	96	92	89	88	86	84	86	86	86	86	91	94	93	96	96	101	102	104	
	Mid-Rise	63 du		91	89	84	81	78	77	75	74	75	75	75	75	79	82	81	84	85	89	90	91	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	8,500 sf		22	0	1	4	7	11	17	20	19	18	17	16	11	14	16	14	8	2	3	0	
	Restaurant	4,000 sf		42	9	16	21	28	31	38	38	38	19	15	15	30	31	24	24	23	17	16	13	
	Total					463	205	238	337	386	403	410	408	414	402	395	380	337	272	234	232	218	211	211
4,6,7,8	Office	28,000 sf		67	2	13	46	60	64	64	63	64	67	66	62	42	17	7	5	2	1	0	0	
	Institutional	285,000 sf		684	21	137	465	616	657	650	643	657	684	677	629	424	171	68	48	21	7	0	0	
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	20 du		29	28	26	25	25	24	24	23	24	24	24	24	25	26	26	26	27	28	28	29	
	Mid-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	12,000 sf		32	0	2	5	11	15	25	29	28	26	25	23	16	20	24	20	12	3	4	0	
	Restaurant	3,000 sf		31	7	12	15	20	23	28	28	28	14	11	11	22	23	17	18	17	13	12	10	
	Total					843	58	190	556	732	783	791	786	801	815	803	749	529	257	142	117	79	52	44
9	Office	15,000 sf		36	1	7	24	32	35	34	34	35	36	36	33	22	9	4	3	1	0	0	0	
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	85,000 sf		64	2	13	44	58	61	61	60	61	64	63	59	40	16	6	4	2	1	0	0	
	Low-Rise	21 du		30	30	28	27	26	26	25	25	25	25	25	25	26	27	27	28	28	30	30	30	
	Mid-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	900 sf		2	0	0	0	1	1	2	2	2	2	2	1	1	1	1	1	1	0	0	0	
	Restaurant	350 sf		4	1	2	2	3	3	4	4	4	2	1	1	3	3	2	2	2	2	2	1	
	Total					136	34	50	97	120	126	126	125	127	129	127	119	92	56	40	38	34	33	32
10	Office	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Low-Rise	183 du		268	261	246	237	230	226	221	217	221	221	221	220	233	242	239	247	248	261	263	268	
	Mid-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Retail	1,000 sf		3	0	0	0	1	1	2	3	3	2	2	2	2	2	2	1	0	0	0	0	
	Restaurant	2,500 sf		26	6	10	13	17	19	23	23	23	12	9	9	18	19	15	15	14	11	10	8	
	Total					297	267	256	250	248	246	246	243	247	235	232	231	253	263	256	264	263	272	273
Grand Total					2,984	1,036	1,292	2,059	2,444	2,554	2,609	2,649	2,710	2,679	2,616	2,493	2,136	1,610	1,334	1,263	1,158	1,051	1,042	1,026

Summary of Parking Demand and Supply										
Parking Area	Demand		Supply							
	ITE Maximum	Shared Parking Maximum Hourly	Proposed Parking	Available On-Street	Total Supply	Proposed Practical Supply	Recommended Supply Range		Surplus / Deficiency Range	
1	1,245	1,121	1,682	316	1,998	1.78	1,233	1,289	449	393
2,3,5	463	414	533	159	692	1.67	455	476	78	57
4,6,7,8	843	815	734	98	832	1.02	897	937	-162	-203
9	136	129	171		171	1.33	142	148	29	23
10	297	276	341		341	1.23	304	317	37	23
Total	2,984	2,755	3,461	573	4,034	1.46	3,031	3,168	431	293

Parking Demand based on Rates from ITE and Shared Parking																							
ITE #	Land Use	ITE Rate	Units	% Reduction	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 AM
701	Office	2.40	ksf		3%	20%	68%	90%	96%	95%	94%	96%	100%	99%	92%	62%	25%	10%	7%	3%	1%	0%	0%
701	Research / Institutional	2.40	ksf		3%	20%	68%	90%	96%	95%	94%	96%	100%	99%	92%	62%	25%	10%	7%	3%	1%	0%	0%
110/130	Industrial / Warehouse	0.75	ksf		55%	55%	82%	88%	89%	90%	92%	97%	100%	95%	77%	62%	25%	10%	7%	3%	1%	0%	0%
230/221	Residential - Assigned	1.00	du		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Residential - Uassigned	0.46	du		92%	74%	64%	55%	50%	45%	40%	45%	45%	45%	44%	59%	69%	66%	75%	77%	92%	94%	100%
820	Retail	2.65	ksf	10%	1%	5%	16%	34%	48%	77%	90%	88%	82%	77%	73%	51%	62%	74%	63%	38%	9%	12%	0%
931/932	Restaurant	10.48	ksf	10%	22%	38%	49%	66%	73%	90%	90%	90%	46%	36%	36%	71%	73%	56%	57%	54%	41%	38%	32%
420	Marina	0.27	slips		9%	16%	31%	38%	34%	38%	78%	94%	94%	78%	75%	100%	94%	78%	47%	47%	6%	6%	6%
					Shared Parking Demand																		
Area	Land Use	Size	Units	Demand	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM	12:00 AM
1	Office	85,000 sf		204	6	41	139	184	196	194	192	196	204	202	188	126	51	20	14	6	2	0	0
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Light Industrial	365,000 sf		274	8	55	186	247	263	260	258	263	274	271	252	170	69	27	19	8	3	0	0
	Low-Rise	375 du		548	534	503	485	470	461	453	444	453	453	453	451	477	494	489	504	508	534	537	548
	Mid-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Retail	50,000 sf		133	1	7	21	45	64	102	120	117	109	102	97	68	82	98	84	51	12	16	0
	Restaurant	10,000 sf		105	23	40	51	69	77	95	95	95	48	38	38	75	77	59	60	57	43	40	34
	Marina	460 slips		124	11	20	38	47	42	47	97	117	117	97	93	124	117	97	58	58	7	7	7
	Total			1,388	583	666	920	1,062	1,103	1,151	1,206	1,241	1,205	1,163	1,119	1,040	890	790	739	688	601	600	589
2,3,5	Office	450,000 sf		1,080	32	216	734	972	1,037	1,026	1,015	1,037	1,080	1,069	994	670	270	108	76	32	11	0	0
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Low-Rise	229 du		335	326	307	297	287	282	277	271	277	277	277	276	291	302	299	308	310	326	328	335
	Mid-Rise	258 du		377	368	346	334	324	318	312	306	312	312	312	311	328	340	337	347	350	368	370	377
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Retail	35,000 sf		93	1	5	15	32	45	72	84	82	76	72	68	47	58	69	59	35	8	11	0
	Restaurant	10,000 sf		105	23	40	51	69	77	95	95	95	48	38	38	75	77	59	60	57	43	40	34
	Total			1,990	750	914	1,431	1,684	1,759	1,782	1,771	1,803	1,793	1,768	1,687	1,411	1,047	872	850	784	756	749	746
4,6,7,8	Office	280,000 sf		672	20	134	457	605	645	638	632	645	672	665	618	417	168	67	47	20	7	0	0
	Institutional	570,000 sf		1,368	41	274	930	1,231	1,313	1,300	1,286	1,313	1,368	1,354	1,259	848	342	137	96	41	14	0	0
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Low-Rise	196 du		286	279	262	253	245	241	236	232	236	236	236	235	249	258	255	263	265	279	281	286
	Mid-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Retail	123,500 sf		327	3	16	52	111	157	252	294	288	268	252	239	167	203	242	206	124	29	39	0
	Restaurant	23,000 sf		241	53	92	118	159	176	217	217	217	111	87	87	171	176	135	137	130	99	92	77
	Total			2,894	396	778	1,810	2,351	2,532	2,643	2,661	2,699	2,655	2,594	2,438	1,852	1,147	836	749	580	428	412	363
9	Office	315,000 sf		756	23	151	514	680	726	718	711	726	756	748	696	469	189	76	53	23	8	0	0
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Light Industrial	85,000 sf		64	2	13	44	58	61	61	60	61	64	63	59	40	16	6	4	2	1	0	0
	Low-Rise	83 du		122	119	112	108	104	103	101	99	101	101	101	100	106	110	109	112	113	119	119	122
	Mid-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Retail	5,000 sf		13	0	1	2	4	6	10	12	11	11	10	9	7	8	10	8	5	1	2	0
	Restaurant	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total			955	144	277	668	846	896	890	882	899	932	922	864	622	323	201	177	143	129	121	122
10	Office	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Institutional	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Light Industrial	0 sf		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Low-Rise	183 du		268	261	246	237	230	226	221	217	221	221	221	220	233	242	239	247	248	261	263	268
	Mid-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High-Rise	0 du		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Retail	1,000 sf		3	0	0	0	1	1	2	3	3	2	2	2	2	2	2	1	0	0	0	0
	Restaurant	2,500 sf		26	6	10	13	17	19	23	23	23	12	9	9	18	19	15	15	14	11	10	8
	Total			297	267	256	250	248	246	246	243	247	235	232	231	253	263	256	264	263	272	273	276
Grand Total				7,524	2,140	2,891	5,079	6,191	6,536	6,712	6,763	6,889	6,820	6,679	6,339	5,178	3,670	2,955	2,779	2,458	2,186	2,155	2,096

Summary of Parking Demand and Supply											
Parking Area	Demand		Supply						Surplus / Deficiency Range (with Proposed Parking Only)		Surplus / Deficiency Range (with On-Street Parking)
	ITE Maximum	Shared Parking Maximum Hourly	Proposed Parking	Available On-Street	Total Supply	Proposed Practical Supply	Recommended Supply Range				
1	1,388	1,241	1,843	316	2,159	1.74	1,365	1,427	478	416	794 732
2,3,5	1,990	1,803	2,363	159	2,522	1.40	1,983	2,073	379	289	538 448
4,6,7,8	2,894	2,699	2,772	98	2,870	1.06	2,969	3,104	-197	-332	-99 -234
9	955	932	1,195		1,195	1.28	1,025	1,072	170	123	170 123
10	297	276	341		341	1.23	304	317	37	23	37 23
Total	7,524	6,951	8,513	573	9,086	1.31	7,646	7,994	867	519	1,440 1,092