City of White Rock

INTEGRATED TRANSPORTATION & INFRASTRUCTURE MASTER PLAN

July 2022

WHITE ROCK
City by the Sea!

Report for

City of White Rock
877 Keil Street
White Rock, BC, Canada V4B 4V6

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Prepared by

Urban Systems
550-1090 Homer Street
Vancouver, BC V6B 2W9

URBAN SYSTEMS

CONTENTS

APPENDICES

LIST OF MAPS

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

The City of White Rock's **Integrated Transportation and Infrastructure Master Plan (ITIMP)** is a comprehensive multi-modal transportation master plan that will guide the City's transportation investments, municipal infrastructure improvements, capital expenditures, and decision making over the next twenty years and beyond. The Plan encourages walking as the first choice for short trips and cycling and transit use as the preferred choice for medium- and longer-distance trips to provide access to schools, local businesses, recreation facilities, and local and regional employment centres while also accommodating growth in vehicle traffic as required for economic growth and community development patterns. The ITIMP also ensures that transportation improvements coincide with other municipal infrastructure improvements projects (i.e., sewers, drainage, and water).

The ITIMP was developed over a five-phase process over the course of 2020-2022. The Plan was developed based on best practices from around the world as well as local expertise and public input to develop a plan that responds to how we live today and how we want to live in the future. This long-term plan represents the results of this technical work and engagement.

The ITIMP is composed of several interrelated layers that form the foundation for the Plan's long-term recommendations. It is designed to align with White Rock's City Council's **six Strategic Priorities**. The Plan then outlines a **vision**, **three guiding principles**, and **five goals** along with more detailed objectives that guide all aspects of the City's transportation network, emphasizing the safety, health, and well-being of all road users. To achieve the vision, goals, and objectives, the plan identifies **six big moves** that will make the greatest impact to achieving the vision and goals of the plan, as well as **13 strategies** and **36 actions**. Each of these components are summarized below.

STRATEGIC PRIORITIES

VISION

The community of White Rock appreciates walkability, accessibility, and safety complementing the unique seaside and hillside community.

The City will prioritize safety in all aspects of the transportation system and will develop a completed and connected network of walking, cycling, and transit facilities that connects the waterfront, the Town Centre, and residential neighbourhoods and that is comfortable for people of all ages and abilities, promoting and encouraging an active life to inspire a dynamic, sustainable community for current and future generations.

The City will ensure and improve the safety and efficiency of vehicle operations to provide mobility options for residents and visitors, and goods movement to support the local and regional economy.

3 GUIDING PRINCIPLES

Vision Zero	Complete Streets	Equity
The City is committed to measures that will work to eliminate all traffic fatalities and severe injuries, while ensuring safe, healthy, and equitable mobility for all.	The City is committed to developing a street network that serves more than just transportation, accommodating all road users and modes.	The City is committed to providing equitable and universally accessible mobility options for all residents and visitors of all ages and abilities. regardless of age, ability, gender, income, race, or other socio-demographic characteristics.

5 GOALS

1. Improved Safety
2. Improved Efficiency
3. Improved Environmental Outcomes
4. Increased Mobility Choices
5. Improved Health

6 BIG MOVES

1. The City of White Rock will adopt a Vision Zero strategy by 2022.
2. All streets within 100 metres of a transit stop will have sidewalks on both sides of the street by 2050.
3. White Rock will follow Complete Streets principles in its roadway design.
4. White Rock will have an All Ages and Abilities(AAA) bicycle network by 2030.
5. All bus stops in White Rock will be accessible by 2030.
6. Electric Vehicle Plug-in Stations will be available at all community facilities and at least 10 locations within the public right-of-way by 2030.

STRATEGIES

THEME 1 – Safe Streets

- **1.1** Adopt and implement a Vision Zero Strategy containing actionable and measurable road safety targets

THEME 2 – People-first Streets

- **2.1** Develop an expanded network of sidewalks and pathways to reduce barriers and create a more walkable city for people of all ages and abilities
- **2.2** Develop and design universally accessible streets
- **2.3** Create safe, welcoming, and comfortable places that attract pedestrians and make walking enjoyable

THEME 3 – Connected Streets

- **3.1** Update street classification network and design standards following complete streets principles
- **3.2** Improve intersections that have been identified as having safety, operational, or geometric issues
- **3.3** Enhance the transit user experience through improved service, passenger amenities, and accessible connections to transit
- **3.4** Develop a comfortable, complete, and connected cycling network to support local and regional cycling trips

THEME 4 – Dynamic Streets

- **4.1** Develop an integrated and multi-modal network to facilitate the safe and efficient movement of goods
- **4.2** Ensure residential parking appropriately allows residents to park without interrupting the safe movement of people
- **4.3** Focus on asset management and ensure the transportation system is in a state of good repair
- **4.4** Expect disruptive technologies and plan to accommodate new modes on the transportation network
- **4.5** Manage curb space to be flexible and dynamic

IMPLEMENTATION STRATEGY

The strategies and actions developed as part of the ITIMP are intended to guide White Rock's capital, operations, maintenance, policy, and programming decisions as well as on-going resource requirements over the next 20 years and beyond. While the Plan has been developed as a long-term plan, it will require financial investment, staff resources, and an implementation strategy to prioritize improvements over the short-, medium- and long-term. An implementation plan was developed based on both technical evaluation results as well as the results of public input.

The implementation plan was developed based on the following guiding principles:

- The ITIMP is one step towards implementing the vision for transportation in White Rock; it is not the last step.
- The ITIMP is a flexible and living document.
- The City should monitor, review, and update the ITIMP on a regular basis, as needed.
- The City will engage in further public consultation to implement the recommendations included in the ITIMP.
- The City should incorporate the short-term priorities into its 5-year Capital Plan, and a new investment strategy should be developed for the long-term.

Based on the capital costs presented for the high priority projects, the five-year capital implementation plan for the ITIMP includes approximately $5.5 million in transportation-related capital projects over the next five years. This represents just over $1 million in transportation-related capital projects per year. This includes approximately $2.3 million in sidewalk improvements, approximately $2.75 in road space reallocation and/or cycling network projects, and approximately $0.5 million in intersection improvements.

It should be emphasized that these costs can be shared by pursuing external funding from other levels of governments, partnerships with other organizations and the development industry, and integration of improvements with other plans and projects. This can help to reduce the City's share of project costs.

There are several strategies that the City may consider to help leverage its investments and to maximize its ability to implement transportation improvements. However, it is recognized that the external funding sources do not provide a consistent and stable funding stream, and that in order to ensure completion of projects identified in the ITIMP, consistent funding sources should be identified to help ensure staff can logically plan for improvements and coordinate these improvements with other capital works to provide economies of scale for construction activities providing best value for capital expenditures.

1 SETTING THE STAGE

The City of White Rock is a unique and vibrant seaside community on Semiahmoo Bay in the southwest corner of Metro Vancouver. The City, which was incorporated in 1957, now has a population of approximately 20,000 people. The City has a strong sense of place and community identity for both residents and visitors alike, with a popular waterfront promenade, scenic ocean views, unique Town Centre area, and highly livable residential neighbourhoods.

As White Rock grows, the City's transportation system must evolve and be designed to move everyone efficiently and comfortably, no matter how people choose to get to their destinations. This section introduces White Rock's Integrated Transportation & Infrastructure Master Plan (ITIMP) and the process undertaken to develop the plan that will shape White Rock's transportation decision-making over the next twenty years and beyond.

1.1 INTRODUCTION

With a total land area of approximately 5 square kilometres, White Rock is one of the most compact cities in Metro Vancouver. White Rock also has a well-developed transportation network, with a dense grid network of streets, sidewalks on most major streets, several east-west bicycle routes, and transit services throughout the community. This compact built form and existing transportation infrastructure makes it possible to use active and sustainable transportation for many daily transportation needs. It is also important to consider motor vehicle traffic, goods movement, and the management of parking, all of which is important to local economic and community development.

The City is home to unique demographics, with the highest proportion of older adults of any municipality in Metro Vancouver. The high proportion of seniors, along with the hilly topography, presents challenges to encouraging active transportation. However, this also highlights the importance of creating a multi-modal transportation system that is universally accessible and provides mobility options for people of all ages and abilities, especially people who may not have access to a motor vehicle and who may have reduced mobility.

As White Rock grows, the City's transportation system must evolve and be designed to move everyone efficiently and comfortably, no matter how people choose to get to their destinations. In order to optimize this transportation network and guide improvements over the next 20 years and beyond, the City has developed this ITIMP, a comprehensive update of the 2014 Strategic Transportation Plan (STP).

Since the 2014 STP was developed, there have been several significant changes in the City and surrounding region that influence the City's transportation system. The City completed an Official Community Plan (OCP) update in 2017 and OCP Amendment No. 2 adopted on July 12, 2021, setting the framework for this multi-modal ITIMP, with a number of policies related to walking, cycling, transit, goods movement, parking, and motor vehicles. The City is updating its Zoning Bylaw to be in alignment with the amended OCP. At the regional level, there have also been significant changes since 2014, as both TransLink and Metro Vancouver recently updated **Transport 2050**, Metro Vancouver's updated Regional Transportation Strategy and **Metro 2050**, Metro Vancouver's updated Regional Growth Strategy, respectively.

1.2 PLAN PURPOSE AND OVERVIEW

The ITIMP is a comprehensive multi-modal transportation plan that will guide the City's transportation investments, municipal infrastructure improvements, capital expenditures, and decision-making over the next twenty years and beyond. In addition to identifying ways to encourage walking, cycling, and transit use to schools, businesses, recreational facilities, and employment centres throughout the City, the Plan will ensure that transportation improvements coincide with other municipal infrastructure improvements projects (i.e., sewers, drainage, and water).

The ITIMP aims for an integrated transportation network that will efficiently handle a growing community. All aspects of the plan focus on road safety with an overarching commitment to Vision

Zero. The plan encourages walking as the first choice for short trips, cycling, and transit use for access to schools, local businesses, recreation facilities and local and regional employment centres while also accommodating growth in vehicle traffic as required for economic growth and community development patterns.

COVID-19 Considerations

The ITIMP was developed during the global COVID-19 outbreak. The COVID-19 pandemic drastically changed mobility patterns and has reshaped the way people use and travel through public spaces. The ITIMP considers these changing mobility needs and opportunities.

1.3 PLAN PROCESS

The ITIMP was developed over a five-phase process between 2020 and 2022 (see **Figure 1**). The Plan was developed based on best practices from around the world as well as local expertise and public input to develop a plan that responds to how we live today and how we want to live in the future.

- **Phase 1: Launching Project** involved collecting and reviewing relevant background information and data, conducting traffic counts, and developing the base travel demand model.
- **Phase 2: Defining Vision** involved preparing a detailed understanding of the City's existing transportation system, identifying current issues and opportunities for the road, transit, pedestrian, and cycling networks, as well as developing a shared vision for White Rock's transportation system.
- **Phase 3: Exploring Possibilities** involved exploring the possibilities for each mode of transportation individually before developing an integrated plan that reflects the aspirations and directions for each mode.
- **Phase 4: Refining Options** involved selecting preferred options for each mode of transportation and developing a recommended long-term plan.
- **Phase 5: Finalizing Plan** involved developing the Final Plan, including an implementation and funding strategy that will ensure that the Plan is affordable and implementable.

Figure 1: *Plan Process*

The ITIMP was developed through a series of three Summary Reports. The first Summary Report presented an overview of existing transportation conditions in White Rock. The second Summary Report presented the long-term plan, including a review of possibilities for each mode of transportation. The third Summary Report included an implementation strategy, including a five-year integrated capital plan.

1.4 REPORT STRUCTURE

This report is separated into five parts:

- **Part 1: Setting the Stage** highlights the overall purpose, process and community engagement activities that have taken place to develop the plan.

- **Part 2: Shaping Influences** outlines the analysis and considerations that shaped the ITIMP's directions and actions. This includes understanding the benefits of a well-functioning and multi-modal transportation system, connections and integration with other relevant plans and policies, and land use and demographic trends.

- **Part 3: Future Directions** outlines the ITIMP's vision, goals. strategies and actions, which build on and incorporate the City's overarching plans and policies. The vision and goals will guide transportation decision-making and actions in White Rock over the next twenty years. The targets will align with regional mode share goals and be used to measure progress in achieving these goals.

- **Part 4: Strategies and Actions** outlines the long-term plans for each mode and area of transportation that will support sustainable growth and transportation choices.

- **Part 5: Implementation Strategy** outlines a suggested implementation plan to guide the City's investments over the short-term, medium-term, and long-term. This includes costs estimates and priorities for all aspects of the long-term plan, along with a five-year capital implementation plan.

1.5 AREAS OF FOCUS

White Rock's ITIMP is a plan for an integrated transportation network that will efficiently handle a growing community. The plan prioritizes and encourages walking as the first choice for short trips; cycling and transit use for access to schools, local businesses, recreation facilities and local and regional employment centres; while also accommodating growth in vehicle traffic as required for economic growth and community development patterns. The plan includes the following **Areas of Focus** that are integrated throughout the long-term plan:

- **Safety:** The plan has an overarching emphasis on road safety that encompasses all aspects of the plan, with a focus on Vision Zero.
- **Walking:** Walking is essential for health and wellbeing. The plan focuses on improving the pedestrian experience through improved sidewalks, trails and crossings and creating safe, comfortable, accessible, and inviting spaces.

What is Vision Zero?

Visio Zero refers to a strategy to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all.

- **Cycling:** Cycling is a growing mode of transportation in Metro Vancouver. The plan focuses on addressing gaps in the cycling network and improving cycling comfort.
- **Transit:** A frequent and reliable transit network is important for providing effective access to uptown and downtown White Rock as well as regional connections. While transit services are the responsibility of TransLink, the plan focuses on opportunities to improve the transit experience, including walking connections to bus stops.
- **Street Network:** The City's road network accommodates a variety of travel modes and uses. The plan focuses on ensuring a robust road network that safely and comfortably incorporates all modes to ensure the City's continued economic growth, livability, and success.
- **Regional/External Connections:** White Rock has the opportunity to better connect to the City of Surrey and the broader region. The plan identifies regional travel patterns and connections for all modes.
- **Goods Movement:** Goods movement and truck routes are an important component to a growing economy. The plan recognizes the importance of goods movement with designated truck routes to serve local businesses.
- **Parking:** Parking, incorporated on and off streets in the City, enables access by residents and visitors to residential and commercial areas. The plan focuses on parking opportunities, particularly in residential areas.
- **Complete Streets:** Opportunity exists within White Rock's streets to exist as more than a transportation function and accommodate all road users following Complete Streets principles.
- **Land Use and Transportation Integration:** Land use and transportation are intermixed and should be utilized and leveraged with one another. The plan focuses on the relationship between land use and transportation and ensuring a plan that is integrated with the City's OCP.

What are Complete Streets?

Streets that can incorporate active transportation modes, vibrant streetscapes, access to transit, on-street parking demands, traffic calming, safe routes to schools and access to parks and recreation.

- **Future Technology:** new technology and mobility impact existing and future planning, their role, opportunity, influence and impact on the transportation network should be considered.

1.6 AN INTEGRATED PLAN

The ITIMP is closely linked to and informed by many of the City and region's key planning documents that contain transportation-related guidance, as well as other utility master plans. Many of these documents and resolutions include broader aspirations for growth and transportation and provide specific directions on how walking, cycling and transit can be balanced with more traditional transportation modes such as private vehicle use and goods movement. The balance of all modes will be critical to help further the goals and policies found in other documents and to ensure the City of White Rock continues to develop in a way that supports all modes. The ITIMP can reinforce and help further the goals and policies found in other documents.

In particular, the ITIMP is guided by and supports the aspirations of City policies and plans in the Official Community Plan (OCP). In addition, the City has a number of plans and documents for pavement condition, transportation, water, drainage and sanitary systems that are considered, including:

- Pavement Assessment Report (2020)
- Streetlight and Traffic Signal Condition Assessment Report (2020)
- Drainage Master Plan Update (2018)
- Sewer Master Plan Update (2018)
- Water System Master Plan Update (2017)
- CCTV Inspection Program (2018)
- Area C Spring Flushing CCTV Memo (2017)

The ITIMP's implementation and phasing strategy ensures that transportation improvements coincide and are integrated with recommendations from these infrastructure master plans as well as other municipal infrastructure improvements projects.

1.7 COMMUNITY ENGAGEMENT

The ITIMP was developed in conjunction with the input of White Rock residents to ensure the Plan addresses transportation issues that are relevant to and desired by the community. There were two rounds of community engagement throughout the course of the plan process. The first round of community engagement focused on identifying issues and opportunities, and the second round focused on obtaining input on the findings of the draft plan. Because the plan was developed during the COVID-19 pandemic, opportunities for engagement were limited. In order to comply with public health protocols, public engagement was limited to virtual settings with online engagement tools.

Round 1 Engagement

The first round of engagement took place between December, 2020 and February, 2021. An online Issues & Opportunities Survey was available on the *Talk White Rock* website for all interested White Rock residents to complete between December 9, 2020, and February 3, 2021. The survey was designed to better understand current travel habits and priorities for the City's transportation network. In addition, the survey included an interactive map (**Figure 2**), where respondents were able to drop markers on a map of the City to identify issues and ideas for improvements related to transportation in White Rock.

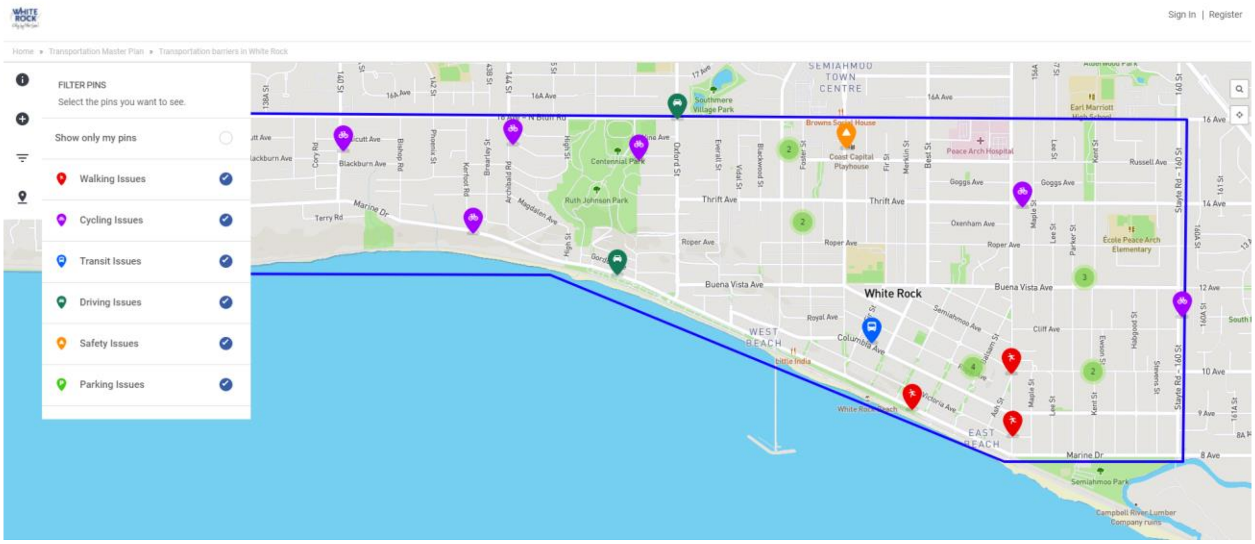


Figure 2: *Sample of Interactive Map*

The survey received 428 views, resulting in 188 responses. The results of the online survey are presented in the **Round One Engagement Summary Report** in **Appendix A** and have been used to inform the long-term plan, along with the results of the technical analysis.

The following is a summary of what we heard through the first round of engagement. Overall, improving the pedestrian network and addressing safety concerns were the top priorities for White Rock residents.

Priorities

Survey respondents were asked to identify their priorities for the ITIMP. A list of 6 outcomes were provided for participants to rank from 1 (most important) to 6 (least important). Improving traffic safety was identified as the most important outcome of the Plan among respondents, followed by reducing travel times and congestion. Reducing transportation costs was identified as the lowest priority among respondents (see **Figure 3**).

As the City of White Rock develops its Integrated Transportation and Infrastructure Master Plan, which of the following outcomes are most important to you?

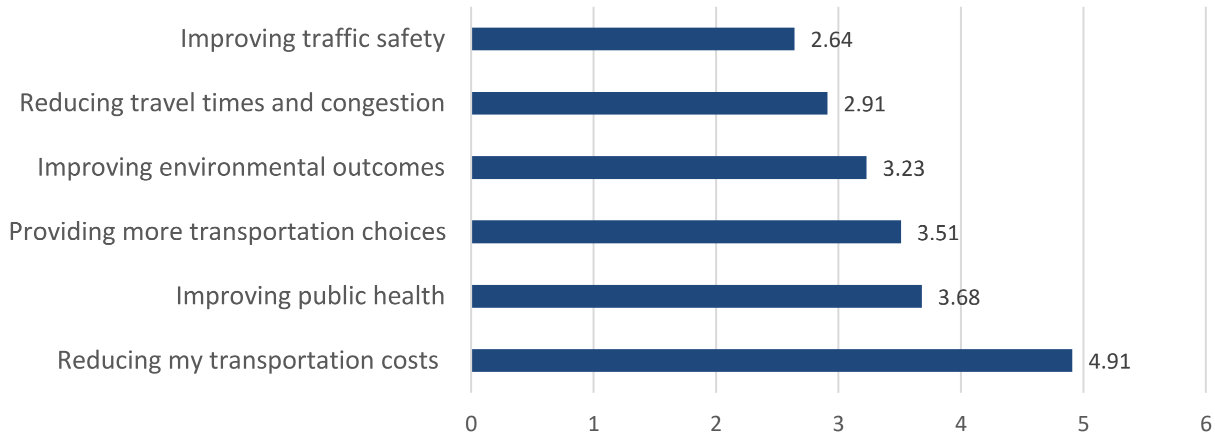


Figure 3: *Most Important Outcomes*

Survey participants were also presented with a list of six topics areas and asked to indicate their highest priority areas for White Rock's transportation system from 1 (most important) to 6 (least important). Walking was identified as the top priority, followed by traffic safety. Neighbourhood Parking and Cycling were the lowest priorities among survey respondents (see **Figure 4**).

What aspects of White Rock's transportation system should be considered the highest priority areas?

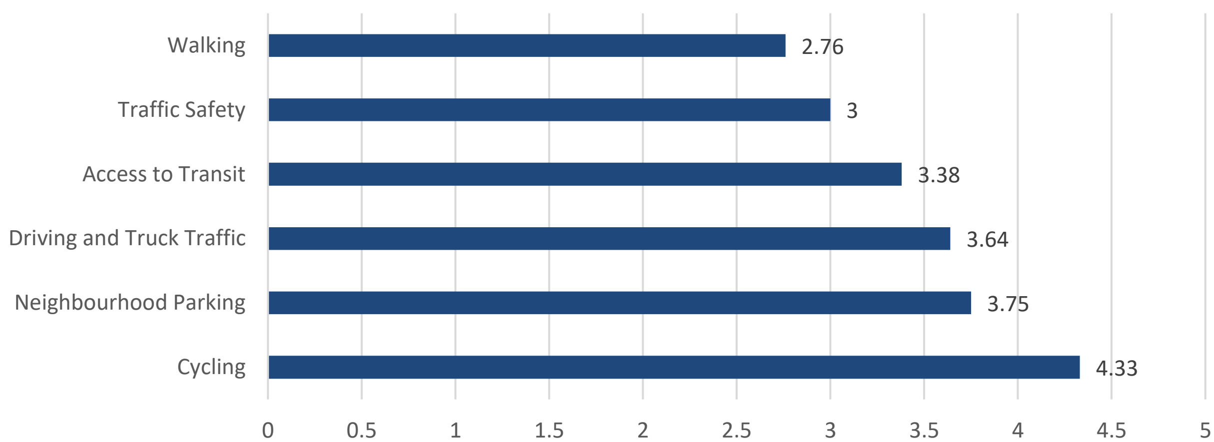


Figure 4: *Priorities*

Opportunities and Challenges

White Rock residents indicated that they are most interested in improving traffic safety, reducing travel times and congestion and improving environmental outcomes, and consider walking, traffic safety and access to transit priorities for improvement. Respondents indicated that the walking network is where they would like to see the most improvements. Residents also identified a number of transportation issues and challenges facing White Rock today or in the future. Key subjects for issues or challenges included:

- **Subject 1: Pedestrian infrastructure**
  - Pedestrian safety, traffic safety and traffic calming measures
  - Pedestrian network improvements and implementing new sidewalks
  - Walkability within and between neighbourhoods

- **Subject 2: Connectivity within the White Rock community**
  - Connectivity to the beach
  - Improving access throughout neighborhood communities
  - Improving the connection to other areas in Metro Vancouver

- **Subject 3: Congestion**
  - Improving congestion planning around new developments
  - Congestion along Marine Drive
  - Congestion across communities in White Rock

- **Subject 4: Transit system improvements and transit planning to meet needs**
  - Improving transit frequency, reliability, access, and cost improvements
  - Access to reliable transit to the Lower Mainland and Downtown Vancouver
  - Need for improved transit options
  - Holistic transit planning is needed to manage future growth

- **Subject 5: Parking**
  - Neighbourhood and residential parking
  - Street parking and parking for businesses access
  - Lack of parking
  - EV parking

- **Subject 6: Investments in a cycling network**
  - Cycling infrastructure
  - Cyclist safety

- **Theme 7: Miscellaneous**
  - Emissions and environmental considerations
  - Infrastructure and road maintenance
  - Traffic enforcement
  - Garbage or organic trucks

Round 2 Engagement

The second round of engagement took place between September and November, 2021 and included an online survey and three public open houses. Engagement materials were posted on the talkwhiterock.ca project website, including the draft plan, a project video, and summary infographics. The City also regularly promoted the engagement through its social media channels. The online survey was available on the Talk White Rock website for all interested White Rock residents to complete between September 1, 2021 and November 21, 2021. The survey was designed to obtain input on the draft Integration Transportation and Infrastructure Master Plan. The survey received 100 views, resulting in 33 responses. Three virtual public events were held in September and October, 2021 with 14 participants.

The draft long-term plan was updated based on the findings from the second round of engagement. Overall, the overall directions in the long-term plan received strong community support. The findings from the second round of engagement are presented in the **Round Two Engagement Summary Report** in **Appendix B.**

2 SHAPING INFLUENCES

White Rock is one of the most compact cities in Metro Vancouver, making it possible to use active and sustainable transportation for many daily trips and open the roads for economic and community development.

However, the City is also home to the highest proportion of older adults of any municipality in Metro Vancouver. Along with hilly topography, challenges to encouraging active transportation highlights the importance of creating a multi-modal transportation system that is universally accessible and provides mobility options for people of all ages and abilities. This section summarizes they key influences that shape mobility patterns in White Rock today and in the future.

2.1 WHY TRANSPORTATION MATTERS

Transportation plays a significant role in the development of healthy and sustainable communities, as transportation policies, plans and infrastructure are a fundamental part of the impact of the built environment on residents' mobility patterns. Transportation can impact a community in a number of ways, including:

- **Road Traffic Injuries:** The way our roads and intersections are designed contribute to traffic-related injuries and deaths for pedestrians, cyclists, and motorists. Safe road design can improve safety and address citizens' perception of safety.

- **Physical Activity, Obesity and Chronic Disease:** Transportation and urban planning policies can effectively encourage physical activity. With more active transportation and transit options, people can be more active. Being more physically active can improve health and reduce rates of obesity, chronic disease, and premature death.

- **Air Quality:** Transportation-related air pollutants are the largest contributors to poor air quality and produce greenhouse gas (GHG) emissions, which has negative implications for community quality of life and public health.

- **Noise:** Road traffic is the biggest cause of noise in many cities, which can exacerbate stress levels, increase blood pressure, cause sleep disturbance, and negatively affect mental health.

- **Equity:** Affordable and equitable transit service can enable residents of all incomes and abilities to access necessary services and supports (i.e., employment, education, healthcare, public and social services, and healthy food) that are critical components to health.

- **Social Cohesion and Inclusion:** Cycling, walking, and transit have been shown to stimulate physical activity, which leads to increased social interaction and cohesion. Social inclusion can lead to greater cohesiveness and result in positive outcomes such as better health and increased participation in community life.

Managing transportation impacts can help foster more liveable, vibrant, and safe neighbourhoods, and help to support a higher quality of life for White Rock residents. This is especially important for vulnerable groups including children, youth, and seniors. Factors such as high traffic speeds, traffic volumes, and inadequate pedestrian and cycling infrastructure can deter these groups from walking or cycling to and from their destinations.

It is important that transportation infrastructure allow seniors to be mobile in their community without a vehicle and attracts children and youth to sustainable modes of transportation early in their lives, as there is opportunity to continue walking and cycling behaviours into adulthood. It is also important that vehicle based GHG emissions and air quality impacts from the transportation system are mitigated to reduce health impacts on residents.

2.2 INTEGRATING WITH OTHER PLANS

The ITIMP is closely linked to, and will be informed by, many of the City and region's key planning and infrastructure documents that contain active transportation, transit, roadway, goods movement and parking-related policies, plans, goals and visions, as well as planned maintenance and development of sewers, drainage, pavement and utilities. Many of these documents and resolutions include broader aspirations for growth and transportation and provide specific directions on how walking, cycling and transit can be balanced with more traditional transportation modes such as private vehicle use and goods movement. The balance of all modes will be critical to help further the goals and policies found in other documents and to ensure the City continues to develop in a way that supports all modes. By integrating transportation plans with infrastructure plans, White Rock can see the most cost-savings and efficiencies. The ITIMP can reinforce and help further the goals and policies found in other documents.

Regional Plans and Policies

The following regional plans and policies shape the direction of the ITIMP:

- Metro 2050: Regional Growth Strategy Update (2022), Metro Vancouver
- Transport 2050: Regional Transportation Strategy Update (2022), TransLink
- Climate 2050: Strategic Framework (2018, revised 2019), Metro Vancouver
- Semiahmoo Town Centre Plan (2022), City of Surrey
- Surrey Transportation Plan (Under Development), City of Surrey
- Cycling for Everyone: A Regional Cycling Strategy for Metro Vancouver (2011), TransLink
- South of Fraser Area Transit Plan (2007), TransLink

Overarching City Plans and Policies

The following overarching city plans and policies shape the direction of the ITIMP:

- 2021 – 2022 Council Strategic Priorities Update (2020)
- Official Community Plan (2017, including OCP Amendment #2)
- Parks & Recreation Master Plan (2017)
- Tourism Strategy and Implementation Plan (2016)
- Community Climate Action Plan (2010)
- Economic Development Strategic Plan (2009)
- Environmental Strategic Plan (2008)
- Leisure Services Master Plan (2007)

Area-Specific Plans and Policies

The following area-specific plans and policies shape the direction of the ITIMP:

- Town Centre Urban Design and Public Realm Review (ongoing)
- Waterfront Enhancement Strategy (DRAFT 2019)
- Town Centre Urban Design Guidelines and Plan (2011)

Related Infrastructure Master Plans

The ITIMP is an integrated plan that will reference and align with other infrastructure master plans to develop coordinated prioritized infrastructure improvements. The following infrastructure plans were considered in developing the plan:

- **Pavement Assessment Report (2020):** is a plan to extend the lifespan of city roads before full rehabilitation is required by ranking all streets as poor, moderate or excellent/good condition. Of White Rock's 81km of public roadways, 23% or 18.52 km were rated as poor. It is recommended that these are reviewed in conjunction with utility repair programs and upcoming land development to avoid duplication of effort.
- **Streetlight and Traffic Signal Condition Assessment Report (2020):** this report undertakes a condition assessment of all streetlights and traffic signal assets. The City has 931 streetlights and traffic signals, of which 47 are in critical condition, 177 in poor condition and the rest are in fair or good condition. A program to replace the critical poles immediately and the remainder in future years was developed, with a total replacement value of $1.36M.
- **Sewer Master Plan Update (2018):** this updates the 2013 update as there had been developments in the City and new sanitary infrastructure built. The update includes the new infrastructure as well as reassesses the model under future growth projections from the Official Community Plan. The majority of upgrades recommended are located along Marine Drive with a few capacity and condition upgrades throughout the east side of the City.
- **Drainage Master Plan Update (2018):** this updates the 2012 update due to recent developments and new drainage infrastructure, as well as a new Official Community Plan. The intent of the update was to assess upgrades needed to address current capacity issues and support future development. The plan recommends that the City implement stormwater control measures in future developments to reduce runoff volumes and peak flow during smaller storm events, although these may not decrease long-term peak flows. The capacity upgrades typically increase more than one pipe size from the existing.
- **Water System Master Plan Update (2017):** is an update to the 2013 water system plan and includes existing system demand development, future system demand development, hydraulic water model update, review of water treatment options, system evaluation including water main break history update, and recommended upgrades.
- **CCTV Inspection Program (2018):** This program assesses structural conditions of existing sanitary and storm sewers and provides recommendations of the time frame for next maintenance or replacement as well as the method for next maintenance or upgrade.
- **Area C Spring Flushing CCTV Memo (2017):** CCTV inspections of sanitary and storm sewers were conducted in 2017, and the results of the inspection was ranked in order of urgency of repairs.

Supporting Studies and Policies

There are a number of other supporting studies and policies that were considered, including Traffic Impact Assessments, traffic studies, and safety assessments throughout the City.

2.3 COMMUNITY PROFILE

The Local Context

White Rock is home to one of the highest population densities in Metro Vancouver, with nearly 4,000 residents per square kilometre. This high population density, combined with the small land area, makes the city ideally suited to move towards more sustainable forms of transportation including walking and cycling due to the short distance between destinations. This population growth and density is expected to continue to in the coming years, with the city's population expected to reach 31,000 residents by 2050. However, White Rock is also an attractive retirement community and has the highest proportion of older adults in Metro Vancouver, with 31% of White Rock residents over the age of 65. Seniors are the fastest growing age group in White Rock, and by 2050 42% of White Rock residents will be over 65.

In addition, the City is characterized by its unique hillside topography, with residential neighbourhoods perched along the steep ridge that lines the City's waterfront (see **Map 1**). The grade from the waterfront to the Town Centre is measured at well over 15% along some of the City's streets. This percentage can make both walking and cycling difficult, and it can also present a challenge for some vehicles, including goods movement and transit.

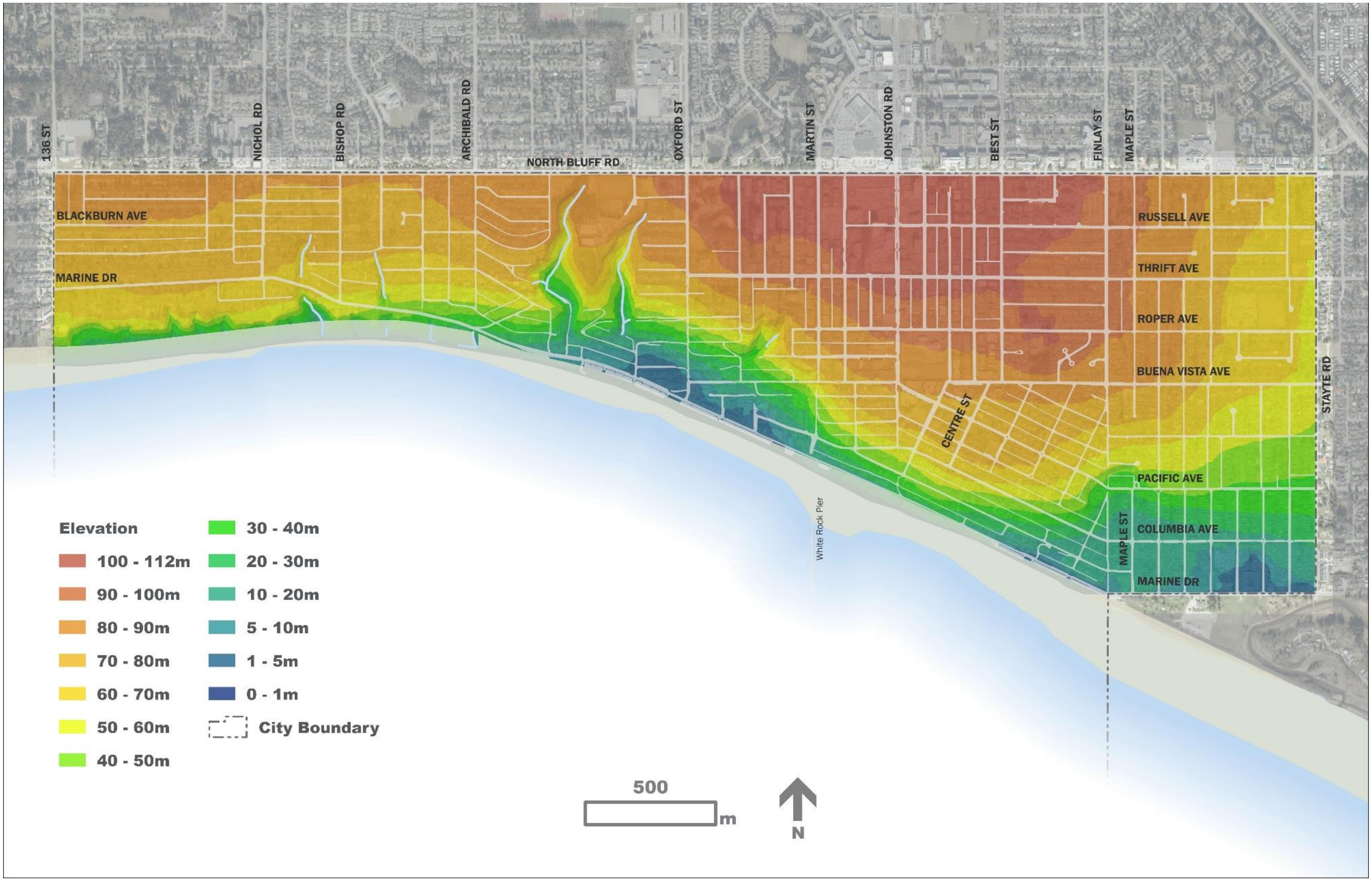
A Regional Destination

Stretching along the sandy coastline of Semiahmoo Bay, the City attracts visitors from across the region who are drawn to the waterfront promenade and beaches in the Waterfront area, as well as the waterfront and Town Centre commercial areas (see **Map 2**). Tourism adds traffic volumes and pressure on parking facilities. Attracting and keeping visitors on the waterfront is important to ensure a thriving local economy.

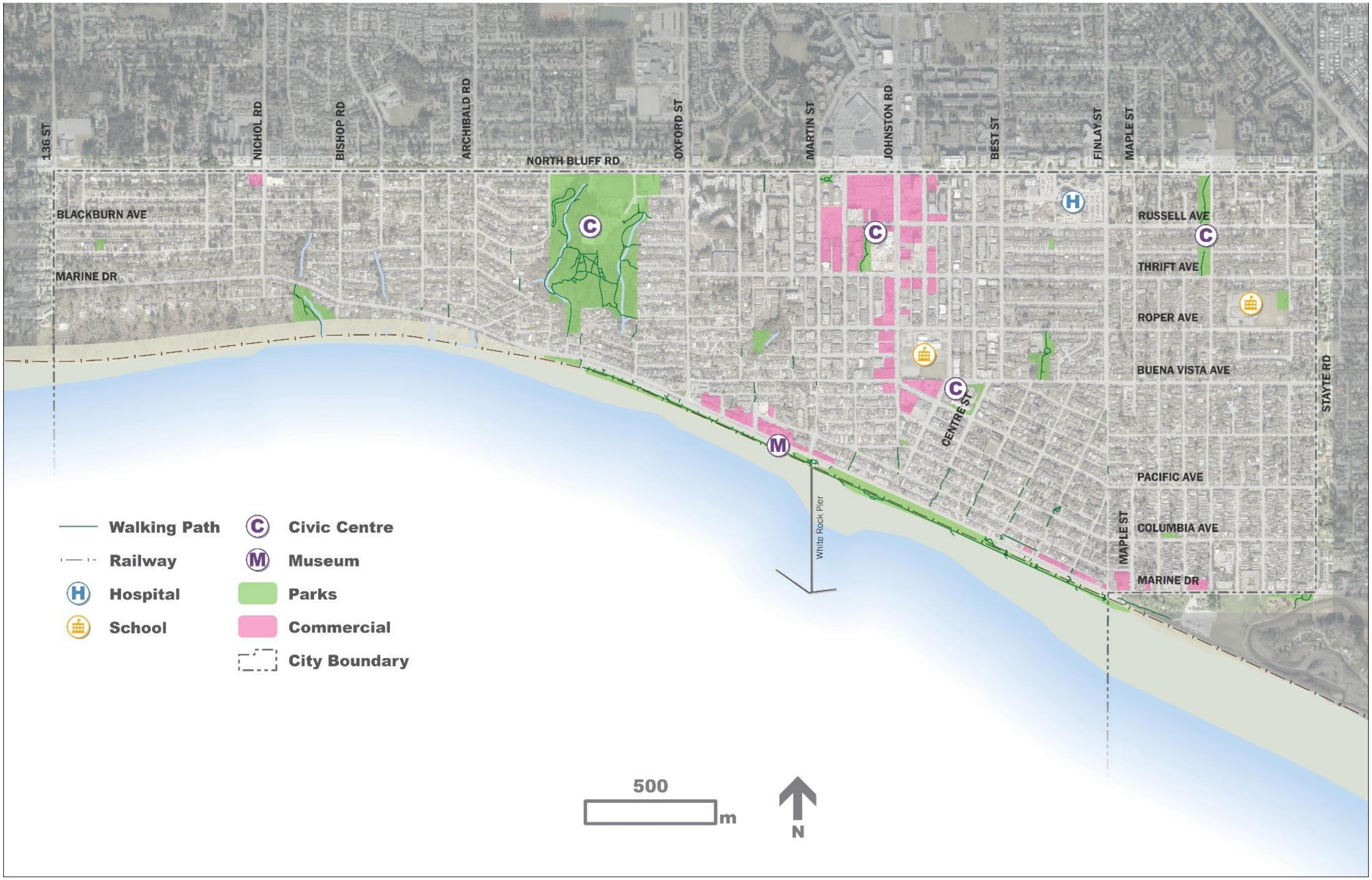
The City is influenced by major regional transportation corridors, including:

- Highway 99 and King George Boulevard: regional connections to Surrey and Metro Vancouver;
- Johnston Road: a critical north-south connection across the Semiahmoo Peninsula; and.
- North Bluff Road: a primary east-west arterial.

With relatively few jobs compared to population, many residents are leaving White Rock to access jobs, which means that regional travel and commuting will continue to remain important, potentially increasing congestion along these key corridors.



Map 1: Topography



Map 2: *Key Land Uses and Destinations*

2.4 HOW WE MOVE TODAY

Current transportation patterns are critical to understanding needs and priorities for the ITIMP. This section summarizes key travel patterns based on information from TransLink's 2017 Regional Trip Diary Survey, including mode share, trip distance, trip purpose, and demographics.

Mode Share

The road network in White Rock has traditionally been designed to accommodate vehicular traffic. With White Rock's dense neighbourhoods, the city has a high walking mode share. Based on data from TransLink's 2017 Trip Diary Survey, **the majority of trips made by White Rock residents are by motor vehicle**, including approximately 67% of trips by vehicle drivers and 13% by vehicle passengers (see **Figure 5**). Sustainable forms of transportation make up less than one in five daily trips made by White Rock residents, including walking (14%), transit (4%), and cycling (1%). By contrast, 29% of trips in Metro Vancouver were made by sustainable modes in 2016, and TransLink's Regional Transportation Strategy – Strategic Framework (2013) called for half of all trips in the region to be made by walking, cycling, and transit by 2040.

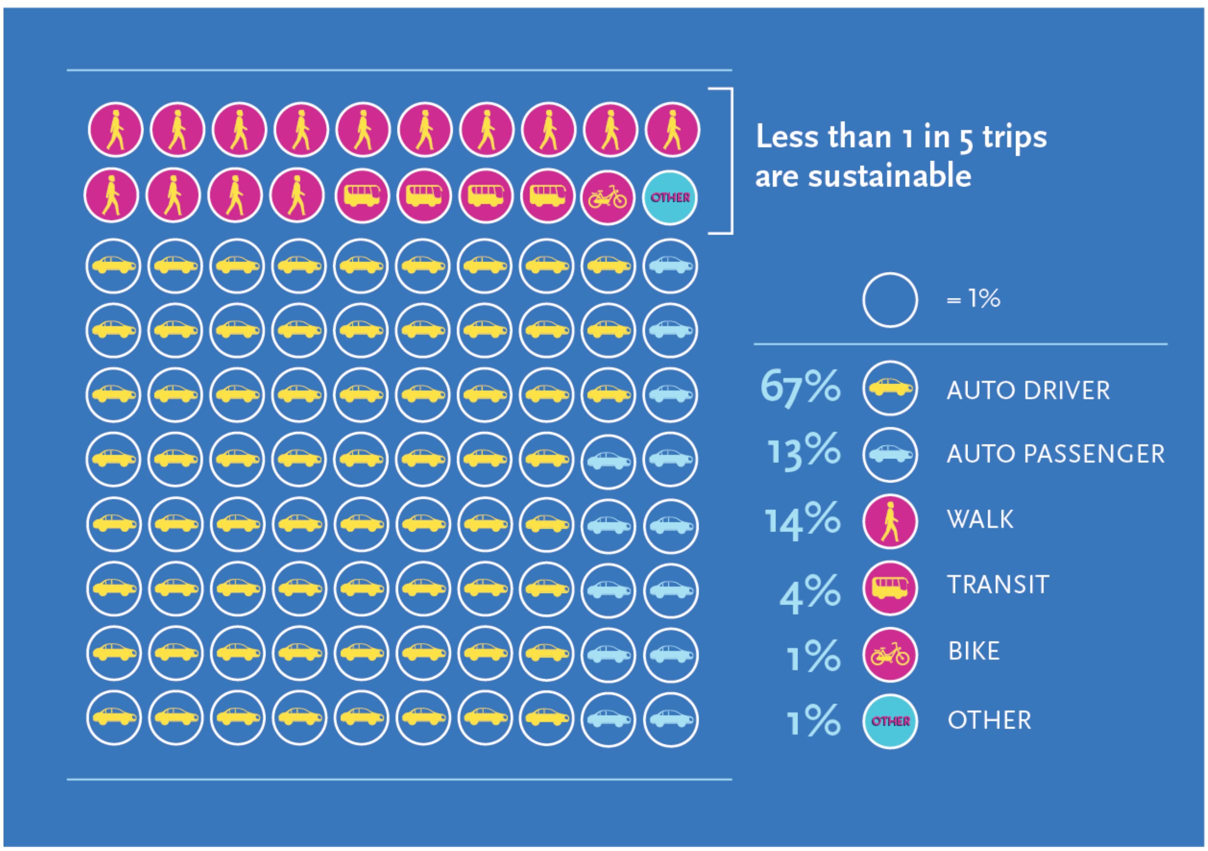


***Figure 5**: Mode Share*

Trip Distance

The average transit trip distance is approximately 26 km, while the average walking trip distance is less than 1 km. The largest opportunity to shift to more sustainable modes of transportation exists within short driving trips as **over half (52%) of all driving trips are less than 5 km**, including over 40% that are less than 3 km, a distance which could easily be replaced by active transportation (see **Figure 6**).

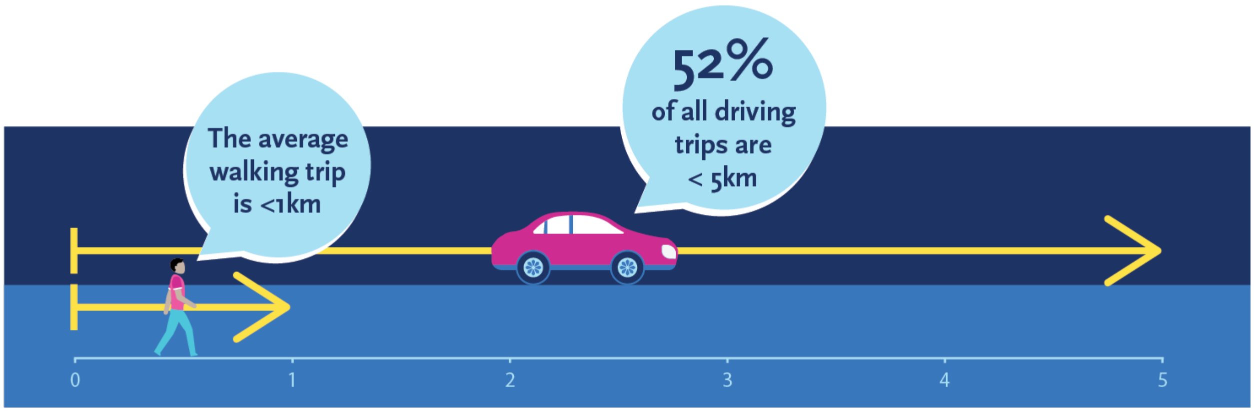


Figure 6: *Trip Distance*

Trip Purpose

Understanding the purpose of trips in White Rock also helps to better inform planning. For example, when looking at transit, **commuting is the reason for the majority (47%) of all transit trips**, compared to 28% for shopping and personal business, and 25% for social, recreational, or dining purposes.

When looking at walking, **shopping and personal business is the main reason for the majority (48%) of all walking trips**), compared to 23% for commuting, 21% for social, recreational, or dining purposes, and 8% travelling to grade school (see **Figure 7**).

For example, the City could encourage more transit use for shopping and social purposes, and continue to encourage residents to walk for shopping and personal business.

Figure 7*: Trip Purpose*

Demographics

Nearly two thirds (63%) of all sustainable transportation trips in White Rock are made by women, compared to just over half (51%) of all vehicle trips. In addition, older adults aged 65 and over are much less likely to be auto drivers, and have a higher reliance on carpooling as an automobile passenger and cycling (see **Figure 8**). These are important considerations from a mobility equity perspective to ensure White Rock's transportation system meets the travel needs of all residents, regardless of gender or age.

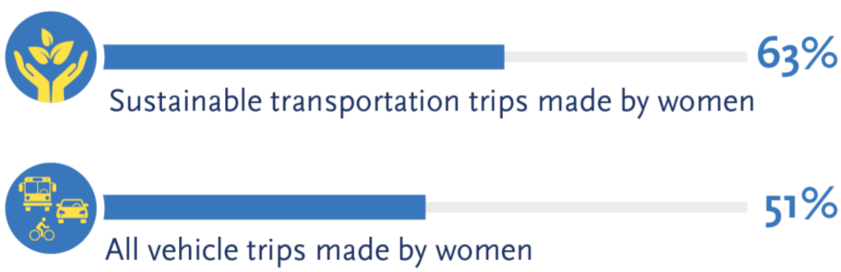


Figure 8: *Trips by Gender*

2.5 KEY ISSUES AND OPPORTUNITIES

A number of specific transportation issues have been identified by residents and City staff for review during the ITIMP project. These issues can be grouped into the following categories:

- Intersection improvements (traffic control, sightlines for turning movements, turning lanes);
- Improved pedestrian crossings;
- Transit stop amenities;
- High motor vehicle speeds and volumes;
- Parking and loading;
- Damaged pavement; and
- Encroachments onto public right-of-way and the use of public property.

The issues identified from the public have been considered in the development of the ITIMP. A full list of issues identified to date is provided in **Appendix C**.

3 FUTURE DIRECTIONS

The ITIMP presents a long-term vision that aligns with White Rock's strategic priorities and builds on the overarching goals of the City and the region as a whole. The vision and guiding principles are intended to be long-range, holistic, and integrated. As a result, by working towards this vision, White Rock can achieve several important goals. This section outlines the framework for the ITIMP, including alignment with strategic priorities as well as vision, guiding principles, goals, objectives, targets, and the establishment of a modal hierarchy.

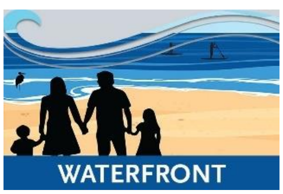
3.1 ALIGNMENT WITH STRATEGIC PRIORITIES

White Rock's City Council has established six strategic priorities in its Council Strategic Priorities (2021-2022) document. The ITIMP can play a critical role in helping the City to achieve each of these strategic priorities and the City's overall aspirations, as described below.

Strategic Priority | **How the ITIMP Aligns**

The ITIMP aligns with the directions of the City's OCP and can help achieve the OCP vision and goals, while also support the integration of transportation and land use for more connected pedestrian, transit and cycling network. Land use and transportation integration helps contribute to an excellent quality of life with stronger social connections and better health. The ITIMP was also developed with community input and reflects the priorities of what was heard through this engagement.

The ITIMP will help contribute the City's environmental goals by reducing transportation-related greenhouse gas emissions by encouraging sustainable forms of transportation such as walking, cycling, and transit and promoting emerging technologies such as non-polluting electric vehicles (EVs).



The ITIMP enhances White Rock's seaside experience with the pedestrian and cycling network along the waterfront, as well as stronger connections to the waterfront from the Town Centre and other areas of the City.

The ITIMP integrates the City's other infrastructure master plans to ensure these plans align and that the City is coordinating its capital investments across all infrastructure areas such as water, sewer, drainage, as well as transportation.

The ITIMP supports the prosperity and diversification of the City's economic base. Without a fully functioning transportation network, people and goods cannot move throughout the city or the region; the ITIMP ensures that all roads function as they are intended and promotes a safe and enjoyable experience for all road users. Further, as sustainable modes are encouraged, the ITIMP is encouraging more road space for businesses and goods movement.

The ITIMP was developed during the COVID-19 pandemic and has considered changing mobility patterns as well as opportunities for the City to plan for pandemic recovery with opportunities to repurpose road space to increase opportunities for people to travel by active modes and to provide opportunities to additional public spaces and patios to support local businesses.

3.3 PLAN FRAMEWORK

The ITIMP is composed of several interrelated layers that combine to form the plan's framework. This framework is outlined below.

- **Strategic Priorities**: As noted above, the ITIMP is aligned with the City's Strategic Priorities to help achieve the City's broader goals and aspirations.
- **Vision:** Building on these Strategic Priorities, the future directions for the plan include a vision statement that describes the key focus areas of the plan and the City's aspirations for transportation today and in the future.
- **Guiding Principles:** Three guiding principles – Vision Zero, Complete Streets, and Equity – help guide all aspects of the City's transportation network, emphasizing the safety, health, and well-being of all road users.
- **Goals and Objectives:** The vision and guiding principles are supported by five goals and several supporting objectives, as outlined below.
- **Strategies and Actions:** Several strategies, each containing a series of actions, provide the detailed blueprint for how the City can achieve its vision, goals, and objectives, all of which consider the overarching strategic priorities and guiding principles. The strategies are divided into four **Themes** – safe streets, people-first streets, connected streets, and dynamic streets. They also identify six **Big Moves** that will make the greatest impact to achieving the vision and goals of the plan. The strategies, and actions make up the main recommendations of the ITIMP and are outlined in detail in Section 4.

Vision

The community of White Rock appreciates walkability, accessibility, and safety complementing the unique seaside and hillside community.

The City will prioritize safety in all aspects of the transportation system and will develop a completed and connected network of walking, cycling, and transit facilities that connects the waterfront, the Town Centre, and residential neighbourhoods and that is comfortable for people of all ages and abilities, promoting and encouraging an active life to inspire a dynamic, sustainable community for current and future generations.

The City will ensure and improve the safety and efficiency of vehicle operations to provide mobility options for residents and visitors, and goods movement to support the local and regional economy.

Guiding Principles

The vision is supported the following three guiding principles:

- **Vision Zero:** The City is committed to measures that will work to eliminate all traffic fatalities and severe injuries, while ensuring safe, healthy, and equitable mobility for all.
- **Complete Streets:** The City is committed to developing a street network that serves more than just transportation, accommodating all road users and modes.
- **Equity:** The City is committed to providing equitable and universally accessible mobility options for all residents and visitors of all ages and abilities. regardless of age, ability, gender, income, race, or other socio-demographic characteristics.

Goals and Objectives

The ITIMP includes five goals to achieve the vision and improve the multi-modal transportation system in White Rock. Each goal has several supporting objectives. Goals and objectives are connected to all elements of the plan and allow for monitoring of the ITIMP's progress. All five goals received strong support from the second round of public engagement, with at least 50% of respondents indicating that all five goals were *Very important* or *Fairly important.* Goal #1 to improve safety was identified as the most important goal followed by Goal #3 to improve environmental outcomes.

Goal 1: Improved Safety – Improve the safety of all road users, with a specific focus on vulnerable road users

- Objective 1.1: Eliminate fatalities and serious injuries from the transportation system
- Objective 1.2: Reduce the severity of injuries on White Rock's roads
- Objective 1.3: Improve the safety of vulnerable road users such as pedestrians, cyclists, and motorcyclists

Goal 2: Improved Efficiency – Ensure the efficient movement of people and goods to support the local and regional economy

- Objective 2.1: Identify and address areas of congestion and delay to improve the reliability of the transportation network
- Objective 2.2: Ensure goods movement are able to move efficiently throughout the City's transportation network

Goal 3: Improved Environmental Outcomes – Reduce transportation-related environmental outcomes

- Objective 3.1: Reduce the average distance driven by White Rock residents
- Objective 3.2: Promote sustainable modes of transportation such as walking, cycling, and transit
- Objective 3.3: Support non-polluting forms of transportation, including electric vehicles and e-bikes
- Objective 3.4: Reduce greenhouse gas emissions and other transportation-related emissions
- Objective 3.5: Increase green space and tree canopy to help mitigate climate change impacts

Goal 4: Increased Mobility Choices – Provide attractive and convenient mobility choices that are safe and comfortable for people of all ages and abilities

- Objective 4.1: Promote walking for as the preferred choice for all short trips
- Objective 4.2: Improve the transit customer experience with high quality transit services and facilities
- Objective 4.3: Encourage cycling as a convenient form of transportation for short- and medium-distance commuter and transportation trips

Goal 5: Improved Health – Improve the health and well-being of White Rock residents and the broader community

- Objective 5.1: Encourage all active forms of transportation, including walking, wheeling, and cycling
- Objective 5.2: Improve local air quality
- Objective 5.3: Reduce noise generated by the transportation system

3.4 TARGETS

As noted previously, sustainable forms of transportation make up approximately 19% of all trips made by White Rock residents. In alignment with regional mode share targets (50% sustainable modes by 2040) and those of other municipalities through Metro Vancouver, the ITIMP includes ambitious, yet achievable targets. The plan recommends a target **that one third (33%) of all trips be made by sustainable transportation by 2040.** This represents a nearly 75% increase in the sustainable transportation mode share over the next twenty years.

This could be achieved with the following individual mode share targets:

- Walking trips will increase from 14% to 21% by 2040
- Transit trips will increase from 4% to 8% by 2040
- Cycling trips will increase from 1% to 4% by 2040

3.5 MODAL HIERARCHY

A modal hierarchy that prioritizes walking, cycling and transit within the City can create a transportation system supports land use patterns with appropriate investments to enable and encourage people to walk, cycle, and use transit. The hierarchy of modes proposes that the City consider the needs of pedestrians, public transit, cyclists and goods and services movements before that of private automobiles. By considering needs of these priority modes, future transportation plans, programs and projects will provide better, safer and more convenient solutions and encourage over time more people to walk, cycle, and choose transit (see **Figure 9**).

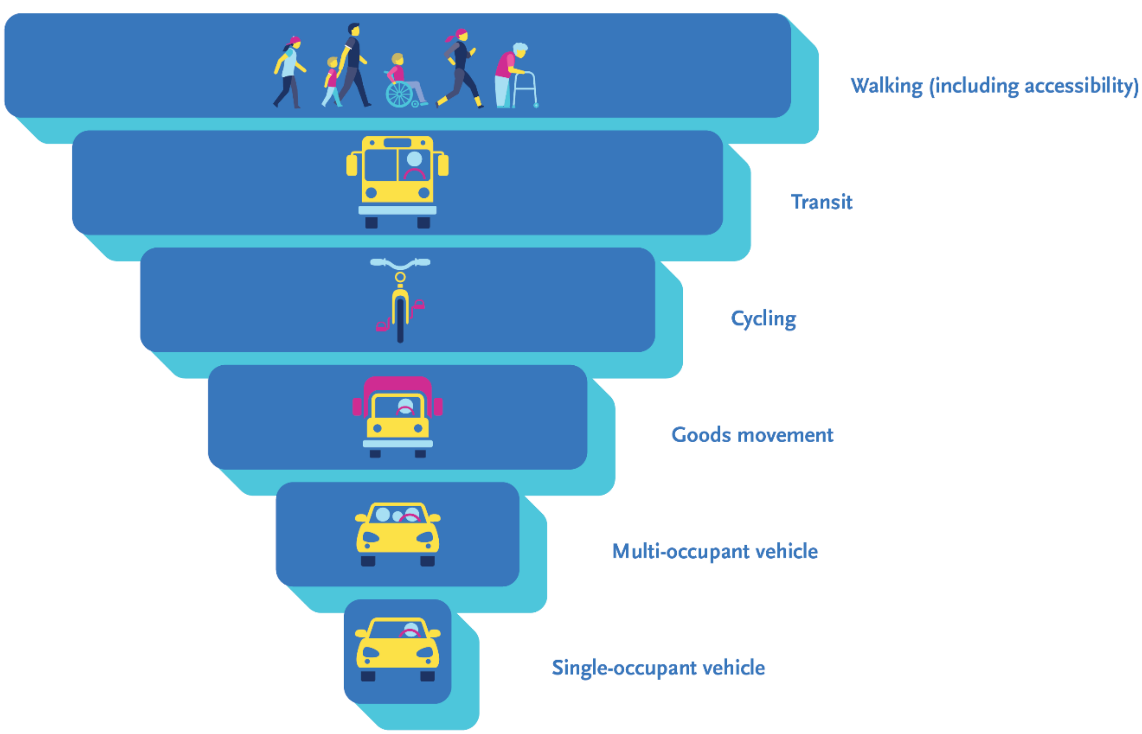


Figure 9: *Modal Hierarchy*

4 STRATEGIES AND ACTIONS

The framework for the ITIMP consists of four overarching themes. Each of the themes were built off public and stakeholder feedback, as well as a review of existing conditions. Each theme has a series of strategies, as well as a series of more detailed actions for how to best achieve these outcomes.

For each of these four themes, the following sections provide **background** description of the theme, a summary of how the strategies and actions align with the **areas of focus** of the plan, the identification of **six big moves** that will make the greatest impact to achieving the vision and goals of the plan, and a description of the **13 strategies** and **36 actions** included in the plan to help achieve the vision, goals, and objectives of the ITIMP.

4.1 THEMES

To achieve the vision, goals, and objectives of the ITIMP, the plan includes the following four key **Themes**. Each theme contains a series of **Strategies**, **Big Moves**, and **Actions**.

The **Safe Streets** theme focuses on adopting and implementing a Vision Zero strategy. Vision Zero is a global traffic safety initiative that aims to eliminate traffic fatalities and serious injuries among all road users by considering road design, speed limits, and road user education. Vision Zero recognizes that people will sometimes make mistakes, so the transportation system and related policies should be designed to ensure that these mistakes do not lead to severe injuries or fatalities. Vision Zero has been implemented in communities of all sizes across the world, from Sweden and the United States to close to home in the City of Surrey.

The **People-first Streets** theme recognizes that the Plan should take a human-centred approach and create streets that are convenient, attractive, safe, and inviting for people of all ages and abilities. The focus here is on making a walkable city by expanding the sidewalk network, providing accessibility improvements, and creating beautiful and interesting public spaces.

The **Connected Streets** theme focuses on balancing the needs of all road users while making it easier to walk, bike, and take transit when making local trips and connecting to regional destinations. This includes developing a connected cycling network, making sure transit stops are accessible, and designing “complete streets” that facilitate safe, comfortable, and enjoyable connections between White Rock’s neighbourhoods and beyond.

Finally, the **Dynamic Streets** theme considers new and emerging transportation technologies such as carsharing, ride-hailing, bike sharing, and autonomous vehicles, which will have wide-ranging implications on the way we live and move both now and in the future.

Safe Streets

4.2 SAFE STREETS

Background

Improving road safety was identified as the highest priority for the ITIMP by respondents to the first survey, and was identified as *Very important* or *Fairly important* by 57% of respondents to the second survey. As such, the ITIMP includes an overarching emphasis on road safety and creating safe streets where serious injuries and fatalities are not acceptable. Road safety is considered in all aspects of the ITIMP, with the fundamental premise that the City will commit to a Vision Zero approach.

Vision Zero is an approach to safe mobility that aims to eliminate death and serious injuries in the transportation system, while increasing safe, healthy, and equitable mobility for all road users. The key principle underpinning Vision Zero is that everyone has the right to safe mobility, and that those who design, manage, and make decisions about the transportation system have a shared responsibility to ensure safety for all. **Figure 10** outlines the difference between the traditional approach to road safety and the Vision Zero approach.

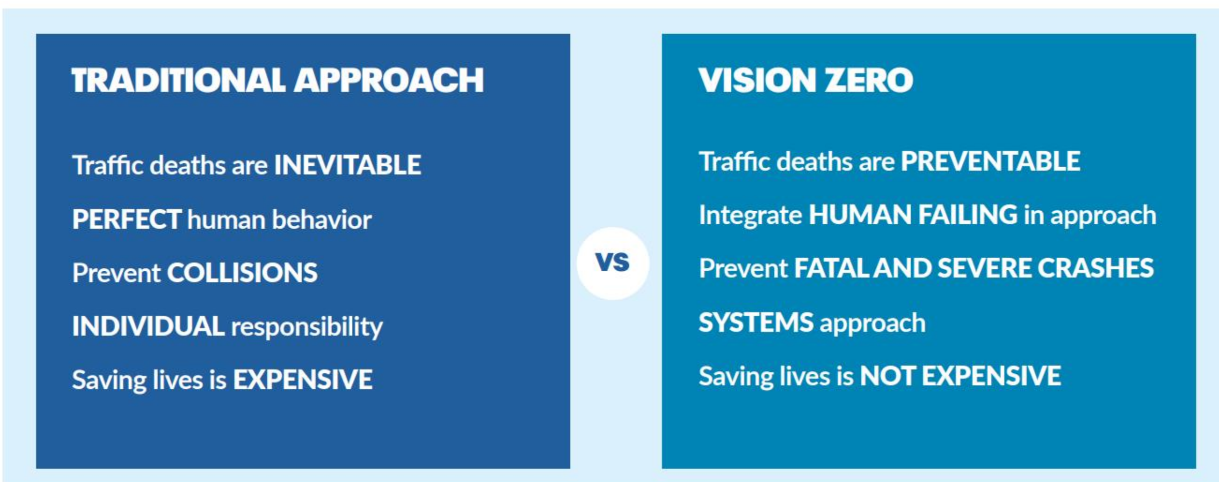


Figure 10: *Traditional Approach vs. Vision Zero (source: Vision Zero Network)*

Vision Zero is adapted from public health frameworks and takes a holistic, integrated approach to transportation safety. It has been implemented in countries such as Sweden, Norway, and the United Kingdom which now have the lowest rates of motor vehicle crash fatalities in the world. Vision Zero has since gained momentum in many countries, including the United States and, more recently, in Canada, including the neighbouring municipality of Surrey.

Between 2013 and 2017, there were an average of approximately 318 reported collision per year in White Rock, which approximately one third of those collisions resulting in a casualty. As shown in **Table 1**, the number of reported collisions in White rock has increased every year since 2013, including an increase in the number of casualty collisions that result in injuries or fatalities.

Table 1: *Reported Collisions (2013 to 2017)*

	Property Damage Only	Casualty	Total
2013	188	98	286
2014	212	100	312
2015	223	95	318
2016	223	106	329
2017	213	131	344
Average	*212*	*106*	*318*

This section provides an overview of how the safe streets are considered in the ITIMP through the following strategy. More detailed strategies and actions related to safety are included throughout all aspects of the ITIMP:

- **Strategy 1: Adopt and implement a Vision Zero strategy containing actionable and measurable road safety targets**

Alignment with Areas of Focus

The strategies and actions for creating safe streets align with a number of areas of focus for the ITIMP, including:

- **Safety:** By planning and designing for safe streets, the City is making a commitment to advancing a Vision Zero approach and recognizing that no serious injuries or fatalities are acceptable on the City's transportation network. The plan recommends that the City adopts and implement a Vision Zero strategy to support all other components of the ITIMP, ensuring that all road users are first and foremost safe when traveling throughout White Rock.
- **Walking:** By focusing on road safety, the City can help prioritize vulnerable road users such as pedestrians and cyclists. This is outlined in further detail in multiple strategies and actions in the plan, including developing a complete and connected sidewalk network, improving intersection safety, and creating a universally accessible city.
- **Cycling:** Cyclists are also vulnerable road users who are more likely to be seriously injured or killed when involved in a collision. The City can help improve cycling safety through a number of strategies and actions identified in the plan, including developing a cycling network that is comfortable for people of all ages and abilities.

Big Moves

The Big Move to create safe streets is outlined below:

BIG MOVE #1: The City of White Rock will adopt a Vision Zero strategy by 2022.

Strategies and Actions

The ITIMP includes one strategy to create Safe Streets, with a number of supporting actions.

Strategy 1.1: Adopt and implement a Vision Zero Strategy containing actionable and measurable road safety targets

As outlined above, Vision Zero is an approach to safe mobility that aims to eliminate death and serious injuries in the transportation system. With a Vision Zero Strategy, there is a clear path to achieving a reduction in the number of traffic fatalities and serious injuries, making White Rock a safer place to walk and move for everyone. To understand that the scale of personal loss and financial cost of road trauma can be prevented through targeted policy, programming and monitoring suggests that maintaining the status-quo is negligent and enables the unnecessary loss of life. There is an economic and ethical incentive to implement and meet Vision Zero targets.

Vision Zero follows the 'Safe Systems Approach,' which aims to create a safe mobility system forgiving of human error. Everyone involved in the transport system, including planners, engineers, policy makers, and police officers, have a shared responsibility with road users for designing a road system that does not allow human error to result in serious or fatal outcomes.
The Safe Systems Approach utilizes four pillars – Safe Roads, Safe Speeds, Safe People (or road users), and Safe Vehicles. Sometimes a fifth pillar – Post-Crash Care – is also included. **Figure 11** outlines the Safe Systems Approach. This ensures a holistic approach is taken to Vision Zero.
Each of these pillars are described in further detail below, along with strategies the City can take for each pillar.

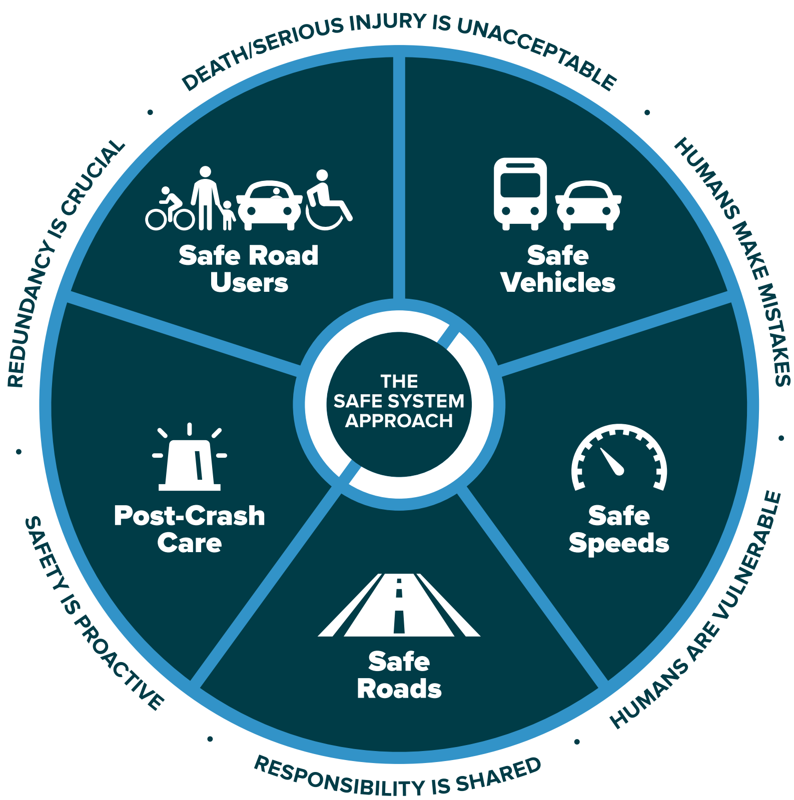


***Figure 11**: Vision Zero Safe Systems Approach (Source: US DOT Federal Highway Administration)*

- **Safe Roads:** Safe road design is crucial for reducing the risk of severe injury. Treatments to create safe roads are broad and varied; White Rock's context requires safe design standards and treatments that prioritize vulnerable road users.
- **Safe Speeds:** Speed is a key factor in motor vehicle accidents, and higher speed increase the severity of all crashes, the number killed and seriously injured. By managing speeds, we decrease the likelihood of crashes and the chances of injuring the driver or other road users. Speeds can be managed in a variety of ways such as traffic calming, monitoring speeds, signage, and enforcement. While enforcement is key to managing speeds, automated enforcement is proven to reduce collisions.
- **Safe People:** We all have a role to play in road safety. This pillar considers human behaviours such as following the rules of the road that can lead to or avoid collisions, ensuring all road users abide by the rules of the road, and enforcing these behaviours in situations where necessary. Interventions can include education campaigns, school travel planning and annual safety audits.
- **Safe Vehicles:** As technology develops and grows our ability to prevent collisions and lessen injuries is stronger. White Rock should leverage technological advances to make the city a safer place for all road users, educating those on new industry advances.
- **Post-Crash Care:** includes the emergency responders that stabilize injuries and transport people to the hospital, as well as the forensic analysis at the crash site, traffic incident management, and other related activities.

This strategy includes the following 6 actions, as described in further detail below:

1.1A Adopt and implement a Vision Zero Strategy

1.1B Improve and enhance existing design standards and intersections to improve safety for all road users

1.1C Develop an annual traffic data collection program to systematically monitor traffic volumes and speeds to inform a systematic, objective approach to addressing transportation issues

1.1D Review traffic data and identify streets that would benefit from traffic calming, traffic diversion, and speed reduction.

1.1E Support education initiatives and programs to encourage all road users to safely use the transportation network

1.1F Design and build transportation infrastructure for vulnerable road users of all ages and abilities

Action 1.1A: Adopt and implement a Vision Zero Strategy

Adopting and implementing a Vision Zero Strategy is a foundational step towards improving traffic safety in White Rock. Adopting and implementing this strategy will require work on the part of City staff, but there are excellent resources available to assist in this process. **Vision Zero Network**, a collaborative campaign working to advance Vision Zero policy across the US, has developed a resource titled Guidelines for an Effective Vision Zero Action Plan. This guide is designed to help cities who have committed to Vision Zero implement a concrete and action driven Vision Zero Strategy that is contextually relevant. The guide lays out foundational elements and actionable strategies, each underpinned by a process of continued community engagement and attention to equity. The City should use this guide to help adopt and implement a Vision Zero Strategy.

Action 1.1B: Improve and enhance existing design standards and intersections to improve safety for all road users

There are a number of specific actions the City should take to improve and enhance existing design standards and intersections for all road users, including:

- Conduct a comprehensive **road safety review** to identify the top collision locations in the City along with identification of contributing factors, issues, and mitigation measures for each location.
- Work with the City of Surrey to implement **fully protected left turns** at all signalized intersections.
- Work with the City of Surrey to provide **Leading Pedestrian Intervals** at all signalized intersections
- Install **Rectangular Rapid Flashing Beacons (RRFBs)** at uncontrolled approaches to improve pedestrian safety, where warranted.
- **Reduce curb radii** where possible with any new and improved street designs to prioritize slower turn movements and improve pedestrian safety, while ensuring design and control vehicles can be accommodated.
- Develop a formal process to track resident complaints related to **sightlines and speeding issues** and develop a process to evaluate and monitor those concerns and implement mitigation measures if warranted. A number of sightline and speed issues were identified through the ITIMP process and are summarized in **Appendix C**, along with other identified issues. However, it is recognized that the current approach is ad-hoc and not formalized.

Action 1.1C: Develop an annual traffic data collection program to systematically monitor traffic volumes and speeds to inform a systematic, objective approach to addressing transportation issues.

The City regularly receives complaints from residents about a wide range of transportation issues. Common complaints include speeding and short-cutting traffic on residential streets. However, the City does not have a formal process for collecting these complaints or for analyzing the warrant for improvements. The City should develop an annual traffic data collection program to systematically monitor traffic volumes and speeds, including residential streets. The City could develop a rotating list of streets to be included over a 3–5-year period to ensure it has objective data that it can use to respond to request complaints. The City should also develop a formal process to receive requests for traffic calming and should develop an objective approach to addressing transportation issues based on this data.

Action 1.1D: Review traffic data and identify streets that would benefit from traffic calming, traffic diversion and speed reduction.

Travel speeds are the main factor in how serious a crash will be and whether a crash occurs at all. The risk of death and injury increases significantly as travel speeds increase. Research has shown that a pedestrian struck at 30 km/h has a 90% chance of surviving, while at 50 km/h they have only a 15% chance of survival. This underscores the need to ensure that speed is managed appropriately within the City. 50 km/h is the statutory default speed limit for municipal roadways in the BC Motor Vehicle Act (BC MVA) unless noted otherwise. The City of White Rock has adopted the Street and Traffic Bylaw, 1999, No. 1529, which outlines local regulations for motor vehicle speed limits within its municipal boundaries. Communities around North America are considering opportunities to reduce speed limits through a range of approaches.

However, it is important to note that changing the posted speed limit alone may not alter actual travel speeds on a roadway. Motorists tend to travel at speeds that feel comfortable based on road geometry and conditions, which can result in non-compliance and enforcement challenges. In addition to the required speed limit signs, traffic speed management approaches such as enforcement, traffic calming, traffic diversion, and other supporting measures (e.g. surface treatments, pavement markings, speed feedback signs, etc.) may be required. Speed limit changes should also be implemented along with education in order in inform road users of the change and encourage compliance. This could include initial warnings and advertising with onsite signage of the new measure.

The City should continue to monitor collision data (see Strategy 3.2), police data (e.g. speeding infractions), and resident complaints to identify streets that would benefit from traffic calming, traffic diversion and speed reduction. Engineering measures such as traffic calming and traffic diversion can help to reduce operating speeds and create a safe multi-modal environment.

Action 1.1E: Support education initiatives and programs to encourage all road users to safely use the transportation network

Education is a key component of a successful Vision Zero Strategy and achieving the goals and objectives of the ITIMP. Vision Zero is only successful if all road users understand the rules in place, abide by the rules, and work to improve road safety. Education initiatives and programs can help to bridge any of these gaps, and to create a coordinated effort to realizing road safety goals. The following education initiatives and programs should be considered by the City to produce a culture shift towards road safety in White Rock.

- Work with regional partners to develop and implement **education campaigns** that resonate with White Rock residents around the importance of safety, the cost to the community, and action that can be taken to make White Rock's roads safer.
- Continuing to support **School Travel Planning** initiatives to reduce traffic at school sites and to encourage more active school travel among students.
- Establish and foster **relationships with community organizations** that will be able to deepen White Rock residents' understanding of road safety such as schools, seniors'

organizations, and non-profit organizations. These community organizations can also help to ensure equity-seeking groups are included in the conversations around Vision Zero and road safety.

Action 1.1F: Design and build transportation infrastructure for vulnerable road users of all ages and abilities in conjunction with the BC Active Transportation Design Guide

Adopting a modal hierarchy that considers the needs of pedestrians, cyclists, public transit, and goods and services movements before that of private automobiles in the urban area centers vulnerable road users in the planning process. By considering needs of these priority modes in all planning activities, future transportation plans, programs and projects will provide better, safer and more convenient solutions and encourage over time more people to walk, cycle, and ride the bus. This action is an overarching strategy to prioritize vulnerable users based on the modal hierarchy that will inform the development of the sidewalk network and bicycle network, among others. Specific examples are provided in their respective strategies.

In order to ensure the City is designing and building infrastructure for vulnerable road users of all ages and abilities, the City should ensure it follows the recommendations and design guidance from the BC Active Transportation Design Guide as well as other national and international best practices.


People-first
Streets

4.3 PEOPLE-FIRST STREETS

Background

People-first streets recognizes that the transportation plan should take a human-centred approach and create streets that are convenient, attractive, safe, and inviting for people of all ages and abilities. This theme focuses primarily on creating a more walkable City, where walking is the preferred mode of transportation for short trips and where walking is safe, comfortable, accessible, and inviting for people of all ages and abilities. Walking was identified as the highest priority for improvements by mode of transportation in the first survey, and was the highest ranked strategy in the second survey, with 85% of respondents ranking this strategy as *Very important* or *Fairly important.*

Walking is the most fundamental form of transportation and is essential for health and well-being. Walking is a part of every trip, whether that trip is made by car, transit, or bicycle. If suitable conditions exist within a community – such as having a complete, connected sidewalk network and major destinations close to where people live – walking trips can be increased and lengthened, which helps to reduce automobile dependence and greenhouse gas (GHG) emissions, improve public health outcomes, and create more livable and vibrant communities. It is important for White Rock to promote walking and improve the overall user experience in order to increase walking mode share.

Walking to everyday destinations can be easy if city streets and neighbourhoods are safe and well-designed for pedestrian safety and accessibility. The pedestrian environment must be accessible to a large cross-section of people, including people with disabilities, seniors, and parents with children. Accessibility is particularly important at intersections and crossings, as a difficult crossing can act as a barrier to walking, making trips much longer or creating safety issues, particularly for seniors, children, and people with physical and cognitive disabilities.

The first survey found that that lack of sidewalks or pathways was the most significant issue or challenge for walking in White Rock, followed the condition of sidewalk and pathways and intersection safety. Survey respondents stated that building more trails and pathways, widening and improving existing sidewalks, and building more sidewalks were the top three things the City could do to encourage more walking in White Rock.

This theme includes the following three strategies to create people-friendly streets in White Rock:

- **Strategy 2.1: Develop an expanded network of sidewalks and pathways to reduce barriers and create a more walkable city for people of all ages and abilities**
- **Strategy 2.2: Develop and design universally accessible streets**
- **Strategy 2.3: Create safe, welcoming, and comfortable places that attract pedestrians and make walking enjoyable**

Alignment with Areas of Focus

The strategies and actions for creating people-friendly streets align with a number of areas of focus for the ITIMP, including:

- **Walking:** Walking is the preferred mode of transportation for short trips; however, there are significant barriers to walking in White Rock that need to be addressed, including a lack of sidewalks on many streets, accessibility challenges, and topography. By filling in gaps in the sidewalk network, building a greenway network, and improving overall accessibility, White Rock residents can have the space and confidence needed to travel throughout White Rock by walking.
- **Land Use:** Land use has a profound influence on our travel patterns and can help to encourage walking through higher densities and mixed land uses in key areas as well as streetscape improvements to improve the attractiveness and vibrancy of the White Rock's streets. The transportation system can support land use patterns with appropriate investments to enable and encourage people to walk, cycle, and use transit. Higher sustainable mode shares are an indicator of how integrated the city's transportation system is with land use patterns. It is also an indication of how investments in sustainable modes can shift the amount of driving in support of a healthier and more vibrant community.

Big Moves

BIG MOVE #2: All streets within 100 metres of a transit stop will have sidewalks on both sides of the street by 2050.

Strategies and actions

The ITIMP includes three strategies to create People-first Streets. Each strategy is accompanied by several supporting actions that seek to create streets that are comfortable and safe for everyone.

Strategy 2.1: Develop an expanded network of sidewalks and pathways to reduce barriers and create a more walkable city for people of all ages and abilities

Providing a complete and connected pedestrian network is critical to creating an environment where people of all ages can walk for a variety of trip purposes. While White Rock already has an extensive sidewalk network, there are significant gaps in the network, as 40% of streets have no sidewalk and 22% have a sidewalk on only one side of the street. Many areas in White Rock do not have sidewalks connecting to schools, transit, recreation, or shopping areas, which creates connectivity and accessibility issues for pedestrians.

Sidewalk coverage and filling in gaps in the network is particularly important within high activity areas such as the Town Centres, along bus routes, and near parks, schools, hospitals, and other community facilities.

White Rock also has a significant amount of sidewalk encroachments which can endanger pedestrians. A proactive long-term plan to "free up" City owned boulevard space is required. Encroachments should be used to gauge ease of implementation but not prioritization.

Greenway corridors can also facilitate pedestrian and cycling movement in an efficient and comfortable environment. Various types of greenways such as multi-use pathways, off-street bicycle pathway and neighbourhood bikeways are recommended. The plan considers both interim (cost-effective) and long-term (through development) treatments for greenways throughout White Rock.

This strategy includes the following 3 actions, as described in further detail below:

2.1A Fill in gaps in the sidewalk network by strategically investing in new sidewalks on existing streets

2.1B Review and expand on the encroachment policy to allow for safe and seamless sidewalk and pathway connections

2.1C Identify, plan for, and invest in greenway corridors to seamlessly connect the pedestrian network

Action 2.1A: Fill in gaps in the sidewalk network by strategically investing in new sidewalks on existing streets

Although White Rock has an extensive sidewalk network, there are significant gaps in the network. This can create connectivity and accessibility issues for pedestrians. Sidewalk coverage and filling in gaps in the network is particularly important within high activity areas, along bus routes, and near parks, schools, hospitals, and other community facilities.

The City should work to strategically invest in completing the sidewalk network. The Big Move for walking aims to provide sidewalks on both sides of all streets in White Rock within 100 metres of a transit stop by 2050. The proposed long-term sidewalk network is shown in **Map 3**. **Map 4** shows the same network overlain with a 100m buffer from each transit stop.

The network was developed based on the following principles:

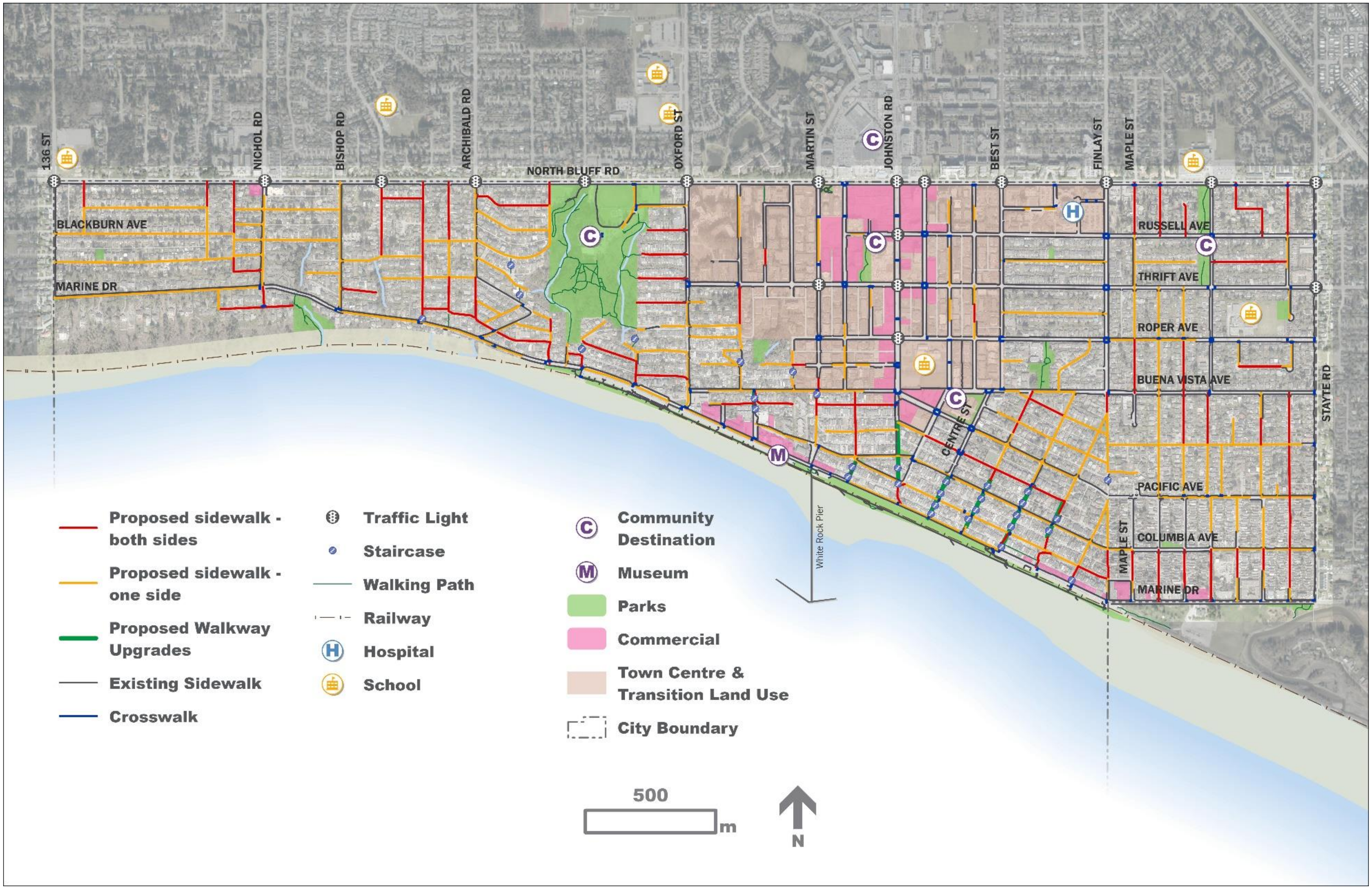
- All streets should have a sidewalk on at least one side of the street over the long-term.
- All streets in the Town Centre area should have a sidewalk on both sides of the street.
- All arterial and collector streets should have sidewalks on both sides of the street.
- All bus routes should have sidewalks on both sides of the street.
- All streets in proximity (100m) to the waterfront should have sidewalks on both sides of the street.

The long-term sidewalk network also identifies priorities for implementation, with higher priorities focused primarily on filling in gaps in the network and completing the sidewalk network in the Town Centre. It is recognized that the implementation of sidewalks will be a challenge in many areas of the City due to steep topography and existing encroachments, among other things. The plan recognizes these challenges and identifies them on the long-term sidewalk network map; however, the plan also recognizes that implementing these sidewalks is a priority despite these challenges.

New sidewalks can be implemented in three primary ways:

- **City-initiated sidewalks,** which focus on filling in gaps on major streets and on bus routes, as well as connections to parks and schools.

- **Developer-initiated sidewalks,** which will be required through redevelopment as per the City's Development Bylaw. These can be triggered in areas of redevelopment as well as through residential infill. For residential infill, the City should consider cash-in-lieu payments for sidewalks to avoid 'leapfrog' sidewalk development.
- **Resident-initiated sidewalks,** where residents can request a sidewalk through the Local Improvement Process. Sidewalk requests would undergo an engineering evaluation by City staff and would then go through a sidewalk evaluation matrix.



Map 3: *Long-Term Pedestrian Network*

Map 4: *Bus Stop 100m Buffer with Long-Term Pedestrian Network*

Action 2.1B: Review and expand on the encroachment policy to allow for safe and seamless sidewalk and pathway connections

As noted above, the implementation of many sidewalks in White Rock can be challenging due to existing encroachments, such as hedges, gardens, pathways, retaining walls, fences, and staircases which many property owners may have implemented within the public right-of-way to beautify or improve accessibility to the area in front of their home. Encroachments within the public right-of-way impact the ability to provide sidewalks and can reduce sightlines, thus endangering pedestrians.

The City has an existing Roads/Road Allowance Policy (Policy ID: Operations/Eng. 600) that prohibits encroachments or improvements on the Road Right of Way. The City should review and expand on this policy to outline further measures that will improve walking connections and transportation safety. Additional details to cover could include the following:

- Landscape features including fences, raised planting beds, decks, pergolas, artificial turf, lighting, and irrigation systems should be prohibited within the boulevard without a permit.
- Vegetation should be kept clear of sidewalks.
- Traffic and information signs must be clear of vegetation.

The City should undertake a community-wide review of encroachments, identifying encroachments in the public right of way. The City should also develop a webpage and information and education materials to support resident awareness around encroachments.

Action 2.1C: Identify, plan for, and invest in greenway corridors to seamlessly connect the pedestrian network

The pedestrian network is an integrated network that includes off-street trails as well as sidewalks. Urban trails and greenways are an excellent way to connect the pedestrian network, remove barriers to walking, and ensure walking is accessible for people of all ages and abilities. Greenways can enhance the experience of walking and cycling with parks, landscaping, public art, and amenities. These off-street trails and pathways make up an important part of the city's pedestrian network, link key destinations, and improve walkability within the community, where possible. Greenways also attract residents and visitors alike and are an important recreational activity in White Rock. Greenways encourage all forms of active transportation, including walking, jogging, cycling, skateboarding, rollerblading, and people using mobility aids.

The proposed greenway network is shown alongside the proposed cycling network on **Map 11** in the Connected Streets section below. Additional details such as greenway facility type and proposed cross-sections for major streets are also provided in that section.

Strategy 2.2: Develop and design universally accessible streets

Designing city streets with pedestrian safety and accessibility in mind can make it easy and convenient to walk to everyday destinations. Best practice in accessibility is to follow Universal Design principles, which create inclusion for all by making designs equitable, flexible, and simple, and intuitive to navigate. Universal Design ensures that the transportation network is accessible people of all ages and abilities. This includes people with reduced mobility, vision, hearing, strength, dexterity, and comprehension. Accessibility is especially important in White Rock due to its aging demographic and steep topography.

It is important that the pedestrian environment be accessible to people of all ages and abilities, including people with disabilities, seniors, and parents with children. The walking environment must, therefore, include accessibility features to accommodate the unique needs of these groups and to provide better pedestrian experience for everyone. Improving accessibility at intersections and crossings is important, as difficult crossings can act as barriers to walking. This can lengthen trips and create safety issues, particularly for seniors, children, and people with physical and cognitive disabilities.

Several locations throughout White Rock, particularly intersections, present potential accessibility and safety issues, predominantly for persons with disabilities and older adults. Wide crossing distances, intersections without curb let downs, and desirable crossing locations without crosswalks can create challenges to navigating the city as a pedestrian.

This strategy includes the following 4 actions, as described in further detail below:

2.2A Update the City's design standards and ensure all new and improved streets follow universal design best practices

2.2B Identify and support trail and pathway enhancements such as staircases

2.2C Identify new crosswalks and upgrade existing crosswalks to improve pedestrian accessibility

Action 2.2A: Update the City's design standards and ensure all new and improved streets follow universal design best practices

The BC Active Transportation Design Guide provides a universal accessibility design toolkit covering a range of strategies that can improve the pedestrian network in White Rock, including:

- **Accessible sidewalks** (at least 1.8 metres wide) that are **free of obstructions.**
- **Ensuring surfaces are smooth**, firm, slip-resistant, free of tripping hazards, and well maintained year-round.
- **Accessible curb ramps**.
- **Frequent benches and resting spots**, especially on uphill segments.
- **Detectable warning surfaces.**
- **Audible pedestrian signals**,
- **Pedestrian scale lighting and improved lighting and crosswalks**,
- **Intuitive wayfinding**.

The City should update its design standards in accordance with the BC Active Transportation Design Guide and other national and international best practices in universal design, and should ensure that the design of all new and improved streets follows these design standards and best practices.

Action 2.2B: Identify and support trail and pathway enhancements such as staircases

Trails and pathways in White Rock add important connections where roads do not. However, many of these stairways are not well marked, are not accessible, and are not necessarily inviting due to overgrown trees and bushes, and substandard infrastructure. Ladder sidewalks and stairways are also used in White Rock but can present a barrier for people with reduced mobility and for cyclists. The City should conduct an accessibility audit of existing trails and staircases to identify opportunities to improve accessibility.

Action 2.2C: Identify new crosswalks and upgrade existing crosswalks to improve pedestrian accessibility

Several locations throughout White Rock, particularly intersections, present potential accessibility and safety issues, predominantly for persons with disabilities and older adults. Wide crossing distances, intersections without curb let downs, and desirable crossing locations without crosswalks can create challenges to navigating the city as a pedestrian.

There a range of potential pedestrian crossing treatments, ranging from unmarked crossings to marked crosswalks, signalized crossings, and grade separation. In addition, there are a number of features that can be used at intersections to improve pedestrian safety and accessibility, including:

- **Marked crossings:** Enhance the visibility and safety of crossing pedestrians. High visibility crosswalk markings are more visible to approaching vehicles. The crosswalks, while meeting standards, can also be marked with decorative colour designs to create a visually appealing facility and make them stand out visually to motorists.
- **Reduced crossing distances:** Installing curb extensions, bus bulges, and median islands can help reduce pedestrian crossing distances while providing additional spaces for pedestrian amenities, such as landscaping and benches. Changing the curb radius by installing a curb extension can also reduce the speed of turning motor vehicles, making the intersection safer for pedestrians.
- **Lighting:** Street lighting should be present at all intersections to ensure people walking are clearly visible at night.
- **Audible pedestrian signals:** Used at signalized intersections to assist pedestrians with disabilities by communicating when to walk in non-visual formats, including audible tones, speech messages, or vibrating surfaces. Braille can also be found on pedestrian signals.
- **Rectangular Rapid Flashing Beacons:** Rectangular Rapid Flashing Beacons (RRFBs) are a type of active warning beacon with amber lights that flash in an irregular pattern. They make the crosswalk more visible and can significantly improve motor vehicle driver yielding behaviour. RRFBs may be used at mid-block crossings and unsignalized intersections. They can be user activated using a push button or can be activated passively by detecting nearby users.
- **Pedestrian activated pushbuttons:** Provide an opportunity for pedestrians to trigger a change to the traffic signal, allowing them to cross the street.
- **Pedestrian countdown timers:** Indicate to people walking how much time they have to cross the street at a signalized intersection. Countdown timers may be installed with or without pedestrian push button actuation.

It should be noted that any new crosswalks should follow an engineering warrant process and be warranted based on the Transportation Association of Canada's Pedestrian Crossing Control Guidelines.

Strategy 2.3: Create safe, welcoming, and comfortable places that attract pedestrians and make walking enjoyable

Public spaces that are welcoming and interesting invite residents and visitors to enjoy their environment by foot instead of car. White Rock's planning should emphasize design interventions, including creating plazas, enhancing the tree canopy, and creating unique gateway treatments at the entrance to special areas such as the waterfront. These treatments can help create destinations in and of themselves and produce lively, vibrant, pedestrian-oriented streetscapes.

In White Rock, there are limited pedestrian amenities in key pedestrian areas that would provide places for pedestrians to want to stay for extended periods of time. Part of creating a city that has high levels of pedestrian activity involves creating areas that are attractive, interesting, and provide a place where people would like to stop and linger. Currently, the Town Centre and Waterfront areas are attracting a number of pedestrians, but they are not necessarily 'great places' where pedestrians feel comfortable and invited to stay.

Initiatives that support and encourage more walking are another way to help shift travel habits, and increase community interest. Forming clubs or groups can help get people active while encouraging social interaction. A common example of a walking club is a Senior Walking Group, which provides many social and health benefits.

This strategy includes the following 2 actions, as described in further detail below:

2.3A Support other organizations in their initiatives to promote walking

2.3B Ensure new developments provide high quality urban design and placemaking features

Action 2.3A: Support other organizations in their initiatives to promote walking

Forming clubs or groups can help get people active while encouraging social interaction. A common example of a type walking club is a Senior Walking Group, which provides many social and health benefits. Other examples include Safe Routes to School programs, developing neighbourhood walking maps, and improving pedestrian wayfinding (maps, signage, kiosks).

Coordination with non-profit organizations, community groups, and other agencies (e.g. ICBC, police, school districts) can help improve the effectiveness of these programs. The City should partner with other organizations, agencies, non-profits, and other nearby communities to gain support for these programs and to help make them more effective.

Action 2.3B: Ensure new developments provide high quality urban design and placemaking features

Leveraging new developments as an opportunity to make White Rock's public spaces more inviting and comfortable for pedestrians is key. The City should continue to require that all new developments provide high quality urban design and placemaking features such as pedestrian-scale lighting, benches, and other urban design features.

Providing placemaking inspiration and toolkits for developers can help to guide enhancements. For example, TransLink has developed a **Tactical Urbanism Toolkit** that can be used as a guide for demonstration and interim projects focused on active transportation and placemaking. Tactical urbanism is a set of tools and techniques that can be used to pilot low cost, rapid implementation improvements to the street, and they can greatly enhance the pedestrian realm. Projects can last for hours, days, or weeks, and some become permanent.

Connected Streets

4.4 CONNECTED STREETS

Background

White Rock is a dense and vibrant community, with a unique position in the region as a tourist destination with a bustling waterfront. Providing multi-modal connections within the City and to the surrounding region is important to support the local and regional economy, including regional commuting patterns, tourism and economic development, and the growth and development of the Semiahmoo Peninsula together with the City of Surrey.

White Rock's street network is largely built out and significant changes to the street network are not anticipated. The strategy for Connected Streets is to manage the existing street network and to identify various minor improvements that could be implemented to improve overall efficiency, operations, and safety for all road users with priority for improvements following the modal hierarchy. In that regard, the street network improvements seek to improve conditions for walking, cycling, and transit before private vehicles. The street network improvements are multi-modal improvements that integrate the recommendations.

This theme focuses on multi-modal streets that provide connections both with the City as well for medium and longer-distance trips that focus on transit, cycling, vehicles, or goods movement. In order to maintain strong connections, the ITIMP focuses on a Complete Streets approach to street design that considers the surrounding context, land use and all street users. In the past, most streets in White Rock have been designed mainly to accommodate vehicle travel; however, streets should be comfortable places for all road users – places that feel safe, interesting and convenient to travel, whether by car, foot, bicycle or bus. **In a Complete Street, the design and operation of the entire road right-of-way is considered to support all road users.**

This balanced approach results in streets that function better for more street users in comparison to historic designs that emphasized motor vehicle operations. Complete streets can reduce collision rates (particularly for vulnerable road users such as pedestrians and cyclists), better support adjacent land uses (both businesses and residents), support shifts to sustainable transportation travel modes (walking, cycling and transit), and improve the quality of streets as positive public spaces within communities.

This theme includes the following four strategies to create people-friendly streets in White Rock:

- **Strategy 3.1: Update street classification network and design standards following complete streets principles**
- **Strategy 3.2: Improve intersections that have been identified as having safety, operational, or geometric issues**
- **Strategy 3.3: Enhance the transit user experience through improved service, bus stop amenities, and accessible connections to transit**
- **Strategy 3.4: Develop a comfortable, complete, and connected cycling network to support local and regional cycling trips**

Areas of Focus

The strategies and actions for creating connected streets align with a number of areas of focus for the ITIMP, including:

- **Complete Streets:** By focusing on all road users, Complete Streets help to make streets connected and ensure that they serve more than simply transportation function. Complete Streets incorporate active transportation modes, vibrant streetscapes, access to transit, on-street parking demands, speeds, traffic calming, safe routes to schools and access to parks and recreation. Complete Streets facilitate the safe, comfortable and enjoyable connections between White Rock's neighbourhoods and beyond.
- **Street Network:** White Rock's street network accommodates a variety of travel modes and uses. Ensuring a robust road network that safely and comfortably incorporates all modes is important for economic growth and community livability. By balancing the needs of all road users, the City can balance the demand for streets and encourage more sustainable modes of transportation.
- **Transit:** Not all residents have access to automobiles, including youth and many seniors. A robust and safe transit network – and integration with pedestrian, cycling and street network – is important for providing effective access between the Town Centre and the waterfront as well as ensuring regional connections.
- **Cycling:** Cycling is a popular and growing mode of transportation in Metro Vancouver, and by developing a comfortable, complete, and connected bicycle network and incorporating All Ages and Abilities cycling facilities into street designs, cycling can become a more attractive choice for transportation and recreation trips in White Rock.
- **Regional/External Connections:** White Rock is uniquely connected to the Metro Vancouver region as both a tourist destination, a retirement community, and for commuters to other parts of the region. Connections to neighbouring municipalities and the region are important to social connections, economic prosperity, and livability.

Big Moves

BIG MOVE #3: White Rock will follow Complete Streets principles in its roadway design.

BIG MOVE #4: White Rock will have an All Ages and Abilities (AAA) bicycle network by 2030.

BIG MOVE #5: All bus stops in White Rock will be accessible by 2030.

Strategies and actions

The ITIMP includes five strategies to create Connected Streets. Each strategy is accompanied by several supporting actions that seek to create streets that are comfortable and safe for everyone.

Strategy 3.1: Update street classification network and design standards following complete streets principles

Travel by private vehicle is the dominant mode of transportation in White Rock today, as vehicles account for approximately 80% of trips made by White Rock residents. For many residents and businesses, travel by private vehicle is currently their only viable travel option. The City's street network is made up of different components, each serving specific functions within the overall network.

While streets provide an important function of ensuring mobility and access to a community, they are not just corridors for moving vehicles and goods. They are also public spaces that can largely shape and define the character of a community. As roadways, the street network represents the primary component of the City's transportation system, as it supports not only automobile traffic, but all other modes of travel as well. The City's street network also makes up a significant portion of the City's public space.

Complete Streets move people, not just cars. They are designed and operated to enable safe and comfortable use for all, regardless of age or ability. They recognize that streets have different roles, functions, and characteristics depending on their context. Through attractive design, enhanced safety, and multi-modal infrastructure, streets can be transformed into spaces that increase safety, promote a more active lifestyle, decrease carbon dioxide emissions, encourage a sense of community and support local businesses. The City should update its street design standards to include and support complete streets principles in future design guidelines.

Complete Streets require planning and design that goes beyond the typical street function of supporting through traffic. Planning and designing Complete Streets means providing characteristics that make streets destinations – places for people to be, instead of places to move through. There are several principles that can work together to create a Complete Street, as outlined below:

Transportation:
- Mobility
- Deliveries & Emergency
- Safety
- Curbside Management
- Accessibility
- All Users & Modes

Placemaking
- Land Use
- Delightful
- Sociable
- Vibrant
- Weather Protection
- Contextual

Adaptable:
- Flexible
- Smart
- Reliable

Green Infrastructure
- Storm-water Management
- Street Trees
- Habitat

This strategy includes the following 4 actions, as described in further detail below:

3.1A Review and update street classifications to prioritize pedestrians and other vulnerable road users and ensure all streets are functioning as intended

3.1B Review and update design standards, including cross-sections, to prioritize complete streets

3.1C Develop complete streets improvement strategies for major streets

Action 3.1A: Review and update street classifications to prioritize pedestrians and other vulnerable road users and ensure all streets are functioning as intended

The City's existing street network is divided into a street network classification hierarchy that reflects the mix of traffic and function of each street. The street network classification represents the typical form and function for each type of street, although there may be some variations in the actual characteristics of various roadways.

The City of Seattle's Seattle *Streets Illustrated (2020)* provides a useful breakdown of Essential Right-of-Way functions. These have been adapted for consideration by White Rock and used in the update to the street classification. The seven functions are:

- **Mobility for people.** The corridor moves people, typically faster and / or over longer distances. In high mobility corridors, interruptions to flow are reduced or eliminated and capacity is high. Examples include bus lanes, bicycle facilities (especially those with a regional or longer-distance network function), sidewalks, high occupancy vehicle lanes, turn lanes, and general-purpose travel lanes.
- **Mobility for goods.** This is similar to mobility for people, but focused on the movement of goods and services that may be travelling by heavy truck, light trucks, delivery vehicles, cargo bicycles, or by foot. Similar to mobility for people, high mobility functions typically have higher capacity and travel speeds with few interruptions. Examples include truck lanes, general purpose travel lanes, turn lanes, and bicycle facilities (where they serve a delivery / goods movement function).
- **Access for people.** The corridor facilitates people arriving at their destination or transferring between modes. These activities typically interrupt travel flows, which is why mobility and access are typically opposing functions that must be intentionally balanced on each roadway corridor. Examples of access for people includes building entryways, bus stops, bicycle parking, passenger loading zones (i.e. pick-up / drop-off locations for private passengers, taxis, ride hailing / ride sharing, and future automated vehicle services), short-term parking, and driveways.
- **Access for goods.** The corridor facilitates goods and services reaching customers and markets or transferring between modes. Similar to access for people, these activities typically interrupt travel flows. Some examples of access for goods include on-street commercial vehicle loading zones, on-street transload locations (i.e. truck to bicycle courier) and driveways.

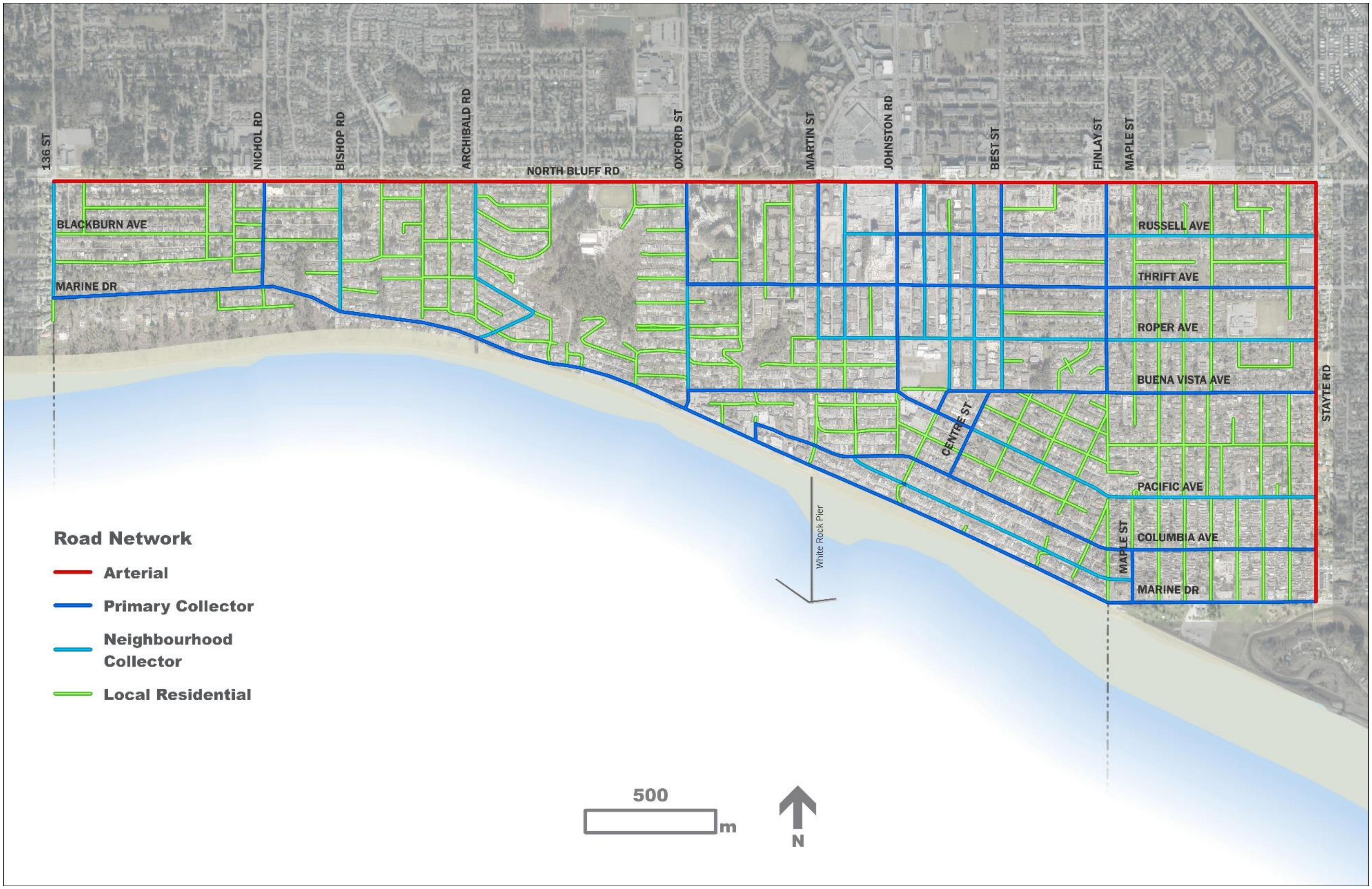
- **Activation.** The corridor serves as a social and gathering space and supports public life. Examples of activation function include parklets, patios, public art, and seating. Activation functions are typically highly tied to land use.
- **Greening.** The corridor has plantings and / or stormwater management features that enhance aesthetics and environmental health. Examples of greening include street trees, bushes and other plantings, and rain gardens.
- **Parking.** The corridor provides parking for private and / or public vehicles or equipment. Examples of parking include long-term on-street parking and reserved spaces (e.g. spaces reserved for emergency service vehicles, City vehicles, construction equipment stored off-site, etc.).

These functions combine in different ways on different corridors. Each classification of roadways has a different combination of primary and limited or prohibited functions. The City's street network is made up of **arterial**, **primary collector**, **neighbourhood collector**, and **local streets** as well as lanes. The proposed street classification along with existing and proposed intersection controls is shown in **Map 5**. A summary of the primary, context-dependent, and limited or prohibited functions of each of these classifications are shown in **Table 2**.

Table 2: *Functions by Street Classification*

CLASSIFICATION	PRIMARY FUNCTIONS	CONTEXT DEPENDENT FUNCTIONS	LIMITED OR PROHIBITED FUNCTIONS
Arterial	Mobility for people Mobility for goods	Activation Greening Access for people Access for goods	Parking Access for people (via vehicle)* Access for goods
Primary Collector	Mobility for people Access for people Access for goods	Activation Greening Mobility for goods**	Parking
Neighbourhood Collector	Access for people Access for goods Mobility for people	Activation Greening Parking	Mobility for goods
Local	Access for people Access for goods Greening	Activation Parking Mobility for people	Mobility for goods

* Access for people via private vehicle on arterials is typically limited to facilitate faster, higher capacity mobility for all modes.
** Although most truck routes are along Arterials, Primary Collector roadways often serve to connect Arterials to Industrial areas or other destinations. Trucks are permitted to travel from a truck route to their destination by the most direct path and Primary Collectors serve a mobility for goods function in these contexts.



Map 5: *Updated Street Network Classification*

Action 3.1B: Review and update design standards, including cross-sections, to prioritize complete streets

The City's Road Subdivision Bylaw includes design standards, including cross-sections, for each road classification. The City should update the design standards in this bylaw to reflect Complete Streets principles and to align with the recommended form and function of each street classification. In addition to the form and function characteristics outlined in **Table 2**, **Table 3** outlines desired cross-section elements for each form of transportation for each road classification. These desired elements would generally to new roadways or upgraded roadways through redevelopment.

Table 3: *Desired Cross-Section Elements*

CLASSIFICATION	Vehicles	Walking	Cycling	Transit	Parking
Arterial	4 lanes (3.3 – 3.5m)	Minimum 2.0m separated sidewalk on both sides of the street	Minimum 1.8m protected bicycle lane	Frequent or conventional service	Limited or prohibited
Primary Collector	2 lanes (3.0-3.3m*)	Minimum 2.0m separated sidewalk on both sides of the street	Minimum 1.8m protected bicycle lane	Conventional service	Both sides (2.0-2.2m)
Minor Collector	2 lanes (3.0-3.3m)	Minimum 1.8m separated sidewalk on both sides of the street	Separated on-street facilities	Conventional service	One or both sides (2.0-2.2m)
Local	2 lanes (shared roadway with no centreline)	Minimum 1.8m separated sidewalk on at least one side of the street	Shared on-street facilities	Conventional service	Both sides (2.0-2.2m)

*3.3m minimum width required on transit routes

Action 3.1C: Develop complete streets improvement strategies for major streets

The City should work to implement complete to upgrade major streets following Complete Streets principles either through its capital planning or through the redevelopment process. In some cases, the City can work towards its desired standards if it has sufficient right-of-way or by acquiring right-of-way through the development process; however, in many cases, the City will need to consider interim treatments based on the existing right-of-way. This includes cases such as planning for "fixed" transit (see Section 3.3F).

This section summarizes recommended improvements for major streets in White Rock (including arterial and primary collector streets) and provides illustrative cross-sections for interim and ultimate treatments for corridors with significant changes to the cross-section proposed, primarily due to the addition of a greenway.

North Bluff Road

North Bluff Road is an east-west arterial road on the border with the City of Surrey. North Bluff Road generally consists of two travel lanes in each direction, on-street parking on the south side of the street for the majority of the corridor, and dedicated left turn lanes at most major intersections. Road rights-of-way vary between 23 and 26 metres with curb-to-curb widths varying from 16 to 19 metres. North Bluff Road currently accommodates between 10,000 – 15,000 vehicles per day, and this is expected to increase to approximately 13,500 – 19,000 vehicles per day by 2045. North Bluff Road is shared ownership between the City of Surrey and the City of White Rock, with White Rock's jurisdiction on the south half of the roadway. The ITIMP identifies North Bluff Road as a greenway corridor, including All Ages and Abilities bicycle facilities.

Typical cross-sections developed as part of the ITIMP focus on reimagining the City's portion of North Bluff Road in the future based on a 30-metre cross-section (15 metre cross-section within White Rock). This includes both an interim cross-section within the existing right-of-way and an ultimate cross-section with the full right-of-way. The ultimate cross-section focuses on a complete street that accommodates all users by removing on-street parking and acquiring additional right-of-way and would include:

- 2 eastbound travel lanes;
- 2.0 metre landscaped boulevard;
- 1.8 metre eastbound raised bicycle path; and
- 2.0 metre sidewalk.

The interim cross-sections focus on two segments, one of which does not have a raised bicycle path and the other has an interim on-street painted bicycle lane.

Interim **Ultimate**

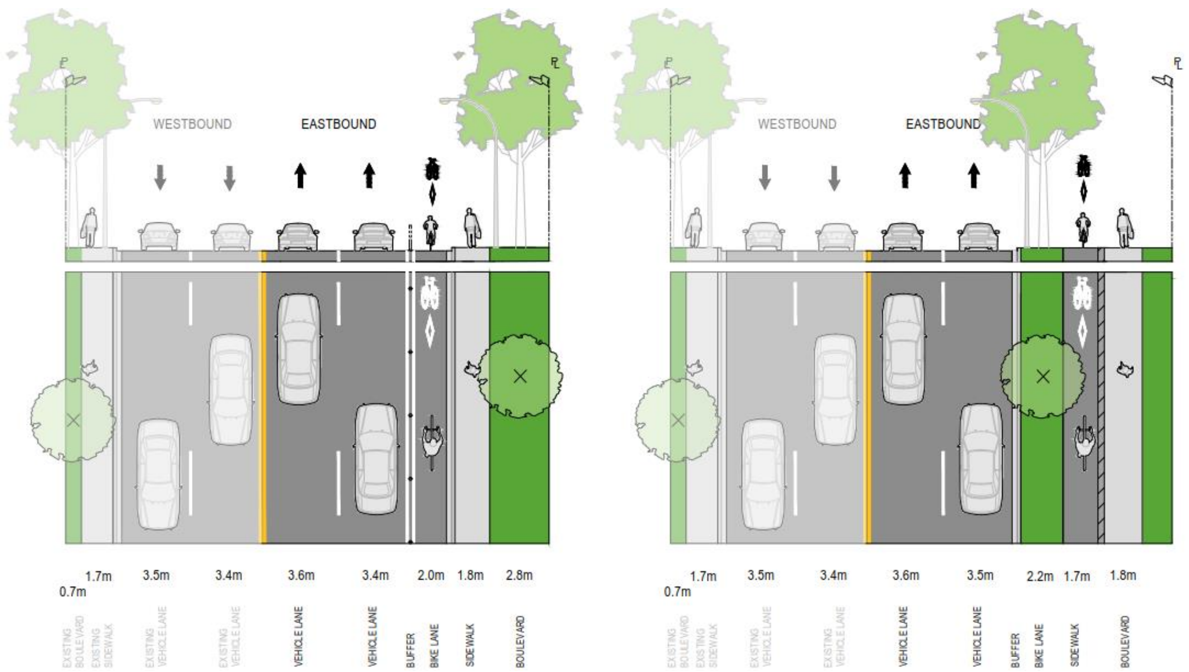


Figure 12: *North Bluff Road Proposed Illustrative Cross-Sections*

North Bluff Road also has a number of safety and operational issues today and in the future. The corridor is home to many of the City's highest collision locations, although this is to be expected as North Bluff Road carries the highest traffic volumes in the City. The highest collision locations include Johnston Road, Oxford Street, Martin Street, Best Street, Finlay Street, and Stayte Road, each of which experience an average of at least 8 reported collisions per year.
Another important measure of traffic operations is Level of Service (LOS), which is a mechanism used to determine how well a transportation facility is operating from a motor vehicle driver's perspective. Levels of service is ranked from A to F, with LOS A representing the best conditions (i.e. free flowing traffic) and LOS F representing the worst traffic conditions (i.e. excessive delay). All intersections along North Buff Road currently operated at LOS C or better during both the AM and PM peak periods, with the exception of North Bluff Road and Kent Street during the PM peak period (LOS D) In 2045, North Bluff Road and Stayte Road is projected to operate at LOS D in the AM peak period, and North Bluff Road and Johnson Road is projected to operate at LOS F in the AM peak period. In addition, several individual movements are projected to have challenges by 2045, including North Bluff Road at Nichol Road (eastbound left turn), Phoenix Street (northbound, all movements), Archibald Street (northbound, all movements), and Martin Street (eastbound left turn).

To help address these safety and operational concerns, the following improvements are recommended at all signalized intersections, in addition to the proposed interim and ultimate cross-section:

- Dedicated left turn lanes at all signalized intersections with fully protected left turn phase
- Raised median separating eastbound and westbound traffic, including adjacent to left turn lanes (see **Figure 13**); and
- Leading pedestrian intervals.

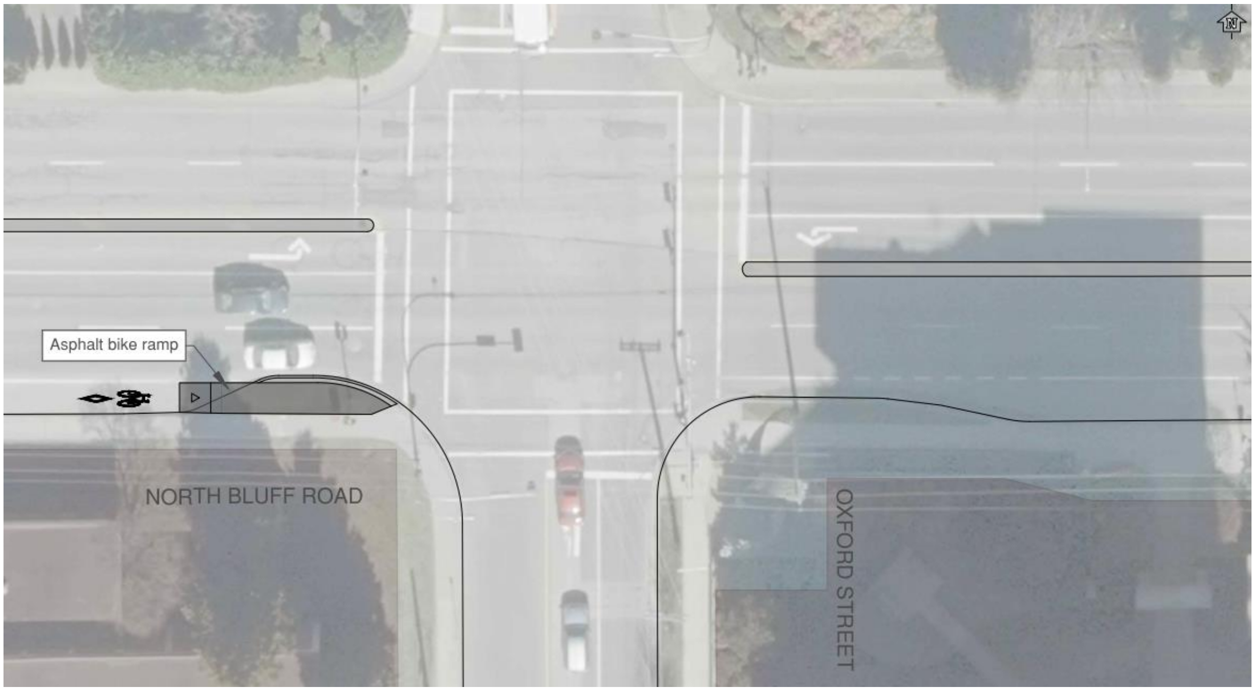


Figure 13: *North Bluff Road Safety and Operational Improvements (Typical Intersection)*

Improvements on North Bluff Road can also be coordinated with a number of other infrastructure improvements, including drainage improvements between west of Kent Street and Stayte Road (Year 5), between Bergstrom Street and west of Chestnut Street (Year 6); and between Cory Road and Nichol Road (Year 6). Pavement upgrades are also a high priority between Bergstrom Road and Lancaster Street, between George Street and Merklin Street, and between Best Street and Stevens Street.

Recognizing the shared jurisdiction of North Bluff Road between the City of White Rock and the City of Surrey, it is recommended that both municipalities work together to develop a corridor study identifying a conceptual design for both interim and ultimate conditions, including opportunities to improve pavement quality and incorporate drainage improvements.

Stayte Road

Stayte Road is a north-south arterial road on the border with the City of Surrey. Stayte Road generally consists of one travel lane in each direction with on-street parking pockets on the west side of the street in some locations. A multi-use pathway is provided on the west side of the roadway between North Bluff Road and Pacific Avenue. The multi-use pathway is entirely separated from the roadway by a treed boulevard. North Bluff Road is shared ownership between the City of Surrey and the City of White Rock, with White Rock's jurisdiction on the west half of the roadway. The ITIMP identifies North Bluff Road as a greenway corridor, including All Ages and Abilities bicycle facilities.

Typical cross-sections developed as part of the ITIMP focus on revising the City's portion of Stayte Road in the future based on a 20.12 metre cross-section (10.06 metre cross-section within White Rock). This includes both upgrading the existing multi-use pathway to separated pedestrian and bicycle paths on the west side of the street (see **Figure 14**). An additional 2.00 metre road dedication may be required in the future to rebuild the sidewalk due to the current design of the pathway and parking pockets.

Improvements on Stayte Road can also be coordinated with a number of other infrastructure improvements, including drainage improvements between Pacific Avenue and Buena Vista Avenue (Year 4) and between Buena Vista Avenue and Russell Avenue (Year 5), and sewer improvements between Cliff Avenue and Buena Vista Avenue (Year 2). Pavement upgrades are also a medium priority between Columbia Avenue and Cliff Avenue. Two streetlight improvements have also been identified (Year 2 and Year 7).

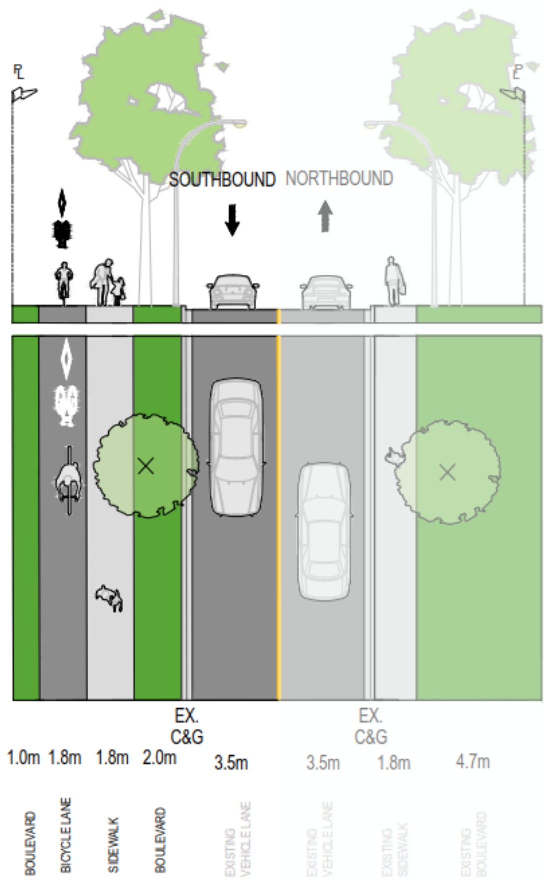


Figure 14: *Stayte Road Proposed Illustrative Cross-Section*

Bergstrom Road

Bergstrom Road is a north-south neighbourhood collector road on the border with the City of Surrey. Bergstrom Road generally consists of one travel lane in each direction with on-street parking on the west side of the street. The east side of the street (within the City of Surrey's jurisdiction) is primarily an unfinished road with no sidewalks and gravel frontages that are informally used for parking. Bergstrom Road is shared ownership between the City of Surrey and the City of White Rock, with White Rock's jurisdiction on the east half of the roadway. The ITIMP identifies Bergstrom Road as a greenway corridor, including All Ages and Abilities bicycle facilities, because of its direct connection to Ray Shepherd Elementary School.

The proposed concept includes adding protected bicycle facilities to make cycling more comfortable and to provide enhanced mobility options for people walking, wheeling, or cycling. An interim configuration would involve removing on-street parking and replacing this with an on-street protected bicycle lane with low-cost materials such as a painted buffer zone and flexible bollard, while the ultimate configuration would involve a raised bicycle path (see **Figure 15**).
No other infrastructure upgrades have been identified for Bergstrom Road.

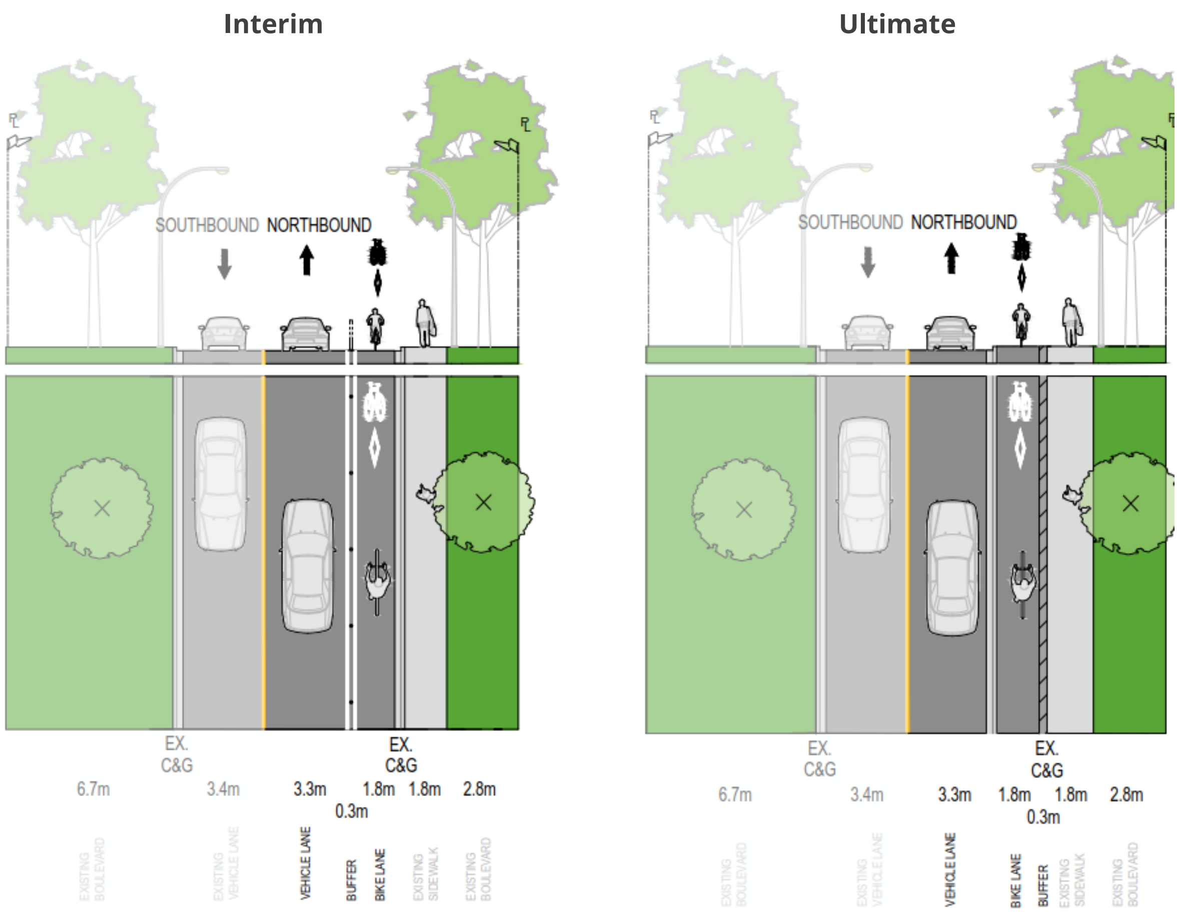


Figure 15: *Bergstrom Road Proposed Illustrative Cross-Section*

Oxford Street (North Bluff Road to Thrift Avenue)

Oxford Street is a north-south primary collector road and generally consists of one travel lane in each direction with on-street parking on the east side of the street. The ITIMP identifies Oxford Street as a greenway corridor between North Bluff Road and Thrift Avenue, including All Ages and Abilities bicycle facilities, as a portion an east-west crosstown route that would connect the local street bikeway on Malabar Avenue and Blackburn Avenue through Centennial Park to the proposed greenway on Thrift Avenue.

The proposed concept includes adding protected 61ustaine facilities to make cycling more comfortable and to provide enhanced mobility options for people walking, wheeling, or cycling. An interim configuration would involve removing on-street parking and replacing this with an on-street two-way protected bicycle lane with low-cost materials such as a painted buffer zone and flexible bollard, while the ultimate configuration would involve one-way raised bicycle paths on each side of the street (see **Figure 16**). Improvements on Oxford Street can also be coordinated with a number of other infrastructure improvements, including drainage improvements between Thrift Avenue and south of Russell Avenue (Year 7-12). Three streetlight improvements have also been identified (Year 5 and Year 6).

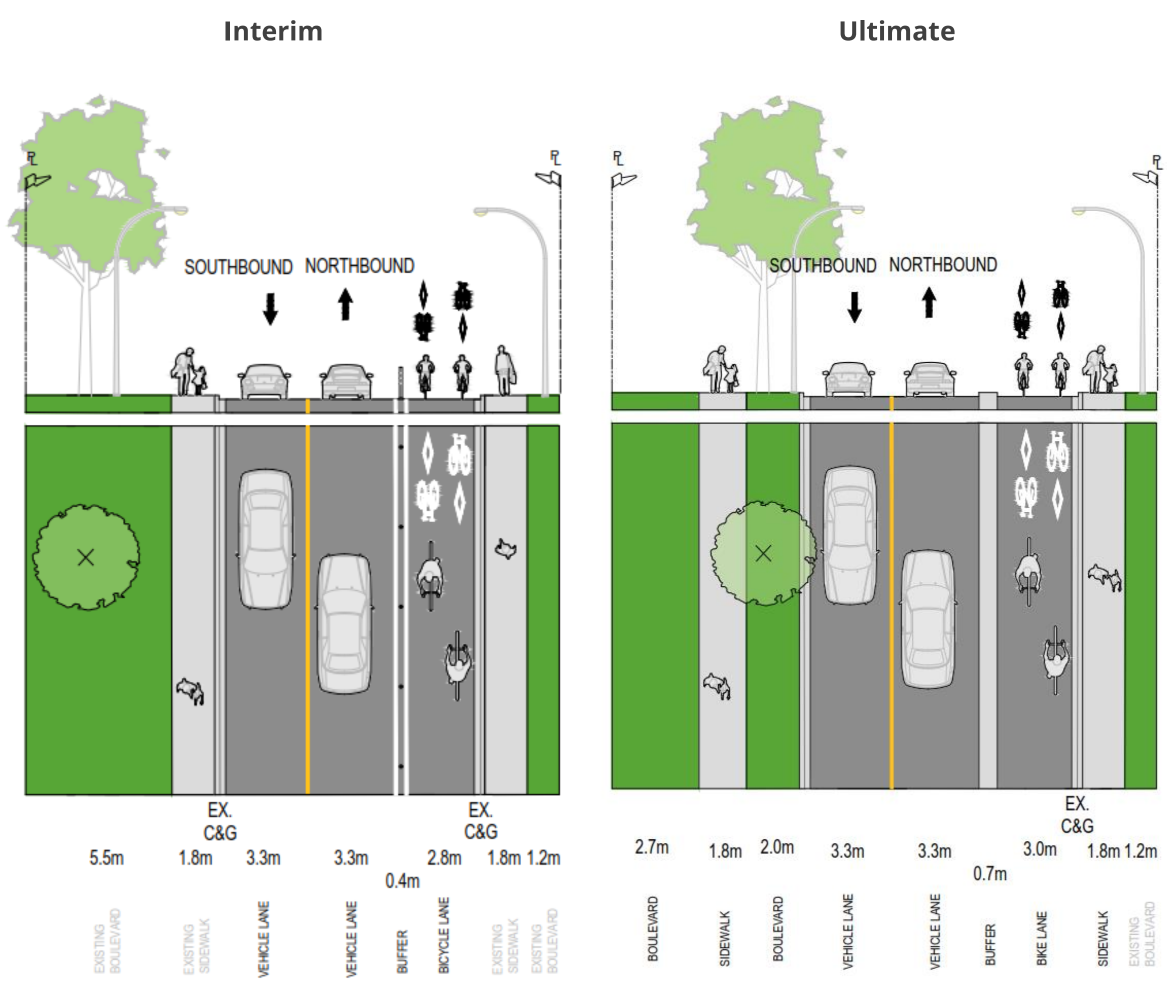


Figure 16: *Oxford Street Proposed Illustrative Cross-Sections*

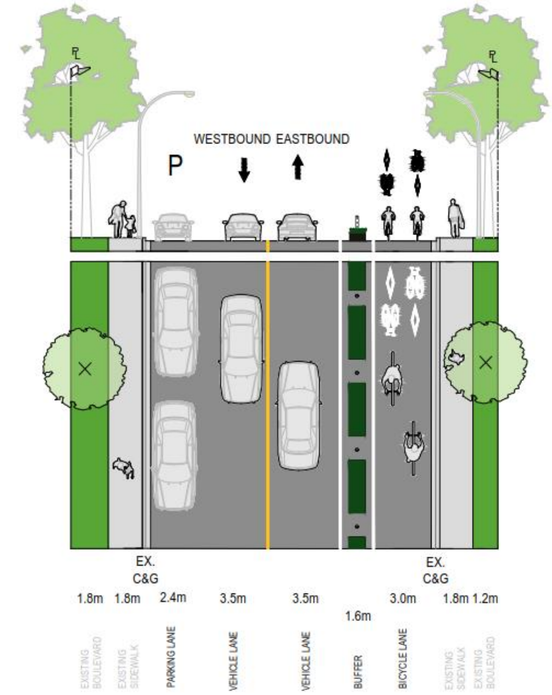
Thrift Avenue

Thrift Avenue is an east-west primary collector road and generally consists of one travel lane in each direction with on-street parking on both sides of the street. Thrift Avenue carries approximately 8,000 vehicles per day, and this is expected to increase to approximately 10,000 vehicles per day by 2045. Thrift Avenue has long been identified as a greenway corridor, including in both the 2006 and 2016 Strategic Transportation Plans. The ITIMP identifies Thrift as a greenway corridor, including All Ages and Abilities bicycle facilities, as a portion an east-west crosstown route that would connect the local street bikeway on Malabar Avenue and Blackburn Avenue through Centennial Park and along Oxford Street

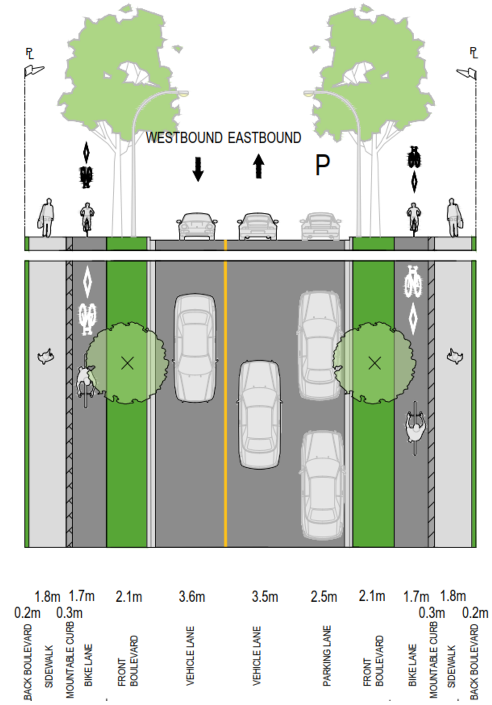
The proposed concept includes adding protected bicycle facilities to make cycling more comfortable and to provide enhanced mobility options for people walking, wheeling, or cycling. An interim configuration would involve removing on-street parking and replacing this with an on-street two-way protected bicycle lane with low-cost materials such as a painted buffer zone and flexible bollard, while the ultimate configuration would involve one-way raised bicycle paths on each side of the street (see **Figure 17**). Note that the cross-section is wider west of Best Street; as such, improvement options have been provided both segments to the west and east of Best Street.

Improvements on Oxford Street can also be coordinated with a number of other infrastructure improvements, including drainage improvements between George Street and west of Finlay Street (Year 2), Vidal Street and Martin Street (Year 7-12, with a small segment Year 2), and west of Stevens Street (Year 7-12). Pavement upgrades have been identified in a number of locations, including high priority improvements from Foster Street to Johnston Street and Best Street to Finlay Street. The remainder of the corridor is predominantly a moderate priority for pavement improvements. There are also a number of streetlight improvements been identified along Thrift Avenue.

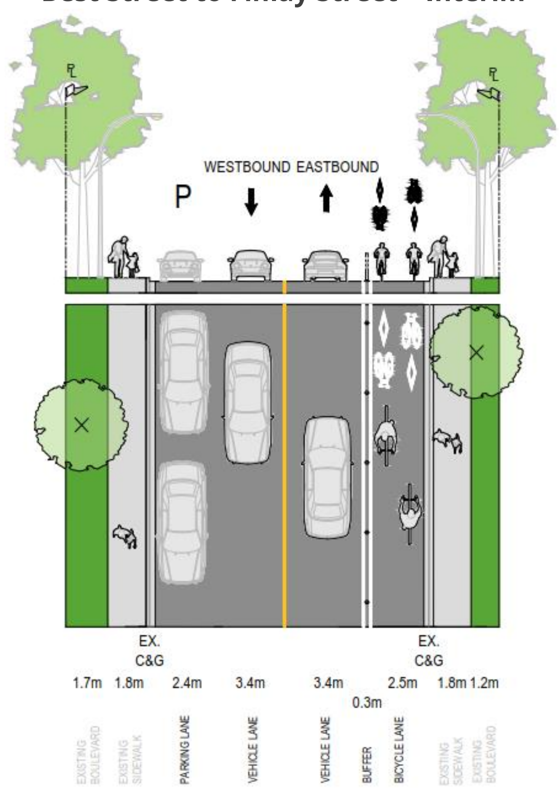
Oxford Street to Best Street– Interim



Oxford Street to Best Street – Ultimate



Best Street to Finlay Street – Interim



Best Street to Finlay Street – Ultimate

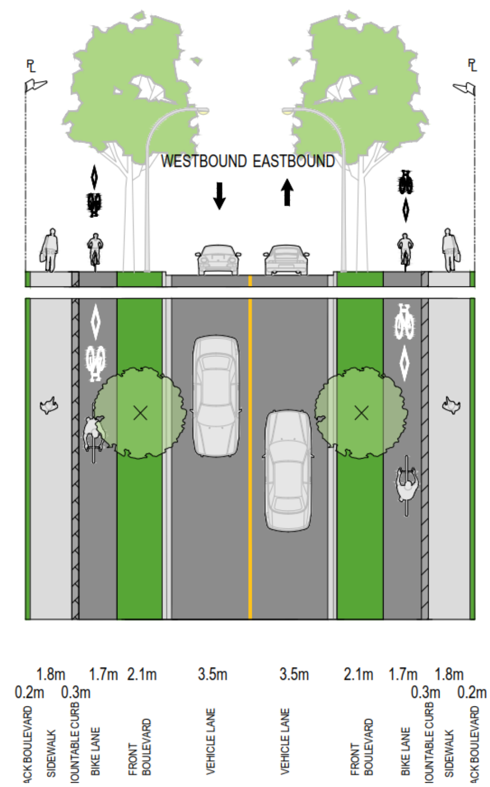


Figure 17: *Thrift Avenue Proposed Illustrative Cross-Sections*

Best Street

Best Street is a north-south primary collector road (north of Thrift Avenue) and neighbourhood collector (south of Thrift Avenue), and generally consists of one travel lane in each direction with on-street parking on both sides of the street. Best Street is part of TransLink's Major Bikeway Network and, as such, has been identified as a greenway corridor between North Bluff Road and Buena Vista Avenue, including All Ages and Abilities bicycle facilities.

The proposed concept includes adding protected bicycle facilities to make cycling more comfortable and to provide enhanced mobility options for people walking, wheeling, or cycling. An interim configuration would involve removing on-street parking on both sides of the street and replacing this with an on-street one-way protected bicycle lanes on each side of the street with low cost materials such as a painted buffer zone and flexible bollard, while the ultimate configuration would involve one-way raised bicycle paths on each side of the street (see **Figure 18**).

Improvements on Best Street can also be coordinated with a number of other infrastructure improvements, including drainage improvements between Russell Avenue and Thrift Avenue (Year 2). One streetlight improvement has also been identified (Year 10).

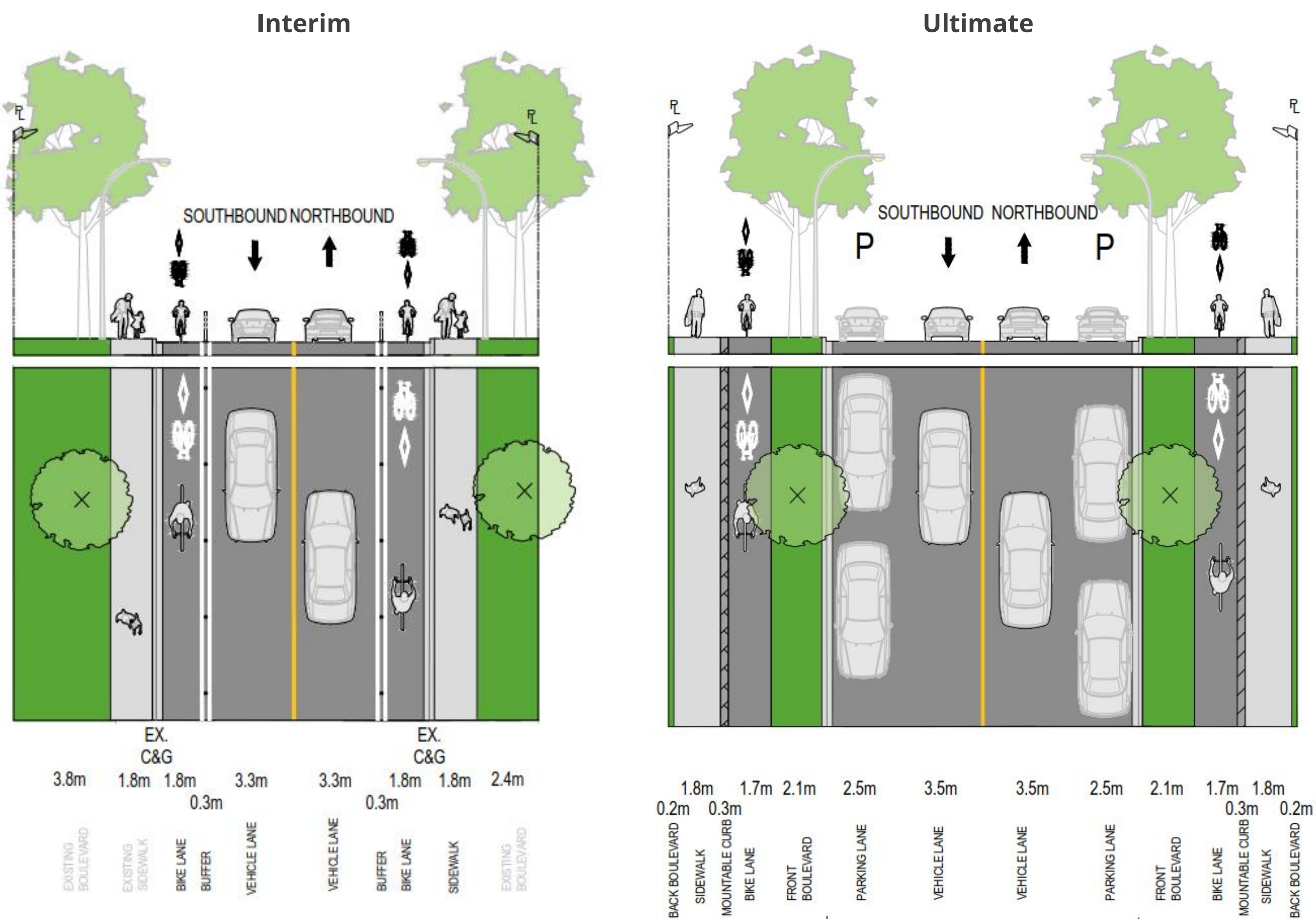


Figure 18: *Best Street Proposed Illustrative Cross-Sections*

Johnston Road (Pacific Avenue to Columbia Avenue)

Johnston Road is a north-south local residential road south of Pacific Avenue, and generally consists of one travel lane in each direction with on-street parking permitted intermittently on each side of the street. Johnston Road is part of TransLink's Major Bikeway Network and, as such, has been identified as a greenway corridor between Pacific Avenue and Columbia, including All Ages and Abilities bicycle facilities.

The proposed concept includes converting this segment of Johnston Road to one-way motor vehicle traffic (southbound) along with the closure of the existing one-way segment between Buena Vista Avenue and Beachview Avenue (described in further detail below in **Strategy 3.2**). This one-way conversion would allow for protected bicycle facilities to make cycling more comfortable and to provide enhanced mobility options for people walking, wheeling, or cycling. An interim configuration would involve removing one travel lane and consolidating on-street parking on the west side of the street and adding an on-street two-way protected bicycle lane on the east side of the street with low cost materials such as a painted buffer zone and flexible bollard, while the ultimate configuration would involve one-way raised bicycle paths on each side of the street (see **Figure 19**). A two-way protected bicycle lane was considered suitable for network connectivity to the pathway south of Johnston Road and to the Five Corners intersection.

Improvements on Best Street can also be coordinated with sewer upgrades between Beachview Avenue and Columbia Lane (Year 6).

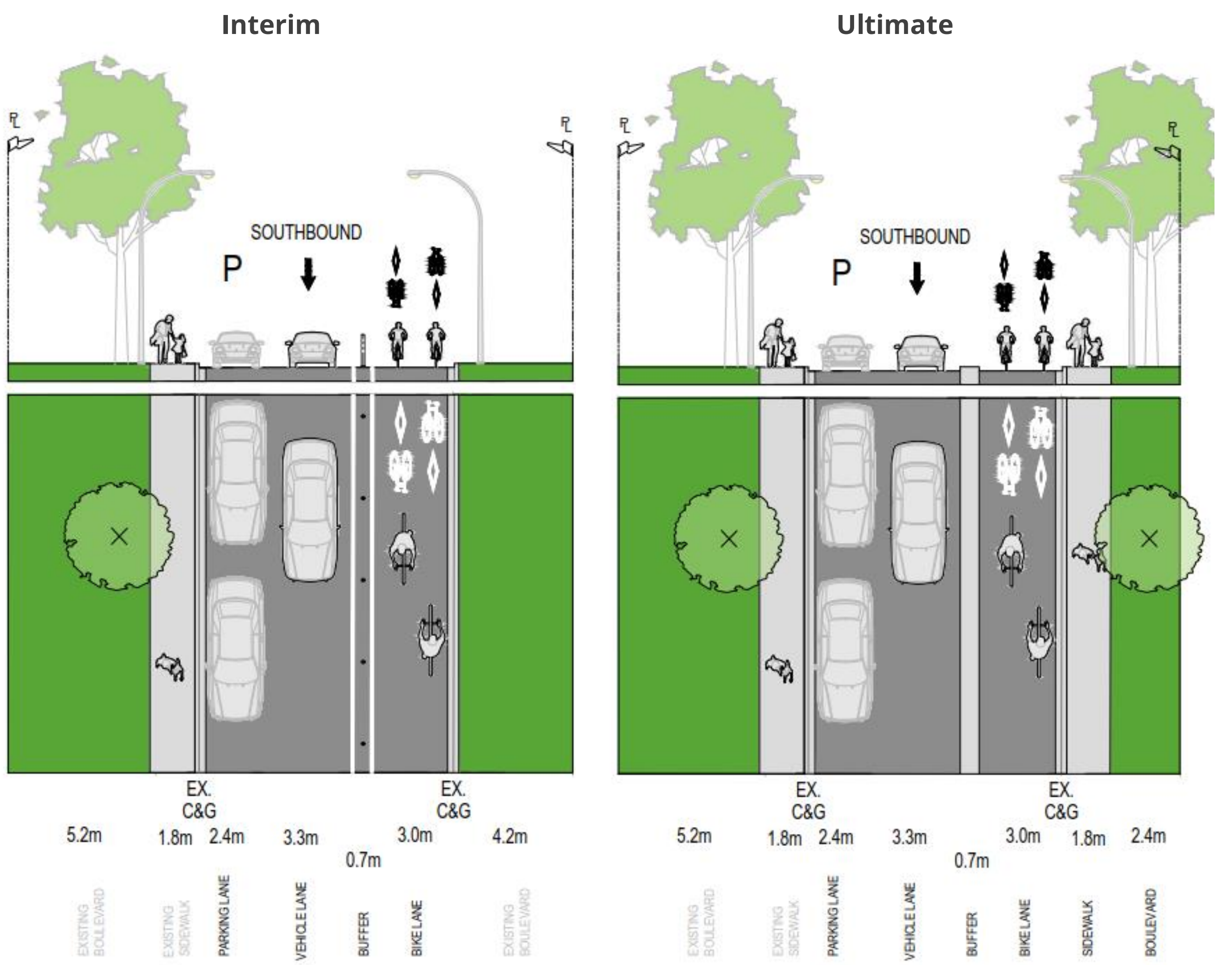


Figure 19: *Johnston Road Proposed Illustrative Cross-Sections*

Strategy 3.2: Improve intersections that have been identified as having safety, operational, or geometric issues

Through the traffic analysis, collision analysis, and public input from the ITIMP, a number of location-specific intersection improvements have been identified to improve identified safety, operational, and/or geometric issues. Traffic congestion and delay were analyzed based on available traffic counts for both existing conditions as well as forecast base conditions in an interim horizon (2025) and long-term horizon (2045). The analysis found that most intersections are operating at acceptable levels of service (LOS C or better) today and in the future (see **Map 6** and **Map 7**), with the following exceptions:

- North Bluff Road and Kent Street: LOS D (existing and 2025) in the PM peak;
- North Bluff Road and Johnston Street: LOS E (2025) and LOS F (2045) in the AM peak; and
- Stayte Road and Buena Vista Avenue: LOS F (2045) in the PM peak.

In addition, some intersections have specific movements that are expected to experience congestion and delay by 2045; however, the overall transportation network is projected to function at acceptable levels by 2045.

Collision analysis was also conducted based on reported ICBC collision data between 2013 and 2017. This analysis found a number of locations with higher collisions. The highest collision locations are predominantly located on North Bluff Road, which experiences the highest traffic volumes, as well as the intersection of Johnston Road and Thrift Avenue (see **Map 8**).

Finally, a number of locations with geometric issues were identified, primarily at locations with skewed alignments.

> **This strategy includes the following 1 action, as described in further detail below:**
>
> 3.2A Develop spot improvements focused on geometric, safety, and/or operational issues

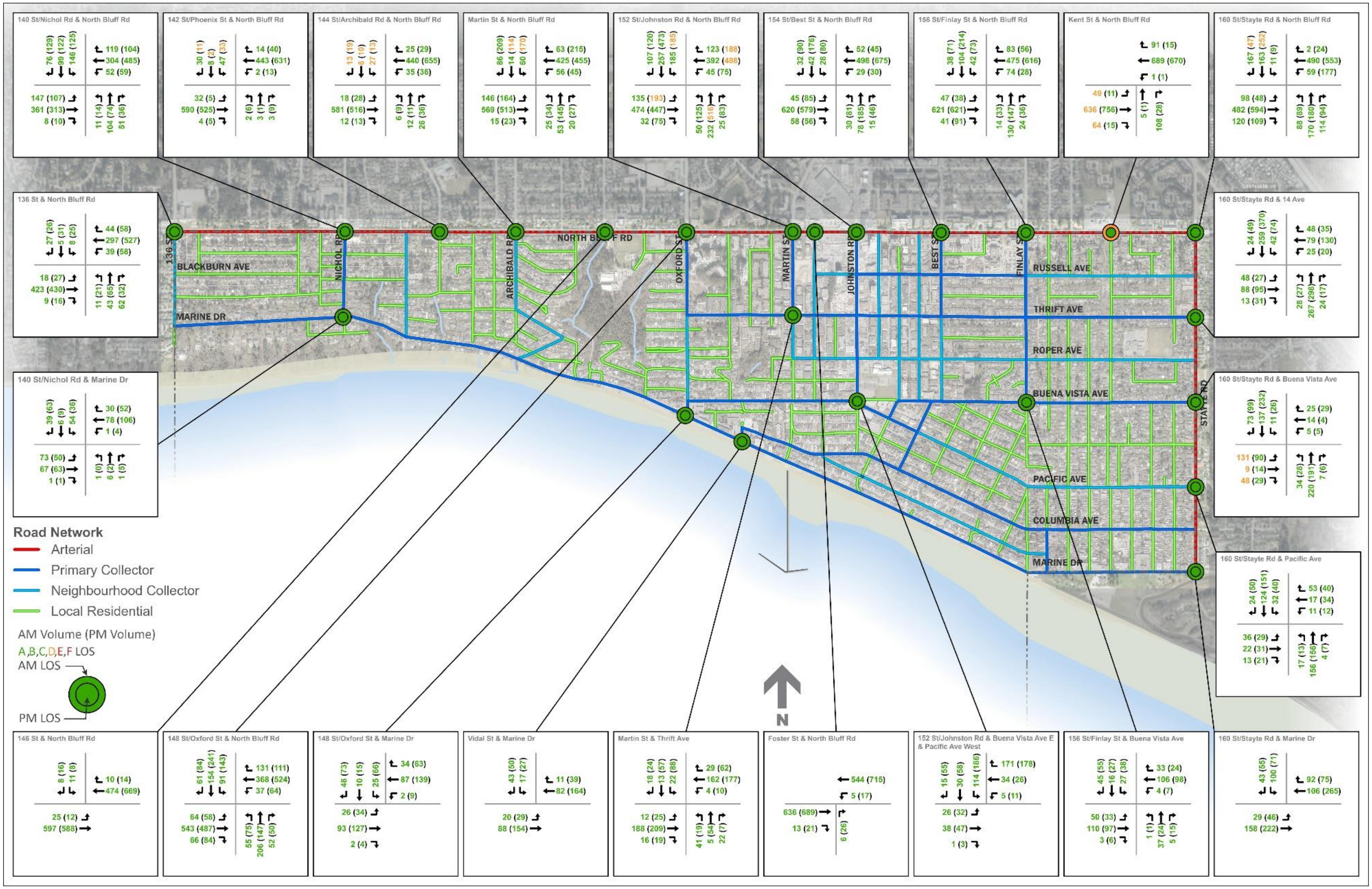
Action 3.2A: Develop spot improvements focused on geometric, safety, and/or operational issues

Locations with geometric, operations, and/or safety improvements are shown in **Map 9**. It should be noted that while these improvements are categories separately, they are inter-connected as safety can improved by operational and geometric improvements as well.

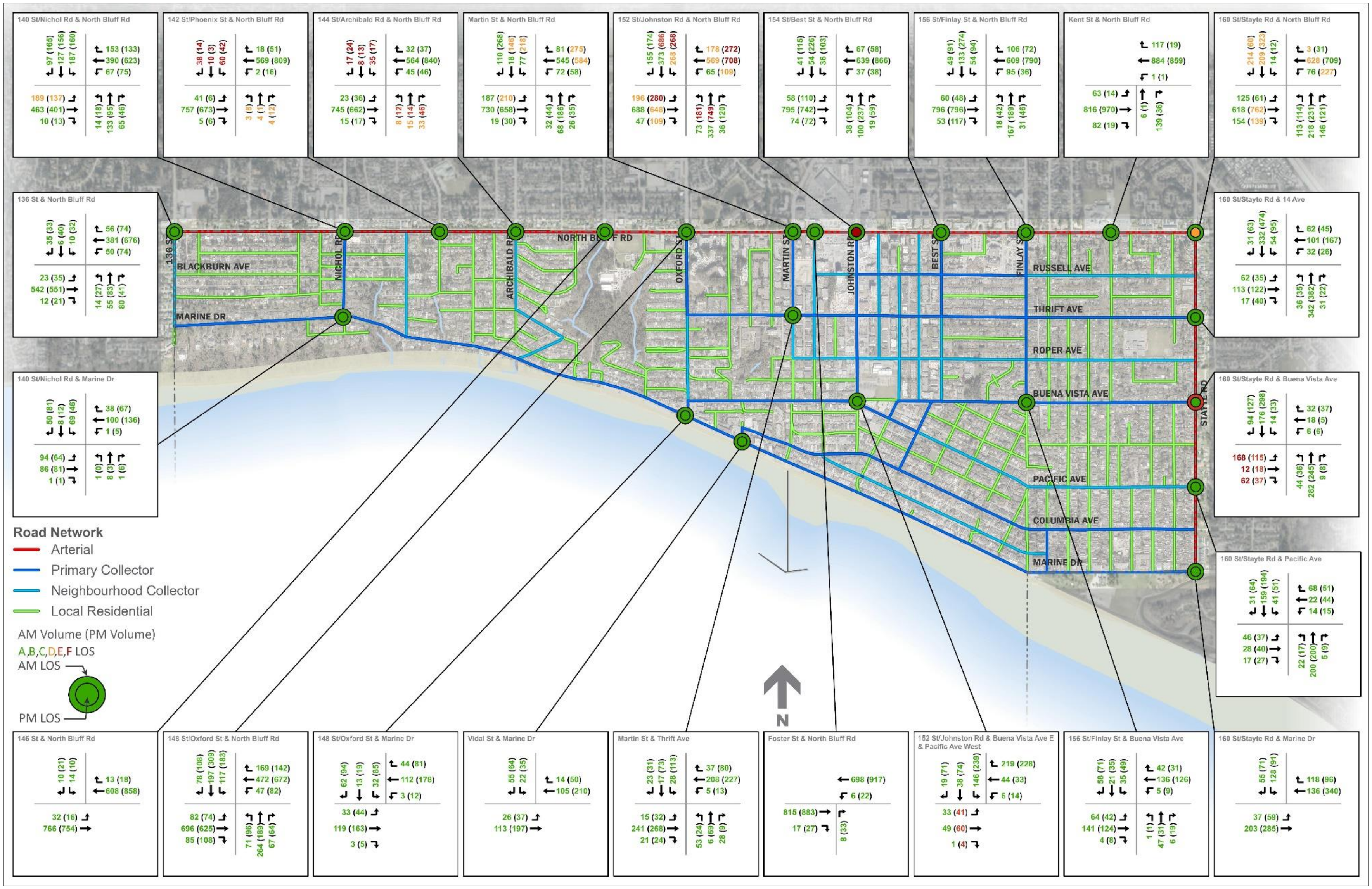
- **Safety Improvements:**
  - Protected left turn signal phase eliminates the conflicts between left turn traffic and incoming traffic as well as pedestrians and cyclists.
  - Leading Pedestrian Interval (LPI) makes pedestrians are better seen by drivers as a LPI allows pedestrians to cross the street 3-5 seconds before vehicles.
  - Improved sightline provides a better visibility to road users. For example, removing obstacles / pruning trees that impact drivers' visibilities at intersections and accesses. Installing warning signs can also allow drivers to be better prepared when their visibility is limited.
- **Operational Improvements:**
  - Signal timing optimization improves the efficiency of traffic operations to best accommodate traffic volumes from all approaches. This can be a re-occurring action to best accommodate the changes of traffic volumes over years.
  - Laning re-arrangement allows traffic to better flow through intersections. For example, providing a dedicated left turn lane prevents through traffic being delayed by left turn traffic by separating these movements.
  - Increasing lane storge length can accommodate more vehicles in their own lane without spilling over. As traffic demand increases in the future, some traffic in certain movements may not be able to clear during one cycle. Therefore, the remaining traffic can be accommodated with increased storage length.
- **Geometric Improvements:**

- Curb extensions can improve pedestrian safety, reduce pedestrian crossing distances and reduce speeds of turning vehicles.
- Lane closure reduces conflicting between road users at intersections therefore improves safety.
- Intersection realigning could improve drivers' visibility, pedestrian safety and well as better connect the roadway to adjacent active transportation and transit facilities.
- Active transportation facility realigning improves the connections of active transportation facilities such as pathway and stairs and therefore provides a safer and yet more convenient environment to pedestrians and cyclists.

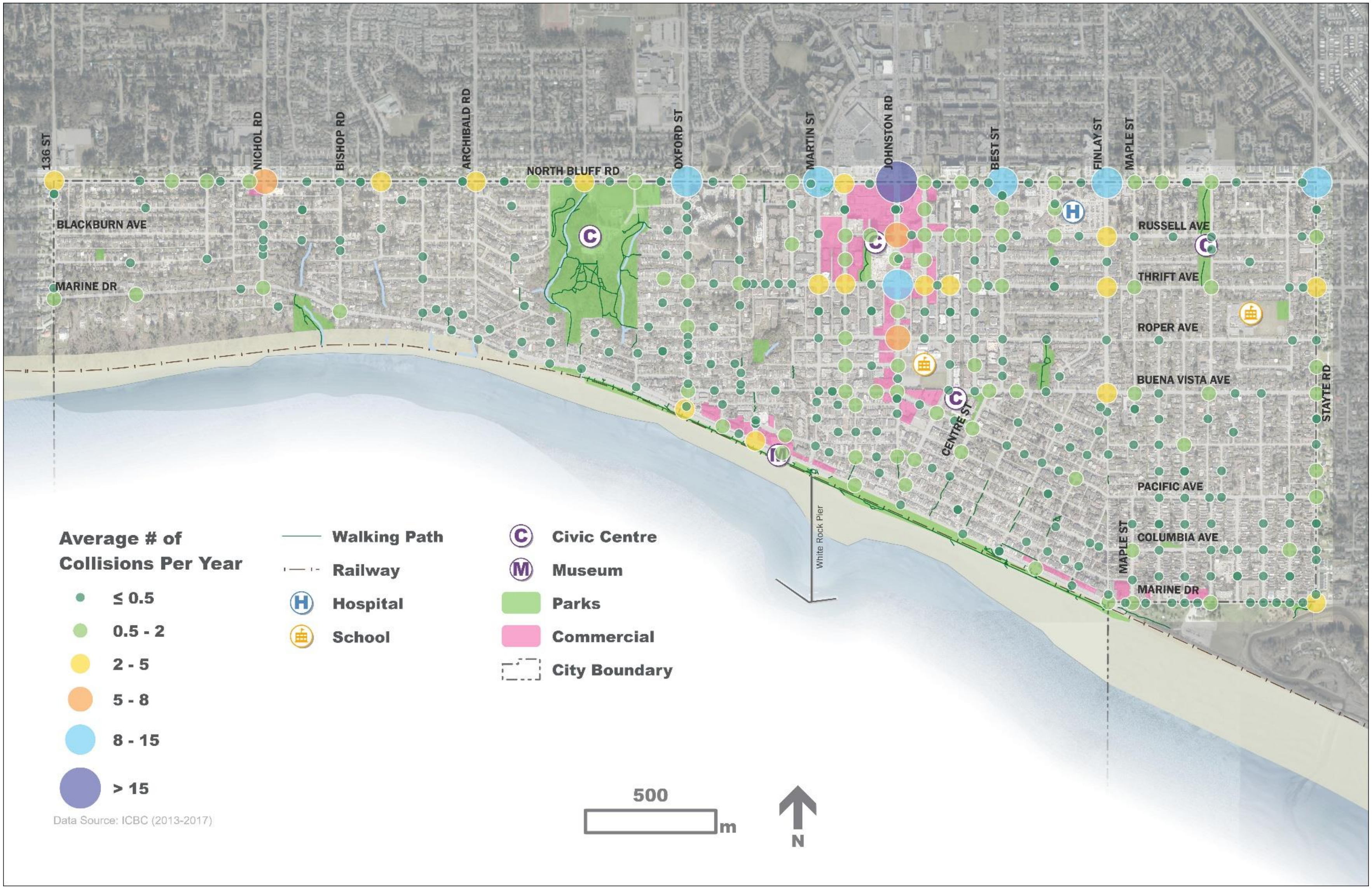
Based on the improvements described above, specific improvements each site are developed and illustrative improvement concepts have been developed for discussion purposes at locations with suggested geometric changes. Note that improvements along North Bluff Road were previously discussed in **Strategy 3.1.**



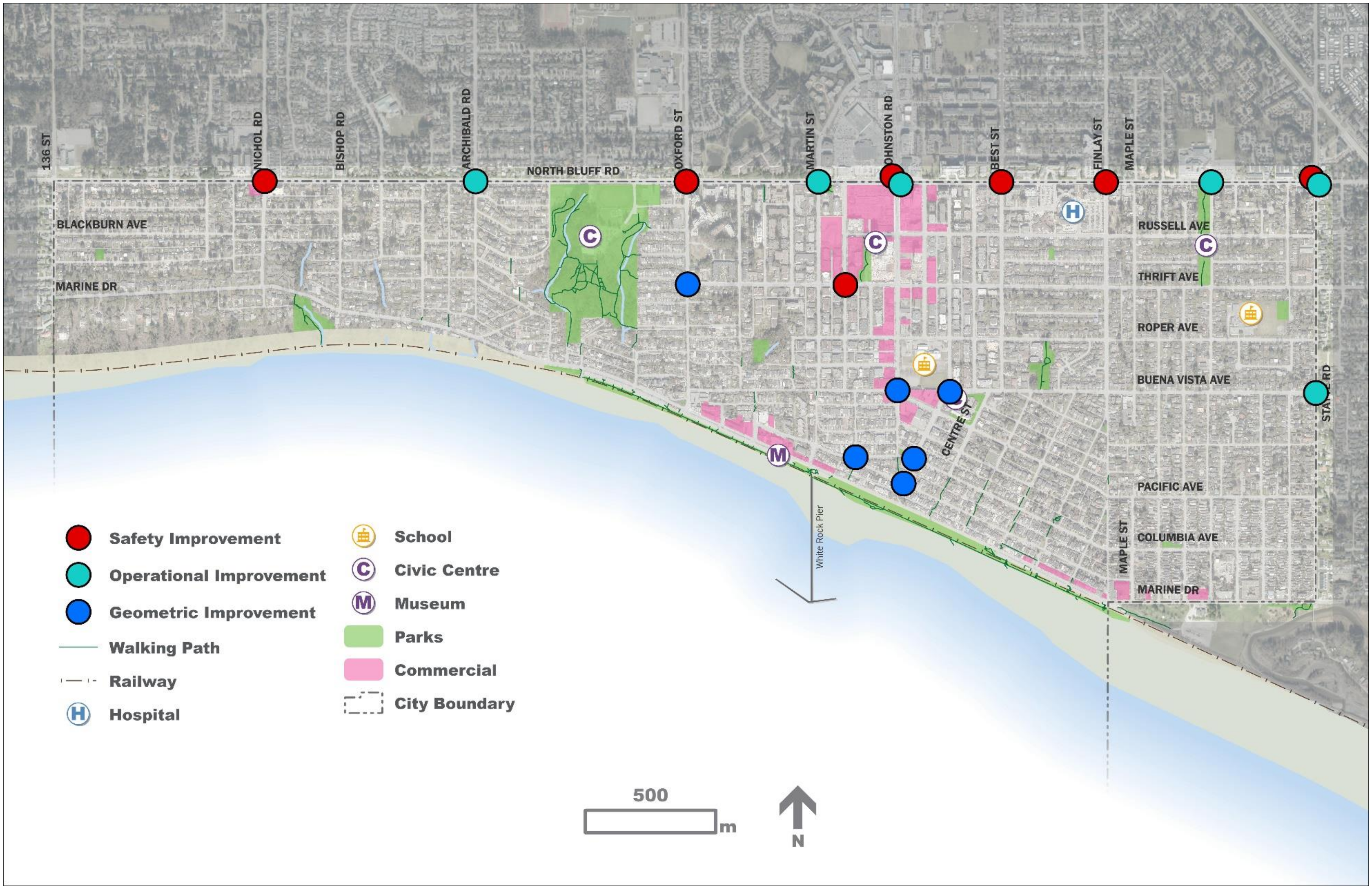
Map 6: *Existing Level of Service (LOS)*



Map 7: *Forecast (2045 Base) Level of Service (LOS)*



Map 8: *Reported Collisions*



Map 9: *Safety, Operational, and Geometric Improvements*

Oxford Street and Thrift Avenue. Improvements include curb extensions to improve pedestrian safety, reduce pedestrian crossing distances, and reduce speeds of turning vehicles as well as incorporating the interim greenways on Oxford Street and Thrift Avenue, including a multi-use crossing (see **Figure 20**).

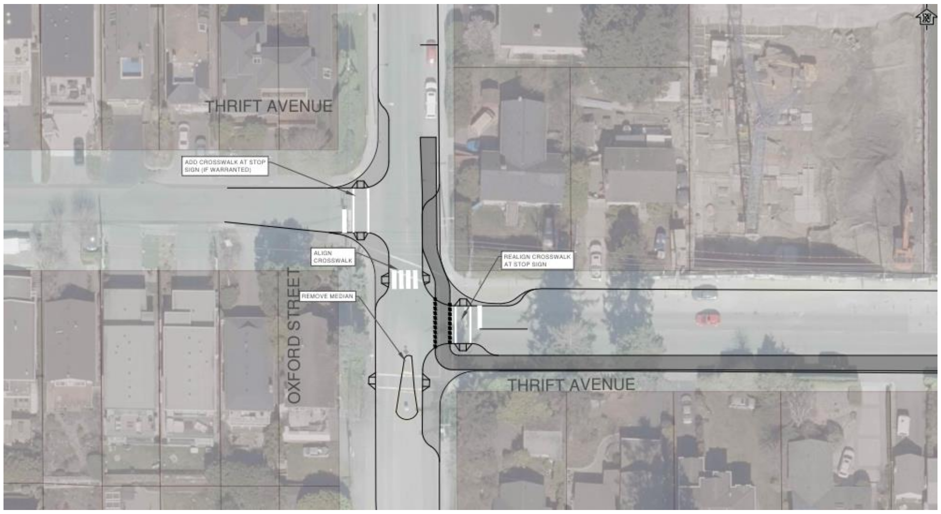


Figure 20: *Oxford Street and Thrift Avenue Illustrative Concept*

Johnston Road, Pacific Avenue, and Buena Vista Avenue. Improvements include closing the existing southbound leg of Johnston Avenue to create additional public space along with a connection to the Johnston Road greenway to the south. This also involves a new crosswalk on the north leg of the intersection if warranted, along with a new curb extension on the northwest corner. Finally, this involves improvements to the pathway within the Buena Vista Avenue right-of-way to improve the greenway connection with lighting and widening (see **Figure 21**).

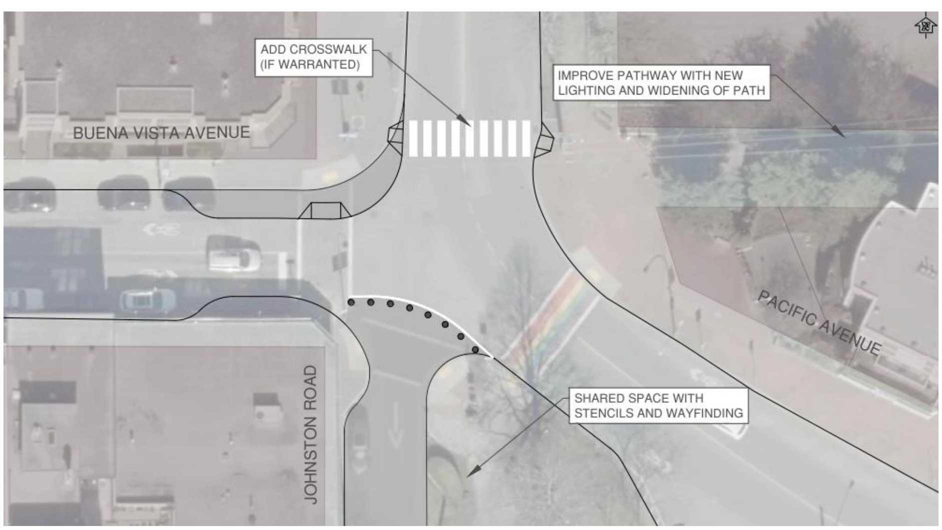


Figure 21: *Johnston Road, Pacific Avenue, and Buena Vista Avenue Illustrative Concept*

Victoria Avenue and Columbia Avenue. Improvements include realigning the intersection so that Victoria Avenue is perpendicular to Columbia Avenue with a curb extension on the southwest corner. This would also improve the pedestrian connection to the stairs. Additional improvements include curb extensions on the north side to improve pedestrian safety, reduce pedestrian crossing distances, and reduce speeds of turning vehicles as well as a new crosswalk, if warranted (see **Figure 22**).

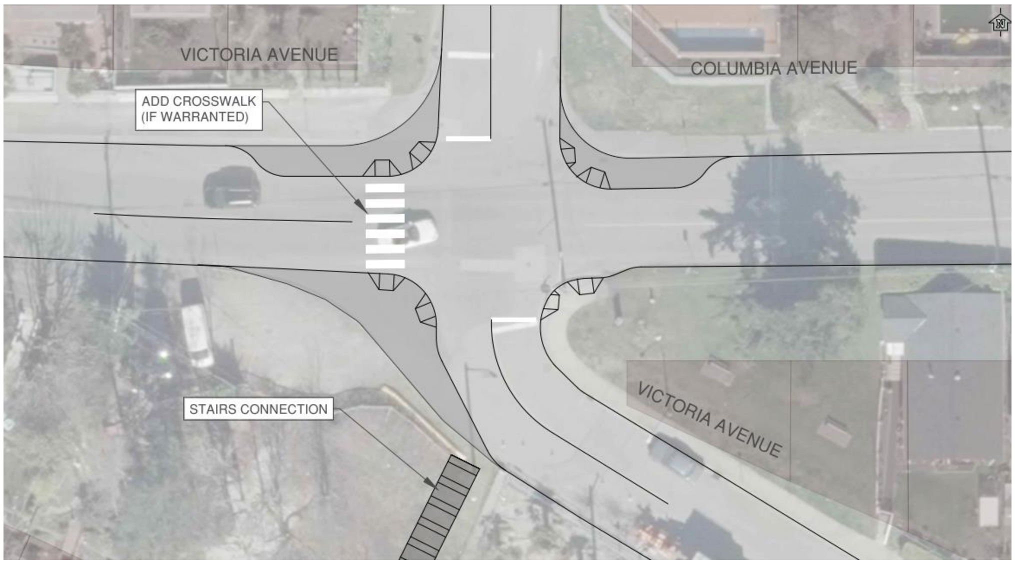


Figure 22: *Victoria Avenue and Columbia Avenue Illustrative Concept*

Fir Street and Buena Vista Avenue. Improvements include a new multi-use crossings for the greenway connection on Buena Vista Avenue along with curb extensions to improve pedestrian safety, reduce pedestrian crossing distances, and reduce speeds of turning vehicles (see **Figure 23)**.

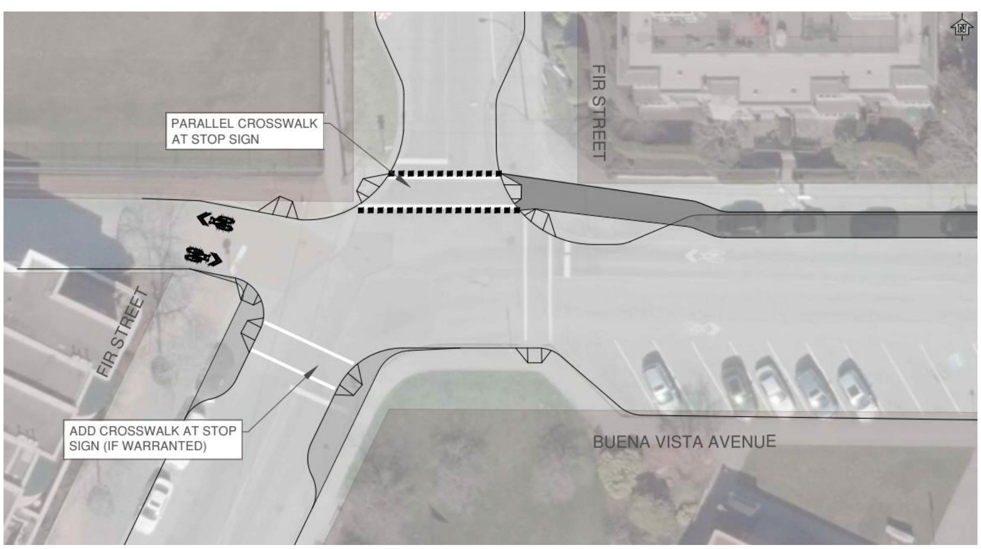


Figure 23: *Fir Street and Buena Vista Avenue Illustrative Concept*

Fir Street and Victoria Avenue: Improvements include an improved connection along the pathway and stairs connecting to Johnston Road, including adding a switchback alignment to the pathway to improve accessibility and enable people using bicycles and other mobility devices. This also includes a raised intersection and improved intersection alignment with a crossing to the Johnston Road alignment to the south (see **Figure 24**).

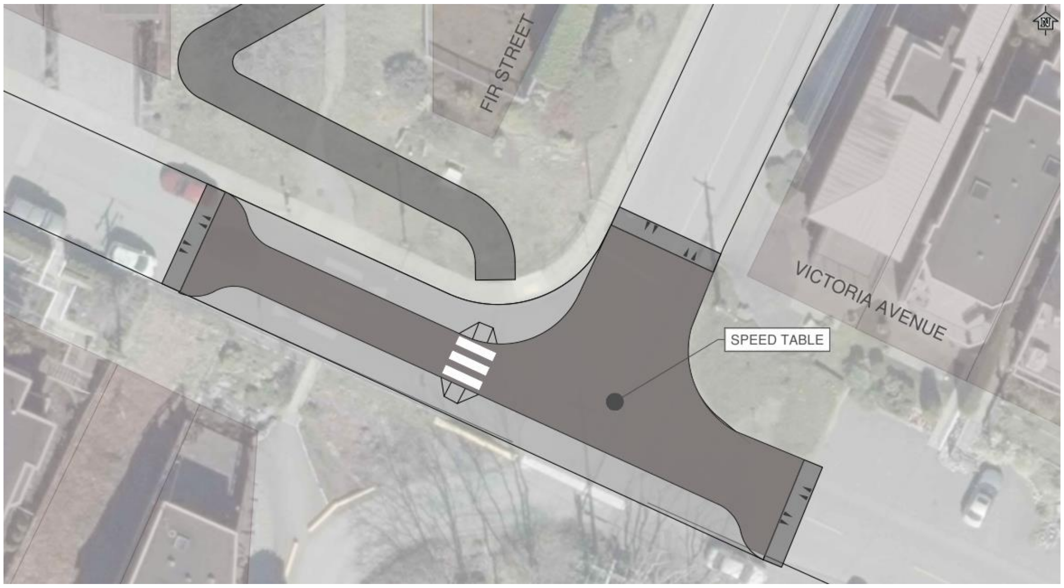


Figure 24: *Fir Street and Victoria Avenue Illustrative Concept*

Fir Street and Columbia Avenue: Improvements include curb extensions to realign Columbia Avenue to be perpendicular to Fir Street as well as to improve sightlines, pedestrian safety, reduce pedestrian crossing distances, and reduce speeds of turning vehicles (see **Figure 25**).

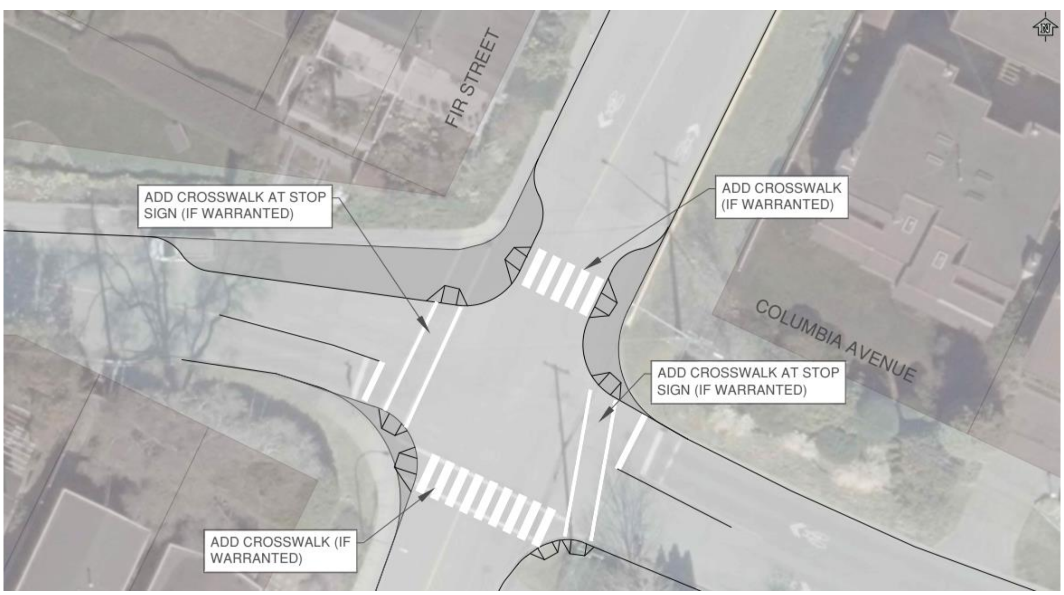


Figure 25: *Fir Street and Columbia Avenue Illustrative Concept*

Strategy 3.3: Enhance the transit user experience through improved service, passenger amenities, and accessible connections to transit

A convenient and reliable public transit system is crucial to creating a vibrant and sustainable community. Public transit is the primary alternative to automobile travel in White Rock and across the region. Public Transit, in combination with walking and cycling, can provide an attractive alternative to automobile travel for both local and regional connections. Public transit can offer competitive travel times to the automobile and reduce the environmental and community impacts of transportation. Public transit can often be the only option for people who do not drive, for travelling to jobs, school, shopping areas, and recreational centres. Public transit can also reduce overall environmental and community impacts of vehicle transportation.

Transit service in White Rock, and throughout the Metro Vancouver region, is planned and funded by TransLink and operated by various subsidiary companies. Decisions about fares, routes, and service levels are all made through TransLink and based on TransLink's guidelines and service plans. The City works with TransLink on matters influencing current and future services as they affect the community.

The Issues & Opportunities Survey found that that the most significant issues or challenges for transit in White Rock where that transit is not frequent enough and does not go to where people need to. Survey respondents stated that making transit routes faster and more direct, making transit more frequent, and providing more transit on weekends and evenings were the top three things the City could do to encourage more transit in White Rock. Other opportunities included providing more amenities at bus stops and making it easier to walk to bus stops.

The majority of the City's bus stops are not full accessible due to its gaps in the sidewalk network, intersections with wide crossing distances, and the lack of curb letdowns and crosswalks. There are also limited placed to stop and stay. In order to make public transit more accessible in White Rock, curb ramps and wheelchair loading pads are necessary. Amenities at bus stops, such as shelters, benches, good lighting, transit maps and route information, can make waiting for the bus a more pleasant experience and may attract additional ridership. Currently, only 14 of the city's bus stops have shelters and, as noted, less than half are accessible.

This strategy includes the following 6 actions, as described in further detail below:

3.3A Improve transit service

3.3B Improve walking access to transit stops and stations

3.3C Improve bus stop passenger amenities

3.3B Reinstate the White Rock Trolley or similar local transit shuttle

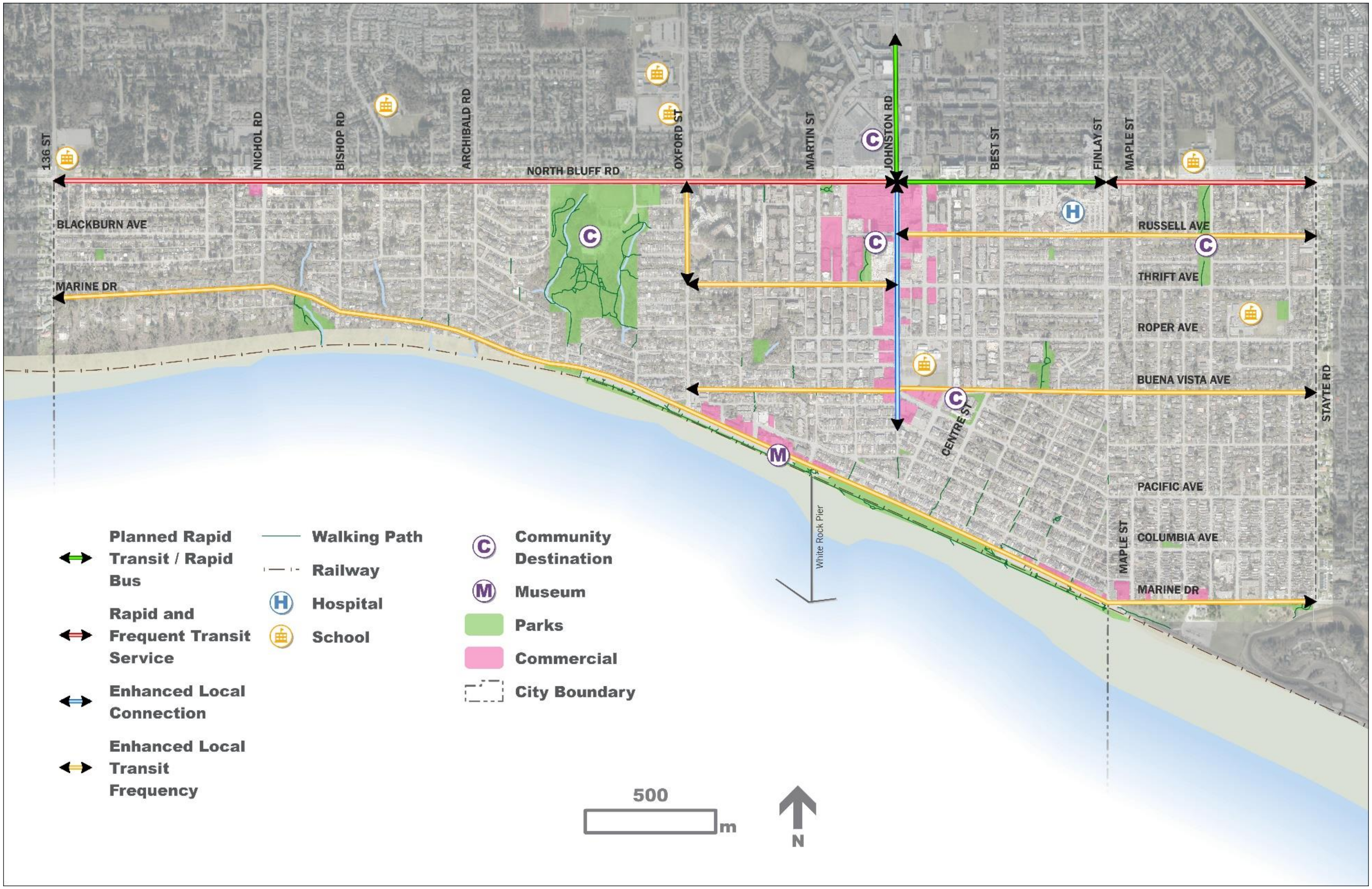
3.3E Ensure a universally accessible transit system

3.3F Plan for a hillside connection

Action 3.3A: Improve transit service

As noted above, transit service in White Rock, and throughout the Metro Vancouver region, is planned and funded by TransLink and operated by various subsidiary companies. As such, route planning and service frequency is not within the City's jurisdiction. However, the ITIMP provides an opportunity to provide strategic guidance on the types of transit improvements that would be desired, which can be considered by TransLink in its future planning processes.

To make transit a more attractive alternative than driving to, from, and within White Rock, it is recommended that the City work with TransLink to increase service frequencies on local routes, with desired service levels of at least 15 minutes during peak periods and 30 minutes during off-peak periods, along with more frequent transit service along North Bluff Road as part of the Frequent Transit Network (FTN). The City should also continue to work with TransLink to support continued enhancements to regional transit to support longer-distance commute trips along Johnston Road and through the White Rock Transit Exchange (see **Map 10**).



Map 10: *Conceptual Transit Network*

Action 3.3B: Improve walking access to transit stops and stations

All transit trips start and end on foot. As such, it is critical to ensure that all bus stops have adequate pedestrian facilities to ensure seamless connections between walking and transit and to ensure the transit network is accessible to people of all ages and abilities. The long-term pedestrian network in **Map 3** places a specific emphasis on ensuring there are sidewalks on both sides of the street with 100 metres of each bus stop. **Map 4** provides a buffer of 100 metres (typically less than one block) to identify improvement opportunities around each bus stop, which can be used to help identify pedestrian infrastructure improvements in the immediate vicinity of bus stops. In addition, the street leading up to bus stops should be well-maintained and crosswalks should be provided, if warranted, to ensure pedestrian connections to bus stops on both sides of the street.

Action 3.3C: Improve bus stop passenger amenities

Improving bus stop passenger amenities is a way that White Rock can make transit use more accessible and enjoyable for its residents, with the goal of increasing ridership and overall user experience. Amenities that make bus stops and transit exchanges more comfortable can also have a significant impact on passenger safety and satisfaction, in addition to attracting new customers.

- **Benches and Shelters:** Only 14% of bus stops in White Rock currently have shelters and benches. Shelters provide protection weather protection, making waits significantly more pleasant. Benches allow people to rest after their walk to the transit stop and are especially important for seniors and people with physical disabilities.
- **Litter/Recycling Bins:** Help to keep the area clean.
- **Customer Information:** Information on fares, delays, access transit, and safety, with contact information for the transit agency.
- **Transit System Maps:** Assists with wayfinding and indicates which buses stop at each location.
- **Real-time Updates:** Electronic displays at bus stops indicating the estimated arrival time for each bus. Real-time information can also be provided online and through smartphone apps, although not all transit users will have access to the internet when waiting at a transit stop.

Action 3.3D: Reinstate the White Rock Trolley or similar local transit shuttle

Tourism White Rock formerly provided a free hop-on hop-off bus service, known as the White Rock Trolley. The Trolley provided weekend and holiday services in July and August only, and operated between 11 AM and 9 PM. The trolley route was designed to serve White Rock's four commercial districts: central White Rock, Five Corners, West Beach and East Beach. The White Rock Trolley provided important connections between these areas, particularly by connecting the Town Centre and the waterfront, and can play a key strategy in alleviating parking pressures in the Waterfront. With the pilot project to convert Marine Drive to one-way traffic during summer months, this service can also help to relieve traffic pressures. The City should work with Tourism White Rock and/or TransLink other partners to investigate the feasibility of reinstating the White Rock Trolley or a similar community transit shuttle for peak season.

Action 3.3E: Ensure a universally accessible transit system

Many individuals experience barriers to using transit for various reasons, ranging from the physical challenges of system elements (such as accessing bus stops and transit exchanges) through to those that experience cognitive difficulties getting around on transit. With a large and growing seniors population in White Rock, the number of people with age-related mobility and cognitive impairments in White Rock will likely increase in the future. Having a universally accessible transit system is important to allow all transit users access to the entire transit system. Currently, less than half of the City's bus stops are accessible. It is recommended that the City strive to make 100% of all transit stops accessible in the long-term, where feasible, recognizing that White Rock's topography means that it is not possible for all bus stops to be fully accessible.

Strategy 3.3F: Plan for a hillside connection

To truly integrate the Waterfront and Town Centre, the ITIMP examined the potential for a "fixed" transit link between these two areas. "Fixed" transit refers to any type of connection that does not involve conventional buses traveling in mixed traffic. Ultimately, an enhanced hillside connection could serve as an economic development opportunity and tourist attraction.

There are various types of "people-moving" technologies that may be considered for this type of connection, such as:
- Covered/enhanced escalators;
- Funicular railway;
- Aerial tramway/gondola; or
- Automated transit in dedicated guideway.

Experience in other communities indicates that a fixed hillside connection using one of these technologies would require a capital investment of approximately $25-50 million. Preliminary estimates indicate that ridership will need to be in the order of 5,000-10,000 passengers per day on average throughout the year for some of these technologies to cover financing, maintenance, and operating costs. As a point of comparison, the estimated weekday ridership on all four of the Community Shuttle routes serving the entire White Rock/South Surrey area is currently less than 1,300 per day combined.

Although a fixed transit connection is not a recommended investment at this time, the Plan recommends that the City preserve the long-term potential of this opportunity by:

- Building demand for transit and carefully gauging the long-term opportunity by pursuing other initiatives, such as:
    - Local circulator bus services;
    - Remote parking facilities with circulator connection; and
    - Integrated transit and parking strategies.
- Preserving the undeveloped right-of-way that currently exists in the Johnston Street corridor between Columbia Avenue and Marine Drive to protect for the eventual development of some form of "fixed" transit between the Town Centre and the Waterfront.

- Reviewing and assessing technologies and experience in other communities. There are a range of options available offering different advantages, disadvantages, costs, and impacts on the community. The technology will also determine how much space in the right-of-way is required – more detailed analysis is required, but as an example, existing technologies in Canada require anywhere from 7m to 10m of right-of-way. These various technologies should be considered in depth to determine the most appropriate approach for White Rock.

Strategy 3.4: Develop a comfortable, complete, and connected cycling network to support local and regional cycling trips

Cycling can be a convenient, relatively low cost, and practical alternative for vehicle travel for some trips. There are many benefits of cycling to individuals, the community, and the environment. Cycling is enjoyable, efficient, affordable, healthy, sociable, and a non-polluting form of transportation.

Cycling is already a popular recreational activity in White Rock; however, cycling only accounts for a relatively small portion (approximately 1%) of all daily trips made by White Rock residents. Encouraging more residents and visitors to use their bicycles for short- to medium-distance trips will require developing a safe and comprehensive bicycle network in White Rock, with infrastructure and programs that help cycling become more time-competitive with other modes, particularly for short-to-moderate distances.

The Issues & Opportunities Survey found that that the most significant issues or challenges for cycling in White Rock where that bicycle routes do not feel safe and that hills are too steep, followed by a lack of bicycle routes. Survey respondents stated that building bicycle lanes that were physically protected from traffic, building more trails and pathways, and building more shared routes on quiet streets were the top three things the City could do to encourage more cycling in White Rock. The actions to improve cycling in White Rock focus directly on these top three opportunities identified by survey respondents.

To make cycling a safe and comfortable transportation option for people of all ages and abilities, ITIMP recommends developing a complete bicycle network connecting key destinations throughout the city that is comfortable for people of all ages and abilities along with support programs and facilities.

This strategy includes the following 2 actions, as described in further detail below:

3.4A Develop a complete, comfortable, and connected bicycle network that is suitable for all ages and abilities and connects all destinations throughout the City

3.4B Provide support facilities and programs that make cycling an attractive and convenient transportation choice

Action 3.4A: Develop a complete, comfortable, and connected bicycle network that is suitable for all ages and abilities and connects all destinations throughout the City

Developing a complete and connected network of bicycle facilities that are comfortable for all users is an important component of connecting White Rock residents to one another and to the region. By designing a bicycle network that is visible, intuitive, and connected, residents and visitors can enjoy cycling in White Rock for a variety of trip types.

White Rock's long-term bicycle network was developed based on a series of three overarching network planning principles:

- **A Comfortable Network**. The proposed bicycle network focuses on developing an All Ages and Abilities ("AAA") network. The purpose of an AAA network is to provide an interconnected system of bicycle facilities that are comfortable and attractive for all users. The AAA bicycle network will include three types of bicycle facilities that are most effective at increasing ridership: local street bikeways, separated bicycle lanes, and multi-use pathways (see **Figure 26**). These facilities are the most preferred types of facilities by all users and are proven to be the safest types of facilities.
- **A Complete Network**. The proposed bicycle network ensures all areas within White Rock are within a close distance to a designated and complete bicycle route. This involves developing a minimum City-wide grid that ensures that most residents and areas of the City are within 400 metres of a designated bicycle route.
- **A Connected Network.** The plan focuses on providing direct AAA routes to White Rock's urban centres, the waterfront, commercial, business, employment and educational destinations is an important component of making cycling an attractive transportation option.

The long-term bicycle network was developed based on these principles and is shown in **Map 11**.

Figure 26: *Types of Bicycle Facilities*

The bicycle network includes the greenways discussed in **Action 2.1C** and is made of both on-street and off-street facilities. The greenway network identifies both Metro Vancouver's Regional Greenway

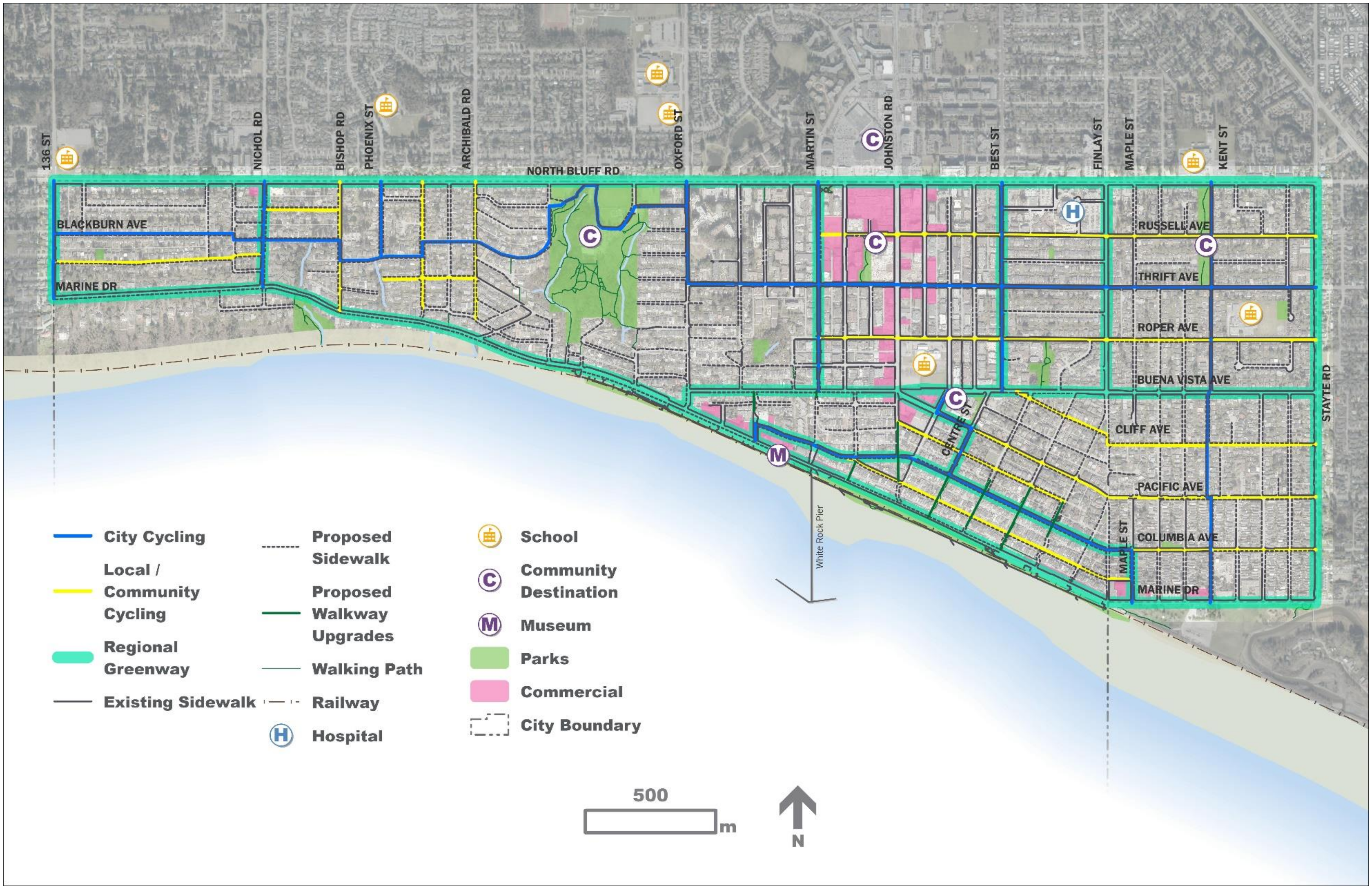
Network (RGN) and TransLink's Major Bikeway Network (MBN), which together identify regionally significant greenway and cycling corridors. The City's proposed greenway network builds off this regional network to establish a locally serving network of greenways.

There are three types of greenways, depending on the context:

- **Local street bikeways**, which are quiet streets with low traffic volumes and speeds where cyclists share the road with motor vehicles, and where pedestrians may either walk in the roadway or which have a sidewalk.
- **Multi-use pathways**, where pedestrians and cyclists share an off-street pathway, generally along trails in parks or areas of lower pedestrian demand.
- **Separated bicycle and pedestrian pathways**, where pedestrians and cyclists are separated from each other on an off-street pathway, generally in areas within the road right-of-way and in areas of higher pedestrian demand. Separated bicycle lanes should be on collectors or higher road classifications.

As noted in the Parks & Recreation Master Plan (2017), the following urban trails/greenways are priorities:

1. Centennial Park to the Town Centre "east west greenway"
2. The Town Centre to the Waterfront (connecting through five corners)
3. Ruth Johnson Park to Bayview Park on Duprez Street
4. Centennial Park to South Surrey Indoor Pool, in partnership with the City of Surrey



Map 11: *Long-Term Cycling Network*

Action 3.4B: Provide support facilities and programs that make cycling an attractive and convenient transportation choice

In addition to on-street and off-street bicycle network connections, there are other bicycle infrastructure improvements that can make cycling a more attractive and convenient transportation choice. Opportunities include enhanced wayfinding, bicycle parking supply and development requirements, end-of-trip facilities, bicycle-transit integration, and the creation of an online bicycle network map.

- **Wayfinding:** While most residents know how to travel through the city by car, it may not be obvious which routes are the best by bicycle. For both experienced and inexperienced cyclists, signage and pavement markings can help riders to find the best routes that match their cycling abilities and comfort levels and to find new routes as they become more confident. Bicycle route signage and pavement markings can also highlight for drivers and other road users where they should expect to see greater concentrations of cyclists, which can help to educate drivers and cyclists and to improve cycling safety.
- **Bicycle Parking:** Providing safe, secure parking for bicycles is an important part of improving cycling conditions throughout White Rock. It is important to recognize that the fear of bicycle theft or vandalism is a significant deterrent to cycling. There are many different types of bicycle parking that can be tailored to specific situations. One of the key considerations in providing bicycle parking is to locate the 'right' bicycle parking facility in the 'right' place. The best type of bicycle parking facility for a specific location is driven by user needs (such as the purpose of the trip, length of the trip, and length of stay); and other factors (such as adjacent land uses, available space, and safety). Bicycle parking is typically categorized as either short-term or long-term. The City's Zoning Bylaw includes recommendations for short-term and long-term bicycle parking for commercial, institutional, and multi-family developments.

  Recommendations to improve bicycle parking in White Rock include:
  - Update the Zoning Bylaw to add requirements for **plug-ins for electric bicycles** and to have a minimum required number of **weather protected on-street bicycle racks**;
  - Work with businesses to provide regularly spaced and sheltered on-street **bicycle parking in the public right-of-way** on all commercial streets and other commercial areas, and should also ensure that bicycle parking is provided at schools, community centres, and other important destinations.
  - Work with businesses to develop an **on-street bicycle corral program** in areas of high pedestrian and cycling activity such as the Town Centre and waterfront to provide on-street bicycle parking as an alternative to bicycle racks on sidewalks.
  - Work with community groups to provide **temporary event parking.** Temporary parking typically consists of portable racks that meet the demand for an event. Racks are clustered together, providing a higher level of security than if people were to park the bicycles on their own. Event staff can monitor the area, providing people with peace of mind while they are away from their bicycle.
- **End-of-trip facilities** such as showers and clothing lockers at workplaces are critical components of making cycling more convenient for employees. Many bicycle commuters have long commutes or are required to wear professional clothing attire and need a place to

change before coming into the office. The City should consider updating its Zoning bylaw to include requirements for end-of -trip facilities.

- **Bicycle maps**: Bicycle maps enable users to identify designated cycling routes that match their cycling ability and comfort level. The City should develop a bicycle map that identifies bicycle facility types and includes important local destinations and amenities. The map should be available in both hard copy and digital formats. The City should consider creating an interactive online map or encouraging innovation by releasing open-source mapping data.

Dynamic Streets

4.5 DYNAMIC STREETS

Background

Like all cities across North America and the world, White Rock is experiencing significant changes in its transportation system. Advances in telecommunications and socio-behavioural shifts have already led to the exponential growth of new mobility services such as carsharing, ride-hailing (i.e., Uber and Lyft), and bike share in many cities, the impacts of which are only now beginning to be understood. Further, autonomous vehicle technology is rapidly emerging. Emerging technologies will have wide-ranging implications on the way we live and move-about communities, both large and small, and will influence the way we plan for White Rock's future. Understanding the travel patterns and demand for our streets and supporting facilities allows White Rock to expect the unexpected and accommodate all road users safely and comfortably.

Aside from new technologies, the demand and pressure on White Rock's transportation system fluctuates over time. By taking a proactive approach to understanding the supply and demand on the City's streets, including goods movement, parking and neighbourhood traffic, the City can regulate these pieces, ensuring White Rock's neighbourhoods remain people oriented.

Alignment with Areas of Focus

The strategies and actions for creating dynamic streets align with a number of areas of focus for the ITIMP, including:

- **Goods Movement** is an important component to a growing economy in White Rock; however, increased truck traffic can impact the efficiency of the road network, required maintenance and livability on the corridors they use. By taking a dynamic approach to goods movement and balancing the needs of all road users, the City can ensure goods movement benefits everyone in White Rock.
- **Parking** enables access by residents and visitors to residential areas. The City can take a proactive approach to regulating parking, particularly on residential streets.
- **Future Technology** is a growing and uncertain element in planning for the future – while it is known what is coming and that it will disrupt the way people move, it is not clear how exactly that will happen. The City can plan to accommodate future technology and try to determine its impact and influence on the transportation network. In addition, White Rock can make its current transportation network smarter by incorporating new technologies and best practices.

Big Moves

Big Move #6: Electric Vehicle Plug-in Stations will be available at all community facilities and at least 10 locations within the public right-of-way by 2030.

Strategies

The ITIMP includes five strategies to create Dynamic Streets. Each strategy is accompanied by several supporting actions that seek to create streets that accommodate a range of new and emerging modes and technologies, helping to future-proof the City.

Strategy 4.1: Develop an integrated and multi-modal network to facilitate the safe and efficient movement of goods

Goods movement is an important component of the ITIMP as it supports the City's continued economic prosperity, allows residents and businesses to receive goods, and facilitates waste removal and other important functions.
Effective goods movement is also essential to the regional economy, as the transportation system must accommodate local deliveries, processing and production, and shipping of commodities and goods to the global marketplace. In White Rock, the primary role of goods movement is for local deliveries, to transport products to business and homes for local consumption. Typically, this requires that trucks should be able to access key destinations throughout the City, including commercial, institutional, and industrial areas.

At a regional level, TransLink has developed a Regional Goods Movement Strategy for Metro Vancouver which outlines a vision and goals for the regional movement of goods, along with three strategies:

- Invest strategically to maintain and grow the transportation system;
- Manage the transportation system to be more efficient and user focused; and
- Partner to make it happen

The City of White Rock has identified dedicated truck routes in its Streets and Traffic Bylaw. According to the bylaw, designated truck routes include North Bluff Road, Johnston Road, parts of Nichol Road, Finlay Street, Buena Vista Avenue, Thrift Avenue, Oxford Street, Martin Street and Best Street. The Streets and Traffic Bylaw currently defines a Truck as a vehicle that has a gross vehicle weight (GVW) of more than 5,500 kg and is used for commercial purposes. Across the region, municipalities are moving towards a simple, harmonized definition of a truck as being any vehicle with a gross vehicle weight of more than 11,800 kg. These vehicles are restricted from through travel on the municipal network outside of truck routes. Regionally, municipalities are also moving towards definition the legal vehicle weights and dimensions by adopting the Commercial Transport Regulations by reference into their Street and Traffic Bylaws. The City's bylaw currently refers to the 1996 Commercial Transport Act. Regional harmonization benefits the region, cities, the public, and industry by creating consistent expectations for operators throughout the region.

The transportation system will seek to create and support a vibrant, li'able, healthy and 89ustainnable community for residents, businesses and visitors alike. In order to do so, the current truck route network should be reviewed and monitored for its effectiveness.

This strategy includes the following 3 actions, as described in further detail below:

4.1A Review the weight and dimensions limits of the road network to identify locations that cannot support vehicles with a GVW greater than 5,500 kg and less than 11,800 kg

4.2B Complete a truck restriction review and application to TransLink to simplify the truck route network and remove redundant links that have higher potential impacts on the City's goals and objectives

4.1C Update the City's Street and Traffic Bylaw to harmonize with the Metro Vancouver region and modernize the truck network

Action 4.1A: Review the weight and dimensions limits of the road network to identify locations that cannot support vehicles with a GVW greater than 5,500 kg and less than 11,800 kg.

The City's Street and Traffic Bylaw currently limits travel by vehicles with a GVW greater than 5,500 kg to the Truck Route Network. To harmonize across the region, the definition of a truck should be updated to a GVW greater than 11,800 kg – this means that vehicles between 5,500 kg and 11,800 kg GVW will be permitted to travel on any road within the City unless specifically restricted. Before making this change, the City should review structures, slopes, and other conditions to confirm that no additional restrictions are needed for these vehicles.

Action 4.1B: Complete a truck restriction review and application to TransLink to simplify the truck route network and remove redundant links that have higher potential impacts on the City's goals and objectives.

The Truck Route Network is intended to focus the movement of heavy vehicles (those greater than 11,800 kg) to those routes best suited to accommodate large and heavy vehicles. Vehicles can leave from the Truck Route Network to reach their final destination when it is no longer practical to stay on the route – in other words, when they are no longer a 'thru trip' and are in their 'last mile' of travel. The City's current Truck Route Network has a high density compared to other networks in the region. Some of these roads are less suitable for heavy vehicles than others. The City should seek to identify parallel routes where the community is better served by focusing heavy trucks on one route and removing the other from the truck route network. Factors for consideration may include slope, width, traffic control, and desired modal emphasis. Some potential links for consideration include: TransLink's enabling legislation requires municipalities in Metro Vancouver to seek permission before restricting truck movements on the road network, including introducing new restrictions or removing existing truck routes from the Truck Route Network. TransLink typically requires a study documenting the existing truck volumes on the Truck Route Network and analysis and consultation examining whether removing a link will create additional delay and / or unreliability for trucks. A proposed truck network for discussion with TransLink is shown in **Map 12** and includes:

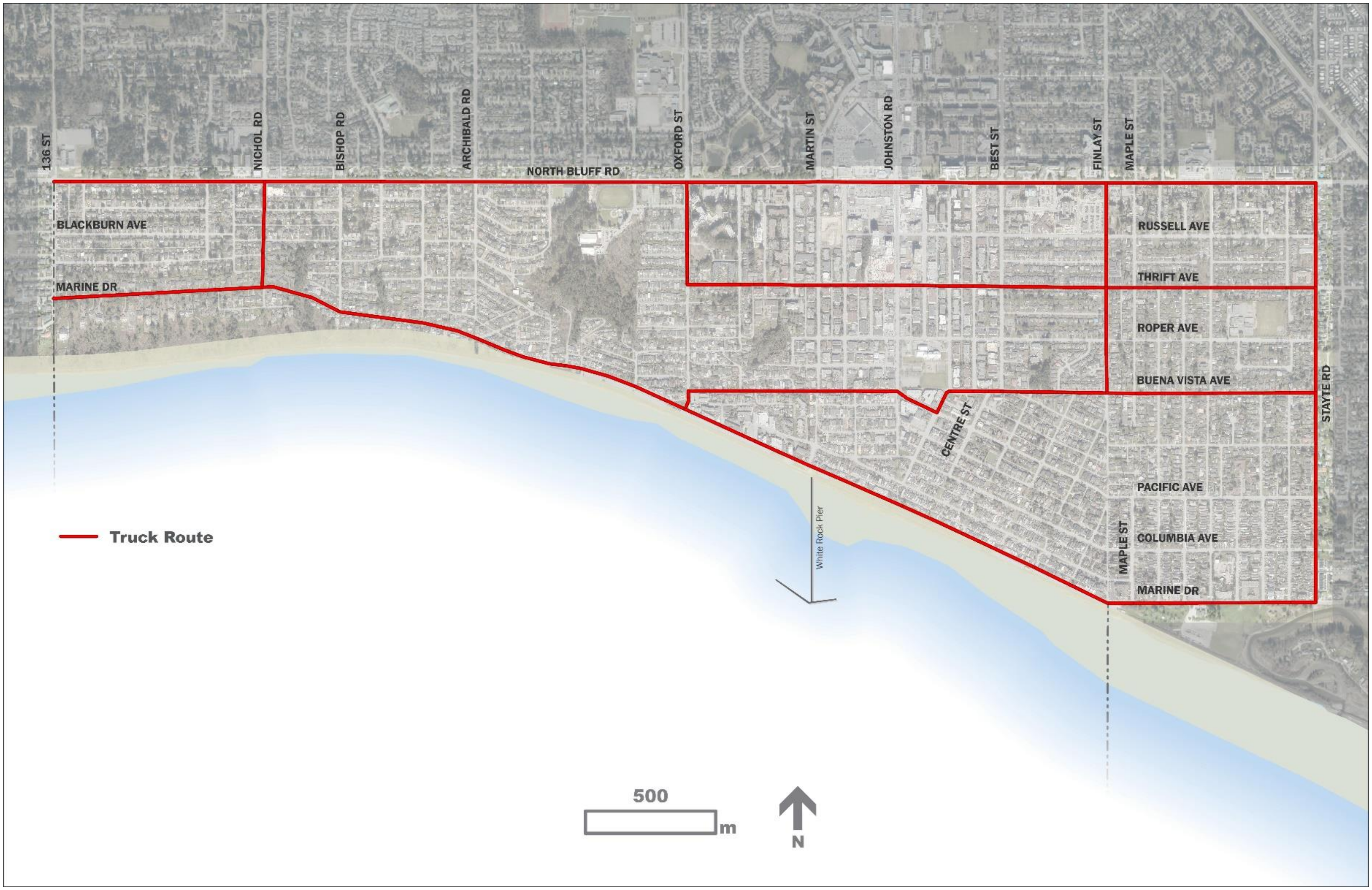
- Nichol Road between North Bluff Road and Marine Drive;
- Oxford Street between North Bluff Road and Thrift Avenue;
- Finlay Street between North Bluff Road and Buena Vista Avenue;

- North Bluff Road;
- Thrift Avenue;
- Buena Vista Avenue; and
- Marine Drive

Action 4.1C: Update the City's Street and Traffic Bylaw to harmonize with the Metro Vancouver region and modernize the truck network.

After completion of the Actions above, amend the City's Street and Traffic Bylaw to:

- Include regionally harmonized and consistent wording referring to the Commercial Transport Regulations by Reference.
- Update the definition of a truck to be vehicles with a GVW greater than 11,800 kg
- Update the Truck Route network based on the findings of Action 4.1B



Map 12: *Proposed Truck Route Network*

Strategy 4.2: Ensure residential parking appropriately allows residents to park without interrupting the safe movement of people

Like most urban areas, White Rock has a limited supply of on-street parking. Therefore appropriate management of existing resources is essential for achieving a sustainable community with an efficient transportation system. It has been identified that in some neighbourhoods residential parking is limited and even further constrained by the provision of secondary suites and the hospital. The City has a residential parking permit program that allows for parking in designated Permit Parking Only areas on the block printed on the front of the permit and the next adjacent block. Staff have identified issues with the existing program including compliance and enforcement.

This strategy includes the following 2 actions, as described in further detail below:

- 4.2A Implement the recommendations of the City-Wide Parking Strategy (ongoing) to revise the residential parking permit program and procedures
- 4.2B Manage issues with residential parking in boulevards

Action 4.2A: Implement the recommendations of the City-Wide Parking Strategy (ongoing) to revise the residential parking permit program and procedures

The City has a residential parking permit program that allows for parking in designated Permit Parking Only areas on the block printed on the front of the permit and the next adjacent block. Permit parking areas are established on a by-request basis based on a petition with 67% majority vote from residents on both sides of the street. Current Resident Parking Only (RPO) areas are shown in **Figure 27**. Up to four permits can be purchased for each dwelling unit at a cost of $12 per permit; the permit does not currently require a license plate number.

The City has noted that there can be some abuse of these permits, with residents giving them away or selling them to employees. This results in staff parking in residential areas. In addition, license plate is not currently required to register for the permits. The City has noted that moving towards license plate recognition technology along with registered license plates for these permits would assist in enforcement of the program.

The City is currently developing a separate **City-Wide Parking Study** to improve parking management across the city. The recommendations for this study are currently being finalized. The ITIMP implementation should be coordinated to consider the results of this City-wide study.

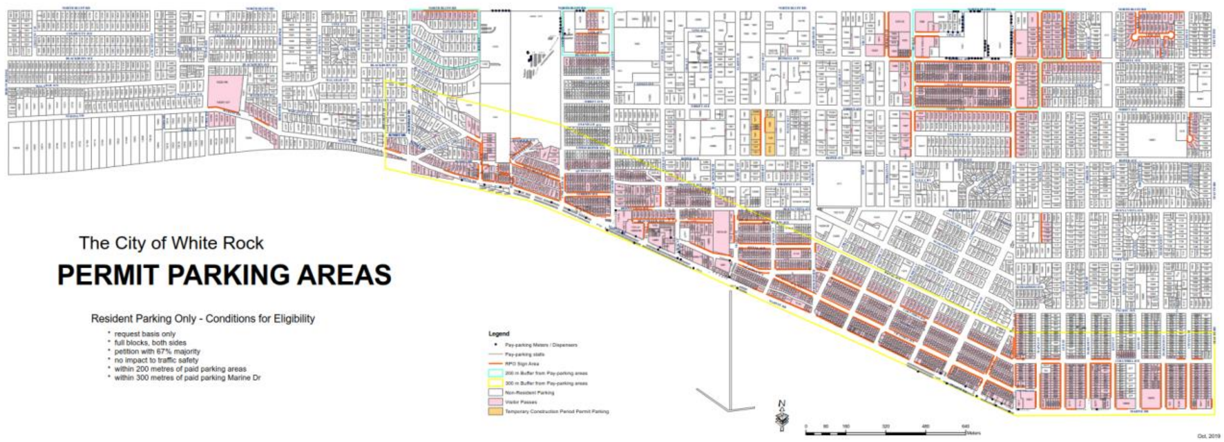


Figure 27: *Resident Parking Areas*

Action 4.2B: Manage issues with residential parking in boulevards

Many of White Rock's streets have been constructed to an interim standard without curb and gutter or sidewalks. This results in a poorly defined space within the public right-of-way that often results in gravel areas that are used for on-street parking. This boulevard parking results in significant challenges, including erosion damage, viability of installing sidewalks, and limited opportunities for street trees. As a result, this is a significant challenge to implementing the complete streets recommendations in the ITIMP including building sidewalks. The City's current Streets and Traffic Bylaw notes that vehicles may be parked on the City's streets, with the exception of RPOs, for up to 72 hours without a permit. However, enforcement of this requirement can be challenging.

The City should develop a strategy to manage issues with residential parking in boulevards, including an education campaign identifying the bylaw requirements and what is permitted within the right-of-way, as well as increase enforcement. Over the longer-term, the City can address this issue by formalizing interim streets and constructing curb and gutter along with sidewalks and other street improvements to prohibit boulevard parking.

Strategy 4.3: Focus on asset management and ensure the transportation system is in a state of good repair

The ITIMP is an integrated plan that references and aligns with other infrastructure master plans to develop coordinated prioritized infrastructure improvements. By coordinating with other infrastructure master plans for recommendations related to existing infrastructure such as the Pavement Assessment Report and the Streetlight and Traffic Signal Condition Assessment Report as well as prioritizing improvements that coincide with priorities of the sewer, water, and drainage master plans, the City can efficiently leverage all of its infrastructure investments.

This strategy includes the following 2 actions, as described in further detail below:

4.3A Implement the recommendations of the Pavement Assessment Report to maintain and rehabilitate City roads

4.3B Implement the recommendations of the Streetlight and Traffic Signal Condition Assessment Report to replace streetlight and traffic signal poles in critical condition and monitor those in poor condition

Action 4.3A: Implement the recommendations of the Pavement Assessment Report to maintain and rehabilitate City roads

The City undertook a Pavement Assessment Report to undertake a visual condition assessment and pavement management system of the asphalt pavement for all public roads and back lanes in the City. The purpose of this assessment was to provide the City with the general condition of their public roads, provide recommendations for future maintenance and rehabilitation programs and to provide a cost estimate for the City for budgetary use. The report included a plan to extend the lifespan of City roads before full rehabilitation was required by ranking all streets as poor, moderate or excellent/good condition. Of White Rock's 81km of public roadways, 23% or 18.52 km were rated as poor, including the majority of North Bluff Road as well as segments of Marine Drive, Thrift Avenue, Buena Vista Avenue, Roper Avenue, Pacific Avenue, Foster Street, Martin Street, Merklin Street, Maple Street, George Street, and numerous local roads. It is recommended that these are reviewed in conjunction with utility repair programs and upcoming land development to avoid duplication of effort.

Action 4.3B: Implement the recommendations of the Streetlight and Traffic Signal Condition Assessment Report to replace streetlight and traffic signal poles in critical condition and monitor those in poor condition

The Streetlight and Traffic Signal Condition Assessment Report (2020) undertook a condition assessment of all streetlights and traffic signal assets in the City. The City has 931 streetlights and traffic signals. A detailed condition assessment was conducted for each streetlight or traffic signal to create a baseline inventory for the City. Each streetlight and traffic signal were evaluated based on a range of factors, including pole condition, luminaire condition, anchor belt condition, service pole, service panel condition, pole age, fuse presence, bonding presence, and other land use and transportation factors such as the presence of nearby parks, schools, or hospitals, adjacent sidewalks, road classification, and banner arms. Based on this evaluation, the majority of the streetlights or traffic signal poles are in fair condition, while 47 are in critical condition and 177 are in poor condition. The 2020 report included a program to replace the 47 critical poles immediately, and the remainder in future years was developed, with a total replacement value of $1.36M. The 2020 report recommended that an annual budget of $50,000 be utilized to maintain the streetlighting inventory once the critical poles are remedied. The City should follow the implementation plan recommended in that report, with a specific focus on leveraging opportunities for other street works projects to implement the recommendations of the report.

Strategy 4.4: Expect disruptive technologies and plan to accommodate new modes on the transportation network

Technologies in the transportation sector are undergoing an unprecedented time of change, ranging from vehicle technologies such as Zero Emissions Vehicles (ZEVs) and autonomous vehicles (AVs), transportation infrastructure technologies such as Intelligent Transportation Systems (ITS), and changes to how services are delivered such as car sharing, bike sharing, and ride hailing. These disruptive technologies are profoundly impacting the way residents move throughout their communities, and these changes are likely to accelerate in the next several years. While the specifics of what the implications may be on White Rock's transportation system future are unclear, what is very clear is that the way people will get around in the future will be different from the way people are getting around today. These changed realities will have significant impacts on land use patterns, vehicle ownership, travel demand, and public transit systems, all of which have implications for long range infrastructural decisions being made today. While we plan for pedestrians, cyclists and motor vehicles currently, consider the impact of new mobility technologies on facility design.

This strategy includes the following 2 actions, as described in further detail below:

4.4A Plan for Zero Emission Vehicles

4.4B Plan for new mobility services

4.4C Use Intelligent Transportation Systems to improve the efficiency of the transportation system

4.4D Plan for autonomous vehicles

Action 4.4A: Plan for Zero Emission Vehicles

Transportation is one of the most significant contributors to community greenhouse gas emissions. As part of its climate plan, the Government of Canada is committed to achieve net-zero emissions by 2050 and has a goal to reach 100% of passenger zero-emission vehicle sales by 2040. To work towards this, communities must start planning for a significant increase in Zero Emission Vehicles (ZEVs) or electric vehicles (EVs). The federal government is providing incentives to help municipalities invest in infrastructure to support ZEVs, including providing funding through the Zero-Emission Vehicle Infrastructure Program.

EVs are recharged by plugging into the electricity grid. Three charge types are available:

- Level 1 (One Hour of Charge – 8 km of Range). Standard cord-set that plugs into a regular wall socket.
- Level 2 (One Hour of Charge – 30 km of Range). The most common level for public charge stations. Requires 4 to 6 hours to fully charge an EV.
- Level 3 (One Hour of Charge – 250 km of Range). Requires 30-45 minutes to fully charge an EV.

There are over 5,000 public charging stations in Canada. They can be found in a variety of places including malls, restaurants and office towers. Public charging stations are either free to use or pay per use. Free to use stations do not require payment, however, some are only available to customers, can only be used for a set amount of time, and / or are located in parkades and parking lots with associated parking fees. Pay per use stations vary in cost from one location to another and there is no industry standard,

- There are currently five electric vehicle charging locations with 28 stations in the City of White Rock, including:
  - West Beach Parkade (7 stations)
  - Centennial Arena (2 stations)
  - White Rock Community Centre Parkade (Miramar Village at 15152 Russell Ave) (8 stations)
  - 1441 Johnson Road (8 stations)
  - Ocean Promenade Hotel (3 stations)

In addition, in April 2021 it was announced that 126 electric vehicle chargers would be installed at a multi-use unit residential building and commercial site on Finlay Street.

To support the necessary infrastructure required for the future, many cities have begun requiring that new buildings provide electric outlets to service residential parking, and some municipalities are requiring that a share of new commercial and industrial parking stalls be wired for Level 2 charging. To support the proliferation of ZEVs, the City should install public charging stations at all community facilities by 2030.

Action 4.4B: Plan for new mobility services

The availability of real time information and the societal proliferation of smart personal devices have resulted in the exponential growth of new mobility service offerings over the past decade, including the emergence of urban bike sharing, as well as the sharp rise of car sharing and ride-hailing. Consumers now have the ability to access, plan, reserve, and pay for travel options at the push of button. While growth in new mobility services has mainly occurred to this point in larger cities, these services could additionally be hugely beneficial to small-sized cities within Metro Vancouver such as White Rock. Two new mobility services are profiled as they relate to White Rock: car sharing and bike sharing:

- **Car sharing:** Car sharing can satisfy a variety of different micro and macro goals, from deferring the purchase of a first or second vehicle to reducing the need for parking. Car sharing provides a more efficient use of vehicles and the street itself. Unlike private automobiles that remain parked for the vast majority of the time, car sharing pairs vehicles with trip makers, allowing vehicles to be used (and parking space unoccupied) for a greater share of the time.

  There are two car share service types: round trip and free-floating car shares. The two service types result in very different car share trips and cater to different markets. The pricing and rental structure of round-trip car shares are geared towards customers who want an easily available short-term vehicle for a set period of time. Round trip car shares are not geared towards commuting and are more suitable for leisure or special interest trips. By comparison, free floating car shares offer point-to-point travel with billing by the minute, giving the traveller the flexibility of using a car when it is most needed, and discarding it in favour of public transit or walking where it is less efficient.

The City should consider the following to encourage car sharing:

- Seek strategic partnerships to encourage car share operations to come to White Rock.
- Develop an approach to on-street and off-street public parking that includes incentives for car share vehicles (i.e. priority parking, free parking at parking meters).
- Investigate the potential for parking variances if developers provide and support car share services. This provision is based on research that car share vehicles can significantly reduce the need for private vehicle ownership.
- Reserve a supply of priority parking spaces in higher density areas already well served by transit, such as the Town Centre.

- **Bike sharing:** Bike sharing is a sustainable transportation initiative that allows individuals to borrow bicycles on a short-term basis for a fee, similar to a car sharing system. There are various bike share systems operating across North America and internationally, including the Mobi bike share system operated within the City of Vancouver. Modern bike share systems are typically comprised of bike share stations, a maintenance centre, and transport vehicles to move bikes between stations and the maintenance facility. Users can pick up a bike and helmet at one station and drop it off at another, which supports one-way trips and return trips.

  More recently, station-less (or dockless) bike share systems have been implemented, which can significantly reduce the upfront capital costs of establishing a bike share. A dockless service can also eliminate the need for street space that would otherwise have to be allocated to a permanent docking station, reducing potential parking or sidewalk impacts. The City should work with the City of Surrey and TransLink to consider the feasibility of implementing a bike share program, including e-bikes.

Action 4.4C: Use Intelligent Transportation Systems to improve the efficiency of the transportation system

Intelligent Transportation Systems (ITS) involve the implementation of advanced technology on transportation operations. This emerging area is beneficial in reducing congestion and increasing road safety. ITS technology can create a communication link between the various vehicles and road systems including traffic signals, transit vehicles, and all other travellers providing drivers (and autonomous vehicles in the future) with advance warning about changing or upcoming travel conditions.

The communication of current conditions and unexpected incidents to drivers allows people to make informed decisions of routes and travel methods which improve traffic movement on the road network. Maintaining streams of communication to the public is important in reducing congestion in unexpected events.

The City should consider undertaking a comprehensive examination of the practical applications for ITS in White Rock, which could include the provision of real time information to drivers, dynamic corridor signal coordination, transit signal prioritization, as well as future oriented applications such as vehicle to infrastructure technology.

Action 4.4D: Plan for autonomous vehicles

Autonomous Vehicle (AV) technology is rapidly emerging – most major auto manufacturers and tech giants such as Google and Uber are racing against one another to fine-tune the technology with vehicles already being trialed to varying degrees on city streets. Over the next several years, industry analysts expect fully autonomous vehicles to be available for purchase with market adoption occurring over the next 30 years. The scale of technological change amounts to a revolution in urban transportation that can radically reshape the way we live and move about communities. Like previous urban transportation revolutions, such as the invention of the automobile, a new AV reality will both broaden possibilities and present new threats to the established order.

To ensure White Rock takes a pro-active approach to new transformative transportation technologies, the City should consider:

- Work with partners such as adjacent municipalities and TransLink to study the various implications of autonomous vehicle technology including potential impacts on accessibility, safety, mobility, parking demand, public transit, multi-modality, and land-use; the study should develop a long-range strategic vision for AVs and examine tools and policies required to leverage this vision while mitigating negative externalities.
- Develop a multi-scenario approach to long-range transportation modelling that incorporates degrees of uncertainty posed by changing technologies.
- Commit to undertaking regular updates to the ITIMP in recognition of the high degree of long-term uncertainty posed by changing technologies.

Strategy 4.5: Manage curb space to be flexible and dynamic

Curb space is where movement meets access. Curb space can be used for vehicle parking and loading, but it can also be used for mobility, sidewalk cafes, transit stops and amenities, active pick-up and drop-off, traditional bike locks, raingardens, street furniture and micromobility stations (i.e. bike-share, e-bike share, e-scooter share stations). While curb space has historically been seen as a zone for on-street parking, the curbside zone has increased in importance as municipalities seek to best manage these zones. Busy corridors may see the curbside lane carefully managed for a variety of purposes including inline bus stops, bus queue jumps, on-street parking, dedicated loading space, and right turn lanes.

This strategy includes the following 1 action, as described in further detail below:

4.5A Consider opportunities for dynamic curb-space management on commercial streets

Action 4.5A: Consider opportunities for dynamic curb-space management and road space reallocation on commercial streets

ITE's *Curbside Management Practitioners Guide* details the varying pressures and demands on curbside lanes (particularly in busy commercial areas). These include:

- **Access to Loading / Unloading Zones:** One of the most fundamental aspects of curbside management is streamlining access to the curbside for loading and unloading activities. These can include practical approaches to accommodate passenger access for taxis, ride-hailing, and autonomous vehicles as well as freight access for loading and unloading.
- **Parking:** Increasingly municipalities price and/or place time limits on curbside parking to optimize turnover and reduce occupancy targets in order to advance local business and community interests and ensure best use. This can include demand-based pricing where rates vary for peak times, or special events; time limits or time of day restrictions to balance ROW needs; or priority parking programs for residents or specific vehicle types such as car share vehicles, food trucks or other vendors;
- **Transit:** Curbside management strategies are often designed to encourage transit operations and can include transit lanes, bus queue jumps, bus bulbs, and bus boarding islands
- **Bicycle:** Curbside management strategies often seek to establish all-ages and abilities cycling networks and can include: protected bicycle lanes and storage of bicycles and share mobility devices such as bike share and e-scooters.
- **Pedestrian & Activation.** Reduced emphasis on mobility can allow for enhanced active pedestrian space which can include wider sidewalks, curb extensions to reduce road crossing distance, parklets, or opportunities for expanded commercial or retail space, including restaurants and sidewalk cafes.

The need for dynamic curb spaces has grown significantly as a result of the COVID-19 pandemic, with increased demands for curbside loading, pick-up, and drop-off as well as the need for road space reallocation to provide increased space for restaurant patios, parks, and widened pedestrian and cycling facilities. The City should continue to explore opportunities for reallocating road space and consider flexible and dynamic use of the street on commercial streets such as Marine Drive, Johnston Road, and other commercial streets within the Town Centre.

5 IMPLEMENTATION STRATEGY

The strategies and actions developed as part of the ITIMP are intended to guide White Rock's policy, planning, and capital investment decisions as well as on-going operations and maintenance activities related to transportation over the next 20 years and beyond. To achieve the vision and goals of the Plan, an implementation strategy is necessary to provide a framework for advancing specific transportation improvements that align with other infrastructure priorities. This chapter presents an implementation strategy for the ITIMP.

5.1 IMPLEMENTATION PRINCIPLES

The implementation plan was developed based on the following guiding principles:

- **The ITIMP is one step towards implementing the vision for transportation in White Rock; it is not the last step.** The strategies in the ITIMP are intended to lay the groundwork for implementation over the long-term. It is important to recognize that implementation will require significant investment and resources, as well as a shift to prioritize walking, cycling, and transit to meet the vision, goals, and targets of the Plan. The Plan includes significant investments in new infrastructure, upgrades to existing infrastructure, ongoing maintenance of existing and new facilities, resources for development of new standards and policies, funding for new programming and public education, and staff resources. It will require ongoing support from the City and its partners, along with sustained investment in all transportation modes.

- **The ITIMP is a flexible and living document.** For each long-term network plan, there is some level of flexibility for the specific locations and corridors that are recommended. The Plan presents recommendations based on public input and technical analysis; however, the City will need to review the feasibility and desirability of each infrastructure project. As this Plan is a long-term, strategic document, it is anticipated that additional projects will emerge over time to reflect changing priorities.

- **The City should monitor, review, and update the ITIMP on a regular basis, as needed.** As the City begins implementing the strategies and actions of the ITIMP, a monitoring and reporting strategy will be needed to measure and communicate progress towards achieving the vision, goals, and targets. Reporting back on the indicators identified with each of the goals and objectives in the ITIMP is one of the ways the City can report on progress made in implementing the Plan. As the City moves forward with implementing the Plan, the document will need to be updated to reflect the changing priorities and conditions over time.

- **The City will engage in further public consultation to implement the recommendations included in the ITIMP.** Many of the initiatives require more detailed input and technical work. The City should work closely with partners, residents, and stakeholder groups to move forward with priorities in the ITIMP.

- **The City should incorporate the short-term priorities into its 5-year Capital Plan, and a new investment strategy should be developed for the long-term.** Finally, there will be an annual review as part of the financial planning and municipal budgeting process, with a full review of the ITIMP recommended every 5 years.

5.2 PRIORITIZING ACTIONS

The strategies and actions developed as part of the ITIMP are intended to guide White Rock's capital, operations, maintenance, policy, and programming decisions as well as on-going resource requirements over the next 20 years and beyond. While the Plan has been developed as a long-term plan, it will require financial investment, staff resources, and an implementation strategy to prioritize improvements over the short-, medium- and long-term. The implementation plan was developed based on both technical evaluation results as well as the results of public input.

5.3 OPTIONS ANALYSIS METHODOLOGY

Each action identified in the ITIMP was evaluated using a weighted, multi-criteria options evaluation. Each action was ranked on a scale of 1 (low) to 5 (high) for a range of criteria related to the overall benefits and feasibility of each action.

Benefits

The plan aims to prioritize those initiatives that will have the greatest benefits in terms of aligning with the City's six strategic priorities and the five goals of the plan. Two types of benefits were identified and evaluated, each with equal weighting:

- **Alignment with strategic priorities**; and
- **Impact on goals**.

Each action was evaluated qualitatively on a scale of 1 to 5 for the degree to which it achieved each of these.

Feasibility

While the plan aims to prioritize projects based on benefits, it also seeks to prioritize projects that have higher degrees of feasibility. Three types of feasibility (or impacts) were identified and evaluated, each with equal weighting:

- **Relative cost**, including capital, operating, and maintenance costs;
- **Ease of implementation**, including phasing and coordination with other works, bylaws, fees, agreements and rates of adoption; and
- **Risks,** including impacts to residents, neighbourhoods and businesses, traffic, bus service, service, city-owned and third-party utilities, and other risks and liabilities.

Each action was evaluated qualitatively on a scale of 1 to 5 for the degree to which it achieved each of these.

5.4 OPTIONS ANALYSIS RESULTS

Table 4 below summarize the results of the options evaluation along with implementation priorities and considerations, including:

- **Areas of Focus.** These columns identify which areas of focus each action aligns with. This was provided for information purposes but is not included in the evaluation.

- **Alignment with Strategic Priorities.** These columns identify the alignment with the City's strategic priorities, including community, environment, waterfront, infrastructure, economy, and COVID-19.

- **Impact on Goals.** These columns identify the impact on the goals of the ITIMP, including increased mobility choices, improved environmental outcomes, improved health, improved safety, and improved efficiency.

- **Feasibility / Impacts.** These columns identify the results of the feasibility assessment, including relative cost, ease of implementation, and risks.

- **Evaluation Results.** These columns identify the overall evaluation results, including the weighted results of the combined benefits and feasibility / impacts (to determine projects that might have high benefits and high feasibility) as well as the overall evaluation results. The results were weighted to yield an overall score for each action ranging from 1 (low) to 100 (high). The benefits (alignment with strategic priorities and impact on goals) were assigned a weight of 1 for an overall maximum possible score of 55. The feasibility / impacts (relative cost, ease of implementation, and risks) were assigned a weight of 3 for an overall maximum possible score of 45. This results in a relatively even distribution between benefits and feasibility. Evaluation results have been grouped as follows:
    - **Low:** Overall score between 1 and 50
    - **Low – Medium:** Overall score between 51 and 60
    - **Medium:** Overall score between 61 and 70
    - **Medium – High:** Overall score between 71 and 80
    - **High:** Overall score above 80

- **Priority.** These columns identify the overall priority of each action based the options assessment as either high (0-5 years), medium (5-10 years), or low priority (over 10 years). Many actions will be implemented on an ongoing basis, in which case they are shown under each timeframe. It should also be noted that these priorities may change over time. If an opportunity arises to immediately implement an action identified as a medium or long-term priority, such as an infrastructure redevelopment opportunity or other capital project, the City should seek to maximize the opportunity.

- **Method of Implementation.** These columns identify how each action will be implemented: as a capital project, through ongoing operations and maintenance, or as a policy or programming initiative.

- **Responsibility.** This column suggests the primary and secondary responsibility for each action. Many actions are the primary responsibility of the City of White Rock (including Engineering, Public Works, Planning, Parks & Recreation, Communications, or Finance), while other actions should be led by external agencies, such as other government agencies (such as MOTI, BC Transit, and/or TransLink), community groups, or the private sector.

***Table 4**: Option Analysis and Prioritization Summary*

Safe Streets	AREAS OF FOCUS	ALIGNMENT WITH STRATEGIC PRIORITIES						IMPACT ON GOALS					FEASIBILITY / IMPACTS			EVALUATION RESULTS			PRIORITY			METHOD OF IMPLEMENTION		
		Community	Environment	Waterfront	Infrastructure	Economy	COVID-19	Improved Safety	Improved Efficiency	Improved Enviromental Outcomes	Increased Mobility Choices	Improved Health	Relative Cost	Ease of Implementation	Risks	Benefits	Feasibility / Impacts	Total	High	Medium	Low	Capital	Operations and Maintenance	Policy and Programming
		Weight: 1 (max score 30)						Weight: 1 (max score 25)					Weight:3 (max score 45)			55	45	100	>79	70-79	<70			
Strategy 1.1: Adopt and implement a Vision Zero Strategy containing actionable and measurable road safety targets																								
1.1A: Adopt and implement a Vision Zero Strategy	Safety, Walking, Cycling	5	2	3	3	5	3	5	4	2	5	5	4	4	5	42	39	81	✓			✓		✓
1.1B: Improve and enhance existing design standards and intersections to improve safety for all road users	Safety, Walking, Cycling	5	3	3	5	5	3	5	4	3	5	4	4	4	4	45	36	81	✓					✓
1.1C: Develop an annual traffic data collection program to systematically monitor traffic volumes and speeds to inform a systematic, objective approach to addressing transportation issues	Safety, Walking, Cycling	3	3	2	3	3	2	5	5	4	5	4	2	3	5	39	30	69			✓		✓	
1.1D: Review traffic data and identify streets that would benefit from traffic calming, traffic diversion, and speed reduction.	Safety, Walking, Cycling	5	4	5	3	4	3	5	3	4	5	4	3	3	3	45	27	72		✓			✓	✓
1.1E: Support education initiatives and programs to encourage all road users to safely use the transportation network	Safety, Walking, Cycling	4	3	3	2	3	3	4	3	3	4	4	3	3	4	36	30	66			✓			✓
1.1F: Design and build transportation infrastructure for vulnerable road users of all ages and abilities	Safety, Walking, Cycling	5	5	3	5	5	4	5	5	5	5	5	2	2	3	52	21	73		✓		✓		

People-first Streets	AREAS OF FOCUS	ALIGNMENT WITH STRATEGIC PRIORITIES						IMPACT ON GOALS					FEASIBILITY / IMPACTS			EVALUATION RESULTS			PRIORITY			METHOD OF IMPLEMENTION		
		Community	Environment	Waterfront	Infrastructure	Economy	COVID-19	Improved Safety	Improved Efficiency	Improved Enviromental Outcomes	Increased Mobility Choices	Improved Health	Relative Cost	Ease of Implementation	Risks	Benefits	Feasibility / Impacts	Total	High	Medium	Low	Capital	Operations and Maintenance	Policy and Programming
		Weight: 1 (max score 30)						Weight: 1 (max score 25)					Weight:3 (max score 45)			55	45	100	>79	70-79	<70			
Strategy 2.1: Develop an expanded network of sidewalks and pathways to reduce barriers and create a more walkable city for people of all ages and abilities																								
2.1A: Fill in gaps in the sidewalk network by strategically investing in new sidewalks on existing streets	Safety, Walking	5	5	4	5	4	4	5	5	5	5	5	1	3	4	52	24	76	✓			✓		
2.1B: Review and expand on the encroachment policy to allow for safe and seamless sidewalk and pathway connections	Walking	4	4	1	4	3	3	4	5	4	4	4	5	3	3	40	33	73		✓			✓	✓
2.1C: Identify, plan for, and invest in greenway corridors to seamlessly connect the pedestrian network	Walking	5	5	5	5	5	5	5	4	5	5	5	2	3	3	54	24	78	✓			✓		
Strategy 2.2: Develop and design universally accessible streets																								
2.2A: Update the City's design standards and ensure all new and improved streets follow universal design best practices	Safety, Walking	4	4	3	5	3	3	5	5	4	5	5	4	4	4	46	36	82	✓					✓
2.2B: Identify and support trail and pathway enhancements such as staircases	Walking	5	5	5	5	4	4	5	3	4	5	5	1	1	5	50	21	71		✓		✓		
2.2C: Identify new crosswalks and upgrade existing crosswalks to improve pedestrian accessibility	Safety, Walking	5	4	4	5	4	4	5	3	4	5	5	3	3	3	48	27	75		✓		✓		
Strategy 2.3: Create safe, welcoming, and comfortable places that attract pedestrians and make walking enjoyable																								
2.3A: Support other organizations in their initiatives to promote walking	Walking	5	5	4	1	2	4	4	3	5	5	5	4	4	5	43	39	82	✓					✓
2.3B: Ensure new developments provide high quality urban design and placemaking features	Walking, Land Use and Transportation Integration	5	5	2	5	4	4	5	3	5	4	5	5	4	5	47	42	89	✓					✓

Table 4: *Option Analysis and Prioritization Summary (continued)*

Connected Streets	AREAS OF FOCUS	ALIGNMENT WITH STRATEGIC PRIORITIES						IMPACT ON GOALS					FEASIBILITY / IMPACTS			EVALUATION RESULTS			PRIORITY			METHOD OF IMPLEMENTION		
		Community	Environment	Waterfront	Infrastructure	Economy	COVID-19	Improved Safety	Improved Efficiency	Improved Enviromental Outcomes	Increased Mobility Choices	Improved Health	Relative Cost	Ease of Implementation	Risks	Benefits	Feasibility / Impacts	Total	High	Medium	Low	Capital	Operations and Maintenance	Policy and Programming
		Weight: 1 (max score 30)						Weight: 1 (max score 25)					Weight:3 (max score 45)			55	45	100	>79	70-79	<70			
Strategy 3.1: Update street classification network and design standards following complete streets principles																								
3.1A: Review and update street classifications to prioritize pedestrians and other vulnerable road users and ensure all streets are functioning as intended	Safety, Walking, Cycling, Street Network, Regional/External Connections, Compelte Streets	5	4	4	5	4	4	5	5	4	5	4	5	4	3	49	36	85	✓					✓
3.1B: Review and update design standards, including cross-sections, to prioritize complete streets	Safety, Walking, Cycling. Street Network, Complete Streets	5	4	3	5	3	3	4	5	4	5	4	5	4	3	45	36	81	✓					✓
3.1C: Develop complete streets improvement strategies for major streets	Street Network, Goods Movement, Regional/External Connections	5	5	3	5	4	3	5	5	5	5	5	1	3	3	50	21	71		✓		✓		
Strategy 3.2: Improve intersections that have been identified as having safety, operational, or geometric issues																								
Action 3.2A: Develop spot improvements focused on geometric, safety, and/or operational issues		5	5	3	5	5	3	5	5	4	5	5	1	3	3	50	21	71		✓		✓		
Strategy 3.3: Enhance the transit user experience through improved service, bus stop amenities, and accessible connections to transit																								
3.3A: Improve transit service	Transit	5	5	4	5	4	4	4	5	5	5	4	4	3	5	50	36	86	✓					✓
3.3B: Improve walking access to transit stops and stations	Transit, Walking	5	5	3	5	4	4	5	5	5	5	5	2	4	5	51	33	84	✓			✓		
3.3C: Improve bus stop passenger amenities	Transit, Walking	5	5	4	5	4	4	4	5	5	5	4	3	4	5	50	36	86	✓			✓		
3.3D: Reinstate the White Rock Trolley or similar local transit shuttle	Transit, Land Use and Transportation Integration	5	4	5	3	5	3	4	4	5	5	3	3	2	3	46	24	70		✓		✓		
Strategy 3.4: Develop a comfortable, complete, and connected cycling network to support local and regional cycling trips																								
3.4A: Develop a complete, comfortable, and connected bicycle network that is suitable for all ages and abilities and connects all destinations throughout the City	Safety, Cycling	4	5	4	5	4	5	5	3	5	5	5	2	2	3	50	21	71		✓		✓		
3.4B: Provide support facilities and programs that make cycling an attractive and convenient transportation choice	Safety, Cycling	4	5	4	5	4	4	5	4	5	5	4	1	1	3	49	15	64			✓	✓		

Table 4: *Option Analysis and Prioritization Summary (continued)*

Dynamic Streets	AREAS OF FOCUS	ALIGNMENT WITH STRATEGIC PRIORITIES						IMPACT ON GOALS					FEASIBILITY / IMPACTS			EVALUATION RESULTS			PRIORITY			METHOD OF IMPLEMENTION		
		Community	Environment	Waterfront	Infrastructure	Economy	COVID-19	Improved Safety	Improved Efficiency	Improved Enviromental Outcomes	Increased Mobility Choices	Improved Health	Relative Cost	Ease of Implementation	Risks	Benefits	Feasibility / Impacts	Total	High	Medium	Low	Capital	Operations and Maintenance	Policy and Programming
		Weight: 1 (max score 30)						Weight: 1 (max score 25)					Weight:3 (max score 45)			55	45	100	>79	70-79	<70			
Strategy 4.1: Develop an integrated and multi-modal network to facilitate the safe and efficient movement of goods																								
Action 4.1A: Review the weight and dimensions limits of the road network to identify locations that cannot support vehicles with a GVW greater than 5,500 kg and less than 11,800 kg	Goods Movement	3	3	4	4	5	3	4	5	3	2	3	5	5	5	39	45	84	✓					✓
Action 4.1B: Complete a truck restriction review and application to TransLink to simplify the truck route network and remove redundant links that have higher potential impacts on the City's goals and objectives	Goods Movement	3	3	4	4	5	3	4	5	3	2	3	5	2	2	39	27	66			✓			✓
Action 4.1C: Update the City's Street and Traffic Bylaw to harmonize with the Metro Vancouver region and modernize the truck network.	Goods Movement	3	3	4	4	5	3	4	5	3	2	3	5	5	5	39	45	84	✓					✓
Strategy 4.2: Ensure residential parking appropriately allows residents to park without interrupting the safe movement of people																								
Action 4.2A: Implement the recommendations of the City-Wide Parking Strategy (ongoing) to revise the residential parking permit program and procedures	Parking	4	3	3	4	4	3	3	3	3	4	3	5	2	2	37	27	64			✓			✓
Action 4.2B: Manage issues with residential parking in boulevards	Parking	5	4	3	5	3	2	4	3	4	2	2	4	2	2	37	24	61			✓			✓
Strategy 4.3: Focus on asset management and ensure the transportation system is in a state of good repair																								
4.3A: Implement the recommendations of the Pavement Assessment Report to maintain and rehabilitate City roads	Street Network	4	2	4	5	4	1	5	5	2	2	4	3	3	5	38	33	71		✓			✓	
4.3B: Implement the recommendations of the Streetlight and Traffic Signal Condition Assessment Report to replace streetlight and traffic signal poles in critical condition and monitor those in poor condition	Street Network	4	3	3	5	4	1	5	5	2	2	4	3	3	5	38	33	71		✓			✓	
Strategy 4.4: Expect disruptive technologies and plan to accommodate new modes on the transportation network																								
4.4A: Plan for Zero Emission Vehicles	Future Technology	3	5	3	3	3	3	4	3	5	3	4	2	3	3	39	24	63			✓			✓
4.4B: Plan for new mobility services	Future Technology, Cycling	4	5	4	3	4	4	4	5	5	5	3	3	3	3	46	27	73		✓				✓
4.4C: Use Intelligent Transportation Systems to improve the efficiency of the transportation system	Future Technology	5	5	4	3	4	3	4	5	5	5	3	1	3	3	46	21	67			✓			✓
4.4D: Plan for autonomous vehicles	Future Technology	4	5	4	3	4	3	3	5	5	5	3	1	3	3	44	21	65			✓			✓
Strategy 4.5: Manage curb space to be flexible and dynamic																								
4.5A: Consider opportunities for dynamic curb-space management on commercial streets	Street Network, Complete Streets, Land Use and Transportation Integration, Future Technology	5	4	4	3	5	5	3	5	5	5	3	3	4	3	47	30	77		✓				✓

5.5 RELATED INFRASTRUCTURE MASTER PLANS

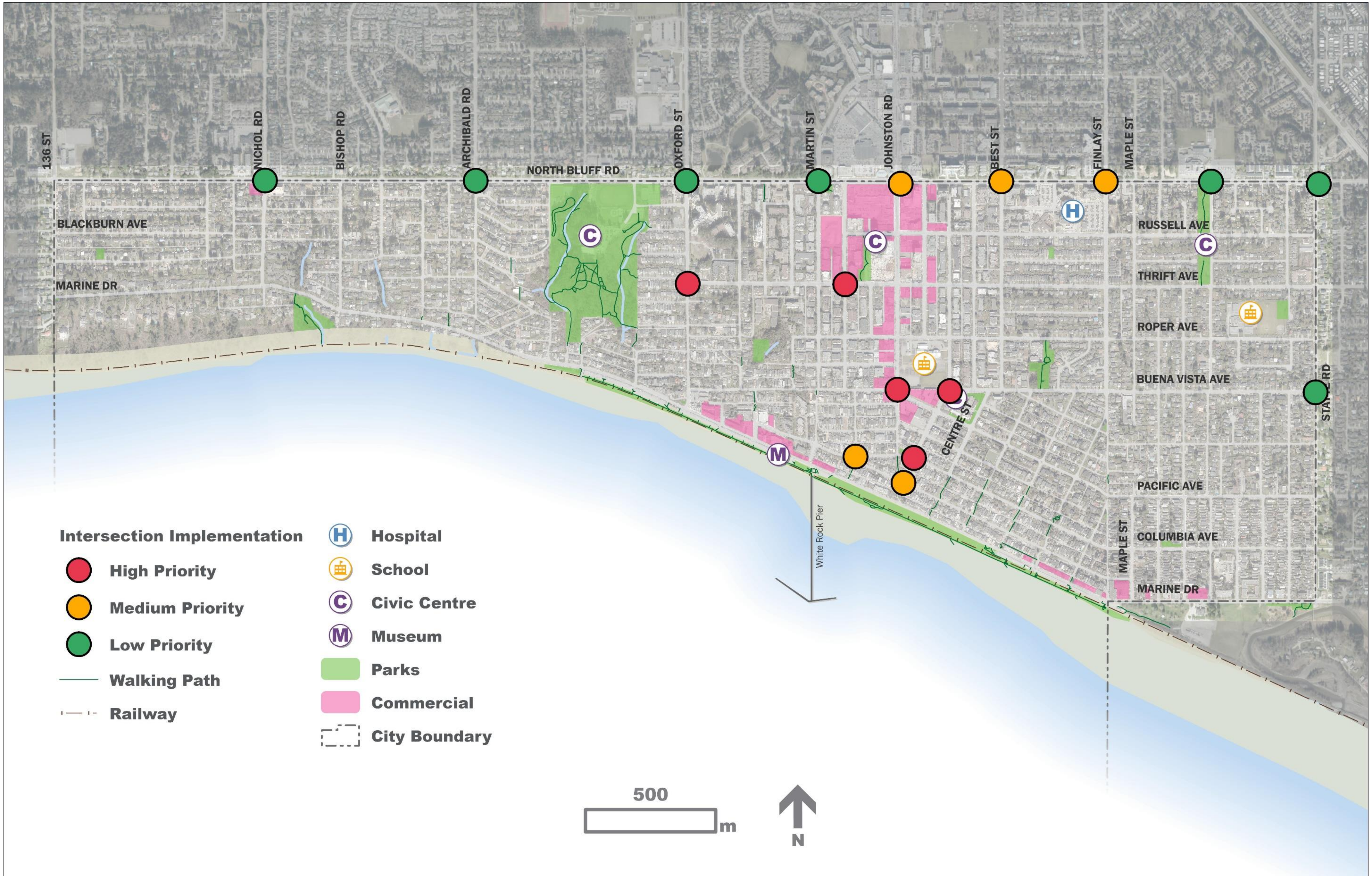
The capital implementation plan was guided by the priorities identified in the City's other relevant infrastructure master plans, including:

- Sewer Master Plan (2019-20)
- Water Master Plan (2017)
- Drainage Master Plan (2019-20)
- Integrated Stormwater Plan (2010)
- Pavement Assessment Report (2020)
- Streetlight and Traffic Light Condition Assessment (2020)

Priorities from each of these documents were reviewed to identify priorities related to all capital infrastructure projects identified in the ITIMP.

5.6 PRIORITIZING IMPROVEMENTS

The tables and maps in the sections below summarize the implementation priorities for all the transportation capital projects identified in the ITIMP. The tables identify the project, order-of-magnitude capital cost, ITIMP priority, related infrastructure master plan priorities, and the overall suggested timeline for implementation.



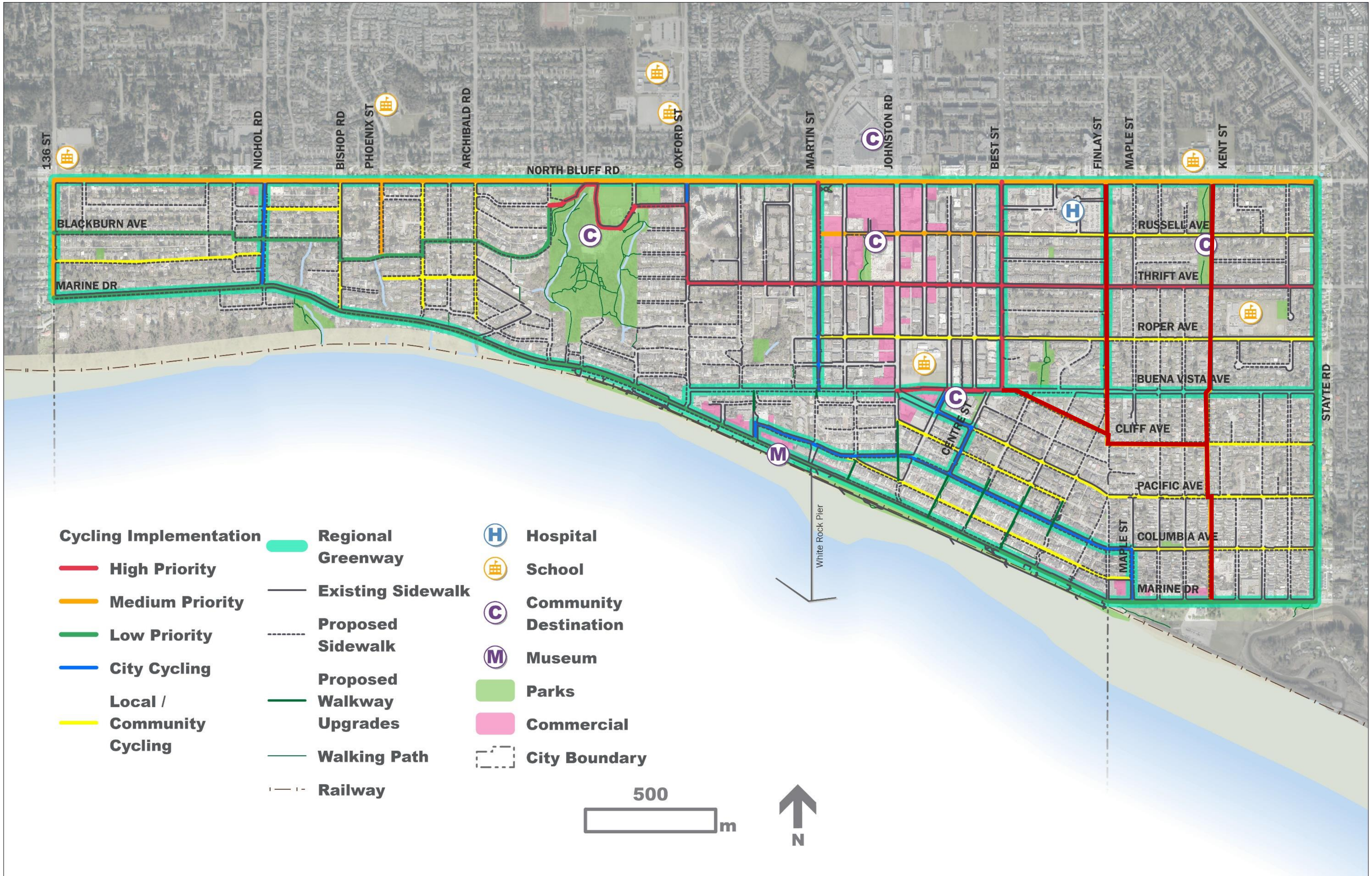
Map 13: *Road Network Capital Projects*

Table 5: Road Network – Complete Streets Improvement Strategies for Major Streets (Action 3.1C)

Project	Improvement Type	ITIMP Priority	Related Infrastructure Master Plan Priorities					Implementation Timeline (1-2 / 3-5/ 6-10 / 10+)	Comments
			Sewer	Water	Drainage	Pavement Condition	Street Light		
North Bluff Road	Road Space Reallocation (Interim)	High	–	–	Year 5/6	Low – High	–	Year 6-10	
North Bluff Road	Road Space Reallocation (Ultimate)	Development-driven	–	–	Year 5/6	Low – High	–	Year 10+	
Stayte Road	Road Space Reallocation	Development-driven	Year 2	–	Year 4/5	Medium	2 (Years 2/7)	Year 10+	Additional ROW Required
Bergstrom Road	Road Space Reallocation (Interim)	Medium	–	–	–	Low	–	Year 6-10	
Bergstrom Road	Road Space Reallocation (Ultimate)	Low	–	–	–	Low	–	Year 10+	
Oxford Street	Road Space Reallocation (Interim)	High	–	–	Year 7-12	Medium	3 (Years 5/6)	Years 1-2	
Oxford Street	Road Space Reallocation (Ultimate)	Development-driven	–	–	–	Medium		Year 6-10	
Thrift Avenue (Oxford to Best Street)	Road Space Reallocation (Interim)	High	–	–	Year 2 / Year 7-12	Low – High	3 (Years 2/7)	Years 1-2	
Thrift Avenue (Oxford to Best Street)	Road Space Reallocation (Ultimate)	Development-driven	–	–	Year 2 / Year 7-12	Low – High	3 (Years 2/7)	Year 6-10	
Thrift Avenue (Best to Stayte Road)	Road Space Reallocation (Interim)	High	–	–	Year 2 / Year 7-12	Low – High	5 (Years 4-9)	Years 1-2	
Thrift Avenue (Best to Stayte Road)	Road Space Reallocation (Ultimate)	Low	–	–	Year 2 / Year 7-12	Low – High	5 (Years 4-9)	Year 6-10	
Best Street	Road Space Reallocation (Interim)	High	–	–	Year 2	Medium	1 (Year 10)	Years 1-2	
Best Street	Road Space Reallocation (Ultimate)	High	–	–	Year 2	Medium	1 (Year 10)	Year 6-10	
Johnston Road	Road Space Reallocation (Interim)	Medium	–	Year 6	–	Medium – Low	–	Year 3-5	
Johnston Road	Road Space Reallocation (Ultimate)	Medium	–	Year 6	–	Medium – Low	–	Year 6-10	

Table 6: *Road Network – Safety, Operational, or Geometric Improvements (Action 3.2A)*

Project	Improvement Type	ITIMP Priority	Related Infrastructure Master Plan Priorities					Implementation Timeline	Comments
			Sewer	Water	Drainage	Pavement Condition	Street Light		
North Bluff Road & Nichol Road	Safety Improvements	Low	–	–	–	–	–	Year 10 +	Outside Town Centre
North Bluff Road & Archibald Road	Operational Improvements	Low	–	–	–	–	–	Year 10 +	Outside Town Centre
North Bluff Road & Oxford Street	Safety Improvements	Low	–	–	–	–	–	Year 10 +	Outside Town Centre
North Bluff Road & Martin Street	Operational Improvements	Low	–	–	–	–	–	Year 10 +	Outside Town Centre
North Bluff Road & Johnston Road	Safety and Operational Improvements	Medium	–	–	–	–	–	Year 6-10	Within Town Centre, RapidBus Alignment
North Bluff Road & Best Street	Safety Improvements	Medium	–	–	–	–	–	Year 6-10	Within Town Centre, RapidBus Alignment
North Bluff Road & Finlay Street	Safety Improvements	Medium	–	–	–	–	–	Year 6-10	Within Town Centre, RapidBus Alignment
North Bluff Road & Kent Street	Operational Improvements	Low	–	–	–	–	–	Year 10 +	Outside Town Centre
North Bluff Road & Stayte Road	Safety and Operational Improvements	Low	–	–	–	–	–	Year 10 +	Outside Town Centre
Oxford Street & Thrift Avenue	Geometric Improvements	High	–	–	–	–	–	Year 1-2	Within Town Centre, Priority Cycling Route
Thrift Avenue & Foster Street	Safety Improvements	High	–	–	–	–	–	Year 1-2	Within Town Centre, Priority Cycling Route
Johnston Road, Pacific Avenue & Buena Vista Avenue	Geometric Improvements	High	–	–	–	–	–	Year 3-5	Within Town Centre, Priority Cycling Route and MBN
Fir Street & Buena Vista Avenue	Geometric Improvements	High	–	–	–	–	–	Year 3-5	Within Town Centre, Priority Cycling Route and MBN
Buena Vista Avenue & Stayte Road	Operational Improvements	Low	–	–	–	–	–	Year 10 +	Outside Town Centre
Victoria Avenue & Columbia Avenue	Geometric Improvements	High	–	–	–	–	–	Year 3-5	Within Town Centre, Priority Cycling Route and MBN
Fir Street & Columbia Avenue	Geometric Improvements	Medium	–	–	–	–	–	Year 6-10	Connection to Waterfront
Fir Street & Victoria Avenue	Geometric Improvements	Medium	–	–	–	–	–	Year 6-10	Connection to Waterfront



Map 14: *Cycling Network Capital Projects*

Table 7: *Cycling Network – Cycling Network Improvements (Action 3.4A)*

Project	Improvement Type	ITIMP Priority	Related Infrastructure Master Plan Priorities					Implementation Timeline (1-2 / 3-5/ 6-10 / 10+)	Comments
			Sewer	Water	Drainage	Pavement Condition	Street Light		
North Bluff Road	Protected bicycle lane	See above							
Russell Avenue (Martin Street to George Street	Protected bicycle lane	High	–	–	–	Low - Medium	–	Year 6-10	Within Town Centre
Russell Avenue (George Street to Best Street)	Local street bikeway	High	–	–	–	Medium	1 (Year 10)	Year 6-10	Within Town Centre
Blackburn Avenue / Malabar Avenue	Local street bikeway	Low	–	–	–	Low - High	–	Year 10+	Upgrade to existing route
Centennial Park	Off-street pathway	High	–	–	–	–	–	Year 3-5	Connection to Oxford/ Thrift bikeway
Thrift Avenue	Protected bicycle lane	See above							
Buena Vista Avenue (Johnston Road to Fir Street)	Off-street pathway / local street bikeway	High	Year 4	–	–	–	–	Year 1-2	MBN
Buena Vista Avenue (Fir Street to Best Street)	Protected bicycle lane	High	Year 4	–	Year 4	Low - High	1 (Year 9)	Year 1-2	MBN
Marine Drive (Bergstrom Road to Duprez Street)	Protected bicycle lane	Low	Year 4	–	Years 7-12	Low - High	2 (Years 7-9)	Year 10+	Long-term redevelopment
Waterfront Pathway	Off-street pathway	Low	–	–	–	–	–	Year 10+	Long-term redevelopment
Bergstrom Road	Protected bicycle lane	See above							
Oxford Street	Protected bicycle lane	See above							
Johnston Road	Protected bicycle lanes / off-street pathway	See above							MBN
Best Street	Protected bicycle lane	See above							MBN
Cliff Avenue	Local street bikeway	Medium	–	–	Year 1	Low - High		Year 1-2	East-west connection
Finlay Street	Protected bicycle lane / local street bikeway	Medium	Year 1	–	Years 7-12	Medium	4 (Years 3-8)	Year 1-2	Hospital connection
Kent Street	Local street bikeway / shared road	High	–	–	Year 1	Low - High	–	Year 1-2	School connections
Stayte Road	Off-street pathway	See above							
Martin Street	Protected bicycle lane	High	–	–	–	–	–	Year 3-5	Within Town Centre, connection to Samiahmoo

Map 15: Pedestrian Network Capital Projects

Table 8: *Pedestrian Network Capital Projects – High Priorities (Action 2.1A)*

Project	Type	ITIMP Priority	Related Infrastructure Master Plan Priorities					Implementatio n Timeline	Comments
			Sewer	Water	Drainage	Pavement Condition	Street Light		
Everall Street south of North Bluff to north of Thrift	1 side	High	–	–	–	Medium	–	Year 3-4	
Everall Street south of Thrift	1 side	High	–	–	–	Medium	–	Year 3-4	
Vidal Street south of North Bluff to north of Thrift	2 sides	High		Year 1		Low - Medium		Year 1-2	
Blackwood Street south of Roper to Buena Vista	1 side	High	–	–	–	Low	–	Year 5	
Martin Street south of North Bluff to north of Thrift	1 side	High	–	Year 3	–	Medium	–	Year 3-4	
Martin Street north of Buena Vista	2 sides	High	–	–	–	Medium	–	Year 3-4	
Foster Street north of Roper	1 side	High	–	–	–	High	–	Year 1-2	
Foster Street north of Prospect	1 side	High	–	–	Year 2	Medium	–	Year 1-2	
Foster Street south of Prospect	1 side	High	–	–	Year 2	Medium	–	Year 1-2	
Winter Street south of Thrift	1 side	High	–	–	–	Medium	–	Year 3-4	
Fir Street north of Russell	1 side	High	–	–	Year 1	High	–	Year 1-2	
Fir Street north of Thrift	1 side	High	–	–	–	Medium	–	Year 3-4	
Fir Street between Roper and Thrift	1 side	High	–	–	–	Low	–	Year 5	
Merklin Street north of Russell	1 side	High	–	–	–	Low	–	Year 5	
Merklin Street south of Thrift	2 sides	High	–	–	Year 1	High	–	Year 1-2	
Russell Avenue east of Foster	1 side	High	–	–	–	Low	–	Year 5	
Vine Avenue west of Hospital	1 side	High	–	–	–	Medium	–	Year 3-4	
Prospect Avenue east of Blackwood	2 sides	High	–	–	–	Low	–	Year 5	
Prospect Avenue west of Foster	1 side	High	–	–	–	Low	–	Year 5	
Prospect Avenue east of Foster	1 side	High	–	–	–	High	–	Year 1-2	
Buena Vista Avenue east of Foster	1 side	High	–	–	–	Medium	–	Year 3-4	
Buena Vista Avenue east of Best	1 side	High	–	–	Year 4	Medium	–	Year 3-4	
Royal Avenue Fir to Balsam	1 side	High	–	Year 1	Year 4	Medium	–	Year 1-2	
Finlay Street from Buena Vista to Balsam	1 side	High	Year 1	–	–	Medium	–	Year 1-2	
Balsam St from Finlay to north of Columbia	1 side	High		Year 1	Year 7-12	Low		Year 1-2	

5.7 FIVE-YEAR CAPITAL IMPLEMENTATION PLAN

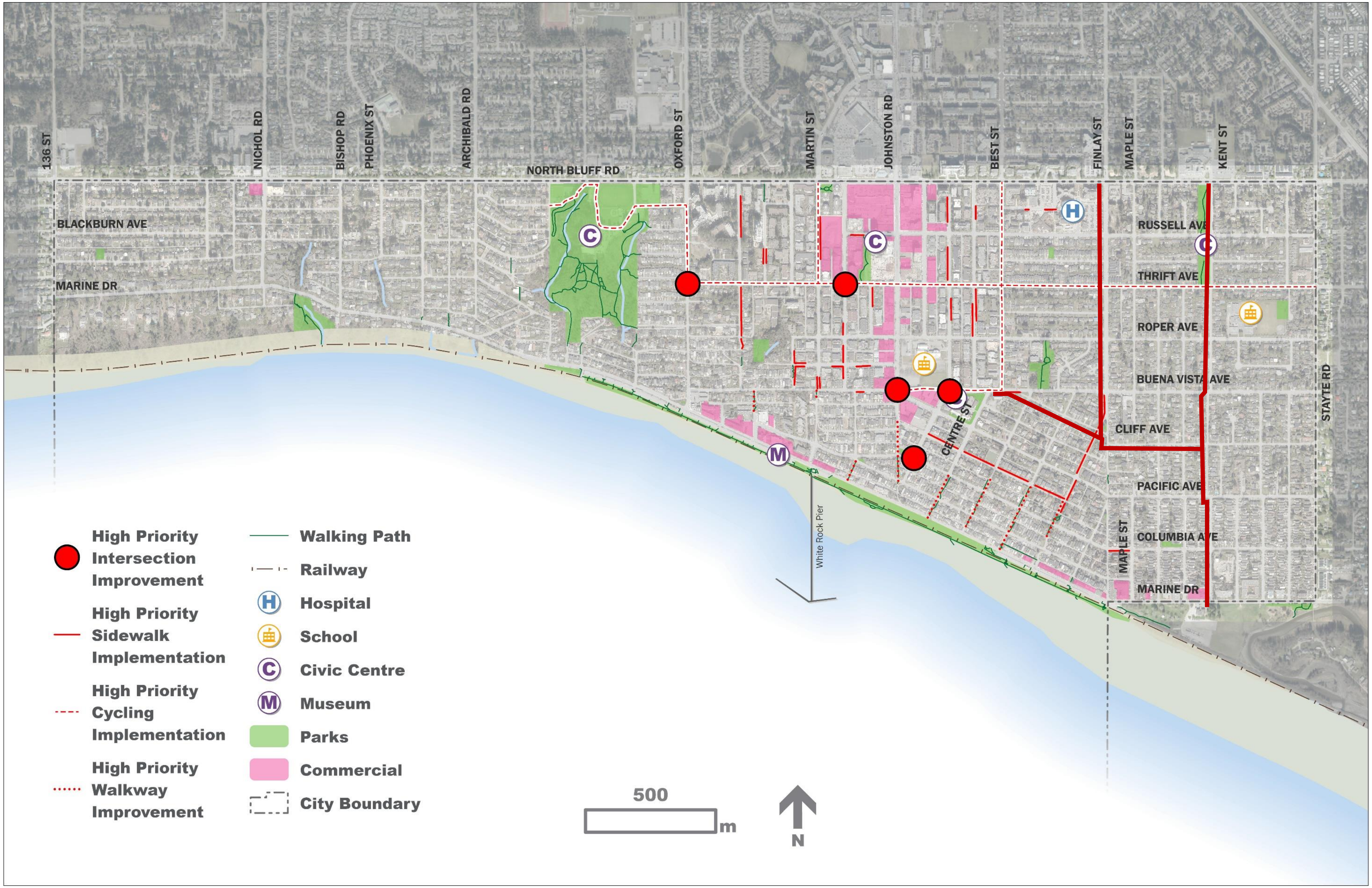
Map 16 summarizes the high priority projects identified in the previous section as recommendations for the City to integrated into its five-year capital implementation plan.

Conceptual order-of-magnitude capital cost estimates (Engineering Class 'D' Level estimates in 2022 dollars) were developed for each proposed high priority project identified in the previous section. These conceptual costs were developed based on the unit cost assumptions shown in **Table 9**, which represent typical unit costs and recent construction pricing in other similar sized communities in British Columbia. The unit costs recognize that some project installation may require curb, gutter, and drainage in some contexts. Any required land acquisition, structures, traffic control devices, burying hydro lines, and further engineering studies have not been included in the cost. It should also be noted that costs associated with other infrastructure requirements (such as water and sewer) have not been incorporated in these costs, and these only consider the transportation-related capital costs as well as drainage (if required). These costs are to be used only for high level planning purposes to identify the relative cost between projects for planning purposes and should be refined for detailed budgeting.

Table 9: *Unit Costs*

Facility	Unit Cost (per metre)
1.8m sidewalk (without curb and gutter)	$430
1.8. sidewalk (with curb and gutter)	$871
3.0m multi-use pathway (without curb and gutter)	$850
3.0m multi-use pathway (with curb and gutter)	$1,100
Local street bikeway	$50
Protected bicycle lane	$425
Painted bicycle lane	$40
Curb extensions	$40,000
Raised intersection	$190,000

Table 10 provides additional detail regarding these high priority improvements and outlines the recommended improvements to be considered with the City's five-year capital plan, including integration with other infrastructure projects.



__Map 16:__ High Priority Capital Projects

Table 10: *Five-Year Capital Implementation Plan*

Project	Improvement Type	Project Cost	Timeline	Capital Project Integration
Oxford Street	Road Space Reallocation (Interim)	$160,000	Years 1-2	Drainage, Pavement Condition, Streetlight
Thrift Avenue (Oxford to Best Street)	Road Space Reallocation (Interim)	$510,000	Years 1-2	Drainage, Pavement Condition, Streetlight
Thrift Avenue (Best to Stayte Road)	Road Space Reallocation (Interim)	$510,000	Years 1-2	Drainage, Pavement Condition, Streetlight
Best Street	Road Space Reallocation (Interim)	$335,000	Years 1-2	Drainage, Pavement Condition, Streetlight
Oxford Street & Thrift Avenue	Geometric Improvements	$125,000	Years 1-2	
Thrift Avenue & Foster Street	Safety Improvements	$25,000	Years 1-2	
Buena Vista Avenue (Johnston Road to Fir Street)	Off-street pathway / local street bikeway	$165,000	Years 1-2	Sewer
Buena Vista Avenue (Fir Street to Best Street)	Protected bicycle lane	$85,000	Years 1-2	Sewer, Drainage, Pavement Condition, Streetlight
Cliff Avenue	Protected bicycle lane / local street bikeway	$60,000	Years 1-2	Drainage, Pavement Condition
Finlay Street	Local street bikeway / shared road	$50,000	Years 1-2	Sewer, Drainage, Pavement Condition, Streetlight
Kent Street	Off-street pathway	$75,000	Years 1-2	Drainage, Pavement Condition
Vidal Street south of North Bluff to north of Thrift	Sidewalk	$70,000	Years 1-2	Water, Pavement Condition
Foster Street north of Roper	Sidewalk	$20,000	Years 1-2	Pavement Condition
Foster Street north of Prospect	Sidewalk	$17,000	Years 1-2	Drainage, Pavement Condition
Foster Street south of Prospect	Sidewalk	$15,000	Years 1-2	Drainage, Pavement Condition
Fir Street north of Russell	Sidewalk	$40,000	Years 1-2	Drainage, Pavement Condition
Merklin Street south of Thrift	Sidewalk	$160,000	Years 1-2	Drainage, Pavement Condition
Prospect Avenue east of Foster	Sidewalk	$40,000	Years 1-2	Pavement Condition
Royal Avenue Fir to Balsam	Sidewalk	$500,000	Years 1-2	Water, Drainage, Pavement Condition

Finlay Street from Buena Vista to Balsam	Sidewalk	$75,000	Years 1-2	Sewer, Pavement Condition
Balsam St from Finlay to north of Columbia	Sidewalk	$360,000	Years 1-2	Water, Drainage, Pavement Condition
Johnston Road	Road Space Reallocation (Interim)	$350,000	Years 3-5	Water, Pavement Condition
Johnston Road, Pacific Avenue & Buena Vista Avenue	Geometric Improvements	$100,000	Years 3-5	
Fir Street & Buena Vista Avenue	Geometric Improvements	$85,000	Years 3-5	
Victoria Avenue & Columbia Avenue	Geometric Improvements	$120,000	Years 3-5	
Centennial Park	Off-street pathway	$450,000	Years 3-5	
Everall Street south of North Bluff to north of Thrift	Sidewalk	$80,000	Years 3-4	Pavement Condition
Everall Street south of Thrift	Sidewalk	$210,000	Years 3-4	Pavement Condition
Martin Street south of North Bluff to north of Thrift	Sidewalk	$75,000	Years 3-4	Water, Pavement Condition
Martin Street north of Buena Vista	Sidewalk	$70,000	Years 3-4	Pavement Condition
Winter Street south of Thrift	Sidewalk	$35,000	Years 3-4	Pavement Condition
Fir Street north of Thrift	Sidewalk	$58,000	Years 3-4	Pavement Condition
Vine Avenue west of Hospital	Sidewalk	$20,000	Years 3-4	Pavement Condition
Buena Vista Avenue east of Foster	Sidewalk	$85,000	Years 3-4	Pavement Condition
Buena Vista Avenue east of Best	Sidewalk	$39,000	Years 3-4	Drainage, Pavement Condition
Blackwood Street south of Roper to Buena Vista	Sidewalk	$39,000	Year 5	Pavement Condition
Fir Street between Roper and Thrift	Sidewalk	$87,000	Year 5	Pavement Condition
Merklin Street north of Russell	Sidewalk	$44,000	Year 5	Pavement Condition
Russell Avenue east of Foster	Sidewalk	$13,000	Year 5	Pavement Condition
Prospect Avenue east of Blackwood	Sidewalk	$70,000	Year 5	Pavement Condition
Prospect Avenue west of Foster	Sidewalk	$35,000	Year 5	Pavement Condition

Based on the capital costs presented above for the high priority projects, the five-year implementation plan includes approximately $5.5 million in transportation-related capital projects over the next five years, as summarized in **Table 11**. This represents just over $1 million in transportation-related capital projects per year. This includes approximately $2.3 million in sidewalk improvements, approximately $2.75 in road space reallocation and/or cycling network projects, and approximately $0.5 million in intersection improvements

Table 11: *Summary of Five-Year Capital Plan*

	Years 1-2	Years 3-5	Total
Sidewalks	$1,297,000	$960,000	$2,257,000
Road space reallocation / cycling projects	$1,950,000	$800,000	$2,750,000
Intersection improvements	$150,000	$305,000	$455,000
Total	**$3,397,000**	**$2,065,000**	**$5,462,000**

5.8 FUNDING AND LEVERAGE STRATEGIES

While the ITIMP is estimated to cost approximately $5.5 million over the next 5 years, these costs can be shared by pursuing external funding from other levels of governments, partnerships with other organizations and the development industry, and integration of improvements with other plans and projects. This can help to reduce the City's share of project costs. This section describes several strategies that the City may consider to help leverage its investments and to maximize its ability to implement transportation improvements.

The City should pursue all available sources of funding for transportation facilities and programs, including the programs identified below. As funding opportunities change regularly, the information in this section is subject to change. The City should regularly check with all levels of government to keep up to date on current funding opportunities.

However, it is recognized that the external funding sources do not provide a consistent and stable funding stream, and that in order to ensure completion of projects identified in the ITIMP, consistent funding sources should be identified to help ensure staff can logically plan for improvements and coordinate these improvements with other capital works to provide economies of scale for construction activities providing best value for capital expenditures.

- **Capital Planning:** The City should incorporate the recommendations from the ITIMP into its short-, medium-, and long-term budgeting plans to ensure that the projects are accounted for in the City's capital planning process. The City should also seek to integrate transportation improvements with other capital projects, such as utility projects. In particular, the City should follow the recommendations of the five-year capital implementation plan to integrate improvements with other infrastructure priorities. To accommodate this, the City may seek changes to its capital budget to fund the implementation of this Plan over the medium- and long-term.

- **Development Cost Charges:** The City has a DCC bylaw that should be updated to include projects identified in the ITIMP. It should be emphasized that DCC eligible projects should not only include street network projects but can also include active transportation and transit projects that benefit new growth in the community.

- **Developers:** An important component of the implementation of the ITIMP will be the City's ability to leverage transportation investments during planning of new development projects. Some ways in which transportation investments can be leveraged through developers include:
  - Voluntary public realm improvements;
  - Community amenity contributions;
  - Density bonusing contributions;
  - Funding in lieu of parking; and
  - Providing high quality bicycle parking facilities.

- **Federal Funding:** There are several programs that provide funding for environmental and local transportation infrastructure projects in municipalities across Canada. Typically, the federal government contributes one third of the cost of municipal infrastructure projects. Provincial and municipal governments contribute the remaining funds, and in some instances, there may be private sector investment as well. The Federal Government recently announced the National Active Transportation Fund (ATF), which will provide $400 million over five years to help build new and expanded active transportation facilities across the country.

- **Provincial Programs and Initiatives:** The Provincial Government administers the Active Transportation Infrastructure Grant program, which promotes new, safe, and high-quality active transportation infrastructure through cost-sharing with local governments. The grant program provides funding for infrastructure which forms part of an active transportation network plan adopted by a BC local government. To ensure maximum success at obtaining grant funding, the City should have grant-ready concepts pre-developed for application.

- **TransLink:** TransLink administers several funding programs including Bicycle Infrastructure Capital Cost Sharing Program (BICCS), Walking Infrastructure to Transit (WITT), Bus Speed and Reliability (BSR), and Major Road Network & Bike Cost Share (MRNB) programs on an annual basis to provide improvements to active transportation, transit, and major roads.

- **Green Municipal Funds:** The Federation of Canadian Municipalities manages the Green Municipal Fund, with a total allocation of $550 million. This fund is intended to support local government efforts to reduce pollution, reduce greenhouse gas emissions, and improve quality of life. The expectation is that knowledge and experience gained in best practices and innovative environmental projects will be applied to national infrastructure projects.

- **Carbon Tax Rebate:** Each municipality that has signed the Climate Action Charter receives an annual rebased based on completion of the CARIP form. The City could choose to direct this funding towards sustainable transportation projects, such as funding bicycle, pedestrian, and transit infrastructure.

- **ICBC:** ICBC provides funding for road safety improvements, including pedestrian and bicycle infrastructure, particularly where these have the potential to reduce crashes, improve safety, and reduce claims costs to ICBC. Funding is available through ICBC's Road Improvement Program, and other ICBC programs include the Speed Watch Program (through the Community Policing Centres), Speed and Intersection Safety Program, Counter Attack, Operation Red Nose, and Road Sense Speaker Program for Schools

- **Private Sector:** Many corporations wish to be good corporate neighbours— to be active in the community and to promote environmentally-beneficial causes. Bicycle and pedestrian routes and facilities in particular are well-suited to corporate sponsorship and have attracted significant sponsorship both at the local level and throughout North America. Examples in BC include Construction Aggregates in Sechelt, which constructed an overpass over a gravel conveyor to provide a link for pedestrians and cyclists, and 7-Eleven and Molson Breweries, which have sponsored multi-use pathways in Metro Vancouver.

APPENDIX A:
ROUND ONE ENGAGEMENT SUMMARY

ISSUES & OPPORTUNITIES SURVEY SUMMARY REPORT

White Rock Integrated Transportation and Infrastructure Master Plan

1 INTRODUCTION

An online survey was available on the Talk White Rock website for all interested White Rock residents to complete between December 9, 2020 and Feb 3, 2021. The survey was designed to better understand current travel habits and priorities for the City's transportation network. In addition, the survey included an interactive map, where respondents were able to drop markers on a map of the City to identify issues and ideas for improvements related to transportation in White Rock.

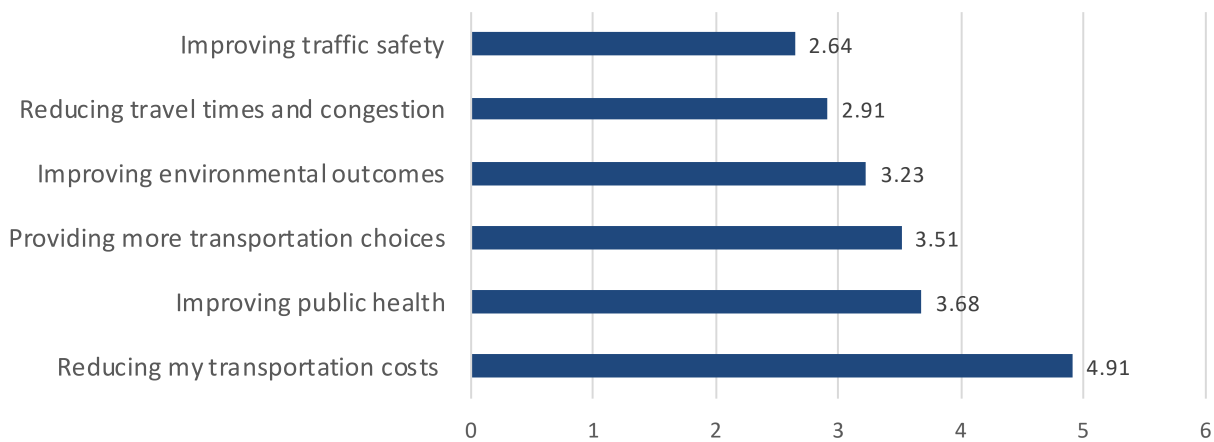
The survey received 428 views, resulting in 188 responses. The results of the online survey will be used to inform the draft Integrated Transportation and Infrastructure Master Plan, along with the results of the technical review. The following is a summary of what we heard through the online survey.

1.1 IDENTIFYING PRIORITIES

As the City of White Rock develops its Integrated Transportation and Infrastructure Master Plan, which of the following outcomes are most important to you? Please rank these topics in order from most important (1) to least important (6)

Survey respondents were asked to identify their priorities for White Rock's Integrated Transportation and Infrastructure Master Plan. A list of 6 topics were provided for participants to rank from 1 (most important) to 6 (least important). Improving traffic safety was identified as a top priority among respondents receiving an average ranking of 2.64, followed by reducing travel times and congestion with an average ranking of 2.91. Reducing transportation costs was identified as the lowest priority among respondents with an average ranking of 4.91.

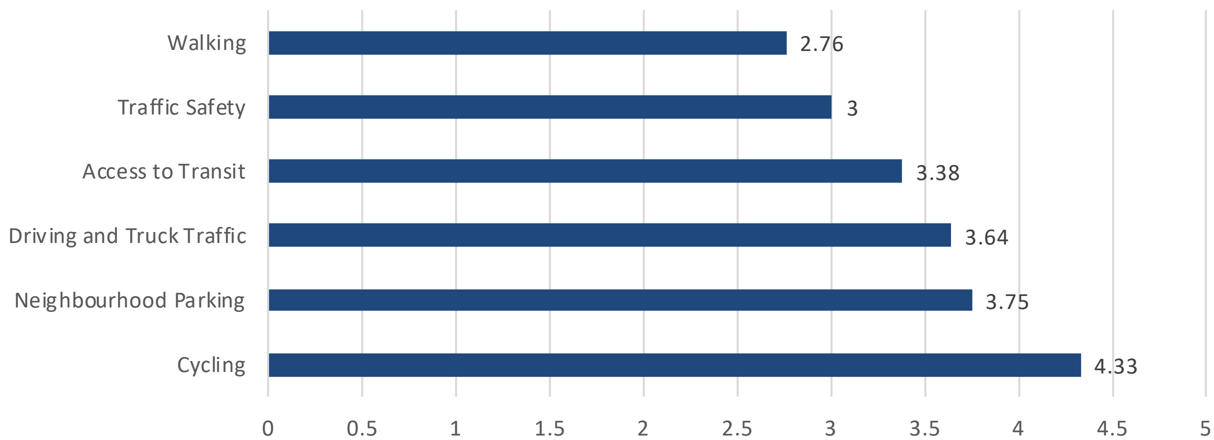
As the City of White Rock develops its Integrated Transportation and Infrastructure Master Plan, which of the following outcomes are most important to you?



What aspects of White Rock's transportation system should be considered the highest priority areas?

Survey participants were then presented with a list of six topics areas and asked to indicate their highest priority areas for White Rock's transportation system from 1 (most important) to 6 (least important). Walking was identified as the top priority among respondents with an average ranking of 2.76, followed by traffic safety (average ranking 3). Neighbourhood Parking and Cycling are the lowest priorities among respondents with average rankings of 3.75 and 4.33, respectively.

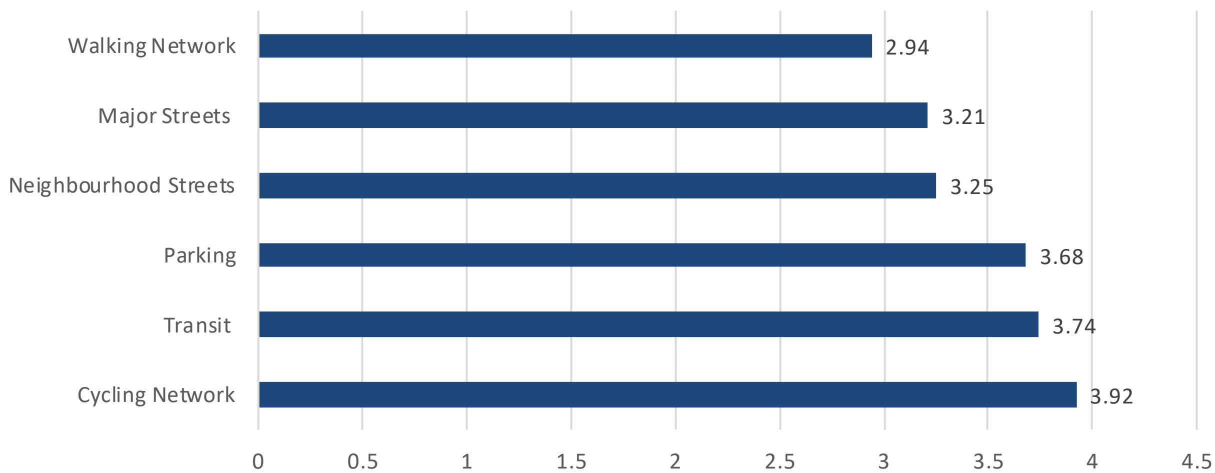
What aspects of White Rock's transportation system should be considered the highest priority areas?



What are the transportation facilities need the most improvement in White Rock today?

Survey respondents indicated that the Walking network should be White Rock's highest priority as an improvement towards our transportation facilities with a weighted score of 2.64. Whereas the cycling network is considered the lowest priority amongst respondents with a weighted score of 3.92.

What transportation facilities need the most improvement in White Rock today?



What are the top three transportation issues or challenges facing White Rock today or in the future?

Theme 1: Pedestrian infrastructure (117 comments)

- **Pedestrian safety, traffic safety and traffic calming measures (72 comments) –** Respondents noted that with increasing traffic and speeding within the city which include Johnston Rd, North Bluff Rd, 16th Ave, Marine Dr, there needs to be a larger focus on pedestrian safety throughout the City. This includes implementing traffic calming measures for motor vehicles, controlled pedestrian lights, safer pedestrian crossings and wider sidewalks.

- **Pedestrian network improvements and implementing new sidewalks (36 comments) -** Respondents noted that there is need to add new sidewalks due to the lack of sidewalks (Buena Vista to Columbia/West of Anderson) as well as maintaining, improving, and repairing existing sidewalks.
- **Walkability within and between neighbourhoods (9 comments)** Respondents stated that there was an overall lack of a "walkable community" design. It

is difficult to walk due to the lack of sidewalks and construction inhibiting neighbourhoods

Theme 2: Connectivity within White Rock community (24 comments)

- **Connectivity to the beach (12 comments)**
  Respondents noted that developing a reliable and accessible connection to the beach through means of a funicular or shuttles.

- **Improving access throughout neighborhood communities (6 comments)**
  It was noted creating a cost-effective connection between uptown, waterfront and marine drive as well improving points of access into neighbourhoods would be beneficial.

- **Improving the connection to other areas in Metro Vancouver (6 comments)**
  Participants noted that there are currently not enough reliable transit options to Vancouver and other areas across Metro Vancouver. One suggestion that participants noted was developing a form of rail transit or service to Vancouver.

Theme 3: Congestion (83 comments)

- **Improving congestion planning around new developments (21 comments)**
  Participants stated that there are currently too many new developments that are creating congestion due to construction and poor transit planning as more people plan to move into White Rock.

- **Congestion along Marine Dr (12 comments)**
  It was stated that there is too much traffic congestion along Marine Drive.

- **Congestion across communities in White Rock (50 comments)**
  It was stated that generally that there is too much congestion with some areas referenced by participants (North Bluff, 152nd Street, 16th Avenue). This increased in congestion is typically associated with increase in travel speeds which creates a concern for traffic and pedestrian safety. Participants are also concerned with the added noise pollution and emissions from vehicles idling.

Theme 4: Transit system improvements and transit planning to meet needs (58 comments)

- **Improving transit frequency, reliability, access, and cost improvements (39 comments)**
  It was stated that transit options needed improvements for transit access, frequency, reliability for White Rock. Due to the growing seniors' population, it was also stated that accessibility and the need for community busses or shuttles that serve where people reside are important. Pricing and cost improvements was another area of suggestion,
- **Access to reliable transit to the Lower Mainland and Downtown Vancouver (9 comments)**
  It was noted that there is a need for efficient transit access to the Lower Mainland as there are few choices to travel to other municipalities as well as rapid and reliable transit into Downtown Vancouver.
- **Need for improved transit options (5 comments)**
  Respondents mentioned that there is a need for accommodating more transit options including scooters, electric bikes and ride hailing in White Rock.
- **Holistic transit planning is needed to manage future growth (8 comments)**
  It was stated that that there should be better management of transit planning for future growth, noise levels and more strategic and accessible routes for the aging population across the city.

Theme 5: Parking (59 comments)

- **Neighbourhood and residential parking (15)**
  Respondents called for more residential parking in neighbourhoods as well as more enforcements for people parking unlicensed without a permit.
- **Street Parking and parking for businesses access (14 comments)**
  Currently respondents did not feel that there is sufficient on-street parking for merchants and businesses.
- **Lack of parking (28 comments)**
  Respondents felt that there is a currently a lack of parking throughout White Rock.
- **EV Parking (2 comments)**
  White Rock should consider investing in more EV parking stalls to support the transition to electrification.

Theme 6: Investments in a cycling network (28 comments)

- **Cycling infrastructure (20 comments)**
  Respondents called for more cycling lanes, cycling paths and trails, and an overall well-defined cycling network.

- **Cyclist safety (8 comments)**
  Currently respondents did not feel safe cycling around White Rock. Comments indicated that there should be proper signaling to assist with safe passage across the city and cycling lanes are clearly marked and separated from motor vehicles.

Theme 7: Miscellaneous (22 comments)

- **Emissions and environmental considerations (8 comments)**
  Respondents noted that overall increase in pollution and emissions from vehicles or trucks idling on the road in particular Marine Drive.

- **Infrastructure and road maintenance (8 comments)**

  Respondents stated that there are streets that are crumbling and need to be repaved (32nd Avenue). There are also comments indicated that the road quality and infrastructure should be consistently maintained.

- **Traffic enforcement (5 comments)**

  Respondents stated that there was a lack of law enforcement for vehicles that are currently speeding.

- **Garbage or organic trucks (2 comments)**

  Respondents stated that there are too many large garbage or organic trucks travelling along the streets of White Rock.

1.2 TRAVEL PATTERNS

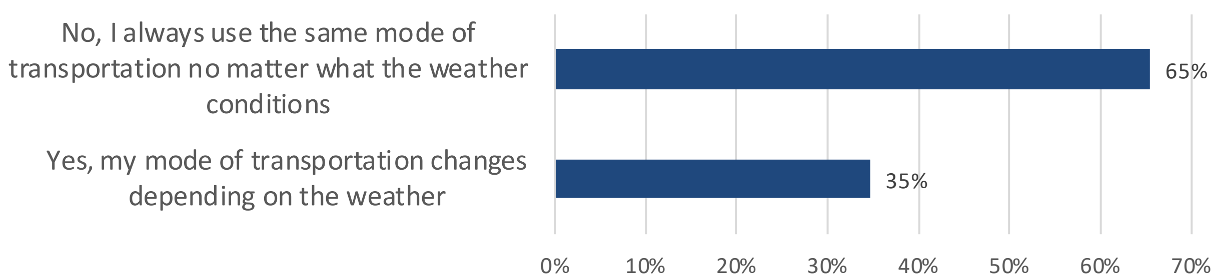
Acknowledging the significant impact of COVID-19, questions related to travel patters were broken down for respondents to consider their travel patterns and habits before and during the pandemic.

Before COVID-19

Before COVID-19, did the weather impact what mode of transportation you choose when commuting to work or school?

Of those who provided an answer to this question, the majority (65%) indicated that weather has not influence of their choice of transportation mode.

Before COVID-19, did the weather impact what mode of transportation you chose when commuting to work or school?

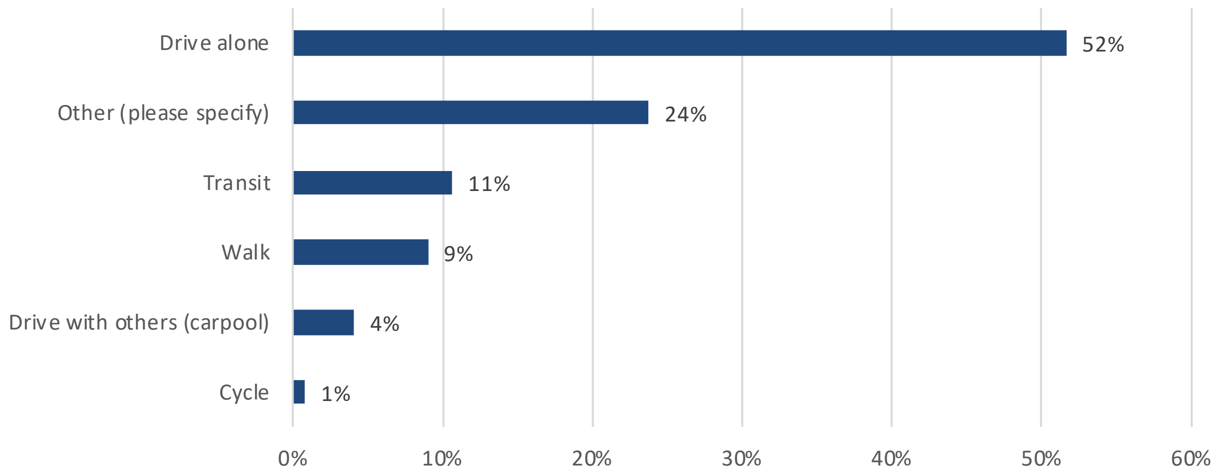


162/188 answered this question.

What is your usual mode of transportation to commute to work or school?

Respondents who answered "no" to the question above were then asked to identify their usual mode of transportation when commuting to work or school. The results show that over 50% of survey respondents who are not influenced by the weather choose to "drive alone" when commuting to work or school.

What is your usual mode of transportation to commute to work or school?

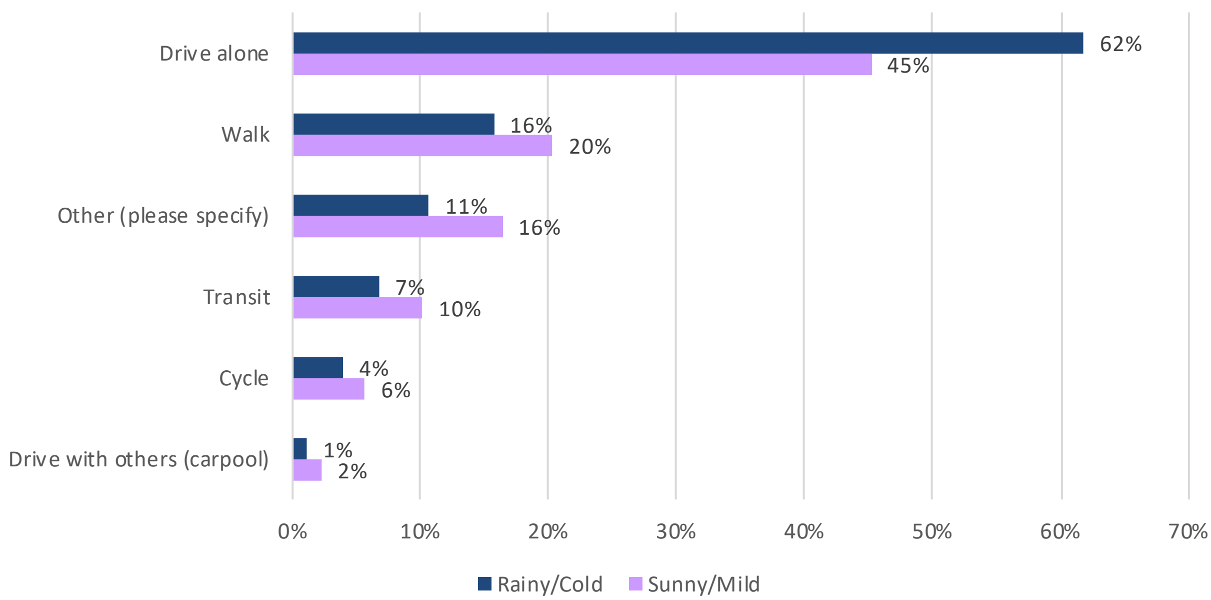


122/188 answered this question.

On a typical day, what is your usual mode of transportation to commute to work or school?

Those who indicated that weather plays a role in what mode of transportation they choose to commute to work or school were asked separately to identify what mode of transportation they choose when the weather is sunny/mild as well as rainy/cold. While many still choose to drive, the results show a higher percentage of people choosing to walk and cycle when it is sunny/warm outside.

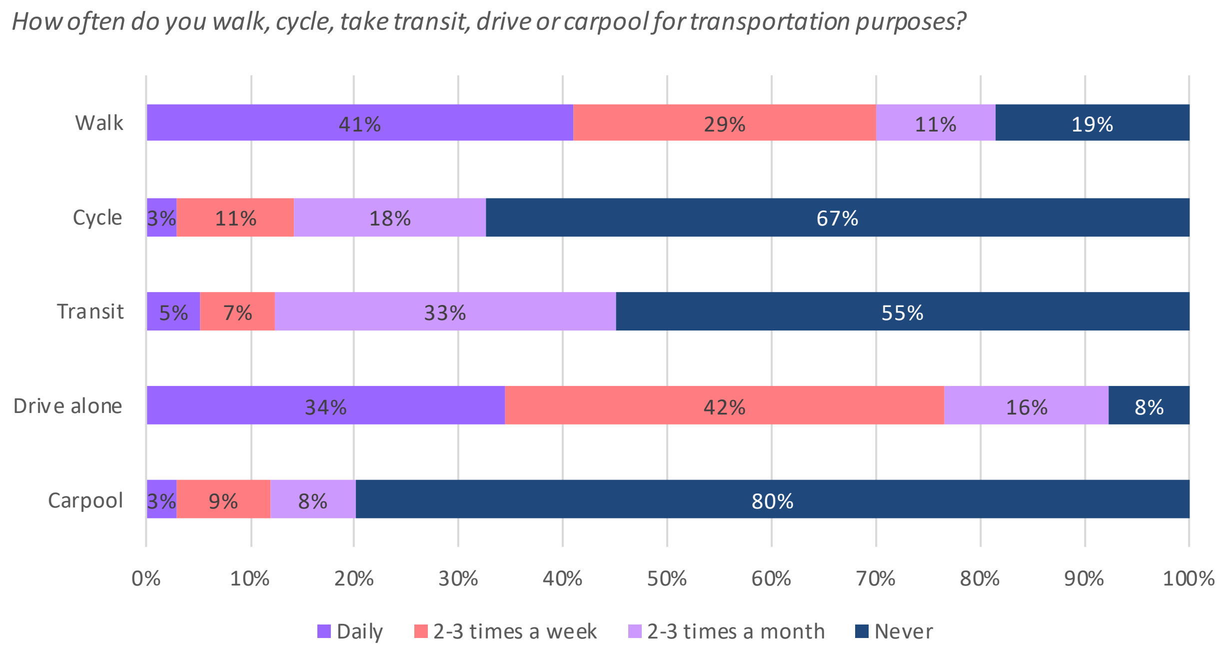
On a typical day, what is your usual mode of transportation to commute to work or school?



177/188 answered this question.

How often do you walk, cycle, take transit, drive, or carpool for transportation purposes?

Survey participants were then asked how often they walk, cycle, take transit, drive or carpool for transportation purposes (before COVID-19). Of those who indicated they walk for transportation purposes, 41% said they walk daily. 34% of those who said they drive for transportation purposes do so daily. More than half of those who responded to this question indicated they never cycle, carpool, or take transit for transportation purposes.

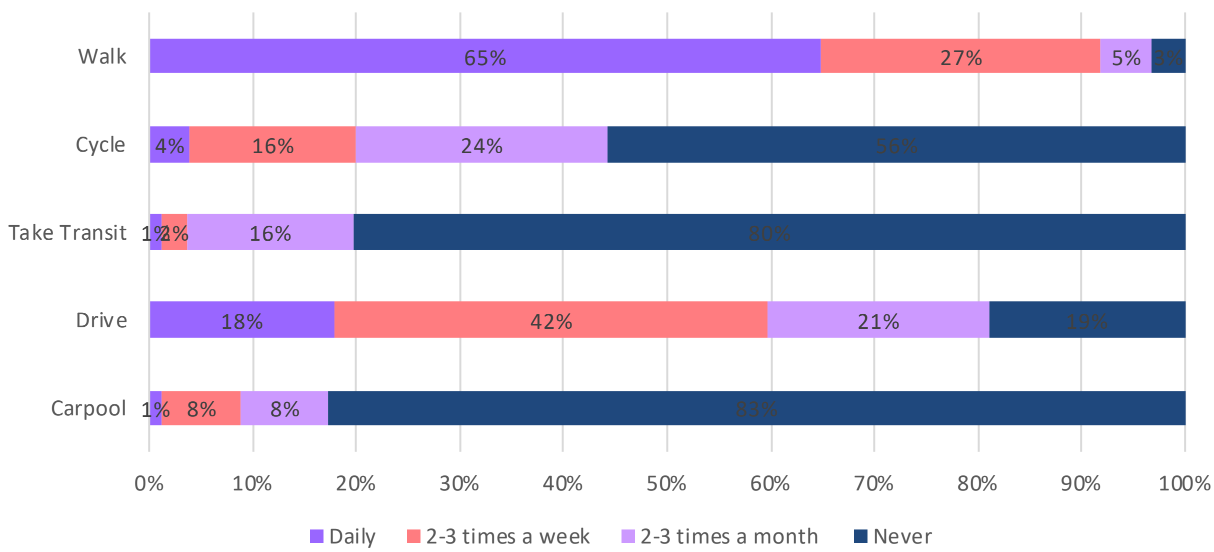


177/188 answered this question.

How often do you walk or cycle for recreation or exercise purposes?

When it comes to walking and cycling for recreation or exercise purposes, rates of cycling among respondents continue to be low with more than half indicating they never cycle for recreation or exercise. However, rates of walking increase compared to those who walk for transportation purposes. Nearly half of those who provided a response to this question said they walk for recreation or exercise daily, with only 3% indicating they never walk for this purpose.

How often do you walk, cycle, take transit, drive or carpool for recreation or exercise purposes?

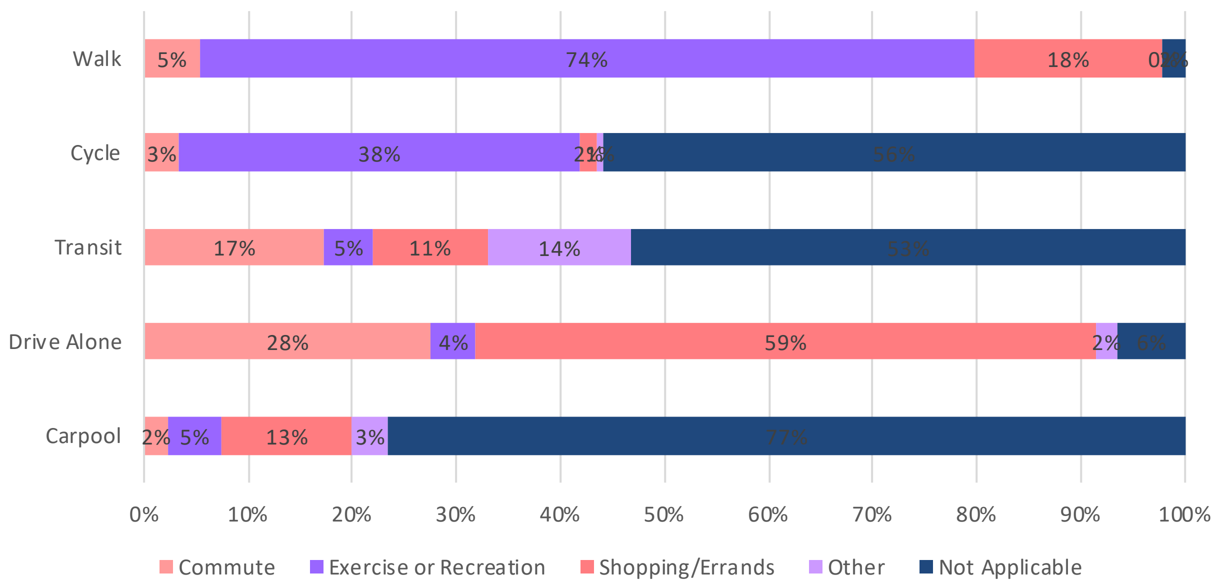


172/188 answered this question.

What is the main purpose of most of your walking, cycling, transit, driving or carpool trips?

The next question was focused on understanding the main reason why people use a variety of modes of transportation. The majority of those who walk indicated they do so for exercise and recreation purposes. Whereas shopping/errands or commuting were the most common reason why people drive alone. The rates of cycling have grown as it is a common mode for exercise and recreation, while transit users purpose vary for different trips. Carpooling use continues to be low based on the results.

What is the main purpose of most of your walking, cycling, transit, driving or carpool trips?



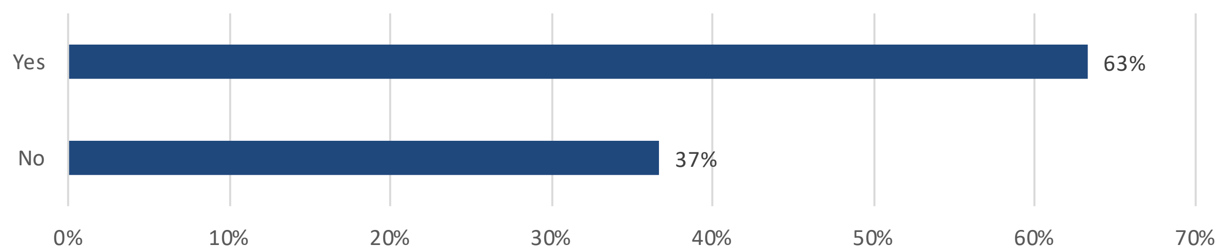
171/188 answered this question.

During COVID-19

Has Covid-19 impacted your transportation habits and travel patterns?

To begin to understand the impacts of COVID-19 on transportation, respondents were asked to indicate if their habits and travel patterns have changed since the COVID-19 pandemic began in early 2020. The results indicated a slight majority, with over half of respondents indicating their habits have changed (63% compared to 37%).

Has Covid-19 impacted your transportation habits and travel patterns?



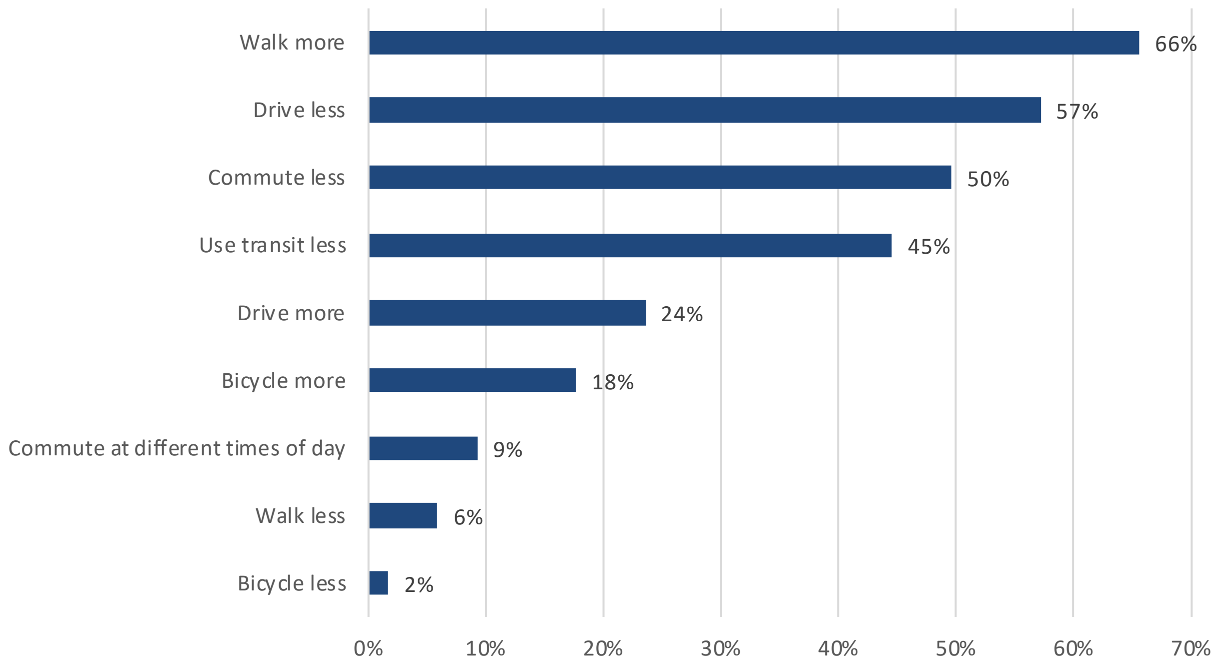
Those who indicated their transportation habits and patterns have changed as a result of COVID-19 were asked a follow-up question.

188/188 answered this question.

How has COVID-19 impacted your transportation habits and travel patterns?

The first follow-up question asked respondents to indicate how their transportation habits and patterns have changed. Several reasons were provided with participants able to select as many as applicable to them. Half of those who answered this question are both driving and commuting less. Transit usage is also lower with 45% saying they use transit less. Rates of walking have increased among those who answered this question with 66% indicating they are walking more.

How has COVID-19 impacted your transportation habits and travel patterns?



119/188 answered this question.

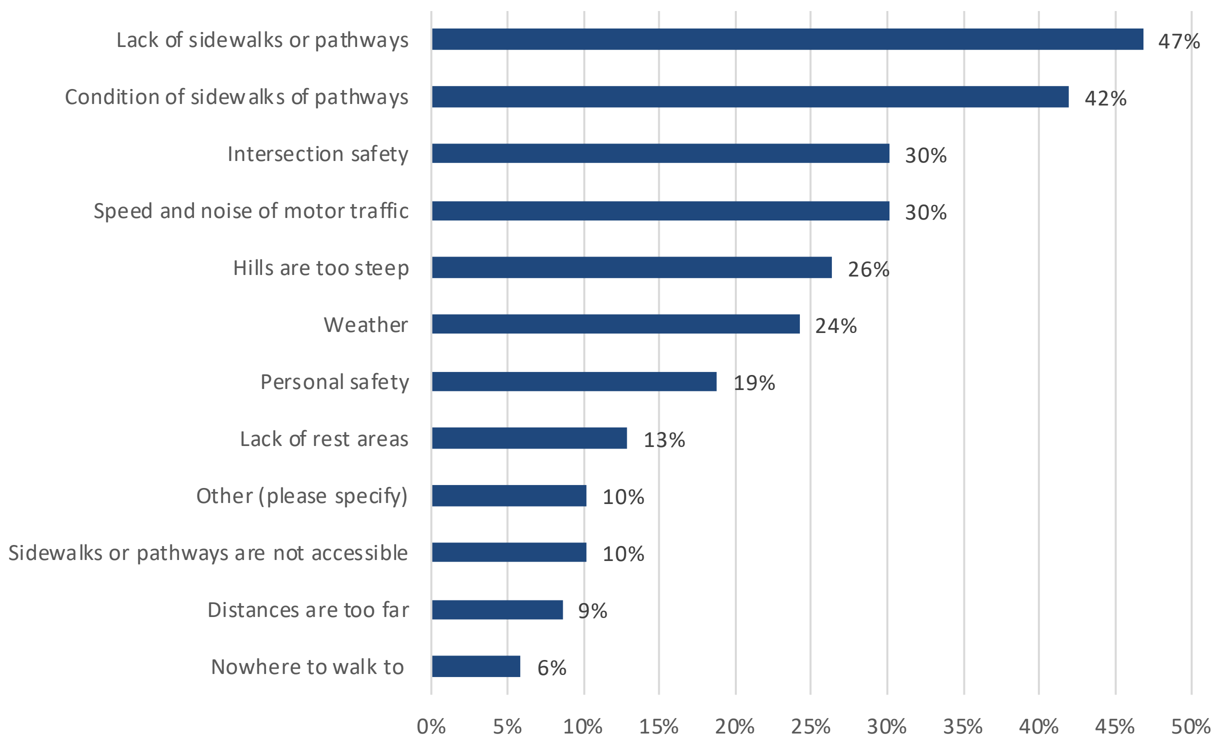
1.3 ISSUES AND OPPORTUNITIES

WALKING

What are the main issues or challenges for walking in White Rock? (pick your top 3)

When asked to identify their top 3 issues or challenges for walking in White Rock, nearly 50% of respondents selected *lack of sidewalks or pathways* as a top issues/challenge. This is followed by just 42% of respondents who identified *condition of sidewalks of pathways* as one of their 3 top issues/challenges.

What are the main issues or challenges for walking in White Rock?

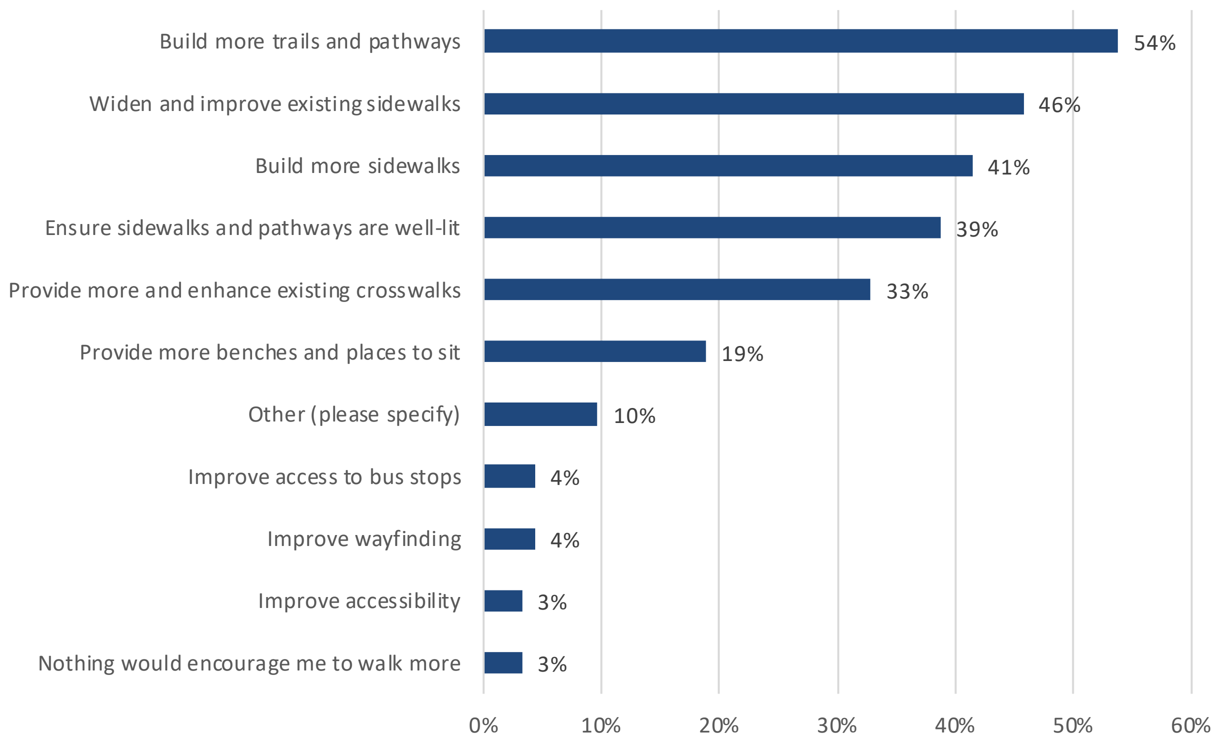


186/188 answered this question.

What could we do to encourage you to walk more? (pick your top 3)

When asked what the City could do to encourage more walking, *build more trails and pathways* (54%), *widen and improve existing sidewalks* (46%), and *build more sidewalks* (41%) were the most popular responses among respondents.

What could we do to encourage you to walk more?

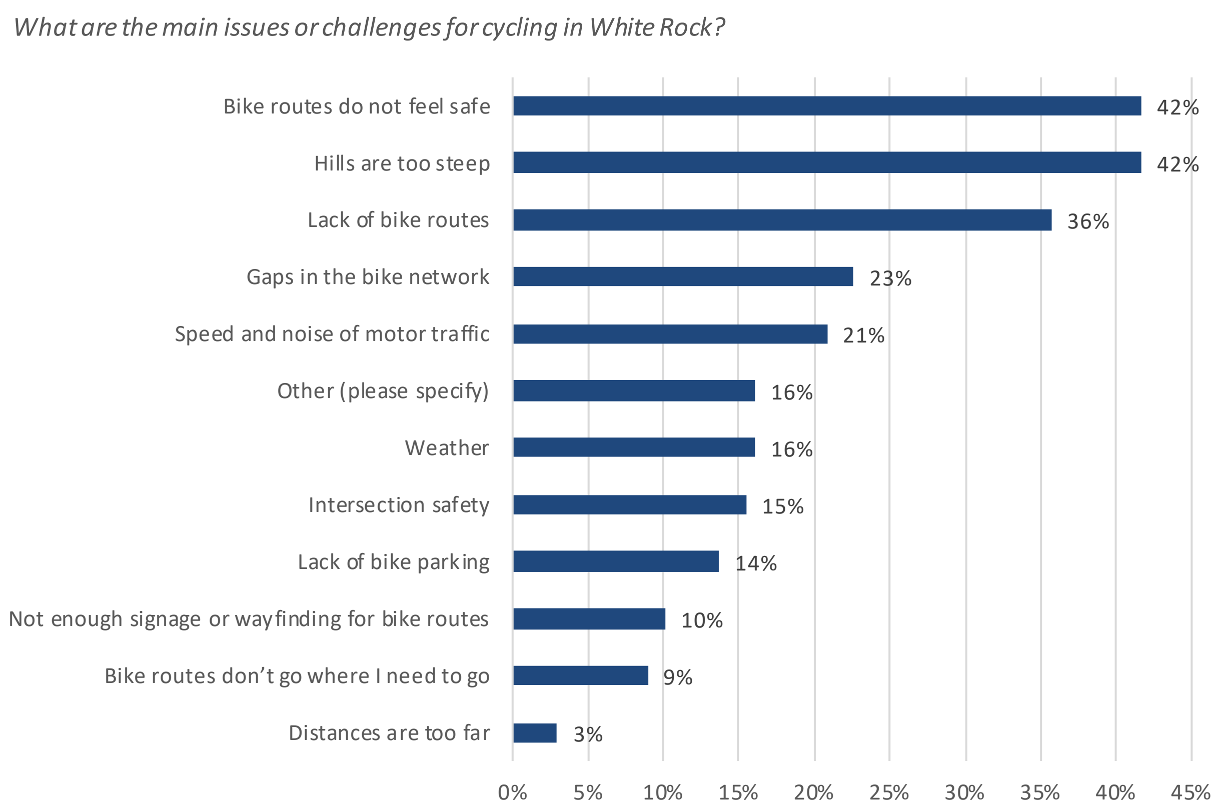


186/188 answered this question.

CYCLING

What are the main issues or challenges for cycling in White Rock? (pick your top 3)

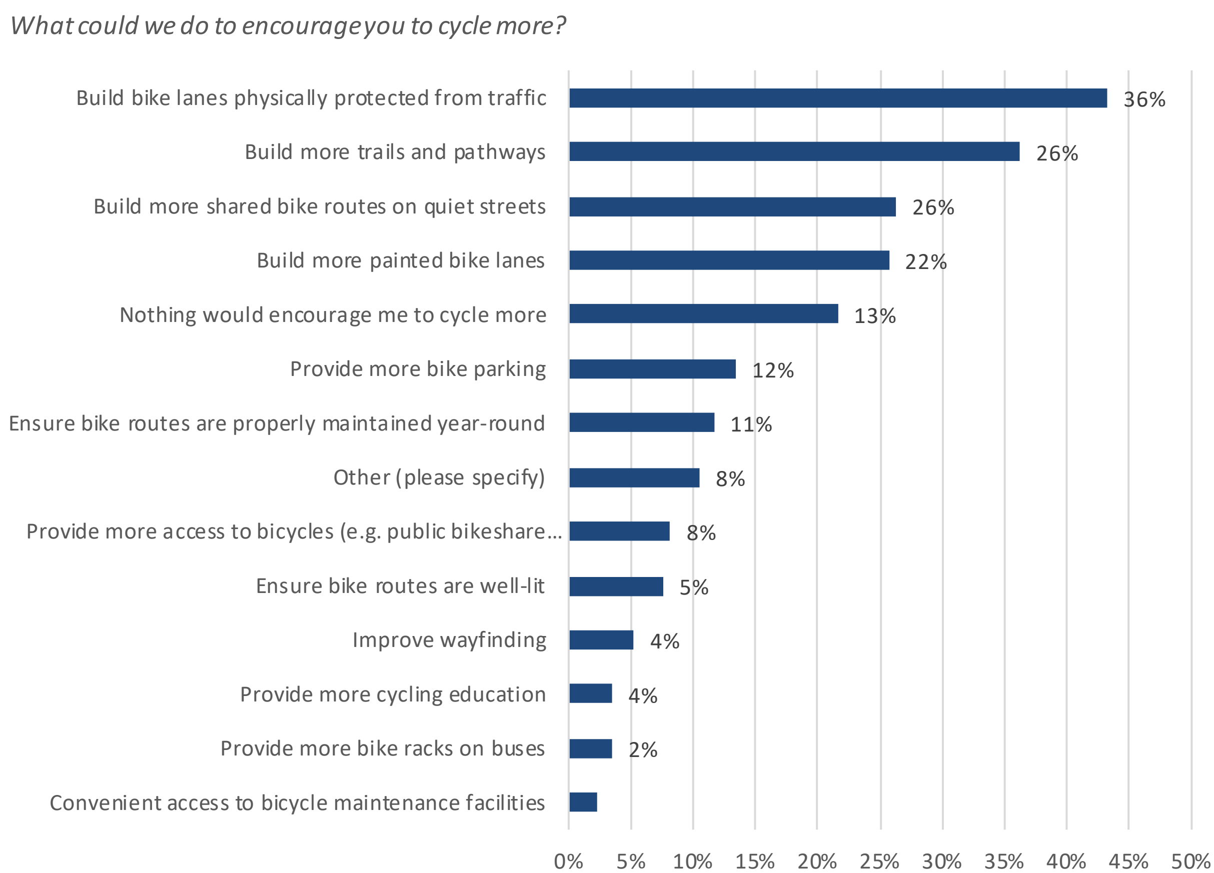
When asked to identify the main issues or challenges for cycling in White Rock, more than 40% of those who responded to this question selected *bike routes do not feel safe and hills are too steep* as two of their top three issues/challenges. *Lack of bike routes* (36%) was also a key issue/challenge among respondents.



168/188 answered this question.

What could we do to encourage you to cycle more? (pick your top 3)

Among surveyed respondents, *build bike lanes physically protected from traffic* (43%), *build more trails and pathways* (36%), *build more shared bike routes on quiet streets (26%)* and *build more painted bike lanes* were also popular ways to encourage more cycling among those who answered this question.



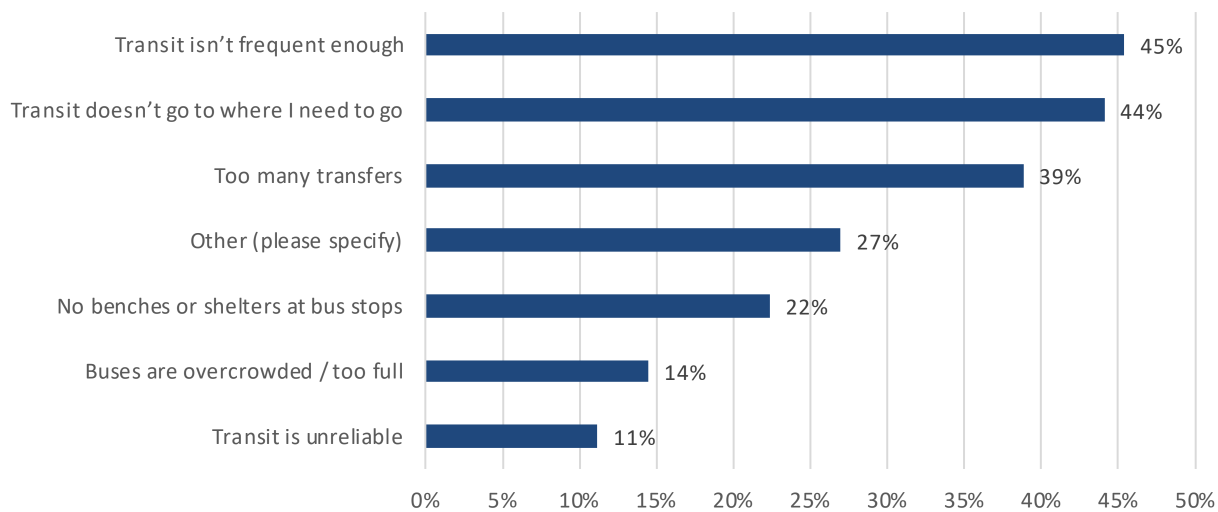
171/188 answered this question.

TRANSIT

What are the main issues or challenges for transit in White Rock? (pick your top 3)

When asked to identify the main issues or challenges for transit in White Rock, just under half of those who responded to this question selected *Transit isn't frequent enough* as one of their top three issues/challenges. *Transit doesn't go to where I need to go* (44%) and *too many transfers* (39%) were also key issues/challenges among respondents.

What are the main issues or challenges for transit in White Rock?

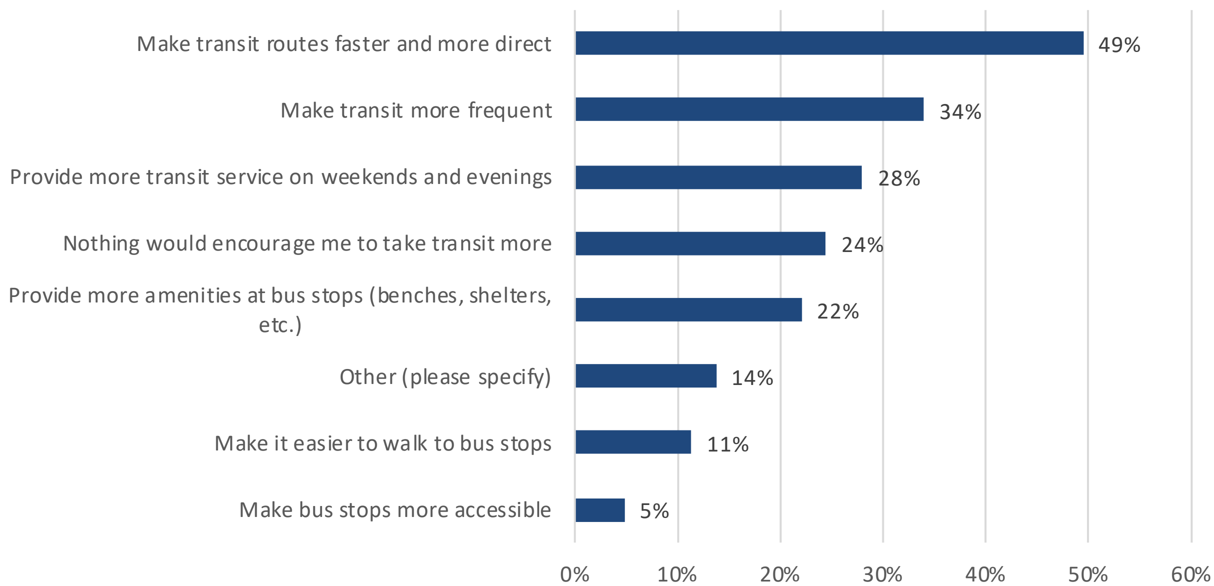


152/188 answered this question.

What could we do to encourage you to take transit more? (pick your top 3)

When asked what the City could do to encourage people to take transit more, *make transit routes faster and more direct* (49%) and *make transit more frequent* (44%) were the most popular responses among respondents.

What could we do to encourage you to take transit more?



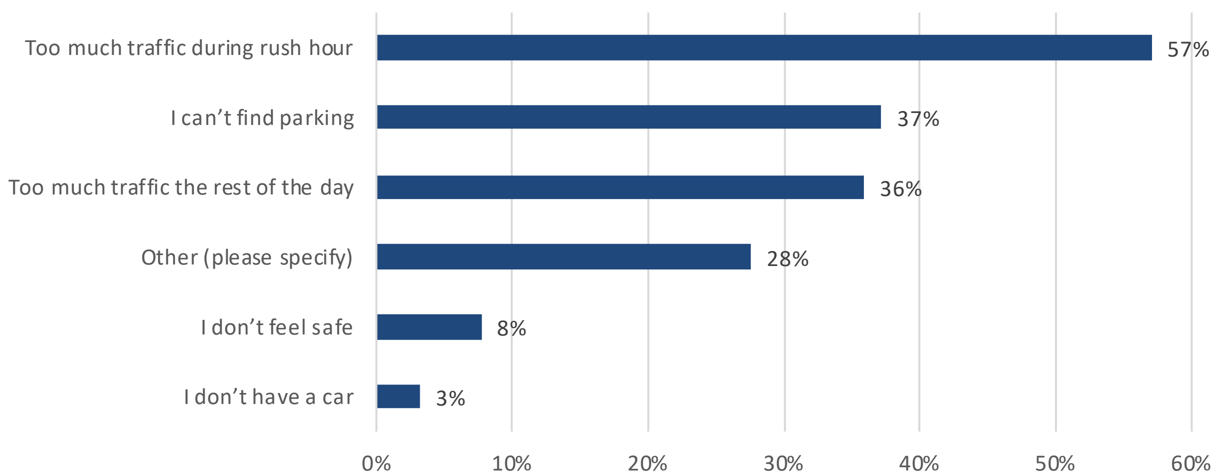
160/188 answered this question.

DRIVING

What are the main issues or challenges for driving or carpooling in White Rock? (pick your top 3)

When asked to identify the main issues or challenges for driving or carpooling in White Rock, more than half of those who responded to this question selected *too much traffic during rush hour* as one of their top three issues/challenges. Other popular selected answer included, *I can't find parking (37%)* and *too much traffic the rest of the day (36%) for those* who answered this question.

What are the main issues or challenges for driving or carpooling in White Rock?

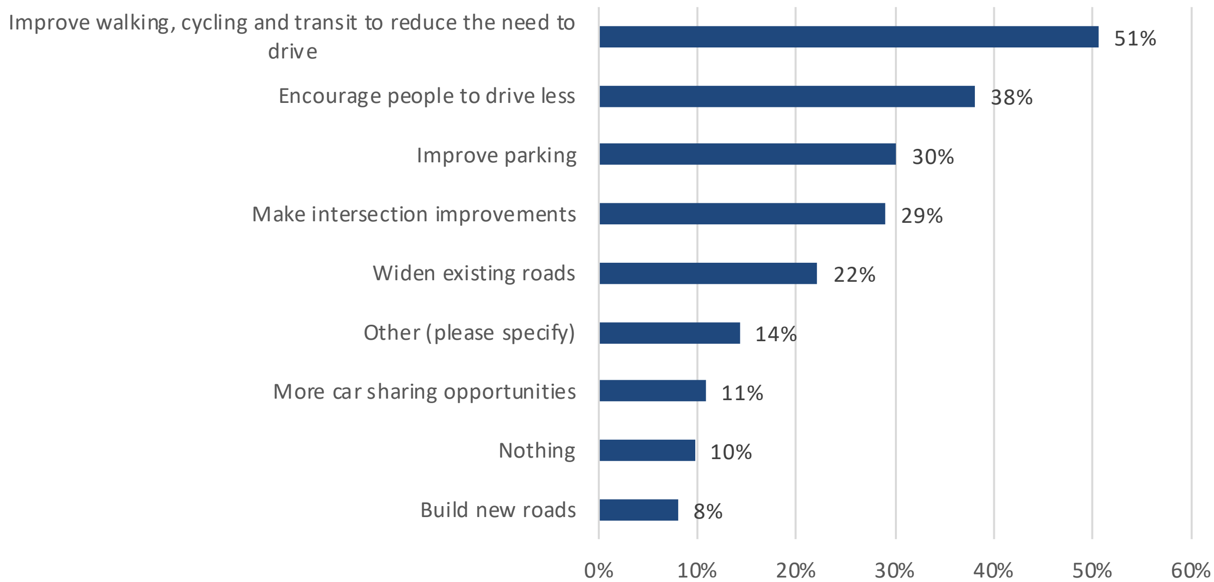


156/188 answered this question.

What could we do to improve driving or carpooling? (pick your top 3)

When asked what the City could do to improve driving and carpooling, *improve walking, cycling and transit to reduce the need to drive* (51%) and *encourage people to drive less* (38%) were the most popular responses among respondents.

What could we do to improve driving or carpooling?



176/188 answered this question.

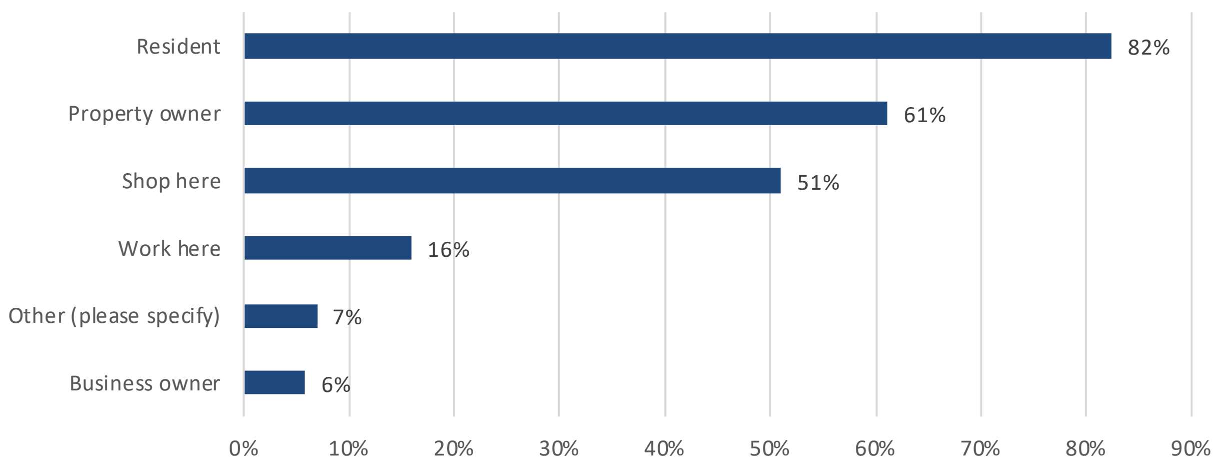
1.4 DEMOGRAPHICS

To better understand who was responding to the community survey, the questionnaire ended with a series of demographics questions.

What is your connection to White Rock?

Respondents had the ability to select as many connections to White Rock that apply to them. More than 80% of survey respondents are White Rock residents and over 60% identify as being property owners.

What is your connection to White Rock?

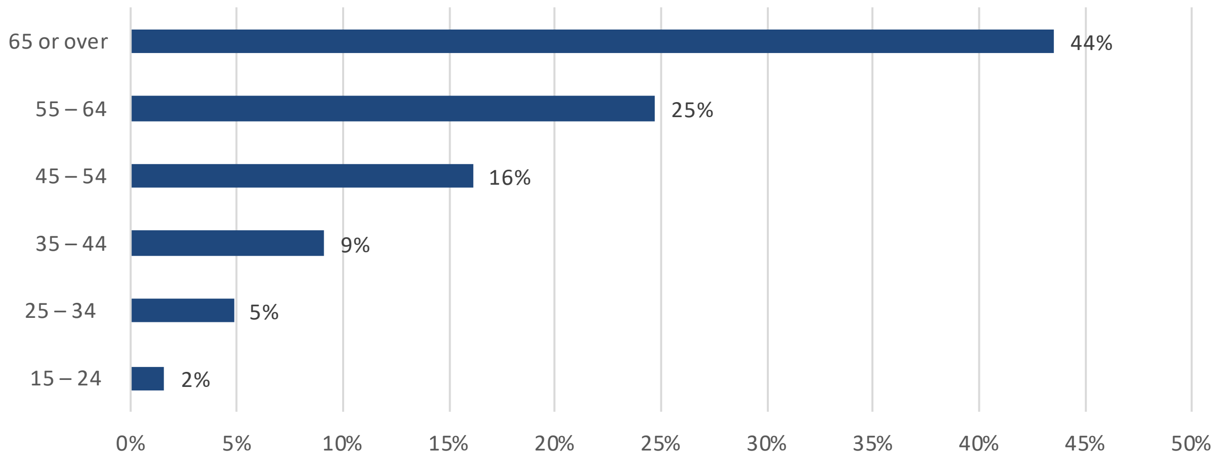


188/188 answered this question.

How old are you?

More than half of respondents are 55 years or older (69%). Those between 35 and 54 years of age make up 25% of respondents.

Which age group do you fall under?

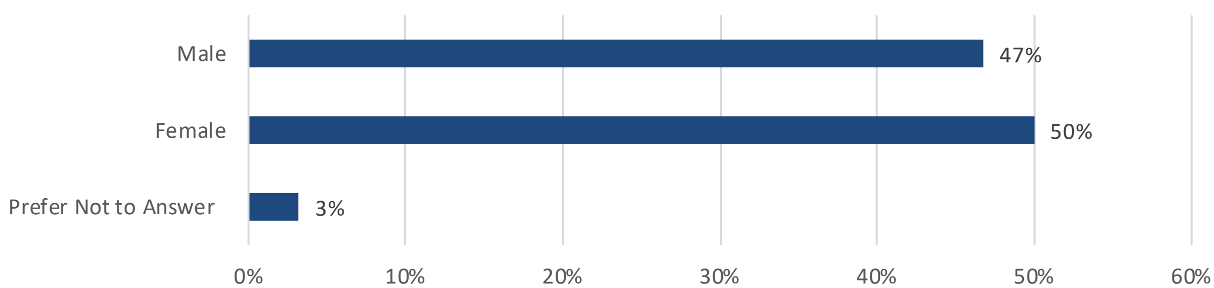


186/188 answered this question.

What is your gender?

The surveyed respondents are nearly equally divided amongst male to female gender (47% vs 50%).

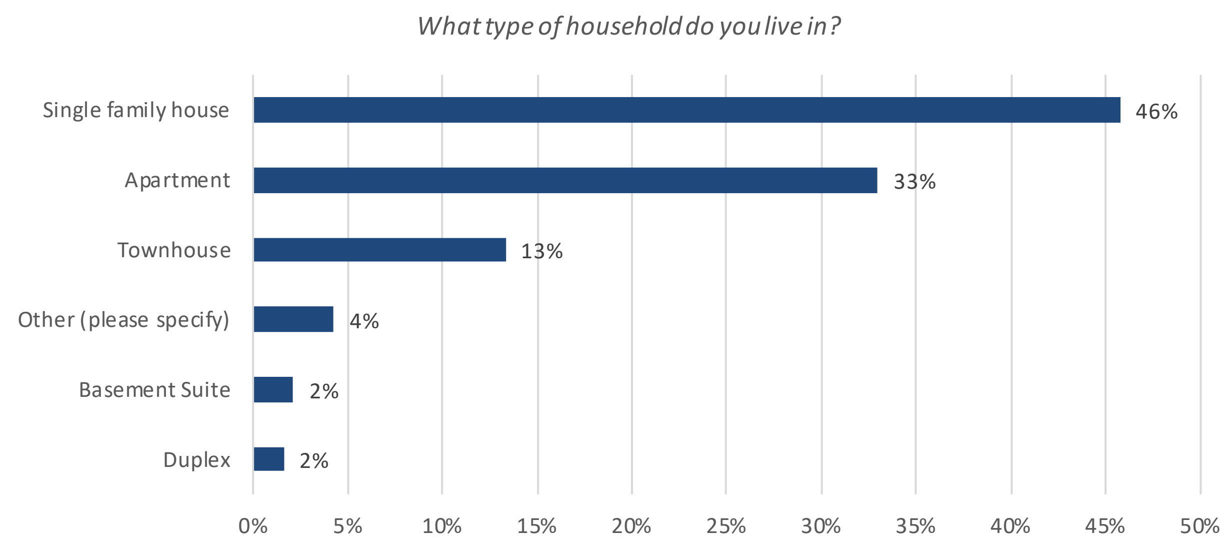
What gender do you identify with?



186/188 answered this question.

What type of household do you live in?

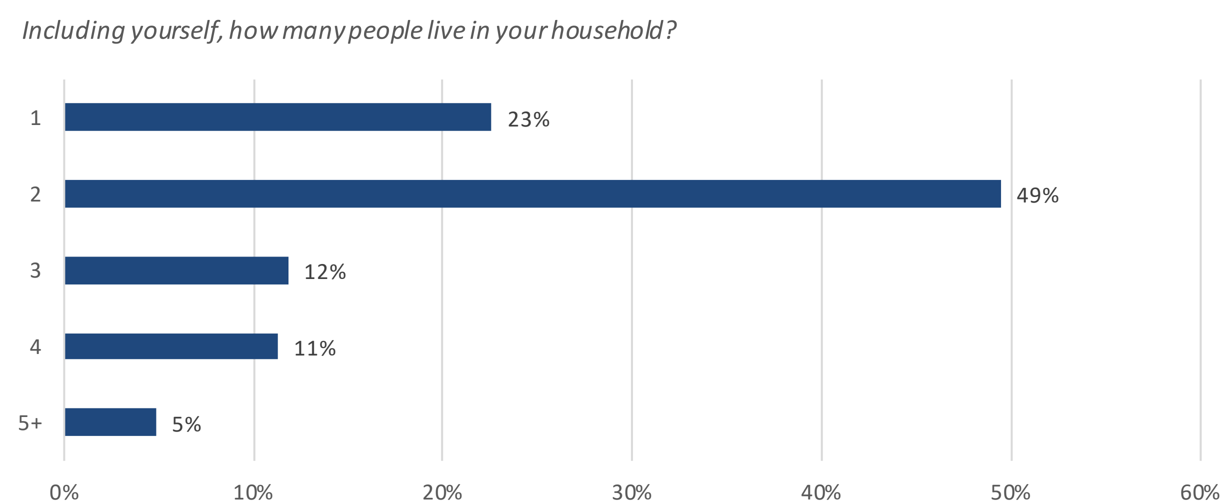
The majority of respondents live in either a single-family home (46%) with the next highest answer being an apartment (33%).



188/188 answered this question.

Including yourself, how many people live in your household?

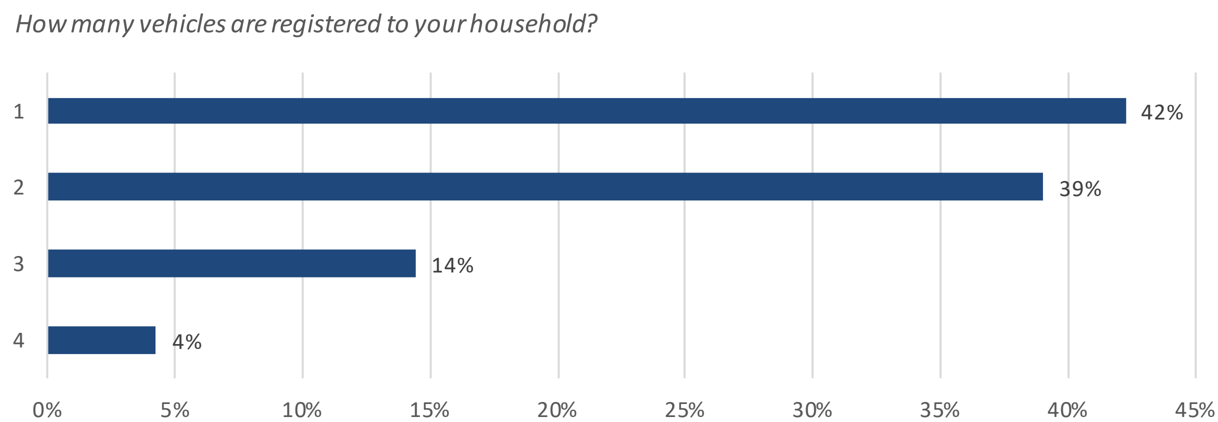
More than half of respondents live with one or two people in their household (2-3 including themselves).



186/188 answered this question.

How many vehicles are registered to your household?

The majority of respondents (79%) indicated they have two vehicles registered to their household. Less than 5% of respondents do not have any vehicles registered to their household.



187/188 answered this question.

1.5 ADDITIONAL COMMENTS

Do you have any other comments about transportation issues and opportunities in White Rock?

THEME 1: PEDESTRIAN INFRASTRUCTURE (20 COMMENTS)

- **Pedestrian safety (12 comments)**
  Respondents noted that there a need for better speed control and safer pathways to walk. There should be a larger focus on pedestrian safety and measures that could be improve include street lighting, traffic calming measures for motor vehicles, lowering speed limits and more signals.

- **Pedestrian network improvements and implementing new sidewalks (7 comments)**
  Respondents noted that there is need to add new attractive and safe sidewalks due to the lack of available sidewalks and pathways in the community. Comments also indicate that some current sidewalks and pathways along the beach are rough and uneven as they are inconsistently maintained.
- **Walkability within and between neighbourhoods (4 comments)**
  Respondents stated that there was an overall lack of a pedestrian oriented community that should look to lower speed limits to 30-40 km/hr and enforce speed limits. Comments also indicated to look towards densifying Uptown to develop a more walkable center.

THEME 2: CONNECTIVITY WITHIN WHITE ROCK COMMUNITY (8 COMMENTS)

- **Connectivity to the beach (6 comments)**
  Respondents noted that improve and maintain the connection to the beach. Ideas for improving access to the beach area include shuttles, a tram system and a funicular. Respondents also indicated that there is a need to repair and maintain existing stairs and railings that provide access to the beach

- **Connectivity to shopping and recretational facilities (2 comments)**
  It was stated that there is a potential for providing better connectivity to shopping and recreation needs by foot and sidewalks.

THEME 3: CONGESTION (16 COMMENTS)

- **Improving congestion planning around new developments (10 comments)**

Participants stated that there are currently too many new developments that are creating congestion due to construction and poor transit planning as the increase in growth of people and their personal vehicles will increase existing congestion.

- **Congestion across communities in White Rock (6 comments)**
  It was stated that generally that there is too much congestion in communties with some areas referenced by participants (Oxford Hill, Stayte Road, Marine Drive, 32nd Avenue, 16th Avenue). This increased in congestion is typically associated with increase in travel speeds which creates a concern for traffic and pedestrian safety.

THEME 4: TRANSIT SYSTEM IMPROVEMENTS AND TRANSIT PLANNING TO MEET NEEDS (26 COMMENTS)

- **Improving transit frequency, reliability, access, and cost improvements (14 comments)**
  It was stated that existing transit options needed improvements for transit access, frequency, reliability for White Rock.

- **Access to reliable transit to the Lower Mainland (9 comments)**
  Respondents noted that there is a need for better and efficient transit access to the rest Lower Mainland, neighboring municipalities such as Surrey, Langley and connectivity to Downtown Vancouver. Respondents have also indicated that the city should be working closely with other municipalities and the province to ensure connectivity is developed properly.

- **Need for improved transit options (3 comments)**
  Respondents mentioned that there is a need for accommodating more transit options including consideration of tram system and more car sharing opportunities such as Car to Go.

- **Holistic transit planning is needed to manage future growth (8 comments)**
  It was stated that that there should be better management of transit planning for future growth and to accommodate future growth. Some residents have also mentioned the removal of train tracks and freight trains.

THEME 5: PARKING (18 COMMENTS)

- **Neighbourhood and residential parking (3)**
  Respondents called for more residential parking in neighbourhoods as well as more enforcements for people parking unlicensed without a permit. Some residents have also raised the concern of different parking permit pricing at varying geographical boundaries.

- **Street Parking and parking for businesses access (1 comments)**
  Currently respondents did not feel that there is sufficient on-street parking for specifically merchants and businesses.

- **Lack of parking (8 comments)**
  Respondents felt that there is a lack of parking within area of White Rock.

- **Parking Safety (3 comments)**
  Respondents felt that some parking in specific locations have developed blind spots can arise imposing safety concerns for pedestrians and cyclists. An example of a location mention by respondents are along Johnston Road and dump trucks in construction sites taking on-street parking.

- **Less Parking (2 comments)**
  Respondents felt that there is currently too much parking and feel that underground parking is not adequate compared to on-street parking.

- **EV Parking (1 comments)**
  White Rock should consider investing in more EV parking stalls to support the transition to electrification.

THEME 6: TRAFFIC SAFETY AND SPEED ENFORCEMENT (22 COMMENTS)

- **Traffic safety concerns (22 comments)**
  Respondents noted that there is excessive need to improve pedestrian and traffic safety as there is a speeding concern along several areas in White Rock including Oxford Street, Buena Vista, 16th Avenue, North Bluff Road, Marine Drive. Residents have also raised the concern that there should be more policy for traffic enforcement for motorist that are speeding.

THEME 7: INVESTMENTS IN A CYCLING NETWORK (11 COMMENTS)

- **Cycling infrastructure (8 comments)**
  Respondents called for more cycling lanes, cycling paths and trails, and an overall well-defined cycling network. It was also noted that better wayfinding and signage is needed for existing cycling routes.

- **Cyclist safety (3 comments)**

Currently respondents feel that cycling safety can be improve along major routes such as 16th Avenue, Marine Drive, Johnstone Road. Comments indicated that the speed limits for motor vehicles should be reduced and separated from motor vehicles.

THEME 8: MISCELLANEOUS (12 COMMENTS)

- **Emissions and environmental considerations (3 comments)**
  Respondents noted that overall increase in pollution and emissions from vehicles or trucks idling on the road.

- **Infrastructure and road maintenance (6 comments)**
  Respondents stated that there are streets that are not maintained and need to be repaved (Johnston Road). A respondent also mentioned that there appears to be no changes to infrastructure despite a new tax revenue.
- **Public consultation and improving transportation (2 comments)**
  Respondents stated that it would be beneficial to link to the 2014 Strategic Transportation Plan to see what part of the plan has been reviewed and updated as well as learning from European counties on how to improve transportation.
- **Tree trimming (1 comments)**
  Respondent stated that it is short sighted to not trim some of the trees that obstruct the double decker bus as they could cause power outages a branch ends up hitting a power line.

APPENDIX B:
ROUND TWO ENGAGEMENT SUMMARY

PHASE 2 ENGAGEMENT SUMMARY REPORT

White Rock Integrated Transportation and Infrastructure Master Plan

1 INTRODUCTION

The City of White Rock is developing an Integrated Transportation and Infrastructure Master Plan (ITIMP). The plan has been developed based on two phases of public engagement. The first phase of engagement focused on identifying issues, opportunities, and challenges for transportation in White Rock. The second phase of engagement focused on obtaining input on the draft long-term plan.

The second phase of engagement took place between September and November, 2021 and included an online survey and three public open houses. Engagement materials were posted on the talkwhiterock.ca project website, including the draft plan, a project video, and summary infographics. The City also regularly promoted the engagement through its social media channels.

The online survey was available on the Talk White Rock website for all interested White Rock residents to complete between September 1, 2021 and November 21, 2021. The survey was designed to obtain input on the draft Integration Transportation and Infrastructure Master Plan. The survey received 100 views, resulting in 33 responses.

Three virtual public events were held in September and October, 2021 with 14 participants. The open houses were designed to provide an overview of the draft plan and respond to any questions.

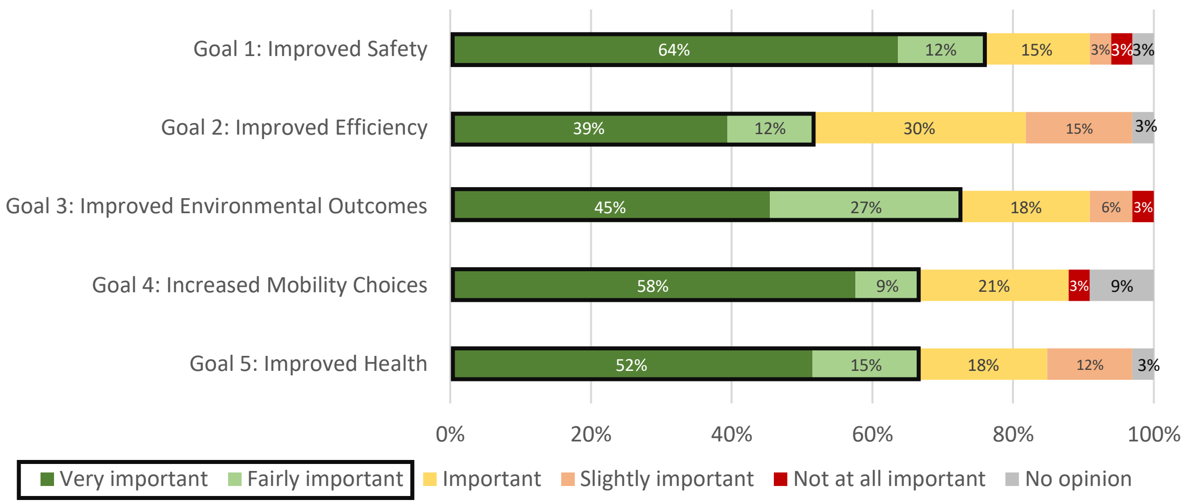
The results of the online survey and public open houses will be used to refine and finalize the ITIMP. The following is a summary of what we heard through the second phase of public engagement.

2 ONLINE SURVEY SUMMARY

2.1 GOALS

The Draft Plan includes five overarching Goals to improve White Rock's transportation system. How important are each of these Goals to you?

Survey respondents were asked to identify which of the goals were most important to them. A list of 5 goals was provided for participants to rank from *Very important* to *Not at all important*. Goal #1 to improve safety was identified as the most important goal followed by Goal #3 to improve environmental outcomes, with 76% and 73% of respondents indicating these were *Very important* or *Fairly important* goals, respectively. All five goals received relatively strong support, with at least 50% of respondents indicating that all five goals were *Very important* or *Fairly important.*



Comments

Survey respondents were invited to provide additional comments about the goals. Comments included:

- Confusion about Goal 5 (Improved Health), as it was felt this is covered by Goal 1 (Improved Safety) since improving safety contributes to improved health, and since transportation is not a health service.
- Concerns about the noise and pollution from busses, particularly those travelling down Oxford Street, along Thrift Avenue and north on Johnston Road for residents who live along these routes.
- Desire for more 4-way stops on residential streets for safe roads.
- Desire for more green space to improve environmental outcomes, including tree cover

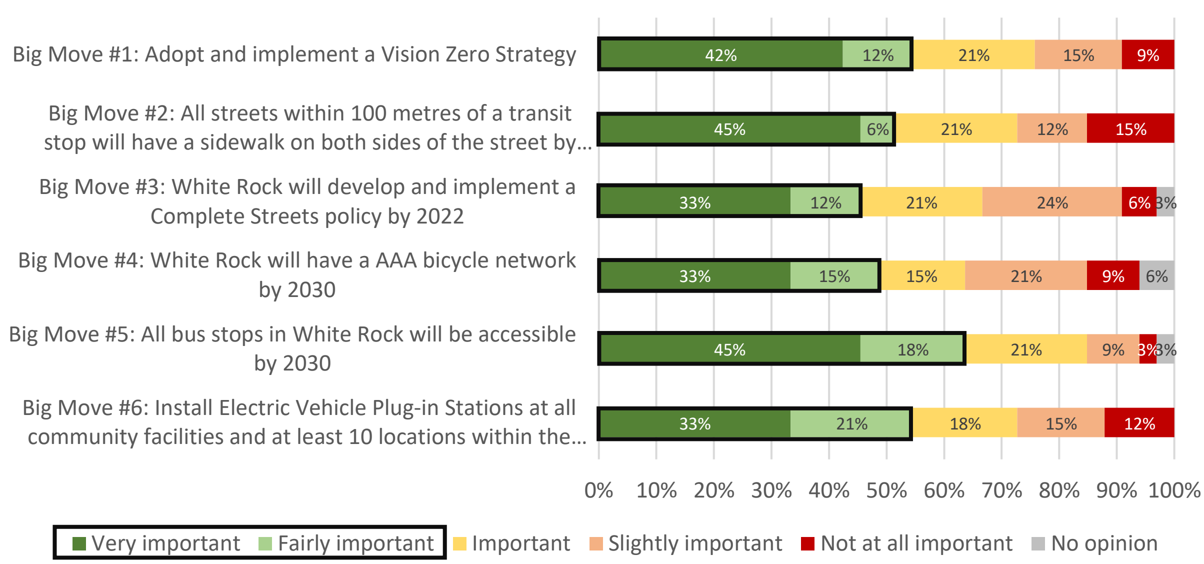
to provide shelter and health benefits and roads that absorb water to prevent flooding.

- Desire for more clarity about how the City plans to show traffic adjacent to East Beach and adjacent to Semiahmoo First Nation
- Comment that having health transportation networks that prioritize safe and accessible active transportation are important for the health of residents. Health benefits include increased physical activity, lower obesity rates, and better mental well-being and social connectivity.
- Desire for more services for bicycles.

2.2 BIG MOVES

The Draft Plan includes six Big Moves that will make the greatest impact to achieving the Vision and Goals of the plan. How important are each of these Big Moves to you?

Survey respondents were asked to identify which of the Big Moves were most important to them. A list of 6 Big Moves was provided for participants to rank from *Very important* to *Not at all important*. Big Move #5 to ensure all bus stops in White Rock will be accessible by 2030 was identified as the most important Big Move, with 64% of respondents indicating this was a *Very important* or *Fairly important* Big Move. Big Move #2 to ensure all streets within 100 metres of a transit stop will have a sidewalk on both sides of the street by 2050 and Big Move #6 to install Electric Vehicle Plug-in Stations at all community facilities and at least 10 locations within the public right-of-way by 2030 were indicated to be the least important Big Moves, with 15% and 12% of respondents indicating these were *Not at all important*, respectively.



Comments

Survey respondents were invited to provide additional comments about the Big Moves. Comments included:

- Concern that Vision Zero is not achievable as long as motor vehicles, motorcycles, bicycles and pedestrians share the road, there will be collisions and fatalities and the focus should instead be on reducing collisions and fatalities.
- Sidewalk improvements should be part of any new development and paid for by the developer.
- Concerns about the noise and pollution from busses, particularly those travelling down Oxford Street, along Thrift Avenue and north on Johnston Road for residents who live along these routes.
- Support more for electric vehicle charger applications and desire to expedite them along with subsidies for homes that have electric vehicles.
- Electric charging stations should have a cost per user/amount used.
- The City should design transportation more for those not using automobiles, including making more pedestrian and bicycle friendly streets.
- Instead of a goal of sidewalks on both sides of streets, suggestion to start with a more simple and equitable goal to have sidewalk on one side of all streets. It was noted that some neighbourhoods will continue to have no sidewalks for a long time as the terrain challenging and expensive to address.
- Ensuring access for all people of all ages and abilities is also very important. Prioritizing safety can lead to reduced pedestrian and cyclist injury.
- Fraser Health would like to be a community partner when it comes to policy development for a Vision Zero strategy. Additionally, they would like to be a collaborator for related policies including the Complete Streets policy.

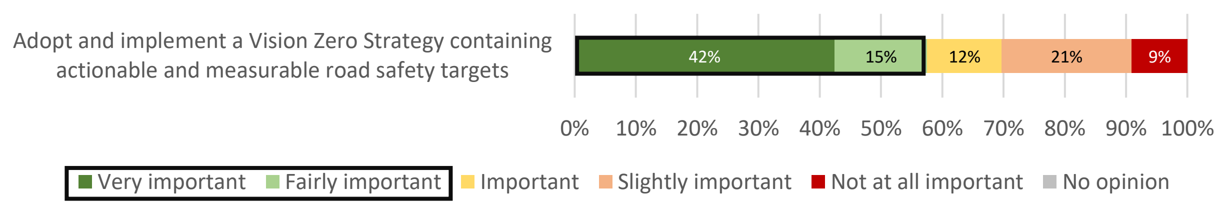
2.3 STRATEGIES

The Draft Plan includes four overarching themes with 13 strategies, each with more detailed actions. The survey asked respondents to identify how important each strategy was to them, as well as to provide specific comments for each strategy.

2.3.1 SAFE STREETS

How important is the strategy identified below in supporting the development of safe streets where serious injuries and fatalities are not acceptable?

The theme of Safe Streets includes one strategy to adopt and implement a Vision Zero Strategy containing actionable and measurable road safety targets. 57% of survey respondents indicated that this strategy was *Very important* or *Fairly important*, with only 9% staying it was *Not at all important*.



Comments

Survey respondents were invited to provide additional comments. Comments included:

- Sentiment that local governments cannot prevent collisions and should not focus tax dollars on trying to do so.
- Concern that Vision Zero is not achievable as long as motor vehicles, motorcycles, bicycles and pedestrians share the road, there will be collisions and fatalities and the focus should instead be on reducing instead of eliminating collisions and fatalities.
- Educating all users on the need to be aware at all times is important, including cyclists wearing headphones and pedestrians looking at their phones.
- Enforcement is required for motorists who do not follow the rules.
- Intelligent road design is required, and preferred over enforcement, to create pedestrian-friendly and bicycle-friendly streets with clear speed markings.
- Reducing motor vehicle traffic is important to reduce collisions and fatalities as well as noise and pollution. Transit, taxi, rideshare, carpool, car share, walking, and cycling should take precedence.
- Concern that curb extensions can impact cycling road edge space if not well designed.
- Desire for more speed humps.

- While all road deaths are preventable, sentiment that does not need to always come at the expense of travel time.
- Speeds are a fundamental factor in crash severity and can be managed through road design, enforcement, and education measures especially where vulnerable road users are present. Having safer roads not only helps prevent injury but also supports health activity.
- Fraser health is a supporter and would like to be engaged in the development of a Vision Zero Strategy for White Rock. They are excited to see the consideration of adoption and implementation of a Vision Zero Strategy.

What do you like about the Vision Zero strategy?

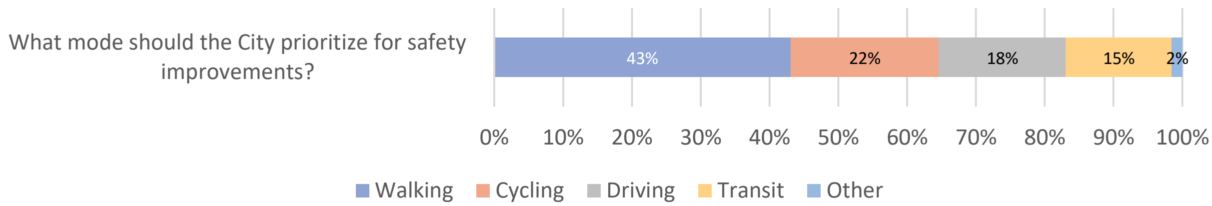
- This goal is nice to have as the background to all the other goals, but not as a primary goal.
- Improved street design standards.
- Consideration for the safety and well-being of elderly people and all citizens.
- Every part of the approach as compared to a traditional approach to road safety.

What do you dislike about the Vision Zero strategy?

- Lack of clarity and transparency about the implications and expectations of a Vision Zero goal.
- Concern that Vision Zero is not achievable.
- Concern that Vision Zero may introduce unreasonable and/or unenforceable measures
- Sentiment that this it not a priority and changes are not necessary, as roads are generally safe in White Rock already.
- Vision Zero plans tend to be focussed on reducing vehicle speeds instead of changing road design to be safer for moderate speeds. This is the best approach for neighbourhood streets, but major roads should be designed so that cars, and especially busses, can travel fast enough to get people where they need to go in a timely manner.
- Too many roads are designed and built for primarily for motor vehicle use.
- Concern about insufficient funding to implement Vision Zero strategy.

What mode should the City prioritize for safety improvements?

Respondents were asked which mode of transportation should be prioritized for safety improvements. 43% of survey respondents indicated that walking should be prioritized, followed by 22% for cycling, 18% for driving, and 15% for transit.



Where should the City prioritize safety improvements?

Respondents were asked where the City should prioritize safety improvements. Comments included:

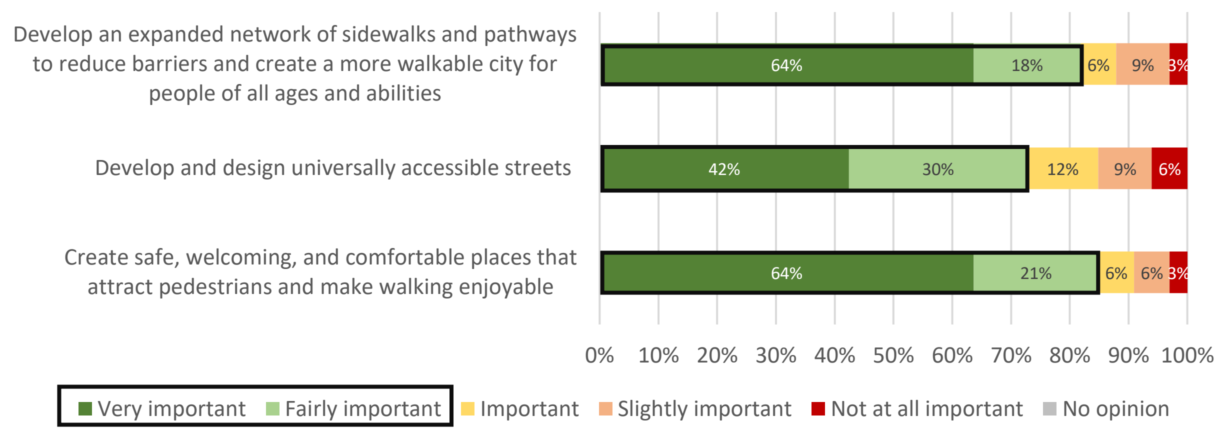
- Thrift Avenue is a busy road and pulling onto it from a stop sign is dangerous.
- Foster Street to Thrift Avenue northbound has poor sightlines and frequently see motor vehicles running stop signs onto Thrift Avenue between Johnston Road and Best Street.
- North Bluff Road is unsafe as vehicles travel at high speeds.
- Marine Drive.
- Roadways with higher traffic volumes and areas with pedestrian crossings.
- Locations with higher numbers of collisions.
- Geometric improvements at intersections.
- Ensure sidewalks are provided on at least one side of all streets.
- Focus on providing wider sidewalks, with an even, smooth surfaces.
- Improve visibility by removing encroachments such as retaining walls and vegetation.
- Limit speed limits to 30 km/h and add more 4-way stops signs for safe driving and traffic calming such as speed humps.
- Speed humps and marked crosswalks should be provided in all 30 km/h zones, including East Beach, particularly the crosswalk of Marine Drive and Parker Street.
- Focus on areas where slopes are very steep.
- All areas throughout White Rock that support the use of active transportation for all ages and abilities.
- Addressing where transit makes rest stops and idling which causes noise and pollution for residents, such as Oxford Street.
- Consider smaller transit vehicles on residential streets to enhance resident’s physical, mental and emotional well-being.
- Wheelchair users need better access to get from Marine Dr to uptown. Currently the sidewalks are too narrow and limited visibility. Someone driving might hit a person in a

wheelchair because they are forced to use the roads as there is no dedicated bike lane/scooter lanes.

- Construction zones.
- Buena Vista Avenue and Kent Street should be improved with a curb extension to narrow the road and slow vehicles down.
- Focus on education, awareness, and enforcement.

2.3.2 PEOPLE-FIRST STREETS

The theme of People-first Streets includes three strategies. Survey respondents were asked to identify which of the strategies were most important to them. Creating safe, welcoming, and comfortable places that attract pedestrians and make walking enjoyable was the highest ranked strategy, with 85% of respondents ranking this strategy as *Very important* or *Fairly important.* All three strategies received relatively high support, with all three strategies ranked by at least 72% of all respondents as *Very important* or *Fairly important.*



Comments

Survey respondents were invited to provide additional comments. Comments included:

- Support for anything that can encourage walking to become the first mode of transportation people consider for their journey.
- Many streets have no sidewalks on them at all, while many existing sidewalks are uneven.
- Pedestrians and cyclists can share mobility space by a painted line and/or change in paving material.
- Almost all streets where pedestrians walk should have at least one bench every two blocks or so in order for resting areas.
- Green spaces with benches and trees for shade and rest are much needed throughout White Rock.

- Consider the cost and impact on taxation.
- Provide greater priority for pedestrians to feel safe walking along the street by having at least one sidewalk.
- Increased education.
- Improved lighting, particularly at crosswalks.
- Additional speed enforcement along Marine Drive along with traffic calming such as speed humps and marked crosswalks to improve pedestrian safety.
- Positive outcomes of increased focus of walking include improved physical and mental health in addition to improved air quality.
- Consider ways to reduce number of cans and bins left out on sidewalk by recycling trucks
- Would like to see more 4-way stops.
- Back lanes could also be considered for walking, as they are fairly quiet.
- Need to keep and maintain migration corridors by limiting dogs along the beach as they scare the birds away and unsettle the walkers when they are off leash or on long leashes.
- Location-specific suggestions:
    - Consider making areas around the Kent Street Activity Centre more pedestrian-friendly as seniors may be walking to and from Kent Street and around the area for exercise.
    - Connections between Earl Marriott High School and Peace Arch Elementary School, including along Kent Street and Stevens Street.
    - Maple street between Marine Drive to Columbia Avenue is a transit corridor and should be a short-term upgrade priority to add sidewalks on both sides.
    - More emphasis on beach areas.
    - Some respondents felt that Victoria Avenue should be a priority, while others did not.
    - Additional crosswalk at Kent Street and Columbia Avenue and Cliff Avenue.

What do you like about the proposed priorities for new sidewalks?

- Overall this makes sense and priorities are well assigned.
- More sidewalks and walkways.
- Opportunities for green space.
- Sidewalks improve pedestrian safety.
- Priority sidewalks are located in the uptown commercial area.
- The expanded network will make it much easier to walk around White Rock and will help more short car trips be done on foot.
- New sidewalks are excellent and encourage walking to the beach rather than driving down.

- Ensuring there are connections between different areas and modes of transportation including the need to prioritize accessibility for all ages and abilities is very important.

What do you dislike about the proposed priorities for new sidewalks?

- Cost estimates and budget has not been identified.
- The plan does not specify the size of sidewalks.
- More sidewalks will require more maintenance to keep them in good condition and snow free in the winter.
- Need more options to access the waterfront with all ages considered, including both younger and older people.
- Opportunity to work with BC Hydro to eliminate utility poles and power lines.
- Timelines for implementation are too long.
- Map is challenging to read and understand.
- Narrow streets need to be improved.
- East Beach has very steep hills which are not pedestrian-friendly and need wider sidewalks and benches for sitting.
- There are no downsides to new sidewalks; several of my walking routes in White Rock require me to walk on the road, which isn't safe.
- The priorities focus primarily on commercial areas.
- Need to prioritize one sidewalk for many streets, before two sidewalks for some streets.

What do you like about the proposed priorities for new greenways?

- Love the greenway concepts with benefits for both pedestrians and cyclists.
- Like the idea of being able to walk “somewhere” without too many barriers.
- Love the focus on greenery and open space to provide shade and attract local birds and other natural habitat.
- Like landscaping ideas.
- The network will help to separate vehicle and active transportation modes.
- Would like to see more greenways as priorities.
- Like the network but concerned about how it will impact residential parking.
- Some greenways could use improved steps, railings, and vegetation trimming.
- Location-specific suggestions:
    - Like the connection on Oxford Street.
    - Would like to see more greenways to the waterfront such as Centre Street.
    - Would like to see greenways extended to Semiahmoo Trail in surrey.
    - Would like to see more greenways in the central core of White Rock.
    - Cliff Avenue greenway should connect to Stayte Road instead of ending at Kent Street.
    - Would like to see extension of Russell Avenue greenway between Foster Street

and Oxford Street.

What do you dislike about the proposed priorities for new greenways?

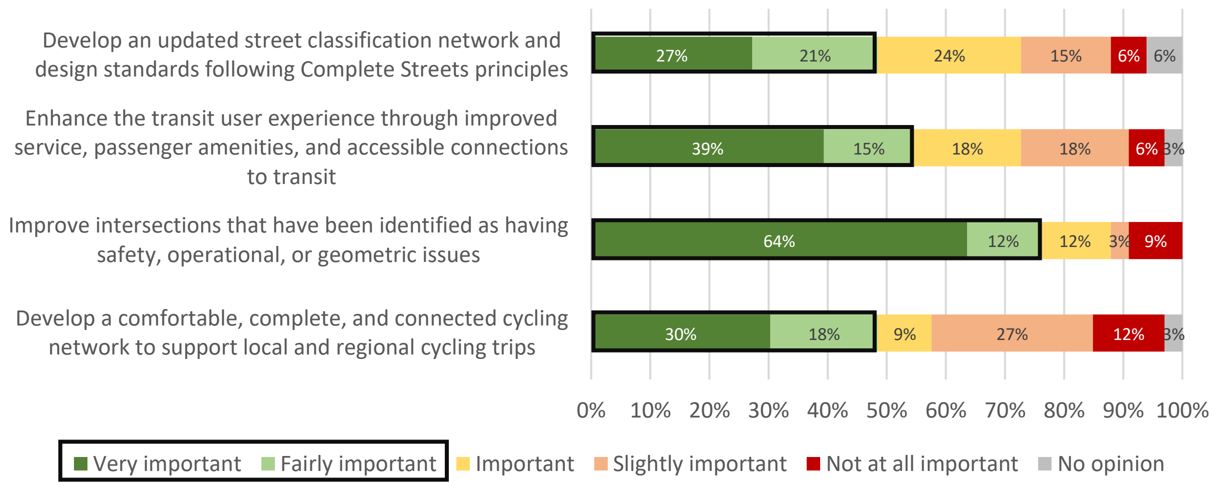
- Cost estimates and budget has not been identified.
- Do not support investing in bicycle lanes.
- Year-round maintenance can be an issue.
- Unclear about what greenways entail and how they are enhanced from what exists currently.
- When designing greenways, there is a need to consider potential conflicts between pedestrians and cyclists.
- Sentiment that greenways are not needed.
- Map is challenging to read and understand.
- Greenery should not be limited to just greenways.
- Treatments should be considered on all residential streets, and not limited to select greenways.
- Concerns about impacts to residential parking and reducing parking will create parking challenges on other streets.

Are there any other priorities the City should consider when expanding the network of sidewalks, pathways, and greenways?

- Improve connections between Marine Drive and the commercial core.
- Safe walking spaces for seniors.
- Improve wheelchair access throughout the City.
- Consider parking impacts.
- Consider connection to pathways and trails.
- Consider feasibility of steep slopes, which can be challenging for recreational cyclists and other users.
- Ensure all connections are easily accessible for people of all ages and mobilities.
- Ensure they are completed in sequence so that the network growth is logical and not disconnected.

2.3.3 MULTI-MODAL STREETS

The theme of Multi-modal Streets includes four strategies. Survey respondents were asked to identify which of the strategies were most important to them. Improving intersections that have been identified as having safety, operational, or geometric issues was by far the highest ranked strategy, with 76% of respondents ranking this strategy as *Very important* or *Fairly important.* The other three strategies under this theme received more modest support, ranging from 48% to 55% of respondents who ranked each of these as *Very important* or *Fairly important.* Developing a comfortable, complete, and connected cycling network to support local and regional cycling trips received the lowest level of support, with 12% of respondents indicating that this strategy is *Not at all important*.



Comments

Survey respondents were invited to provide additional comments. Comments included:

- Cycling should be a lower priority due to demographics and geography.
- Some respondents felt that encouraging public transit is important, while others see transit as a lower priority due to impacts on residents.
- Oxford Street can be very crowded with busses and traffic.
- Desire for improved transit connections to SkyTrain.
- Desire for more roundabouts.
- Desire for rideshare options.
- Concerns that intersection improvements may be expensive and may be challenging to implement without significant benefits.

What do you like about the proposed bicycle long-term network?

- It is a fantastic proposal and a great idea to expand the network, especially with more e-bikes coming.

- Separation between cyclists and motor vehicles.
- The network includes lots of variety, including more protected bicycle lanes.
- Well connected network that does a good job of avoiding the steepest hills.
- The use of greenways for bicycles.
- East-west connection through Centennial Park.
- Focus on children and youth, including connections to schools.
- Location-specific comments:
    - The only east-west practical connectors are on busy streets such as Marine Drive and North Bluff Road.
    - Protected Bike lane should be on Russell Avenue instead of Thrift Avenue, as Thrift Avenue is too busy.
    - Concern that it will be difficult to add dedicated bicycle lanes to North Bluff Road.

What do you dislike about the proposed bicycle long-term network?

- Bicycle network should be a lower priority.
- Cost estimates and budget has not been identified.
- Not enough bicycle routes have been identified, including not enough protected bicycle lanes.
- The proposed network may not be attractive to people of all ages and abilities.
- Too many shared roads, which are more dangerous for cyclists as they impede drivers, often causing unsafe/illegal passing.
- Topography is a challenge for cycling in White Rock.
- Greenways that include pedestrians must separate users and mitigate cycling speeds.
- Concerns about potential conflicts between cyclists and motor vehicles on streets unless there are bicycle lanes
- Concerns about impacts on residential parking.

What do you like about the proposed accessibility improvements to and from transit?

- Focus on accessibility improvements.
- More transit is a good thing, but it must be affordable.
- Identification of a potential hillside connection.
- Improvements should be focused on specific areas where there is a demonstrated need.
- Improving walking access to transit stops will increase the usage of public transportation.
- Improved walking access and bus stop amenities.
- Focus on more frequency with smaller busses.
- Sidewalks both sides of the road along transit corridors.

What do you dislike about the proposed accessibility improvements to and from transit?

- Bus stop improvements are not needed.
- The hillside connection will not be practical; covered escalators should be considered instead.
- Ultimately it depends on where transit is routed - decisions that are not made by the City.
- Idling of busses on Oxford Street.
- Prioritize improvements based on the number of transit users that will benefit.
- Staircases are not accessible.

What do you like about the proposed major street network improvements?

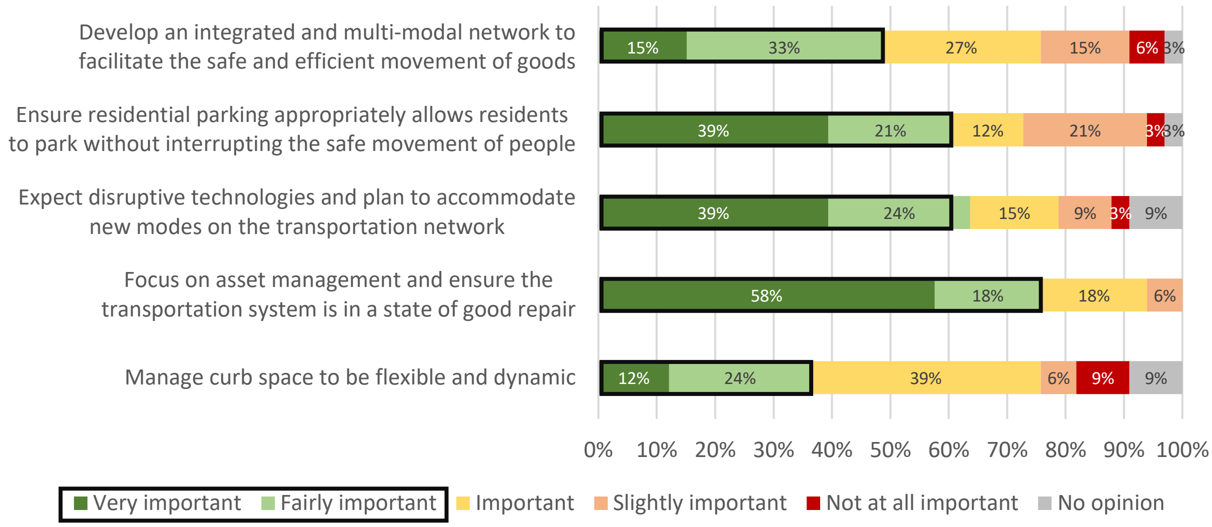
- Support all of the improvements.
- Reducing driving and promoting walkability and cycling is good for the population.
- Safety and operational issues that are being addressed.
- Need to focus on how to reduce traffic in general through all alternatives.

What do you dislike about the proposed major street network improvements?

- The improvements ignore the fundamental issue in White Rock to improve connections between Uptown and the waterfront.
- These improvements will provide services at the expense of the motoring public.
- Cost estimates and budget has not been identified.
- More speed humps are needed.

2.3.4 DYNAMIC STREETS

The theme of Dynamic Streets includes five strategies. Survey respondents were asked to identify which of the strategies were most important to them. Focusing on asset management and ensuring the transportation system is in a state of good repair was by far the highest ranked strategy, with 76% of respondents ranking this strategy as *Very important* or *Fairly important.* This was followed by expecting disruptive technologies and planning to accommodate new modes on the transportation network, and ensuring residential parking appropriately allows residents to park without interrupting the safe movement of people, which received 64% and 61% of respondents who ranked each of these as *Very important* or *Fairly important.* Managing curb space to be flexible and dynamic received the lowest level of support, with 9% of respondents indicating that this strategy is *Not at all important*.



Comments

Survey respondents were invited to provide additional comments. Comments included:

- This does not include recommendations about improving traffic flow.
- Need to plan for the future, such as robotic deliveries, drones, etc.
- Need to protect pedestrians as the most vulnerable road users when considering flexible and dynamic curb space.
- Consider the impact on individual neighborhoods in terms of well-being and quality of life.
- Noise pollution is a major issue and efforts should be made to minimize this.
- Consider designated times outside of peak periods for goods movement.
- There should be less charges for parking to enjoy the beach.
- There will be a need for more than ten electric vehicle chargers in ten years.
- The plan should include carshare infrastructure.

What do you like about the proposed actions for disruptive technologies such as Zero Emission Vehicles, new mobility services and Autonomous Vehicles?

- Planning for a future that is expected or unexpected is important.
- Longevity of electric cars due to finite resources such as lithium used for batteries.
- Flexibility to adapt.
- New technologies will help to reduce pollution and may reduce noise.
- Parcel drop offs for major residential developments need to be considered.
- We need to lead all other cities to provide EV chargers and EV residents who can install them quickly.

- It's a win-win that is good for people and good for the environment.
- Finally starting to address and support alternative disruptive technologies in transportation to keep up with innovation.
- Like that the City is looking ahead and any further developments should be forced to include climate friendly infrastructure.
- The transportation network should be future-proofed as much as possible.

What do you dislike about the proposed actions for disruptive technologies such as Zero Emission Vehicles, new mobility services and Autonomous Vehicles?

- Zero emissions should mean that the source of electricity it renewable as well.
- Caution about over building for what may happen.
- Do not waste money on initiatives that are of such fluidity. These technologies are in constant evolution, and trying to anticipate the direction of change is very challenging.
- Initiatives should be correlated to demand and should be user-paid.
- It may affect the local business if not adopted in time.
- Need more thought about allowing autonomous vehicles in White Rock.
- Technology can change so quickly that you might plan for something that never transpires.

2.3.5 SUMMARY

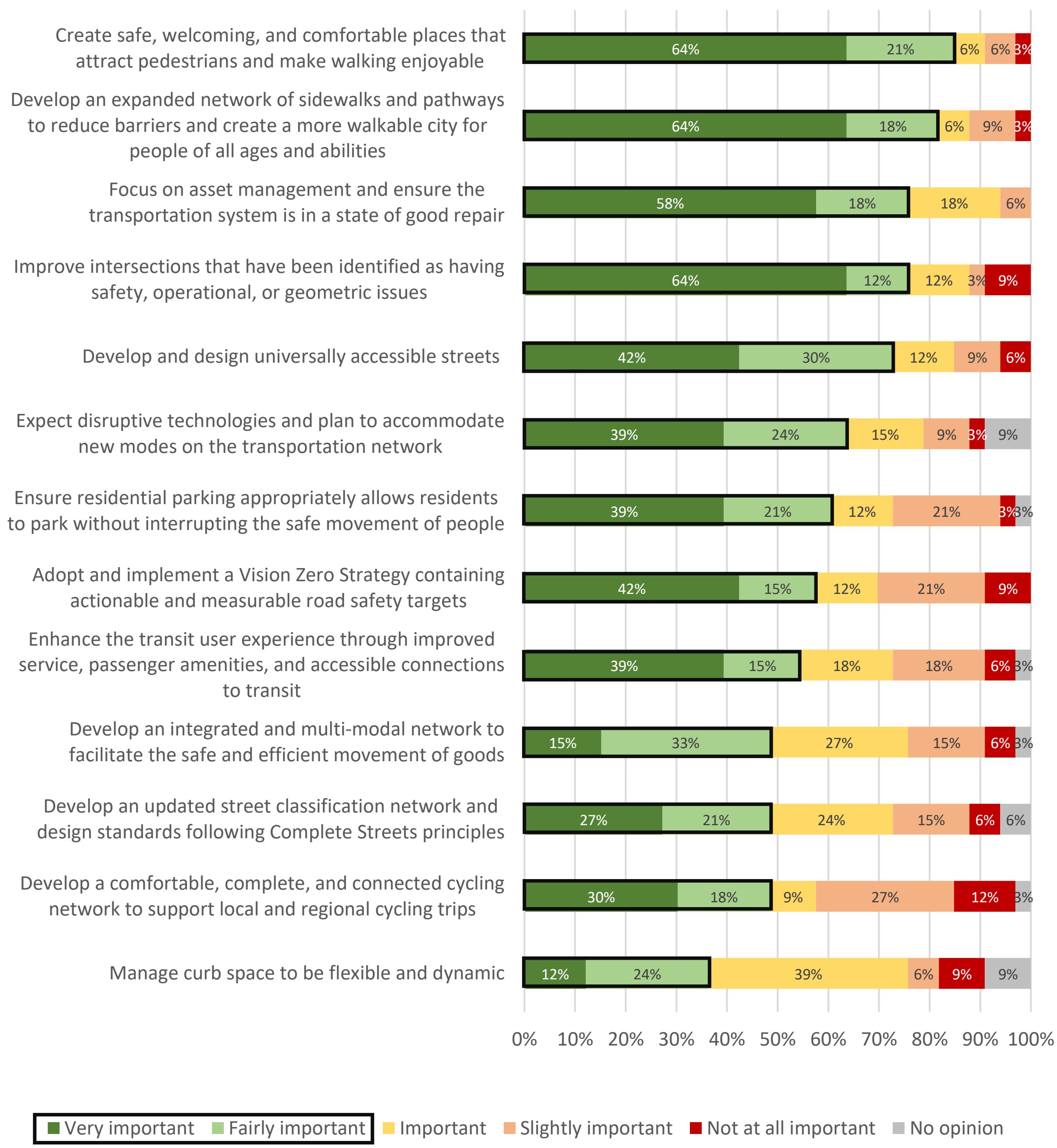
Overall, when all thirteen strategies are compared against each other, there is generally strong support for most strategies. The most important strategies were generally related to pedestrian improvements, asset management, intersection improvements, and accessibility, as follows:

- Create safe, welcoming, and comfortable places that attract pedestrians and make walking enjoyable (85% of respondents ranking this as *Very important* or *Fairly important*);
- Develop an expanded network of sidewalks and pathways to reduce barriers and create a more walkable city for people of all ages and abilities (82%);
- Focus on asset management and ensure the transportation system is in a state of good repair (76%);
- Improve intersections that have been identified as having safety, operational, or geometric issues (76%); and
- Develop and design universally accessible streets (73%).

Four strategies received less than 50% responses that they were *Very important* or *Fairly important.* These strategies generally related to creating flexible and dynamic curb space, creating a cycling connect network, and multi-modal improvements, as follows:

- Develop a comfortable, complete, and connected cycling network to support local and regional cycling trips (48% of respondents ranking this as *Very important* or *Fairly* *important*););

- Develop an updated street classification network and design standards following Complete Streets principles (48%);
- Develop an integrated and multi-modal network to facilitate the safe and efficient movement of goods (48%); and
- Manage curb space to be flexible and dynamic (36%).

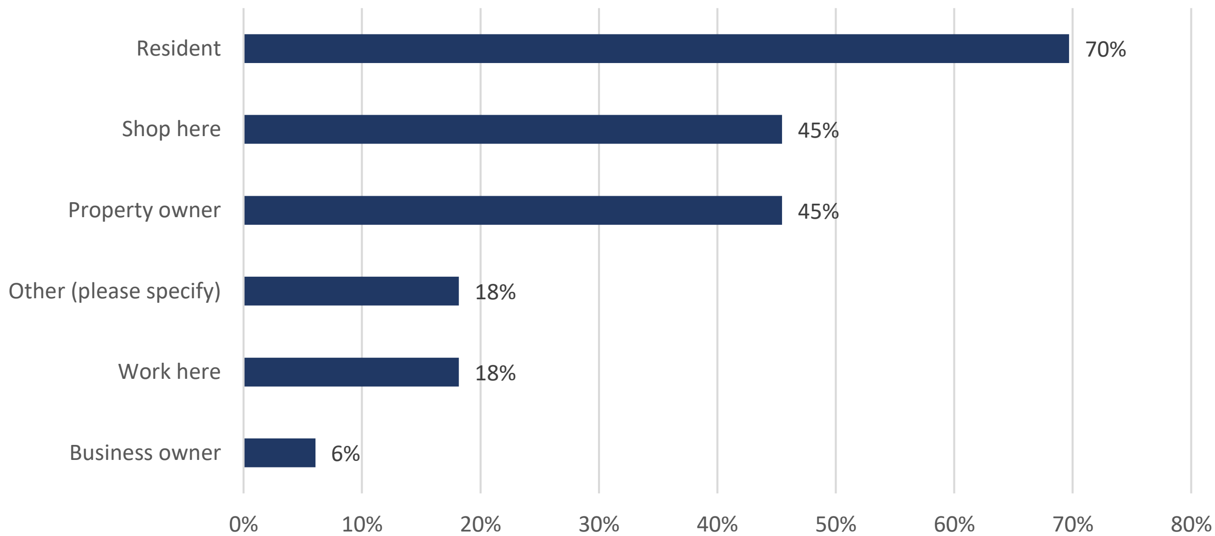


2.4 DEMOGRAPHICS

To better understand who was responding to the online survey, the survey ended with a series of demographics questions.

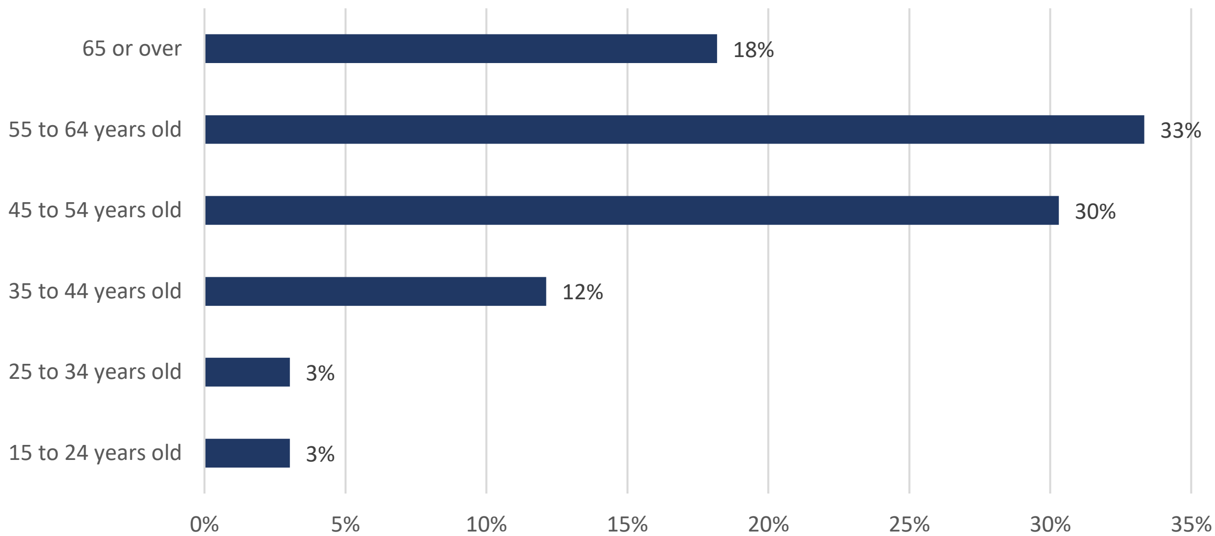
What is your connection to White Rock?

Respondents had the ability to select as many connections to White Rock that apply to them. Approximately 70% of survey respondents are White Rock residents and approximately 45% identify as being property owners, with 45% also indicating that they shop in White Rock.



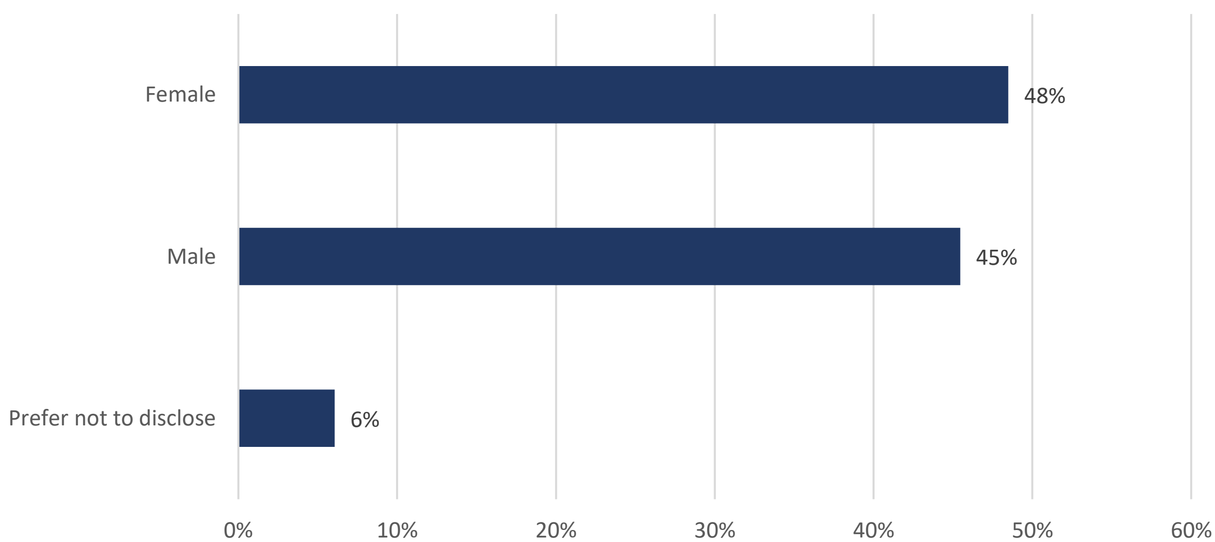
How old are you?

More than half of respondents are 55 years or older (52%). Those between 35 and 54 years of age make up 42% of respondents.



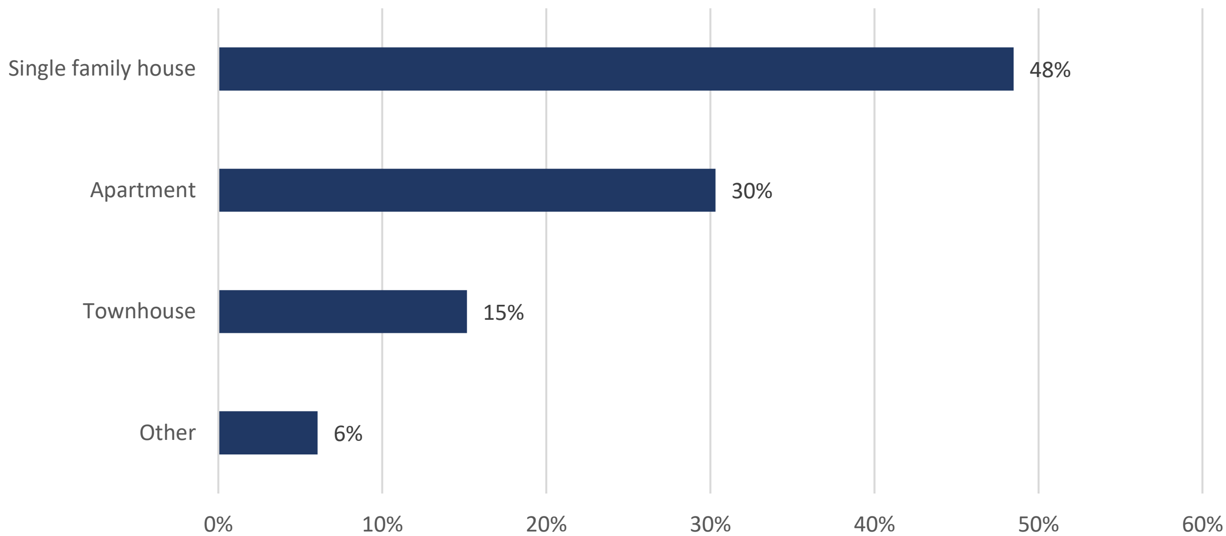
What is your gender?

The surveyed respondents are nearly equally divided amongst male to female gender (48% vs 45%).



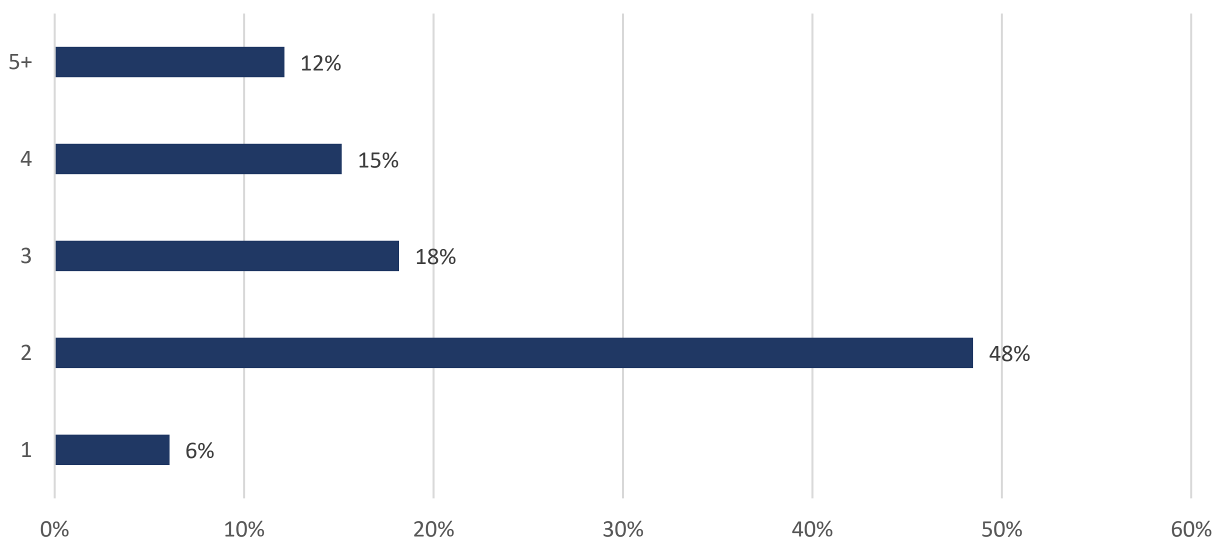
What type of household do you live in?

The majority of respondents live in either a single-family home (48%) with the next highest answer being an apartment (30%).



Including yourself, how many people live in your household?

Almost half (48%) of respondents live with one other person in their household (2 including themselves), with nearly half (45%) living with two or more people in their household (3 or more including themselves).



3 PUBLIC EVENT SUMMARY

Three virtual public open houses were hosted in September and October, 2021 with a total of 14 attendees, as summarized below:

- September 29, 2021, 10:00am – 11:15am: 5 participants
- October 5, 2021, 3:00pm – 4:15pm: 7 participants
- October 5, 2021, 6:00pm- 7:15pm: 2 participants

The purpose of the public open houses was:

1) To share with the general public the draft ITIMP, specifically the core priorities, goals, guiding principles, themes, strategies that will underpin the ITIMP; and
2) To generate input from the general public on the draft ITIMP, specifically what they like and areas of concern, as well as priorities for its implementation.

The event included several targeted questions for discussion, including:

1) **Are the vision, goals, targets, and big moves ambitious enough?**
    - There was general support for the vision, goals, targets, and big moves, while some participants felt these were not ambitious enough.

2) **Do you support the vision, goals, targets, and big moves?**
    - There was a question about how this plan aligns with other regional initiatives, including Metro Vancouver's updated land use plan (Metro 2050) and TransLink's updated Regional Transportation Strategy (Transport 2050). It was confirmed that alignment of these documents is critical and the City has been working with TransLink to ensure the plans are in alignment.
    - While regional alignment is important, the plan must also ensure it considers the unique characteristics of White Rock, including an older population and its hillside topography. These elements need to be given more consideration.
    - The plan should have a stronger focus on equity, recognizing it may be unrealistic to expect older populations will use bicycles given the topography.
    - Accessibility and affordability are very important considerations for the plan.
    - It is very important that the ambitions of the plan are realistic and there is sufficient staff and resources to implement the plan and ensure it does not 'sit on a shelf'.
    - The plan structure with "big moves" and themes is different than previous transportation plans which focused on specific modes individually. It was noted that this was to consider a holistic plan that avoided silos for each mode of transportation, as well as to ensure safety was considered as an overarching part of the plan that encompasses all modes of transportation.
    - There was a question about there the plan includes a target to reduce greenhouse gas (GHG) emissions. It was noted that this is not included in the plan and the City does not currently have other GHG reduction targets, but that the mode share targets will help to reduce GHG emissions.

3) What gives you confidence about each theme and related strategies?

- Have overall confidence in the draft plan and how it has evolved in the previous plan.
- Questions about whether water could be considered as a means of transportation to help address environmental concerns.
- The information on pages 10 and 11 of the draft plan summarizing priorities, outcomes, and opportunities and challenges from the first round of engagement are very important as they show how they informed the plan.
- Concerned that any initiatives that are low priorities will get lost in the plan and not implemented.
- "Action 1.1C: Develop an annual traffic data collection program to systematically monitor traffic volumes and speeds to inform a systematic, objective approach to addressing transportation issues" – Support this action but this should be a high priority as this is required to have baseline information for the Vision Zero strategy.
- Comment that encroachments are a challenge for pedestrian infrastructure.
- "Action 3.3A: Improve transit service" – This section should explicitly recognize that the City does not control transit service and will require working with TransLink.
- "Strategy 4.2: Ensure residential parking appropriately allows residents to park without interrupting the safe movement of people" – This is already an ongoing initiative and is very important to residents and businesses.
- Strategy 4.4: Plan for Zero Emissions Vehicles" – The focus of this section as a high priority should be electric vehicles and planning for this technology.
- Comment that Columbia Street was not identified as a transit corridor for sidewalk improvements.
- Comment that transit should have improved frequency in the evenings.
- Comment that transit should provide improved connections to the South Surrey Park and Pool, including evening service.
- The plan should ensure it focuses on not only on building infrastructure, but planning for the future such as through bylaw changes to enable future initiatives.

4) Is there anything missing or that you would change?

- High traffic speeds along North Bluff Road adjacent to Centennial Park and from Oxford Street to Martin Street needs speed reduction measures.
- The plan should consider a micromobility program (e-bikes, e-scooters, and bike share).

5) Additional questions / comments

- *Will plug in stalls/scooter battery recharge outlets be available?*
  - It was noted the City will conduct further research to confirm.

- *Who is responsible for painting the bright yellow curbs on pick-up/loading areas on city streets? How long can you be there?*

    - The City is not responsible for painting these lines. Residents sometimes do paint these curbs, although they are not permitted to. The loading times allowed are three minutes for loading/unloading passengers and 30 minutes for materials under section 4(2) of the Street and Traffic Bylaws.

- *How much does the Draft Integrated Transportation and Infrastructure plan align with unique or unusual characteristics of White Rock, for example, the older population or hilly terrain?*
    - The ITIMP is designed to meet the unique needs and context of White Rock, including both demographics and topography. The ITIMP includes several strategies and actions designed to make the transportation system accessible for people of all ages and abilities, including the older population. This includes improving the walking network by adding sidewalks, crosswalks, benches, and other pedestrian amenities. It also looks to create more accessible connections to transit so that people can get around without needing to rely on motor vehicles.

      Regarding topography, the City's hilly geography was considered when planning the future walking and cycling networks. The project team conducted site visits and analyses to identify routes and made changes to specific proposed cycling routes, such as creating a series of routes that avoid the steepest sections. The ITIMP also notes the emergence of e-bikes, which can help to 'flatten' hills, and seeks to make the adoption of e-bikes easier by encouraging secure and electrified bike parking spaces.

- *Has there been a permanent change to the bus routes along Victoria Street?*
    - No, this change has been temporary and was related to the Marine Drive closure for the patio program. The buses along Marine Drive were temporarily relocated to Victoria Street to support the businesses.

- *Does the City have plans to address encroachment issues, for example, for new builds where larger homes are built and people build to the entire front of the lot with a driveway and no curb and gutters?*
    - White Rock has many existing encroachments, such as hedges, gardens, pathways, retaining walls, fences, and staircases, that property owners may have implemented within the public right-of-way to beautify or improve accessibility to the area in front of their home. Encroachments within the public right-of-way impact the ability to provide sidewalks and can reduce sightlines, thus endangering pedestrians.

      The City has an existing Roads/Road Allowance Policy (Policy ID: Operations/Eng. 600) that prohibits encroachments or improvements on the Road Right of Way. Action 2.1B of the ITIMP notes that the City will review and expand on this policy to outline further measures that will improve walking connections and transportation safety. This includes undertaking a community-wide review of encroachments and developing a webpage and information and education materials to support resident awareness around encroachments.

The sidewalk network map identified in Strategy 2.1 of the ITIMP identifies future short-, medium-, and long-term sidewalks throughout the City. This network will provided further basis for enforcing the existing Roads/Road Allowance Policy and preventing future encroachments.

- *The Draft Integrated Transportation and Infrastructure Plan has areas indicated as high, medium and low priority. Does this affect the sequencing of these items?*
  - The identification of priority actions is related to the sequencing of project implementation, but it is not the only factor.

    Section 5 of the plan summarizes the results of an options evaluation and identifies high-, medium-, and low-priority actions. The results of this technical analysis will be combined with the findings of public engagement to then determine implementation priorities in terms of timelines, such as short-term, medium-term, or long-term.

    Additionally, the ITIMP's implementation and phasing strategy will ensure that transportation improvements coincide and are integrated with recommendations from other infrastructure master plans as well as other municipal infrastructure improvements projects. This will help improve efficiency and cost effectiveness.

APPENDIX C:
ISSUES IDENTIFIED BY COMMUNITY MEMBERS

White Rock Transportation Issues - Master List

ID#	Category	Location	Issue	From	Description	Action By	ITIMP Action	Study at specific location if required (Separate Task)
1	Parking	1500 block Kent St. School zone	loading/unloading of passengers (school zone). Parking prohibited requested	Ralph Volkens (2020-01-22)	Loading/unloading in No Stopping zone.	USL	Provide general recommendations for parking/loading/unloading zones	Parking review
2	Safety	15800 block Roper Ave. School zone	Passenger loading creates unsafe situations.	Ralph Volkens (2020-01-22)	Driveways blocked, inefficient parking as stall markings faded.	USL	Provide general recommendations for parking/loading/unloading zones	Parking review
3	Safety	1200 block Fir St. School zone	Passenger loading creates unsafe situations.	Ralph Volkens (2020-01-22)	Driveways blocked. Illegal left hand turns from school lot.	USL	Provide general recommendations for parking/loading/unloading zones	Parking review
4	Parking	14800-15500 block Marine Drive	loading/unloading of goods (deliverys)	Ralph Volkens (2020-01-22)	provide L/UL zones & post restrictions	USL	Provide general recommendations for parking/loading/unloading zones	Curbside management research
5	Parking	1400 block Johnston Rd	Loading/unloading, Drop off Zone	Ralph Volkens (2020-01-22)	Frequently occurs at Rexall pharmacy, and Bosa highrise	USL	Provide general recommendations for parking/loading/unloading zones	Curbside management research
6	Safety	15600 block Finlay St/Marine Dr.	Dangerous exiting onto Marine Dr.	Ralph Volkens (2020-01-22)	Sightline obstructed. Access Marine Drive from Maple St. instead.	USL	Provide general guidance on addressing sightline issues and its importance (i.e., the City to consider developing a program to continuously monitor specific locations)	Sightline review
7	Safety	15000 block Victoria plus many others...	Parking on boulevards.	Ralph Volkens (2020-01-22)	Sightlines/pedestrian access, fire hydrants, stop signs obstructed. Boulevard/Road edge damage.	USL	Provide general guidance on addressing sightline issues and its importance (i.e., the City to consider developing a program to continuously monitor specific locations)	Sightline review Locations to be clarified: any other locations in
8	Parking	15100 block Marine Drive	Parking other than parallel to traffic.	Ralph Volkens (2020-01-22)	Unsafe parking. Occurs elsewhere too ie. 15500 block of Victoria Ave.	USL	Provide general guidance on addressing sightline issues and its importance (i.e., the City to consider developing a program to continuously monitor specific locations)	Sightline review
9	Parking	Town Centre	Relocation of vehicles to avoid time limits	Ralph Volkens (2020-01-22)	Does not provide intended turnover of parking stalls.	USL	Provide general recommendations for parking	Parking review
10	Other	14000 block Magdelan Ave.	Dead end with no cul-de-sac	Ralph Volkens (2020-01-22)	No room to turn around, but parking not restricted.	USL	Provide general recommendations for parking	Geometry/Parking Review
11	Safety	14000 block Malabar Cresc.	Sightline/limited vision of oncoming traffic	Srood Omer (2020-01-22)	Trees on the corner restricting vision and posing the stopped vehicle at hazard	USL	Provide general guidance on addressing sightline issues and its importance (i.e., the City to consider developing a program to continuously monitor specific locations)	Sightline review
12	Traffic	15000 block North Bluff Rd.	Bus stops	Srood Omer (2020-01-22)	Excessive delay/backup when bus pulls up	USL	Provide general recommendations for transit / auto operations	Transit/traffic Study
13	Other	15000 block Buena Vista Ave.	Bus stop landing	Srood Omer (2020-01-22)	Lack of landing at most bust stops/sidewalk being used as landing	USL	Provide general recommendations for bus stops	Transit stop review (i.e., identify all of the locations that have th
14	Traffic	14000 block Marine Drive	Marine Dr./Magdalen Cres. Intersection	Srood Omer (2020-01-22)	Left turning radi for large vehicle/trucks	USL	Provide general guidelines of intersection geometry	AutoTURN pathway check
15	Traffic	15000 block Victoria Ave	Victoria Ave./Balsam St.	Srood Omer (2020-01-22)	Sharp right turn is difficult/no right turn sign into Balsam St. heading east on Victoria Ave.	USL	Provide general guidelines of intersection geometry	AutoTURN pathway check
16	Cycling	1300 block Best plus many other streets	shared bike lane	Srood Omer (2020-01-22)	Shared veh/bike lane poses safety issues and delay	USL	Bikelane locations to be identified as part of the cycling network	-
17	Traffic/Safety	Roper between Best and Finlay	Speeding/Traffic calming	Hiep Lo (kickoff mtg 2020-01-07)		USL	Provide general recommendations for speed management program	Speed and traffic calming study
18	Traffic/Safety	Phoenix between North Bluff and Malabar	Traffic Calming	Hiep Lo (kickoff mtg 2020-01-07)		USL	Provide general recommendations for speed management program	Speed and traffic calming study
19	Sidewalk	Everall between Thrift and North Bluff	Sidewalk	Hiep Lo (kickoff mtg 2020-01-07)		USL	New sidewalk locations to be identified as part of the recommonded walking network	-
20	Parking	Prospect Avenue between Everall and Oxford	Wider road to permit parking	Hiep Lo (kickoff mtg 2020-01-07)		City	-	-
21	Parking	McDonald Avenue between Oxford and McDon	Wider road to permit parking	Hiep Lo (kickoff mtg 2020-01-07)		City	-	-
22	Parking	Sunset Drive between Magdalen and High	Wider road to permit parking	Hiep Lo (kickoff mtg 2020-01-07)		City	-	-
23	Traffic	Everall between Everall and North Bluff	Crosswalk	Hiep Lo (kickoff mtg 2020-01-07)		USL	Provide general guidance on the usage of pedestrian crossing control devices	Pedestrian crossing control device study. Specific locations requ
24	Sidewalk	Roper between Roper and Martin	Sidewalk request	Hiep Lo (kickoff mtg 2020-01-07)		USL	New sidewalk locations to be identified as part of the sidewalk inventory map (not sure about the extent. Roper used twice in the description)	
25	Traffic	Kerfoot between Malabar and Marine	Speeding/Traffic calming	Hiep Lo (kickoff mtg 2020-01-07)		USL	Provide general recommendations for speed management program	Speed and traffic calming study
26	Traffic	North bluff between Martin and North Bluff	Turning left south on Martin	Hiep Lo (kickoff mtg 2020-01-07)		TBD	More information required to determine the issue	
27	Traffic	Johnston between Columbia and Johnston	Crosswalk	Hiep Lo (kickoff mtg 2020-01-07)		USL	Provide general guidance on the usage of pedestrian crossing control devices	Pedestrian crossing control device study. Specific locations requ
28	Traffic	Buena Vista between Stayte and 12 Avenue	White to Surrey crosswalk	Hiep Lo (kickoff mtg 2020-01-07)		USL	Provide general guidance on the usage of pedestrian crossing control devices	Pedestrian crossing control device study.
29	Traffic	Thrift and Kent	4way stop	Hiep Lo (kickoff mtg 2020-01-07)		USL	Provide general guidance on the selection of traffic control devices	Traffic control study
30	Traffic	Foster at Roper	stop signs	Hiep Lo (kickoff mtg 2020-01-07)		TBD	More information required to determine the issue	
31	Traffic	Foster at Prospect	stop signs	Hiep Lo (kickoff mtg 2020-01-07)		TBD	More information required to determine the issue	
32	Traffic	Finlay between Victoria and Columbia	Traffic Calming	Hiep Lo (kickoff mtg 2020-01-07)		USL	Provide general recommendations for speed management program	Speed and traffic calming study
33	Traffic/Safety	Thrift between Oxford and Stayte	Truck route and safety review	Hiep Lo (kickoff mtg 2020-01-07)		USL	Provide general guidance on truck routes and goods movement	Truck route and safety study
34	Other	Wheatley	Paving	Hiep Lo (kickoff mtg 2020-01-07)		City	-	-
35	Traffic	Magdalen Avenue between Magdalen Ave and	Speeding traffic	Hiep Lo (kickoff mtg 2020-01-07)		USL	Provide general recommendations for speed management program	Speed and traffic calming study
36	Traffic	Johnston Road New Crosswalk		Hiep Lo (kickoff mtg 2020-01-07)		USL	Provide general guidance on the usage of pedestrian crossing control devices	Pedestrian crossing control device study. Specific locations requ
37	Traffic	Roper Ave and Martin St	4way stop	Hiep Lo (kickoff mtg 2020-01-07)		USL	Provide general guidance on the selection of traffic control devices	Traffic control study.
38	Traffic	Martin and Foster (On Thrift)	Busy intersection & Speeding	Hiep Lo (kickoff mtg 2020-01-07 & 2021-07-16)		USL	Provide general guidance on the selection of traffic control devices	operation and safety study
39	Traffic	Buena Vista Ave and Dolphin St	Speed unsafe	Hiep Lo (kickoff mtg 2020-01-07)		USL	Provide general recommendations for speed management program	Speed and traffic calming study. Speeding on Buena Vista Ave o
40	Traffic	Best St and Vine Ave	cross walk	Hiep Lo (kickoff mtg 2020-01-07)		USL	Provide general guidance on the selection of traffic control devices	Traffic control study
41	Traffic	Marine Drive	Traffic Calming	Hiep Lo (kickoff mtg) / Rosaline Choy (email) 2019-01-07		USL	Study (Identify potential traffic calming measures) completed	
42	Safety	1500 block Russell Avenue	Reduced visibility re. truck traffic at hospital	Hiep Lo (email 2020-02-14)		USL	Provide general guidance on addressing sightline issues and its importance (i.e., the City to consider developing a program to continuously monitor specific locations)	Sightline review
43	Traffic	15000 block Foster Street at Prospect	4-way stop requested	Hiep Lo (email 2020-02-21)		USL	Provide general guidance on the selection of traffic control devices	Traffic control study
44	Traffic	Marine Drive at Oxford Street	Advance turn arrow requested (eastbound, turning up Oxford)	Hiep Lo (email 2020-03-09)		USL	Signal operation review to be conducted as part of the option development	-
45	Traffic	Marine Drive	Enhanced crosswalks (e.g., Finaly and more locations)	Hiep Lo (email 2020-03-09)	Can be studied together with the traffic calming study for Marine Dr	USL	Provide general guidance on the usage of pedestrian crossing control devices	Pedestrian crossing control device study
46	Traffic	Russell Avenue at Best St	Painted crosswalk requested at the 4-way stop	Hiep Lo (email 2020-03-11)		USL	Provide general guidance on the usage of pedestrian crossing control devices	Pedestrian crossing control device study
47	Traffic/Safety	Johnson Road at Buena Vista Ave (5 Corners)	Speeding and drivers overlooking pedestrians. Enhanced pedestrian crossing (flashing beacon and signage) requested	Hiep Lo (email 2020-03-19)		USL	Provide general guidance on the usage of pedestrian crossing control devices	Pedestrian crossing control device study
48	Safety	Victoria Ave and Cypress Street	Review sightlines going south on Balsam Street onto Victoria Avenue and for northbound turning movements.	Hiep Lo (email 2020-05-25)	City is removing two on-street parking spots to address issue, but residents are complaining about removing this parking.	USL	Provide general guidance on addressing sightline issues and its importance (i.e., the City to consider developing a program to continuously monitor specific locations)	Sightline review
49	Safety	Buena Vista at Cliffe	unsafe and causes sightline issues, no sidewalks	Hiep Lo (email 2020-05-27)	The road is not wide enough for 2 way traffic and currently there are no sidewalks	USL	Provide general guidance on addressing sightline issues and its importance (i.e., the City to consider developing a program to continuously monitor specific locations)	Sightline review
50	Traffic	Cliff at Cypress	possibility of installing a 4-way stop control	Hiep Lo (email 2020-05-27)		USL	Provide general guidance on the selection of traffic control devices	Traffic control study
51	Traffic	Nichol Rd between Marine Drive and North Blu	Possibility of speed bump(s) on Nichol Rd just off Marine (btwn Marine and North Bluff). Noted speeding concerns.	Hiep Lo (email 2020-06-17)		USL	Provide general recommendations for speed management program	Speed and traffic calming study
52	Traffic	Maple Street between Marine Dr and Victoria A	Sidewalks and Traffic Calming requested	Hiep Lo (email 2020-07-07)		USL	Provide general recommendations for speed management program	Speed and traffic calming study
53	Traffic/Safety	Marine Dr at Maple Street	Speeding and near misses issue. Enhanced crosswalk requested	Hiep Lo (email 2020-07-07)		USL	Provide general guidance on the usage of pedestrian crossing control devices	Pedestrian crossing control device study
54	Traffic/Safety	Marine Dr at Parker Street	Enhanced crosswalk	Hiep Lo (email 2020-07-07)		USL	Pedestrian Crossing Control Devices Study (Completed)	
55	Traffic/Safety	Ash at Columbia Ave	Illegal parking on Columbia (WB). Speeding (70 km/hr) on Columbia and safety concerns. Concrete barrier requested	Hiep Lo (email 2020-07-16)		USL	Provide general recommendations for speed management program	Speed and traffic calming study
56	Traffic/Safety	1300 block Foster St	Speeding issue. No sidewalk	Hiep Lo (email 2020-07-21)		USL	Provide general recommendations for speed management program	Speed and traffic calming study
57	Traffic/Safety	Fir and Thrift	4-way stop requested (to be consistent with adj intersections and improve safety)	Hiep Lo (email 2020-07-21)		USL	Provide general guidance on the selection of traffic control devices	Traffic control study
58	Traffic/Safety	15500 block Victoria Ave	Speeding. Cement barriers requested	Hiep Lo (email 2020-07-27)		USL	Provide general recommendations for speed management program	Speed and traffic calming study
59	Traffic/Safety	Balsam & Finlay	Unclear signage at the intersection	Hiep Lo (email 2020-08-10)		USL	Provide general guidance on the selection of traffic control devices	Traffic control study
60	Traffic/Safety	Fir and Columbia	4-way stop added (a traffic incident occurred)	Hiep Lo (email 2020-08-24)		USL	Provide general guidance on the selection of traffic control devices	Traffic control study
61	Traffic/Safety	900 block Kent St south of Pacific Ave	Traffic calming measures requested	Hiep Lo (email 2020-08-25)		USL	Provide general recommendations for speed management program	Speed and traffic calming study
62	Parking/Safety	SE corner of McDonald Ave and Anderson St	Removal parking requested	Hiep Lo (email 2020-10-13)	Parking near the intersection blocks drivers view	USL	Provide general guidelines of intersection geometry and parking	Sightline review
63	Safety	Columbia at Fir	"Stop ahead" sign requested	Hiep Lo (email 2020-10-21)	Drivers potentially failed (or come too close) to yield to pedestrians	USL	Provide general guidelines of intersection geometry and signage	Intersection geometry / signage review
64	Traffic/Safety	Columbia at Johnston	Marked crosswalk requested	Hiep Lo (email 2020-10-30)		USL	Provide general guidance on the usage of pedestrian crossing control devices	Pedestrian crossing control device study
65	Safety	Phoenix St & North Bluff	Limited sightlines due to pared large vehciles	Hiep Lo (email 2020-11-04)		City	Installed a "no parking" sign min. 10m from the intersection (Completed)	
66	Safety	Nichol Rd & Marine Dr	all-way stop requested	Hiep Lo (email 2020-11-13)	Stop signs requested. Speeding issue/near misses with ped	USL	Provide general guidance on the selection of traffic control devices	Traffic control study
67	Safety	Roper Ave and Foster St	all-way stop requested	Hiep Lo (email 2020-11-16)	Speeding suspected. Parked veh blocking drivers' views and grades.	USL	Provide general guidance on the selection of traffic control devices	Traffic control study & Intersection geometry check
68	Safety	800 Blk Finlay	Traffic calming & One way Street Requested	Hiep Lo (email 2021 multiple dates)	Near misses occurred due to steep slop and high pedestrian incl. children activities (requested multiple times c	USL	Provide general guidance on the selection of traffic calming devices	Traffic calming study
70	Safety	Oxford St between North Bluff and Thrift	Traffic calming requested	Hiep Lo (email 2021-01-21)	Speeding and traffic calming requested	USL	Provide general guidance on the selection of traffic calming devices	Traffic calming study
71	Parking	Prospect Cres at Roper Ave	Stopping regulation	Hiep Lo (email 2021-02-01)	"No stopping" instead of "No parking" signs requested	USL	Provide general recommendations for parking	Parking review
72	Cycling	136 St/Bergstrom Rd & Blackburn Ave	Cycling facilities requested - Surrey connection	2021 January Online Survey	No cycling facilities/connection to Surrey; cycling facilities (bike lanes or path) requested to connect to Surrey			
73	Cycling	Nichol Rd & Laurel Ave	Cycling facilities requested - Surrey connection	2021 January Online Survey	No cycling facilities/connection to Surrey; cycling facilities (bike lanes or path) requested to connect to Surrey			
74	Cycling	Marine Dr	Cycling facilities requested - Safety	2021 January Online Survey	No cycling facilities along what is a dedicated cycling route; sharrows are not safe enough; provide dedicated cycling facilities (e.g. cycle tracks)			
75	Cycling	Mann Park Cres & Archibald Rd	Cycling facilities requested - Surrey connection	2021 January Online Survey	No cycling facilities/connection to Surrey; cycling facilities (bike lanes or path) requested to connect to Surrey			
76	Traffic/Safety	Marine Dr (between Anderson & Bay)	Traffic volumes and speeding	2021 January Online Survey	Speed bumps requested: Speeding along this stretch of Marine Dr (& in summer, nightly drag races); no yielding to peds at crosswalks			
77	Cycling	14716 Russell Ave	Barriers to cycling	2021 January Online Survey	Cycling path has barriers on it that make cycling difficult; request to remove baffle gates			

78	Traffic/Safety	Oxford St & North Bluff Rd	Traffic volumes, speeds, congestion & Intersection safety	2021 January Online Survey	Traffic backed up in all directions causes vehicle and transit delays; congestion making left turns high risk; requesting left-turn arrows on traffic lights & possible re-alignment for improving visibility of oncoming traffic			
79	Cycling	Martin St (near 16 Ave)	Cycling facilities requested	2021 January Online Survey	Poor cycling facilities (just a sharrow and signs); no bike lanes/paths; separated cycling facilities requested			
80	Cycling/Sidewalk	Russell Ave & Foster St	Active transportation pathway requested	2021 January Online Survey	Pedestrian/cycling pathway is requested along Russell Ave in the green space between Foster St & Martin St; no active transportation facilities here			
81	Cycling/Safety	Thrift Ave	Cycling facilities requested	2021 January Online Survey	No bike lanes/paths, only sharrows, along a main biking route. Doesn't make cycling accessible/safe. Requesting fully protected (concrete) & separated bike lanes on both sides of Thrift.			
82	Traffic/Safety	Foster St (between Buena Vista & Roper)	Traffic volumes, speeds & Intersection safety	2021 January Online Survey	Speeding by all motor vehicle types in both directions. Crossing intersection at Foster & Roper is dangerous for peds & drivers due to slopes and speeding. Requested: speed bumps in several locations along stretch, narrow road (especially at Foster & Prospect), add sidewalk bulges at crosswalk for ped saftey, add raised crosswalks. Restrict access to Foster from Buena Vista (no left turns from Buena Vista).			
83	Traffic/Safety	Johnston Rd (between 16 Ave & Russell Ave)	Unsafe mid-block corsswalk	2021 January Online Survey	Requesting improvement to midblock crosswalk "before pedestrian is killed". Many near misses at mid-block crosswalk; cannot see peds until they have entered street. Unsafe conditions for pedestrians due to speeding vehicles, traffic congestion & visibility problems (parking in lane, tall vegetation on both sides of side walk).			
84	Transit	Columbia Ave (near Fir St), Centre St	Unreliable bus, Bus routes don't serve destination	2021 January Online Survey	Requesting bus service improvements for this neighborhood. Transit stops #56278 & #56299 used to provide good service to area & to/from Vancouver. Changes in service ~2 years prior has resulted in reduced bus service/public transit options, longer walking distances to North side of city hall, and more requires more transfers. Requesting more consistent service to Centre St stops, added routes along Fir St with more direct access to/from the beach to the transit hub at 152 and 16th.			
85	Sidewalks/Safety	Marine Ln (Near Dolphin St)	Narrow sidewalks	2021 January Online Survey	Sidewalks are too narrow for safe use. Pedestrians must enter road to pass each other. Requesting sidewalk wide enough for strollers/wheelchairs to pass each other.			
86	Traffic	Pacific Ave (between Balsam & Dolphin) & Roya	Road signage needed to prevent traffic & speeding	2021 January Online Survey	Better signage is needed along Pacific Ave to direct traffic to beach. Signage needs to tell drivers there is no access along Royal, Balsam, Cypress & Dolphin to the beach. Currently, drivers try to access beach on these roads and causes speeding along these roads.			
87	Parking	Royal Ave	Inadequate space for parking	2021 January Online Survey	Inadequate space for on street parking along Royal Ave, allegedly due to requirement that new homes extend lawns to road edge. Requesting more room for on-street parking in front of new homes.			
88	Traffic/Parking	Balsam St	Inadequate space for parking	2021 January Online Survey	Inadequate space for vehicles to drive down Balsam St between cars parked on both sides of roadway (since cars can't park on the lawn which comes right out to the road). Requesting that parking be limited to one side, or allow cars to park in the lawn area.			
89	Other	Pacific Ave (between Finlay & Balsam)	Overweight vehicle spills	2021 January Online Survey	Overweight vehicles spill cargo on hill (cement, gravel, mud, etc.) & causes City staff to clean up frequently. Requesting more discouragement for overweight vehicles on using Pacific Ave.			
90	Sidewalks/Cyclin	Pacific Ave & Finlay St	Active transportation pathway requested	2021 January Online Survey	Walking problems: no pathway. Requesting a pathway at the location where one was shown on the survey map at this location, since it doesn't exist.			
91	Sidewalks	Finlay St (Near Victoria Ave)	Sidewalk request	2021 January Online Survey	No walking path on lower end of Finlay St. Requesting sidewalk/pathway to access the beach along Finlay St.			
92	Cycling	Thrift Ave	Cycling facilities requested	2021 January Online Survey	No bike lanes/paths along a main biking route. Doesn't make cycling accessible/safe. Requesting dedicated, safe, separated cycling facilities along street. Requesting that the new transport plan include/mentions cycling upgrades to this street.			
93	Sidewalks	Roper Ave (between Parker & Kent)	Sidewalk ends abruptly	2021 January Online Survey	Sidewalk ends apbruptly. Request to continue sidewalk west to Finlay St.			
94	Cycling	Buena Vista Ave (Near Parker St)	Cycling facilities requested	2021 January Online Survey	No bike lanes/paths along Buena Vista. Requesting safe, separated cycling facilities (recommending a separated cycle track).			
95	Cycling	Buena Vista Ave (Near Kent St)	Cycling facilities requested	2021 January Online Survey	No bike lanes/paths along Buena Vista. Requesting safe, separated cycling facilities.			
96	Cycling/Safety/Si	160 St (Near Buena Vista Ave)	Safety improvements to shared path	2021 January Online Survey	Shared path is too narrow & visibility problems are causing near misses with vehicles backing out of driveways. Path narrows to 2m in multiple areas & there are visibility problems including obstructions like bus benches. Requesting widening to TAC recommendation of 3m for shared path, & improvements to visibility for safety.			
97	Cycling/Safety	Kent St & Pacific Ave	Intersection improvements	2021 January Online Survey	2014 Plan suggests bike route along Kent St, but intersections are not safe for this purpose. Kent St is a good route for local bike path, but requires intersection improvements for safety, especially Pacific Ave & Kent.			
98	Cycling	Kent St	Cycling facilities requested	2021 January Online Survey	No bike paths/lanes. 2014 Plan suggests bike route along Kent St. Requesting safe dedicated cycling facilities along Kent St (recommending "cycling tracks").			
99	Transit	King George Blvd & 24 Ave	Bus not accessible, No bus service for retirement home	2021 January Online Survey	Bus stop is not accessible to retirement homes near 2466 King George Blvd. Nearest stop is too far/hilly to access. Plus trucks/cars speed, drag race, & loud loud mufflers night and day going up incline.			
100	Safety/Parking	Thrift & Johnson	Safety issues especially for crossing children	Hiep Lo (email 2021-02-17)	Challenging to children to cross due to vehicle speeding, poor visbility etc. Ped signal requested. Also removal of the 2-3 parking spaces on the north side of Thirft requested	USL	Provide general guidiance on traffic control and parking	Traffic control device study and parkings study
101	Safety	All Roads	30km/hr Requested	Hiep Lo (email 2021-02-18)	City-wide 30km/hr posted speed limit requested	USL	Provide general discussions on selection of posted speed	A few studies completed to date (i.e., speed review and crossing
102	Safety/Parking	Oxford and Everall near Baptist Centre	removing on-street parking requested	Hiep Lo (email 2021-03-22)	sightline (parked veh blocking drivers' view)	USL	Provide general guidiance on sightlines and on-street parking	Parking study
103	Traffic	Fir & Columbia	four-way stop requested	Hiep Lo (email 2021-03-23)	Safety concern	USL	Provide general guidiance on traffic control	Traffic control study
104	Traffic	Playground zone 15400 Blk Roper	30km/hr Requested	Hiep Lo (email 2021-03-24)	Speeding / safety concern	USL	Provide general discussions on traffic calming	Speed study
105	Safety	Blackburn and Bergstrom	Crosswalk requested	Hiep Lo (email 2021-03-25)	Ped crossing signs and crosswalks requested	USL	provide general discussions on crosswalks	Pedestrian crossing study
106	Parking	Bishop & Marine and Bishop & North Bluff	Streets too narrow for parking	Hiep Lo (email 2021-04-20)	Sightline issues	USL	provide general discussions on sighlines	Slightline review
107	Safety	Columbia & Fir	Sightline	Resident (USL Site Visit 2021-04-21)	Sightlines issues & Topography	USL	provide general discussions on sighlines	Slightline review
108	Other	Columbia & Fir	Signage	Resident (USL Site Visit 2021-04-21)	Wayfinding sign is confusing			
109	Safety	Laneways (i.e., Columbia Lane)	Speeding concern	Resident (USL Site Visit 2021-04-21)	Speeding issues along laneways	USL	Provide general discussions on traffic calming	Speed study
110	Safety	Laneways (i.e., Columbia Lane)	Tight Turning Lane	Resident (USL Site Visit 2021-04-21)	Tight turning radius for trucks with damages occuring to the curb	USL	typical cross-section	
111	Safety	south leg of Johnston & Victoria	ped facility requested	Resident (USL Site Visit 2021-04-21)	No dedicated pedestrian facility and curving roadway is dangerous for crossing	USL	provide general discussions on crosswalks	Ped crossing device study
112	Parking	parking issues	No parking signs requested and safety concerns	Hiep Lo (email 2021-04-26)	No parking signs requested and safety concerns	USL	Provide general parking regulation discussions	Parking Study
113	Safety	Clombia in front of Emerson Park	Playground signs requested	Hiep Lo (email 2021-05-10)	Speeding issues along Colmbia	USL	Provide general discussions on traffic calming	Speed study
114	Sidewalk	1321 Foster St	Sidewalk on Foster St and a letdown requested	Hiep Lo (email 2021-05-10)	Accessibility	USL	Provide general guidelines on sidewalks	Sidewalk gap study
115	Safety	McDonald Ave near Oxford	Narrow road	Hiep Lo (email 2021-05-19)	Road is narrow creating chanllenages for vehicles to turn	USL	Road cross-section	Roadway design
116	Safety	Columbia/Victoria between Fir and Vidal	Speeding on Victoria's downhill	Hiep Lo (email 2021-05-19)	Speeding	USL	Provide general discussion on traffic calming	Speed study
117	Other	Fir/Columbia and Centre/Columbia	Signage	Hiep Lo (email 2021-06-10)	Wayfinding sign is confusing		This is the same item as #108	
118	Traffic	Fir/Columbia	Speed limit change ahead warning sign requested	Hiep Lo (email 2021-06-10)	Claims that a warning sign is required unless the posted speed is not enforceable		This is not true that a speed limit change warning sign is required in order to enforce speed limits.	
119	Safety	Fir/Columbia	Speeding	Hiep Lo (email 2021-06-10)	Drivers on Fir fail to stop (potentially due to slope)	USL	Provide general discussions on traffic calming & sightline requirements	Traffic control and geometry review
120	Safety	Fir/Columbia	Speeding	Hiep Lo (email 2021-06-10)	Speeding from southbound left to eastboundbound on Columbia	USL	Provide general discussions on traffic calming	Speed study
121	Cycling	Fir	No cycling demand on Fir	Hiep Lo (email 2021-06-10)	No cycling demand on Fir and signs are not clear and requested Centre as a bike route	USL	Fir has been removed as part of the greenway network in this update	
122	Safety	Johnston/Columbia	Dangerous for pedestrians walking on Johnston	Hiep Lo (email 2021-06-10)	Ped have to share the space with vehicles to walk	USL	Provide typical cross-sections	
123	Safety	Victoria/Maple	Existing speed bumps do not go all the way to Maple St	Hiep Lo (email 2021-06-11)	Requested extending traffic calming all the way to Maple St	USL	Provide general discussion on traffic calming	Speed study
124	Parking	800 blk Parker	Removing one side of on-street parking requested	Hiep Lo (email 2021-06-18)	On-street on both sides create safety concerns	USL	Provide general discussion on parking	
125	Safety	Maple btw Marine and Victoria	Speeding, Traffic calming/all way stop requested	Hiep Lo (email 2021-06-21)	Speeding around the cornder	USL	Provide general discussion on traffic calming	Speed study and site visit
126	Parking	15800 Blk Prospect Cr	On-street parking removal requested	Hiep Lo (email 2021-06-24)	Road is too narrow for having on-street parking on both sides	USL	Road cross-section	
127	Safety	Foster/Prospect	4-way stop requested due to speeding issues	Hiep Lo (email 2021-07-05)	Speeding concerns	USL	Provide general discussion on traffic calming and traffic control device selection	Speed study
128	Safety	Georges/Thrift	Traffic signal requested	Hiep Lo (email 2021-07-19)	Safety concern	USL	Provide general discussion on traffic control device selection	Traffic control review
129	Safety	Marine between Nichol and Bergstrom	Speeding issue	Hiep Lo (email 2021-07-19)	Speeding concerns	USL	Provide general discussion on traffic calming	Speed study
130	Safety	Marine west of Pier	Speeding issue	Hiep Lo (email 2021-07-19)	Speeding concerns	USL	Provide general discussion on traffic calming	Speed study
131	Safety	Fir/Thrift	Speeding issue	Hiep Lo (email 2021-07-19)	Speeding concerns	USL	Provide general discussion on traffic calming	Speed study
132	Safety	Fir/Columbia	Drivers ignoring stop signs	Hiep Lo (email 2021-07-19)	Drviers ignore stop signs on Columbia	USL	Provide general discussion on intersection geometry design and traffic calming	Traffic control and geometry review
133	Safety	Thrift/Oxford	Dangerous for pedestrians crossing Ocxford	Hiep Lo (email 2021-08-13)	Sightlines issues & lack of warnings	USL	Provide general discussion on intersection geometry design and traffic calming	Traffic control and geometry review
134	Safety	Finaly/Buena Vista Ave	Speeding issue	Rosaline (email 2021-08-09)	Speeding concerns	USL	Provide general discussion on traffic calming	Speed study
134	Safety	Kent/Buena Vista Ave	Speeding issue	Rosaline (email 2021-08-09)	Speeding concerns	USL	Provide general discussion on traffic calming	Speed study
135	Parking	North end of Kerfoot	Narrow street for parking	Hiep Lo (email 2021-08-18)	Street too narrow for on-street parking	USL	Road cross-section	Roadway design
136	Safety	Stevens (North Bluff and Russell)	Speeding issue	Rosaline (email 2021-10-04)	Speeding concerns	USL	Provide general discussion on traffic calming	Speed study
137	Safety	Thrift/Lee	Speeding issue	Rosaline (email 2021-10-04)	Speeding concerns	USL	Provide general discussion on traffic calming	Speed study
138	Safety	Thrift/Maple	Speeding issue	Rosaline (email 2021-10-04)	Speeding concerns	USL	Provide general discussion on traffic calming	Speed study
138	Safety	Finaly/Buena Vista Ave	Speeding issue	Hiep Lo (email 2021-10-04)	Speeding concerns	USL	Provide general discussion on traffic calming	Speed study
139	Safety	Foster/North Bluff	Dangerous pedestrian crossing	Hiep Lo (email 2021-10-13)	Speeding / geometry	USL	Provide general discussion on intersection geometry design	Traffic control and geometry review
140	Safety	Pacific Ave/Johnston Rd	Speeding / Noise issue	Hiep Lo (email 2021-10-28)	Speeding concerns	USL	Provide general discussion on traffic calming	Speed study
141	Safety	Beachview/Johnston Rd	Speeding / Noise issue	Hiep Lo (email 2021-10-28)	Speeding concerns	USL	Provide general discussion on traffic calming	Speed study
142	Safety	Royal Ave/Johnston Rd	Speeding / Noise issue	Hiep Lo (email 2021-10-28)	Speeding concerns	USL	Provide general discussion on traffic calming	Speed study
143	Parking	Coldicutt Lane from Nichol Rd to east of the Bea	on-street parking removal requst	Hiep Lo (email 2022-01-24)	On-street parking making backing into driveways difficult	USL	Provide general discussion on parking	
144	Safety	Alley of 14000/14100 behind North Bluff Rd	Traffic calming requested	Hiep Lo (email 2022-02-14)	Speeding concerns	USL	Provide general discussion on traffic calming	Speed study
145	Safety	Georges/Thrift	Ped crossing lights request	Hiep Lo (email 2022-02-22)	Speeding concerns	USL	Provide general discussion on pedestrian crossing	Traffic control review
146	Safety	Stayte Rd/Columbia Ave	Sightline / Parking issue	Hiep Lo (email 2022-02-24)	Parking near the intersection blocks drivers view	USL	Provide general discussion on parking	
147	Safety	Roper Ave at Peace Arch Elementary School	Speeding issue	Hiep Lo (email 2022-04-07)	Speeding concerns	USL	Provide general discussion on traffic calming	Speed study
148	Safety	Balsam between Cliff and Pacific	Speeding issue	Hiep Lo (email 2022-05-02)	Speeding concerns	USL	Provide general discussion on traffic calming	Speed study

APPENDIX D:
TRAFFIC ANALYSIS AND MODELLING RESULTS

MEMORANDUM

Date:	August 19, 2020
To:	Rosaline Choy (City of White Rock)
cc:	Brian Patterson (Urban Systems)
From:	Ming Xia (Urban Systems)
File:	1325.0088.01
Subject:	White Rock Integrated Transportation & Infrastructure Plan (ITIMP) Modelling Summary

1.0 INTRODUCTION

This memorandum provides a snapshot of the current road network and traffic operations in the City of White Rock and describes the methodology, assumptions, and findings of traffic modelling work to assess existing and future base traffic conditions. The goal of the traffic modelling was to understand the City's current traffic conditions and future traffic growth, which can then guide options development discussions and analyses as part of the City's Integrated Transportation and Infrastructure Master Plan (ITIMP).

The memorandum contains the following three sections:

- Current Road Network;
- Existing Traffic Conditions; and
- Future Base Traffic Conditions.

2.0 CURRENT ROAD NETWORK

The City of White Rock is bounded by North Bluff Road/16 Avenue to the north, Bergstrom Road/136 Street to the west, Stayte Road/160 Street to the east, and Boundary Bay to the south, respectively. The roads internal to the City boundaries are owned and maintained by the City of White Rock. The roads that are on the boundary with the City of Surrey have shared ownership between the City of White Rock and City of Surrey with boundaries at the centre line. The City has four types of road classifications, as summarized in Table 1 below.

Table 1: White Rock's Road Classification System

Class	Primary Function
Arterial	Regional traffic; connect to highway and MRN (Major Road Network); limited property access
Collector	Cross-town traffic, connector to arterials and major roads, Limited property access for Primary Collector Access to property for Neighbourhood Collector
Local	Access to property
Lane	Access to property; local circulation

Figure 1 illustrates the road network with the classification information in White Rock.

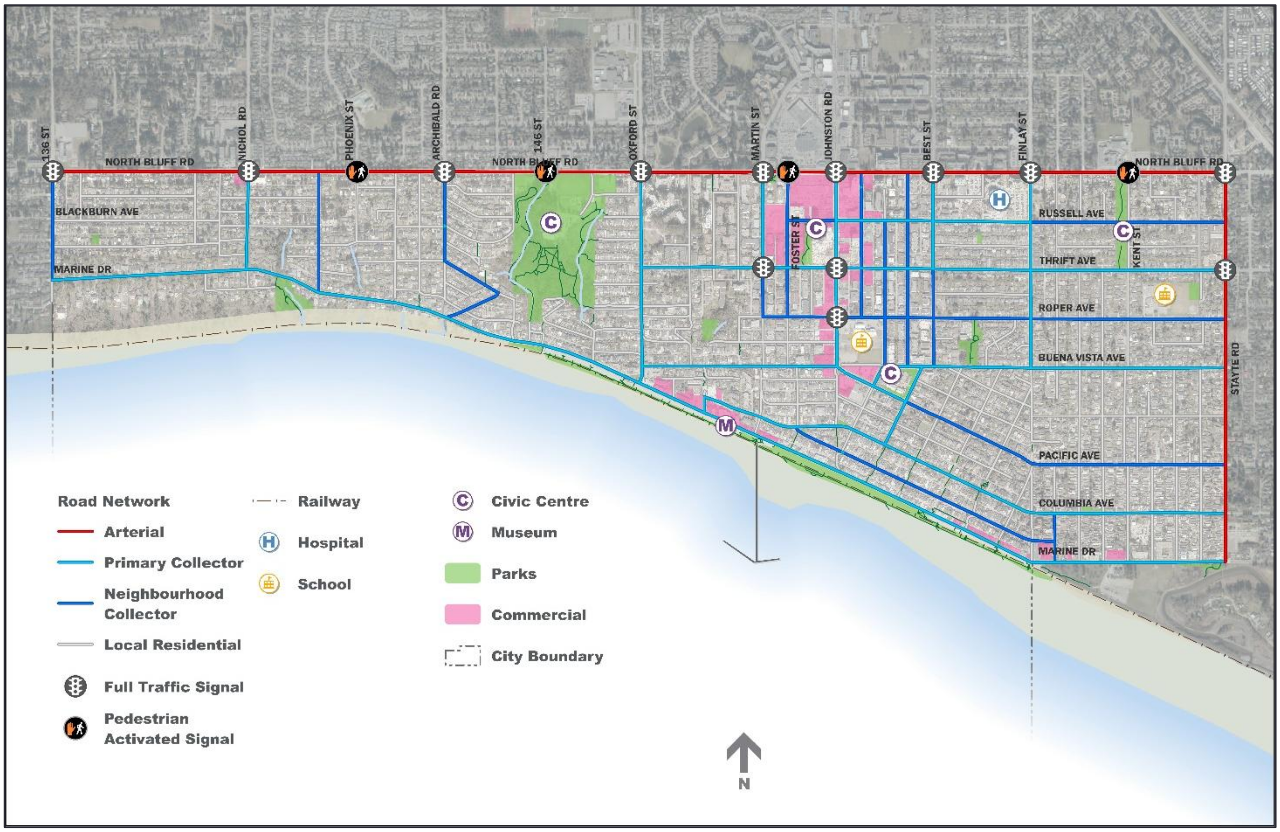


Figure 1: White Rock's Road Network

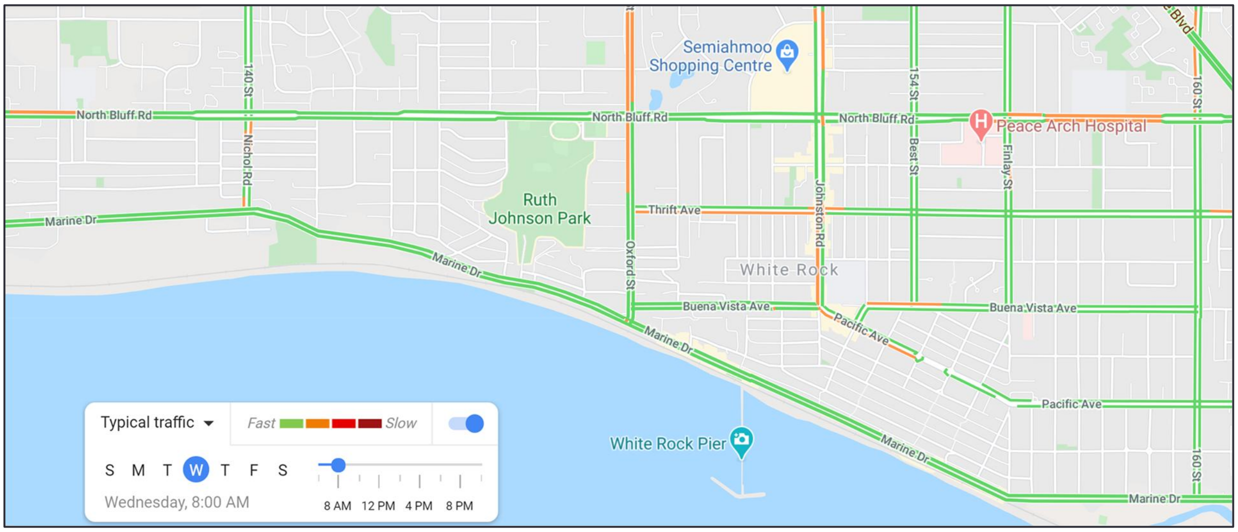
North Bluff Road (bordering Surrey at the centre line) is a four-lane arterial road, with the city of White Rock having ownership on the south half of the road south of the centre line. The collector roads within the City are two-lane roads with turn lanes at certain intersections. Most of the local roads provide two-way travel and some of them do not have a marked centre line.

3.0 EXISTING TRAFFIC CONDITIONS

According to Google Typical Traffic's data illustrated in Figure 2, weekday traffic is relatively light in most of the areas in general. The afternoon (PM) peak hour traffic appears to be slightly heavier than the morning (AM) peak hour traffic. North Bluff Road, Johnston Road, and sections of Oxford Street, Thrift Avenue, Buena Vista Avenue/Pacific Avenue, and Marine Drive experience slower speeds during the PM peak hour. The speed for each colour gradient was estimated by comparing the Google Typical Traffic to the observed travel time provided by Google. As illustrated, the green colours indicate that the corridor segments are operating at or greater than 80% of posted speeds and orange colours indicate between 50% and 80%

of posted speeds[1]. These patterns can be used to highlight the areas of recurring congestion due to peak period traffic volumes.

Typical AM Peak Travel Speed (Wednesday 8:00AM)



Typical Weekday PM Peak Travel Speed (Wednesday 4:00PM)

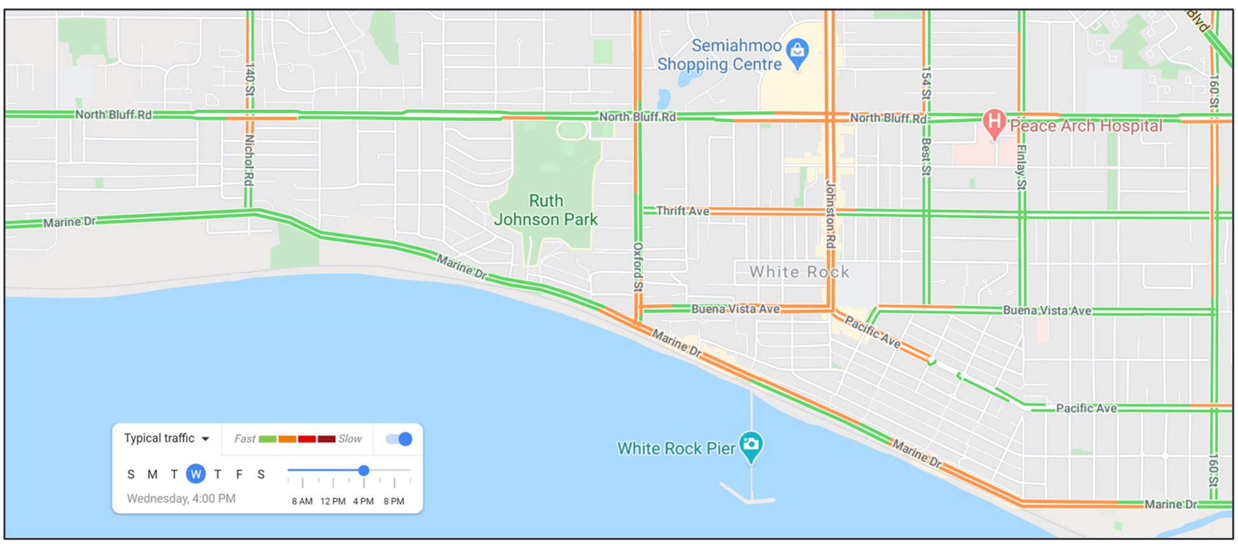


Figure 2: Google Typical Travel Speeds (Wednesday AM and PM Peak Hour)

[1] These estimates are rough approximations but give some indication of locations where travel speeds are slow in the peak periods.

To better understand traffic operations at a corridor level, 24-hour corridor tube counts were collected over one week in February, 2020[2] and were supplemented by the City of Surrey's counts. Figure 3 through Figure 5 illustrate the 24-hour average weekday traffic volume profiles and the two-way average peak hour volumes during the AM (6:00am-9:00am) and PM (3:00pm-6:00pm) peak periods on North Bluff Road, Johnston Road, and Marine Drive.

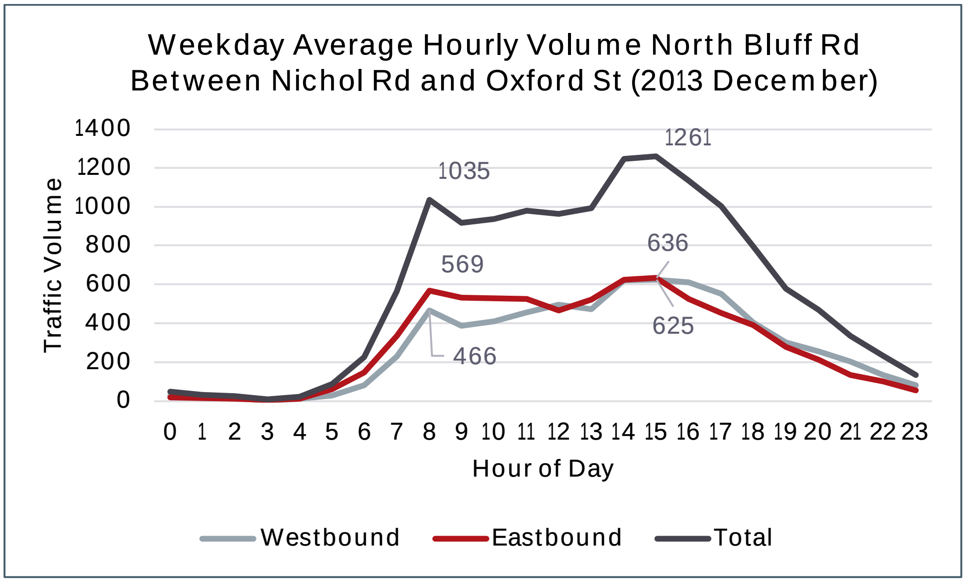


Figure 3: 24-hour Traffic Volume Profile (North Bluff Road between Nichol Road and Oxford Street)

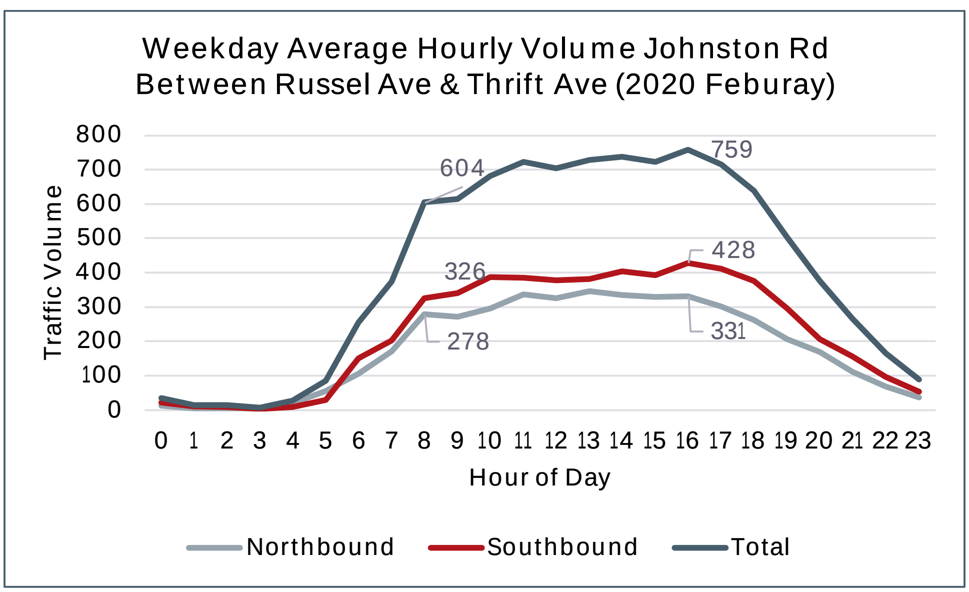


Figure 4: 24-Hour Traffic Volume Profile (Johnston Road between Russel Avenue and Thrift Avenue)

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[2] All traffic counts were collected during BAU (business-as-usual) conditions as they were collected after winter snow conditions and prior to the COVID-19 pandemic shutdowns.

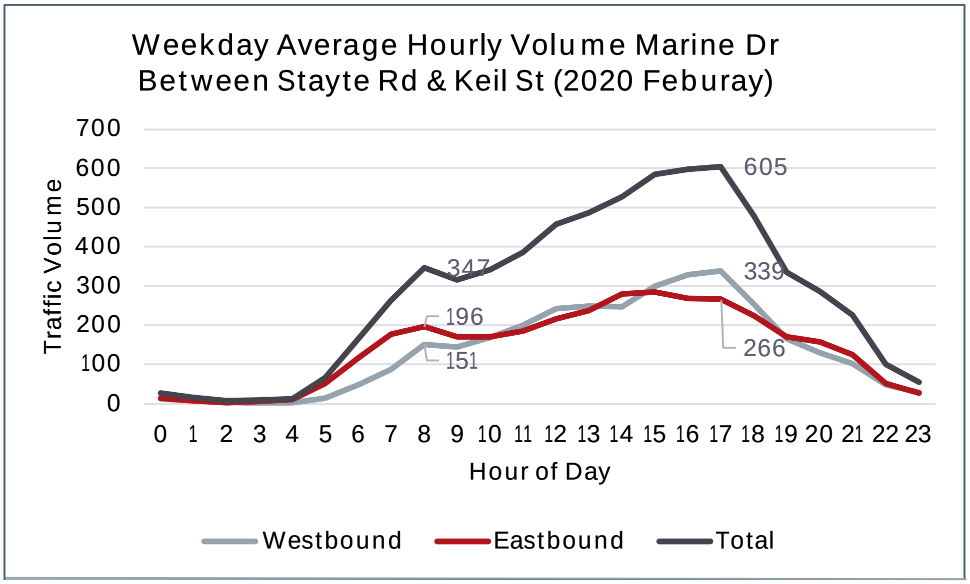

Figure 5: 24-Hour Traffic Volume Profile (Marine Drive between Stayte Road and Keil Street)

The 24-hour traffic volume profiles suggest a balanced traffic pattern, which implies the traffic volumes are similar in each direction. The traffic volume typically reaches its morning peak hour around 8:00am, continues to build up, and reaches its afternoon peak around 4:00pm. At the locations where counts are available, the truck percentages are usually higher on weekdays (approximately 1%) and slightly lower over the weekends (less than 1%).

The *TAC Geometric Design Guide for Canadian Roads (2017)* provides a general range of daily traffic volumes for urban roads by classifications, as summarized in Table 2. While some of the ranges are quite wide (for example, the typical daily traffic volumes on an industrial/commercial collector road can range from 1,000 to 12,000 vehicles per day), these figures can be used as a reference when reviewing the current daily traffic volumes in White Rock.

Table 2: Typical Daily Traffic Volumes for Urban Roads (Source: TAC Geometric Design Guide for Canadian Roads, 2017)

Road Class	Typical Daily Traffic Volume (veh/day)
Major Arterial	10,000 – 30,000
Minor Arterial	5,000 – 20,000
Industrial/Commercial Collector	1,000 – 12,000
Residential Collector	< 8,000
Industrial/Commercial Local	< 3,000
Residential Local	< 1,000

Figure 6 illustrates the average daily traffic at locations with available counts, which are within the typical daily traffic volume ranges for each road class illustrated in Table 2.

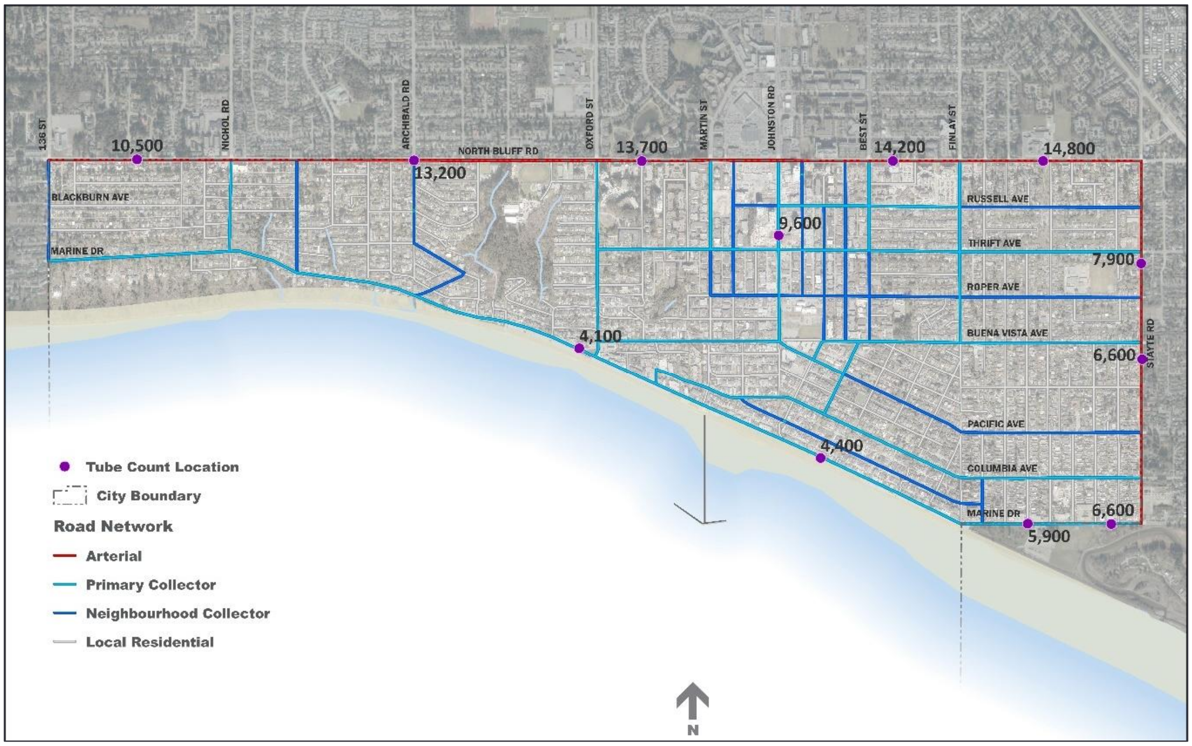

Figure 6: Average Daily Traffic Volume

In addition to 24-hour tube counts, intersection turning movement counts during weekday peak hours were also collected at various locations. Using the 2020 intersection turning movement counts supplemented by historical intersection turning movement counts from the City's previous plan, *2014 Strategic Plan*, 2020 intersection volumes were established. The historical traffic counts from the previous plan have been factored up to current conditions. All intersection volumes have been reviewed and adjusted as needed to ensure that the volumes are generally balanced throughout the corridors. Historical traffic volumes from the 2014 Plan are provided in Appendix A.

AM and PM peak hour corridor volumes are summarized and illustrated in Figure 7.

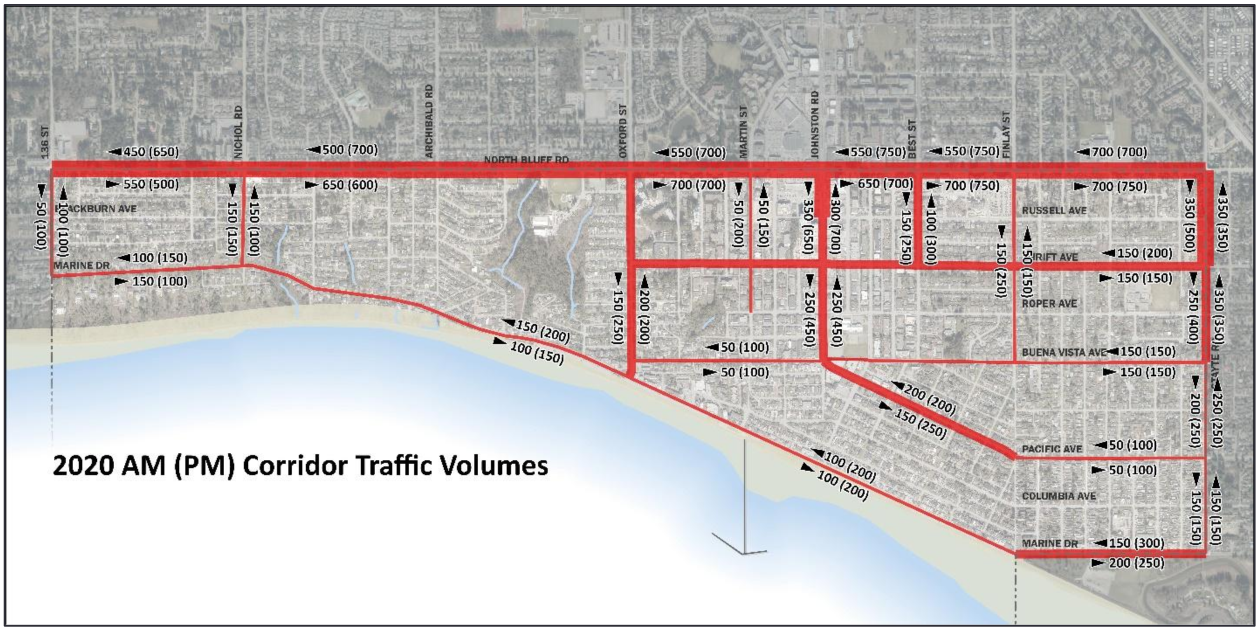

Figure 7: 2020 AM (PM) Corridor Traffic Volumes

Synchro models were developed using the 2020 intersection volumes to calculate LOS (Level of Service). LOS indicates the average delays experienced by motorists and can be reported at an intersection level and at a movement level. According to the Highway Capacity Manual (HCM) 2010, LOS is expressed using letter grades from “A” through “F”, where LOS “A” represents minimal delays, and LOS “F” represents significant delays (80 seconds per vehicle for signalized intersections and 50 seconds per vehicle for unsignalized intersections). LOS “F” often indicates insufficient capacity, and the intersection or movement is likely operating at a failing condition. LOS “D” or better are usually considered as acceptable operational conditions by many agencies.

Figure 8 illustrates the turning movement volumes and associated LOS under the existing conditions.

A review of the Synchro results indicates that:

- Most of the major intersections in the City of White Rock are operating at LOS “D” or better with less than one minute of delay per vehicle; and
- Motorists experience longer delays and queue lengths during the afternoon peak hour.

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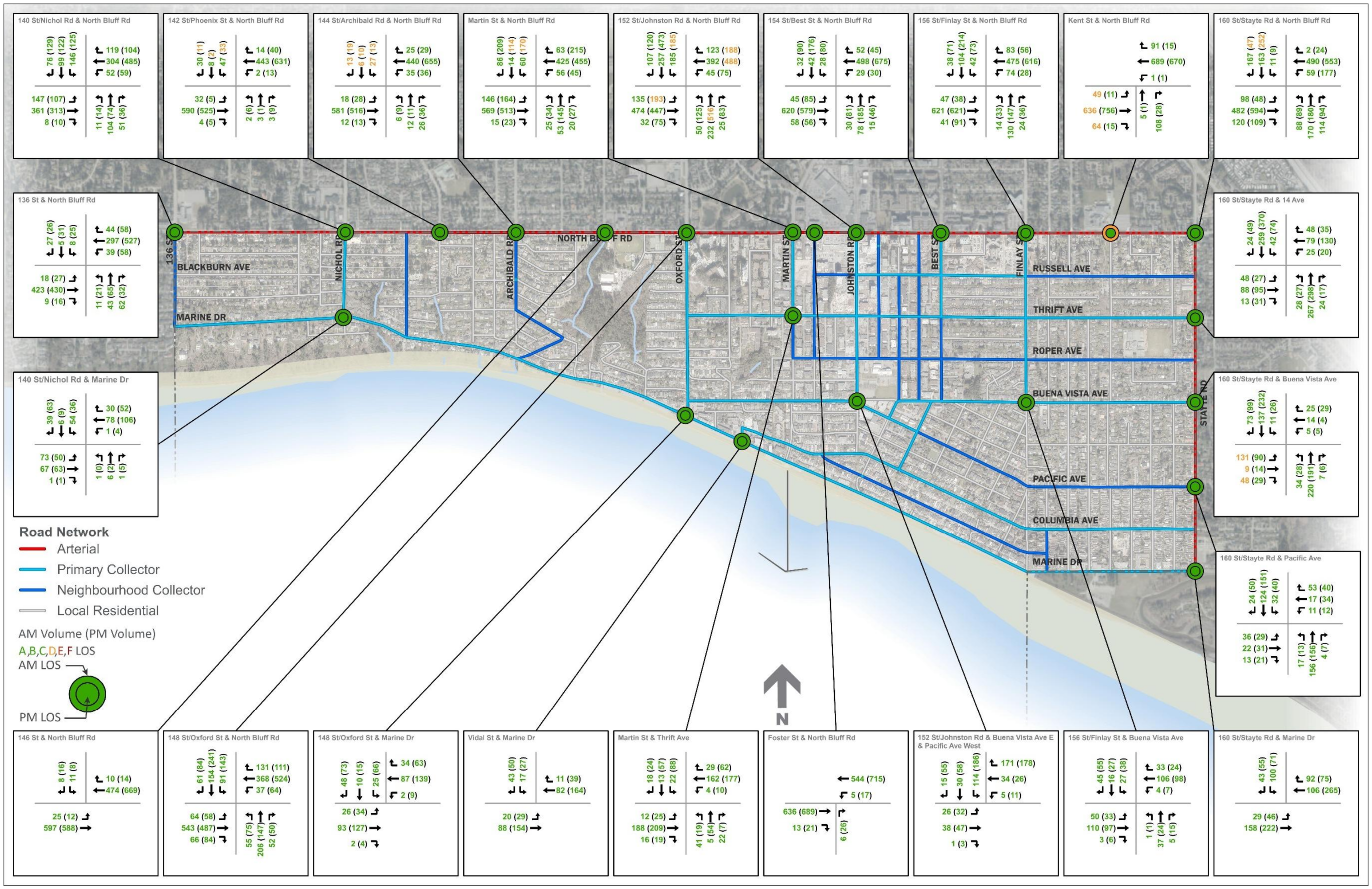

Figure 8: 2020 AM (PM) Peak Hour Volumes and LOS

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4.0 FUTURE BASE TRAFFIC CONDITIONS

This section describes the process of developing future traffic volume growth assumptions and summarizes the findings of future traffic operational assessment.

4.1. FUTURE TRAFFIC VOLUME GROWTH ASSUMPTION

TransLink's Regional Transportation Demand Model (RTM v3.3) was used as a base to determine future traffic volumes. The RTM is calibrated at a screenline level in the Metro Vancouver region. A screenline is an imaginary line typically drawn along features such as rivers and municipal boundaries. Typically, model volume validation is carried out at a screenline level where modelled traffic volumes crossing the screenlines are compared to count data along the same screenlines. Using land use information such as population and employment data, the model can generate vehicle trips by transportation zones and assign them onto the road network. The increase in modelled vehicle trips between the existing and future horizon models is typically used to establish a growth rate. The model package consists of different horizon years. The 2017 and 2050 horizons were used to represent the existing and future horizon years for this assignment, respectively.

4.2. LAND USE

The RTM's 2017 and 2050 land use data at the Traffic Analysis Zone (TAZ) level were sent to the City's Planning Department for validation. A discrepancy in the 2017 population data was identified (approximately 3,000 more than the Census data). Urban Systems contacted TransLink and Metro Vancouver, who were responsible for the data. The model was corrected with updated data provided by Metro Vancouver. The remaining data (2017 employment data, 2050 population and employment data, etc.) was confirmed as valid inputs for modelling purposes.

From the 2017 to the 2050 model, the land use data indicates an increase in population and employment of approximately 52% (1.3% annually) and 18% (0.5% annually), respectively, as shown in Table 3.

Table 3: Updated 2017 and 2050 Population and Employment Assumptions (White Rock)

	2017	2050	Overall Growth (Growth Per Year)
Population	20,469	31,142	52% (1.3%)
Employment	7,473	8,830	18% (0.5%)

A TAZ map and detailed 2017 and 2050 land use data at the TAZ level for the City of White Rock is provided in **Appendix B**.

As South Surrey is anticipated to play an important role in the City of White Rock's traffic patterns, the RTM's land use assumptions for South Surrey were also confirmed with the City of Surrey's Planning Department. The RTM's 2017 land use data was quite different than the City of Surrey's 2019 data. Through conversations with the City of Surrey's staff and Metro Vancouver's Data group, it was identified that the discrepancy was caused by different counting methods. Metro Vancouver has confirmed that the RTM's land use information is valid for this assignment, and therefore, no changes were made to South Surrey's land use data.

The redevelopment of the Semiahmoo neighbourhood, located immediately north of North Bluff Road near Johnston Road, is also likely to impact the City of White Rock's traffic patterns. Therefore, the most recent land use projection (available March 2020) of this redevelopment must be taken into consideration. Summarized in Table 4, the data provided by the City of Surrey includes three projection scenarios: Low, High and Average. The Average scenario was used for the traffic analysis, and a sensitivity test using the High scenario was also conducted.

Table 4: Semiahmoo Development Projection (Source: City of Surrey)

	Existing	Low		High		Average	
		2045	Growth	2045	Growth	2045	Growth
Population	7,500	15,924	+8,424	20,049	+12,549	17,987	+10,487
Employment	127	2,138	+2,011	2,713	+2,586	2,426	+2,299

4.3. MODEL NETWORK

The City of White Rock's road network coded in the RTM was reviewed to ensure all major roads were included and that the road characteristics were properly coded under the existing conditions. For the future base analysis, the future network is assumed to be the same as today's condition (Do Nothing scenario).

4.4. EXISTING MODEL VALIDATION

Several screenlines were established to compare the 2017 model volumes to observed counts. The screenlines were established (see Figure 9) around the City, where traffic counts are available at multiple locations to form the screenlines.

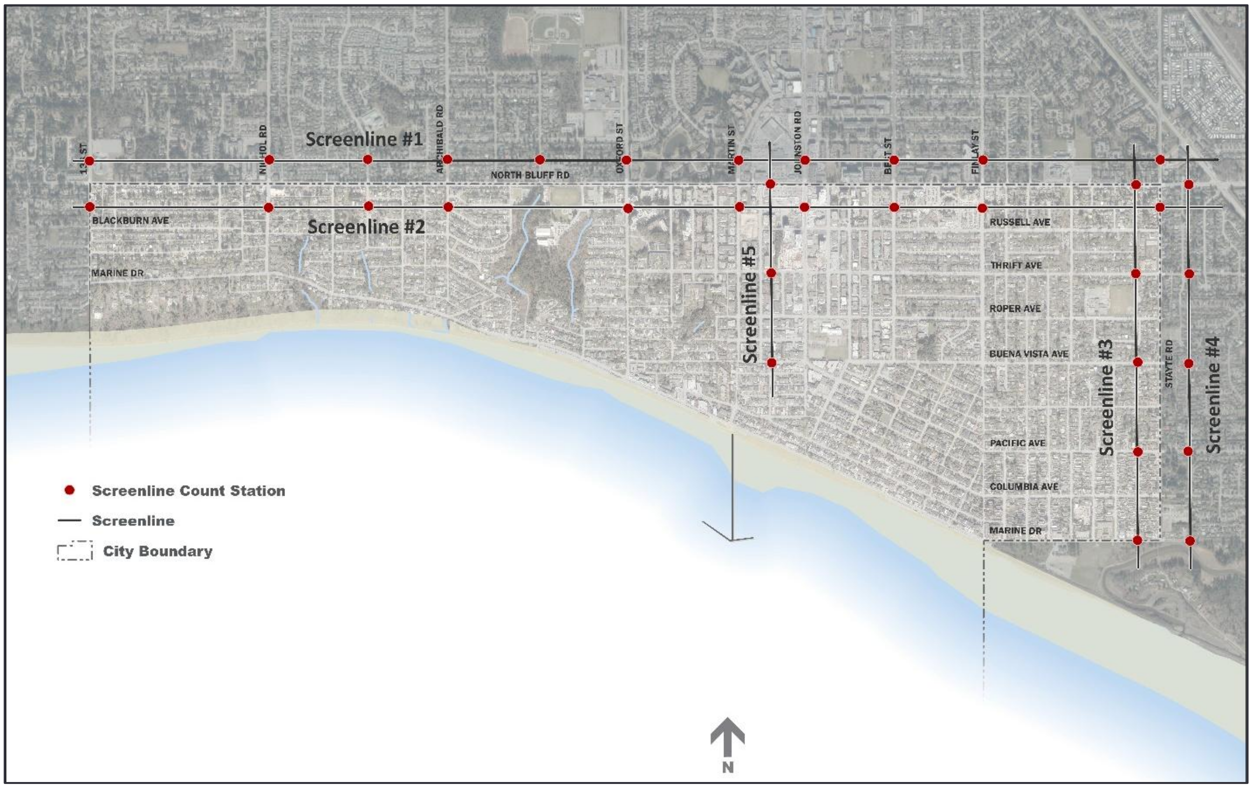

Figure 9: Screenlines for Model Validation

The comparison between the 2017 model results and observed traffic counts indicated that the model results are significantly lower than the observed counts throughout the City. TransLink was consulted regarding this discrepancy. TransLink recommends changing the peak hour assumption because the 24-hour RTM model assumes the entire region has the same peak hours of 7:30am to 8:30am and 3:30pm to 4:30pm. However, the City of White Rock's peak hours are generally approximately 8:00am to 9:00am and 4:00pm to 5:00pm according to traffic counts and the 2017 Trip Diary.

In order to change the peak hour assumption, the slicing factors, which refer to the peak hour splits in the RTM, for each trip purpose, need to be adjusted. For example, using a slicing factor of 0.1 for morning peak means that the morning peak hour traffic volume represents 10% of the daily traffic volume. However, the slicing factors are not only trip purpose based but also direction based, which means each type of trip by purpose has different factors for each direction. For the City of White Rock, 69 slicing factors were coded in the model. Developing accurate slicing factors would mean full access to TransLink's Trip Diary with detailed information on trip purpose during each peak hour. However, this type of information was not available in the Trip Diary package received by Urban Systems. In addition, as the City of Surrey and City of White Rock use the same slicing factors due to model structure, adjusting them would affect the entire network pattern for the City of Surrey. It would require extensive efforts to review and develop new slicing factors for both

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the cities of White Rock and Surrey and to potentially review other adjoining municipalities that may influence traffic through White Rock's transportation network. This would also require more access to the RTM/Trip Diary and all other modelling assumptions that went into TransLink's model development. Thus, it was concluded that only high-level adjustments of slicing factors should be carried out for this task. In the end, slicing factors were adjusted using TransLink's online Trip Diary tool[3], which has peak hour information, and by comparing each model run's results to the observed counts. Ideally, the model results are preferred to be within +/-10% of difference based on best practices. As summarized in Table 5, although the final model run's results are still quite different than the observed counts at some locations, the model results have overall greatly improved from the initial model run.

Table 5: Comparison between Observed Counts and RTM Model Results

AM				
Screenline Description	Direction	Observed Counts	2017 RTM Volume (% change: Model vs Observed)	
			Original Model Run	Final Model Run
Screenline 1 (North of North Bluff Road)	NB	2,388	1,452 (-39%)	1,913 (-20%)
	SB	2,049	1,373 (-33%)	1,742 (-15%)
Screenline 2 (South of North Bluff Road)	NB	1,663	1,715 (+3%)	1,975 (+19%)
	SB	1,578	1,357 (-14%)	1,652 (+5%)
Screenline 3 (East of 160 St)	EB	1,077	914 (-15%)	1,392 (+26%)
	WB	982	788 (-20%)	1,267 (+23%)
Screenline 4 (West of 160 St)	EB	1,146	806 (-30%)	1,284 (-1%)
	WB	1,073	716 (-33%)	1,131 (-6%)
Screenline 5 (West of Johnston Rd)	EB	707	376 (-47%)	486 (-31%)
	WB	598	418 (-30%)	557 (-7%)
PM				
Screenline Description	Direction	Observed Counts	2017 RTM Volume (% change: Model vs Observed)	
			Original Model Run	Final Model Run
Screenline 1 (North of North Bluff Road)	NB	3,048	1,634 (-46%)	2,311 (-24%)
	SB	3,251	1,899 (-42%)	2,742 (-16%)
Screenline 2 (South of North Bluff Road)	NB	2,335	1,777 (-24%)	2,434 (+4%)
	SB	2,624	2,019 (-23%)	2,560 (-2%)
Screenline 3 (East of 160 St)	EB	1,254	932 (-26%)	1,716 (+32%)
	WB	1,365	1,020 (-25%)	1,588 (+13%)
Screenline 4 (West of 160 St)	EB	1,232	888 (-28%)	1,615 (+17%)
	WB	1,231	943 (-23%)	1,557 (+8%)
Screenline 5 (West of Johnston Rd)	EB	797	403 (-49%)	824 (+3%)
	WB	814	521 (-36%)	825 (+1%)

Using the peak hour expansion factors that TransLink provided, daily traffic volumes generated from the City of White Rock were compared to 2017 Trip Diary. As Table 6

[3] 2017 Trip Diary: https://public.tableau.com/profile/translink#!/vizhome/Trip_Diary_2017/TripDiary2017

indicated, the daily model traffic volumes are comparable (within 10% of difference) to the 2017 Trip Diary's information, which confirms that the model's trip generation is valid.

Table 6: Comparison of Daily Trips between RTM and Trip Diary (White Rock)

2017 Trip Diary	2017 RTM	Difference (%)
57,000	62,000	+8%

It is concluded that the traffic information from the RTM is appropriate to use to determine the traffic growth between the existing (2017) and future (2050) horizons. As such, recalibrating the RTM is not required.

4.5. FUTURE CONDITIONS

With the updated models, a model volume comparison under the 2017 and 2050 horizons was made. The model results indicate that the average vehicle trip growths along major corridors and screenlines are generally from 1.0% to 1.5% per year, which aligns with the City's population growth rate (1.3%). Based on the model growth, a growth rate ranging between 1.0% to 1.5% was used to forecast future traffic volumes. Major intersections such as North Bluff Road and Johnston Road are expected to grow at 1.5% per year. A sensitivity test for the Semiahmoo High Growth scenario indicates that the growth assumptions remain in the range of 1.0% to 1.5% per year.

Figure 10 and Figure 11 illustrate the estimated daily traffic volumes under the 2025 and 2045 horizons, respectively. Under the 2025 horizon, the estimated daily traffic volumes are within the typical daily traffic volume ranges from the TAC guide. Under the 2045 horizon, while the traffic volumes on most of the roads are still within the range, the daily traffic volumes on Johnston Road north of Thrift Avenue and Marine Drive just west of Stayte Road may slightly exceed the thresholds.

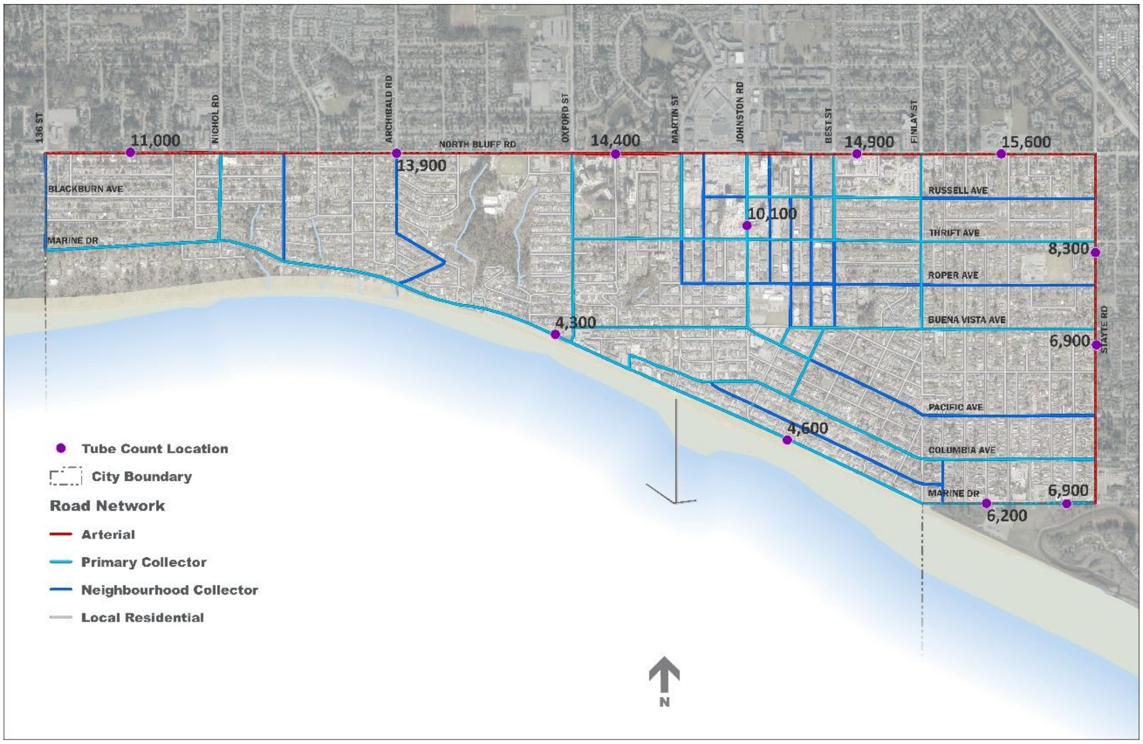

Figure 10: Estimated Average Daily Traffic (2025)

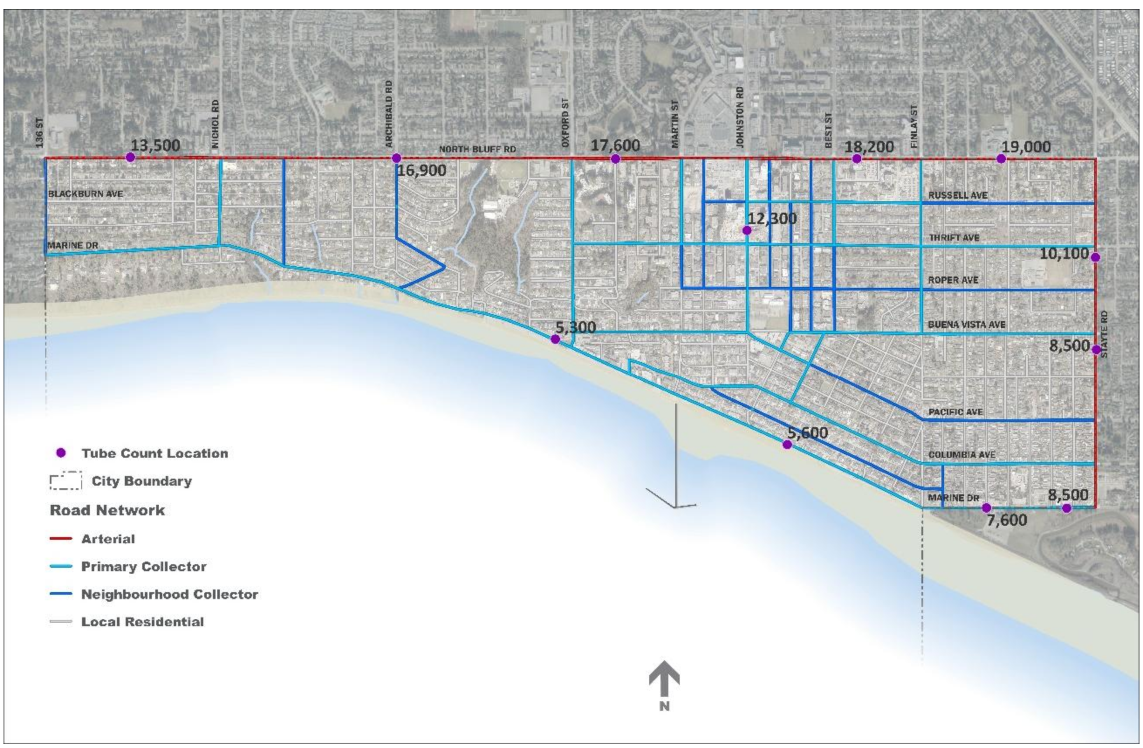

Figure 11: Estimated Average Daily Traffic Volumes (2045)

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Figure 12 and Figure 13 illustrate the estimated corridor peak hour volumes under the 2025 and 2045 horizons, respectively.

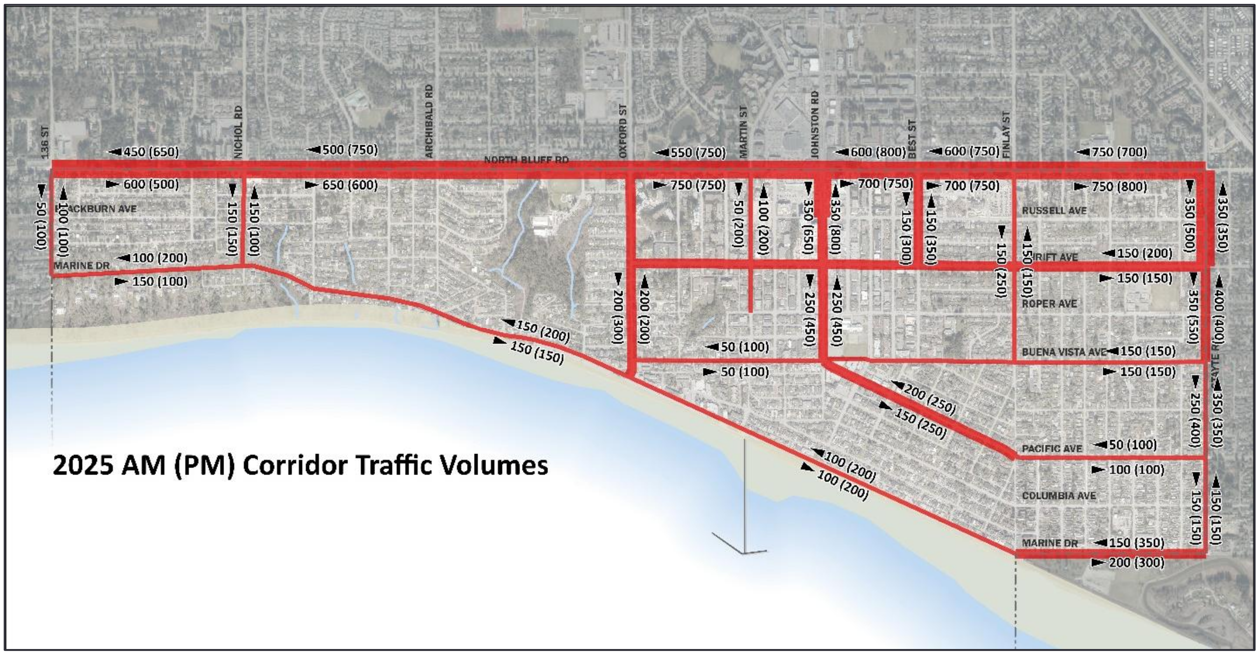

Figure 12: 2025 AM (PM) Peak Hour Corridor Traffic Volumes

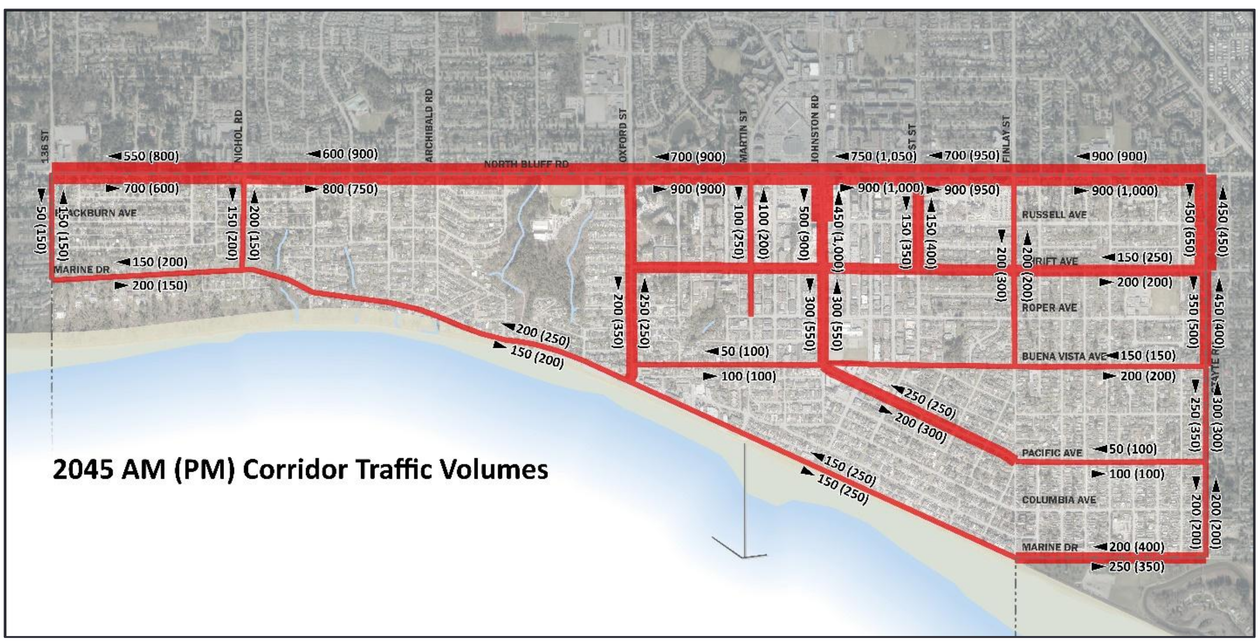

Figure 13: 2045 AM (PM) Peak Hour Corridor Traffic Volumes

Future intersection volumes under the 2025 and 2045 horizons were also developed using the growth assumptions. To assess the traffic operational condition under these two horizons, Synchro models were developed. Figure 14 and Figure 15 illustrate the volume and

LOS under the 2025 and 2045 horizons. The future condition assessment includes signal timing adjustments at major intersections to best accommodate future traffic volumes. Detailed Synchro results are provided in Appendix C.

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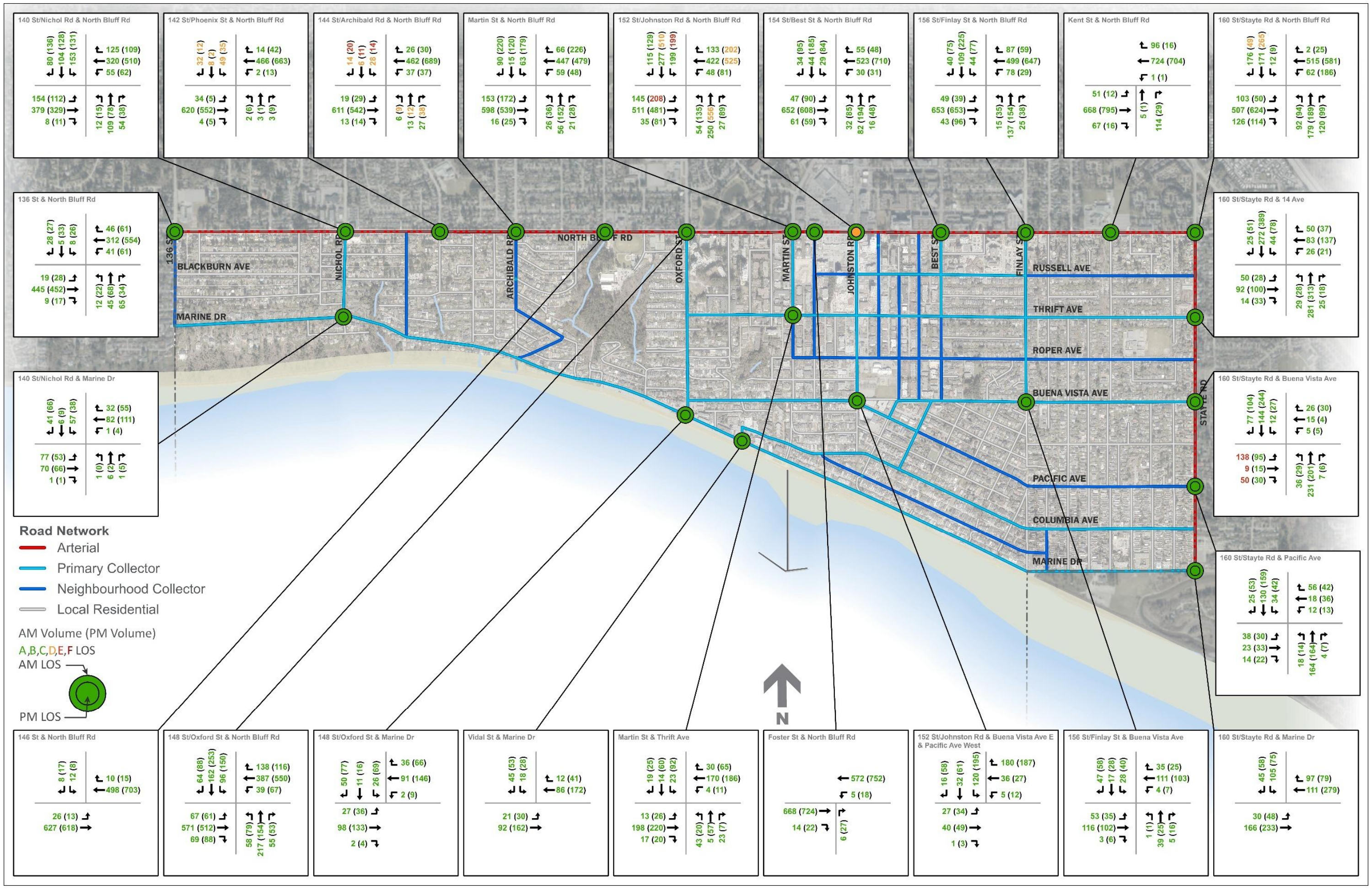

Figure 14: AM (PM) Peak Hour Traffic Volumes and LOS (2025)

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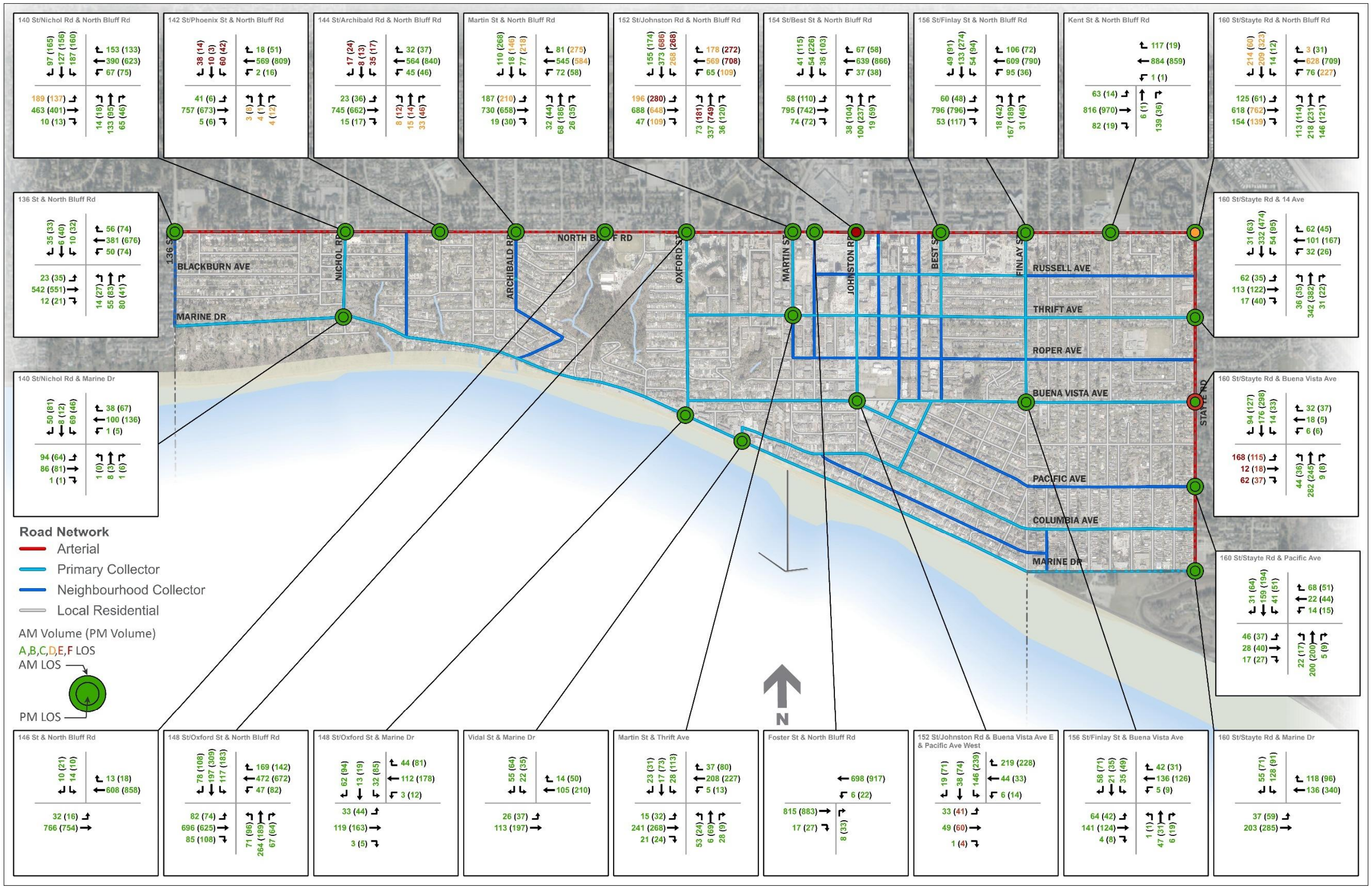

Figure 15: AM (PM) Peak Hour Traffic Volumes and LOS (2045)

A review of the 2025 model results indicates that

- Most of the major intersections are expected to continue to operate at LOS "D" or better at the intersection level;
- Major intersections on North Bluff Road are expected to experience some additional delays especially in the PM peak hour;
- During the PM peak hour, the intersection of North Bluff Road and Johnston Road is expected to operate at LOS "D" at the intersection level. Some movements including eastbound left and southbound left will operate at LOS "E" with approximate one minute of delay per vehicle; and
- Unsignalized intersections at North Bluff Road and Phoenix Street, North Bluff Road and Archibald Road, and Stayte Road and Buena Vista Avenue, are expected to operate at LOS "A" at the intersection level. However, the side streets will operate at LOS "D/E" with approximately 30 seconds of delay per vehicle due to the increased main street traffic volumes.

A review of the 2045 model results indicates that

- While most of the intersections south of North Bluff Road will continue to operate at LOS "D" or better at the intersection and movement level, major intersections along North Bluff Road are expected to experience increased delays;
- During the PM peak hour, the intersection of North Bluff Road and Johnston Road is expected to operate at LOS "F". A few movements will operate at LOS "F" with up to approximately three minutes of delay per vehicle; and
- Unsignalized intersections at North Bluff Road and Phoenix Street, North Bluff Road and Archibald Road, and Stayte Road and Buena Vista Avenue, are expected to operate at LOS "A" at the intersection level. However, the side streets will operate at LOS "E/F" with up to approximately 60 seconds of delay per vehicle due to increased main street's traffic volumes.

5.0 CONCLUSION

Based on the analysis, it was concluded that under the existing condition, the road network and major intersections in White Rock generally provide sufficient capacity and operate at acceptable conditions. Under the future base condition with planned land use growth, a few major intersections are expected to start to see increased delays, particularly on North Bluff Road in the PM peak hour. Under the 2045 condition, the intersection of North Bluff Road and Johnston Road is expected to experience some significantly increased delay in the PM peak hour. The improvements addressing the operational issues identified in this document will be explored during the option development stage.

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Ming Xia, P.Eng, PTOE
Transportation Engineer

Enclosure: Appendix A - C
cc: Brian Patterson

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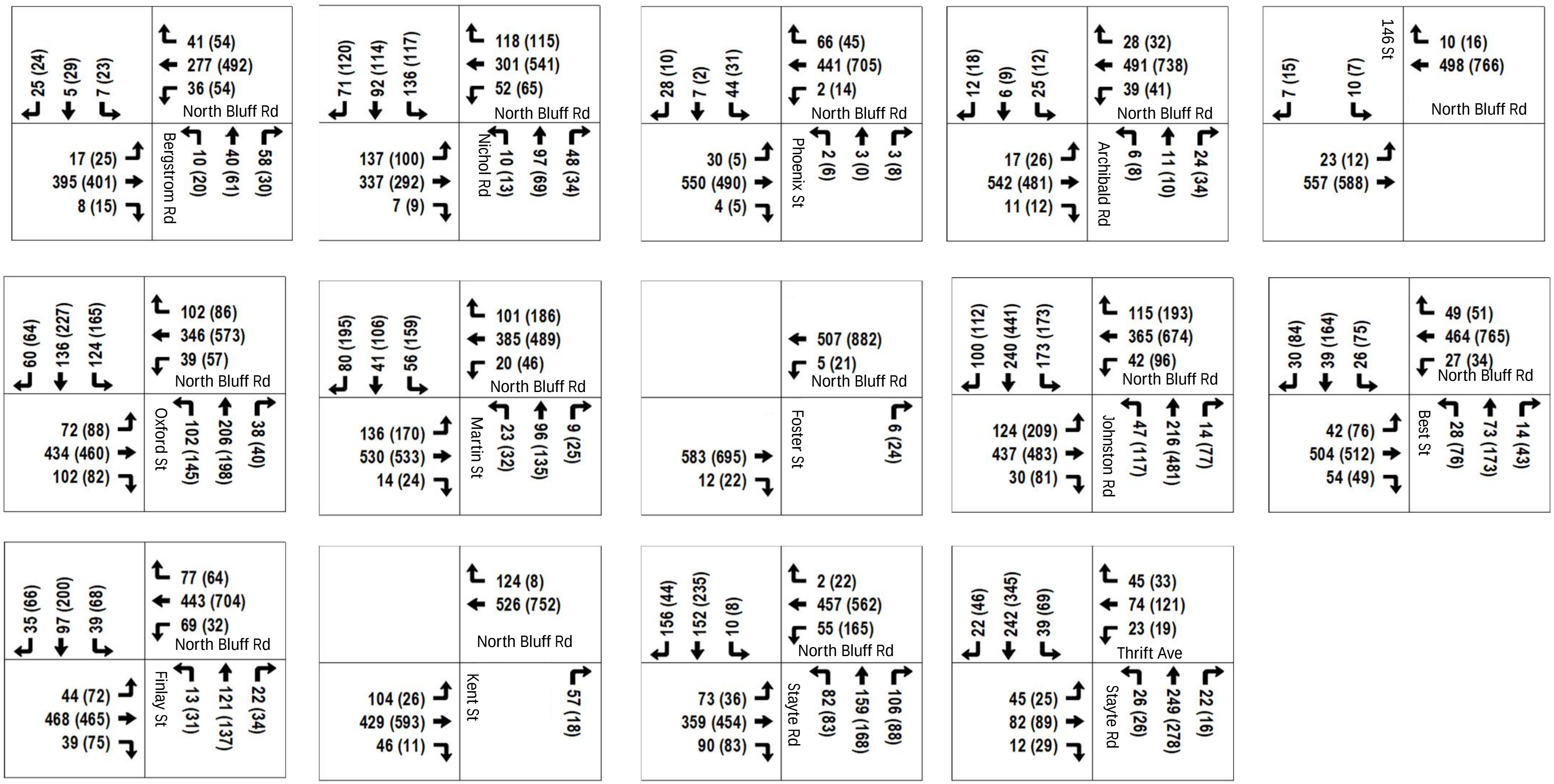
APPENDIX A

2014 Traffic Data


25 (24)
5 (29)
7 (23)
41 (54)
277 (492)
36 (54)
North Bluff Rd
17 (25)
395 (401)
8 (15)
Bergstrom Rd
10 (20)
40 (61)
58 (30)
71 (120)
92 (114)
136 (117)
118 (115)
301 (541)
52 (65)
North Bluff Rd
137 (100)
337 (292)
7 (9)
Nichol Rd
10 (13)
97 (69)
48 (34)
28 (10)
7 (2)
44 (31)
66 (45)
441 (705)
2 (14)
North Bluff Rd
30 (5)
550 (490)
4 (5)
Phoenix St
2 (6)
3 (0)
3 (8)
12 (18)
6 (9)
25 (12)
28 (32)
491 (738)
39 (41)
North Bluff Rd
17 (26)
542 (481)
11 (12)
Archibald Rd
6 (8)
11 (10)
24 (34)
7 (15)
10 (7)
146 St
10 (16)
498 (766)
North Bluff Rd
23 (12)
557 (588)
60 (64)
136 (227)
124 (165)
102 (86)
346 (573)
39 (57)
North Bluff Rd
72 (88)
434 (460)
102 (82)
Oxford St
102 (145)
206 (198)
38 (40)
80 (195)
41 (106)
56 (159)
101 (186)
385 (489)
20 (46)
North Bluff Rd
136 (170)
530 (533)
14 (24)
Martin St
23 (32)
96 (135)
9 (25)
507 (882)
5 (21)
North Bluff Rd
583 (695)
12 (22)
Foster St
6 (24)
100 (112)
240 (441)
173 (173)
115 (193)
365 (674)
42 (96)
North Bluff Rd
124 (209)
437 (483)
30 (81)
Johnston Rd
47 (117)
216 (481)
14 (77)
30 (84)
39 (164)
26 (75)
49 (51)
464 (765)
27 (34)
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54 (49)
Best St
28 (76)
73 (173)
14 (43)
35 (66)
97 (200)
39 (68)
77 (64)
443 (704)
69 (32)
North Bluff Rd
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468 (465)
39 (75)
Finlay St
13 (31)
121 (137)
22 (34)
124 (8)
526 (752)
North Bluff Rd
104 (26)
429 (593)
46 (11)
Kent St
57 (18)
156 (44)
152 (235)
10 (8)
2 (22)
457 (562)
55 (165)
North Bluff Rd
73 (36)
359 (454)
90 (83)
Stayte Rd
82 (83)
159 (168)
106 (88)
22 (46)
242 (345)
39 (69)
45 (33)
74 (121)
23 (19)
Thrift Ave
45 (25)
82 (89)
12 (29)
Stayte Rd
26 (26)
249 (278)
22 (16)

APPENDIX C

Synchro Reports

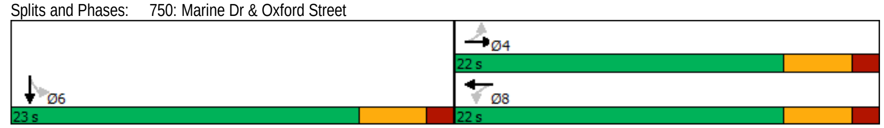
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	93	2	2	87	34	0	0	0	25	10	48
Future Volume (vph)	26	93	2	2	87	34	0	0	0	25	10	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	1873	0	0	1806	0	0	0	0	1805	1628	0
Flt Permitted		0.928			0.996					0.950		
Satd. Flow (perm)	0	1750	0	0	1801	0	0	0	0	1800	1628	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			43						61	
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		217.8			282.3			23.9			896.6	
Travel Time (s)		26.1			33.9			1.7			64.6	
Confl. Peds. (#/hr)	17		1	1		17	5		2	2		5
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	154	0	0	156	0	0	0	0	32	74	0
Turn Type	Perm	NA		Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8					6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0					7.0	7.0	
Minimum Split (s)	21.0	21.0		21.0	21.0					21.0	21.0	
Total Split (s)	22.0	22.0		22.0	22.0					23.0	23.0	
Total Split (%)	48.9%	48.9%		48.9%	48.9%					51.1%	51.1%	
Yellow Time (s)	3.5	3.5		3.5	3.5					3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5					1.5	1.5	
Lost Time Adjust (s)		0.0			0.0					0.0	0.0	
Total Lost Time (s)		5.0			5.0					5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min					None	None	
Act Effct Green (s)		19.4			19.4					7.1	7.1	
Actuated g/C Ratio		0.65			0.65					0.24	0.24	
v/c Ratio		0.14			0.13					0.07	0.17	
Control Delay		5.4			4.4					8.6	4.6	
Queue Delay		0.0			0.0					0.0	0.0	
Total Delay		5.4			4.4					8.6	4.6	
LOS		A			A					A	A	
Approach Delay		5.4			4.4						5.8	
Approach LOS		A			A						A	
Queue Length 50th (m)		4.1			3.0					1.6	0.7	
Queue Length 95th (m)		8.1			6.8					3.1	3.4	
Internal Link Dist (m)		193.8			258.3			0.1			872.6	
Turn Bay Length (m)										30.0		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		1318			1366					1095	1014	
Starvation Cap Reductn		0			0					0	0	
Spillback Cap Reductn		0			0					0	0	
Storage Cap Reductn		0			0					0	0	
Reduced v/c Ratio		0.12			0.11					0.03	0.07	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 29.8
Natural Cycle: 45
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.17
Intersection Signal Delay: 5.1 Intersection LOS: A
Intersection Capacity Utilization 36.5% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 750: Marine Dr & Oxford Street



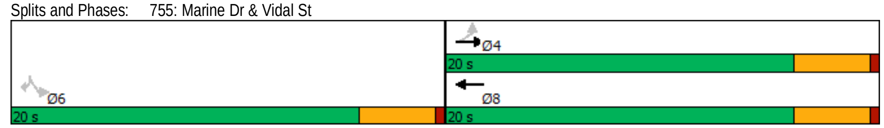
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	88	82	11	17	43
Future Volume (vph)	20	88	82	11	17	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1883	1862	0	1805	1615
Flt Permitted		0.959			0.950	
Satd. Flow (perm)	0	1818	1862	0	1778	1615
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			12			47
Link Speed (k/h)		30	30		50	
Link Distance (m)		282.3	128.9		78.4	
Travel Time (s)		33.9	15.5		5.6	
Confl. Peds. (#/hr)	12			12	12	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	118	101	0	18	47
Turn Type	Perm	NA	NA		Perm	Perm
Protected Phases		4	8			
Permitted Phases	4				6	6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		7.0	7.0
Minimum Split (s)	20.0	20.0	20.0		20.0	20.0
Total Split (s)	20.0	20.0	20.0		20.0	20.0
Total Split (%)	50.0%	50.0%	50.0%		50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	0.5	0.5	0.5		0.5	0.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min		None	None
Act Effct Green (s)		22.5	22.5		7.0	7.0
Actuated g/C Ratio		0.78	0.78		0.24	0.24
v/c Ratio		0.08	0.07		0.04	0.11
Control Delay		3.4	3.1		8.1	3.8
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		3.4	3.1		8.1	3.8
LOS		A	A		A	A
Approach Delay		3.4	3.1		5.0	
Approach LOS		A	A		A	
Queue Length 50th (m)		0.0	0.0		0.7	0.0
Queue Length 95th (m)		6.1	5.0		2.1	2.6
Internal Link Dist (m)		258.3	104.9		54.4	
Turn Bay Length (m)						
Base Capacity (vph)		1514	1553		995	925
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.08	0.07		0.02	0.05

Intersection Summary

Area Type: Other
Cycle Length: 40
Actuated Cycle Length: 28.7
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.11
Intersection Signal Delay: 3.7 Intersection LOS: A
Intersection Capacity Utilization 24.9% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 755: Marine Dr & Vidal St



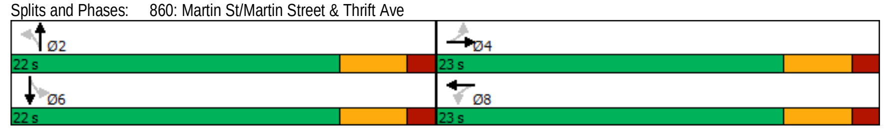
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	188	16	4	162	29	41	5	22	22	13	18
Future Volume (vph)	12	188	16	4	162	29	41	5	22	22	13	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1834	0	0	1817	0	0	1716	0	0	1728	0
Flt Permitted		0.979			0.994						0.910	
Satd. Flow (perm)	0	1801	0	0	1808	0	0	1765	0	0	1603	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			23			30			25	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		147.0			159.6			143.4			402.9	
Travel Time (s)		10.6			11.5			10.3			29.0	
Confl. Peds. (#/hr)	3		9	9		3	2		2	2		2
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	296	0	0	267	0	0	93	0	0	73	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	21.0	21.0		21.0	21.0		21.0	21.0		21.0	21.0	
Total Split (s)	23.0	23.0		23.0	23.0		22.0	22.0		22.0	22.0	
Total Split (%)	51.1%	51.1%		51.1%	51.1%		48.9%	48.9%		48.9%	48.9%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)		21.3			21.3			7.8			7.8	
Actuated g/C Ratio		0.76			0.76			0.28			0.28	
v/c Ratio		0.22			0.19			0.18			0.16	
Control Delay		4.7			4.5			6.9			6.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		4.7			4.5			6.9			6.8	
LOS		A			A			A			A	
Approach Delay		4.7			4.5			6.9			6.8	
Approach LOS		A			A			A			A	
Queue Length 50th (m)		0.0			0.0			0.9			0.7	
Queue Length 95th (m)		15.6			13.4			6.3			5.4	
Internal Link Dist (m)		123.0			135.6			119.4			378.9	
Turn Bay Length (m)												
Base Capacity (vph)		1484			1492			1116			1013	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.20			0.18			0.08			0.07	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 28.1
Natural Cycle: 45
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.22
Intersection Signal Delay: 5.1 Intersection LOS: A
Intersection Capacity Utilization 32.0% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 860: Martin St/Martin Street & Thrift Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	88	13	25	79	48	28	267	24	42	259	24
Future Volume (vph)	48	88	13	25	79	48	28	267	24	42	259	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	1807	0	0	1747	0	1770	1836	0	1770	1835	0
Flt Permitted		0.839			0.914		0.573			0.569		
Satd. Flow (perm)	0	1534	0	0	1609	0	1065	1836	0	1052	1835	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			37			9			9	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		203.7			211.4			403.8			414.4	
Travel Time (s)		14.7			15.2			29.1			29.8	
Confl. Peds. (#/hr)	14		2	2		14	3		12	12		3
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	162	0	0	165	0	30	316	0	46	308	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		15.0	15.0		15.0	15.0	
Total Split (s)	30.0	30.0		30.0	30.0		40.0	40.0		40.0	40.0	
Total Split (%)	42.9%	42.9%		42.9%	42.9%		57.1%	57.1%		57.1%	57.1%	
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	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		9.6			9.6		16.6	16.6		16.6	16.6	
Actuated g/C Ratio		0.29			0.29		0.51	0.51		0.51	0.51	
v/c Ratio		0.36			0.33		0.06	0.34		0.09	0.33	
Control Delay		11.4			9.6		7.1	8.4		7.4	8.3	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		11.4			9.6		7.1	8.4		7.4	8.3	
LOS		B			A		A	A		A	A	
Approach Delay		11.4			9.6			8.3			8.2	
Approach LOS		B			A			A			A	
Queue Length 50th (m)		5.8			4.7		0.9	10.9		1.4	10.5	
Queue Length 95th (m)		18.9			16.9		4.5	28.2		6.0	27.4	
Internal Link Dist (m)		179.7			187.4			379.8			390.4	
Turn Bay Length (m)							50.0			50.0		
Base Capacity (vph)		1247			1313		1035	1785		1022	1784	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.13			0.13		0.03	0.18		0.05	0.17	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 32.6
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.36
Intersection Signal Delay: 9.0 Intersection LOS: A
Intersection Capacity Utilization 51.0% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 920: 160 Street & Thrift Avenue/14 Avenue

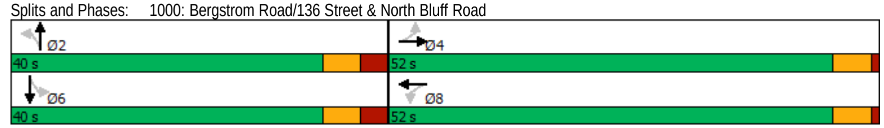
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	423	9	39	297	44	11	43	62	8	5	27
Future Volume (vph)	18	423	9	39	297	44	11	43	62	8	5	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3515	0	0	3452	0	1770	1683	0	1770	1586	0
Flt Permitted		0.931			0.878		0.735			0.684		
Satd. Flow (perm)	0	3279	0	0	3035	0	1348	1683	0	1270	1586	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			23			67			29	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		121.6			803.7			309.0			286.0	
Travel Time (s)		8.8			57.9			22.2			20.6	
Confl. Peds. (#/hr)	3		77	77		3	19		5	5		19
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	490	0	0	413	0	12	114	0	9	34	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		17.0	17.0		17.0	17.0	
Total Split (s)	52.0	52.0		52.0	52.0		40.0	40.0		40.0	40.0	
Total Split (%)	56.5%	56.5%		56.5%	56.5%		43.5%	43.5%		43.5%	43.5%	
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		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0		7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)		17.7			17.7		10.1	10.1		10.1	10.1	
Actuated g/C Ratio		0.51			0.51		0.29	0.29		0.29	0.29	
v/c Ratio		0.29			0.27		0.03	0.21		0.02	0.07	
Control Delay		8.0			7.5		9.5	6.4		9.4	5.6	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		8.0			7.5		9.5	6.4		9.4	5.6	
LOS		A			A		A	A		A	A	
Approach Delay		8.0			7.5			6.6			6.4	
Approach LOS		A			A			A			A	
Queue Length 50th (m)		10.7			8.3		0.5	1.8		0.3	0.3	
Queue Length 95th (m)		18.1			15.0		2.8	9.4		2.4	4.0	
Internal Link Dist (m)		97.6			779.7			285.0			262.0	
Turn Bay Length (m)							30.0			30.0		
Base Capacity (vph)		3279			3035		1263	1581		1190	1488	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.15			0.14		0.01	0.07		0.01	0.02	

Intersection Summary

Area Type: Other
Cycle Length: 92
Actuated Cycle Length: 34.8
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.29
Intersection Signal Delay: 7.6 Intersection LOS: A
Intersection Capacity Utilization 45.9% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1000: Bergstrom Road/136 Street & North Bluff Road



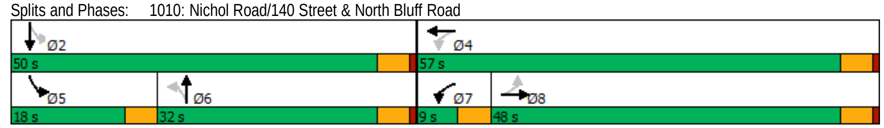
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	361	8	52	304	119	11	104	51	146	99	76
Future Volume (vph)	147	361	8	52	304	119	11	104	51	146	99	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	50.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3527	0	1770	3364	0	1770	1763	0	1770	1732	0
Flt Permitted	0.488			0.437			0.637			0.443		
Satd. Flow (perm)	904	3527	0	814	3364	0	1185	1763	0	824	1732	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			75			22			45	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		803.7			447.2			425.8			283.1	
Travel Time (s)		57.9			32.2			30.7			20.4	
Confl. Peds. (#/hr)	8		1	1		8	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	160	401	0	57	459	0	12	168	0	159	191	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		8		7	4			6		5	2	
Permitted Phases	8			4			6			2		
Detector Phase	8	8		7	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	15.0	15.0		9.0	15.0		15.0	15.0		9.0	15.0	
Total Split (s)	48.0	48.0		9.0	57.0		32.0	32.0		18.0	50.0	
Total Split (%)	44.9%	44.9%		8.4%	53.3%		29.9%	29.9%		16.8%	46.7%	
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		0.0	1.0		1.0	1.0		0.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		4.0	5.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effct Green (s)	25.9	25.9		27.8	30.1		16.7	16.7		26.1	27.7	
Actuated g/C Ratio	0.45	0.45		0.48	0.52		0.29	0.29		0.45	0.48	
v/c Ratio	0.39	0.25		0.11	0.26		0.03	0.32		0.27	0.22	
Control Delay	24.2	17.5		12.3	10.8		26.1	24.7		13.9	11.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.2	17.5		12.3	10.8		26.1	24.7		13.9	11.2	
LOS	C	B		B	B		C	C		B	B	
Approach Delay		19.4			11.0			24.8			12.4	
Approach LOS		B			B			C			B	
Queue Length 50th (m)	17.3	21.0		3.9	15.6		1.3	16.5		11.8	11.2	
Queue Length 95th (m)	41.2	37.6		11.6	30.7		6.4	41.4		30.0	30.3	
Internal Link Dist (m)		779.7			423.2			401.8			259.1	
Turn Bay Length (m)	45.0			50.0			50.0			50.0		
Base Capacity (vph)	661	2582		515	2779		632	951		786	1321	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.24	0.16		0.11	0.17		0.02	0.18		0.20	0.14	

Intersection Summary

Area Type: Other
Cycle Length: 107
Actuated Cycle Length: 57.5
Natural Cycle: 55
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.39
Intersection Signal Delay: 15.8 Intersection LOS: B
Intersection Capacity Utilization 55.7% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1010: Nichol Road/140 Street & North Bluff Road



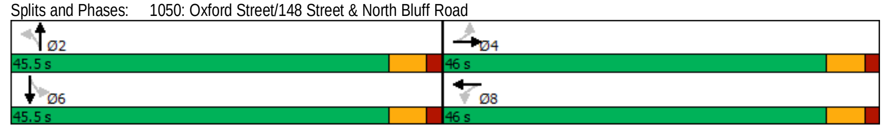
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	543	66	37	368	131	55	206	52	91	154	61
Future Volume (vph)	64	543	66	37	368	131	55	206	52	91	154	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	45.0		0.0	35.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1787	3496	0	1787	3414	0	1787	1816	0	1787	1772	0
Flt Permitted	0.405			0.320			0.592			0.533		
Satd. Flow (perm)	761	3496	0	595	3414	0	1079	1816	0	996	1772	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			70			18			27	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		391.2			502.9			896.6			204.8	
Travel Time (s)		28.2			36.2			64.6			14.7	
Confl. Peds. (#/hr)	3		32	32		3	69		17	17		69
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	81	771	0	47	632	0	70	327	0	115	272	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (s)	46.0	46.0		46.0	46.0		45.5	45.5		45.5	45.5	
Total Split (%)	50.3%	50.3%		50.3%	50.3%		49.7%	49.7%		49.7%	49.7%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.7	1.7		1.7	1.7		1.8	1.8		1.8	1.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		5.8	5.8		5.8	5.8	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	18.2	18.2		18.2	18.2		15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.33	0.33		0.33	0.33	
v/c Ratio	0.26	0.54		0.20	0.45		0.20	0.53		0.35	0.45	
Control Delay	12.6	12.0		12.2	10.1		13.4	15.8		15.9	14.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	12.6	12.0		12.2	10.1		13.4	15.8		15.9	14.0	
LOS	B	B		B	B		B	B		B	B	
Approach Delay		12.1			10.2			15.4			14.5	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	4.0	22.1		2.2	15.4		3.8	18.8		6.6	14.4	
Queue Length 95th (m)	12.2	38.6		8.1	28.4		11.4	39.7		17.9	31.8	
Internal Link Dist (m)		367.2			478.9			872.6			180.8	
Turn Bay Length (m)	40.0			45.0			35.0			30.0		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	672	3090		525	3023		945	1593		872	1555	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.12	0.25		0.09	0.21		0.07	0.21		0.13	0.17	

Intersection Summary

Area Type: Other
Cycle Length: 91.5
Actuated Cycle Length: 45.2
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.54
Intersection Signal Delay: 12.5 Intersection LOS: B
Intersection Capacity Utilization 67.6% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1050: Oxford Street/148 Street & North Bluff Road



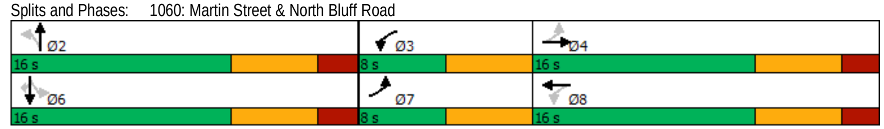
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	146	569	15	56	425	63	25	53	20	60	14	86
Future Volume (vph)	146	569	15	56	425	63	25	53	20	60	14	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	20.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3521	0	1770	3453	0	0	3366	0	0	1790	1583
Flt Permitted	0.435			0.411				0.869			0.725	
Satd. Flow (perm)	801	3521	0	760	3453	0	0	2937	0	0	1331	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			39			22				185
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		502.9			102.1			402.9			184.7	
Travel Time (s)		36.2			7.4			29.0			13.3	
Confl. Peds. (#/hr)	27		12	12		27	30		17	17		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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	159	634	0	61	530	0	0	107	0	0	80	93
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	10.0		4.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	8.0	15.9		8.0	15.8		15.9	15.9		15.9	15.9	15.9
Total Split (s)	8.0	16.0		8.0	16.0		16.0	16.0		16.0	16.0	16.0
Total Split (%)	20.0%	40.0%		20.0%	40.0%		40.0%	40.0%		40.0%	40.0%	40.0%
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)	0.0	1.8		0.0	1.8		1.9	1.9		1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	4.0	5.8		4.0	5.8			5.9			5.9	5.9
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	19.4	19.8		18.8	18.4			11.4			11.4	11.4
Actuated g/C Ratio	0.58	0.59		0.56	0.55			0.34			0.34	0.34
v/c Ratio	0.27	0.30		0.11	0.28			0.11			0.18	0.15
Control Delay	6.5	10.0		5.6	10.0			9.5			12.5	1.1
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	6.5	10.0		5.6	10.0			9.5			12.5	1.1
LOS	A	B		A	A			A			B	A
Approach Delay		9.3			9.5			9.5			6.3	
Approach LOS		A			A			A			A	
Queue Length 50th (m)	5.4	14.0		2.0	15.8			2.4			4.5	0.0
Queue Length 95th (m)	12.2	#36.1		5.7	27.2			6.6			12.4	1.9
Internal Link Dist (m)		478.9			78.1			378.9			160.7	
Turn Bay Length (m)	50.0			50.0								
Base Capacity (vph)	600	1842		566	1685			1028			459	642

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.27	0.34		0.11	0.31			0.10			0.17	0.14

Intersection Summary

Area Type: Other
Cycle Length: 40
Actuated Cycle Length: 33.3
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.30
Intersection Signal Delay: 9.1 Intersection LOS: A
Intersection Capacity Utilization 46.0% ICU Level of Service A
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1060: Martin Street & North Bluff Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	474	32	45	392	123	50	232	25	185	257	107
Future Volume (vph)	135	474	32	45	392	123	50	232	25	185	257	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	40.0		0.0	40.0		40.0	50.0		0.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3476	0	1770	3280	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.319			0.413			0.566			0.505		
Satd. Flow (perm)	572	3476	0	747	3280	0	1036	1863	1454	910	1863	1501
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			63				198			198
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		199.3			399.9			810.7			195.6	
Travel Time (s)		14.3			28.8			58.4			14.1	
Confl. Peds. (#/hr)	58		44	44		58	32		56	56		32
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	147	550	0	49	560	0	54	252	27	201	279	116
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	15.9		11.0	15.9		11.0	15.8	15.8	11.0	15.8	15.8
Total Split (s)	11.0	18.0		11.0	18.0		11.0	20.0	20.0	11.0	20.0	20.0
Total Split (%)	18.3%	30.0%		18.3%	30.0%		18.3%	33.3%	33.3%	18.3%	33.3%	33.3%
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)	0.0	1.9		0.0	1.9		0.0	1.8	1.8	0.0	1.8	1.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.9		4.0	5.9		4.0	5.8	5.8	4.0	5.8	5.8
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	20.1	14.3		19.3	12.2		20.2	13.2	13.2	21.0	15.3	15.3
Actuated g/C Ratio	0.37	0.27		0.36	0.23		0.37	0.24	0.24	0.39	0.28	0.28
v/c Ratio	0.39	0.59		0.12	0.71		0.11	0.55	0.05	0.42	0.53	0.20
Control Delay	14.5	23.4		11.4	25.5		10.2	25.3	0.2	13.7	23.4	1.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	23.4		11.4	25.5		10.2	25.3	0.2	13.7	23.4	1.6
LOS	B	C		B	C		B	C	A	B	C	A
Approach Delay		21.5			24.3			20.8			15.9	
Approach LOS		C			C			C			B	
Queue Length 50th (m)	10.4	31.3		3.2	28.8		3.3	25.8	0.0	13.6	29.1	0.0
Queue Length 95th (m)	20.6	#53.3		8.6	#51.8		8.6	46.3	0.0	25.7	#51.8	2.7
Internal Link Dist (m)		175.3			375.9			786.7			171.6	
Turn Bay Length (m)	40.0			40.0			40.0		40.0	50.0		
Base Capacity (vph)	378	970		409	831		490	522	550	473	577	602

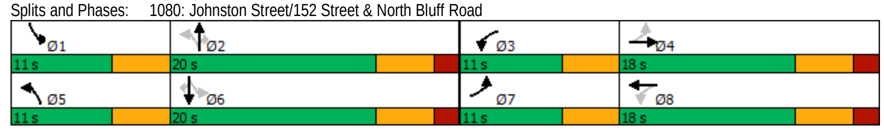
Lanes, Volumes, Timings
1080: Johnston Street/152 Street & North Bluff Road
Existing AM
08/14/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.57		0.12	0.67		0.11	0.48	0.05	0.42	0.48	0.19

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 53.9
Natural Cycle: 60
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 20.7 — Intersection LOS: C
Intersection Capacity Utilization 62.2% — ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1080: Johnston Street/152 Street & North Bluff Road



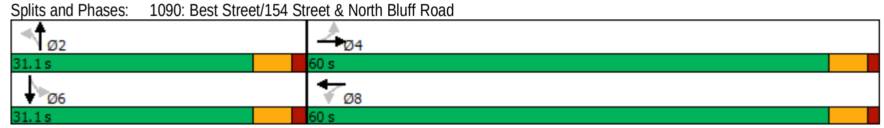
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	620	58	29	498	52	30	78	15	28	42	32
Future Volume (vph)	45	620	58	29	498	52	30	78	15	28	42	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	55.0		0.0	35.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3484	0	1770	3482	0	1770	1811	0	1770	1722	0
Flt Permitted	0.426			0.372			0.741			0.741		
Satd. Flow (perm)	793	3484	0	690	3482	0	1363	1811	0	1365	1722	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			22			10			35	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		399.9			401.5			193.1			201.3	
Travel Time (s)		28.8			28.9			13.9			14.5	
Confl. Peds. (#/hr)	3		14	14		3	13		12	12		13
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	737	0	32	598	0	33	101	0	30	81	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	15.4	15.4		15.4	15.4		15.7	15.7		15.7	15.7	
Total Split (s)	60.0	60.0		60.0	60.0		31.1	31.1		31.1	31.1	
Total Split (%)	65.9%	65.9%		65.9%	65.9%		34.1%	34.1%		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)	1.4	1.4		1.4	1.4		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.4	5.4		5.4	5.4		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	22.9	22.9		22.9	22.9		10.4	10.4		10.4	10.4	
Actuated g/C Ratio	0.67	0.67		0.67	0.67		0.30	0.30		0.30	0.30	
v/c Ratio	0.09	0.32		0.07	0.26		0.08	0.18		0.07	0.15	
Control Delay	6.6	5.9		6.6	5.6		11.9	11.2		11.8	8.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.6	5.9		6.6	5.6		11.9	11.2		11.8	8.5	
LOS	A	A		A	A		B	B		B	A	
Approach Delay		5.9			5.6			11.4			9.4	
Approach LOS		A			A			B			A	
Queue Length 50th (m)	1.7	16.0		1.1	12.2		1.5	4.2		1.3	2.1	
Queue Length 95th (m)	5.9	26.2		4.4	20.5		6.7	14.2		6.3	10.2	
Internal Link Dist (m)		375.9			377.5			169.1			177.3	
Turn Bay Length (m)	50.0			55.0			35.0			55.0		
Base Capacity (vph)	793	3484		690	3482		1039	1383		1041	1321	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.06	0.21		0.05	0.17		0.03	0.07		0.03	0.06	

Intersection Summary

Area Type: Other
Cycle Length: 91.1
Actuated Cycle Length: 34.2
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.32
Intersection Signal Delay: 6.5 Intersection LOS: A
Intersection Capacity Utilization 49.5% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1090: Best Street/154 Street & North Bluff Road



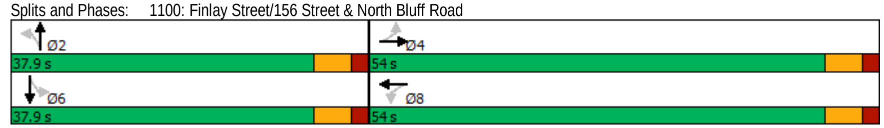
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	621	41	74	475	83	14	130	24	42	104	38
Future Volume (vph)	47	621	41	74	475	83	14	130	24	42	104	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	40.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3502	0	1770	3449	0	1770	1809	0	1770	1775	0
Flt Permitted	0.423			0.378			0.659			0.651		
Satd. Flow (perm)	786	3502	0	703	3449	0	1212	1809	0	1185	1775	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			32			11			22	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		401.5			402.3			816.6			217.9	
Travel Time (s)		28.9			29.0			58.8			15.7	
Confl. Peds. (#/hr)	5		6	6		5	18		33	33		18
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	720	0	80	606	0	15	167	0	46	154	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	16.0	16.0		16.0	16.0		15.9	15.9		15.9	15.9	
Total Split (s)	54.0	54.0		54.0	54.0		37.9	37.9		37.9	37.9	
Total Split (%)	58.8%	58.8%		58.8%	58.8%		41.2%	41.2%		41.2%	41.2%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	20.0	20.0		20.0	20.0		11.1	11.1		11.1	11.1	
Actuated g/C Ratio	0.54	0.54		0.54	0.54		0.30	0.30		0.30	0.30	
v/c Ratio	0.12	0.38		0.21	0.32		0.04	0.31		0.13	0.28	
Control Delay	8.1	8.2		9.5	7.5		12.0	13.1		12.8	12.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.1	8.2		9.5	7.5		12.0	13.1		12.8	12.2	
LOS	A	A		A	A		B	B		B	B	
Approach Delay		8.2			7.8			13.0			12.3	
Approach LOS		A			A			B			B	
Queue Length 50th (m)	1.9	16.4		3.2	12.7		0.7	8.0		2.2	6.7	
Queue Length 95th (m)	7.2	30.8		11.0	24.6		4.2	22.5		9.0	20.2	
Internal Link Dist (m)		377.5			378.3			792.6			193.9	
Turn Bay Length (m)	50.0			40.0			50.0			50.0		
Base Capacity (vph)	786	3502		703	3449		1030	1539		1007	1512	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.06	0.21		0.11	0.18		0.01	0.11		0.05	0.10	

Intersection Summary

Area Type: Other
Cycle Length: 91.9
Actuated Cycle Length: 37.3
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.38
Intersection Signal Delay: 8.9 Intersection LOS: A
Intersection Capacity Utilization 63.6% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1100: Finlay Street/156 Street & North Bluff Road



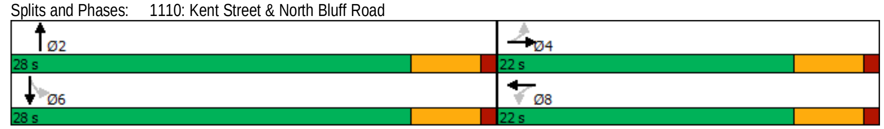
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	636	64	1	689	91	0	5	108	0	0	0
Future Volume (vph)	49	636	64	1	689	91	0	5	108	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3398	0	0	3422	0	0	1587	0	0	1845	0
Flt Permitted		0.741			0.954							
Satd. Flow (perm)	0	2524	0	0	3264	0	0	1587	0	0	1845	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			31			23				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		402.3			400.8			238.4			72.1	
Travel Time (s)		29.0			28.9			17.2			5.2	
Confl. Peds. (#/hr)	27		107	107		27	581		1	1		581
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	881	0	0	919	0	0	133	0	0	0	0
Turn Type	Perm	NA		Perm	NA			NA				
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8			2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0			7.0		7.0	7.0	
Minimum Split (s)	20.0	20.0		20.0	20.0			28.0		28.0	28.0	
Total Split (s)	22.0	22.0		22.0	22.0			28.0		28.0	28.0	
Total Split (%)	44.0%	44.0%		44.0%	44.0%			56.0%		56.0%	56.0%	
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	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None			Ped		Ped	Ped	
Act Effct Green (s)		17.0			17.0			23.0				
Actuated g/C Ratio		0.34			0.34			0.46				
v/c Ratio		1.01			0.81			0.18				
Control Delay		53.2			22.3			7.5				
Queue Delay		0.0			0.0			0.0				
Total Delay		53.2			22.3			7.5				
LOS		D			C			A				
Approach Delay		53.2			22.3			7.5				
Approach LOS		D			C			A				
Queue Length 50th (m)		~42.3			38.7			5.5				
Queue Length 95th (m)		#71.8			#54.6			12.3				
Internal Link Dist (m)		378.3			376.8			214.4			48.1	
Turn Bay Length (m)												
Base Capacity (vph)		872			1130			742				
Starvation Cap Reductn		0			0			0				
Spillback Cap Reductn		0			0			0				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0				
Reduced v/c Ratio		1.01			0.81			0.18				

Intersection Summary

Area Type: Other
Cycle Length: 50
Actuated Cycle Length: 50
Natural Cycle: 55
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 35.3 Intersection LOS: D
Intersection Capacity Utilization 75.5% ICU Level of Service D
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1110: Kent Street & North Bluff Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	482	120	59	490	2	88	170	114	11	163	167
Future Volume (vph)	98	482	120	59	490	2	88	170	114	11	163	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	35.0		0.0	45.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3413	0	1770	3535	0	1770	1736	0	1770	1699	0
Flt Permitted	0.327			0.277			0.327			0.572		
Satd. Flow (perm)	604	3413	0	515	3535	0	606	1736	0	1060	1699	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27						33			50	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		400.8			526.2			414.4			217.2	
Travel Time (s)		28.9			37.9			29.8			15.6	
Confl. Peds. (#/hr)	17		6	6		17	17		12	12		17
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	107	654	0	64	535	0	96	309	0	12	359	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	10.0		7.0	10.0	
Minimum Split (s)	11.5	15.4		11.5	15.4		11.5	15.8		11.5	15.8	
Total Split (s)	15.0	42.0		13.0	40.0		13.0	50.2		12.0	49.2	
Total Split (%)	12.8%	35.8%		11.1%	34.1%		11.1%	42.8%		10.2%	42.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	1.4		0.0	1.4		0.0	1.8		0.0	1.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.4		4.0	5.4		4.0	5.8		4.0	5.8	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effct Green (s)	30.5	22.3		28.3	21.2		33.3	29.9		29.5	22.4	
Actuated g/C Ratio	0.41	0.30		0.38	0.28		0.44	0.40		0.39	0.30	
v/c Ratio	0.27	0.63		0.19	0.54		0.23	0.43		0.02	0.66	
Control Delay	16.6	27.4		16.1	27.9		15.1	19.0		13.8	29.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.6	27.4		16.1	27.9		15.1	19.0		13.8	29.2	
LOS	B	C		B	C		B	B		B	C	
Approach Delay		25.9			26.6			18.0			28.7	
Approach LOS		C			C			B			C	
Queue Length 50th (m)	9.6	45.6		5.6	38.4		8.2	27.7		1.0	43.4	
Queue Length 95th (m)	23.5	78.1		15.5	66.5		20.4	71.5		4.5	85.4	
Internal Link Dist (m)		376.8			502.2			390.4			193.2	
Turn Bay Length (m)	60.0			35.0			45.0			30.0		
Base Capacity (vph)	450	1898		372	1852		427	1102		512	1069	

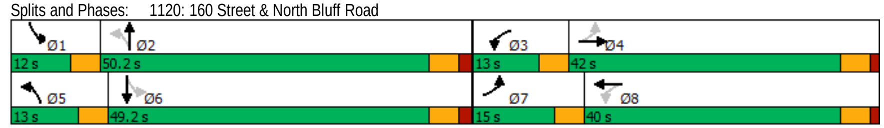
Lanes, Volumes, Timings Existing AM
1120: 160 Street & North Bluff Road 08/14/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.24	0.34		0.17	0.29		0.22	0.28		0.02	0.34	

Intersection Summary

Area Type: Other
Cycle Length: 117.2
Actuated Cycle Length: 75
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 25.1 Intersection LOS: C
Intersection Capacity Utilization 64.6% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1120: 160 Street & North Bluff Road



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	29	158	106	92	100	43
Future Volume (Veh/h)	29	158	106	92	100	43
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	35	190	128	111	120	52
Pedestrians		2			7	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.2			1.2	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	246				450	192
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	246				450	192
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				78	94
cM capacity (veh/h)	1318				550	845

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	225	239	172
Volume Left	35	0	120
Volume Right	0	111	52
cSH	1318	1700	615
Volume to Capacity	0.03	0.14	0.28
Queue Length 95th (m)	0.7	0.0	9.1
Control Delay (s)	1.4	0.0	13.1
Lane LOS	A		B
Approach Delay (s)	1.4	0.0	13.1
Approach LOS			B

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	22	13	11	17	53	17	156	4	32	124	24
Future Volume (Veh/h)	36	22	13	11	17	53	17	156	4	32	124	24
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	46	28	17	14	22	68	22	200	5	41	159	31
Pedestrians		1			4						3	
Lane Width (m)		3.6			3.6						3.6	
Walking Speed (m/s)		1.2			1.2						1.2	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	586	510	176	538	524	210	191			209		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	586	510	176	538	524	210	191			209		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	87	94	98	97	95	92	98			97		
cM capacity (veh/h)	360	446	872	409	439	831	1394			1369		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	91	104	227	231
Volume Left	46	14	22	41
Volume Right	17	68	5	31
cSH	433	626	1394	1369
Volume to Capacity	0.21	0.17	0.02	0.03
Queue Length 95th (m)	6.3	4.7	0.4	0.7
Control Delay (s)	15.5	11.9	0.9	1.6
Lane LOS	C	B	A	A
Approach Delay (s)	15.5	11.9	0.9	1.6
Approach LOS	C	B		

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
680: Johnston Rd/Johnston Street & Buena Vista Ave/Pacific Ave

Existing AM
08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	38	1	5	34	171	0	0	0	114	30	15
Future Volume (Veh/h)	26	38	1	5	34	171	0	0	0	114	30	15
Sign Control		Stop			Yield			Free			Free	
Grade		0%			0%			0%			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)	29	42	1	5	37	188	0	0	0	125	33	16
Pedestrians		18			22			17				
Lane Width (m)		3.6			3.6			0.0				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		2			2			0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	516	331	76	352	339	22	67			22		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	516	331	76	352	339	22	67			22		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	91	92	100	99	93	82	100			92		
cM capacity (veh/h)	331	527	976	512	521	1042	1524			1577		

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	72	230	174
Volume Left	29	5	125
Volume Right	1	188	16
cSH	428	880	1577
Volume to Capacity	0.17	0.26	0.08
Queue Length 95th (m)	4.8	8.4	2.1
Control Delay (s)	15.1	10.5	5.5
Lane LOS	C	B	A
Approach Delay (s)	15.1	10.5	5.5
Approach LOS	C	B	

Intersection Summary			
Average Delay	9.4		
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
700: Finlay Street

Existing AM
08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	110	3	4	106	33	1	37	5	27	16	45
Future Volume (Veh/h)	50	110	3	4	106	33	1	37	5	27	16	45
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	62	136	4	5	131	41	1	46	6	33	20	56
Pedestrians		2			8			4			6	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			1			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	178			144			475	454	150	464	436	160
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	178			144			475	454	150	464	436	160
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			100			100	90	99	93	96	94
cM capacity (veh/h)	1403			1446			435	477	893	446	488	885

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	62	140	5	172	53	109
Volume Left	62	0	5	0	1	33
Volume Right	0	4	0	41	6	56
cSH	1403	1700	1446	1700	502	611
Volume to Capacity	0.04	0.08	0.00	0.10	0.11	0.18
Queue Length 95th (m)	1.1	0.0	0.1	0.0	2.8	5.2
Control Delay (s)	7.7	0.0	7.5	0.0	13.0	12.2
Lane LOS	A		A		B	B
Approach Delay (s)	2.4		0.2		13.0	12.2
Approach LOS					B	B

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	67	1	1	78	30	1	6	1	54	6	39
Future Volume (Veh/h)	73	67	1	1	78	30	1	6	1	54	6	39
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	80	74	1	1	86	33	1	7	1	59	7	43
Pedestrians					3			2			2	
Lane Width (m)					3.6			3.6			3.6	
Walking Speed (m/s)					1.2			1.2			1.2	
Percent Blockage					0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	121			77			388	360	80	348	344	104
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	121			77			388	360	80	348	344	104
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			100			100	99	100	90	99	95
cM capacity (veh/h)	1477			1532			519	537	982	574	549	954

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	155	120	9	109
Volume Left	80	1	1	59
Volume Right	1	33	1	43
cSH	1477	1532	563	679
Volume to Capacity	0.05	0.00	0.02	0.16
Queue Length 95th (m)	1.4	0.0	0.4	4.6
Control Delay (s)	4.1	0.1	11.5	11.3
Lane LOS	A	A	B	B
Approach Delay (s)	4.1	0.1	11.5	11.3
Approach LOS			B	B

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	131	9	48	5	14	25	34	220	7	11	137	73
Future Volume (Veh/h)	131	9	48	5	14	25	34	220	7	11	137	73
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	168	12	62	6	18	32	44	282	9	14	176	94
Pedestrians		8			6			5			5	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	680	644	236	704	686	298	278			297		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	680	644	236	704	686	298	278			297		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	48	97	92	98	95	96	97			99		
cM capacity (veh/h)	320	372	799	302	352	740	1288			1269		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	242	56	335	284
Volume Left	168	6	44	14
Volume Right	62	32	9	94
cSH	382	490	1288	1269
Volume to Capacity	0.63	0.11	0.03	0.01
Queue Length 95th (m)	33.5	3.1	0.8	0.3
Control Delay (s)	29.4	13.3	1.3	0.5
Lane LOS	D	B	A	A
Approach Delay (s)	29.4	13.3	1.3	0.5
Approach LOS	D	B		

Intersection Summary			
Average Delay	9.2		
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis

1020: Phoenix Street/142 Street & North Bluff Road

Existing AM
08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	590	4	2	443	14	2	3	3	47	8	30
Future Volume (Veh/h)	32	590	4	2	443	14	2	3	3	47	8	30
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	641	4	2	482	15	2	3	3	51	9	33
Pedestrians		7			2			32				
Lane Width (m)		3.6			3.6			3.6				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		1			0			3				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	497			677			1034	1246	356	890	1240	256
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	497			677			1034	1246	356	890	1240	256
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 %	97			100			99	98	100	77	94	96
cM capacity (veh/h)	1063			886			157	162	622	222	163	739

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	356	324	243	256	8	93
Volume Left	35	0	2	0	2	51
Volume Right	0	4	0	15	3	33
cSH	1063	1700	886	1700	222	282
Volume to Capacity	0.03	0.19	0.00	0.15	0.04	0.33
Queue Length 95th (m)	0.8	0.0	0.1	0.0	0.9	11.2
Control Delay (s)	1.1	0.0	0.1	0.0	21.8	23.9
Lane LOS	A		A		C	C
Approach Delay (s)	0.6		0.0		21.8	23.9
Approach LOS					C	C

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis

1030: Archibald Road/144 Street & North Bluff Road

Existing AM
08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	581	12	35	440	25	6	12	26	27	6	13
Future Volume (Veh/h)	18	581	12	35	440	25	6	12	26	27	6	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	632	13	38	478	27	7	13	28	29	7	14
Pedestrians		15			7			2			4	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	509			647			1028	1266	332	969	1258	272
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	509			647			1028	1266	332	969	1258	272
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 %	98			96			96	92	96	84	96	98
cM capacity (veh/h)	1049			933			167	157	659	176	159	715

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	20	421	224	38	319	186	48	50
Volume Left	20	0	0	38	0	0	7	29
Volume Right	0	0	13	0	0	27	28	14
cSH	1049	1700	1700	933	1700	1700	287	219
Volume to Capacity	0.02	0.25	0.13	0.04	0.19	0.11	0.17	0.23
Queue Length 95th (m)	0.5	0.0	0.0	1.0	0.0	0.0	4.7	6.8
Control Delay (s)	8.5	0.0	0.0	9.0	0.0	0.0	20.0	26.3
Lane LOS	A			A			C	D
Approach Delay (s)	0.3			0.6			20.0	26.3
Approach LOS							C	D

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1040: North Bluff Road & 146 Street

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	597	474	10	11	8
Future Volume (Veh/h)	25	597	474	10	11	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	649	515	11	12	9
Pedestrians			1		1	
Lane Width (m)			3.6		3.6	
Walking Speed (m/s)			1.2		1.2	
Percent Blockage			0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			391			
pX, platoon unblocked						
vC, conflicting volume	527				901	264
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	527				901	264
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				96	99
cM capacity (veh/h)	1035				270	734

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	243	433	343	183	21
Volume Left	27	0	0	0	12
Volume Right	0	0	0	11	9
cSH	1035	1700	1700	1700	370
Volume to Capacity	0.03	0.25	0.20	0.11	0.06
Queue Length 95th (m)	0.6	0.0	0.0	0.0	1.4
Control Delay (s)	1.2	0.0	0.0	0.0	15.3
Lane LOS	A				C
Approach Delay (s)	0.4		0.0		15.3
Approach LOS					C

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1070: Foster Street & North Bluff Road

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	636	13	5	544	0	6
Future Volume (Veh/h)	636	13	5	544	0	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	691	14	5	591	0	7
Pedestrians	9				26	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	1				2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	102			199		
pX, platoon unblocked			0.89		0.92	0.89
vC, conflicting volume			731		1038	378
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			463		638	69
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	99
cM capacity (veh/h)			958		363	858

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	461	244	5	296	296	7
Volume Left	0	0	5	0	0	0
Volume Right	0	14	0	0	0	7
cSH	1700	1700	958	1700	1700	858
Volume to Capacity	0.27	0.14	0.01	0.17	0.17	0.01
Queue Length 95th (m)	0.0	0.0	0.1	0.0	0.0	0.2
Control Delay (s)	0.0	0.0	8.8	0.0	0.0	9.2
Lane LOS			A			A
Approach Delay (s)	0.0		0.1			9.2
Approach LOS						A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	28.0%	ICU Level of Service	A
Analysis Period (min)	15		

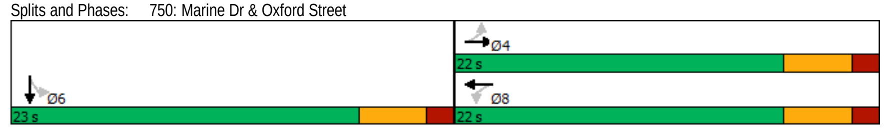
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	127	4	9	139	63	0	0	0	66	15	73
Future Volume (vph)	34	127	4	9	139	63	0	0	0	66	15	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	1874	0	0	1791	0	0	0	0	1805	1595	0
Flt Permitted		0.911			0.987					0.950		
Satd. Flow (perm)	0	1716	0	0	1771	0	0	0	0	1802	1595	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			55						82	
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		217.8			282.3			23.9			896.6	
Travel Time (s)		26.1			33.9			1.7			64.6	
Confl. Peds. (#/hr)	25		2	2		25	22		1	1		22
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	185	0	0	237	0	0	0	0	74	99	0
Turn Type	Perm	NA		Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8					6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0					7.0	7.0	
Minimum Split (s)	21.0	21.0		21.0	21.0					21.0	21.0	
Total Split (s)	22.0	22.0		22.0	22.0					23.0	23.0	
Total Split (%)	48.9%	48.9%		48.9%	48.9%					51.1%	51.1%	
Yellow Time (s)	3.5	3.5		3.5	3.5					3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5					1.5	1.5	
Lost Time Adjust (s)		0.0			0.0					0.0	0.0	
Total Lost Time (s)		5.0			5.0					5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min					None	None	
Act Effct Green (s)		17.8			17.8					7.2	7.2	
Actuated g/C Ratio		0.62			0.62					0.25	0.25	
v/c Ratio		0.17			0.21					0.16	0.21	
Control Delay		5.9			5.0					8.9	4.5	
Queue Delay		0.0			0.0					0.0	0.0	
Total Delay		5.9			5.0					8.9	4.5	
LOS		A			A					A	A	
Approach Delay		5.9			5.0						6.4	
Approach LOS		A			A						A	
Queue Length 50th (m)		5.0			5.0					2.4	0.6	
Queue Length 95th (m)		11.9			12.7					6.9	5.3	
Internal Link Dist (m)		193.8			258.3			0.1			872.6	
Turn Bay Length (m)										30.0		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		1319			1373					1135	1034	
Starvation Cap Reductn		0			0					0	0	
Spillback Cap Reductn		0			0					0	0	
Storage Cap Reductn		0			0					0	0	
Reduced v/c Ratio		0.14			0.17					0.07	0.10	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 28.6
Natural Cycle: 45
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.21
Intersection Signal Delay: 5.7 Intersection LOS: A
Intersection Capacity Utilization 39.9% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 750: Marine Dr & Oxford Street



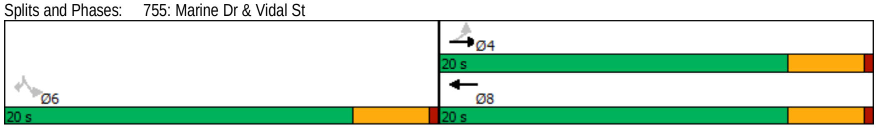
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	29	154	164	39	27	50
Future Volume (vph)	29	154	164	39	27	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1885	1818	0	1805	1615
Flt Permitted		0.944			0.950	
Satd. Flow (perm)	0	1778	1818	0	1805	1539
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			36			56
Link Speed (k/h)		30	30		50	
Link Distance (m)		282.3	128.9		78.4	
Travel Time (s)		33.9	15.5		5.6	
Confl. Peds. (#/hr)	58			58		22
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	206	228	0	30	56
Turn Type	Perm	NA	NA		Perm	Perm
Protected Phases		4	8			
Permitted Phases	4				6	6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		7.0	7.0
Minimum Split (s)	20.0	20.0	20.0		20.0	20.0
Total Split (s)	20.0	20.0	20.0		20.0	20.0
Total Split (%)	50.0%	50.0%	50.0%		50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	0.5	0.5	0.5		0.5	0.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min		None	None
Act Effct Green (s)		21.5	21.5		7.0	7.0
Actuated g/C Ratio		0.77	0.77		0.25	0.25
v/c Ratio		0.15	0.16		0.07	0.13
Control Delay		3.6	3.2		7.8	3.6
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		3.6	3.2		7.8	3.6
LOS		A	A		A	A
Approach Delay		3.6	3.2		5.0	
Approach LOS		A	A		A	
Queue Length 50th (m)		0.0	0.0		1.1	0.0
Queue Length 95th (m)		9.8	9.6		3.0	2.9
Internal Link Dist (m)		258.3	104.9		54.4	
Turn Bay Length (m)						
Base Capacity (vph)		1499	1538		1036	907
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.14	0.15		0.03	0.06

Intersection Summary

Area Type: Other
Cycle Length: 40
Actuated Cycle Length: 27.9
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.16
Intersection Signal Delay: 3.7 Intersection LOS: A
Intersection Capacity Utilization 42.6% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 755: Marine Dr & Vidal St



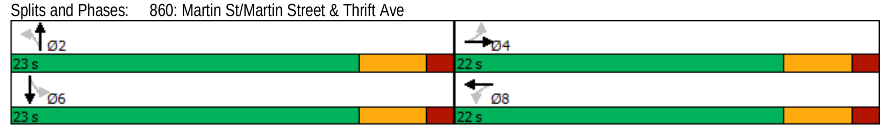
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	209	19	10	177	62	19	54	7	88	57	24
Future Volume (vph)	25	209	19	10	177	62	19	54	7	88	57	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1866	0	0	1811	0	0	1851	0	0	1809	0
Flt Permitted		0.955			0.985			0.893			0.793	
Satd. Flow (perm)	0	1787	0	0	1786	0	0	1667	0	0	1458	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			43			7			22	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		147.0			159.6			143.4			402.9	
Travel Time (s)		10.6			11.5			10.3			29.0	
Confl. Peds. (#/hr)	19		16	16		19	14		10	14		10
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
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	261	0	0	256	0	0	83	0	0	175	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	21.0	21.0		21.0	21.0		21.0	21.0		21.0	21.0	
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)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)		17.9			17.9			8.9			8.9	
Actuated g/C Ratio		0.62			0.62			0.31			0.31	
v/c Ratio		0.24			0.23			0.16			0.38	
Control Delay		7.0			6.3			8.0			9.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		7.0			6.3			8.0			9.8	
LOS		A			A			A			A	
Approach Delay		7.0			6.3			8.0			9.8	
Approach LOS		A			A			A			A	
Queue Length 50th (m)		7.8			6.5			2.5			5.3	
Queue Length 95th (m)		22.4			19.9			8.8			16.3	
Internal Link Dist (m)		123.0			135.6			119.4			378.9	
Turn Bay Length (m)												
Base Capacity (vph)		1240			1249			1071			942	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.21			0.20			0.08			0.19	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 29.1
Natural Cycle: 45
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.38
Intersection Signal Delay: 7.5 Intersection LOS: A
Intersection Capacity Utilization 46.8% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 860: Martin St/Martin Street & Thrift Ave



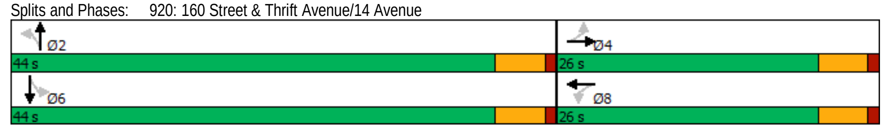
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	95	31	20	130	35	27	298	17	74	370	49
Future Volume (vph)	27	95	31	20	130	35	27	298	17	74	370	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	1786	0	0	1791	0	1770	1845	0	1770	1826	0
Flt Permitted		0.922			0.943		0.467			0.555		
Satd. Flow (perm)	0	1657	0	0	1697	0	869	1845	0	1027	1826	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			17			6			15	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		203.7			211.4			403.8			414.4	
Travel Time (s)		14.7			15.2			29.1			29.8	
Confl. Peds. (#/hr)	14		2	2		14	3		12	12		3
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	166	0	0	201	0	29	342	0	80	455	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		15.0	15.0		15.0	15.0	
Total Split (s)	26.0	26.0		26.0	26.0		44.0	44.0		44.0	44.0	
Total Split (%)	37.1%	37.1%		37.1%	37.1%		62.9%	62.9%		62.9%	62.9%	
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	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		10.5			10.6		20.3	20.3		20.3	20.3	
Actuated g/C Ratio		0.29			0.29		0.56	0.56		0.56	0.56	
v/c Ratio		0.34			0.40		0.06	0.33		0.14	0.44	
Control Delay		12.7			13.5		6.9	8.0		7.5	9.0	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		12.7			13.5		6.9	8.0		7.5	9.0	
LOS		B			B		A	A		A	A	
Approach Delay		12.7			13.5			7.9			8.7	
Approach LOS		B			B			A			A	
Queue Length 50th (m)		7.0			9.0		1.0	13.0		2.8	18.3	
Queue Length 95th (m)		22.8			27.6		4.5	32.2		9.6	44.8	
Internal Link Dist (m)		179.7			187.4			379.8			390.4	
Turn Bay Length (m)							50.0			50.0		
Base Capacity (vph)		1016			1039		825	1751		975	1734	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.16			0.19		0.04	0.20		0.08	0.26	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 36.4
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.44
Intersection Signal Delay: 9.8 — Intersection LOS: A
Intersection Capacity Utilization 56.6% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 920: 160 Street & Thrift Avenue/14 Avenue



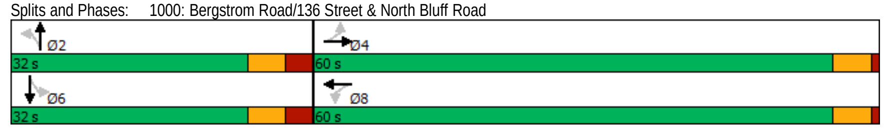
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	430	16	58	527	58	21	65	32	25	31	26
Future Volume (vph)	27	430	16	58	527	58	21	65	32	25	31	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3501	0	0	3469	0	1770	1759	0	1770	1711	0
Flt Permitted		0.900			0.872		0.717			0.689		
Satd. Flow (perm)	0	3160	0	0	3028	0	1310	1759	0	1277	1711	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			20			26			28	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		121.6			803.7			309.0			286.0	
Travel Time (s)		8.8			57.9			22.2			20.6	
Confl. Peds. (#/hr)	3		77	77		3	19		5	5		19
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	513	0	0	699	0	23	106	0	27	62	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		17.0	17.0		17.0	17.0	
Total Split (s)	60.0	60.0		60.0	60.0		32.0	32.0		32.0	32.0	
Total Split (%)	65.2%	65.2%		65.2%	65.2%		34.8%	34.8%		34.8%	34.8%	
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		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0		7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)		20.7			20.7		10.3	10.3		10.3	10.3	
Actuated g/C Ratio		0.55			0.55		0.27	0.27		0.27	0.27	
v/c Ratio		0.29			0.42		0.06	0.21		0.08	0.13	
Control Delay		7.3			8.0		12.7	11.2		12.8	9.1	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		7.3			8.0		12.7	11.2		12.8	9.1	
LOS		A			A		B	B		B	A	
Approach Delay		7.3			8.0			11.5			10.2	
Approach LOS		A			A			B			B	
Queue Length 50th (m)		11.3			16.4		1.1	3.9		1.3	1.6	
Queue Length 95th (m)		19.4			27.6		5.6	14.4		6.2	8.9	
Internal Link Dist (m)		97.6			779.7			285.0			262.0	
Turn Bay Length (m)							30.0			30.0		
Base Capacity (vph)		3160			3028		882	1194		860	1162	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.16			0.23		0.03	0.09		0.03	0.05	

Intersection Summary

Area Type: Other
Cycle Length: 92
Actuated Cycle Length: 37.7
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.42
Intersection Signal Delay: 8.2 Intersection LOS: A
Intersection Capacity Utilization 54.0% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1000: Bergstrom Road/136 Street & North Bluff Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	313	10	59	485	104	14	74	36	125	122	129
Future Volume (vph)	107	313	10	59	485	104	14	74	36	125	122	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	50.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3519	0	1770	3430	0	1770	1763	0	1770	1708	0
Flt Permitted	0.409			0.443			0.591			0.511		
Satd. Flow (perm)	759	3519	0	825	3430	0	1100	1763	0	951	1708	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			36			21			57	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		803.7			447.2			425.8			283.1	
Travel Time (s)		57.9			32.2			30.7			20.4	
Confl. Peds. (#/hr)	8		1	1		8	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	116	351	0	64	640	0	15	119	0	136	273	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		8		7	4			6		5	2	
Permitted Phases	8			4			6			2		
Detector Phase	8	8		7	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	15.0	15.0		9.0	15.0		15.0	15.0		9.0	15.0	
Total Split (s)	50.0	50.0		11.0	61.0		27.0	27.0		19.0	46.0	
Total Split (%)	46.7%	46.7%		10.3%	57.0%		25.2%	25.2%		17.8%	43.0%	
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		0.0	1.0		1.0	1.0		0.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		4.0	5.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effct Green (s)	18.0	18.0		24.6	23.5		12.1	12.1		24.2	23.1	
Actuated g/C Ratio	0.31	0.31		0.43	0.41		0.21	0.21		0.42	0.40	
v/c Ratio	0.49	0.32		0.14	0.45		0.06	0.31		0.25	0.38	
Control Delay	28.3	18.1		11.3	12.9		26.9	24.2		14.0	12.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	28.3	18.1		11.3	12.9		26.9	24.2		14.0	12.8	
LOS	C	B		B	B		C	C		B	B	
Approach Delay		20.7			12.8			24.5			13.2	
Approach LOS		C			B			C			B	
Queue Length 50th (m)	11.8	17.4		4.0	23.8		1.5	10.2		9.7	16.8	
Queue Length 95th (m)	31.3	32.7		12.0	45.1		7.3	29.8		25.5	43.0	
Internal Link Dist (m)		779.7			423.2			401.8			259.1	
Turn Bay Length (m)	45.0			50.0			50.0			50.0		
Base Capacity (vph)	595	2760		479	3037		469	764		661	1265	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.19	0.13		0.13	0.21		0.03	0.16		0.21	0.22	

Intersection Summary

Area Type: Other

Cycle Length: 107

Actuated Cycle Length: 57.8

Natural Cycle: 55

Control Type: Semi Act-Uncoord

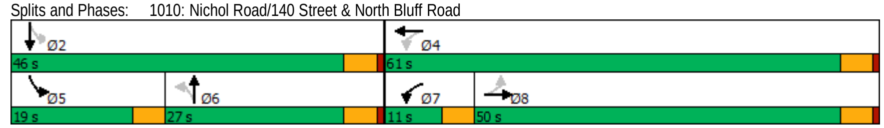
Maximum v/c Ratio: 0.49

Intersection Signal Delay: 16.0 Intersection LOS: B

Intersection Capacity Utilization 52.1% ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1010: Nichol Road/140 Street & North Bluff Road



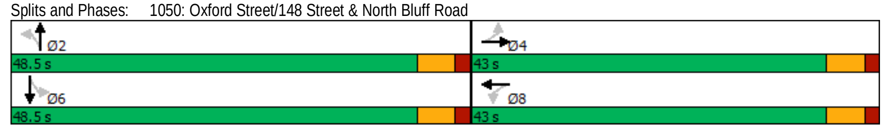
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	487	84	64	524	111	75	147	50	143	241	84
Future Volume (vph)	58	487	84	64	524	111	75	147	50	143	241	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	45.0		0.0	35.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1805	3506	0	1805	3482	0	1805	1815	0	1805	1799	0
Flt Permitted	0.351			0.398			0.502			0.621		
Satd. Flow (perm)	659	3506	0	748	3482	0	929	1815	0	1166	1799	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			33			25			26	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		391.2			502.9			896.6			204.8	
Travel Time (s)		28.2			36.2			64.6			14.7	
Confl. Peds. (#/hr)	29		23	23		29	72		25	25		72
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	634	0	71	705	0	83	219	0	159	361	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (s)	43.0	43.0		43.0	43.0		48.5	48.5		48.5	48.5	
Total Split (%)	47.0%	47.0%		47.0%	47.0%		53.0%	53.0%		53.0%	53.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.7	1.7		1.7	1.7		1.8	1.8		1.8	1.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		5.8	5.8		5.8	5.8	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	16.7	16.7		16.7	16.7		15.9	15.9		15.9	15.9	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.35	0.35		0.35	0.35	
v/c Ratio	0.26	0.48		0.25	0.53		0.25	0.33		0.38	0.55	
Control Delay	14.2	12.0		13.7	12.5		13.3	11.4		14.7	14.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.2	12.0		13.7	12.5		13.3	11.4		14.7	14.8	
LOS	B	B		B	B		B	B		B	B	
Approach Delay		12.2			12.6			11.9			14.8	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	3.2	17.5		3.6	19.8		4.4	10.5		8.9	19.9	
Queue Length 95th (m)	13.2	39.2		13.8	43.9		14.9	28.4		25.7	49.2	
Internal Link Dist (m)		367.2			478.9			872.6			180.8	
Turn Bay Length (m)	40.0			45.0			35.0			30.0		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	556	2963		631	2944		844	1652		1060	1638	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.12	0.21		0.11	0.24		0.10	0.13		0.15	0.22	

Intersection Summary

Area Type: Other
Cycle Length: 91.5
Actuated Cycle Length: 44.8
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 12.9 Intersection LOS: B
Intersection Capacity Utilization 73.4% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1050: Oxford Street/148 Street & North Bluff Road



Lanes, Volumes, Timings
1060: Martin Street & North Bluff Road

Existing PM
08/14/2020

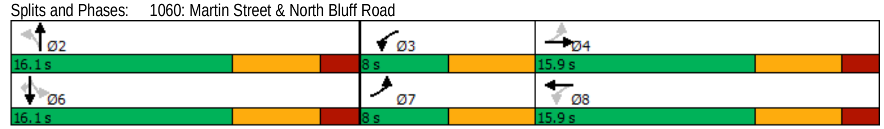
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↰↑↱			↰↑	↱
Traffic Volume (vph)	164	513	23	45	455	215	34	145	27	170	114	209
Future Volume (vph)	164	513	23	45	455	215	34	145	27	170	114	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	20.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3511	0	1770	3322	0	0	3430	0	0	1809	1583
Flt Permitted	0.303			0.432				0.845			0.687	
Satd. Flow (perm)	560	3511	0	799	3322	0	0	2911	0	0	1268	1510
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			188			29				227
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		502.9			102.1			402.9			184.7	
Travel Time (s)		36.2			7.4			29.0			13.3	
Confl. Peds. (#/hr)	27		12	12		27	30		17	17		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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	178	583	0	49	729	0	0	224	0	0	309	227
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	10.0		4.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	8.0	15.9		8.0	15.8		15.9	15.9		15.9	15.9	15.9
Total Split (s)	8.0	15.9		8.0	15.9		16.1	16.1		16.1	16.1	16.1
Total Split (%)	20.0%	39.8%		20.0%	39.8%		40.3%	40.3%		40.3%	40.3%	40.3%
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)	0.0	1.8		0.0	1.8		1.9	1.9		1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	4.0	5.8		4.0	5.8			5.9			5.9	5.9
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	16.6	13.2		15.1	10.2			10.3			10.3	10.3
Actuated g/C Ratio	0.43	0.34		0.39	0.27			0.27			0.27	0.27
v/c Ratio	0.48	0.48		0.12	0.72			0.28			0.91	0.40
Control Delay	11.1	12.3		6.2	15.4			11.5			52.8	4.9
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	11.1	12.3		6.2	15.4			11.5			52.8	4.9
LOS	B	B		A	B			B			D	A
Approach Delay		12.0			14.8			11.5			32.5	
Approach LOS		B			B			B			C	
Queue Length 50th (m)	6.2	12.7		1.6	18.0			5.8			21.7	0.0
Queue Length 95th (m)	#13.8	31.5		4.9	#39.6			12.3			#58.2	11.5
Internal Link Dist (m)		478.9			78.1			378.9			160.7	
Turn Bay Length (m)	50.0			50.0								
Base Capacity (vph)	368	1219		415	1019			800			339	571

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.48	0.48		0.12	0.72			0.28			0.91	0.40

Intersection Summary

Area Type: Other
Cycle Length: 40
Actuated Cycle Length: 38.4
Natural Cycle: 50
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 17.7 — Intersection LOS: B
Intersection Capacity Utilization 71.1% — ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1060: Martin Street & North Bluff Road



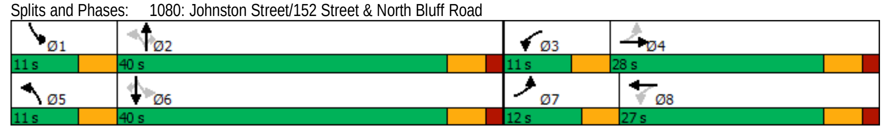
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	193	447	75	75	488	188	125	516	83	185	473	120
Future Volume (vph)	193	447	75	75	488	188	125	516	83	185	473	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	40.0		0.0	40.0		40.0	50.0		0.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3407	0	1770	3257	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.166			0.359			0.212			0.158		
Satd. Flow (perm)	302	3407	0	650	3257	0	392	1863	1496	291	1863	1525
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			59				132			132
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		199.3			399.9			810.7			195.6	
Travel Time (s)		14.3			28.8			58.4			14.1	
Confl. Peds. (#/hr)	58		44	44		58	32		56	56		32
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	210	568	0	82	734	0	136	561	90	201	514	130
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	15.9		11.0	15.9		11.0	15.8	15.8	11.0	15.8	15.8
Total Split (s)	12.0	28.0		11.0	27.0		11.0	40.0	40.0	11.0	40.0	40.0
Total Split (%)	13.3%	31.1%		12.2%	30.0%		12.2%	44.4%	44.4%	12.2%	44.4%	44.4%
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)	0.0	1.9		0.0	1.9		0.0	1.8	1.8	0.0	1.8	1.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.9		4.0	5.9		4.0	5.8	5.8	4.0	5.8	5.8
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	32.2	24.1		29.5	20.5		39.0	30.1	30.1	39.0	30.1	30.1
Actuated g/C Ratio	0.38	0.28		0.35	0.24		0.46	0.35	0.35	0.46	0.35	0.35
v/c Ratio	0.84	0.58		0.26	0.89		0.47	0.86	0.15	0.79	0.78	0.21
Control Delay	49.9	30.2		19.7	44.2		17.0	39.9	1.9	37.2	34.3	4.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.9	30.2		19.7	44.2		17.0	39.9	1.9	37.2	34.3	4.4
LOS	D	C		B	D		B	D	A	D	C	A
Approach Delay		35.5			41.7			31.6			30.4	
Approach LOS		D			D			C			C	
Queue Length 50th (m)	25.5	46.8		9.2	62.8		12.1	88.9	0.0	18.7	78.7	0.0
Queue Length 95th (m)	#63.5	65.7		18.9	#98.3		21.8	#142.3	4.3	#48.8	117.2	10.9
Internal Link Dist (m)		175.3			375.9			786.7			171.6	
Turn Bay Length (m)	40.0			40.0			40.0		40.0	50.0		
Base Capacity (vph)	251	972		316	852		291	749	680	254	749	692

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.58		0.26	0.86		0.47	0.75	0.13	0.79	0.69	0.19

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 85.5
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 34.8 Intersection LOS: C
Intersection Capacity Utilization 85.2% ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1080: Johnston Street/152 Street & North Bluff Road



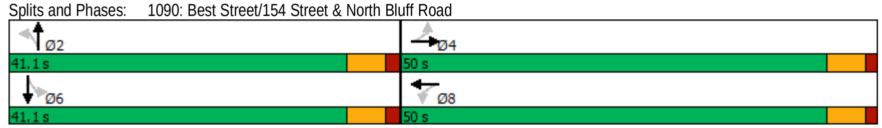
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	579	56	30	675	45	81	185	46	80	176	90
Future Volume (vph)	85	579	56	30	675	45	81	185	46	80	176	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	55.0		0.0	35.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3483	0	1770	3502	0	1770	1799	0	1770	1755	0
Flt Permitted	0.316			0.370			0.583			0.603		
Satd. Flow (perm)	588	3483	0	686	3502	0	1079	1799	0	1116	1755	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			10			16			33	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		399.9			401.5			193.1			201.3	
Travel Time (s)		28.8			28.9			13.9			14.5	
Confl. Peds. (#/hr)	3		14	14		3	13		12	12		13
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	92	690	0	33	783	0	88	251	0	87	289	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	15.4	15.4		15.4	15.4		15.7	15.7		15.7	15.7	
Total Split (s)	50.0	50.0		50.0	50.0		41.1	41.1		41.1	41.1	
Total Split (%)	54.9%	54.9%		54.9%	54.9%		45.1%	45.1%		45.1%	45.1%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.4	1.4		1.4	1.4		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.4	5.4		5.4	5.4		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	18.0	18.0		18.0	18.0		13.8	13.8		13.8	13.8	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.32	0.32		0.32	0.32	
v/c Ratio	0.38	0.47		0.12	0.54		0.26	0.43		0.25	0.50	
Control Delay	14.7	10.4		9.6	11.1		14.6	14.5		14.3	14.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.7	10.4		9.6	11.1		14.6	14.5		14.3	14.9	
LOS	B	B		A	B		B	B		B	B	
Approach Delay		10.9			11.1			14.6			14.7	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	4.3	17.4		1.4	20.6		4.7	13.3		4.6	14.8	
Queue Length 95th (m)	16.8	37.8		6.4	44.0		16.6	37.1		16.3	41.5	
Internal Link Dist (m)		375.9			377.5			169.1			177.3	
Turn Bay Length (m)	50.0			55.0			35.0			55.0		
Base Capacity (vph)	552	3273		644	3291		905	1512		936	1478	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.17	0.21		0.05	0.24		0.10	0.17		0.09	0.20	

Intersection Summary

Area Type: Other
Cycle Length: 91.1
Actuated Cycle Length: 43.4
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.54
Intersection Signal Delay: 12.1 Intersection LOS: B
Intersection Capacity Utilization 70.5% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1090: Best Street/154 Street & North Bluff Road



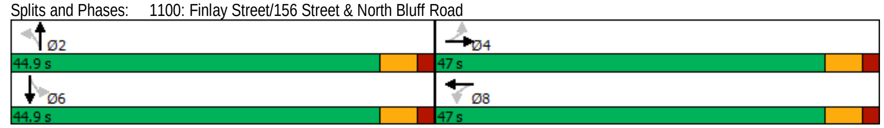
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	621	91	28	616	56	33	147	36	73	214	71
Future Volume (vph)	38	621	91	28	616	56	33	147	36	73	214	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	40.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3460	0	1770	3486	0	1770	1796	0	1770	1783	0
Flt Permitted	0.347			0.322			0.561			0.633		
Satd. Flow (perm)	645	3460	0	599	3486	0	1037	1796	0	1158	1783	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			13			17			22	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		401.5			402.3			816.6			217.9	
Travel Time (s)		28.9			29.0			58.8			15.7	
Confl. Peds. (#/hr)	5		6	6		5	18		33	33		18
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	774	0	30	731	0	36	199	0	79	310	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	16.0	16.0		16.0	16.0		15.9	15.9		15.9	15.9	
Total Split (s)	47.0	47.0		47.0	47.0		44.9	44.9		44.9	44.9	
Total Split (%)	51.1%	51.1%		51.1%	51.1%		48.9%	48.9%		48.9%	48.9%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	17.9	17.9		17.9	17.9		14.6	14.6		14.6	14.6	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.33	0.33		0.33	0.33	
v/c Ratio	0.16	0.55		0.13	0.52		0.11	0.33		0.21	0.52	
Control Delay	11.3	12.0		10.9	11.8		12.6	12.9		13.5	15.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	11.3	12.0		10.9	11.8		12.6	12.9		13.5	15.6	
LOS	B	B		B	B		B	B		B	B	
Approach Delay		12.0			11.8			12.9			15.2	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	1.9	22.0		1.4	20.6		1.9	10.4		4.4	17.6	
Queue Length 95th (m)	8.4	45.7		6.6	43.1		7.9	28.1		14.4	44.2	
Internal Link Dist (m)		377.5			378.3			792.6			193.9	
Turn Bay Length (m)	50.0			40.0			50.0			50.0		
Base Capacity (vph)	578	3104		537	3126		903	1566		1008	1556	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.07	0.25		0.06	0.23		0.04	0.13		0.08	0.20	

Intersection Summary

Area Type: Other
Cycle Length: 91.9
Actuated Cycle Length: 44.7
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 12.6 Intersection LOS: B
Intersection Capacity Utilization 70.7% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1100: Finlay Street/156 Street & North Bluff Road



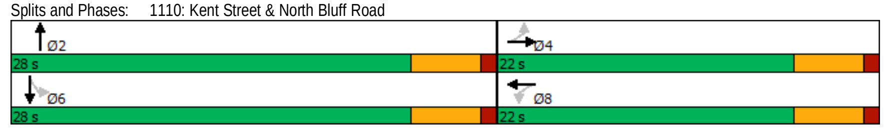
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	756	15	1	670	15	0	1	28	0	0	0
Future Volume (vph)	11	756	15	1	670	15	0	1	28	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3556	0	0	3561	0	0	1635	0	0	1881	0
Flt Permitted		0.938			0.954							
Satd. Flow (perm)	0	3338	0	0	3397	0	0	1635	0	0	1881	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			5			21				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		402.3			400.8			238.4			72.1	
Travel Time (s)		29.0			28.9			17.2			5.2	
Confl. Peds. (#/hr)	7		30	30		7	133					133
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	953	0	0	836	0	0	35	0	0	0	0
Turn Type	Perm	NA		Perm	NA			NA				
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8			2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0			7.0		7.0	7.0	
Minimum Split (s)	20.0	20.0		20.0	20.0			28.0		28.0	28.0	
Total Split (s)	22.0	22.0		22.0	22.0			28.0		28.0	28.0	
Total Split (%)	44.0%	44.0%		44.0%	44.0%			56.0%		56.0%	56.0%	
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	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None			Ped		Ped	Ped	
Act Effct Green (s)		16.4			16.4			23.0				
Actuated g/C Ratio		0.33			0.33			0.47				
v/c Ratio		0.86			0.74			0.05				
Control Delay		25.5			19.2			5.0				
Queue Delay		0.0			0.0			0.0				
Total Delay		25.5			19.2			5.0				
LOS		C			B			A				
Approach Delay		25.5			19.2			5.0				
Approach LOS		C			B			A				
Queue Length 50th (m)		41.9			34.8			0.7				
Queue Length 95th (m)		54.0			45.6			3.7				
Internal Link Dist (m)		378.3			376.8			214.4			48.1	
Turn Bay Length (m)												
Base Capacity (vph)		1151			1172			772				
Starvation Cap Reductn		0			0			0				
Spillback Cap Reductn		0			0			0				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0				
Reduced v/c Ratio		0.83			0.71			0.05				

Intersection Summary

Area Type: Other
Cycle Length: 50
Actuated Cycle Length: 49.4
Natural Cycle: 50
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 22.2 Intersection LOS: C
Intersection Capacity Utilization 56.7% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1110: Kent Street & North Bluff Road



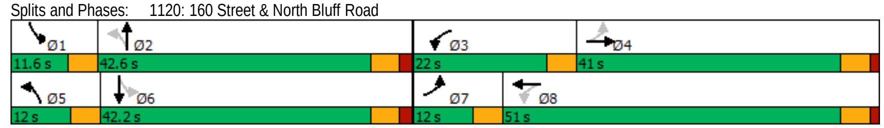
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	594	109	177	553	24	89	180	94	9	252	47
Future Volume (vph)	48	594	109	177	553	24	89	180	94	9	252	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	35.0		0.0	45.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3442	0	1770	3512	0	1770	1754	0	1770	1810	0
Flt Permitted	0.414			0.183			0.318			0.549		
Satd. Flow (perm)	764	3442	0	340	3512	0	588	1754	0	1017	1810	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			4			23			8	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		400.8			526.2			414.4			217.2	
Travel Time (s)		28.9			37.9			29.8			15.6	
Confl. Peds. (#/hr)	17		6	6		17	17		12	12		17
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	764	0	192	627	0	97	298	0	10	325	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	10.0		7.0	10.0	
Minimum Split (s)	11.5	15.4		11.5	15.4		11.5	15.8		11.5	15.8	
Total Split (s)	12.0	41.0		22.0	51.0		12.0	42.6		11.6	42.2	
Total Split (%)	10.2%	35.0%		18.8%	43.5%		10.2%	36.3%		9.9%	36.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	1.4		0.0	1.4		0.0	1.8		0.0	1.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.4		4.0	5.4		4.0	5.8		4.0	5.8	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effct Green (s)	35.8	26.5		43.3	35.8		32.7	29.6		29.4	22.3	
Actuated g/C Ratio	0.42	0.31		0.51	0.42		0.38	0.35		0.35	0.26	
v/c Ratio	0.13	0.70		0.53	0.42		0.29	0.48		0.02	0.68	
Control Delay	14.0	30.9		19.1	21.2		20.1	24.6		18.1	37.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.0	30.9		19.1	21.2		20.1	24.6		18.1	37.4	
LOS	B	C		B	C		C	C		B	D	
Approach Delay		29.8			20.7			23.5			36.8	
Approach LOS		C			C			C			D	
Queue Length 50th (m)	4.5	60.2		18.1	44.4		10.2	33.9		1.0	50.1	
Queue Length 95th (m)	12.4	101.4		37.6	72.0		24.8	81.2		4.7	93.7	
Internal Link Dist (m)		376.8			502.2			390.4			193.2	
Turn Bay Length (m)	60.0			35.0			45.0			30.0		
Base Capacity (vph)	429	1546		496	2010		344	827		429	830	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.12	0.49		0.39	0.31		0.28	0.36		0.02	0.39	

Intersection Summary

Area Type: Other
Cycle Length: 117.2
Actuated Cycle Length: 85.1
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 26.6 — Intersection LOS: C
Intersection Capacity Utilization 68.0% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1120: 160 Street & North Bluff Road



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	46	222	265	75	71	55
Future Volume (Veh/h)	46	222	265	75	71	55
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	51	247	294	83	79	61
Pedestrians		6			16	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.2			1.2	
Percent Blockage		1			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	393				700	358
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	393				700	358
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				79	91
cM capacity (veh/h)	1161				385	679

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	298	377	140
Volume Left	51	0	79
Volume Right	0	83	61
cSH	1161	1700	475
Volume to Capacity	0.04	0.22	0.30
Queue Length 95th (m)	1.1	0.0	9.8
Control Delay (s)	1.8	0.0	15.7
Lane LOS	A		C
Approach Delay (s)	1.8	0.0	15.7
Approach LOS			C

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	31	21	12	34	40	13	156	7	40	151	50
Future Volume (Veh/h)	29	31	21	12	34	40	13	156	7	40	151	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	32	34	23	13	38	44	14	173	8	44	168	56
Pedestrians		9			4						10	
Lane Width (m)		3.6			3.6						3.6	
Walking Speed (m/s)		1.2			1.2						1.2	
Percent Blockage		1			0						1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	571	506	205	533	530	191	233			185		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	571	506	205	533	530	191	233			185		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	91	92	97	97	91	95	99			97		
cM capacity (veh/h)	364	447	834	404	434	846	1336			1397		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	89	95	195	268
Volume Left	32	13	14	44
Volume Right	23	44	8	56
cSH	465	553	1336	1397
Volume to Capacity	0.19	0.17	0.01	0.03
Queue Length 95th (m)	5.6	4.9	0.3	0.8
Control Delay (s)	14.6	12.9	0.6	1.5
Lane LOS	B	B	A	A
Approach Delay (s)	14.6	12.9	0.6	1.5
Approach LOS	B	B		

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — Existing PM
680: Johnston Rd/Johnston Street & Buena Vista Ave/Pacific Ave — 08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	47	3	11	26	178	0	0	0	186	58	55
Future Volume (Veh/h)	32	47	3	11	26	178	0	0	0	186	58	55
Sign Control		Stop			Yield			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	32	47	3	11	26	180	0	0	0	188	59	56
Pedestrians		70			40			57				
Lane Width (m)		3.6			3.6			0.0				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		6			3			0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	726	573	214	586	601	40	185			40		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	726	573	214	586	601	40	185			40		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	85	86	100	96	92	82	100			88		
cM capacity (veh/h)	211	345	783	311	333	1003	1320			1530		

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	82	217	303
Volume Left	32	11	188
Volume Right	3	180	56
cSH	281	740	1530
Volume to Capacity	0.29	0.29	0.12
Queue Length 95th (m)	9.4	9.8	3.4
Control Delay (s)	23.0	11.9	5.2
Lane LOS	C	B	A
Approach Delay (s)	23.0	11.9	5.2
Approach LOS	C	B	

Intersection Summary			
Average Delay	10.0		
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — Existing PM
700: Finlay Street — 08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	97	6	7	98	24	1	24	15	38	27	55
Future Volume (Veh/h)	33	97	6	7	98	24	1	24	15	38	27	55
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	40	118	7	9	120	29	1	29	18	46	33	67
Pedestrians					5			1			11	
Lane Width (m)					3.6			3.6			3.6	
Walking Speed (m/s)					1.2			1.2			1.2	
Percent Blockage					0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	160			126			424	380	128	399	370	146
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	160			126			424	380	128	399	370	146
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			100	95	98	91	94	93
cM capacity (veh/h)	1412			1465			462	529	921	505	537	896

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	40	125	9	149	48	146
Volume Left	40	0	9	0	1	46
Volume Right	0	7	0	29	18	67
cSH	1412	1700	1465	1700	627	642
Volume to Capacity	0.03	0.07	0.01	0.09	0.08	0.23
Queue Length 95th (m)	0.7	0.0	0.1	0.0	2.0	7.0
Control Delay (s)	7.6	0.0	7.5	0.0	11.2	12.2
Lane LOS	A		A		B	B
Approach Delay (s)	1.8		0.4		11.2	12.2
Approach LOS					B	B

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	35.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	63	1	4	106	52	0	2	5	36	9	63
Future Volume (Veh/h)	50	63	1	4	106	52	0	2	5	36	9	63
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	55	69	1	4	116	57	0	2	5	40	10	69
Pedestrians		4						2			11	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	184			72			412	374	72	349	346	160
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	184			72			412	374	72	349	346	160
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			100			100	100	99	93	98	92
cM capacity (veh/h)	1384			1532			479	529	992	573	549	877

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	125	177	7	119
Volume Left	55	4	0	40
Volume Right	1	57	5	69
cSH	1384	1532	794	714
Volume to Capacity	0.04	0.00	0.01	0.17
Queue Length 95th (m)	1.0	0.1	0.2	4.8
Control Delay (s)	3.6	0.2	9.6	11.0
Lane LOS	A	A	A	B
Approach Delay (s)	3.6	0.2	9.6	11.0
Approach LOS			A	B

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	14	29	5	4	29	28	191	6	26	232	99
Future Volume (Veh/h)	90	14	29	5	4	29	28	191	6	26	232	99
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	101	16	33	6	4	33	31	215	7	29	261	111
Pedestrians		6			6			2			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	697	670	324	704	722	226	378			228		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	697	670	324	704	722	226	378			228		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	69	96	95	98	99	96	97			98		
cM capacity (veh/h)	324	359	716	310	335	814	1186			1345		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	150	43	253	401
Volume Left	101	6	31	29
Volume Right	33	33	7	111
cSH	373	599	1186	1345
Volume to Capacity	0.40	0.07	0.03	0.02
Queue Length 95th (m)	15.1	1.9	0.6	0.5
Control Delay (s)	21.0	11.5	1.2	0.8
Lane LOS	C	B	A	A
Approach Delay (s)	21.0	11.5	1.2	0.8
Approach LOS	C	B		

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

1020: Phoenix Street/142 Street & North Bluff Road

08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	525	5	13	631	40	6	1	9	33	2	11
Future Volume (Veh/h)	5	525	5	13	631	40	6	1	9	33	2	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	571	5	14	686	43	7	1	10	36	2	12
Pedestrians		7			2			32				
Lane Width (m)		3.6			3.6			3.6				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		1			0			3				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	729			608			1006	1372	322	1044	1354	372
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	729			608			1006	1372	322	1044	1354	372
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			96	99	98	79	99	98
cM capacity (veh/h)	871			941			177	138	655	173	142	622

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	290	290	357	386	18	50
Volume Left	5	0	14	0	7	36
Volume Right	0	5	0	43	10	12
cSH	871	1700	941	1700	290	207
Volume to Capacity	0.01	0.17	0.01	0.23	0.06	0.24
Queue Length 95th (m)	0.1	0.0	0.4	0.0	1.6	7.3
Control Delay (s)	0.2	0.0	0.5	0.0	18.2	27.8
Lane LOS	A		A		C	D
Approach Delay (s)	0.1		0.2		18.2	27.8
Approach LOS					C	D

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		

1030: Archibald Road/144 Street & North Bluff Road

08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	516	13	36	655	29	9	11	36	13	10	19
Future Volume (Veh/h)	28	516	13	36	655	29	9	11	36	13	10	19
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	30	561	14	39	712	32	10	12	39	14	11	21
Pedestrians		15			7			2			4	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	748			577			1106	1456	296	1202	1447	391
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	748			577			1106	1456	296	1202	1447	391
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			96			93	90	94	88	91	96
cM capacity (veh/h)	854			991			138	119	695	114	120	598

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	30	374	201	39	475	269	61	46
Volume Left	30	0	0	39	0	0	10	14
Volume Right	0	0	14	0	0	32	39	21
cSH	854	1700	1700	991	1700	1700	265	184
Volume to Capacity	0.04	0.22	0.12	0.04	0.28	0.16	0.23	0.25
Queue Length 95th (m)	0.9	0.0	0.0	1.0	0.0	0.0	6.9	7.6
Control Delay (s)	9.4	0.0	0.0	8.8	0.0	0.0	22.6	30.9
Lane LOS	A			A			C	D
Approach Delay (s)	0.5			0.4			22.6	30.9
Approach LOS							C	D

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	40.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	588	669	14	8	16
Future Volume (Veh/h)	12	588	669	14	8	16
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	639	727	15	9	17
Pedestrians			1		1	
Lane Width (m)			3.6		3.6	
Walking Speed (m/s)			1.2		1.2	
Percent Blockage			0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			391			
pX, platoon unblocked						
vC, conflicting volume	743				1082	372
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	743				1082	372
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				96	97
cM capacity (veh/h)	859				209	625

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	226	426	485	257	26
Volume Left	13	0	0	0	9
Volume Right	0	0	0	15	17
cSH	859	1700	1700	1700	370
Volume to Capacity	0.02	0.25	0.29	0.15	0.07
Queue Length 95th (m)	0.4	0.0	0.0	0.0	1.8
Control Delay (s)	0.7	0.0	0.0	0.0	15.5
Lane LOS	A				C
Approach Delay (s)	0.2		0.0		15.5
Approach LOS					C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	689	21	17	715	0	26
Future Volume (Veh/h)	689	21	17	715	0	26
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	749	23	18	777	0	28
Pedestrians	9				26	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	1				2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	102			199		
pX, platoon unblocked			0.89		0.93	0.89
vC, conflicting volume			798		1220	412
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			518		538	82
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	97
cM capacity (veh/h)			906		419	834

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	499	273	18	388	388	28
Volume Left	0	0	18	0	0	0
Volume Right	0	23	0	0	0	28
cSH	1700	1700	906	1700	1700	834
Volume to Capacity	0.29	0.16	0.02	0.23	0.23	0.03
Queue Length 95th (m)	0.0	0.0	0.5	0.0	0.0	0.8
Control Delay (s)	0.0	0.0	9.1	0.0	0.0	9.5
Lane LOS			A			A
Approach Delay (s)	0.0		0.2			9.5
Approach LOS						A

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	29.8%	ICU Level of Service	A
Analysis Period (min)	15		

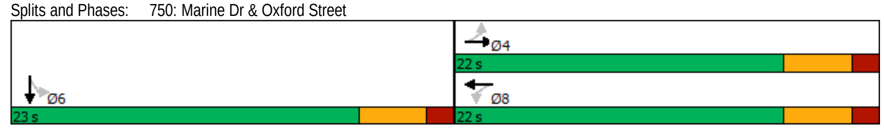
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	98	2	2	91	36	0	0	0	26	11	50
Future Volume (vph)	27	98	2	2	91	36	0	0	0	26	11	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	1875	0	0	1804	0	0	0	0	1805	1630	0
Flt Permitted		0.926			0.996					0.950		
Satd. Flow (perm)	0	1746	0	0	1798	0	0	0	0	1800	1630	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			46						63	
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		217.8			282.3			23.9			896.6	
Travel Time (s)		26.1			33.9			1.7			64.6	
Confl. Peds. (#/hr)	17		1	1		17	5		2	2		5
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	161	0	0	164	0	0	0	0	33	77	0
Turn Type	Perm	NA		Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8					6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0					7.0	7.0	
Minimum Split (s)	21.0	21.0		21.0	21.0					21.0	21.0	
Total Split (s)	22.0	22.0		22.0	22.0					23.0	23.0	
Total Split (%)	48.9%	48.9%		48.9%	48.9%					51.1%	51.1%	
Yellow Time (s)	3.5	3.5		3.5	3.5					3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5					1.5	1.5	
Lost Time Adjust (s)		0.0			0.0					0.0	0.0	
Total Lost Time (s)		5.0			5.0					5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min					None	None	
Act Effct Green (s)		19.2			19.2					7.1	7.1	
Actuated g/C Ratio		0.65			0.65					0.24	0.24	
v/c Ratio		0.14			0.14					0.08	0.18	
Control Delay		5.5			4.4					8.6	4.6	
Queue Delay		0.0			0.0					0.0	0.0	
Total Delay		5.5			4.4					8.6	4.6	
LOS		A			A					A	A	
Approach Delay		5.5			4.4						5.8	
Approach LOS		A			A						A	
Queue Length 50th (m)		4.3			3.1					1.6	0.7	
Queue Length 95th (m)		8.6			7.1					3.2	3.5	
Internal Link Dist (m)		193.8			258.3			0.1			872.6	
Turn Bay Length (m)										30.0		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		1310			1360					1099	1019	
Starvation Cap Reductn		0			0					0	0	
Spillback Cap Reductn		0			0					0	0	
Storage Cap Reductn		0			0					0	0	
Reduced v/c Ratio		0.12			0.12					0.03	0.08	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 29.7
Natural Cycle: 45
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.18
Intersection Signal Delay: 5.2 Intersection LOS: A
Intersection Capacity Utilization 37.6% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 750: Marine Dr & Oxford Street



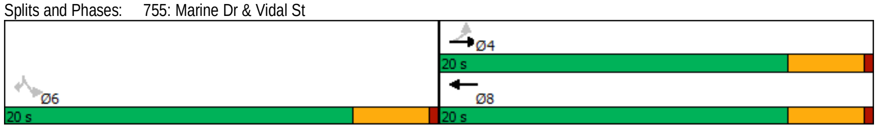
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	92	86	12	18	45
Future Volume (vph)	21	92	86	12	18	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1883	1860	0	1805	1615
Flt Permitted		0.957			0.950	
Satd. Flow (perm)	0	1814	1860	0	1778	1615
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			13			49
Link Speed (k/h)		30	30		50	
Link Distance (m)		282.3	128.9		78.4	
Travel Time (s)		33.9	15.5		5.6	
Confl. Peds. (#/hr)	12			12	12	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	123	106	0	20	49
Turn Type	Perm	NA	NA		Perm	Perm
Protected Phases		4	8			
Permitted Phases	4				6	6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		7.0	7.0
Minimum Split (s)	20.0	20.0	20.0		20.0	20.0
Total Split (s)	20.0	20.0	20.0		20.0	20.0
Total Split (%)	50.0%	50.0%	50.0%		50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	0.5	0.5	0.5		0.5	0.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min		None	None
Act Effct Green (s)		22.3	22.3		7.0	7.0
Actuated g/C Ratio		0.78	0.78		0.25	0.25
v/c Ratio		0.09	0.07		0.05	0.11
Control Delay		3.4	3.2		7.9	3.8
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		3.4	3.2		7.9	3.8
LOS		A	A		A	A
Approach Delay		3.4	3.2		5.0	
Approach LOS		A	A		A	
Queue Length 50th (m)		0.0	0.0		0.7	0.0
Queue Length 95th (m)		6.3	5.2		2.3	2.6
Internal Link Dist (m)		258.3	104.9		54.4	
Turn Bay Length (m)						
Base Capacity (vph)		1510	1551		1001	931
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.08	0.07		0.02	0.05

Intersection Summary

Area Type: Other
Cycle Length: 40
Actuated Cycle Length: 28.5
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.11
Intersection Signal Delay: 3.7 Intersection LOS: A
Intersection Capacity Utilization 25.2% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 755: Marine Dr & Vidal St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	198	17	4	170	30	43	5	23	23	14	19
Future Volume (vph)	13	198	17	4	170	30	43	5	23	23	14	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1834	0	0	1817	0	0	1716	0	0	1728	0
Flt Permitted		0.976			0.994						0.913	
Satd. Flow (perm)	0	1795	0	0	1808	0	0	1765	0	0	1608	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			23			32			26	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		147.0			159.6			143.4			402.9	
Travel Time (s)		10.6			11.5			10.3			29.0	
Confl. Peds. (#/hr)	3		9	9		3	2		2	2		2
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	312	0	0	279	0	0	98	0	0	77	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	21.0	21.0		21.0	21.0		21.0	21.0		21.0	21.0	
Total Split (s)	23.0	23.0		23.0	23.0		22.0	22.0		22.0	22.0	
Total Split (%)	51.1%	51.1%		51.1%	51.1%		48.9%	48.9%		48.9%	48.9%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)		21.5			21.5			7.9			7.9	
Actuated g/C Ratio		0.76			0.76			0.28			0.28	
v/c Ratio		0.23			0.20			0.19			0.16	
Control Delay		4.8			4.5			6.9			6.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		4.8			4.5			6.9			6.9	
LOS		A			A			A			A	
Approach Delay		4.8			4.5			6.9			6.9	
Approach LOS		A			A			A			A	
Queue Length 50th (m)		0.0			0.0			0.8			0.6	
Queue Length 95th (m)		16.8			14.3			6.8			5.8	
Internal Link Dist (m)		123.0			135.6			119.4			378.9	
Turn Bay Length (m)												
Base Capacity (vph)		1485			1498			1122			1021	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	

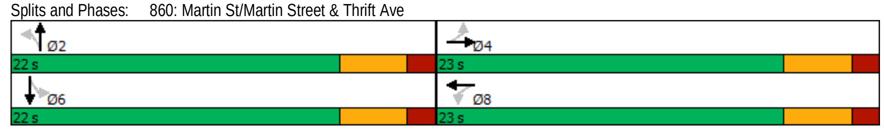
Lanes, Volumes, Timings 2025 AM
860: Martin St/Martin Street & Thrift Ave 08/14/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.21			0.19			0.09			0.08	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 28.3
Natural Cycle: 45
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.23
Intersection Signal Delay: 5.2 Intersection LOS: A
Intersection Capacity Utilization 33.5% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 860: Martin St/Martin Street & Thrift Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	92	14	26	83	50	29	281	25	44	272	25
Future Volume (vph)	50	92	14	26	83	50	29	281	25	44	272	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	1807	0	0	1748	0	1770	1836	0	1770	1835	0
Flt Permitted		0.850			0.913		0.565			0.560		
Satd. Flow (perm)	0	1554	0	0	1609	0	1051	1836	0	1036	1835	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			37			9			9	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		203.7			211.4			403.8			414.4	
Travel Time (s)		14.7			15.2			29.1			29.8	
Confl. Peds. (#/hr)	14		2	2		14	3		12	12		3
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	169	0	0	172	0	32	332	0	48	323	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		15.0	15.0		15.0	15.0	
Total Split (s)	30.0	30.0		30.0	30.0		40.0	40.0		40.0	40.0	
Total Split (%)	42.9%	42.9%		42.9%	42.9%		57.1%	57.1%		57.1%	57.1%	
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	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		9.8			9.8		16.9	16.9		16.9	16.9	
Actuated g/C Ratio		0.30			0.30		0.51	0.51		0.51	0.51	
v/c Ratio		0.36			0.34		0.06	0.35		0.09	0.34	
Control Delay		11.7			9.9		7.2	8.6		7.5	8.5	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		11.7			9.9		7.2	8.6		7.5	8.5	
LOS		B			A		A	A		A	A	
Approach Delay		11.7			9.9			8.5			8.4	
Approach LOS		B			A			A			A	
Queue Length 50th (m)		6.3			5.2		1.0	11.8		1.5	11.4	
Queue Length 95th (m)		20.1			18.0		4.7	30.3		6.4	29.4	
Internal Link Dist (m)		179.7			187.4			379.8			390.4	
Turn Bay Length (m)							50.0			50.0		
Base Capacity (vph)		1200			1249		1016	1775		1001	1774	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.14			0.14		0.03	0.19		0.05	0.18	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 33.1

Natural Cycle: 40

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.36

Intersection Signal Delay: 9.2 Intersection LOS: A

Intersection Capacity Utilization 52.5% ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 920: 160 Street & Thrift Avenue/14 Avenue

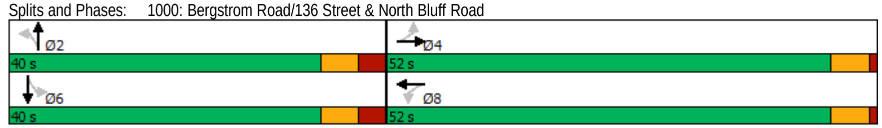
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	445	9	41	312	46	12	45	65	8	5	28
Future Volume (vph)	19	445	9	41	312	46	12	45	65	8	5	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3515	0	0	3453	0	1770	1681	0	1770	1584	0
Flt Permitted		0.930			0.872		0.734			0.680		
Satd. Flow (perm)	0	3275	0	0	3015	0	1347	1681	0	1262	1584	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			22			71			30	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		121.6			803.7			309.0			286.0	
Travel Time (s)		8.8			57.9			22.2			20.6	
Confl. Peds. (#/hr)	3		77	77		3	19		5	5		19
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	515	0	0	434	0	13	120	0	9	35	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		17.0	17.0		17.0	17.0	
Total Split (s)	52.0	52.0		52.0	52.0		40.0	40.0		40.0	40.0	
Total Split (%)	56.5%	56.5%		56.5%	56.5%		43.5%	43.5%		43.5%	43.5%	
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		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0		7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)		17.6			17.6		10.1	10.1		10.1	10.1	
Actuated g/C Ratio		0.51			0.51		0.29	0.29		0.29	0.29	
v/c Ratio		0.31			0.28		0.03	0.22		0.02	0.07	
Control Delay		8.0			7.6		9.7	6.5		9.6	5.6	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		8.0			7.6		9.7	6.5		9.6	5.6	
LOS		A			A		A	A		A	A	
Approach Delay		8.0			7.6			6.8			6.4	
Approach LOS		A			A			A			A	
Queue Length 50th (m)		11.3			8.9		0.5	1.9		0.3	0.3	
Queue Length 95th (m)		19.2			15.8		3.0	9.9		2.4	4.1	
Internal Link Dist (m)		97.6			779.7			285.0			262.0	
Turn Bay Length (m)							30.0			30.0		
Base Capacity (vph)		3275			3015		1264	1581		1184	1488	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.16			0.14		0.01	0.08		0.01	0.02	

Intersection Summary

Area Type: Other
Cycle Length: 92
Actuated Cycle Length: 34.7
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.31
Intersection Signal Delay: 7.7 Intersection LOS: A
Intersection Capacity Utilization 47.1% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1000: Bergstrom Road/136 Street & North Bluff Road



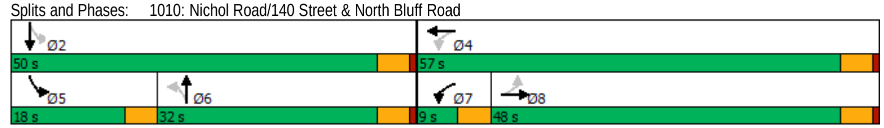
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	379	8	55	320	125	12	109	54	153	104	80
Future Volume (vph)	154	379	8	55	320	125	12	109	54	153	104	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	50.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3527	0	1770	3364	0	1770	1761	0	1770	1732	0
Flt Permitted	0.476			0.391			0.632			0.478		
Satd. Flow (perm)	882	3527	0	728	3364	0	1176	1761	0	889	1732	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			75			22			45	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		803.7			447.2			425.8			283.1	
Travel Time (s)		57.9			32.2			30.7			20.4	
Confl. Peds. (#/hr)	8		1	1		8	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	167	421	0	60	484	0	13	177	0	166	200	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		8		7	4			6		5	2	
Permitted Phases	8			4			6			2		
Detector Phase	8	8		7	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	15.0	15.0		9.0	15.0		15.0	15.0		9.0	15.0	
Total Split (s)	48.0	48.0		9.0	57.0		32.0	32.0		18.0	50.0	
Total Split (%)	44.9%	44.9%		8.4%	53.3%		29.9%	29.9%		16.8%	46.7%	
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		0.0	1.0		1.0	1.0		0.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		4.0	5.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effct Green (s)	19.8	19.8		25.5	24.4		13.6	13.6		30.4	29.3	
Actuated g/C Ratio	0.31	0.31		0.39	0.38		0.21	0.21		0.47	0.45	
v/c Ratio	0.62	0.39		0.16	0.37		0.05	0.46		0.29	0.25	
Control Delay	32.0	19.4		12.9	12.3		27.1	27.7		14.6	11.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	32.0	19.4		12.9	12.3		27.1	27.7		14.6	11.9	
LOS	C	B		B	B		C	C		B	B	
Approach Delay		23.0			12.4			27.7			13.1	
Approach LOS		C			B			C			B	
Queue Length 50th (m)	18.8	22.8		4.3	17.4		1.4	18.2		12.8	12.3	
Queue Length 95th (m)	43.9	40.1		12.2	33.2		6.8	44.8		32.6	33.3	
Internal Link Dist (m)		779.7			423.2			401.8			259.1	
Turn Bay Length (m)	45.0			50.0			50.0			50.0		
Base Capacity (vph)	630	2521		374	2729		534	813		626	1291	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.27	0.17		0.16	0.18		0.02	0.22		0.27	0.15	

Intersection Summary

Area Type: Other
Cycle Length: 107
Actuated Cycle Length: 64.6
Natural Cycle: 60
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 17.9 — Intersection LOS: B
Intersection Capacity Utilization 57.0% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1010: Nichol Road/140 Street & North Bluff Road



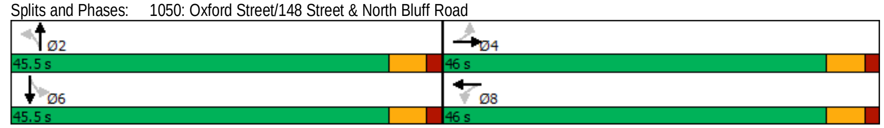
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	571	69	39	387	138	58	217	55	96	162	64
Future Volume (vph)	67	571	69	39	387	138	58	217	55	96	162	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	45.0		0.0	35.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1787	3496	0	1787	3414	0	1787	1816	0	1787	1772	0
Flt Permitted	0.381			0.297			0.582			0.499		
Satd. Flow (perm)	716	3496	0	553	3414	0	1062	1816	0	932	1772	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			70			18			27	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		391.2			502.9			896.6			204.8	
Travel Time (s)		28.2			36.2			64.6			14.7	
Confl. Peds. (#/hr)	3		32	32		3	69		17	17		69
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	85	810	0	49	665	0	73	345	0	122	286	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (s)	46.0	46.0		46.0	46.0		45.5	45.5		45.5	45.5	
Total Split (%)	50.3%	50.3%		50.3%	50.3%		49.7%	49.7%		49.7%	49.7%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.7	1.7		1.7	1.7		1.8	1.8		1.8	1.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		5.8	5.8		5.8	5.8	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	19.5	19.5		19.5	19.5		15.9	15.9		15.9	15.9	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.34	0.34		0.34	0.34	
v/c Ratio	0.29	0.56		0.22	0.46		0.21	0.56		0.39	0.47	
Control Delay	13.5	12.5		13.0	10.5		14.1	16.8		17.6	14.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.5	12.5		13.0	10.5		14.1	16.8		17.6	14.8	
LOS	B	B		B	B		B	B		B	B	
Approach Delay		12.6			10.7			16.3			15.6	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	4.4	24.7		2.5	17.4		4.3	21.7		7.6	16.6	
Queue Length 95th (m)	13.4	42.7		8.9	31.6		12.3	43.5		19.7	34.7	
Internal Link Dist (m)		367.2			478.9			872.6			180.8	
Turn Bay Length (m)	40.0			45.0			35.0			30.0		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	612	2992		473	2929		898	1538		788	1502	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.14	0.27		0.10	0.23		0.08	0.22		0.15	0.19	

Intersection Summary

Area Type: Other
Cycle Length: 91.5
Actuated Cycle Length: 47.4
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.56
Intersection Signal Delay: 13.2 Intersection LOS: B
Intersection Capacity Utilization 69.2% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1050: Oxford Street/148 Street & North Bluff Road



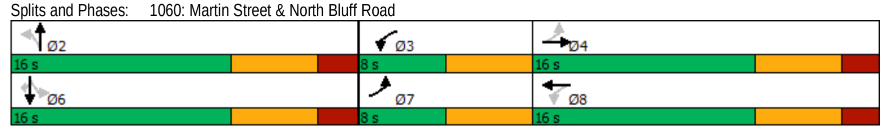
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	153	598	16	59	447	66	26	56	21	63	15	90
Future Volume (vph)	153	598	16	59	447	66	26	56	21	63	15	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	20.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3521	0	1770	3453	0	0	3366	0	0	1790	1583
Flt Permitted	0.401			0.398				0.862			0.688	
Satd. Flow (perm)	739	3521	0	737	3453	0	0	2914	0	0	1264	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			39			23				185
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		502.9			102.1			402.9			184.7	
Travel Time (s)		36.2			7.4			29.0			13.3	
Confl. Peds. (#/hr)	27		12	12		27	30		17	17		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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	166	667	0	64	558	0	0	112	0	0	84	98
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	10.0		4.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	8.0	15.9		8.0	15.8		15.9	15.9		15.9	15.9	15.9
Total Split (s)	8.0	16.0		8.0	16.0		16.0	16.0		16.0	16.0	16.0
Total Split (%)	20.0%	40.0%		20.0%	40.0%		40.0%	40.0%		40.0%	40.0%	40.0%
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)	0.0	1.8		0.0	1.8		1.9	1.9		1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	4.0	5.8		4.0	5.8			5.9			5.9	5.9
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	20.4	18.5		18.8	15.4			10.1			10.1	10.1
Actuated g/C Ratio	0.54	0.49		0.49	0.40			0.27			0.27	0.27
v/c Ratio	0.33	0.39		0.14	0.39			0.14			0.25	0.18
Control Delay	7.8	12.0		6.2	12.4			10.3			14.4	1.5
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	7.8	12.0		6.2	12.4			10.3			14.4	1.5
LOS	A	B		A	B			B			B	A
Approach Delay		11.2			11.7			10.3			7.4	
Approach LOS		B			B			B			A	
Queue Length 50th (m)	5.7	14.9		2.1	16.9			2.5			4.8	0.0
Queue Length 95th (m)	12.7	#43.2		5.9	28.8			6.8			13.0	2.3
Internal Link Dist (m)		478.9			78.1			378.9			160.7	
Turn Bay Length (m)	50.0			50.0								
Base Capacity (vph)	504	1709		474	1419			797			338	539

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.33	0.39		0.14	0.39			0.14			0.25	0.18

Intersection Summary

Area Type: Other
Cycle Length: 40
Actuated Cycle Length: 38.1
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.39
Intersection Signal Delay: 10.9 Intersection LOS: B
Intersection Capacity Utilization 47.3% ICU Level of Service A
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1060: Martin Street & North Bluff Road



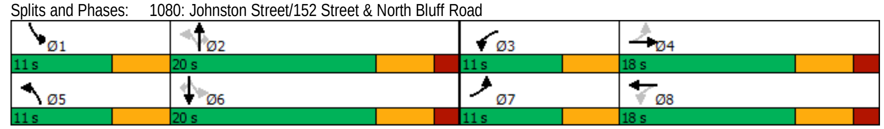
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	511	35	48	422	133	54	250	27	199	277	115
Future Volume (vph)	145	511	35	48	422	133	54	250	27	199	277	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	40.0		0.0	40.0		40.0	50.0		0.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3475	0	1770	3280	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.284			0.352			0.577			0.415		
Satd. Flow (perm)	511	3475	0	638	3280	0	1057	1863	1454	749	1863	1501
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			63				198			198
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		199.3			399.9			810.7			195.6	
Travel Time (s)		14.3			28.8			58.4			14.1	
Confl. Peds. (#/hr)	58		44	44		58	32		56	56		32
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	158	593	0	52	604	0	59	272	29	216	301	125
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	15.9		11.0	15.9		11.0	15.8	15.8	11.0	15.8	15.8
Total Split (s)	11.0	18.0		11.0	18.0		11.0	20.0	20.0	11.0	20.0	20.0
Total Split (%)	18.3%	30.0%		18.3%	30.0%		18.3%	33.3%	33.3%	18.3%	33.3%	33.3%
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)	0.0	1.9		0.0	1.9		0.0	1.8	1.8	0.0	1.8	1.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.9		4.0	5.9		4.0	5.8	5.8	4.0	5.8	5.8
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	20.0	14.1		19.2	12.0		21.9	13.0	13.0	23.7	18.0	18.0
Actuated g/C Ratio	0.35	0.25		0.34	0.21		0.39	0.23	0.23	0.42	0.32	0.32
v/c Ratio	0.47	0.68		0.14	0.81		0.12	0.64	0.06	0.49	0.51	0.20
Control Delay	16.2	26.0		11.7	30.7		10.3	28.0	0.2	14.8	23.3	1.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.2	26.0		11.7	30.7		10.3	28.0	0.2	14.8	23.3	1.9
LOS	B	C		B	C		B	C	A	B	C	A
Approach Delay		23.9			29.2			22.9			16.3	
Approach LOS		C			C			C			B	
Queue Length 50th (m)	11.2	34.3		3.5	32.0		3.7	28.2	0.0	14.8	31.7	0.0
Queue Length 95th (m)	22.0	#60.0		9.0	#58.5		9.2	50.1	0.0	27.5	#62.2	3.8
Internal Link Dist (m)		175.3			375.9			786.7			171.6	
Turn Bay Length (m)	40.0			40.0			40.0		40.0	50.0		
Base Capacity (vph)	339	896		360	763		500	476	519	444	593	613

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.66		0.14	0.79		0.12	0.57	0.06	0.49	0.51	0.20

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 56.4
Natural Cycle: 60
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 23.2 Intersection LOS: C
Intersection Capacity Utilization 65.6% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1080: Johnston Street/152 Street & North Bluff Road



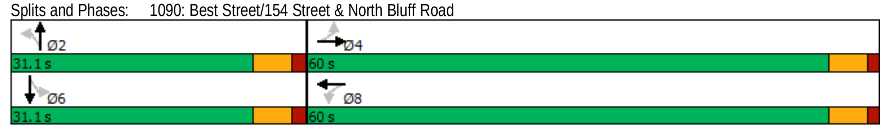
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	652	61	30	523	55	32	82	16	29	44	34
Future Volume (vph)	47	652	61	30	523	55	32	82	16	29	44	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	55.0		0.0	35.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3484	0	1770	3482	0	1770	1811	0	1770	1722	0
Flt Permitted	0.414			0.358			0.741			0.741		
Satd. Flow (perm)	770	3484	0	664	3482	0	1363	1811	0	1365	1722	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			22			10			37	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		399.9			401.5			193.1			201.3	
Travel Time (s)		28.8			28.9			13.9			14.5	
Confl. Peds. (#/hr)	3		14	14		3	13		12	12		13
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	775	0	33	628	0	35	106	0	32	85	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	15.4	15.4		15.4	15.4		15.7	15.7		15.7	15.7	
Total Split (s)	60.0	60.0		60.0	60.0		31.1	31.1		31.1	31.1	
Total Split (%)	65.9%	65.9%		65.9%	65.9%		34.1%	34.1%		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)	1.4	1.4		1.4	1.4		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.4	5.4		5.4	5.4		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	23.2	23.2		23.2	23.2		10.6	10.6		10.6	10.6	
Actuated g/C Ratio	0.67	0.67		0.67	0.67		0.31	0.31		0.31	0.31	
v/c Ratio	0.10	0.33		0.07	0.27		0.08	0.19		0.08	0.15	
Control Delay	6.6	6.0		6.6	5.6		12.1	11.5		12.1	8.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.6	6.0		6.6	5.6		12.1	11.5		12.1	8.7	
LOS	A	A		A	A		B	B		B	A	
Approach Delay		6.0			5.6			11.6			9.6	
Approach LOS		A			A			B			A	
Queue Length 50th (m)	1.8	17.0		1.2	12.9		1.6	4.6		1.5	2.2	
Queue Length 95th (m)	6.2	28.2		4.5	22.0		7.2	15.1		6.7	10.6	
Internal Link Dist (m)		375.9			377.5			169.1			177.3	
Turn Bay Length (m)	50.0			55.0			35.0			55.0		
Base Capacity (vph)	770	3484		664	3482		1030	1371		1031	1310	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.07	0.22		0.05	0.18		0.03	0.08		0.03	0.06	

Intersection Summary

Area Type: Other
Cycle Length: 91.1
Actuated Cycle Length: 34.5
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.33
Intersection Signal Delay: 6.6 Intersection LOS: A
Intersection Capacity Utilization 50.6% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1090: Best Street/154 Street & North Bluff Road



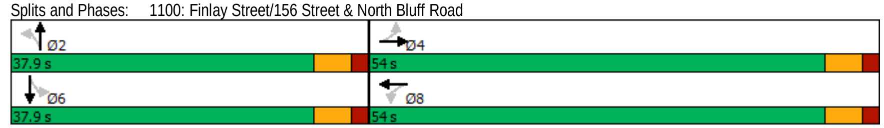
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	653	43	78	499	87	15	137	25	44	109	40
Future Volume (vph)	49	653	43	78	499	87	15	137	25	44	109	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	40.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3502	0	1770	3449	0	1770	1809	0	1770	1775	0
Flt Permitted	0.410			0.364			0.655			0.646		
Satd. Flow (perm)	762	3502	0	677	3449	0	1205	1809	0	1177	1775	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			33			11			22	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		401.5			402.3			816.6			217.9	
Travel Time (s)		28.9			29.0			58.8			15.7	
Confl. Peds. (#/hr)	5		6	6		5	18		33	33		18
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	53	757	0	85	637	0	16	176	0	48	161	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	16.0	16.0		16.0	16.0		15.9	15.9		15.9	15.9	
Total Split (s)	54.0	54.0		54.0	54.0		37.9	37.9		37.9	37.9	
Total Split (%)	58.8%	58.8%		58.8%	58.8%		41.2%	41.2%		41.2%	41.2%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	20.5	20.5		20.5	20.5		11.3	11.3		11.3	11.3	
Actuated g/C Ratio	0.54	0.54		0.54	0.54		0.30	0.30		0.30	0.30	
v/c Ratio	0.13	0.40		0.23	0.34		0.04	0.32		0.14	0.29	
Control Delay	8.3	8.3		9.9	7.6		12.3	13.5		13.1	12.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.3	8.3		9.9	7.6		12.3	13.5		13.1	12.5	
LOS	A	A		A	A		B	B		B	B	
Approach Delay		8.3			7.9			13.4			12.6	
Approach LOS		A			A			B			B	
Queue Length 50th (m)	2.0	17.5		3.4	13.5		0.8	8.7		2.4	7.3	
Queue Length 95th (m)	7.6	33.4		12.0	26.7		4.4	24.3		9.3	21.4	
Internal Link Dist (m)		377.5			378.3			792.6			193.9	
Turn Bay Length (m)	50.0			40.0			50.0			50.0		
Base Capacity (vph)	761	3498		676	3445		1009	1517		985	1490	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.07	0.22		0.13	0.18		0.02	0.12		0.05	0.11	

Intersection Summary

Area Type: Other
Cycle Length: 91.9
Actuated Cycle Length: 37.8
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.40
Intersection Signal Delay: 9.1 Intersection LOS: A
Intersection Capacity Utilization 65.0% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1100: Finlay Street/156 Street & North Bluff Road



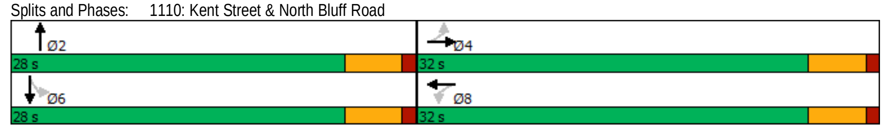
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	668	67	1	724	96	0	5	114	0	0	0
Future Volume (vph)	51	668	67	1	724	96	0	5	114	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3409	0	0	3422	0	0	1587	0	0	1845	0
Flt Permitted		0.777			0.954							
Satd. Flow (perm)	0	2655	0	0	3264	0	0	1587	0	0	1845	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			31			55				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		402.3			400.8			238.4			72.1	
Travel Time (s)		29.0			28.9			17.2			5.2	
Confl. Peds. (#/hr)	27		107	107		27	581		1	1		581
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	925	0	0	966	0	0	140	0	0	0	0
Turn Type	Perm	NA		Perm	NA			NA				
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8			2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0			7.0		7.0	7.0	
Minimum Split (s)	20.0	20.0		20.0	20.0			28.0		28.0	28.0	
Total Split (s)	32.0	32.0		32.0	32.0			28.0		28.0	28.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%			46.7%		46.7%	46.7%	
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	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None			Ped		Ped	Ped	
Act Effct Green (s)		22.7			22.7			23.2				
Actuated g/C Ratio		0.41			0.41			0.42				
v/c Ratio		0.85			0.72			0.20				
Control Delay		23.4			16.7			8.8				
Queue Delay		0.0			0.0			0.0				
Total Delay		23.4			16.7			8.8				
LOS		C			B			A				
Approach Delay		23.4			16.7			8.8				
Approach LOS		C			B			A				
Queue Length 50th (m)		43.8			41.6			5.6				
Queue Length 95th (m)		59.7			54.9			15.1				
Internal Link Dist (m)		378.3			376.8			214.4			48.1	
Turn Bay Length (m)												
Base Capacity (vph)		1299			1602			689				
Starvation Cap Reductn		0			0			0				
Spillback Cap Reductn		0			0			0				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0				
Reduced v/c Ratio		0.71			0.60			0.20				

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 55.9
Natural Cycle: 60
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 19.2 Intersection LOS: B
Intersection Capacity Utilization 77.7% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1110: Kent Street & North Bluff Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	507	126	62	515	2	92	179	120	12	171	176
Future Volume (vph)	103	507	126	62	515	2	92	179	120	12	171	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	35.0		0.0	45.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3413	0	1770	3535	0	1770	1736	0	1770	1699	0
Flt Permitted	0.305			0.254			0.311			0.564		
Satd. Flow (perm)	563	3413	0	472	3535	0	576	1736	0	1046	1699	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27						33			50	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		400.8			526.2			414.4			217.2	
Travel Time (s)		28.9			37.9			29.8			15.6	
Confl. Peds. (#/hr)	17		6	6		17	17		12	12		17
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	112	688	0	67	562	0	100	325	0	13	377	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	10.0		7.0	10.0	
Minimum Split (s)	11.5	15.4		11.5	15.4		11.5	15.8		11.5	15.8	
Total Split (s)	15.0	42.0		13.0	40.0		13.0	50.2		12.0	49.2	
Total Split (%)	12.8%	35.8%		11.1%	34.1%		11.1%	42.8%		10.2%	42.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	1.4		0.0	1.4		0.0	1.8		0.0	1.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.4		4.0	5.4		4.0	5.8		4.0	5.8	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effct Green (s)	32.0	23.6		29.7	22.5		34.9	31.5		31.0	23.9	
Actuated g/C Ratio	0.41	0.30		0.38	0.29		0.45	0.40		0.40	0.31	
v/c Ratio	0.29	0.65		0.21	0.55		0.25	0.45		0.03	0.68	
Control Delay	17.5	28.4		16.9	28.8		15.7	19.7		14.2	30.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.5	28.4		16.9	28.8		15.7	19.7		14.2	30.2	
LOS	B	C		B	C		B	B		B	C	
Approach Delay		26.9			27.5			18.7			29.7	
Approach LOS		C			C			B			C	
Queue Length 50th (m)	10.5	50.2		6.1	42.1		8.8	30.8		1.1	47.9	
Queue Length 95th (m)	25.4	85.4		16.7	72.1		21.8	77.5		4.8	92.9	
Internal Link Dist (m)		376.8			502.2			390.4			193.2	
Turn Bay Length (m)	60.0			35.0			45.0			30.0		
Base Capacity (vph)	433	1835		355	1785		414	1075		510	1043	

Lanes, Volumes, Timings
1120: 160 Street & North Bluff Road

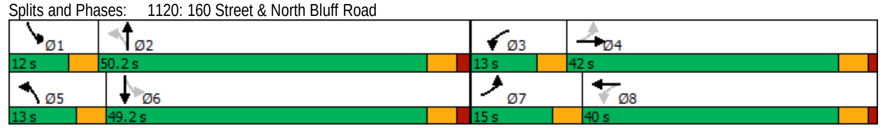
2025 AM
08/14/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.26	0.37		0.19	0.31		0.24	0.30		0.03	0.36	

Intersection Summary

Area Type: Other
Cycle Length: 117.2
Actuated Cycle Length: 78
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 26.0 — Intersection LOS: C
Intersection Capacity Utilization 66.4% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1120: 160 Street & North Bluff Road



HCM Unsignalized Intersection Capacity Analysis — 2025 AM
320: Marine Dr/8 Ave — 08/14/2020

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	166	111	97	105	45
Future Volume (Veh/h)	30	166	111	97	105	45
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	36	200	134	117	127	54
Pedestrians		2			7	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.2			1.2	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	258				472	202
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	258				472	202
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				76	94
cM capacity (veh/h)	1305				534	836

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	236	251	181
Volume Left	36	0	127
Volume Right	0	117	54
cSH	1305	1700	599
Volume to Capacity	0.03	0.15	0.30
Queue Length 95th (m)	0.7	0.0	10.2
Control Delay (s)	1.4	0.0	13.6
Lane LOS	A		B
Approach Delay (s)	1.4	0.0	13.6
Approach LOS			B

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2025 AM
520: Pacific Ave/10 Ave — 08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	23	14	12	18	56	18	164	4	34	130	25
Future Volume (Veh/h)	38	23	14	12	18	56	18	164	4	34	130	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	49	29	18	15	23	72	23	210	5	44	167	32
Pedestrians		1			4						3	
Lane Width (m)		3.6			3.6						3.6	
Walking Speed (m/s)		1.2			1.2						1.2	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	617	537	184	566	550	220	200			219		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	617	537	184	566	550	220	200			219		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	86	93	98	96	95	91	98			97		
cM capacity (veh/h)	339	429	863	389	422	820	1383			1358		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	96	110	238	243
Volume Left	49	15	23	44
Volume Right	18	72	5	32
cSH	412	608	1383	1358
Volume to Capacity	0.23	0.18	0.02	0.03
Queue Length 95th (m)	7.1	5.2	0.4	0.8
Control Delay (s)	16.4	12.2	0.9	1.6
Lane LOS	C	B	A	A
Approach Delay (s)	16.4	12.2	0.9	1.6
Approach LOS	C	B		

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	34.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2025 AM
680: Johnston Rd/Johnston Street & Buena Vista Ave/Pacific Ave — 08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	40	1	5	36	180	0	0	0	120	32	16
Future Volume (Veh/h)	27	40	1	5	36	180	0	0	0	120	32	16
Sign Control		Stop			Yield			Free			Free	
Grade		0%			0%			0%			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)	30	44	1	5	40	198	0	0	0	132	35	18
Pedestrians		18			22			17				
Lane Width (m)		3.6			3.6			0.0				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		2			2			0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	544	348	79	370	357	22	71			22		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	544	348	79	370	357	22	71			22		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	90	91	100	99	92	81	100			92		
cM capacity (veh/h)	310	513	972	494	507	1042	1519			1577		

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	75	243	185
Volume Left	30	5	132
Volume Right	1	198	18
cSH	409	871	1577
Volume to Capacity	0.18	0.28	0.08
Queue Length 95th (m)	5.3	9.2	2.2
Control Delay (s)	15.8	10.7	5.5
Lane LOS	C	B	A
Approach Delay (s)	15.8	10.7	5.5
Approach LOS	C	B	

Intersection Summary			
Average Delay	9.6		
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2025 AM
700: Finlay Street — 08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	116	3	4	111	35	1	39	5	28	17	47
Future Volume (Veh/h)	53	116	3	4	111	35	1	39	5	28	17	47
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	65	143	4	5	137	43	1	48	6	35	21	58
Pedestrians		2			8			4			6	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			1			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	186			151			496	475	157	486	456	166
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	186			151			496	475	157	486	456	166
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			100			100	90	99	92	96	93
cM capacity (veh/h)	1394			1438			418	463	885	428	475	877

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	65	147	5	180	55	114
Volume Left	65	0	5	0	1	35
Volume Right	0	4	0	43	6	58
cSH	1394	1700	1438	1700	487	593
Volume to Capacity	0.05	0.09	0.00	0.11	0.11	0.19
Queue Length 95th (m)	1.2	0.0	0.1	0.0	3.0	5.6
Control Delay (s)	7.7	0.0	7.5	0.0	13.3	12.5
Lane LOS	A		A		B	B
Approach Delay (s)	2.4		0.2		13.3	12.5
Approach LOS					B	B

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	34.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
710: Marine Dr & Nichol Road

2025 AM
08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	70	1	1	82	32	1	6	1	57	6	41
Future Volume (Veh/h)	77	70	1	1	82	32	1	6	1	57	6	41
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	85	77	1	1	90	35	1	7	1	63	7	45
Pedestrians					3			2			2	
Lane Width (m)					3.6			3.6			3.6	
Walking Speed (m/s)					1.2			1.2			1.2	
Percent Blockage					0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	127			80			408	378	82	366	362	110
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	127			80			408	378	82	366	362	110
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			100			100	99	100	89	99	95
cM capacity (veh/h)	1469			1528			500	522	979	557	534	948

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	163	126	9	115
Volume Left	85	1	1	63
Volume Right	1	35	1	45
cSH	1469	1528	548	662
Volume to Capacity	0.06	0.00	0.02	0.17
Queue Length 95th (m)	1.5	0.0	0.4	5.0
Control Delay (s)	4.2	0.1	11.7	11.6
Lane LOS	A	A	B	B
Approach Delay (s)	4.2	0.1	11.7	11.6
Approach LOS			B	B

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
720: Buena Vista Ave/12 Ave & 160 Street

2025 AM
08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	138	9	50	5	15	26	36	231	7	12	144	77
Future Volume (Veh/h)	138	9	50	5	15	26	36	231	7	12	144	77
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	177	12	64	6	19	33	46	296	9	15	185	99
Pedestrians		8			6			5			5	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	712	676	248	738	720	312	292			311		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	712	676	248	738	720	312	292			311		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	41	97	92	98	94	95	96			99		
cM capacity (veh/h)	302	356	788	285	335	727	1273			1255		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	253	58	351	299
Volume Left	177	6	46	15
Volume Right	64	33	9	99
cSH	361	471	1273	1255
Volume to Capacity	0.70	0.12	0.04	0.01
Queue Length 95th (m)	40.9	3.3	0.9	0.3
Control Delay (s)	35.3	13.7	1.3	0.5
Lane LOS	E	B	A	A
Approach Delay (s)	35.3	13.7	1.3	0.5
Approach LOS	E	B		

Intersection Summary			
Average Delay	10.8		
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1020: Phoenix Street/142 Street & North Bluff Road

2025 AM
08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	34	620	4	2	466	14	2	3	3	49	8	32
Future Volume (Veh/h)	34	620	4	2	466	14	2	3	3	49	8	32
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	37	674	4	2	507	15	2	3	3	53	9	35
Pedestrians		7			2			32				
Lane Width (m)		3.6			3.6			3.6				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		1			0			3				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	522			710			1086	1308	373	936	1302	268
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	522			710			1086	1308	373	936	1302	268
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			99	98	100	74	94	95
cM capacity (veh/h)	1041			861			143	148	607	205	149	726

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	374	341	256	268	8	97
Volume Left	37	0	2	0	2	53
Volume Right	0	4	0	15	3	35
cSH	1041	1700	861	1700	204	264
Volume to Capacity	0.04	0.20	0.00	0.16	0.04	0.37
Queue Length 95th (m)	0.9	0.0	0.1	0.0	1.0	12.9
Control Delay (s)	1.2	0.0	0.1	0.0	23.4	26.4
Lane LOS	A		A		C	D
Approach Delay (s)	0.6		0.0		23.4	26.4
Approach LOS					C	D

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1030: Archibald Road/144 Street & North Bluff Road

2025 AM
08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	611	13	37	462	26	6	13	27	28	6	14
Future Volume (Veh/h)	19	611	13	37	462	26	6	13	27	28	6	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	664	14	40	502	28	7	14	29	30	7	15
Pedestrians		15			7			2			4	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	534			680			1080	1329	348	1017	1322	284
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	534			680			1080	1329	348	1017	1322	284
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 %	98			96			95	90	95	81	95	98
cM capacity (veh/h)	1026			907			152	143	643	159	145	702

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	21	443	235	40	335	195	50	52
Volume Left	21	0	0	40	0	0	7	30
Volume Right	0	0	14	0	0	28	29	15
cSH	1026	1700	1700	907	1700	1700	265	201
Volume to Capacity	0.02	0.26	0.14	0.04	0.20	0.11	0.19	0.26
Queue Length 95th (m)	0.5	0.0	0.0	1.1	0.0	0.0	5.5	7.9
Control Delay (s)	8.6	0.0	0.0	9.2	0.0	0.0	21.7	29.0
Lane LOS	A			A			C	D
Approach Delay (s)	0.3			0.6			21.7	29.0
Approach LOS							C	D

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	627	498	10	12	8
Future Volume (Veh/h)	26	627	498	10	12	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	682	541	11	13	9
Pedestrians			1		1	
Lane Width (m)			3.6		3.6	
Walking Speed (m/s)			1.2		1.2	
Percent Blockage			0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			391			
pX, platoon unblocked						
vC, conflicting volume	553				946	277
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	553				946	277
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				95	99
cM capacity (veh/h)	1012				252	720

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	255	455	361	191	22
Volume Left	28	0	0	0	13
Volume Right	0	0	0	11	9
cSH	1012	1700	1700	1700	344
Volume to Capacity	0.03	0.27	0.21	0.11	0.06
Queue Length 95th (m)	0.7	0.0	0.0	0.0	1.6
Control Delay (s)	1.2	0.0	0.0	0.0	16.2
Lane LOS	A				C
Approach Delay (s)	0.4		0.0		16.2
Approach LOS					C

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	668	14	5	572	0	6
Future Volume (Veh/h)	668	14	5	572	0	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	726	15	5	622	0	7
Pedestrians	9				26	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	1				2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	102			199		
pX, platoon unblocked			0.88		0.91	0.88
vC, conflicting volume			767		1090	396
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			451		585	29
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	99
cM capacity (veh/h)			948		388	891

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	484	257	5	311	311	7
Volume Left	0	0	5	0	0	0
Volume Right	0	15	0	0	0	7
cSH	1700	1700	948	1700	1700	891
Volume to Capacity	0.28	0.15	0.01	0.18	0.18	0.01
Queue Length 95th (m)	0.0	0.0	0.1	0.0	0.0	0.2
Control Delay (s)	0.0	0.0	8.8	0.0	0.0	9.1
Lane LOS			A			A
Approach Delay (s)	0.0		0.1			9.1
Approach LOS						A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	29.0%	ICU Level of Service	A
Analysis Period (min)	15		

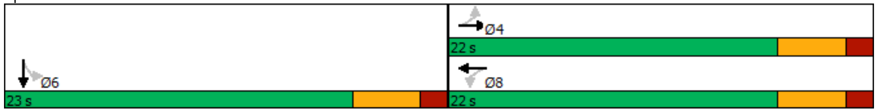
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	133	4	9	146	66	0	0	0	69	16	77
Future Volume (vph)	36	133	4	9	146	66	0	0	0	69	16	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	1874	0	0	1791	0	0	0	0	1805	1595	0
Flt Permitted		0.904			0.987					0.950		
Satd. Flow (perm)	0	1703	0	0	1771	0	0	0	0	1802	1595	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			55						87	
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		217.8			282.3			23.9			896.6	
Travel Time (s)		26.1			33.9			1.7			64.6	
Confl. Peds. (#/hr)	25		2	2		25	22		1	1		22
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	193	0	0	248	0	0	0	0	78	105	0
Turn Type	Perm	NA		Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8					6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0					7.0	7.0	
Minimum Split (s)	21.0	21.0		21.0	21.0					21.0	21.0	
Total Split (s)	22.0	22.0		22.0	22.0					23.0	23.0	
Total Split (%)	48.9%	48.9%		48.9%	48.9%					51.1%	51.1%	
Yellow Time (s)	3.5	3.5		3.5	3.5					3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5					1.5	1.5	
Lost Time Adjust (s)		0.0			0.0					0.0	0.0	
Total Lost Time (s)		5.0			5.0					5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min					None	None	
Act Effct Green (s)		16.3			16.3					7.4	7.4	
Actuated g/C Ratio		0.54			0.54					0.24	0.24	
v/c Ratio		0.21			0.26					0.18	0.23	
Control Delay		6.6			5.6					9.4	4.6	
Queue Delay		0.0			0.0					0.0	0.0	
Total Delay		6.6			5.6					9.4	4.6	
LOS		A			A					A	A	
Approach Delay		6.6			5.6						6.7	
Approach LOS		A			A						A	
Queue Length 50th (m)		5.3			5.3					2.6	0.6	
Queue Length 95th (m)		12.7			13.6					7.4	5.6	
Internal Link Dist (m)		193.8			258.3			0.1			872.6	
Turn Bay Length (m)										30.0		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		1151			1214					1084	994	
Starvation Cap Reductn		0			0					0	0	
Spillback Cap Reductn		0			0					0	0	
Storage Cap Reductn		0			0					0	0	
Reduced v/c Ratio		0.17			0.20					0.07	0.11	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 30.4
Natural Cycle: 45
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.26
Intersection Signal Delay: 6.2 Intersection LOS: A
Intersection Capacity Utilization 41.6% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 750: Marine Dr & Oxford Street



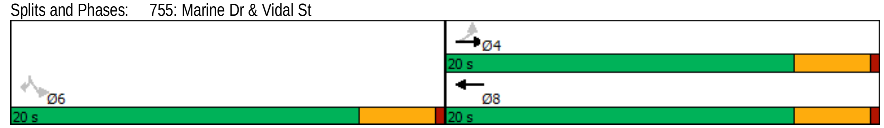
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	30	162	172	41	28	53
Future Volume (vph)	30	162	172	41	28	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1885	1818	0	1805	1615
Flt Permitted		0.943			0.950	
Satd. Flow (perm)	0	1777	1818	0	1805	1539
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			36			60
Link Speed (k/h)		30	30		50	
Link Distance (m)		282.3	128.9		78.4	
Travel Time (s)		33.9	15.5		5.6	
Confl. Peds. (#/hr)	58			58		22
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	216	239	0	31	60
Turn Type	Perm	NA	NA		Perm	Perm
Protected Phases		4	8			
Permitted Phases	4				6	6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		7.0	7.0
Minimum Split (s)	20.0	20.0	20.0		20.0	20.0
Total Split (s)	20.0	20.0	20.0		20.0	20.0
Total Split (%)	50.0%	50.0%	50.0%		50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	0.5	0.5	0.5		0.5	0.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min		None	None
Act Effct Green (s)		21.5	21.5		7.1	7.1
Actuated g/C Ratio		0.77	0.77		0.25	0.25
v/c Ratio		0.16	0.17		0.07	0.14
Control Delay		3.7	3.3		7.7	3.5
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		3.7	3.3		7.7	3.5
LOS		A	A		A	A
Approach Delay		3.7	3.3		5.0	
Approach LOS		A	A		A	
Queue Length 50th (m)		0.0	0.0		1.1	0.0
Queue Length 95th (m)		10.4	10.1		3.1	3.1
Internal Link Dist (m)		258.3	104.9		54.4	
Turn Bay Length (m)						
Base Capacity (vph)		1501	1541		1039	911
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.14	0.16		0.03	0.07

Intersection Summary

Area Type: Other
Cycle Length: 40
Actuated Cycle Length: 27.9
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.17
Intersection Signal Delay: 3.7 Intersection LOS: A
Intersection Capacity Utilization 43.1% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 755: Marine Dr & Vidal St



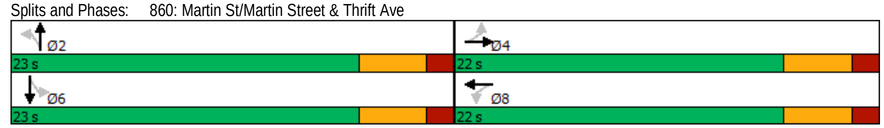
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (vph)	26	220	20	11	186	65	20	57	7	92	60	25
Future Volume (vph)	26	220	20	11	186	65	20	57	7	92	60	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1866	0	0	1811	0	0	1852	0	0	1809	0
Flt Permitted		0.954			0.984			0.897			0.791	
Satd. Flow (perm)	0	1786	0	0	1784	0	0	1675	0	0	1454	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			42			7			22	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		147.0			159.6			143.4			402.9	
Travel Time (s)		10.6			11.5			10.3			29.0	
Confl. Peds. (#/hr)	19		16	16		19	14		10	14		10
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
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	275	0	0	270	0	0	87	0	0	183	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	21.0	21.0		21.0	21.0		21.0	21.0		21.0	21.0	
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)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)		18.1			18.1			9.1			9.1	
Actuated g/C Ratio		0.62			0.62			0.31			0.31	
v/c Ratio		0.25			0.24			0.17			0.39	
Control Delay		7.2			6.5			8.1			10.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		7.2			6.5			8.1			10.0	
LOS		A			A			A			B	
Approach Delay		7.2			6.5			8.1			10.0	
Approach LOS		A			A			A			B	
Queue Length 50th (m)		8.5			7.2			2.6			5.6	
Queue Length 95th (m)		24.4			21.8			9.5			17.7	
Internal Link Dist (m)		123.0			135.6			119.4			378.9	
Turn Bay Length (m)												
Base Capacity (vph)		1242			1250			1078			942	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.22			0.22			0.08			0.19	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 29.3
Natural Cycle: 45
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.39
Intersection Signal Delay: 7.7 Intersection LOS: A
Intersection Capacity Utilization 48.1% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 860: Martin St/Martin Street & Thrift Ave



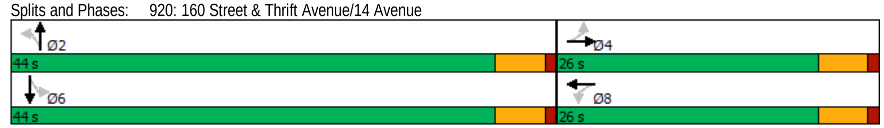
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	100	33	21	137	37	28	313	18	78	389	51
Future Volume (vph)	28	100	33	21	137	37	28	313	18	78	389	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	1788	0	0	1792	0	1770	1845	0	1770	1826	0
Flt Permitted		0.924			0.942		0.445			0.546		
Satd. Flow (perm)	0	1661	0	0	1697	0	828	1845	0	1011	1826	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			17			7			15	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		203.7			211.4			403.8			414.4	
Travel Time (s)		14.7			15.2			29.1			29.8	
Confl. Peds. (#/hr)	14		2	2		14	3		12	12		3
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	175	0	0	212	0	30	360	0	85	478	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		15.0	15.0		15.0	15.0	
Total Split (s)	26.0	26.0		26.0	26.0		44.0	44.0		44.0	44.0	
Total Split (%)	37.1%	37.1%		37.1%	37.1%		62.9%	62.9%		62.9%	62.9%	
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	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		11.0			11.1		20.9	20.9		20.9	20.9	
Actuated g/C Ratio		0.30			0.30		0.56	0.56		0.56	0.56	
v/c Ratio		0.35			0.41		0.06	0.35		0.15	0.46	
Control Delay		13.1			14.0		7.0	8.2		7.6	9.3	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		13.1			14.0		7.0	8.2		7.6	9.3	
LOS		B			B		A	A		A	A	
Approach Delay		13.1			14.0			8.1			9.0	
Approach LOS		B			B			A			A	
Queue Length 50th (m)		7.8			9.9		1.0	14.1		3.0	20.0	
Queue Length 95th (m)		25.0			30.2		4.8	35.1		10.4	49.2	
Internal Link Dist (m)		179.7			187.4			379.8			390.4	
Turn Bay Length (m)							50.0			50.0		
Base Capacity (vph)		1018			1039		774	1725		945	1708	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.17			0.20		0.04	0.21		0.09	0.28	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 37.2
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.46
Intersection Signal Delay: 10.1 Intersection LOS: B
Intersection Capacity Utilization 58.4% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 920: 160 Street & Thrift Avenue/14 Avenue



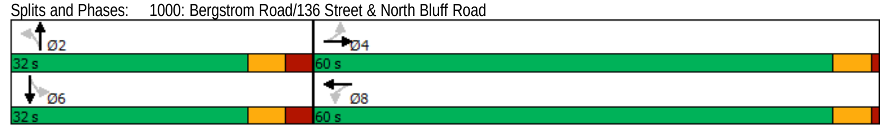
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	452	17	61	554	61	22	68	34	26	33	27
Future Volume (vph)	28	452	17	61	554	61	22	68	34	26	33	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3501	0	0	3472	0	1770	1759	0	1770	1713	0
Flt Permitted		0.898			0.867		0.715			0.685		
Satd. Flow (perm)	0	3153	0	0	3014	0	1306	1759	0	1270	1713	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			20			27			29	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		121.6			803.7			309.0			286.0	
Travel Time (s)		8.8			57.9			22.2			20.6	
Confl. Peds. (#/hr)	3		77	77		3	19		5	5		19
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	539	0	0	734	0	24	111	0	28	65	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		17.0	17.0		17.0	17.0	
Total Split (s)	60.0	60.0		60.0	60.0		32.0	32.0		32.0	32.0	
Total Split (%)	65.2%	65.2%		65.2%	65.2%		34.8%	34.8%		34.8%	34.8%	
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		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0		7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)		21.3			21.3		10.4	10.4		10.4	10.4	
Actuated g/C Ratio		0.56			0.56		0.27	0.27		0.27	0.27	
v/c Ratio		0.31			0.44		0.07	0.22		0.08	0.13	
Control Delay		7.2			8.1		13.1	11.6		13.3	9.4	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		7.2			8.1		13.1	11.6		13.3	9.4	
LOS		A			A		B	B		B	A	
Approach Delay		7.2			8.1			11.9			10.6	
Approach LOS		A			A			B			B	
Queue Length 50th (m)		12.0			17.4		1.2	4.4		1.4	1.8	
Queue Length 95th (m)		20.7			29.7		5.9	15.4		6.6	9.4	
Internal Link Dist (m)		97.6			779.7			285.0			262.0	
Turn Bay Length (m)							30.0			30.0		
Base Capacity (vph)		3153			3014		869	1180		845	1150	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.17			0.24		0.03	0.09		0.03	0.06	

Intersection Summary

Area Type: Other
Cycle Length: 92
Actuated Cycle Length: 38.3
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.44
Intersection Signal Delay: 8.3 Intersection LOS: A
Intersection Capacity Utilization 55.6% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1000: Bergstrom Road/136 Street & North Bluff Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	112	329	11	62	510	109	15	78	38	131	128	136
Future Volume (vph)	112	329	11	62	510	109	15	78	38	131	128	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	50.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3519	0	1770	3431	0	1770	1763	0	1770	1708	0
Flt Permitted	0.396			0.437			0.584			0.511		
Satd. Flow (perm)	735	3519	0	814	3431	0	1087	1763	0	951	1708	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			35			20			58	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		803.7			447.2			425.8			283.1	
Travel Time (s)		57.9			32.2			30.7			20.4	
Confl. Peds. (#/hr)	8		1	1		8	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	122	370	0	67	672	0	16	126	0	142	287	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		8		7	4			6		5	2	
Permitted Phases	8			4			6			2		
Detector Phase	8	8		7	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	15.0	15.0		9.0	15.0		15.0	15.0		9.0	15.0	
Total Split (s)	50.0	50.0		11.0	61.0		27.0	27.0		19.0	46.0	
Total Split (%)	46.7%	46.7%		10.3%	57.0%		25.2%	25.2%		17.8%	43.0%	
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		0.0	1.0		1.0	1.0		0.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		4.0	5.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effct Green (s)	19.1	19.1		25.7	24.6		12.4	12.4		24.7	23.6	
Actuated g/C Ratio	0.32	0.32		0.43	0.41		0.21	0.21		0.42	0.40	
v/c Ratio	0.52	0.33		0.14	0.47		0.07	0.33		0.26	0.40	
Control Delay	29.4	18.2		11.4	13.2		27.8	25.6		14.7	13.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	29.4	18.2		11.4	13.2		27.8	25.6		14.7	13.6	
LOS	C	B		B	B		C	C		B	B	
Approach Delay		21.0			13.0			25.8			14.0	
Approach LOS		C			B			C			B	
Queue Length 50th (m)	12.8	18.7		4.2	25.8		1.7	11.5		10.5	18.6	
Queue Length 95th (m)	33.6	34.8		12.6	48.7		8.0	32.6		27.6	47.5	
Internal Link Dist (m)		779.7			423.2			401.8			259.1	
Turn Bay Length (m)	45.0			50.0			50.0			50.0		
Base Capacity (vph)	564	2703		478	2985		452	746		652	1241	

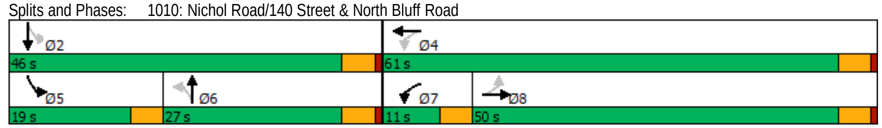
Lanes, Volumes, Timings 2025 PM
1010: Nichol Road/140 Street & North Bluff Road 08/14/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.22	0.14		0.14	0.23		0.04	0.17		0.22	0.23	

Intersection Summary

Area Type: Other
Cycle Length: 107
Actuated Cycle Length: 59.5
Natural Cycle: 55
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 16.4 Intersection LOS: B
Intersection Capacity Utilization 53.7% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1010: Nichol Road/140 Street & North Bluff Road



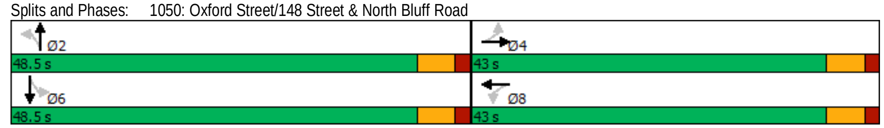
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	512	88	67	550	116	79	154	53	150	253	88
Future Volume (vph)	61	512	88	67	550	116	79	154	53	150	253	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	45.0		0.0	35.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1805	3506	0	1805	3483	0	1805	1815	0	1805	1799	0
Flt Permitted	0.326			0.371			0.474			0.615		
Satd. Flow (perm)	612	3506	0	698	3483	0	878	1815	0	1155	1799	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			33			25			26	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		391.2			502.9			896.6			204.8	
Travel Time (s)		28.2			36.2			64.6			14.7	
Confl. Peds. (#/hr)	29		23	23		29	72		25	25		72
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	667	0	74	740	0	88	230	0	167	379	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (s)	43.0	43.0		43.0	43.0		48.5	48.5		48.5	48.5	
Total Split (%)	47.0%	47.0%		47.0%	47.0%		53.0%	53.0%		53.0%	53.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.7	1.7		1.7	1.7		1.8	1.8		1.8	1.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		5.8	5.8		5.8	5.8	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	17.6	17.6		17.6	17.6		16.9	16.9		16.9	16.9	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.36	0.36		0.36	0.36	
v/c Ratio	0.30	0.50		0.28	0.56		0.28	0.34		0.40	0.57	
Control Delay	15.6	12.6		14.8	13.2		14.1	11.8		15.2	15.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.6	12.6		14.8	13.2		14.1	11.8		15.2	15.4	
LOS	B	B		B	B		B	B		B	B	
Approach Delay		12.9			13.3			12.4			15.3	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	3.8	20.3		4.1	23.0		5.0	11.7		9.9	22.3	
Queue Length 95th (m)	14.5	43.1		15.1	48.3		16.3	30.7		27.8	53.7	
Internal Link Dist (m)		367.2			478.9			872.6			180.8	
Turn Bay Length (m)	40.0			45.0			35.0			30.0		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	499	2866		569	2849		776	1608		1021	1593	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.14	0.23		0.13	0.26		0.11	0.14		0.16	0.24	

Intersection Summary

Area Type: Other
Cycle Length: 91.5
Actuated Cycle Length: 46.6
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 13.5 Intersection LOS: B
Intersection Capacity Utilization 75.2% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1050: Oxford Street/148 Street & North Bluff Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	539	25	48	479	226	36	152	28	179	120	220
Future Volume (vph)	172	539	25	48	479	226	36	152	28	179	120	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	20.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3508	0	1770	3323	0	0	3433	0	0	1809	1583
Flt Permitted	0.241			0.420				0.856			0.681	
Satd. Flow (perm)	446	3508	0	776	3323	0	0	2954	0	0	1260	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			137			30				239
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		502.9			102.1			402.9			184.7	
Travel Time (s)		36.2			7.4			29.0			13.3	
Confl. Peds. (#/hr)	27		12	12		27	30		17	17		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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	187	613	0	52	767	0	0	234	0	0	325	239
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	10.0		4.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	8.0	15.9		8.0	15.8		15.9	15.9		15.9	15.9	15.9
Total Split (s)	10.0	22.0		8.0	20.0		25.0	25.0		25.0	25.0	25.0
Total Split (%)	18.2%	40.0%		14.5%	36.4%		45.5%	45.5%		45.5%	45.5%	45.5%
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)	0.0	1.8		0.0	1.8		1.9	1.9		1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	4.0	5.8		4.0	5.8			5.9			5.9	5.9
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	21.7	16.5		18.4	13.6			16.9			16.9	16.9
Actuated g/C Ratio	0.43	0.33		0.37	0.27			0.34			0.34	0.34
v/c Ratio	0.52	0.53		0.14	0.77			0.23			0.76	0.36
Control Delay	14.3	16.6		9.2	21.5			11.7			30.5	4.0
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	14.3	16.6		9.2	21.5			11.7			30.5	4.0
LOS	B	B		A	C			B			C	A
Approach Delay		16.0			20.7			11.7			19.3	
Approach LOS		B			C			B			B	
Queue Length 50th (m)	10.7	28.0		2.8	32.1			7.6			29.1	0.0
Queue Length 95th (m)	20.9	42.4		7.4	#58.5			14.5			#65.9	12.0
Internal Link Dist (m)		478.9			78.1			378.9			160.7	
Turn Bay Length (m)	50.0			50.0								
Base Capacity (vph)	359	1297		368	1081			1195			502	751

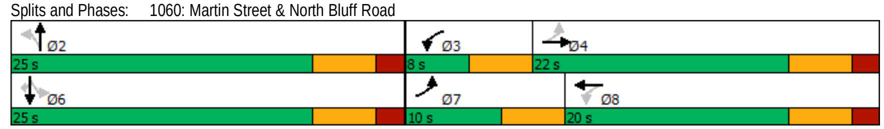
Lanes, Volumes, Timings 2025 PM
1060: Martin Street & North Bluff Road 08/14/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.52	0.47		0.14	0.71			0.20			0.65	0.32

Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 50
Natural Cycle: 55
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 18.0 Intersection LOS: B
Intersection Capacity Utilization 73.4% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1060: Martin Street & North Bluff Road



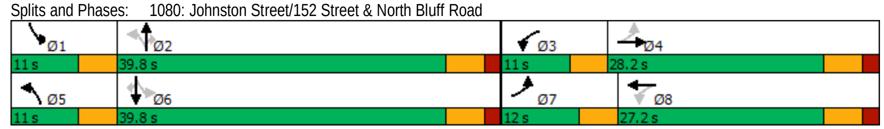
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	208	481	81	81	525	202	135	556	89	199	510	129
Future Volume (vph)	208	481	81	81	525	202	135	556	89	199	510	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	40.0		0.0	40.0		40.0	50.0		0.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3408	0	1770	3258	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.162			0.317			0.175			0.127		
Satd. Flow (perm)	295	3408	0	575	3258	0	324	1863	1495	234	1863	1525
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			59				132			140
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		199.3			399.9			810.7			195.6	
Travel Time (s)		14.3			28.8			58.4			14.1	
Confl. Peds. (#/hr)	58		44	44		58	32		56	56		32
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	226	611	0	88	791	0	147	604	97	216	554	140
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	15.9		11.0	15.9		11.0	15.8	15.8	11.0	15.8	15.8
Total Split (s)	12.0	28.2		11.0	27.2		11.0	39.8	39.8	11.0	39.8	39.8
Total Split (%)	13.3%	31.3%		12.2%	30.2%		12.2%	44.2%	44.2%	12.2%	44.2%	44.2%
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)	0.0	1.9		0.0	1.9		0.0	1.8	1.8	0.0	1.8	1.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.9		4.0	5.9		4.0	5.8	5.8	4.0	5.8	5.8
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	32.9	24.7		30.3	21.3		40.4	31.6	31.6	40.4	31.6	31.6
Actuated g/C Ratio	0.38	0.28		0.35	0.24		0.46	0.36	0.36	0.46	0.36	0.36
v/c Ratio	0.92	0.63		0.30	0.95		0.56	0.90	0.16	0.94	0.83	0.22
Control Delay	65.0	31.5		20.5	52.2		20.1	45.0	2.2	65.4	37.4	4.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.0	31.5		20.5	52.2		20.1	45.0	2.2	65.4	37.4	4.4
LOS	E	C		C	D		C	D	A	E	D	A
Approach Delay		40.5			49.0			35.8			39.0	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	28.2	51.8		10.1	70.3		13.3	99.4	0.0	20.9	87.7	0.0
Queue Length 95th (m)	#71.4	71.1		20.0	#110.3		23.6	#161.4	5.4	#65.1	#134.9	11.5
Internal Link Dist (m)		175.3			375.9			786.7			171.6	
Turn Bay Length (m)	40.0			40.0			40.0		40.0	50.0		
Base Capacity (vph)	245	975		293	837		264	723	661	230	723	678

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.63		0.30	0.95		0.56	0.84	0.15	0.94	0.77	0.21

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 87.7
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 41.1 Intersection LOS: D
Intersection Capacity Utilization 90.4% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1080: Johnston Street/152 Street & North Bluff Road



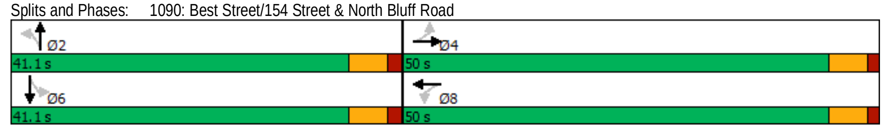
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	608	59	31	710	48	85	194	48	84	185	95
Future Volume (vph)	90	608	59	31	710	48	85	194	48	84	185	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	55.0		0.0	35.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3483	0	1770	3502	0	1770	1799	0	1770	1755	0
Flt Permitted	0.293			0.347			0.555			0.597		
Satd. Flow (perm)	545	3483	0	643	3502	0	1028	1799	0	1105	1755	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			11			16			33	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		399.9			401.5			193.1			201.3	
Travel Time (s)		28.8			28.9			13.9			14.5	
Confl. Peds. (#/hr)	3		14	14		3	13		12	12		13
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	725	0	34	824	0	92	263	0	91	304	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	15.4	15.4		15.4	15.4		15.7	15.7		15.7	15.7	
Total Split (s)	50.0	50.0		50.0	50.0		41.1	41.1		41.1	41.1	
Total Split (%)	54.9%	54.9%		54.9%	54.9%		45.1%	45.1%		45.1%	45.1%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.4	1.4		1.4	1.4		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.4	5.4		5.4	5.4		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	19.5	19.5		19.5	19.5		14.6	14.6		14.6	14.6	
Actuated g/C Ratio	0.43	0.43		0.43	0.43		0.32	0.32		0.32	0.32	
v/c Ratio	0.42	0.49		0.12	0.55		0.28	0.45		0.26	0.52	
Control Delay	16.6	10.7		10.0	11.5		15.8	15.5		15.3	16.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.6	10.7		10.0	11.5		15.8	15.5		15.3	16.0	
LOS	B	B		B	B		B	B		B	B	
Approach Delay		11.4			11.4			15.6			15.8	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	4.9	19.2		1.5	22.8		5.1	14.6		5.1	16.3	
Queue Length 95th (m)	19.5	42.5		7.1	49.7		18.9	42.2		18.3	47.7	
Internal Link Dist (m)		375.9			377.5			169.1			177.3	
Turn Bay Length (m)	50.0			55.0			35.0			55.0		
Base Capacity (vph)	500	3198		590	3215		828	1452		890	1419	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.20	0.23		0.06	0.26		0.11	0.18		0.10	0.21	

Intersection Summary

Area Type: Other
Cycle Length: 91.1
Actuated Cycle Length: 45.8
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 12.7 Intersection LOS: B
Intersection Capacity Utilization 72.3% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1090: Best Street/154 Street & North Bluff Road



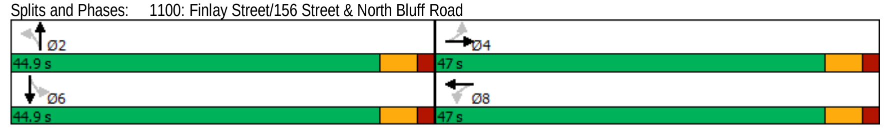
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	653	96	29	647	59	35	154	38	77	225	75
Future Volume (vph)	39	653	96	29	647	59	35	154	38	77	225	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	40.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3460	0	1770	3486	0	1770	1794	0	1770	1781	0
Flt Permitted	0.324			0.298			0.527			0.628		
Satd. Flow (perm)	602	3460	0	554	3486	0	974	1794	0	1150	1781	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			13			17			23	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		401.5			402.3			816.6			217.9	
Travel Time (s)		28.9			29.0			58.8			15.7	
Confl. Peds. (#/hr)	5		6	6		5	18		33	33		18
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	814	0	32	767	0	38	208	0	84	327	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	16.0	16.0		16.0	16.0		15.9	15.9		15.9	15.9	
Total Split (s)	47.0	47.0		47.0	47.0		44.9	44.9		44.9	44.9	
Total Split (%)	51.1%	51.1%		51.1%	51.1%		48.9%	48.9%		48.9%	48.9%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	19.2	19.2		19.2	19.2		15.4	15.4		15.4	15.4	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.33	0.33		0.33	0.33	
v/c Ratio	0.17	0.57		0.14	0.54		0.12	0.35		0.22	0.55	
Control Delay	11.8	12.5		11.6	12.2		13.3	13.6		14.3	16.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	11.8	12.5		11.6	12.2		13.3	13.6		14.3	16.6	
LOS	B	B		B	B		B	B		B	B	
Approach Delay		12.4			12.2			13.5			16.1	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	2.1	24.3		1.5	22.8		2.1	11.4		4.8	19.5	
Queue Length 95th (m)	9.0	51.1		7.3	47.8		8.8	31.1		16.0	49.6	
Internal Link Dist (m)		377.5			378.3			792.6			193.9	
Turn Bay Length (m)	50.0			40.0			50.0			50.0		
Base Capacity (vph)	526	3027		484	3048		822	1517		971	1507	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.08	0.27		0.07	0.25		0.05	0.14		0.09	0.22	

Intersection Summary

Area Type: Other
Cycle Length: 91.9
Actuated Cycle Length: 46.9
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 13.1 Intersection LOS: B
Intersection Capacity Utilization 72.3% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1100: Finlay Street/156 Street & North Bluff Road



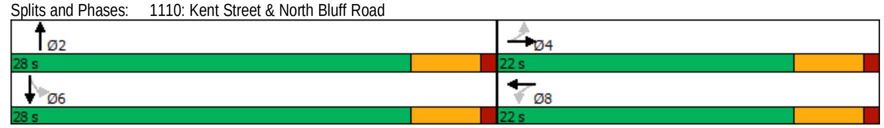
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	795	16	1	704	16	0	1	29	0	0	0
Future Volume (vph)	12	795	16	1	704	16	0	1	29	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3555	0	0	3561	0	0	1635	0	0	1881	0
Flt Permitted		0.935			0.954							
Satd. Flow (perm)	0	3328	0	0	3397	0	0	1635	0	0	1881	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			5			17				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		402.3			400.8			238.4			72.1	
Travel Time (s)		29.0			28.9			17.2			5.2	
Confl. Peds. (#/hr)	7		30	30		7	133					133
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1005	0	0	880	0	0	36	0	0	0	0
Turn Type	Perm	NA		Perm	NA			NA				
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8			2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0			7.0		7.0	7.0	
Minimum Split (s)	20.0	20.0		20.0	20.0			28.0		28.0	28.0	
Total Split (s)	22.0	22.0		22.0	22.0			28.0		28.0	28.0	
Total Split (%)	44.0%	44.0%		44.0%	44.0%			56.0%		56.0%	56.0%	
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	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None			Ped		Ped	Ped	
Act Effct Green (s)		16.7			16.7			23.0				
Actuated g/C Ratio		0.34			0.34			0.46				
v/c Ratio		0.90			0.77			0.05				
Control Delay		28.8			20.4			5.5				
Queue Delay		0.0			0.0			0.0				
Total Delay		28.8			20.4			5.5				
LOS		C			C			A				
Approach Delay		28.8			20.4			5.5				
Approach LOS		C			C			A				
Queue Length 50th (m)		45.2			37.2			0.9				
Queue Length 95th (m)		#66.8			48.5			4.0				
Internal Link Dist (m)		378.3			376.8			214.4			48.1	
Turn Bay Length (m)												
Base Capacity (vph)		1140			1165			765				
Starvation Cap Reductn		0			0			0				
Spillback Cap Reductn		0			0			0				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0				
Reduced v/c Ratio		0.88			0.76			0.05				

Intersection Summary

Area Type: Other
Cycle Length: 50
Actuated Cycle Length: 49.7
Natural Cycle: 55
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 24.5 Intersection LOS: C
Intersection Capacity Utilization 58.6% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1110: Kent Street & North Bluff Road



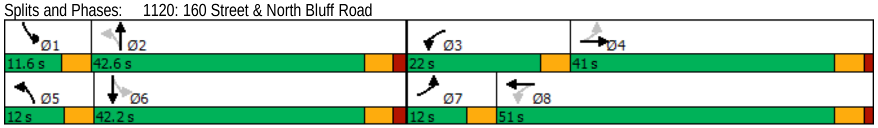
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	624	114	186	581	25	94	189	99	9	265	49
Future Volume (vph)	50	624	114	186	581	25	94	189	99	9	265	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	35.0		0.0	45.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3442	0	1770	3512	0	1770	1752	0	1770	1812	0
Flt Permitted	0.375			0.163			0.302			0.521		
Satd. Flow (perm)	692	3442	0	303	3512	0	559	1752	0	965	1812	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			4			24			8	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		400.8			526.2			414.4			217.2	
Travel Time (s)		28.9			37.9			29.8			15.6	
Confl. Peds. (#/hr)	17		6	6		17	17		12	12		17
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	802	0	202	659	0	102	313	0	10	341	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	10.0		7.0	10.0	
Minimum Split (s)	11.5	15.4		11.5	15.4		11.5	15.8		11.5	15.8	
Total Split (s)	12.0	41.0		22.0	51.0		12.0	42.6		11.6	42.2	
Total Split (%)	10.2%	35.0%		18.8%	43.5%		10.2%	36.3%		9.9%	36.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	1.4		0.0	1.4		0.0	1.8		0.0	1.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.4		4.0	5.4		4.0	5.8		4.0	5.8	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effct Green (s)	37.5	28.2		45.3	35.6		34.1	30.9		30.8	23.7	
Actuated g/C Ratio	0.42	0.32		0.51	0.40		0.38	0.35		0.35	0.27	
v/c Ratio	0.14	0.73		0.58	0.47		0.31	0.50		0.02	0.70	
Control Delay	14.6	32.5		20.7	23.3		21.4	25.9		18.8	39.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.6	32.5		20.7	23.3		21.4	25.9		18.8	39.0	
LOS	B	C		C	C		C	C		B	D	
Approach Delay		31.3			22.7			24.7			38.4	
Approach LOS		C			C			C			D	
Queue Length 50th (m)	4.8	66.5		19.8	48.6		11.3	37.7		1.1	55.2	
Queue Length 95th (m)	13.2	112.8		40.9	78.3		26.5	87.3		4.8	100.3	
Internal Link Dist (m)		376.8			502.2			390.4			193.2	
Turn Bay Length (m)	60.0			35.0			45.0			30.0		
Base Capacity (vph)	401	1485		473	1929		331	800		413	798	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.13	0.54		0.43	0.34		0.31	0.39		0.02	0.43	

Intersection Summary

Area Type: Other
Cycle Length: 117.2
Actuated Cycle Length: 88.7
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 28.2 Intersection LOS: C
Intersection Capacity Utilization 70.3% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1120: 160 Street & North Bluff Road



HCM Unsignalized Intersection Capacity Analysis — 2025 PM
320: Marine Dr/8 Ave — 08/14/2020

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	48	233	279	79	75	58
Future Volume (Veh/h)	48	233	279	79	75	58
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	53	259	310	88	83	64
Pedestrians		6			16	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.2			1.2	
Percent Blockage		1			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	414				735	376
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	414				735	376
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				77	90
cM capacity (veh/h)	1140				367	663

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	312	398	147
Volume Left	53	0	83
Volume Right	0	88	64
cSH	1140	1700	455
Volume to Capacity	0.05	0.23	0.32
Queue Length 95th (m)	1.2	0.0	11.1
Control Delay (s)	1.8	0.0	16.6
Lane LOS	A		C
Approach Delay (s)	1.8	0.0	16.6
Approach LOS			C

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2025 PM
520: Pacific Ave/10 Ave — 08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	33	22	13	36	42	14	164	7	42	159	53
Future Volume (Veh/h)	30	33	22	13	36	42	14	164	7	42	159	53
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	33	37	24	14	40	47	16	182	8	47	177	59
Pedestrians		9			4						10	
Lane Width (m)		3.6			3.6						3.6	
Walking Speed (m/s)		1.2			1.2						1.2	
Percent Blockage		1			0						1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	604	536	216	565	561	200	245			194		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	604	536	216	565	561	200	245			194		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	90	91	97	96	90	94	99			97		
cM capacity (veh/h)	340	429	823	380	415	836	1323			1387		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	94	101	206	283
Volume Left	33	14	16	47
Volume Right	24	47	8	59
cSH	442	533	1323	1387
Volume to Capacity	0.21	0.19	0.01	0.03
Queue Length 95th (m)	6.4	5.5	0.3	0.8
Control Delay (s)	15.3	13.3	0.7	1.5
Lane LOS	C	B	A	A
Approach Delay (s)	15.3	13.3	0.7	1.5
Approach LOS	C	B		

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2025 PM
680: Johnston Rd/Johnston Street & Buena Vista Ave/Pacific Ave — 08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	34	49	3	12	27	187	0	0	0	195	61	58
Future Volume (Veh/h)	34	49	3	12	27	187	0	0	0	195	61	58
Sign Control		Stop			Yield			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	34	49	3	12	27	189	0	0	0	197	62	59
Pedestrians		70			40			57				
Lane Width (m)		3.6			3.6			0.0				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		6			3			0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	758	596	218	610	625	40	191			40		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	758	596	218	610	625	40	191			40		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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	85	100	96	92	81	100			87		
cM capacity (veh/h)	196	333	778	295	320	1003	1313			1530		

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	86	228	318
Volume Left	34	12	197
Volume Right	3	189	59
cSH	265	727	1530
Volume to Capacity	0.32	0.31	0.13
Queue Length 95th (m)	10.9	10.7	3.5
Control Delay (s)	24.9	12.2	5.2
Lane LOS	C	B	A
Approach Delay (s)	24.9	12.2	5.2
Approach LOS	C	B	

Intersection Summary			
Average Delay	10.4		
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2025 PM
700: Finlay Street — 08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	102	6	7	103	25	1	25	16	40	28	58
Future Volume (Veh/h)	35	102	6	7	103	25	1	25	16	40	28	58
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	43	124	7	9	126	30	1	30	20	49	34	71
Pedestrians					5			1			11	
Lane Width (m)					3.6			3.6			3.6	
Walking Speed (m/s)					1.2			1.2			1.2	
Percent Blockage					0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	167			132			446	400	134	420	388	152
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	167			132			446	400	134	420	388	152
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			100	94	98	90	93	92
cM capacity (veh/h)	1404			1458			442	515	914	485	523	889

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	43	131	9	156	51	154
Volume Left	43	0	9	0	1	49
Volume Right	0	7	0	30	20	71
cSH	1404	1700	1458	1700	619	626
Volume to Capacity	0.03	0.08	0.01	0.09	0.08	0.25
Queue Length 95th (m)	0.8	0.0	0.1	0.0	2.1	7.7
Control Delay (s)	7.6	0.0	7.5	0.0	11.3	12.6
Lane LOS	A		A		B	B
Approach Delay (s)	1.9		0.4		11.3	12.6
Approach LOS					B	B

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	36.3%	ICU Level of Service	A
Analysis Period (min)	15		

710: Marine Dr & Nichol Road

08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	66	1	4	111	55	0	2	5	38	9	66
Future Volume (Veh/h)	53	66	1	4	111	55	0	2	5	38	9	66
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	58	73	1	4	122	60	0	2	5	42	10	73
Pedestrians		4						2			11	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	193			76			434	392	76	366	363	167
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	193			76			434	392	76	366	363	167
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			100			100	100	99	92	98	92
cM capacity (veh/h)	1374			1527			460	515	987	557	535	869

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	132	186	7	125
Volume Left	58	4	0	42
Volume Right	1	60	5	73
cSH	1374	1527	782	702
Volume to Capacity	0.04	0.00	0.01	0.18
Queue Length 95th (m)	1.1	0.1	0.2	5.2
Control Delay (s)	3.6	0.2	9.6	11.2
Lane LOS	A	A	A	B
Approach Delay (s)	3.6	0.2	9.6	11.2
Approach LOS			A	B

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

720: Buena Vista Ave/12 Ave & 160 Street

08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	95	15	30	5	4	30	29	201	6	27	244	104
Future Volume (Veh/h)	95	15	30	5	4	30	29	201	6	27	244	104
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	107	17	34	6	4	34	33	226	7	30	274	117
Pedestrians		6			6			2			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	731	704	340	738	758	236	397			239		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	731	704	340	738	758	236	397			239		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	65	95	95	98	99	96	97			98		
cM capacity (veh/h)	306	342	702	292	318	803	1167			1333		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	158	44	266	421
Volume Left	107	6	33	30
Volume Right	34	34	7	117
cSH	353	583	1167	1333
Volume to Capacity	0.45	0.08	0.03	0.02
Queue Length 95th (m)	17.8	2.0	0.7	0.6
Control Delay (s)	23.2	11.7	1.2	0.8
Lane LOS	C	B	A	A
Approach Delay (s)	23.2	11.7	1.2	0.8
Approach LOS	C	B		

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		

1020: Phoenix Street/142 Street & North Bluff Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	552	5	13	663	42	6	1	9	35	2	12
Future Volume (Veh/h)	5	552	5	13	663	42	6	1	9	35	2	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	600	5	14	721	46	7	1	10	38	2	13
Pedestrians		7			2			32				
Lane Width (m)		3.6			3.6			3.6				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		1			0			3				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	767			637			1054	1440	336	1094	1419	390
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	767			637			1054	1440	336	1094	1419	390
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			96	99	98	76	98	98
cM capacity (veh/h)	842			917			163	125	641	158	129	605

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	305	305	374	406	18	53
Volume Left	5	0	14	0	7	38
Volume Right	0	5	0	46	10	13
cSH	842	1700	917	1700	270	191
Volume to Capacity	0.01	0.18	0.02	0.24	0.07	0.28
Queue Length 95th (m)	0.1	0.0	0.4	0.0	1.7	8.6
Control Delay (s)	0.2	0.0	0.5	0.0	19.3	30.8
Lane LOS	A		A		C	D
Approach Delay (s)	0.1		0.2		19.3	30.8
Approach LOS					C	D

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

1030: Archibald Road/144 Street & North Bluff Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	542	14	37	689	30	9	12	38	14	11	20
Future Volume (Veh/h)	29	542	14	37	689	30	9	12	38	14	11	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	589	15	40	749	33	10	13	41	15	12	22
Pedestrians		15			7			2			4	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	786			606			1160	1528	311	1262	1520	410
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	786			606			1160	1528	311	1262	1520	410
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			96			92	88	94	85	89	96
cM capacity (veh/h)	826			966			123	107	680	100	108	581

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	32	393	211	40	499	283	64	49
Volume Left	32	0	0	40	0	0	10	15
Volume Right	0	0	15	0	0	33	41	22
cSH	826	1700	1700	966	1700	1700	242	164
Volume to Capacity	0.04	0.23	0.12	0.04	0.29	0.17	0.26	0.30
Queue Length 95th (m)	1.0	0.0	0.0	1.0	0.0	0.0	8.2	9.5
Control Delay (s)	9.5	0.0	0.0	8.9	0.0	0.0	25.1	36.0
Lane LOS	A			A			D	E
Approach Delay (s)	0.5			0.4			25.1	36.0
Approach LOS							D	E

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	618	703	15	8	17
Future Volume (Veh/h)	13	618	703	15	8	17
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	672	764	16	9	18
Pedestrians			1		1	
Lane Width (m)			3.6		3.6	
Walking Speed (m/s)			1.2		1.2	
Percent Blockage			0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			391			
pX, platoon unblocked						
vC, conflicting volume	781				1138	391
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	781				1138	391
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				95	97
cM capacity (veh/h)	832				191	607

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	238	448	509	271	27
Volume Left	14	0	0	0	9
Volume Right	0	0	0	16	18
cSH	832	1700	1700	1700	352
Volume to Capacity	0.02	0.26	0.30	0.16	0.08
Queue Length 95th (m)	0.4	0.0	0.0	0.0	2.0
Control Delay (s)	0.7	0.0	0.0	0.0	16.1
Lane LOS	A				C
Approach Delay (s)	0.3		0.0		16.1
Approach LOS					C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	724	22	18	752	0	27
Future Volume (Veh/h)	724	22	18	752	0	27
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	787	24	20	817	0	29
Pedestrians	9				26	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	1				2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	102			199		
pX, platoon unblocked			0.87		0.92	0.87
vC, conflicting volume			837		1282	432
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			514		508	48
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	97
cM capacity (veh/h)			892		433	860

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	525	286	20	408	408	29
Volume Left	0	0	20	0	0	0
Volume Right	0	24	0	0	0	29
cSH	1700	1700	892	1700	1700	860
Volume to Capacity	0.31	0.17	0.02	0.24	0.24	0.03
Queue Length 95th (m)	0.0	0.0	0.6	0.0	0.0	0.8
Control Delay (s)	0.0	0.0	9.1	0.0	0.0	9.3
Lane LOS			A			A
Approach Delay (s)	0.0		0.2			9.3
Approach LOS						A

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

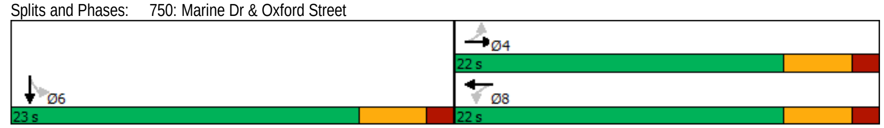
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	119	3	3	112	44	0	0	0	32	13	62
Future Volume (vph)	33	119	3	3	112	44	0	0	0	32	13	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	1873	0	0	1806	0	0	0	0	1805	1627	0
Flt Permitted		0.913			0.995					0.950		
Satd. Flow (perm)	0	1722	0	0	1799	0	0	0	0	1800	1627	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			49						78	
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		217.8			282.3			23.9			896.6	
Travel Time (s)		26.1			33.9			1.7			64.6	
Confl. Peds. (#/hr)	17		1	1		17	5		2	2		5
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	197	0	0	202	0	0	0	0	41	94	0
Turn Type	Perm	NA		Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8					6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0					7.0	7.0	
Minimum Split (s)	21.0	21.0		21.0	21.0					21.0	21.0	
Total Split (s)	22.0	22.0		22.0	22.0					23.0	23.0	
Total Split (%)	48.9%	48.9%		48.9%	48.9%					51.1%	51.1%	
Yellow Time (s)	3.5	3.5		3.5	3.5					3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5					1.5	1.5	
Lost Time Adjust (s)		0.0			0.0					0.0	0.0	
Total Lost Time (s)		5.0			5.0					5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min					None	None	
Act Effct Green (s)		18.5			18.5					7.2	7.2	
Actuated g/C Ratio		0.64			0.64					0.25	0.25	
v/c Ratio		0.18			0.17					0.09	0.20	
Control Delay		5.7			4.7					8.6	4.5	
Queue Delay		0.0			0.0					0.0	0.0	
Total Delay		5.7			4.7					8.6	4.5	
LOS		A			A					A	A	
Approach Delay		5.7			4.7						5.8	
Approach LOS		A			A						A	
Queue Length 50th (m)		5.4			4.1					1.6	0.6	
Queue Length 95th (m)		10.6			8.9					3.9	4.1	
Internal Link Dist (m)		193.8			258.3			0.1			872.6	
Turn Bay Length (m)										30.0		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		1307			1376					1115	1037	
Starvation Cap Reductn		0			0					0	0	
Spillback Cap Reductn		0			0					0	0	
Storage Cap Reductn		0			0					0	0	
Reduced v/c Ratio		0.15			0.15					0.04	0.09	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 29.1
Natural Cycle: 45
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.20
Intersection Signal Delay: 5.3 Intersection LOS: A
Intersection Capacity Utilization 39.0% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 750: Marine Dr & Oxford Street



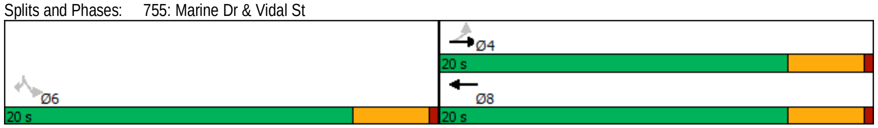
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	26	113	105	14	22	55
Future Volume (vph)	26	113	105	14	22	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1883	1862	0	1805	1615
Flt Permitted		0.952			0.950	
Satd. Flow (perm)	0	1805	1862	0	1778	1615
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			15			60
Link Speed (k/h)		30	30		50	
Link Distance (m)		282.3	128.9		78.4	
Travel Time (s)		33.9	15.5		5.6	
Confl. Peds. (#/hr)	12			12	12	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	151	129	0	24	60
Turn Type	Perm	NA	NA		Perm	Perm
Protected Phases		4	8			
Permitted Phases	4				6	6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		7.0	7.0
Minimum Split (s)	20.0	20.0	20.0		20.0	20.0
Total Split (s)	20.0	20.0	20.0		20.0	20.0
Total Split (%)	50.0%	50.0%	50.0%		50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	0.5	0.5	0.5		0.5	0.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min		None	None
Act Effct Green (s)		21.5	21.5		7.0	7.0
Actuated g/C Ratio		0.77	0.77		0.25	0.25
v/c Ratio		0.11	0.09		0.05	0.13
Control Delay		3.6	3.3		7.6	3.5
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		3.6	3.3		7.6	3.5
LOS		A	A		A	A
Approach Delay		3.6	3.3		4.6	
Approach LOS		A	A		A	
Queue Length 50th (m)		0.0	0.0		0.9	0.0
Queue Length 95th (m)		7.5	6.0		2.5	3.0
Internal Link Dist (m)		258.3	104.9		54.4	
Turn Bay Length (m)						
Base Capacity (vph)		1522	1573		1021	953
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.10	0.08		0.02	0.06

Intersection Summary

Area Type: Other
Cycle Length: 40
Actuated Cycle Length: 27.9
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.13
Intersection Signal Delay: 3.7 Intersection LOS: A
Intersection Capacity Utilization 26.6% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 755: Marine Dr & Vidal St



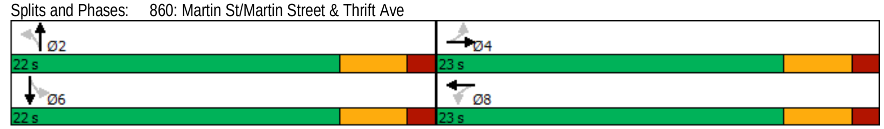
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	241	21	5	208	37	53	6	28	28	17	23
Future Volume (vph)	15	241	21	5	208	37	53	6	28	28	17	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1834	0	0	1817	0	0	1717	0	0	1728	0
Flt Permitted		0.972			0.991			0.759			0.814	
Satd. Flow (perm)	0	1788	0	0	1802	0	0	1341	0	0	1434	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			23			38			32	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		147.0			159.6			143.4			402.9	
Travel Time (s)		10.6			11.5			10.3			29.0	
Confl. Peds. (#/hr)	3		9	9		3	2		2	2		2
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	380	0	0	343	0	0	119	0	0	93	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	21.0	21.0		21.0	21.0		21.0	21.0		21.0	21.0	
Total Split (s)	23.0	23.0		23.0	23.0		22.0	22.0		22.0	22.0	
Total Split (%)	51.1%	51.1%		51.1%	51.1%		48.9%	48.9%		48.9%	48.9%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)		19.9			19.9			8.1			8.1	
Actuated g/C Ratio		0.65			0.65			0.26			0.26	
v/c Ratio		0.33			0.29			0.31			0.23	
Control Delay		6.6			6.1			9.7			8.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		6.6			6.1			9.7			8.6	
LOS		A			A			A			A	
Approach Delay		6.6			6.1			9.7			8.6	
Approach LOS		A			A			A			A	
Queue Length 50th (m)		11.5			9.6			2.8			2.1	
Queue Length 95th (m)		22.3			19.2			9.4			7.6	
Internal Link Dist (m)		123.0			135.6			119.4			378.9	
Turn Bay Length (m)												
Base Capacity (vph)		1323			1337			774			824	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.29			0.26			0.15			0.11	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 30.6
Natural Cycle: 45
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.33
Intersection Signal Delay: 7.0 Intersection LOS: A
Intersection Capacity Utilization 38.3% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 860: Martin St/Martin Street & Thrift Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	113	17	32	101	62	36	342	31	54	332	31
Future Volume (vph)	62	113	17	32	101	62	36	342	31	54	332	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	1807	0	0	1746	0	1770	1834	0	1770	1835	0
Flt Permitted		0.857			0.919		0.518			0.507		
Satd. Flow (perm)	0	1567	0	0	1617	0	963	1834	0	938	1835	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			37			9			10	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		203.7			211.4			403.8			414.4	
Travel Time (s)		14.7			15.2			29.1			29.8	
Confl. Peds. (#/hr)	14		2	2		14	3		12	12		3
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	208	0	0	212	0	39	406	0	59	395	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		15.0	15.0		15.0	15.0	
Total Split (s)	30.0	30.0		30.0	30.0		40.0	40.0		40.0	40.0	
Total Split (%)	42.9%	42.9%		42.9%	42.9%		57.1%	57.1%		57.1%	57.1%	
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	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		11.6			11.4		18.7	18.7		18.7	18.7	
Actuated g/C Ratio		0.33			0.32		0.53	0.53		0.53	0.53	
v/c Ratio		0.40			0.39		0.08	0.41		0.12	0.40	
Control Delay		13.1			11.3		7.8	9.6		8.2	9.4	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		13.1			11.3		7.8	9.6		8.2	9.4	
LOS		B			B		A	A		A	A	
Approach Delay		13.1			11.3			9.4			9.3	
Approach LOS		B			B			A			A	
Queue Length 50th (m)		9.0			7.7		1.4	16.8		2.1	16.1	
Queue Length 95th (m)		27.8			25.3		6.0	42.5		8.3	41.2	
Internal Link Dist (m)		179.7			187.4			379.8			390.4	
Turn Bay Length (m)							50.0			50.0		
Base Capacity (vph)		1148			1192		881	1679		858	1680	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.18			0.18		0.04	0.24		0.07	0.24	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 35.1
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.41
Intersection Signal Delay: 10.2 Intersection LOS: B
Intersection Capacity Utilization 59.6% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 920: 160 Street & Thrift Avenue/14 Avenue

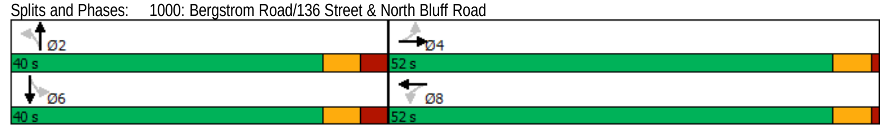
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	542	12	50	381	56	14	55	80	10	6	35
Future Volume (vph)	23	542	12	50	381	56	14	55	80	10	6	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3515	0	0	3453	0	1770	1681	0	1770	1588	0
Flt Permitted		0.924			0.852		0.728			0.663		
Satd. Flow (perm)	0	3254	0	0	2947	0	1336	1681	0	1231	1588	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			22			87			38	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		121.6			803.7			309.0			286.0	
Travel Time (s)		8.8			57.9			22.2			20.6	
Confl. Peds. (#/hr)	3		77	77		3	19		5	5		19
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	627	0	0	529	0	15	147	0	11	45	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		17.0	17.0		17.0	17.0	
Total Split (s)	52.0	52.0		52.0	52.0		40.0	40.0		40.0	40.0	
Total Split (%)	56.5%	56.5%		56.5%	56.5%		43.5%	43.5%		43.5%	43.5%	
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		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0		7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)		18.5			18.5		10.2	10.2		10.2	10.2	
Actuated g/C Ratio		0.52			0.52		0.29	0.29		0.29	0.29	
v/c Ratio		0.37			0.34		0.04	0.27		0.03	0.09	
Control Delay		8.3			7.9		10.9	7.2		10.8	6.0	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		8.3			7.9		10.9	7.2		10.8	6.0	
LOS		A			A		B	A		B	A	
Approach Delay		8.3			7.9			7.6			7.0	
Approach LOS		A			A			A			A	
Queue Length 50th (m)		14.4			11.4		0.7	2.7		0.5	0.3	
Queue Length 95th (m)		24.7			20.5		3.8	13.1		3.1	5.4	
Internal Link Dist (m)		97.6			779.7			285.0			262.0	
Turn Bay Length (m)							30.0			30.0		
Base Capacity (vph)		3254			2947		1224	1548		1128	1459	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.19			0.18		0.01	0.09		0.01	0.03	

Intersection Summary

Area Type: Other
Cycle Length: 92
Actuated Cycle Length: 35.6
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.37
Intersection Signal Delay: 8.0 — Intersection LOS: A
Intersection Capacity Utilization 52.4% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1000: Bergstrom Road/136 Street & North Bluff Road



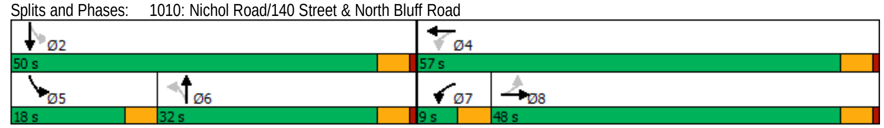
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	189	463	10	67	390	153	14	133	65	187	127	97
Future Volume (vph)	189	463	10	67	390	153	14	133	65	187	127	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	50.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3527	0	1770	3364	0	1770	1763	0	1770	1732	0
Flt Permitted	0.429			0.342			0.608			0.402		
Satd. Flow (perm)	796	3527	0	637	3364	0	1132	1763	0	748	1732	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			75			22			44	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		803.7			447.2			425.8			283.1	
Travel Time (s)		57.9			32.2			30.7			20.4	
Confl. Peds. (#/hr)	8		1	1		8	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	205	514	0	73	590	0	15	216	0	203	243	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		8		7	4			6		5	2	
Permitted Phases	8			4			6			2		
Detector Phase	8	8		7	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	15.0	15.0		9.0	15.0		15.0	15.0		9.0	15.0	
Total Split (s)	48.0	48.0		9.0	57.0		32.0	32.0		18.0	50.0	
Total Split (%)	44.9%	44.9%		8.4%	53.3%		29.9%	29.9%		16.8%	46.7%	
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		0.0	1.0		1.0	1.0		0.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		4.0	5.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effct Green (s)	26.5	26.5		34.3	33.2		16.0	16.0		34.0	32.9	
Actuated g/C Ratio	0.34	0.34		0.44	0.43		0.21	0.21		0.44	0.43	
v/c Ratio	0.75	0.42		0.20	0.40		0.06	0.56		0.41	0.32	
Control Delay	41.8	20.7		13.6	13.2		30.8	34.4		19.6	15.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	41.8	20.7		13.6	13.2		30.8	34.4		19.6	15.9	
LOS	D	C		B	B		C	C		B	B	
Approach Delay		26.7			13.3			34.1			17.6	
Approach LOS		C			B			C			B	
Queue Length 50th (m)	28.4	32.4		6.2	26.6		2.0	28.6		20.3	20.4	
Queue Length 95th (m)	61.8	51.9		15.1	45.3		8.2	60.0		45.5	48.0	
Internal Link Dist (m)		779.7			423.2			401.8			259.1	
Turn Bay Length (m)	45.0			50.0			50.0			50.0		
Base Capacity (vph)	486	2156		363	2373		434	689		533	1110	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.42	0.24		0.20	0.25		0.03	0.31		0.38	0.22	

Intersection Summary

Area Type: Other
Cycle Length: 107
Actuated Cycle Length: 77.1
Natural Cycle: 60
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 21.2 Intersection LOS: C
Intersection Capacity Utilization 64.0% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1010: Nichol Road/140 Street & North Bluff Road



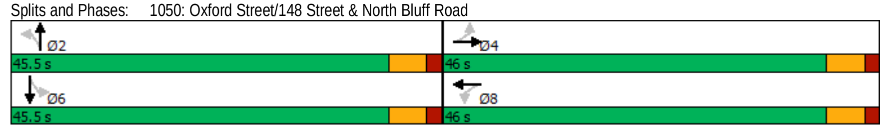
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	696	85	47	472	169	71	264	67	117	197	78
Future Volume (vph)	82	696	85	47	472	169	71	264	67	117	197	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	45.0		0.0	35.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1787	3496	0	1787	3410	0	1787	1816	0	1787	1770	0
Flt Permitted	0.286			0.205			0.470			0.382		
Satd. Flow (perm)	538	3496	0	383	3410	0	860	1816	0	714	1770	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			71			18			28	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		391.2			502.9			896.6			204.8	
Travel Time (s)		28.2			36.2			64.6			14.7	
Confl. Peds. (#/hr)	3		32	32		3	69		17	17		69
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	989	0	59	811	0	90	419	0	148	348	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (s)	46.0	46.0		46.0	46.0		45.5	45.5		45.5	45.5	
Total Split (%)	50.3%	50.3%		50.3%	50.3%		49.7%	49.7%		49.7%	49.7%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.7	1.7		1.7	1.7		1.8	1.8		1.8	1.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		5.8	5.8		5.8	5.8	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	25.8	25.8		25.8	25.8		21.1	21.1		21.1	21.1	
Actuated g/C Ratio	0.44	0.44		0.44	0.44		0.36	0.36		0.36	0.36	
v/c Ratio	0.44	0.65		0.36	0.53		0.30	0.64		0.58	0.54	
Control Delay	20.9	15.8		20.4	13.2		18.1	21.0		27.8	18.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.9	15.8		20.4	13.2		18.1	21.0		27.8	18.2	
LOS	C	B		C	B		B	C		C	B	
Approach Delay		16.3			13.7			20.5			21.0	
Approach LOS		B			B			C			C	
Queue Length 50th (m)	7.2	39.3		3.9	27.6		6.7	34.4		12.4	26.0	
Queue Length 95th (m)	22.5	71.2		14.6	52.4		18.5	67.6		32.0	53.6	
Internal Link Dist (m)		367.2			478.9			872.6			180.8	
Turn Bay Length (m)	40.0			45.0			35.0			30.0		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	392	2551		279	2503		619	1313		514	1282	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.27	0.39		0.21	0.32		0.15	0.32		0.29	0.27	

Intersection Summary

Area Type: Other
Cycle Length: 91.5
Actuated Cycle Length: 59.3
Natural Cycle: 45
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 17.0 Intersection LOS: B
Intersection Capacity Utilization 76.4% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1050: Oxford Street/148 Street & North Bluff Road



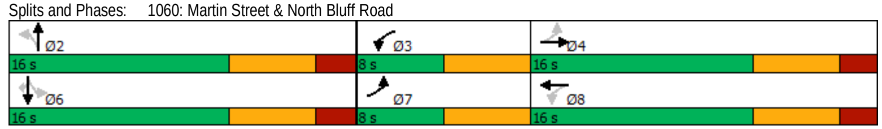
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	187	730	19	72	545	81	32	68	26	77	18	110
Future Volume (vph)	187	730	19	72	545	81	32	68	26	77	18	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	20.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3521	0	1770	3453	0	0	3363	0	0	1790	1583
Flt Permitted	0.353			0.311				0.855			0.673	
Satd. Flow (perm)	652	3521	0	577	3453	0	0	2890	0	0	1237	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			39			28				185
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		502.9			102.1			402.9			184.7	
Travel Time (s)		36.2			7.4			29.0			13.3	
Confl. Peds. (#/hr)	27		12	12		27	30		17	17		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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	203	814	0	78	680	0	0	137	0	0	104	120
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	10.0		4.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	8.0	15.9		8.0	15.8		15.9	15.9		15.9	15.9	15.9
Total Split (s)	8.0	16.0		8.0	16.0		16.0	16.0		16.0	16.0	16.0
Total Split (%)	20.0%	40.0%		20.0%	40.0%		40.0%	40.0%		40.0%	40.0%	40.0%
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)	0.0	1.8		0.0	1.8		1.9	1.9		1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	4.0	5.8		4.0	5.8			5.9			5.9	5.9
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	19.6	16.9		18.8	15.4			10.1			10.1	10.1
Actuated g/C Ratio	0.51	0.44		0.49	0.40			0.27			0.27	0.27
v/c Ratio	0.45	0.52		0.19	0.48			0.17			0.32	0.22
Control Delay	10.0	16.4		6.7	14.3			10.5			15.4	2.3
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	10.0	16.4		6.7	14.3			10.5			15.4	2.3
LOS	B	B		A	B			B			B	A
Approach Delay		15.1			13.5			10.5			8.4	
Approach LOS		B			B			B			A	
Queue Length 50th (m)	7.1	29.0		2.5	21.8			3.1			6.0	0.0
Queue Length 95th (m)	#16.1	#58.3		6.8	#43.1			8.0			15.6	4.3
Internal Link Dist (m)		478.9			78.1			378.9			160.7	
Turn Bay Length (m)	50.0			50.0								
Base Capacity (vph)	453	1568		411	1419			794			331	539

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.45	0.52		0.19	0.48			0.17			0.31	0.22

Intersection Summary

Area Type: Other
Cycle Length: 40
Actuated Cycle Length: 38.1
Natural Cycle: 45
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 13.6 Intersection LOS: B
Intersection Capacity Utilization 53.3% ICU Level of Service A
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1060: Martin Street & North Bluff Road



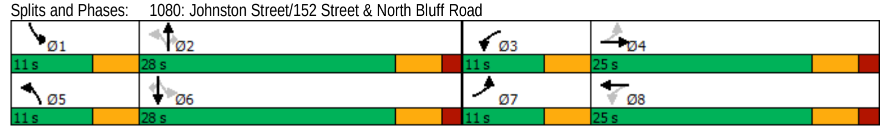
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	196	688	47	65	569	178	73	337	36	268	373	155
Future Volume (vph)	196	688	47	65	569	178	73	337	36	268	373	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	40.0		0.0	40.0		40.0	50.0		0.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3480	0	1770	3305	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.186			0.200			0.323			0.311		
Satd. Flow (perm)	339	3480	0	366	3305	0	595	1863	1476	566	1863	1514
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			53				159			168
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		199.3			399.9			810.7			195.6	
Travel Time (s)		14.3			28.8			58.4			14.1	
Confl. Peds. (#/hr)	58		44	44		58	32		56	56		32
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	213	799	0	71	811	0	79	366	39	291	405	168
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	15.9		11.0	15.9		11.0	15.8	15.8	11.0	15.8	15.8
Total Split (s)	11.0	25.0		11.0	25.0		11.0	28.0	28.0	11.0	28.0	28.0
Total Split (%)	14.7%	33.3%		14.7%	33.3%		14.7%	37.3%	37.3%	14.7%	37.3%	37.3%
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)	0.0	1.9		0.0	1.9		0.0	1.8	1.8	0.0	1.8	1.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.9		4.0	5.9		4.0	5.8	5.8	4.0	5.8	5.8
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	28.9	21.5		28.0	19.0		28.4	19.5	19.5	29.3	22.0	22.0
Actuated g/C Ratio	0.40	0.30		0.39	0.26		0.39	0.27	0.27	0.40	0.30	0.30
v/c Ratio	0.78	0.77		0.26	0.89		0.23	0.73	0.08	0.84	0.72	0.29
Control Delay	37.5	31.4		15.3	39.1		13.1	33.2	0.3	39.5	32.0	5.2
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	31.4		15.3	39.1		13.1	33.2	0.3	39.5	32.0	5.2
LOS	D	C		B	D		B	C	A	D	C	A
Approach Delay		32.7			37.2			27.3			29.3	
Approach LOS		C			D			C			C	
Queue Length 50th (m)	19.9	59.7		6.1	58.1		6.2	47.5	0.0	26.4	53.9	0.0
Queue Length 95th (m)	#51.5	#93.4		13.5	#93.8		13.5	76.3	0.0	#61.0	#93.2	13.1
Internal Link Dist (m)		175.3			375.9			786.7			171.6	
Turn Bay Length (m)	40.0			40.0			40.0		40.0	50.0		
Base Capacity (vph)	274	1038		277	914		347	573	564	345	583	589

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.77		0.26	0.89		0.23	0.64	0.07	0.84	0.69	0.29

Intersection Summary

Area Type: Other
Cycle Length: 75
Actuated Cycle Length: 72.4
Natural Cycle: 75
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 32.2 Intersection LOS: C
Intersection Capacity Utilization 82.3% ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1080: Johnston Street/152 Street & North Bluff Road



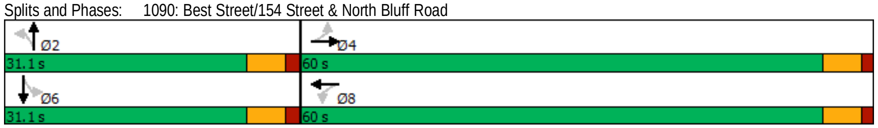
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱		↰	↱		↰	↱	
Traffic Volume (vph)	58	795	74	37	639	67	38	100	19	36	54	41
Future Volume (vph)	58	795	74	37	639	67	38	100	19	36	54	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	55.0		0.0	35.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3484	0	1770	3482	0	1770	1811	0	1770	1722	0
Flt Permitted	0.358			0.277			0.690			0.674		
Satd. Flow (perm)	666	3484	0	514	3482	0	1270	1811	0	1242	1722	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			22			11			42	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		399.9			401.5			193.1			201.3	
Travel Time (s)		28.8			28.9			13.9			14.5	
Confl. Peds. (#/hr)	3		14	14		3	13		12	12		13
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	944	0	40	768	0	41	130	0	39	104	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	15.4	15.4		15.4	15.4		15.7	15.7		15.7	15.7	
Total Split (s)	60.0	60.0		60.0	60.0		31.1	31.1		31.1	31.1	
Total Split (%)	65.9%	65.9%		65.9%	65.9%		34.1%	34.1%		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)	1.4	1.4		1.4	1.4		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.4	5.4		5.4	5.4		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	24.2	24.2		24.2	24.2		10.7	10.7		10.7	10.7	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.26	0.26		0.26	0.26	
v/c Ratio	0.16	0.46		0.13	0.37		0.12	0.27		0.12	0.22	
Control Delay	7.5	7.6		7.4	6.9		14.8	14.6		14.8	10.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.5	7.6		7.4	6.9		14.8	14.6		14.8	10.7	
LOS	A	A		A	A		B	B		B	B	
Approach Delay		7.6			6.9			14.7			11.8	
Approach LOS		A			A			B			B	
Queue Length 50th (m)	2.3	22.2		1.5	16.7		2.2	6.7		2.1	3.4	
Queue Length 95th (m)	8.0	38.7		5.8	29.7		9.2	20.7		9.0	14.4	
Internal Link Dist (m)		375.9			377.5			169.1			177.3	
Turn Bay Length (m)	50.0			55.0			35.0			55.0		
Base Capacity (vph)	666	3484		514	3482		801	1147		783	1102	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.09	0.27		0.08	0.22		0.05	0.11		0.05	0.09	

Intersection Summary

Area Type: Other
Cycle Length: 91.1
Actuated Cycle Length: 41
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.46
Intersection Signal Delay: 8.2 Intersection LOS: A
Intersection Capacity Utilization 55.3% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1090: Best Street/154 Street & North Bluff Road



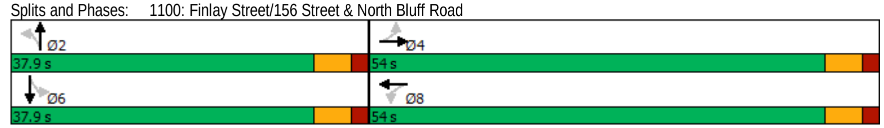
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	796	53	95	609	106	18	167	31	54	133	49
Future Volume (vph)	60	796	53	95	609	106	18	167	31	54	133	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	40.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3502	0	1770	3449	0	1770	1807	0	1770	1775	0
Flt Permitted	0.335			0.262			0.633			0.623		
Satd. Flow (perm)	623	3502	0	487	3449	0	1166	1807	0	1137	1775	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			32			11			22	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		401.5			402.3			816.6			217.9	
Travel Time (s)		28.9			29.0			58.8			15.7	
Confl. Peds. (#/hr)	5		6	6		5	18		33	33		18
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	65	923	0	103	777	0	20	216	0	59	198	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	16.0	16.0		16.0	16.0		15.9	15.9		15.9	15.9	
Total Split (s)	54.0	54.0		54.0	54.0		37.9	37.9		37.9	37.9	
Total Split (%)	58.8%	58.8%		58.8%	58.8%		41.2%	41.2%		41.2%	41.2%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	21.0	21.0		21.0	21.0		12.8	12.8		12.8	12.8	
Actuated g/C Ratio	0.45	0.45		0.45	0.45		0.28	0.28		0.28	0.28	
v/c Ratio	0.23	0.58		0.47	0.49		0.06	0.43		0.19	0.39	
Control Delay	10.2	10.7		17.0	9.5		15.5	17.6		16.7	16.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.2	10.7		17.0	9.5		15.5	17.6		16.7	16.2	
LOS	B	B		B	A		B	B		B	B	
Approach Delay		10.7			10.4			17.4			16.3	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	2.8	25.1		5.1	19.4		1.2	13.1		3.5	11.1	
Queue Length 95th (m)	10.7	50.1		19.3	39.6		6.5	38.8		14.2	34.4	
Internal Link Dist (m)		377.5			378.3			792.6			193.9	
Turn Bay Length (m)	50.0			40.0			50.0			50.0		
Base Capacity (vph)	588	3307		459	3258		848	1317		827	1297	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.11	0.28		0.22	0.24		0.02	0.16		0.07	0.15	

Intersection Summary

Area Type: Other
Cycle Length: 91.9
Actuated Cycle Length: 46.2
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 11.8 Intersection LOS: B
Intersection Capacity Utilization 71.2% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1100: Finlay Street/156 Street & North Bluff Road



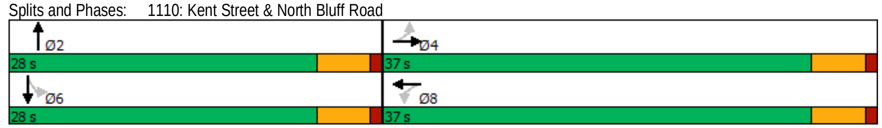
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	816	82	1	884	117	0	6	139	0	0	0
Future Volume (vph)	63	816	82	1	884	117	0	6	139	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3412	0	0	3423	0	0	1587	0	0	1845	0
Flt Permitted		0.714			0.954							
Satd. Flow (perm)	0	2443	0	0	3265	0	0	1587	0	0	1845	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			31			44				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		402.3			400.8			238.4			72.1	
Travel Time (s)		29.0			28.9			17.2			5.2	
Confl. Peds. (#/hr)	27		107	107		27	581		1	1		581
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1130	0	0	1179	0	0	171	0	0	0	0
Turn Type	Perm	NA		Perm	NA			NA				
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8			2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0			7.0		7.0	7.0	
Minimum Split (s)	20.0	20.0		20.0	20.0			28.0		28.0	28.0	
Total Split (s)	37.0	37.0		37.0	37.0			28.0		28.0	28.0	
Total Split (%)	56.9%	56.9%		56.9%	56.9%			43.1%		43.1%	43.1%	
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	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None			Ped		Ped	Ped	
Act Effct Green (s)		31.1			31.1			23.0				
Actuated g/C Ratio		0.49			0.49			0.36				
v/c Ratio		0.95			0.74			0.29				
Control Delay		34.0			16.2			12.7				
Queue Delay		0.0			0.0			0.0				
Total Delay		34.0			16.2			12.7				
LOS		C			B			B				
Approach Delay		34.0			16.2			12.7				
Approach LOS		C			B			B				
Queue Length 50th (m)		65.5			56.3			11.1				
Queue Length 95th (m)		#100.9			71.5			22.4				
Internal Link Dist (m)		378.3			376.8			214.4			48.1	
Turn Bay Length (m)												
Base Capacity (vph)		1226			1647			597				
Starvation Cap Reductn		0			0			0				
Spillback Cap Reductn		0			0			0				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0				
Reduced v/c Ratio		0.92			0.72			0.29				

Intersection Summary

Area Type: Other
Cycle Length: 65
Actuated Cycle Length: 64.1
Natural Cycle: 65
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 24.1 Intersection LOS: C
Intersection Capacity Utilization 87.7% ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1110: Kent Street & North Bluff Road



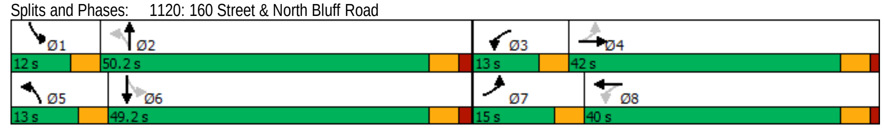
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	618	154	76	628	3	113	218	146	14	209	214
Future Volume (vph)	125	618	154	76	628	3	113	218	146	14	209	214
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	35.0		0.0	45.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3413	0	1770	3535	0	1770	1736	0	1770	1699	0
Flt Permitted	0.198			0.184			0.215			0.456		
Satd. Flow (perm)	366	3413	0	342	3535	0	399	1736	0	846	1699	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27						33			50	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		400.8			526.2			414.4			217.2	
Travel Time (s)		28.9			37.9			29.8			15.6	
Confl. Peds. (#/hr)	17		6	6		17	17		12	12		17
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	136	839	0	83	686	0	123	396	0	15	460	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	10.0		7.0	10.0	
Minimum Split (s)	11.5	15.4		11.5	15.4		11.5	15.8		11.5	15.8	
Total Split (s)	15.0	42.0		13.0	40.0		13.0	50.2		12.0	49.2	
Total Split (%)	12.8%	35.8%		11.1%	34.1%		11.1%	42.8%		10.2%	42.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	1.4		0.0	1.4		0.0	1.8		0.0	1.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.4		4.0	5.4		4.0	5.8		4.0	5.8	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effct Green (s)	41.0	31.9		36.8	27.1		44.1	39.2		39.1	29.9	
Actuated g/C Ratio	0.43	0.33		0.38	0.28		0.46	0.41		0.41	0.31	
v/c Ratio	0.45	0.73		0.33	0.68		0.40	0.54		0.04	0.81	
Control Delay	22.7	33.5		21.2	35.2		19.6	25.0		15.5	40.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.7	33.5		21.2	35.2		19.6	25.0		15.5	40.0	
LOS	C	C		C	D		B	C		B	D	
Approach Delay		32.0			33.7			23.7			39.2	
Approach LOS		C			C			C			D	
Queue Length 50th (m)	15.6	76.7		9.2	63.0		13.6	49.6		1.6	75.3	
Queue Length 95th (m)	33.3	118.6		21.8	97.6		26.9	100.8		5.4	123.8	
Internal Link Dist (m)		376.8			502.2			390.4			193.2	
Turn Bay Length (m)	60.0			35.0			45.0			30.0		
Base Capacity (vph)	327	1379		275	1334		318	860		435	830	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.42	0.61		0.30	0.51		0.39	0.46		0.03	0.55	

Intersection Summary

Area Type: Other
Cycle Length: 117.2
Actuated Cycle Length: 95.6
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 32.2 Intersection LOS: C
Intersection Capacity Utilization 75.2% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1120: 160 Street & North Bluff Road



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	37	203	136	118	128	55
Future Volume (Veh/h)	37	203	136	118	128	55
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	45	245	164	142	154	66
Pedestrians		2			7	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.2			1.2	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	313				577	244
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	313				577	244
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				67	92
cM capacity (veh/h)	1246				460	791

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	290	306	220
Volume Left	45	0	154
Volume Right	0	142	66
cSH	1246	1700	526
Volume to Capacity	0.04	0.18	0.42
Queue Length 95th (m)	0.9	0.0	16.4
Control Delay (s)	1.5	0.0	16.7
Lane LOS	A		C
Approach Delay (s)	1.5	0.0	16.7
Approach LOS			C

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	28	17	14	22	68	22	200	5	41	159	31
Future Volume (Veh/h)	46	28	17	14	22	68	22	200	5	41	159	31
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	59	36	22	18	28	87	28	256	6	53	204	40
Pedestrians		1			4						3	
Lane Width (m)		3.6			3.6						3.6	
Walking Speed (m/s)		1.2			1.2						1.2	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	750	653	225	689	670	266	245			266		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	750	653	225	689	670	266	245			266		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	77	90	97	94	92	89	98			96		
cM capacity (veh/h)	261	364	819	309	356	773	1332			1305		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	117	133	290	297
Volume Left	59	18	28	53
Volume Right	22	87	6	40
cSH	333	533	1332	1305
Volume to Capacity	0.35	0.25	0.02	0.04
Queue Length 95th (m)	12.3	7.8	0.5	1.0
Control Delay (s)	21.6	14.0	0.9	1.7
Lane LOS	C	B	A	A
Approach Delay (s)	21.6	14.0	0.9	1.7
Approach LOS	C	B		

Intersection Summary			
Average Delay	6.2		
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		

680: Johnston Rd/Johnston Street & Buena Vista Ave/Pacific Ave

08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	49	1	6	44	219	0	0	0	146	38	19
Future Volume (Veh/h)	33	49	1	6	44	219	0	0	0	146	38	19
Sign Control		Stop			Yield			Free			Free	
Grade		0%			0%			0%			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)	36	54	1	7	48	241	0	0	0	160	42	21
Pedestrians		18			22			17				
Lane Width (m)		3.6			3.6			0.0				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		2			2			0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	656	412	88	440	423	22	81			22		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	656	412	88	440	423	22	81			22		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	85	88	100	98	89	77	100			90		
cM capacity (veh/h)	240	463	962	428	457	1042	1506			1577		

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	91	296	223
Volume Left	36	7	160
Volume Right	1	241	21
cSH	340	839	1577
Volume to Capacity	0.27	0.35	0.10
Queue Length 95th (m)	8.5	12.8	2.7
Control Delay (s)	19.4	11.6	5.6
Lane LOS	C	B	A
Approach Delay (s)	19.4	11.6	5.6
Approach LOS	C	B	

Intersection Summary			
Average Delay	10.6		
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

700: Finlay Street

08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	141	4	5	136	42	1	47	6	35	21	58
Future Volume (Veh/h)	64	141	4	5	136	42	1	47	6	35	21	58
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	79	174	5	6	168	52	1	58	7	43	26	72
Pedestrians		2			8			4			6	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			1			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	226			183			606	576	188	588	553	202
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	226			183			606	576	188	588	553	202
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			100			100	86	99	88	94	91
cM capacity (veh/h)	1348			1400			338	400	850	350	413	838

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	79	179	6	220	66	141
Volume Left	79	0	6	0	1	43
Volume Right	0	5	0	52	7	72
cSH	1348	1700	1400	1700	423	519
Volume to Capacity	0.06	0.11	0.00	0.13	0.16	0.27
Queue Length 95th (m)	1.5	0.0	0.1	0.0	4.4	8.8
Control Delay (s)	7.8	0.0	7.6	0.0	15.1	14.5
Lane LOS	A		A		C	B
Approach Delay (s)	2.4		0.2		15.1	14.5
Approach LOS					C	B

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	37.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2045 AM
710: Marine Dr & Nichol Road — 08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	94	86	1	1	100	38	1	8	1	69	8	50
Future Volume (Veh/h)	94	86	1	1	100	38	1	8	1	69	8	50
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	103	95	1	1	110	42	1	9	1	76	9	55
Pedestrians					3			2			2	
Lane Width (m)					3.6			3.6			3.6	
Walking Speed (m/s)					1.2			1.2			1.2	
Percent Blockage					0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	154			98			496	460	100	445	439	133
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	154			98			496	460	100	445	439	133
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			100			100	98	100	84	98	94
cM capacity (veh/h)	1436			1505			425	463	956	487	476	920

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	199	153	11	140
Volume Left	103	1	1	76
Volume Right	1	42	1	55
cSH	1436	1505	482	596
Volume to Capacity	0.07	0.00	0.02	0.23
Queue Length 95th (m)	1.9	0.0	0.6	7.3
Control Delay (s)	4.3	0.1	12.6	12.9
Lane LOS	A	A	B	B
Approach Delay (s)	4.3	0.1	12.6	12.9
Approach LOS			B	B

Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2045 AM
720: Buena Vista Ave/12 Ave & 160 Street — 08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	168	12	62	6	18	32	44	282	9	14	176	94
Future Volume (Veh/h)	168	12	62	6	18	32	44	282	9	14	176	94
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	215	15	79	8	23	41	56	362	12	18	226	121
Pedestrians		8			6			5			5	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	868	822	300	900	877	379	355			380		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	868	822	300	900	877	379	355			380		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	5	95	89	96	91	94	95			98		
cM capacity (veh/h)	226	289	737	210	268	666	1207			1184		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	309	72	430	365
Volume Left	215	8	56	18
Volume Right	79	41	12	121
cSH	278	389	1207	1184
Volume to Capacity	1.11	0.19	0.05	0.02
Queue Length 95th (m)	103.1	5.4	1.2	0.4
Control Delay (s)	127.7	16.4	1.5	0.5
Lane LOS	F	C	A	A
Approach Delay (s)	127.7	16.4	1.5	0.5
Approach LOS	F	C		

Intersection Summary			
Average Delay	35.3		
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2045 AM
1020: Phoenix Street/142 Street & North Bluff Road — 08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	757	5	2	569	18	3	4	4	60	10	38
Future Volume (Veh/h)	41	757	5	2	569	18	3	4	4	60	10	38
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	45	823	5	2	618	20	3	4	4	65	11	41
Pedestrians		7			2			32				
Lane Width (m)		3.6			3.6			3.6				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		1			0			3				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	638			860			1314	1590	448	1142	1582	326
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	638			860			1314	1590	448	1142	1582	326
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			97	96	99	54	89	94
cM capacity (veh/h)	942			756			91	99	542	141	100	666

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	456	416	311	329	11	117
Volume Left	45	0	2	0	3	65
Volume Right	0	5	0	20	4	41
cSH	942	1700	756	1700	136	185
Volume to Capacity	0.05	0.24	0.00	0.19	0.08	0.63
Queue Length 95th (m)	1.2	0.0	0.1	0.0	2.1	29.1
Control Delay (s)	1.4	0.0	0.1	0.0	33.8	53.3
Lane LOS	A		A		D	F
Approach Delay (s)	0.7		0.0		33.8	53.3
Approach LOS					D	F

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2045 AM
1030: Archibald Road/144 Street & North Bluff Road — 08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	745	15	45	564	32	8	15	33	35	8	17
Future Volume (Veh/h)	23	745	15	45	564	32	8	15	33	35	8	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	810	16	49	613	35	9	16	36	38	9	18
Pedestrians		15			7			2			4	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	652			828			1312	1620	422	1238	1610	343
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	652			828			1312	1620	422	1238	1610	343
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 %	97			94			91	83	94	62	90	97
cM capacity (veh/h)	927			798			96	93	576	99	94	643

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	25	540	286	49	409	239	61	65
Volume Left	25	0	0	49	0	0	9	38
Volume Right	0	0	16	0	0	35	36	18
cSH	927	1700	1700	798	1700	1700	186	128
Volume to Capacity	0.03	0.32	0.17	0.06	0.24	0.14	0.33	0.51
Queue Length 95th (m)	0.7	0.0	0.0	1.6	0.0	0.0	10.8	19.0
Control Delay (s)	9.0	0.0	0.0	9.8	0.0	0.0	33.6	59.0
Lane LOS	A			A			D	F
Approach Delay (s)	0.3			0.7			33.6	59.0
Approach LOS							D	F

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	32	766	608	13	14	10
Future Volume (Veh/h)	32	766	608	13	14	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	833	661	14	15	11
Pedestrians			1		1	
Lane Width (m)			3.6		3.6	
Walking Speed (m/s)			1.2		1.2	
Percent Blockage			0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			391			
pX, platoon unblocked						
vC, conflicting volume	676				1156	338
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	676				1156	338
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				92	98
cM capacity (veh/h)	911				182	657

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	313	555	441	234	26
Volume Left	35	0	0	0	15
Volume Right	0	0	0	14	11
cSH	911	1700	1700	1700	262
Volume to Capacity	0.04	0.33	0.26	0.14	0.10
Queue Length 95th (m)	1.0	0.0	0.0	0.0	2.6
Control Delay (s)	1.4	0.0	0.0	0.0	20.2
Lane LOS	A				C
Approach Delay (s)	0.5		0.0		20.2
Approach LOS					C

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	815	17	6	698	0	8
Future Volume (Veh/h)	815	17	6	698	0	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	886	18	7	759	0	9
Pedestrians	9				26	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	1				2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	102			199		
pX, platoon unblocked			0.82		0.88	0.82
vC, conflicting volume			930		1324	478
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			479		517	0
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	99
cM capacity (veh/h)			867		412	871

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	591	313	7	380	380	9
Volume Left	0	0	7	0	0	0
Volume Right	0	18	0	0	0	9
cSH	1700	1700	867	1700	1700	871
Volume to Capacity	0.35	0.18	0.01	0.22	0.22	0.01
Queue Length 95th (m)	0.0	0.0	0.2	0.0	0.0	0.3
Control Delay (s)	0.0	0.0	9.2	0.0	0.0	9.2
Lane LOS			A			A
Approach Delay (s)	0.0		0.1			9.2
Approach LOS						A

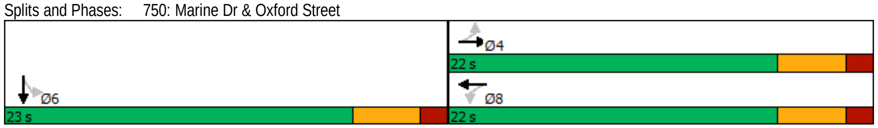
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	163	5	12	178	81	0	0	0	85	19	94
Future Volume (vph)	44	163	5	12	178	81	0	0	0	85	19	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	1874	0	0	1791	0	0	0	0	1805	1593	0
Flt Permitted		0.886			0.983					0.950		
Satd. Flow (perm)	0	1670	0	0	1764	0	0	0	0	1802	1593	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			55						106	
Link Speed (k/h)		30			30			50			50	
Link Distance (m)		217.8			282.3			23.9			896.6	
Travel Time (s)		26.1			33.9			1.7			64.6	
Confl. Peds. (#/hr)	25		2	2		25	22		1	1		22
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	238	0	0	304	0	0	0	0	96	127	0
Turn Type	Perm	NA		Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8					6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0					7.0	7.0	
Minimum Split (s)	21.0	21.0		21.0	21.0					21.0	21.0	
Total Split (s)	22.0	22.0		22.0	22.0					23.0	23.0	
Total Split (%)	48.9%	48.9%		48.9%	48.9%					51.1%	51.1%	
Yellow Time (s)	3.5	3.5		3.5	3.5					3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5					1.5	1.5	
Lost Time Adjust (s)		0.0			0.0					0.0	0.0	
Total Lost Time (s)		5.0			5.0					5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min					None	None	
Act Effct Green (s)		15.6			15.6					7.6	7.6	
Actuated g/C Ratio		0.52			0.52					0.26	0.26	
v/c Ratio		0.27			0.32					0.21	0.26	
Control Delay		7.2			6.3					9.8	4.8	
Queue Delay		0.0			0.0					0.0	0.0	
Total Delay		7.2			6.3					9.8	4.8	
LOS		A			A					A	A	
Approach Delay		7.2			6.3						6.9	
Approach LOS		A			A						A	
Queue Length 50th (m)		6.7			7.1					3.2	0.7	
Queue Length 95th (m)		16.7			18.2					9.7	7.0	
Internal Link Dist (m)		193.8			258.3			0.1			872.6	
Turn Bay Length (m)										30.0		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		1103			1183					1094	1009	
Starvation Cap Reductn		0			0					0	0	
Spillback Cap Reductn		0			0					0	0	
Storage Cap Reductn		0			0					0	0	
Reduced v/c Ratio		0.22			0.26					0.09	0.13	

Intersection Summary	
Area Type: Other	
Cycle Length: 45	
Actuated Cycle Length: 29.8	
Natural Cycle: 45	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.32	
Intersection Signal Delay: 6.8	Intersection LOS: A
Intersection Capacity Utilization 46.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 750: Marine Dr & Oxford Street



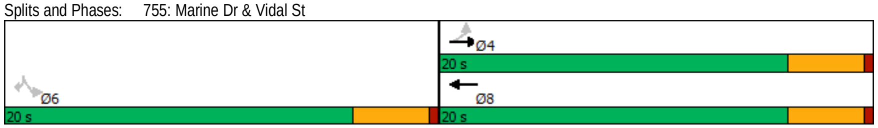
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	37	197	210	50	35	64
Future Volume (vph)	37	197	210	50	35	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1885	1818	0	1805	1615
Flt Permitted		0.929			0.950	
Satd. Flow (perm)	0	1752	1818	0	1805	1539
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			36			72
Link Speed (k/h)		30	30		50	
Link Distance (m)		282.3	128.9		78.4	
Travel Time (s)		33.9	15.5		5.6	
Confl. Peds. (#/hr)	58			58		22
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	263	292	0	39	72
Turn Type	Perm	NA	NA		Perm	Perm
Protected Phases		4	8			
Permitted Phases	4				6	6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		7.0	7.0
Minimum Split (s)	20.0	20.0	20.0		20.0	20.0
Total Split (s)	20.0	20.0	20.0		20.0	20.0
Total Split (%)	50.0%	50.0%	50.0%		50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	0.5	0.5	0.5		0.5	0.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min		None	None
Act Effct Green (s)		19.4	19.4		7.1	7.1
Actuated g/C Ratio		0.68	0.68		0.25	0.25
v/c Ratio		0.22	0.24		0.09	0.16
Control Delay		4.7	4.3		8.3	3.6
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		4.7	4.3		8.3	3.6
LOS		A	A		A	A
Approach Delay		4.7	4.3		5.3	
Approach LOS		A	A		A	
Queue Length 50th (m)		6.2	6.0		1.8	0.0
Queue Length 95th (m)		13.0	13.0		4.1	3.7
Internal Link Dist (m)		258.3	104.9		54.4	
Turn Bay Length (m)						
Base Capacity (vph)		1322	1380		1014	896
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.20	0.21		0.04	0.08

Intersection Summary

Area Type: Other
Cycle Length: 40
Actuated Cycle Length: 28.7
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.24
Intersection Signal Delay: 4.6 Intersection LOS: A
Intersection Capacity Utilization 47.1% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 755: Marine Dr & Vidal St

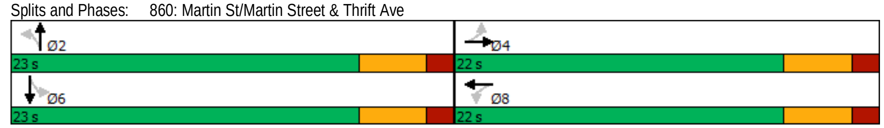


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	268	24	13	227	80	24	69	9	113	73	31
Future Volume (vph)	32	268	24	13	227	80	24	69	9	113	73	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1866	0	0	1811	0	0	1849	0	0	1808	0
Flt Permitted		0.944			0.981			0.882			0.781	
Satd. Flow (perm)	0	1767	0	0	1779	0	0	1645	0	0	1436	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			43			9			22	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		147.0			159.6			143.4			402.9	
Travel Time (s)		10.6			11.5			10.3			29.0	
Confl. Peds. (#/hr)	19		16	16		19	14		10	14		10
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
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	334	0	0	329	0	0	105	0	0	223	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	21.0	21.0		21.0	21.0		21.0	21.0		21.0	21.0	
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)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)		16.4			16.4			10.2			10.2	
Actuated g/C Ratio		0.50			0.50			0.31			0.31	
v/c Ratio		0.38			0.36			0.21			0.49	
Control Delay		9.5			8.5			9.1			12.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.5			8.5			9.1			12.6	
LOS		A			A			A			B	
Approach Delay		9.5			8.5			9.1			12.6	
Approach LOS		A			A			A			B	
Queue Length 50th (m)		11.9			10.3			3.3			7.6	
Queue Length 95th (m)		34.1			30.7			12.2			24.4	
Internal Link Dist (m)		123.0			135.6			119.4			378.9	
Turn Bay Length (m)												
Base Capacity (vph)		1087			1107			920			810	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.31			0.30			0.11			0.28	

Intersection Summary	
Area Type: Other	
Cycle Length: 45	
Actuated Cycle Length: 33.1	
Natural Cycle: 45	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 9.8	Intersection LOS: A
Intersection Capacity Utilization 55.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 860: Martin St/Martin Street & Thrift Ave



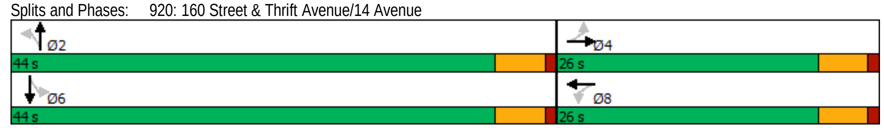
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	122	40	26	167	45	35	382	22	95	474	63
Future Volume (vph)	35	122	40	26	167	45	35	382	22	95	474	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	1788	0	0	1791	0	1770	1845	0	1770	1826	0
Flt Permitted		0.912			0.947		0.317			0.449		
Satd. Flow (perm)	0	1641	0	0	1704	0	590	1845	0	832	1826	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			17			7			15	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		203.7			211.4			403.8			414.4	
Travel Time (s)		14.7			15.2			29.1			29.8	
Confl. Peds. (#/hr)	14		2	2		14	3		12	12		3
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	214	0	0	259	0	38	439	0	103	583	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		15.0	15.0		15.0	15.0	
Total Split (s)	26.0	26.0		26.0	26.0		44.0	44.0		44.0	44.0	
Total Split (%)	37.1%	37.1%		37.1%	37.1%		62.9%	62.9%		62.9%	62.9%	
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	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		13.1			13.1		21.2	21.2		21.2	21.2	
Actuated g/C Ratio		0.29			0.29		0.47	0.47		0.47	0.47	
v/c Ratio		0.44			0.51		0.14	0.50		0.26	0.67	
Control Delay		16.7			18.0		8.6	10.6		9.6	13.6	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		16.7			18.0		8.6	10.6		9.6	13.6	
LOS		B			B		A	B		A	B	
Approach Delay		16.7			18.0			10.4			13.0	
Approach LOS		B			B			B			B	
Queue Length 50th (m)		11.9			15.1		1.5	20.5		4.3	30.0	
Queue Length 95th (m)		37.0			44.9		6.8	51.3		14.8	74.7	
Internal Link Dist (m)		179.7			187.4			379.8			390.4	
Turn Bay Length (m)							50.0			50.0		
Base Capacity (vph)		831			863		504	1579		712	1564	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.26			0.30		0.08	0.28		0.14	0.37	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 45.1
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 13.5 — Intersection LOS: B
Intersection Capacity Utilization 66.7% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 920: 160 Street & Thrift Avenue/14 Avenue



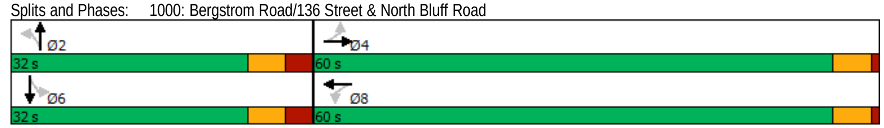
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	551	21	74	676	74	27	83	41	32	40	33
Future Volume (vph)	35	551	21	74	676	74	27	83	41	32	40	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	30.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3501	0	0	3472	0	1770	1759	0	1770	1710	0
Flt Permitted		0.878			0.843		0.706			0.671		
Satd. Flow (perm)	0	3083	0	0	2932	0	1290	1759	0	1244	1710	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			20			27			36	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		121.6			803.7			309.0			286.0	
Travel Time (s)		8.8			57.9			22.2			20.6	
Confl. Peds. (#/hr)	3		77	77		3	19		5	5		19
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	660	0	0	895	0	29	135	0	35	79	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		17.0	17.0		17.0	17.0	
Total Split (s)	60.0	60.0		60.0	60.0		32.0	32.0		32.0	32.0	
Total Split (%)	65.2%	65.2%		65.2%	65.2%		34.8%	34.8%		34.8%	34.8%	
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		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0		7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)		26.1			26.1		10.8	10.8		10.8	10.8	
Actuated g/C Ratio		0.60			0.60		0.25	0.25		0.25	0.25	
v/c Ratio		0.36			0.51		0.09	0.30		0.11	0.18	
Control Delay		7.2			8.5		16.0	14.9		16.2	11.0	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		7.2			8.5		16.0	14.9		16.2	11.0	
LOS		A			A		B	B		B	B	
Approach Delay		7.2			8.5			15.1			12.6	
Approach LOS		A			A			B			B	
Queue Length 50th (m)		15.5			23.4		1.8	6.9		2.2	2.6	
Queue Length 95th (m)		28.2			42.2		7.9	21.5		9.0	12.3	
Internal Link Dist (m)		97.6			779.7			285.0			262.0	
Turn Bay Length (m)							30.0			30.0		
Base Capacity (vph)		3082			2931		755	1041		728	1016	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.21			0.31		0.04	0.13		0.05	0.08	

Intersection Summary

Area Type: Other
Cycle Length: 92
Actuated Cycle Length: 43.7
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.51
Intersection Signal Delay: 8.9 Intersection LOS: A
Intersection Capacity Utilization 77.0% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1000: Bergstrom Road/136 Street & North Bluff Road



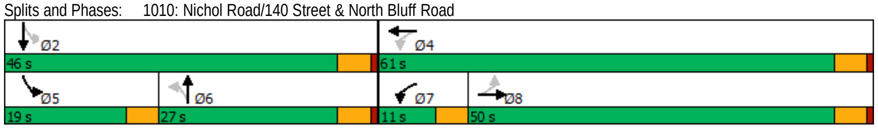
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	137	401	13	75	623	133	18	95	46	160	156	165
Future Volume (vph)	137	401	13	75	623	133	18	95	46	160	156	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	50.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3519	0	1770	3430	0	1770	1763	0	1770	1708	0
Flt Permitted	0.342			0.385			0.552			0.487		
Satd. Flow (perm)	635	3519	0	717	3430	0	1027	1763	0	906	1708	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			36			21			57	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		803.7			447.2			425.8			283.1	
Travel Time (s)		57.9			32.2			30.7			20.4	
Confl. Peds. (#/hr)	8		1	1		8	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	149	450	0	82	822	0	20	153	0	174	349	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		8		7	4			6		5	2	
Permitted Phases	8			4			6			2		
Detector Phase	8	8		7	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	15.0	15.0		9.0	15.0		15.0	15.0		9.0	15.0	
Total Split (s)	50.0	50.0		11.0	61.0		27.0	27.0		19.0	46.0	
Total Split (%)	46.7%	46.7%		10.3%	57.0%		25.2%	25.2%		17.8%	43.0%	
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		0.0	1.0		1.0	1.0		0.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		4.0	5.0		5.0	5.0		4.0	5.0	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effct Green (s)	25.5	25.5		34.9	33.8		13.4	13.4		30.5	29.5	
Actuated g/C Ratio	0.34	0.34		0.47	0.46		0.18	0.18		0.41	0.40	
v/c Ratio	0.68	0.37		0.19	0.52		0.11	0.46		0.34	0.49	
Control Delay	39.9	19.4		11.8	14.4		33.6	32.8		19.7	19.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	39.9	19.4		11.8	14.4		33.6	32.8		19.7	19.2	
LOS	D	B		B	B		C	C		B	B	
Approach Delay		24.5			14.1			32.9			19.4	
Approach LOS		C			B			C			B	
Queue Length 50th (m)	18.6	25.6		5.9	38.3		2.5	17.5		16.3	30.9	
Queue Length 95th (m)	45.8	43.9		15.3	66.0		10.6	45.3		41.9	76.4	
Internal Link Dist (m)		779.7			423.2			401.8			259.1	
Turn Bay Length (m)	45.0			50.0			50.0			50.0		
Base Capacity (vph)	417	2314		445	2659		330	580		562	1045	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.36	0.19		0.18	0.31		0.06	0.26		0.31	0.33	

Intersection Summary

Area Type: Other
Cycle Length: 107
Actuated Cycle Length: 74.1
Natural Cycle: 60
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 19.7 Intersection LOS: B
Intersection Capacity Utilization 73.3% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1010: Nichol Road/140 Street & North Bluff Road



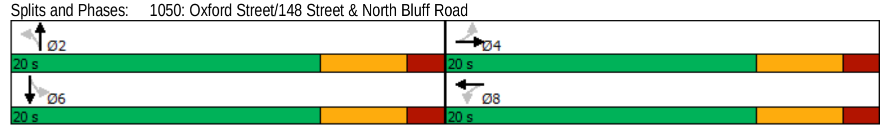
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	625	108	82	672	142	96	189	64	183	309	108
Future Volume (vph)	74	625	108	82	672	142	96	189	64	183	309	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	45.0		0.0	35.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1805	3504	0	1805	3479	0	1805	1813	0	1805	1792	0
Flt Permitted	0.292			0.295			0.385			0.587		
Satd. Flow (perm)	549	3504	0	555	3479	0	711	1813	0	1099	1792	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		55			70			47			49	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		391.2			502.9			896.6			204.8	
Travel Time (s)		28.2			36.2			64.6			14.7	
Confl. Peds. (#/hr)	29		23	23		29	72		25	25		72
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	814	0	91	905	0	107	281	0	203	463	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.7	1.7		1.7	1.7		1.8	1.8		1.8	1.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		5.8	5.8		5.8	5.8	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	13.7	13.7		13.7	13.7		13.0	13.0		13.0	13.0	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.34	0.34		0.34	0.34	
v/c Ratio	0.42	0.63		0.46	0.70		0.44	0.43		0.54	0.72	
Control Delay	17.6	12.3		19.7	13.4		16.9	10.6		16.8	18.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.6	12.3		19.7	13.4		16.9	10.6		16.8	18.4	
LOS	B	B		B	B		B	B		B	B	
Approach Delay		12.8			14.0			12.3			17.9	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	4.3	22.3		4.8	25.3		5.6	11.8		11.0	23.7	
Queue Length 95th (m)	#14.5	36.1		#18.7	40.9		16.1	25.8		25.9	#59.4	
Internal Link Dist (m)		367.2			478.9			872.6			180.8	
Turn Bay Length (m)	40.0			45.0			35.0			30.0		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	206	1350		208	1350		265	705		410	698	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.40	0.60		0.44	0.67		0.40	0.40		0.50	0.66	

Intersection Summary

Area Type: Other
Cycle Length: 40
Actuated Cycle Length: 38.3
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 14.3 Intersection LOS: B
Intersection Capacity Utilization 83.5% ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1050: Oxford Street/148 Street & North Bluff Road



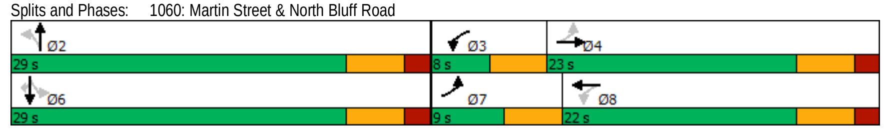
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	658	30	58	584	275	44	186	35	218	146	268
Future Volume (vph)	210	658	30	58	584	275	44	186	35	218	146	268
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	20.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3508	0	1770	3325	0	0	3429	0	0	1809	1583
Flt Permitted	0.195			0.311				0.828			0.653	
Satd. Flow (perm)	362	3508	0	576	3325	0	0	2857	0	0	1210	1528
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			127			33				244
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		502.9			102.1			402.9			184.7	
Travel Time (s)		36.2			7.4			29.0			13.3	
Confl. Peds. (#/hr)	27		12	12		27	30		17	17		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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	748	0	63	934	0	0	288	0	0	396	291
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	10.0		4.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	8.0	15.9		8.0	15.8		15.9	15.9		15.9	15.9	15.9
Total Split (s)	9.0	23.0		8.0	22.0		29.0	29.0		29.0	29.0	29.0
Total Split (%)	15.0%	38.3%		13.3%	36.7%		48.3%	48.3%		48.3%	48.3%	48.3%
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)	0.0	1.8		0.0	1.8		1.9	1.9		1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	4.0	5.8		4.0	5.8			5.9			5.9	5.9
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	25.3	20.6		22.1	16.2			21.8			21.8	21.8
Actuated g/C Ratio	0.43	0.35		0.38	0.28			0.37			0.37	0.37
v/c Ratio	0.83	0.61		0.21	0.92			0.27			0.88	0.40
Control Delay	41.1	19.7		11.5	35.6			12.0			41.9	5.1
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	41.1	19.7		11.5	35.6			12.0			41.9	5.1
LOS	D	B		B	D			B			D	A
Approach Delay		24.7			34.1			12.0			26.3	
Approach LOS		C			C			B			C	
Queue Length 50th (m)	15.7	40.4		3.9	48.3			10.1			40.4	3.4
Queue Length 95th (m)	#47.3	58.4		9.7	#85.6			17.8			#87.7	17.0
Internal Link Dist (m)		478.9			78.1			378.9			160.7	
Turn Bay Length (m)	50.0			50.0								
Base Capacity (vph)	276	1232		297	1010			1145			476	749

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.83	0.61		0.21	0.92			0.25			0.83	0.39

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 58.8
Natural Cycle: 60
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 27.0 Intersection LOS: C
Intersection Capacity Utilization 83.5% ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1060: Martin Street & North Bluff Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	648	109	109	708	272	181	749	120	268	686	174
Future Volume (vph)	280	648	109	109	708	272	181	749	120	268	686	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	40.0		0.0	40.0		40.0	50.0		0.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3417	0	1770	3270	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.105			0.176			0.078			0.072		
Satd. Flow (perm)	194	3417	0	322	3270	0	145	1863	1498	133	1863	1529
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			42				125			134
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		199.3			399.9			810.7			195.6	
Travel Time (s)		14.3			28.8			58.4			14.1	
Confl. Peds. (#/hr)	58		44	44		58	32		56	56		32
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	304	822	0	118	1066	0	197	814	130	291	746	189
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	15.9		11.0	15.9		11.0	15.8	15.8	11.0	15.8	15.8
Total Split (s)	17.0	46.0		11.0	40.0		12.0	57.0	57.0	16.0	61.0	61.0
Total Split (%)	13.1%	35.4%		8.5%	30.8%		9.2%	43.8%	43.8%	12.3%	46.9%	46.9%
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)	0.0	1.9		0.0	1.9		0.0	1.8	1.8	0.0	1.8	1.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.9		4.0	5.9		4.0	5.8	5.8	4.0	5.8	5.8
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	53.0	40.1		43.0	34.1		61.0	51.2	51.2	69.0	55.2	55.2
Actuated g/C Ratio	0.41	0.31		0.33	0.26		0.47	0.39	0.39	0.53	0.42	0.42
v/c Ratio	1.29	0.77		0.64	1.20		1.17	1.11	0.20	1.32	0.94	0.26
Control Delay	187.6	45.9		43.1	141.0		152.5	105.1	5.4	201.2	57.2	8.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	187.6	45.9		43.1	141.0		152.5	105.1	5.4	201.2	57.2	8.6
LOS	F	D		D	F		F	F	A	F	E	A
Approach Delay		84.2			131.3			102.0			83.9	
Approach LOS		F			F			F			F	
Queue Length 50th (m)	~87.4	104.1		20.0	~179.4		~46.5	~250.5	0.8	~84.7	190.2	8.7
Queue Length 95th (m)	#147.7	129.4		#35.7	#223.7		#97.7	#329.5	13.9	#143.9	#273.7	24.6
Internal Link Dist (m)		175.3			375.9			786.7			171.6	
Turn Bay Length (m)	40.0			40.0			40.0		40.0	50.0		
Base Capacity (vph)	236	1064		184	888		168	733	665	221	791	726

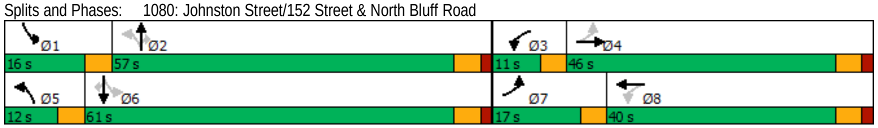
Lanes, Volumes, Timings 2045 PM
1080: Johnston Street/152 Street & North Bluff Road 08/14/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.29	0.77		0.64	1.20		1.17	1.11	0.20	1.32	0.94	0.26

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Natural Cycle: 130
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 1.32
Intersection Signal Delay: 100.4 Intersection LOS: F
Intersection Capacity Utilization 115.7% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1080: Johnston Street/152 Street & North Bluff Road



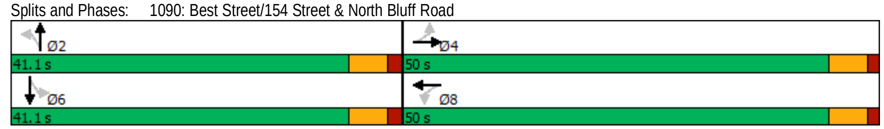
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	742	72	38	866	58	104	237	59	103	226	115
Future Volume (vph)	110	742	72	38	866	58	104	237	59	103	226	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	55.0		0.0	35.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3483	0	1770	3502	0	1770	1799	0	1770	1755	0
Flt Permitted	0.215			0.264			0.405			0.473		
Satd. Flow (perm)	400	3483	0	490	3502	0	750	1799	0	876	1755	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			10			16			33	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		399.9			401.5			193.1			201.3	
Travel Time (s)		28.8			28.9			13.9			14.5	
Confl. Peds. (#/hr)	3		14	14		3	13		12	12		13
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	120	885	0	41	1004	0	113	322	0	112	371	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	15.4	15.4		15.4	15.4		15.7	15.7		15.7	15.7	
Total Split (s)	50.0	50.0		50.0	50.0		41.1	41.1		41.1	41.1	
Total Split (%)	54.9%	54.9%		54.9%	54.9%		45.1%	45.1%		45.1%	45.1%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.4	1.4		1.4	1.4		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.4	5.4		5.4	5.4		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	29.9	29.9		29.9	29.9		19.6	19.6		19.6	19.6	
Actuated g/C Ratio	0.48	0.48		0.48	0.48		0.32	0.32		0.32	0.32	
v/c Ratio	0.62	0.52		0.17	0.59		0.47	0.55		0.40	0.64	
Control Delay	30.0	12.2		12.3	13.2		27.4	22.3		24.2	23.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	30.0	12.2		12.3	13.2		27.4	22.3		24.2	23.7	
LOS	C	B		B	B		C	C		C	C	
Approach Delay		14.3			13.2			23.7			23.8	
Approach LOS		B			B			C			C	
Queue Length 50th (m)	9.1	32.2		2.4	38.5		10.1	28.0		9.7	31.9	
Queue Length 95th (m)	#40.9	66.4		10.1	78.4		30.8	65.5		29.0	75.1	
Internal Link Dist (m)		375.9			377.5			169.1			177.3	
Turn Bay Length (m)	50.0			55.0			35.0			55.0		
Base Capacity (vph)	304	2659		373	2672		476	1149		556	1127	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.39	0.33		0.11	0.38		0.24	0.28		0.20	0.33	

Intersection Summary

Area Type: Other
Cycle Length: 91.1
Actuated Cycle Length: 61.8
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 16.8 Intersection LOS: B
Intersection Capacity Utilization 80.3% ICU Level of Service D
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1090: Best Street/154 Street & North Bluff Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	796	117	36	790	72	42	189	46	94	274	91
Future Volume (vph)	48	796	117	36	790	72	42	189	46	94	274	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	40.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3460	0	1770	3489	0	1770	1795	0	1770	1782	0
Flt Permitted	0.248			0.248			0.451			0.601		
Satd. Flow (perm)	461	3460	0	461	3489	0	833	1795	0	1098	1782	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41			24			30			41	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		401.5			402.3			816.6			217.9	
Travel Time (s)		28.9			29.0			58.8			15.7	
Confl. Peds. (#/hr)	5		6	6		5	18		33	33		18
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	992	0	39	937	0	46	255	0	102	397	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	16.0	16.0		16.0	16.0		15.9	15.9		15.9	15.9	
Total Split (s)	23.0	23.0		23.0	23.0		22.0	22.0		22.0	22.0	
Total Split (%)	51.1%	51.1%		51.1%	51.1%		48.9%	48.9%		48.9%	48.9%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	16.1	16.1		16.1	16.1		13.6	13.6		13.6	13.6	
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.33	0.33		0.33	0.33	
v/c Ratio	0.29	0.73		0.22	0.69		0.17	0.42		0.28	0.65	
Control Delay	15.0	14.7		13.2	13.9		11.9	12.1		13.0	16.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.0	14.7		13.2	13.9		11.9	12.1		13.0	16.6	
LOS	B	B		B	B		B	B		B	B	
Approach Delay		14.7			13.9			12.1			15.8	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	2.6	31.2		1.9	29.4		2.5	13.1		5.7	22.7	
Queue Length 95th (m)	10.0	51.8		7.7	48.6		7.9	27.2		14.5	44.5	
Internal Link Dist (m)		377.5			378.3			792.6			193.9	
Turn Bay Length (m)	50.0			40.0			50.0			50.0		
Base Capacity (vph)	191	1459		191	1461		325	719		428	720	

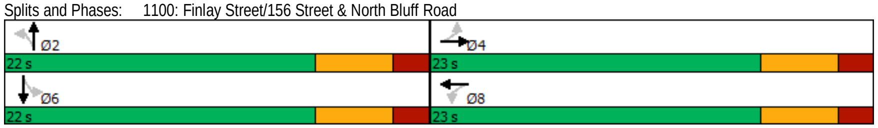
Lanes, Volumes, Timings 2045 PM
1100: Finlay Street/156 Street & North Bluff Road 08/14/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.27	0.68		0.20	0.64		0.14	0.35		0.24	0.55	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 41.6
Natural Cycle: 45
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 14.3 Intersection LOS: B
Intersection Capacity Utilization 82.5% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 1100: Finlay Street/156 Street & North Bluff Road



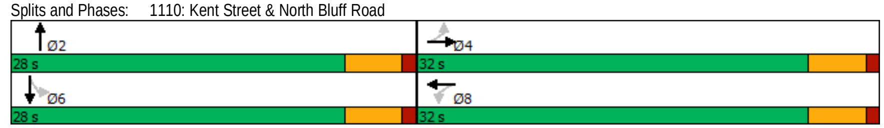
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	970	19	1	859	19	0	1	36	0	0	0
Future Volume (vph)	14	970	19	1	859	19	0	1	36	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3556	0	0	3561	0	0	1633	0	0	1881	0
Flt Permitted		0.932			0.954							
Satd. Flow (perm)	0	3318	0	0	3398	0	0	1633	0	0	1881	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			5			26				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		402.3			400.8			238.4			72.1	
Travel Time (s)		29.0			28.9			17.2			5.2	
Confl. Peds. (#/hr)	7		30	30		7	133					133
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1223	0	0	1072	0	0	45	0	0	0	0
Turn Type	Perm	NA		Perm	NA			NA				
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8			2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0			7.0		7.0	7.0	
Minimum Split (s)	20.0	20.0		20.0	20.0			28.0		28.0	28.0	
Total Split (s)	32.0	32.0		32.0	32.0			28.0		28.0	28.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%			46.7%		46.7%	46.7%	
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	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None			Ped		Ped	Ped	
Act Effct Green (s)		25.0			25.0			23.1				
Actuated g/C Ratio		0.43			0.43			0.40				
v/c Ratio		0.85			0.73			0.07				
Control Delay		22.2			17.1			7.5				
Queue Delay		0.0			0.0			0.0				
Total Delay		22.2			17.1			7.5				
LOS		C			B			A				
Approach Delay		22.2			17.1			7.5				
Approach LOS		C			B			A				
Queue Length 50th (m)		61.0			49.2			1.3				
Queue Length 95th (m)		73.4			59.8			5.9				
Internal Link Dist (m)		378.3			376.8			214.4			48.1	
Turn Bay Length (m)												
Base Capacity (vph)		1547			1585			663				
Starvation Cap Reductn		0			0			0				
Spillback Cap Reductn		0			0			0				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0				
Reduced v/c Ratio		0.79			0.68			0.07				

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 58.1
Natural Cycle: 60
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 19.6 Intersection LOS: B
Intersection Capacity Utilization 64.9% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1110: Kent Street & North Bluff Road



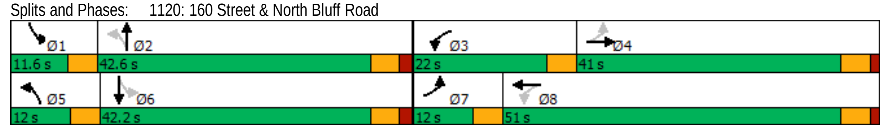
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	762	139	227	709	31	114	231	121	12	323	60
Future Volume (vph)	61	762	139	227	709	31	114	231	121	12	323	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	35.0		0.0	45.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1770	3442	0	1770	3512	0	1770	1752	0	1770	1812	0
Flt Permitted	0.290			0.103			0.208			0.400		
Satd. Flow (perm)	536	3442	0	192	3512	0	385	1752	0	742	1812	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			4			24			8	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		400.8			526.2			414.4			217.2	
Travel Time (s)		28.9			37.9			29.8			15.6	
Confl. Peds. (#/hr)	17		6	6		17	17		12	12		17
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	66	979	0	247	805	0	124	383	0	13	416	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	10.0		7.0	10.0	
Minimum Split (s)	11.5	15.4		11.5	15.4		11.5	15.8		11.5	15.8	
Total Split (s)	12.0	41.0		22.0	51.0		12.0	42.6		11.6	42.2	
Total Split (%)	10.2%	35.0%		18.8%	43.5%		10.2%	36.3%		9.9%	36.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	1.4		0.0	1.4		0.0	1.8		0.0	1.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.4		4.0	5.4		4.0	5.8		4.0	5.8	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effct Green (s)	43.0	34.0		54.0	43.7		41.7	37.0		37.9	28.9	
Actuated g/C Ratio	0.41	0.32		0.51	0.42		0.40	0.35		0.36	0.28	
v/c Ratio	0.21	0.87		0.78	0.55		0.48	0.61		0.04	0.83	
Control Delay	16.8	43.6		41.6	26.4		27.2	32.9		19.8	50.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.8	43.6		41.6	26.4		27.2	32.9		19.8	50.0	
LOS	B	D		D	C		C	C		B	D	
Approach Delay		41.9			29.9			31.5			49.1	
Approach LOS		D			C			C			D	
Queue Length 50th (m)	7.1	106.0		35.3	71.7		17.5	61.7		1.7	85.6	
Queue Length 95th (m)	15.7	#160.0		#74.0	100.6		31.1	110.4		5.7	126.6	
Internal Link Dist (m)		376.8			502.2			390.4			193.2	
Turn Bay Length (m)	60.0			35.0			45.0			30.0		
Base Capacity (vph)	318	1201		374	1556		260	662		347	645	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.21	0.82		0.66	0.52		0.48	0.58		0.04	0.64	

Intersection Summary

Area Type: Other
Cycle Length: 117.2
Actuated Cycle Length: 104.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 37.0 Intersection LOS: D
Intersection Capacity Utilization 81.4% ICU Level of Service D
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1120: 160 Street & North Bluff Road



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	59	285	340	96	91	71
Future Volume (Veh/h)	59	285	340	96	91	71
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	66	317	378	107	101	79
Pedestrians		6			16	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.2			1.2	
Percent Blockage		1			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	501				896	454
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	501				896	454
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				65	87
cM capacity (veh/h)	1059				290	599

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	383	485	180
Volume Left	66	0	101
Volume Right	0	107	79
cSH	1059	1700	375
Volume to Capacity	0.06	0.29	0.48
Queue Length 95th (m)	1.6	0.0	20.1
Control Delay (s)	2.0	0.0	23.2
Lane LOS	A		C
Approach Delay (s)	2.0	0.0	23.2
Approach LOS			C

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	40	27	15	44	51	17	200	9	51	194	64
Future Volume (Veh/h)	37	40	27	15	44	51	17	200	9	51	194	64
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	41	44	30	17	49	57	19	222	10	57	216	71
Pedestrians		9			4						10	
Lane Width (m)		3.6			3.6						3.6	
Walking Speed (m/s)		1.2			1.2						1.2	
Percent Blockage		1			0						1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	731	648	260	686	679	241	296			236		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	731	648	260	686	679	241	296			236		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	84	88	96	94	86	93	99			96		
cM capacity (veh/h)	263	365	777	301	351	793	1267			1339		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	115	123	251	344
Volume Left	41	17	19	57
Volume Right	30	57	10	71
cSH	365	459	1267	1339
Volume to Capacity	0.31	0.27	0.01	0.04
Queue Length 95th (m)	10.6	8.6	0.4	1.1
Control Delay (s)	19.3	15.7	0.7	1.6
Lane LOS	C	C	A	A
Approach Delay (s)	19.3	15.7	0.7	1.6
Approach LOS	C	C		

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
680: Johnston Rd/Johnston Street & Buena Vista Ave/Pacific Ave

2045 PM
08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	60	4	14	33	228	0	0	0	239	74	71
Future Volume (Veh/h)	41	60	4	14	33	228	0	0	0	239	74	71
Sign Control		Stop			Yield			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	41	61	4	14	33	230	0	0	0	241	75	72
Pedestrians		70			40			57				
Lane Width (m)		3.6			3.6			0.0				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		6			3			0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	910	703	238	724	739	40	217			40		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	910	703	238	724	739	40	217			40		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	71	78	99	94	88	77	100			84		
cM capacity (veh/h)	139	279	759	227	266	1003	1285			1530		

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	106	277	388
Volume Left	41	14	241
Volume Right	4	230	72
cSH	205	668	1530
Volume to Capacity	0.52	0.41	0.16
Queue Length 95th (m)	21.2	16.3	4.5
Control Delay (s)	40.0	14.2	5.3
Lane LOS	E	B	A
Approach Delay (s)	40.0	14.2	5.3
Approach LOS	E	B	

Intersection Summary			
Average Delay	13.3		
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
700: Finlay Street

2045 PM
08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	124	8	9	126	31	1	31	19	49	35	71
Future Volume (Veh/h)	42	124	8	9	126	31	1	31	19	49	35	71
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	51	151	10	11	154	38	1	38	23	60	43	87
Pedestrians					5			1			11	
Lane Width (m)					3.6			3.6			3.6	
Walking Speed (m/s)					1.2			1.2			1.2	
Percent Blockage					0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	203			162			544	484	162	506	470	184
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	203			162			544	484	162	506	470	184
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			99			100	92	97	85	91	90
cM capacity (veh/h)	1362			1422			361	458	881	413	466	853

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	51	161	11	192	62	190
Volume Left	51	0	11	0	1	60
Volume Right	0	10	0	38	23	87
cSH	1362	1700	1422	1700	554	560
Volume to Capacity	0.04	0.09	0.01	0.11	0.11	0.34
Queue Length 95th (m)	0.9	0.0	0.2	0.0	3.0	12.0
Control Delay (s)	7.7	0.0	7.6	0.0	12.3	14.7
Lane LOS	A		A		B	B
Approach Delay (s)	1.9		0.4		12.3	14.7
Approach LOS					B	B

Intersection Summary			
Average Delay	6.1		
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2045 PM

710: Marine Dr & Nichol Road — 08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	81	1	5	136	67	0	3	6	46	12	81
Future Volume (Veh/h)	64	81	1	5	136	67	0	3	6	46	12	81
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	70	89	1	5	149	74	0	3	7	51	13	89
Pedestrians		4						2			11	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	234			92			527	476	92	445	439	201
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	234			92			527	476	92	445	439	201
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			100			100	99	99	90	97	89
cM capacity (veh/h)	1327			1506			383	457	967	488	479	832

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	160	228	10	153
Volume Left	70	5	0	51
Volume Right	1	74	7	89
cSH	1327	1506	725	641
Volume to Capacity	0.05	0.00	0.01	0.24
Queue Length 95th (m)	1.3	0.1	0.3	7.4
Control Delay (s)	3.7	0.2	10.0	12.4
Lane LOS	A	A	B	B
Approach Delay (s)	3.7	0.2	10.0	12.4
Approach LOS			B	B

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2045 PM

720: Buena Vista Ave/12 Ave & 160 Street — 08/14/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	115	18	37	6	5	37	36	245	8	33	298	127
Future Volume (Veh/h)	115	18	37	6	5	37	36	245	8	33	298	127
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	129	20	42	7	6	42	40	275	9	37	335	143
Pedestrians		6			6			2			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	892	856	414	900	924	286	484			290		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	892	856	414	900	924	286	484			290		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	44	93	93	97	98	94	96			97		
cM capacity (veh/h)	230	275	638	216	252	753	1084			1277		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	191	55	324	515
Volume Left	129	7	40	37
Volume Right	42	42	9	143
cSH	273	491	1084	1277
Volume to Capacity	0.70	0.11	0.04	0.03
Queue Length 95th (m)	38.1	3.0	0.9	0.7
Control Delay (s)	43.8	13.3	1.4	0.9
Lane LOS	E	B	A	A
Approach Delay (s)	43.8	13.3	1.4	0.9
Approach LOS	E	B		

Intersection Summary			
Average Delay	9.2		
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	673	6	16	809	51	8	1	12	42	3	14
Future Volume (Veh/h)	6	673	6	16	809	51	8	1	12	42	3	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	732	7	17	879	55	9	1	13	46	3	15
Pedestrians		7			2			32				
Lane Width (m)		3.6			3.6			3.6				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		1			0			3				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	934			771			1278	1750	404	1336	1726	474
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	934			771			1278	1750	404	1336	1726	474
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			92	99	98	55	96	97
cM capacity (veh/h)	729			817			108	80	580	103	83	534

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	373	373	456	494	23	64
Volume Left	7	0	17	0	9	46
Volume Right	0	7	0	55	13	15
cSH	729	1700	817	1700	194	126
Volume to Capacity	0.01	0.22	0.02	0.29	0.12	0.51
Queue Length 95th (m)	0.2	0.0	0.5	0.0	3.2	19.1
Control Delay (s)	0.3	0.0	0.6	0.0	26.0	60.3
Lane LOS	A		A		D	F
Approach Delay (s)	0.2		0.3		26.0	60.3
Approach LOS					D	F

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	662	17	46	840	37	12	14	46	17	13	24
Future Volume (Veh/h)	36	662	17	46	840	37	12	14	46	17	13	24
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	39	720	18	50	913	40	13	15	50	18	14	26
Pedestrians		15			7			2			4	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	957			740			1414	1866	378	1540	1855	496
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	957			740			1414	1866	378	1540	1855	496
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			94			81	76	92	66	78	95
cM capacity (veh/h)	712			861			70	64	615	54	65	512

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	39	480	258	50	609	344	78	58
Volume Left	39	0	0	50	0	0	13	18
Volume Right	0	0	18	0	0	40	50	26
cSH	712	1700	1700	861	1700	1700	155	96
Volume to Capacity	0.05	0.28	0.15	0.06	0.36	0.20	0.50	0.60
Queue Length 95th (m)	1.4	0.0	0.0	1.5	0.0	0.0	19.4	22.8
Control Delay (s)	10.3	0.0	0.0	9.4	0.0	0.0	49.7	87.6
Lane LOS	B			A			E	F
Approach Delay (s)	0.5			0.5			49.7	87.6
Approach LOS							E	F

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1040: North Bluff Road & 146 Street

2045 PM
08/14/2020

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	754	858	18	10	21
Future Volume (Veh/h)	16	754	858	18	10	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	820	933	20	11	23
Pedestrians			1		1	
Lane Width (m)			3.6		3.6	
Walking Speed (m/s)			1.2		1.2	
Percent Blockage			0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			391			
pX, platoon unblocked						
vC, conflicting volume	954				1389	478
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	954				1389	478
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				92	96
cM capacity (veh/h)	716				130	534

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	290	547	622	331	34
Volume Left	17	0	0	0	11
Volume Right	0	0	0	20	23
cSH	716	1700	1700	1700	266
Volume to Capacity	0.02	0.32	0.37	0.19	0.13
Queue Length 95th (m)	0.6	0.0	0.0	0.0	3.5
Control Delay (s)	0.9	0.0	0.0	0.0	20.5
Lane LOS	A				C
Approach Delay (s)	0.3		0.0		20.5
Approach LOS					C

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1070: Foster Street & North Bluff Road

2045 PM
08/14/2020

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	883	27	22	917	0	33
Future Volume (Veh/h)	883	27	22	917	0	33
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	960	29	24	997	0	36
Pedestrians	9				26	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	1				2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	102			199		
pX, platoon unblocked			0.83		0.87	0.83
vC, conflicting volume			1015		1556	520
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			606		444	9
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		100	96
cM capacity (veh/h)			785		442	868

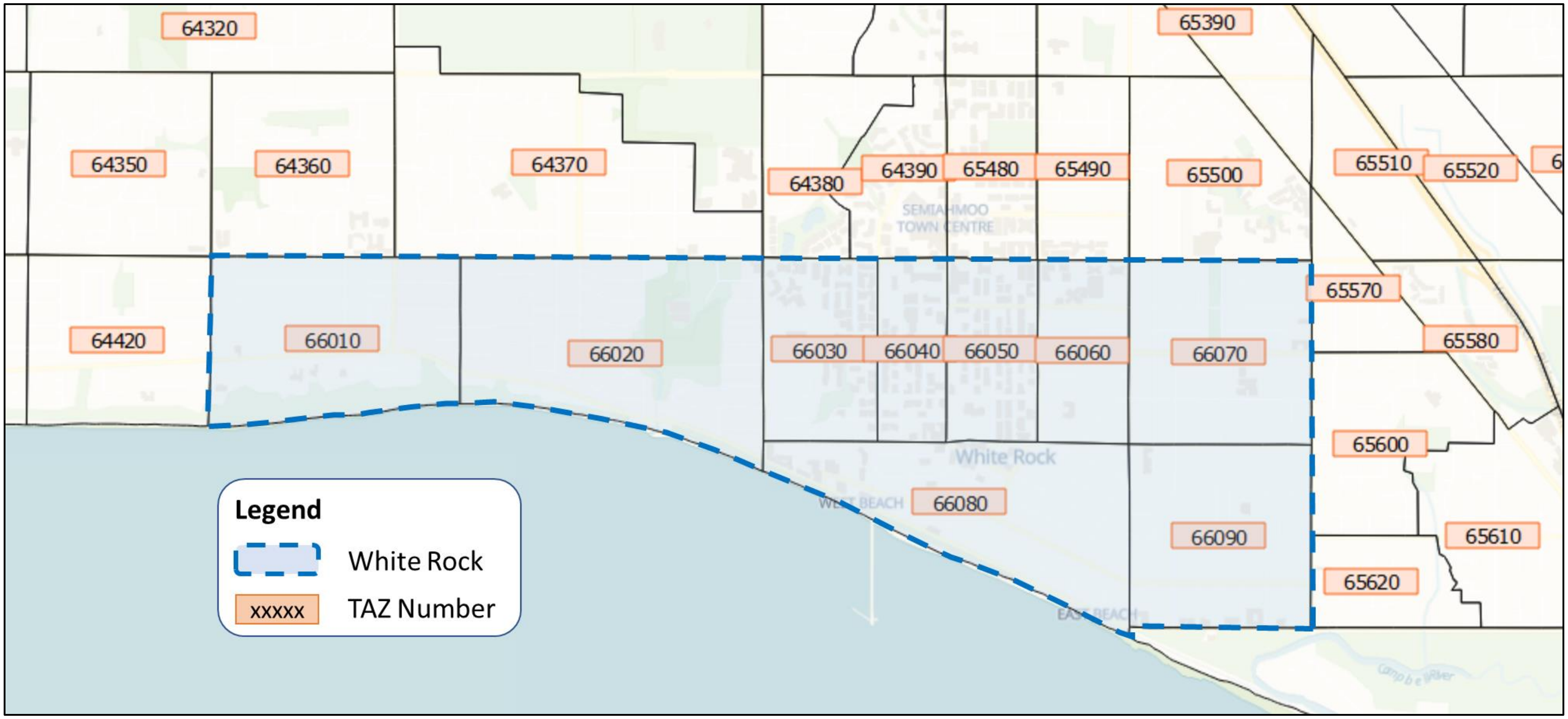
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	640	349	24	498	498	36
Volume Left	0	0	24	0	0	0
Volume Right	0	29	0	0	0	36
cSH	1700	1700	785	1700	1700	868
Volume to Capacity	0.38	0.21	0.03	0.29	0.29	0.04
Queue Length 95th (m)	0.0	0.0	0.8	0.0	0.0	1.0
Control Delay (s)	0.0	0.0	9.7	0.0	0.0	9.3
Lane LOS			A			A
Approach Delay (s)	0.0		0.2			9.3
Approach LOS						A

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX A

Land Use Assumptions

Traffic Analysis Zone (TAZ) – White Rock



2017 Model Land Use Assumptions – White Rock

ID	mo10	mo11	mo12	mo13	mo14	mo15	mo16	mo17	mo18	mo20	mo21	mo22	mo23	mo24	mo25	mo26	mo27	mo30	mo31	mo32	mo40	mo41	mo42	mo43	mo44
Name	TotPop	Pop0t4	Pop5t12	Pop13t17	Pop18t24	Pop25t34	Pop35t54	Pop55t64	Pop65Up	TotEmp	EmpConMfg	EmpFire	EmpTcuWh	EmpRet	EmpBoS	EmpAcFoInCu	EmpHeEdPuAd	EnrolElem	EnrolSec	EnrolPsFte	TotHh	Hh1p	Hh2p	Hh3p	Hh4pUp
Description	POP_Total	POP_0to4	POP_5to12	POP_13to17	POP_18to24	POP_25to34	POP_35to54	POP_55to64	POP_65plus	EMP_Total	Construct_Mfg	FIRE	TCU_Wholesale	Retail	Business_Other Services	AccomFood_InfoCult	Health_Educat_PubAdmin	Elementary_Enrolment	Secondary_Enrolment	PostSec FTE	HHOLDS_Total	HHOLDS_1Person	HHOLDS_2Person	HHOLDS_3Person	HHOLDS_4plusPerson
66010	1286	64	119	93	127	144	388	170	181	183	37	19	49	13	29	26	10	0	0	0	511	143	140	105	123
66020	1862	62	141	133	183	168	455	314	406	441	134	53	58	11	108	44	34	0	0	0	822	165	310	174	172
66030	3528	54	84	68	97	184	743	654	1643	664	172	57	26	10	101	33	265	0	0	0	1700	942	583	68	106
66040	2001	37	6	7	42	128	369	389	1022	940	109	122	44	136	229	87	214	12	7	8	1328	787	461	45	36
66050	2404	50	59	41	101	247	557	390	960	833	36	50	87	105	277	78	199	524	0	0	1781	1080	550	110	40
66060	1805	76	123	84	110	140	485	260	529	2053	35	11	19	25	124	62	1777	0	0	0	619	246	203	95	75
66070	1697	101	177	100	135	221	501	244	219	342	57	17	45	18	93	36	75	592	0	0	712	172	262	99	178
66080	2833	19	104	107	208	256	636	667	835	1365	113	69	45	85	185	624	243	0	0	0	1550	586	596	208	160
66090	3055	89	207	166	254	327	830	530	652	653	88	90	40	14	154	67	200	0	0	0	1221	413	433	153	221
Total	20469	551	1020	800	1257	1814	4963	3617	6447	7473	781	487	413	418	1299	1057	3018	1128	7	8	10242	4535	3537	1057	1113

2050 Model Land Use Assumptions – White Rock

ID	mo10	mo11	mo12	mo13	mo14	mo15	mo16	mo17	mo18	mo20	mo21	mo22	mo23	mo24	mo25	mo26	mo27	mo30	mo31	mo32	mo40	mo41	mo42	mo43	mo44
Name	TotPop	Pop0t4	Pop5t12	Pop13t17	Pop18t24	Pop25t34	Pop35t54	Pop55t64	Pop65Up	TotEmp	EmpConMfg	EmpFire	EmpTcuWh	EmpRet	EmpBoS	EmpAcFoInCu	EmpHeEdPuAd	EnrolElem	EnrolSec	EnrolPsFte	TotHh	Hh1p	Hh2p	Hh3p	Hh4pUp
Description	POP_Total	POP_0to4	POP_5to12	POP_13to17	POP_18to24	POP_25to34	POP_35to54	POP_55to64	POP_65plus	EMP_Total	Construct_Mfg	FIRE	TCU_Wholesale	Retail	Business_Other Services	AccomFood_InfoCult	Health_Educat_PubAdmin	Elementary_Enrolment	Secondary_Enrolment	PostSec FTE	HHOLDS_Total	HHOLDS_1Person	HHOLDS_2Person	HHOLDS_3Person	HHOLDS_4plusPerson
66010	2362	45	80	74	212	138	768	401	645	337	49	9	9	12	95	9	153	0	0	0	864	145	239	289	191
66020	3036	72	190	109	184	85	916	492	989	296	8	26	8	5	62	124	63	0	0	0	1120	172	402	268	278
66030	4608	47	5	43	142	263	696	859	2553	514	8	27	8	5	121	9	336	0	0	0	2750	1688	740	144	178
66040	4751	8	30	26	151	308	900	657	2672	1482	298	245	73	176	352	115	223	16	9	9	2570	1483	633	133	321
66050	5055	37	74	42	111	355	994	742	2699	1309	71	168	121	124	424	125	276	688	0	0	3537	2259	1055	117	106
66060	1845	66	66	88	62	121	565	298	580	1998	8	9	9	12	99	19	1843	0	0	0	713	338	221	75	79
66070	2122	71	106	102	145	251	669	363	415	336	43	24	8	5	71	9	176	778	0	0	857	168	286	284	120
66080	3964	18	71	88	138	458	981	890	1320	1752	141	122	104	65	162	777	381	0	0	0	1720	517	606	290	306
66090	3398	66	84	90	169	382	877	674	1055	804	8	37	69	5	176	144	366	0	0	0	1237	323	556	240	118
Total	31142	429	706	662	1315	2361	7365	5376	12928	8830	634	667	410	409	1563	1331	3816	1482	9	9	15367	7091	4739	1840	1697