

PLANNING COMMISSION MEETING MINUTES

Vancouver City Hall – Council Chambers – 415 W. Sixth Street
PO Box 1995 – Vancouver, Washington 98668-1995
www.cityofvancouver.us

Marjorie Ledell • Steve Schulte • Larry Blaufus • Zachary Pyle
Nena Cavel • Patrick Adigweme • Melissa von Borstel

November 14, 2023

REGULAR MEETING

Vancouver City Hall - 415 W. Sixth Street, Vancouver WA

CALL TO ORDER

The November 14, 2023, meeting of the Planning Commission was called to order at 4:31 p.m. by Chair Ledell.

ROLL CALL

Present: Marjorie Ledell, Zachary Pyle, Patrick Adigweme, Larry Blaufus (virtual, joined at 4:40 pm), Nena Cavel, Steve Schulte, and Melissa von Borstel

ADOPTION OF MINUTES

Chair Ledell amended the minutes to include on page 6, “regarding the somewhat incomplete application, but” to her statement. Commissioner Adigweme noted a typo on page 6 as well.

Motion by Commissioner Cavel, second by Commissioner Schulte, and carried unanimously to adopt the October 24, 2023, minutes as amended.

WORKSHOP

COMPREHENSIVE PLAN UPDATE GOALS FRAMEWORK

Domenique Martinelli, Senior Planner, Community Development Department

Rebecca Kennedy introduced the workshop. Domenique Martinelli presented an overview of the three project phases, the modes of input in the community visioning phase (phase 1), the equity framework draft objectives, the definition of priority communities, the framework approach, community partners that are participating in the project, the codesign process, objectives of community partnership, goals for public involvement, and next steps and plans for 2024.

Commission Questions

- How will staff manage the many shifting and changing work items with this project? Staff responded a big part of addressing this is through staffing. There is a large consultant team and there are experts in every area of the plan, as well as technical advisory groups within the City organization.
- Prioritization process and analysis of tradeoffs for plan goals. Staff responded they will work with equity priority communities to understand lived experiences and current needs that will inform the plan goals.

- Community engagement and interactions with the public related to the project. Staff responded that there is a strategy for robust engagement with the public on this project, including workshops, tabling events, small group discussions, stakeholder groups, engagement with community-based organizations and individuals in a variety of contexts. Staff have directly communicated with approximately 2,300 people, and plan to inform and engage the public through newspapers, social media, emails, in person events and other methods throughout the project.
- Format of the tabling events. Staff indicated at the events, people are invited to start the conversation based on information in flyers and informational boards with housing and land use statistics. They can talk about their lived experience in Vancouver, but it's not a prescriptive conversation.
- Does the community understand the changing nature and rate of growth in Vancouver? Staff responded it depends on the individuals' lived experiences. A lot of folks understand growth is occurring and we either accommodate that growth or live with the consequences of not responding to and managing growth and change. Part of the emphasis of the engagement work is to educate and contextualize the environment we're working in. People also often respond to the symptoms of long range problems, such as the rising cost of housing. They may not identify that it's due to decades of land use decisions that are the cause of these issues, but are able to relate to and identify how those decisions have affected them in their daily life.
- Statistics on those who are moving to Vancouver today. Staff responded the data on those who move to the area is at the county level. If we look at the changing demographics of the City, we see that there are more young people, people of color, immigrants, young families, and that these folks are often coming from within the region.
- Format of the Comprehensive Plan. Staff noted it's difficult to say at this point what the format of the plan will look like, but it will need to be clear and concise to whoever is implementing it as well as transparent to the public.

COMMUNITY FORUM

Peter Bracchi was present to speak regarding outdoor habitation along Burnt Bridge Creek. He expressed concern for fires, illegal dumping, pollution of water, and destruction of habitat. He supported the City Manager to limit habitation along the creek.

PUBLIC HEARINGS

WOOD DUCK SPRINGS REZONE

Bryan Snodgrass, Principal Planner, Community Development Department

Bryan Snodgrass presented the proposed Wood Duck Springs Comprehensive Plan and Zone change located at the intersection of 63rd Street and 82nd Court, zoning in the region, the conceptual site plan, and an analysis of the proposal.

The applicant, Daniel Weisner, presented information on the proposed rezone consistency with other properties in the area, the rationale for the rezone request, integration of the development into the neighborhood, and his previous experience as a residential developer.

Commission Questions for the Applicant

- Townhome widths and City versus County requirements. The applicant responded the City code requires townhomes be a minimum of 20 feet wide. If the townhome is less than 20 feet wide, it must be sold as a condominium. There are significant liability laws that prevent him from pursuing development of condominiums.
- Tentative plans or interest in the commercial development. The applicant responded they will likely partner with a commercial developer for that portion of the development.
- Public usage of the park area. The applicant responded they have had preliminary discussions with the Parks department and are working on connecting the space and a trail system.
- Existing access road on west side of property. The applicant responded there is a setback from that road for the existing abutting properties as well as a setback from the backyards of the townhouses.

Public Testimony

Marcia Carner expressed concerns with the rezone, the increase in density of new housing, and the effects on traffic.

Commission Questions

- Traffic analysis for the site. Staff responded the applicant submitted a traffic study based on the different zones. Potential requirements for traffic calming in the area will be addressed at the site plan review stage. There are no capacity issues in this area and the traffic analysis indicates level of service at the intersections will continue to meet City standards with proposed development on the site.

Motion by Commissioner Cavel, seconded by Commissioner von Borstel, based on the November 14, 2023 public hearing discussion and staff reporting findings, the Planning Commission recommends that the City Council approve the Wood Duck Springs Comprehensive Plan zoning map designation change as described, from Urban Low Density / R-9 to Urban High Density / R-22 and Commercial/CC.

Deliberation

Commissioner Cavel supported approval of the rezone to add more housing units to increase the housing supply.

Commissioner von Borstel supported the approval of the rezone, as the application addressed community needs including walkability, retail, parks, and protected wetland.

Commissioner Adigweme was in favor of the motion as it addresses the needs of the City.

Commissioner Schulte was in favor of the motion.

Vice Chair Pyle was in favor of the motion from an infrastructure and amenities standpoint.

Chair Ledell was in favor of the motion.

Roll Call Vote

Commissioner von Borstel	Yes
Commissioner Adigweme	Yes
Commissioner Cavel	Yes
Commissioner Blaufus	Yes

Commissioner Schulte	Yes
Vice Chair Pyle	Yes
Chair Ledell	Yes

Motion carried unanimously.

COMMUNICATIONS FROM CHAIR AND STAFF

There were no communication items from the Chair. Rebecca Kennedy provided an update for the December meeting, which is the last of the year, as well as the last meeting for Commissioners Schulte and Blaufus. Election of officers will also take place at the December meeting.

ADJOURNMENT 7:13 P.M.

Marjorie Ledell, Chair

To request other formats, contact Julie Nischik, Community Development Department | 360-487-7813. WA Relay: 711 | julie.nischik@cityofvancouver.us



Vancouver Strategic Plan Planning Commission Workshop December 12, 2023



Aaron Lande

Policy & Program Manager

City Manager's Office

Agenda

- Welcome and Overview
- Plan Purpose
- Getting Here: Process and Timeline
- What's in the Plan:
 - Core Values
 - Focus Areas
 - Community Indicators and Performance Measures
- Next Steps



Strategic Plan Purpose

- Lays out city priorities for the next six years for current and future city limits
- Aligns core values with focus areas to identify implementable actions
- Supports prioritization of services related to focus areas including transportation, economic development, housing, culture and heritage, public safety, climate and environment, and governance
- Informs investments and creates accountability to progress through community indicators and performance measures



Connection to Other City Plans

time



Comprehensive Plan

- Long-term (20 yrs)
- Shared community vision
- Future land use and place-based

Master Plans & Frameworks

- Medium-term (5-10 yrs)
- Robust plans and community partnerships
- Topic or location based

Strategic Plan

- Medium-term (3-6 yrs)
- Council's citywide focus areas
- Organizational direction for employees

Biennial Budget, Financial Policies & Operational Plans

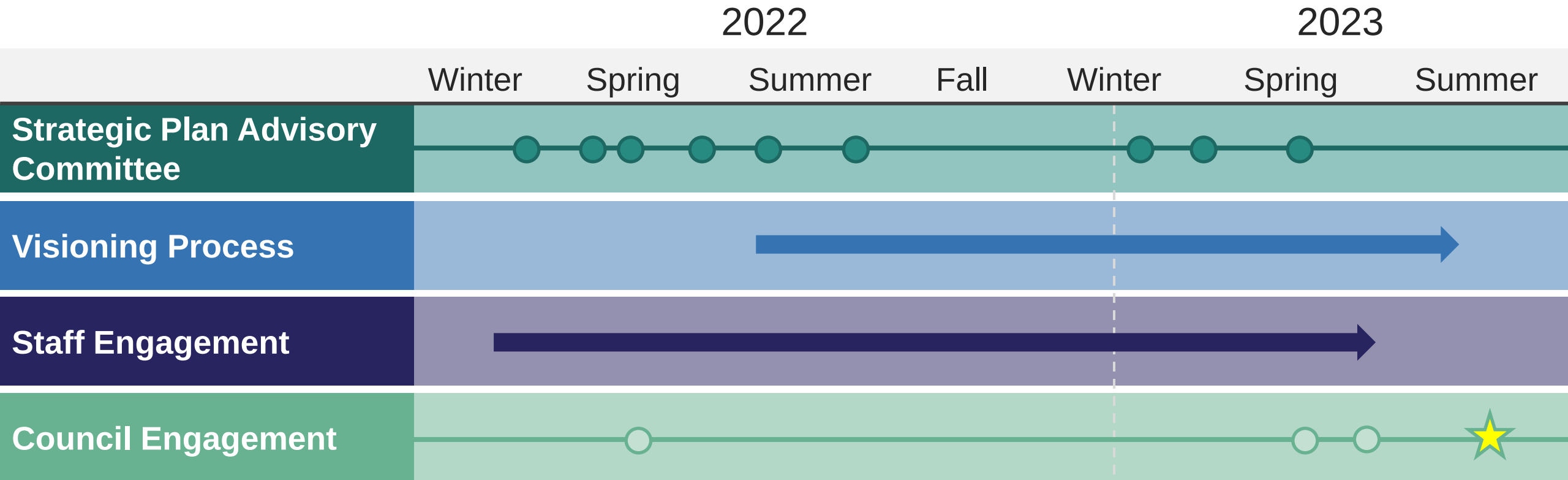
- Short-term (1+ yrs)
- Departmental service levels, capital outlays
- 6-year financial forecast, tax/revenue rates

Performance Management Program

- Daily strategic discipline, performance management
- Pathways for improvement and innovation
- Regular reporting to Council and the community



Process and Timeline

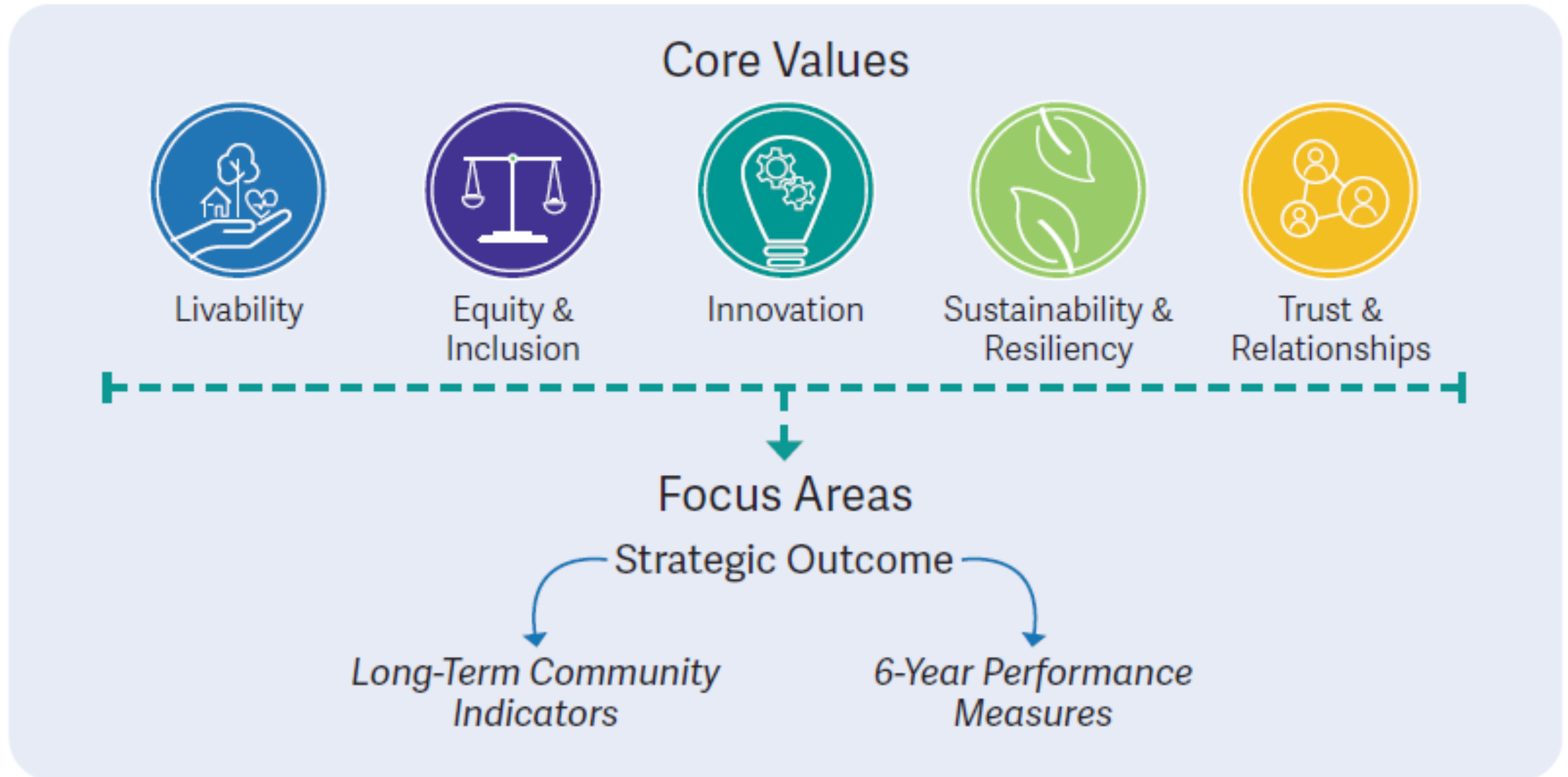


Engagement Process

- 8 Vancouver City Council meetings
- 15 interviews with interested parties
- 9 Strategic Plan Advisory Committee meetings
- Ongoing public engagement across a wide range of projects, programs, and initiatives
- Ongoing meetings and check-ins with department staff



What's in the Plan: Core Values and Focus Areas



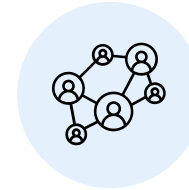
Measuring Progress: Focus Areas



**Transportation
and Mobility**



**Housing and Human
Needs**



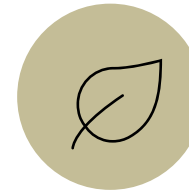
**Safe and Prepared
Community**



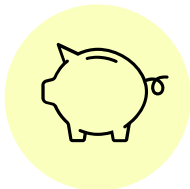
**High Performing
Government**



**Vibrant and Distinct
Neighborhoods**



**Climate and Natural
Systems**



**Economic
Opportunity**



**Culture and
Heritage**

Measuring Progress

Navigating Community Indicators and Performance Measures

Strategic Outcomes - What are we trying to achieve?

Vancouver has a safe, future-ready and convenient transportation system that offers affordable and climate-friendly options for people to get where they need to be. All community members can walk, roll, bike, drive, and take transit to reach their destination. Vancouver considers the needs of different communities when designing transportation infrastructure and prioritizes equity. Vancouver's transportation network supports the local and regional economy and facilitates the movement of goods in addition to people.

Community Indicators	Performance Measures
TM.CI.1 Model Split	TM.PM.1 Miles of Complete Streets
TM.CI.2 Transportation User Experience	TM.PM.2 Number of Collisions
TM.CI.3 Transportation Fatalities & Serious Injuries	TM.PM.3 Miles of Improved Facilities
	TM.PM.4 Percentage of Residents Near Transit Facilities

Core Values



Livability



Equity &
Inclusion



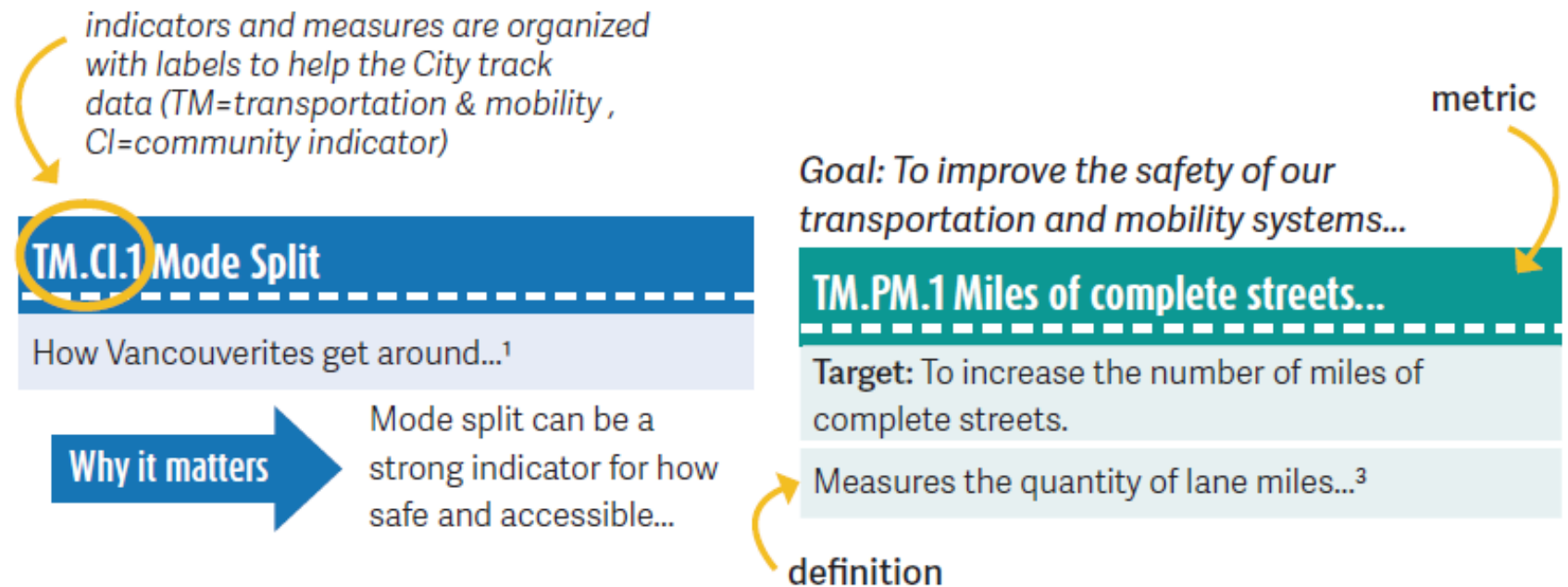
Sustainability &
Resiliency

Measuring Progress

Navigating Community indicators and Performance Measures

Community indicators include a metric, definition, data source, and why it matters

Performance measures include a goal, metric, target (optional), definition, data source, and why it matters



Measuring Progress

Example Community Indicators

TM.Cl.1 Mode Split

The breakdown of how Vancouverites get around, typically representing the percentage of travelers using a particular type of transportation (walk, bike, public transit, etc.).⁵

Why it matters

Mode split can be a strong indicator for how safe and accessible non-drive alone transportation options are for community members. Increased shares of people walking, bicycling, and using transit translates to fewer greenhouse gas emissions, cleaner air, safer roadways, and decreased capital and maintenance costs for the City. Research has shown that having options other than driving alone can also save families money on their transportation costs, have positive health outcomes by increasing activity rates, and improve personal mobility and freedom for those who are unable or choose not to drive.

TM.Cl.2 Transportation User Experience

The level of satisfaction based on users of the transportation system in Vancouver.⁶

Why it matters

Understanding public sentiment about using the transportation system to move around the community can provide insight into what is working well, and where gaps exist and improvements are needed.

⁵ US Census Bureau, American Community Survey

⁶ Periodic, statistically valid community survey

Measuring Progress

Example Performance Measures



Goal: To improve the safety of our transportation and mobility systems for all residents, workers and visitors, the City's Public Works Department in partnership with the Community Development Department will increase the number of miles that are complete streets.

TM.PM.1 Miles of complete streets/mobility lanes/sidewalks and number of Americans with Disabilities Act (ADA) compliant curb ramps/audible pedestrian signal (APS) conversions

Target: To increase the number of miles of complete streets.

Measures the quantity of lane miles in Vancouver that are "complete streets" (a roadway that provides safe and comfortable facilities for all transportation users) compared to roadways that only feature automobile lanes.⁸

Why it matters

Providing complete streets ensures safety and accessibility for all travelers no matter how they choose to travel. It lowers barriers to choosing active transportation modes like walking and bicycling, which lower emissions and creates savings for individuals and the City in the form of street maintenance.

Goal: To monitor the safety effectiveness of alternative transportation systems, the City of Vancouver will measure the number of collisions both city-wide and in areas with updated designs.

TM.PM.2 Number of collisions between vehicles and vulnerable users (pedestrians and bicyclists)

Target: Reduce the number of collisions that occur between vehicles and pedestrians/cyclists.

The count of collisions within the city limits between vehicles and vulnerable users where vulnerable users include bicyclists, pedestrians, and other small-mobility users etc.⁹

Why it matters

The number of collisions can indicate a safety design opportunity/risk. Collisions may result in injuries, property damage, and increased costs to the individual and the City.

⁸ City of Vancouver Public Works Department (GIS)

⁹ Washington State Department of Transportation (WSDOT)

Next Steps

- Connecting the Strategic Plan focus areas to the City budget and investments
- Creating a community dashboard to demonstrate transparency and ensure community members can evaluate progress over time.
- Aligning other City processes, plans and policies with Strategic Plan values
- Maintaining an ongoing committee to periodically assess progress, provide feedback, and inform decision-making
- Develop and maintain communications that support ongoing community engagement and awareness of the Plan



Questions?



Focus Areas with Community Indicators

Transportation & Mobility	High Performing Government	Economic Opportunity	Housing & Human Needs	Vibrant & Distinct Neighborhoods	Culture & Heritage	Safe & Prepared Community	Climate & Natural Systems
Mode Split	Price of Government	Median Household Income	Point in Time Count of Individuals Experiencing Homelessness	Neighborhood Cohesion	Arts-related Businesses	Residents' Perception of Safety	Greenhouse Gas Emissions
Transportation User Experience	Resident Satisfaction with Municipal Services	Per Capita Income	Housing Affordability	Diversity of Businesses	Economic Impact	Residents' Perception of Community Preparedness	Waste Diversion
Transportation Fatalities & Serious Injuries	Municipal Bond Rating	Business Diversity	Rental Affordability	Business Districts Assessment	Creative Vitality Index		Tree Canopy
		Job Creation	Children In Poverty				Parkland Acreage per 1000 Residents
		Unemployment	Healthy Food Insecurity				
		Education Attainment	People Living in Poverty				
		Pre-k Enrollment					
		Workforce Readiness Survey					

The image is a table showing focus areas in columns and associated indicators in rows



City of Vancouver **STRATEGIC PLAN**

2023-2029 UPDATE

CITY OF
Vancouver
WASHINGTON



Welcome

Welcome to all who live, work, and play in the city of Vancouver to our 2023-2029 Strategic Plan. This plan lays out the City's direction for the next six years and beyond. Using our identified core values as a guide, we will advance efforts in each of the eight focus areas for the benefit of Vancouver residents, businesses, and visitors.

Vancouver is at an inflection point. We face many challenges, some local and others societal. We also have boundless opportunities to reshape our community in ways that make it more equitable, safe, and climate friendly. Vancouver is a city on the rise, within the region and the state. This plan will ensure that we preserve the unique traits that led us all to this place, while we continue to grow and evolve as a community.

This plan reflects the work of a dedicated group of community participants, along with the broader voices of Vancouver and City staff. We believe it to be a true reflection of the diverse perspectives and goals of Vancouver.

As a Council and City leadership, we are committed to ensuring alignment between future policies, programs, and investments and the core values and focus areas of the Strategic Plan. The use of six-year performance measures and long-term community indicators will allow us all to track our community's progress and ensure we're moving in the right direction.

We hope you share our excitement for the Vancouver we are becoming and will join us in ensuring the values we have created are realized.

Mayor Anne McEnerny-Ogle

Mayor Pro Tem Ty Stober

Councilmember Sarah J. Fox

Councilmember Bart Hansen

Councilmember Kim D. Harless

Councilmember Erik Paulsen

Councilmember Diana H. Perez

City Manager Eric Holmes

Acknowledgments

Recognition of the residents who this plan reflects and serves.

Vancouver City Council and Mayor

- Mayor Anne McEnerny-Ogle
- Mayor Pro Tem Ty Stober
- Councilmember Sarah J. Fox
- Councilmember Bart Hansen
- Councilmember Kim D. Harless
- Councilmember Erik Paulsen
- Councilmember Diana H. Perez
- Mayor Pro Tem Linda Glover (former Councilmember 2017-2021)
- Councilmember Laurie Lebowsky (former Councilmember 2018-2021)

Thank you to City staff for your participation in the planning process and contributions to the Strategic Plan.

Project Team

- Aaron Lande
- Tanya Gray
- William Cooley
- Kerry Peck

Strategic Plan Advisory Committee

- Abby Griffith
- Schuyler Hoss
- Eric LaBrant
- Mark Meckler
- Ben Moll
- Tammy Pham
- Rosalba Pitkin
- Zachary Pyle
- Rosezena Rothafel
- Christine Selk
- Cindy Skrivanek
- Ty Stober
- Katie Yates

Consultant Team

- Jamie Damon
- Ben Duncan
- Ellen Palmquist
- Erin Bothwell



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Introduction

The 2023 Strategic Plan lays out City priorities for the next six years, through 2029, for current and future city limits. The Plan is built on core values and focus areas affirmed by City Council and work previously completed through A Stronger Vancouver, the 2016 Strategic Plan, and community engagement efforts. Vancouver's Strategic Plan will be used to prioritize and fund a broad range of services related to transportation, housing, economic development, environmental resources, parks and recreation, culture, governance, and public safety.

How does the Strategic Plan fit into other planning processes?



Why do we need a Strategic Plan?

Vancouver's Strategic Plan helps the City understand what to prioritize and invest in. The Plan reminds City Council and staff of what's important to the community and reflects the city's values, hopes, and dreams for the future.

Core Values

In 2021, City Council identified five core values for Vancouver: livability, equity and inclusion, innovation, sustainability and resiliency, and community trust and relationships. The core values guide a vision for engaging with the public and help re-imagine City structures, practices, and policies.



Livability

Livability is about supply and access to basic necessities, quality of life, requirements and experiences that everyone in Vancouver expects. Livability means that every resident and cultural group can live in the community with a sense of belonging and pride while maintaining their own values, beliefs, and identities.

Not all Vancouver residents and cultural groups experience the same level of livability. Bias and negative experiences of communities of color, people with disabilities, and other historically disadvantaged communities create a lack of connection between communities. Some groups are forced to alter or hide their beliefs, identities, or values. Many residents struggle with housing instability and a lack of safe affordable housing. Other residents lack adequate access to physical, mental or behavioral health resources. Some communities experience elevated crime rates, including violence. Investments in public safety have disparate impacts across communities.

A livable Vancouver means:

- ✓ Access to clean and safe housing that is affordable for all socioeconomic statuses
- ✓ Clean public spaces, sidewalks, and streets
- ✓ Being safe and feeling comfortable in public spaces and places
- ✓ Not exposed to crime, violence, or discrimination
- ✓ Public spaces that feel welcoming to people of all ages and abilities
- ✓ Abundant opportunity to access and engage in core community resources including natural resources, transportation, health care, education, cultural experiences, and art
- ✓ Fair, transparent, and inclusive processes for economic improvement opportunities
- ✓ Ensuring accessible, inclusive, and sustainable access to resources and opportunities for those with disabilities
- ✓ A city that nurtures and values people of all ages, nationality, socioeconomic status, sexual orientation, gender identity, race, and religion
- ✓ Education-to-employment support for youth, especially those with barriers to employment
- ✓ A city that is free of groups that promote hate and violence



Sustainability and Resiliency

A sustainable and resilient Vancouver values long-term solutions, and includes crisis management for economic, environmental, and social issues. It seeks to build structures to last in harmony with nature and ensures environmental justice for all Vancouver communities so that everyone can live in a safe, healthy environment. Communities benefit from high quality infrastructure, robust communications, and an emergency response system that helps everyone in the city prepare, respond, and recover from natural disasters and economic harms in a new and better way.

The City has a role in supporting understanding about sustainability and environmental initiatives to combat some of what gets in the way, including misinformation and uncertainty about the roles individual and the jurisdiction play when responding to challenges. While difficult to operate through change and disruption, the City needs to build more community support, be willing to own and acknowledge existing and future issues and allocate funding to programs and initiatives that respond to emergencies and meet the needs of the future.

A sustainable Vancouver means:

- ✓ Protecting water, reducing greenhouse gas emissions, maintaining tree canopies, ecosystem services, and biodiversity
- ✓ Crisis management regarding economic, environment and social issues
- ✓ Increasing nature-based solutions
- ✓ Integrated and interacting plans, processes, and systems
- ✓ Using a proactive and goal-oriented approach
- ✓ Handling an influx of visitors while minimizing impacts to everyday routines
- ✓ Building codes and land-use planning that ensures integrity of infrastructure
- ✓ Learning from past experiences and taking in new information



Innovation

An innovative Vancouver is one that invites and encourages creative thinking. This means calculating risk and finding solutions that promote well-being and improve lives. Innovation can show up in technological solutions, programs, infrastructure investments, climate change, and business approaches that ensure Vancouver is a desirable place to open a new business and to bring new jobs to the region.

Vancouver continues to be a city at a crossroads. Addressing challenges such as climate change, housing and inequality will require us to be bold and work together. We must be willing to confront and work through common barriers to innovation, such as rigid procedures and processes, political polarization, resistance to change and satisfaction with the status quo. Being an innovative city means creatively investing financial resources to solve the challenges of the day and to set a vision for the future.

An innovative Vancouver means:

- ✓ Finding new methods and solutions to old problems
- ✓ Using creative problem solving to fulfill needs
- ✓ Adapting to change
- ✓ Actively pursuing new opportunities
- ✓ Inviting creative communities to thrive
- ✓ Committing to collaboration
- ✓ Collecting, processing, and analyzing data, then acting on insights



Equity and Inclusion

An equitable and inclusive Vancouver is one where everyone feels a sense of belonging and can feel safe expressing their beliefs and values. It is a community that provides access to opportunities, so everyone has the chance to reach their full potential. A Vancouver where other perspectives are heard with compassion and an open mind, that celebrates and recognizes diverse people, activities, and cultures. Ultimately, it means that every culture feels respected, and the elements of livability are accessible to all regardless of age, race, color, national origin, ethnicity, creed, religious opinions or affiliations, sexual orientation, gender identity/expression, pregnancy, marital status, family status, mental or physical disability, military status, status as a veteran or any other protected status under applicable law. It means everyone has equal opportunities because the City is investing in and valuing outcomes for everyone.

This vision is not the current reality for many of Vancouver's communities. Class disparities exist where those with wealth and resources have what they need, and many others lack access to basic needs, including housing, health care, and transportation. These communities carry the burden of poverty because of systemic racism and classism, and feel unwelcome, unappreciated, undervalued, and unsafe. Equity and inclusion demand that the City account for differential impacts to Vancouver's community members and eliminate barriers for communities of color, religious minorities, people with disabilities, LGBTQIA+ communities, and other disadvantaged communities.

An equitable Vancouver means:

- ✓ Fair, transparent, and inclusive processes for economic improvement opportunities
- ✓ Ensuring accessible, inclusive, and sustainable access to resources and opportunities for those with disabilities
- ✓ Nurturing and valuing people of all ages, nationalities, socioeconomic status, sexual orientation, gender identity, race, and religion



Trust and Relationships

A trusting community is reflected by transparent decision-making processes, open communication between the government and the community, and a broadly shared belief that decisions are intended to enhance livability, equity, and the resilience of the entire community. There is a belief that the government is representative of all communities. Vancouver communities believe that building trust leads to an engaged community of government, business, and residents that actively support and participate in carrying out City initiatives.

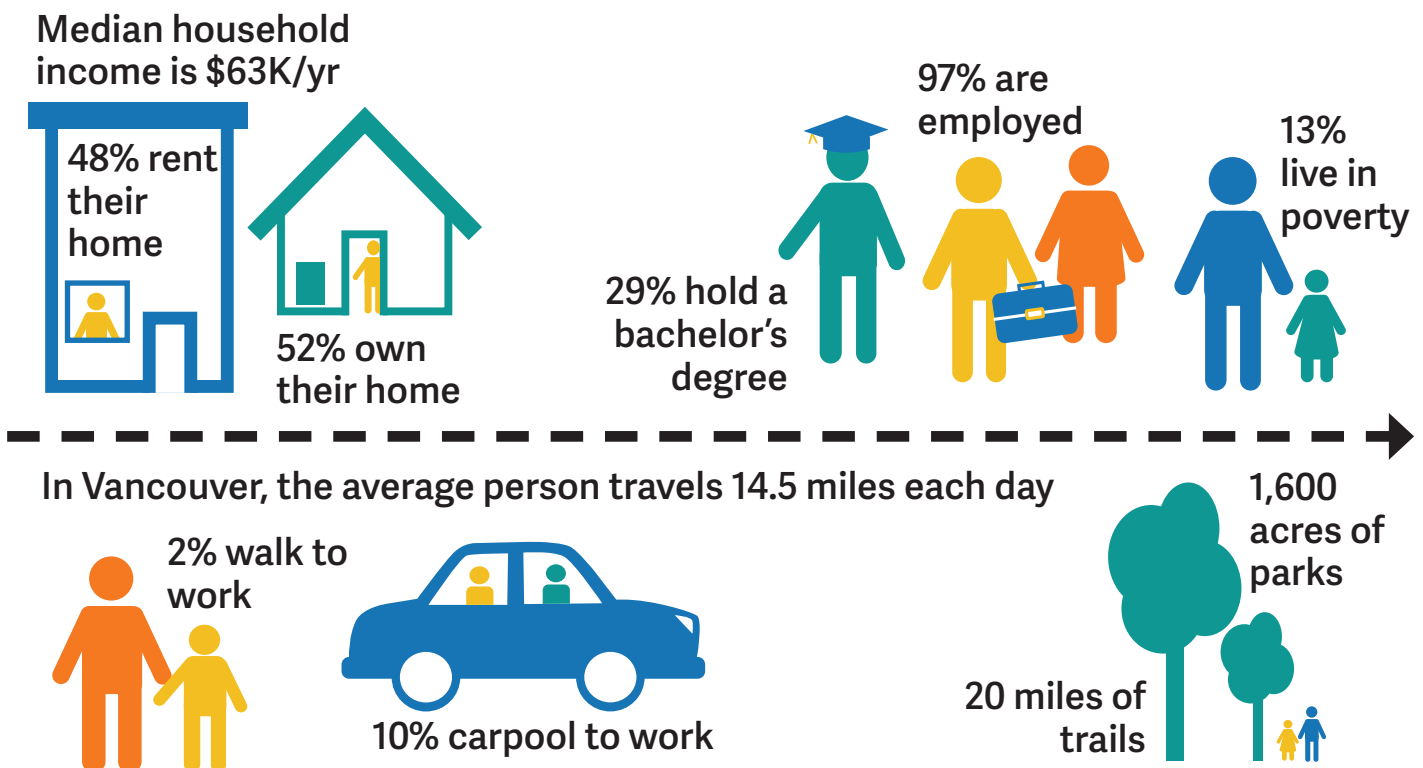
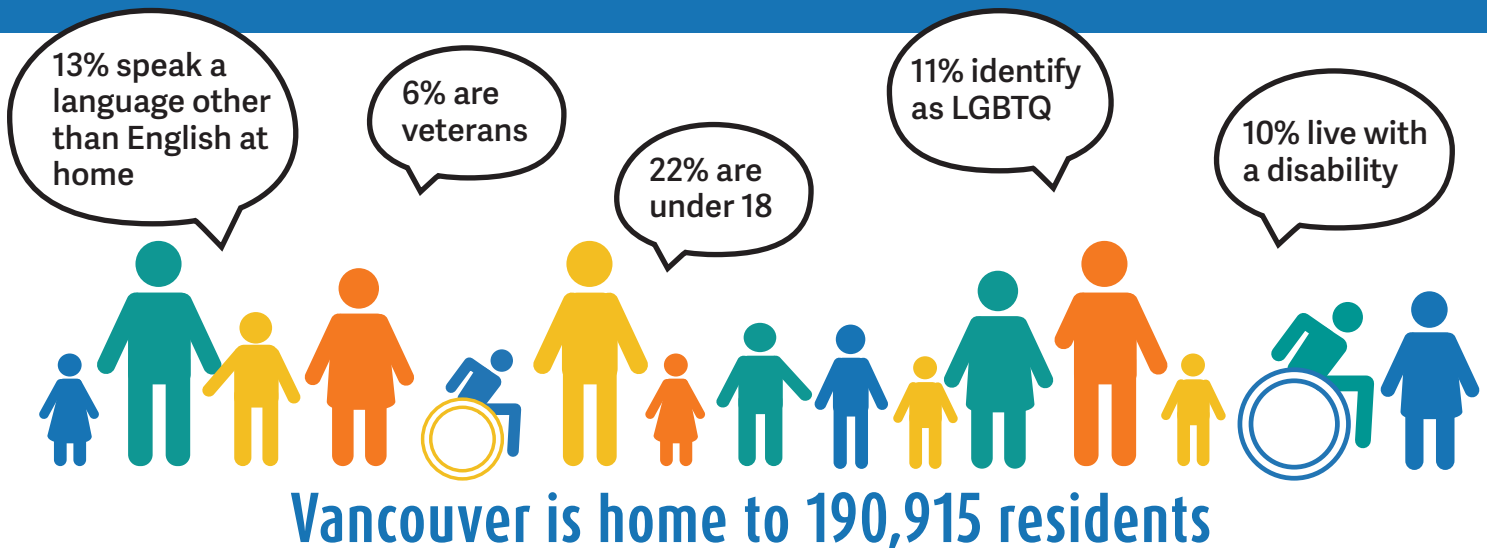
Trust in policing and law enforcement is critical to community trust and safety. In Vancouver, crime, and fear of crime in communities, erodes trust in law enforcement and government in general. Vancouver's vision is to have a city where residents and officials have trusting relationships. Increasing trust requires us to build, repair and maintain relationships. It requires ongoing collaboration and inclusive political processes, which consider the needs of the entire community. Investments in trust building will enable us to work together more effectively and to deliver improvements that will benefit all community members.

A trusting Vancouver means:

- ✓ Strong partnerships and community engagement
- ✓ City leaders who follow through on actions, policies, and commitments
- ✓ Equitable treatment in City processes and equity in outcomes
- ✓ Communities that treat each other in ways they want to be treated
- ✓ A government that demonstrates openness and provides accurate and unambiguous information
- ✓ Respect for common spaces
- ✓ A government that ensures adequate representation in decision making and minimizes barriers to engagement
- ✓ Successful interactions in challenging circumstances
- ✓ Humility, fairness, openness, kindness, and honesty is demonstrated between communities and between communities and government
- ✓ Frequent and intentional interaction from City leaders

Vancouver Profile

Located between the Pacific Ocean and the Cascade Mountains, on the north bank of the Columbia River, Vancouver is known for its natural beauty and high quality of life. Prior to the establishment of the Hudson's Bay Company post in 1824, the area was occupied by many Native Americans, including Chinook, Cowlitz, and Klickitat tribes.¹ The City of Vancouver was incorporated in 1857 and grew to Washington's fourth largest city, with a 2022 population of 197,600 and a service area for sewer, water, fire, and EMS that encompasses more than 290,000.^{2,3,4}



¹ National Park Service. N.D. Vancouver National Historic Reserve Cultural Landscape Report. <http://npshistory.com/publications/fova/clr.pdf>

² John Caldbick. 2009. Washington Territorial Legislature incorporates the City of Vancouver on January 23, 1857. HistoryLink.org. <https://www.historylink.org/File/9115>.

³ U.S. Census Bureau, 2020 Census of Population and Housing, updated every 10 years. Decennial Census by Decades

⁴ Office of Financial Management. April 1 Official Population Estimates. <https://tinyurl.com/mt73ck28>

Strategic Planning Process

The City of Vancouver is committed to developing a Strategic Plan that aligns with community values and hopes for the future. From 2020 to 2023, the project team attended Council workshops and retreats, conducted interviews with community-based organizations and partners, convened a 16-person advisory committee, and engaged the public through the visioning process to learn about priorities for the future. The project team also worked closely with City staff to ensure that the proposed strategic outcomes and metrics are realistic and align with other planning efforts.

Vancouver City Council

The project team met with City Council throughout the process to provide updates on the Strategic Plan Advisory Committee and Strategic Plan.

- March 2020 – Council workshop
- January 2021 – Council retreat
- April 2021 – Council workshop
- February 2022 – Council retreat
- February 2022 – Council workshop
- April 2022 – Council memo
- April 2023 – Council meeting
- May 2023 – Council workshop

Interviews with Interested Parties

The project team conducted 15 interviews with internal and external stakeholders between December 2021 and January 2022. Interviews focused on understanding of the Strategic Plan and desired outcomes for the Strategic Plan update.

Vancouver's Strategic Plan Advisory Committee

The Strategic Plan Advisory Committee (SPAC) was convened to:

- Support community outreach and listening.
- Improve communications between a diversity of community members and the City.
- Identify and reflect on community needs, concerns, and opportunities.
- Guide how the Strategic Plan will collect data and measure progress towards goals.

Committee members met throughout 2022 and 2023 in large and small groups to define the core values and focus areas, and to provide input on metrics for the Strategic Plan.



Committee members reflected on the process during a Vancouver City Council meeting in May 2023.



Public Engagement

During 2022, City staff engaged the Vancouver community across a wide range of projects, programs, and initiatives related to the Strategic Plan. These efforts have involved:

- Housing
- Affordable Housing Fund
- Affordable Housing Levy
- Safe Stay Community Sites #2 and #3
- Short-Term Rentals
- Redevelopment
- Waterfront Gateway
- The Heights District
- Main Street Promise
- Transportation
- Complete Streets Projects
- Fort Vancouver Way/ Fourth Plain Blvd.
- McGillivray Blvd.
- Transportation System Plan
- Climate and Environment
- Climate Action Framework
- Parks Development Projects
- Ida Bell Jones Park
- Raymond Shaffer Park
- Oakbrook Park
- Public Safety
- Police Chief Recruitment
- Opportunities for Broader Policy Direction
- City Council Community Forums
- Biennial Budget
- Biennial Community Survey
- Future of Neighborhoods Initiative

Since June 2022, City staff have also engaged more than 1,015 community members in visioning conversations to learn about community needs and hopes for the future. These conversations have included one-on-one meetings, tabling and intercept interviews at community events, and small group dialogues over the course of three City Council Community Forums — community conversations that each have brought together 40 and 80 community members to share their input directly with councilmembers.

City staff completed a systematic review of the engagement efforts listed above, noting themes that have appeared consistently across visioning conversations and other projects. Care was taken to improve the accuracy of analysis by triangulating across multiple data sources, multiple methodologies (qualitative and quantitative), and multiple researchers (different staff and project teams). To help inform the Strategic Plan, the resulting summary included major themes organized by focus area. City staff and members of the Committee used this work to ensure the Strategic Plan reflects a greater understanding of community needs, challenges and hopes for the future. Engagement results also helped inform language and examples used throughout the Strategic Plan, including descriptions of core values, focus areas, and community indicators and performance measures.

Technical Engagement

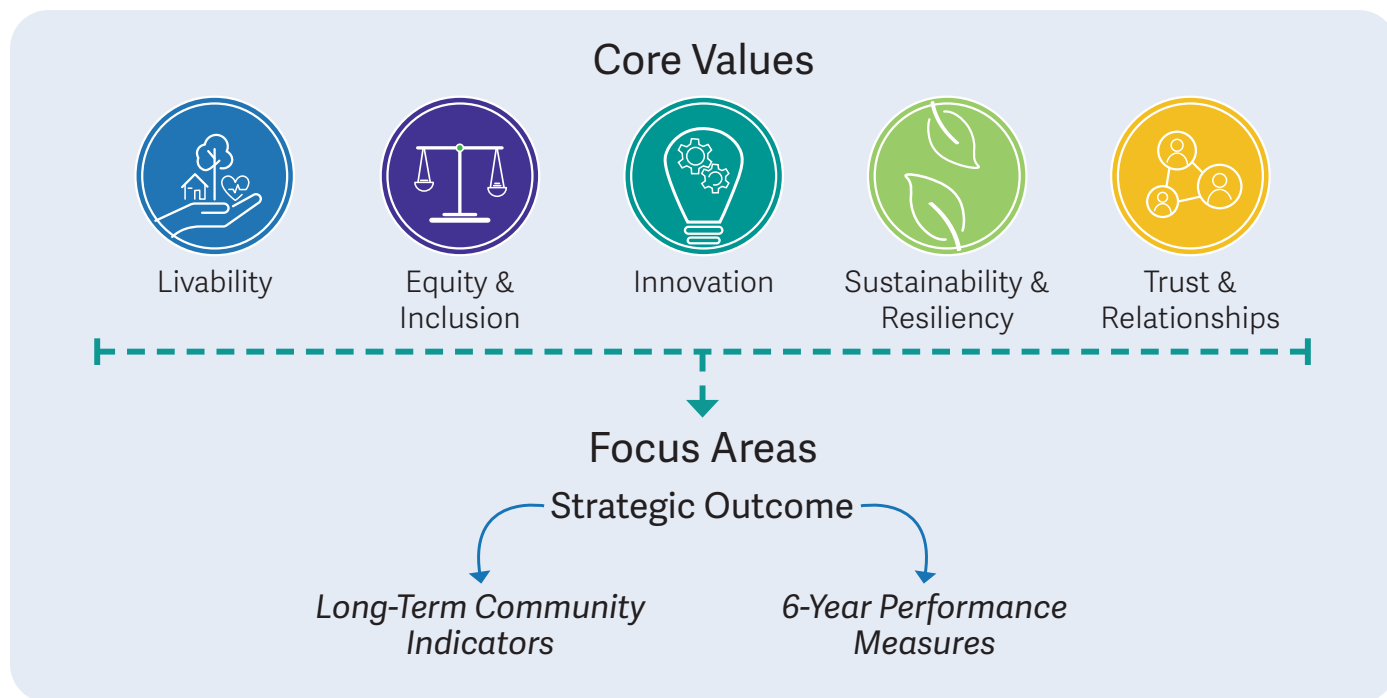
City staff were engaged throughout the Strategic Plan process to provide input on focus areas and to refine community indicators and performance measures. In addition to the six-year horizon of the Strategic Plan, City staff worked within the two-year budgeting cycle and, in many cases, a 10-20 year comprehensive plan. These different planning horizons help guide the work and funding of the City.



Focus Areas

The following focus areas, strategic outcomes, community indicators and performance measures set a path forward for the city. These elements will be used to set citywide priorities and measure progress over time.

Focus Areas Structure and Navigation



How to navigate this section

Community indicators are **blue** and include a metric, definition, data source, and why it matters. Performance measures are **green** and include a goal, metric, target (optional), definition, data source, and why it matters.

indicators and measures are organized with labels to help the City track data (TM=transportation & mobility, CI=community indicator)

TM.CI.1 Mode Split

How Vancouverites get around...¹

Why it matters

Mode split can be a strong indicator for how safe and accessible...

Goal: To improve the safety of our transportation and mobility systems...

TM.PM.1 Miles of complete streets...

Target: To increase the number of miles of complete streets.

Measures the quantity of lane miles...³

definition

metric

Definition of Terms	
Focus Area	Identified topic of priority for the city.
Strategic Outcome	Defines the state we are trying to achieve.
Long-term Community Indicator	At-a-glance view of the major aspects of community condition, tracks trends over time but may not be directly connected to specific City services.
Six-year Priority Performance Measures (goal statements and metrics)	A department or program level measurement aligned with a focus area. Measures the City's contribution (through its programs and policies) towards achieving the strategic outcome.
Goal Statement	What will be accomplished in the next six years to support the strategic outcome.
Metrics	Associated with a goal statement so that progress towards the goal can be quantified. Includes the context of a target, defines what is being measured, identifies the data source, and describes why it matters.
Types of Measures	Measures are included to have a complete picture of complex issues and services. • Results/effectiveness – the change in either the quality of life or behavior of a population or place. • Service experience – the level of satisfaction with a City program/activity experience. • Efficiency – the unit of performance/output achieved per unit of input (\$). • Output – the amount of products/services delivered to or received by customers of a City program/activity.
External Factors and Emerging Issues	As identified by staff and Strategic Plan Advisory Committee members.
Related Plans	List of existing city plans that are related to the focus area.

Focus Areas Table of Contents

12	Transportation and Mobility
17	Economic Opportunity
24	Housing and Human Needs
32	Vibrant and Distinct Neighborhoods
36	Culture and Heritage
40	Safe and Prepared Community
44	Climate and Natural Systems
51	High Performing Government



Transportation and Mobility

Strategic Outcomes - What are we trying to achieve?

Vancouver has a safe, future-ready and convenient transportation system that offers affordable and climate-friendly options for people to get where they need to be. All community members can walk, roll, bike, drive, and take transit to reach their destination. Vancouver considers the needs of different communities when designing transportation infrastructure and prioritizes equity. Vancouver's transportation network supports the local and regional economy and facilitates the movement of goods in addition to people.

Community Indicators

- TM.CI.1 Mode Split
- TM.CI.2 Transportation User Experience
- TM.CI.3 Transportation Fatalities & Serious Injuries

Performance Measures

- TM.PM.1 Miles of Complete Streets
- TM.PM.2 Number of Collisions
- TM.PM.3 Miles of Improved Facilities
- TM.PM.4 Percentage of Residents Near Transit Facilities
- TM.PM.5 Percentage Increase of Downtown Parking Users

Core Values



Livability



Equity & Inclusion



Sustainability & Resiliency

Long-Term Community Indicators

TM.Cl.1 Mode split

The breakdown of how Vancouverites get around, typically representing the percentage of travelers using a particular type of transportation (walk, bike, public transit, etc.).⁵

Why it matters

Mode split can be a strong indicator for how safe and accessible non-drive alone transportation options are for community members. Increased shares of people walking, bicycling, and using transit translates to fewer greenhouse gas emissions, cleaner air, safer roadways, and decreased capital and maintenance costs for the City. Research has shown that having options other than driving alone can also save families money on their transportation costs, have positive health outcomes by increasing activity rates, and improve personal mobility and freedom for those who are unable or choose not to drive.

TM.Cl.2 Transportation user experience

The level of satisfaction based on users of the transportation system in Vancouver.⁶

Why it matters

Understanding public sentiment about using the transportation system to move around the community can provide insight into what is working well, and where gaps exist and improvements are needed.

TM.Cl.3 Transportation fatalities and serious injuries

The number of fatal and serious injuries (including vehicles, bikes, pedestrians, transit) by year on all roads within Vancouver per 10,000 residents.⁷

Why it matters

This is a standard metric commonly used to inform transportation and road safety policy and planning, and aligns with the Washington State Department of Transportation's Strategic Highway Safety Plan. This allows the City to identify the most dangerous roadways and intersections in the city and prioritize investments to address safety issues.

⁵ US Census Bureau, American Community Survey

⁶ Periodic, statistically valid community survey

⁷ Washington State Department of Transportation (WSDOT)

6-Year Priority Performance Measures

Goal: To improve the safety of our transportation and mobility systems for all residents, workers and visitors. The City's Public Works Department will work in partnership with the Community Development Department to increase the number of miles of complete streets.

TM.PM.1 Miles of complete streets/mobility lanes/sidewalks and number of Americans with Disabilities Act (ADA) compliant curb ramps/audible pedestrian signal (APS) conversions

Target: To increase the number of miles of complete streets.

Measures the quantity of lane miles in Vancouver that are "complete streets" (a roadway that provides safe and comfortable facilities for all transportation users) compared to roadways that only feature automobile lanes.⁸

Why it matters

Providing complete streets ensures safety and accessibility for all travelers no matter how they choose to travel. It lowers barriers to choosing active transportation modes like walking and bicycling, which lowers emissions and creates savings for individuals and the City in the form of street maintenance.

Goal: To monitor the safety effectiveness of alternative transportation systems, the City of Vancouver will measure the number of collisions both citywide and in areas with updated designs.

TM.PM.2 Number of collisions between vehicles and vulnerable users (pedestrians and bicyclists)

Target: Reduce the number of collisions that occur between vehicles and pedestrians/cyclists.

The count of collisions within the city limits between vehicles and vulnerable users where vulnerable users include bicyclists, pedestrians, and other small-mobility users etc.⁹

Why it matters

The number of collisions can indicate a safety design opportunity/risk. Collisions may result in injuries, property damage, and increased costs to individuals and the City.

⁸ City of Vancouver Public Works Department (GIS)

⁹ Washington State Department of Transportation (WSDOT)

Goal: To support multiple convenient transportation options (community members have choices for transportation) and connections in all of Vancouver's neighborhoods, the Public Works Department will increase the miles of improved existing non-motorized facilities.

TM.PM.3 Miles of improved existing non-motorized facilities

A count of the linear miles of paved trails or multi-use paths for walking/biking/rolling, and natural trails in parks, that received maintenance or upgrades to safety standards/design during the reporting period.¹⁰

Why it matters

Off-road trails and multi-use paths provide low-barrier, all ages and abilities facilities for transportation and recreation options, and improve access to opportunities for public health and wellbeing.

Goal: To facilitate transit usage, the City will increase the number of neighborhoods designed to allow safe, non-motorized travel by residents to transit facilities.

TM.PM.4 Percentage of residents living within a 15-minute walk or bike to transit facilities*

The portion of residents (in single family and multifamily homes) that can get to a public transit facility within 15 minutes by foot or by bike.¹¹

Why it matters

Creating safe access by foot, bike, or other small mobility device to bus stops lowers the barriers to using transit and improves accessibility for all ages and abilities. Low-barrier access to transit provides affordable, reliable, and clean transportation options to help Vancouver residents meet their daily needs.

Goal: To facilitate diverse transportation options, City Parking Services will implement a new Downtown Parking Plan emphasizing and increasing mode split utilization by those who live, work and/or recreate in downtown enforcement zones.

TM.PM.5 Percentage increase of downtown parking users that use alternative modes of access in downtown parking enforcement zones

The number of individuals who live, work and/or recreate in downtown parking enforcement zones who walk, bike, use public transit or other modes of transportation as compared to individuals who drive.¹²

Why it matters

Encouraging multiple mode access to downtown parking enforcement zones increases the share of individuals walking, bicycling and using public transit, decreasing greenhouse gas emissions and promoting a rotating flow of customers to local businesses unconstrained by parking availability.

¹⁰ City of Vancouver Community Development Department and Public Works Department

¹¹ Vancouver City Staff, C-Tran

¹² US Census Bureau – American Community Survey and City Parking Services occupancy, permit and metered parking utilization data

*Shared with Housing and Human Needs and Vibrant and Distinct Neighborhoods

External Factors and Emerging Issues

- How might we adjust City funding and staffing to achieve these goals?
- How might we effectively collaborate with agencies, organizations, and the Vancouver community around mobility decision-making?
- How might we lower the risk of travel-related injury and protect and promote public health?
- How might we conduct public outreach and collaboration with all transportation users to discuss prioritization and trade-offs?
- How might we ensure residents' needs are met within 15-minute neighborhoods?
- How might we prepare for and lead in leveraging rapidly evolving technology in transportation?

Existing City Plans and Initiatives Related to Transportation and Mobility

- Transportation System Plan (20-year horizon)
- Transportation Improvement Program (6-year horizon)
- Climate Action Framework



Economic Opportunity

Strategic Outcomes - What are we trying to achieve?

Vancouver is a place where a wide variety of businesses of all sizes, from young startups to established enterprises, grow and thrive. A host of education and training opportunities bring prosperity to those who live here and provide a skilled workforce for companies.

Community Indicators

- EO.CI.1 Median Household Income
- EO.CI.2 Per Capita Income
- EO.CI.3 Business Diversity
- EO.CI.4 Job Creation
- EO.CI.5 Unemployment
- EO.CI.6 Education Attainment
- EO.CI.7 Pre-K Enrollment
- EO.CI.8 Workforce Readiness Survey

Performance Measures

- EO.PM.1 Number of New Business Licenses
- EO.PM.2 Equity Index Score
- EO.PM.3 Businesses Older Than Two Years
- EO.PM.4 Living Wage Jobs in Vancouver
- EO.PM.5 Equity Impact Analysis Reports
- EO.PM.6 Business Retention
- EO.PM.7 Engagement by Visitors and Locals
- EO.PM.8 Program Enrollment Rate
- EO.PM.9 Completion Rate
- EO.PM.10 Apprenticeship Placement Rate
- EO.PM.11 Employment Rate
- EO.PM.12 Participant Income Growth

Core Values



Livability



Equity &
Inclusion



Innovation

Long-Term Community Indicators

E0.CI.1 Median household income

The middle point of the range of household income levels in Vancouver. Disaggregated by race/ethnicity and age demographics where available.¹³

Why it matters

Provides information about the financial resources available to households broken down into different community groups.

E0.CI.2 Per capita income

Mean money income received in the past 12 months computed for every person in a geographic area. Disaggregated by race/ethnicity and age demographics where available.¹⁴

Why it matters

Life satisfaction is strongly correlated with per capita income. This is particularly true among disadvantaged countries, regions, and communities, because income gains in these places are associated with the greatest increases in life satisfaction.

E0.CI.3 Business diversity

An assessment of the local businesses in our community considering sector, ownership, and size as determined by number of employees. Women and minority-owned businesses, green economy, and Columbia River Economic Development Council (CREDC) target sectors.¹⁵

Why it matters

Having a diversity of businesses may help contribute to a healthy and resilient local economy. Understanding the types of businesses and any disparities may provide information for improving equity and diversity.

E0.CI.4 Job creation

The number of new jobs created in Vancouver.¹⁶

Why it matters

An indicator of the health of the local economy, job creation means businesses are hiring.

¹³ Department of Commerce, US Census data

¹⁴ Department of Commerce, US Census data – American Community Survey

¹⁵ US Census Data, Annual Business Survey

¹⁶ Bureau of Labor and Statistics (Portland/Hillsboro/Vancouver)

E0.CI.5 Unemployment

The share of the labor force without a job. Disaggregated by race/ethnicity and age demographics where available.¹⁷

Why it matters

An indicator of the health of the local economy.

E0.CI.6 Education attainment

The number of residents with high school, associate, and four-year college degrees broken down by race, ethnicity, gender, and income, expressed as a percentage of all residents 25 and older in a region. Disaggregated by race/ethnicity, special education, English language learners, low-income.¹⁸

Why it matters

Researchers correlate higher levels of educational attainment with better economic prospects. Earnings increase with higher levels of education. A person's earning power compounds, rather than merely increases, with higher levels of educational attainment. However, the benefits of higher levels of education do not accrue evenly. White and Asian individuals receive greater economic benefit from education compared to Black and Hispanic individuals. In addition, for White and Asian individuals, education has a protective effect on wealth during times of recession while this benefit is absent for Black and Hispanic individuals for equal education.

E0.CI.7 Pre-K enrollment

Total count of children ages 3 to 4 enrolling in public or private preschool.¹⁹

Why it matters

Preschool attendance is associated with higher reading and math skills compared to non-preschool enrollment. Some studies show preschool enrollment can facilitate labor force participation and increase educational attainment for parents.

E0.CI.8 Workforce readiness survey

Number and types of businesses reporting that they are able to find qualified job applicants locally.²⁰

Why it matters

In addition to having job opportunities, our community must have a workforce that is prepared to fill those jobs.

¹⁷ Bureau of Labor and Statistics (Portland/Hillsboro/Vancouver)

¹⁸ US Census Bureau American Community Survey

¹⁹ US Census Bureau

²⁰ Community survey

6-Year Priority Performance Measures

Goal: To ensure that the Vancouver economy is continuing to grow, the City will provide support and assistance to businesses in areas of the city that have high equity index scores.

EO.PM.1 Number of new business licenses

The number of business licenses issued to new businesses within one calendar year in a census tract with a high equity index score.²¹

Why it matters

The number of new businesses is related to potential employment opportunities for people in our community. Providing opportunities for employment in census tracts that have a high equity index score prioritizes areas of the city with higher risk.

EO.PM.2 Equity index score

An equity index score has been calculated for each census tract in the city, which have been categorized as very low to very high. Generally, a census tract with a high or very high equity index includes communities that have a larger proportion of the population who are people of color, renters, ages 65+, households with children, a smaller proportion with a bachelor's degree or higher, and a lower median family income.²²

Why it matters

Knowing the equity index scores for census tracts across the city allows investments to be made where they can have the largest impact on addressing inequity and the biggest improvement in factors that impact life outcomes.

Goal: To ensure the Vancouver economy remains strong, the City will help existing businesses navigate identified barriers to success by implementing programs to help them through startup.

EO.PM.3 Number of businesses older than two years

The number of businesses that have maintained a business license for more than two years.²³

Why it matters

For our economy to thrive, we need to attract and retain businesses. The first few years of startup can be pivotal for the success of a business.

²¹ State Department of Licensing and City of Vancouver data

²² 5-year American Community Survey Estimates by the US Census Bureau

²³ State Department of Licensing, City of Vancouver data

Goal: To increase the number of living wage jobs, the City will work with partner agencies to recruit five new businesses by 2029.

EO.PM.4 Number of living wage jobs in Vancouver

Living wage is considered the minimum employment earnings necessary to meet a family's basic needs while maintaining self-sufficiency.²⁴

Why it matters

So that all working people and their families can afford basic necessities without governmental assistance.

Goal: To support equitable development planning for City-managed development and redevelopment projects, the City will conduct feasibility analyses and equity impact analyses for City development projects.

EO.PM.5 Equity impact analysis (EIA) reports completed for 80% of City projects that meet the scope and size to require evaluation

EIA evaluates the feasibility and impact of different development strategies. The analysis considers the impact of factors such as land use, development type, development incentives, parking approach and public benefit.²⁵

Why it matters

EIA determines how the City's development plans for specific projects can support diverse populations and create economic opportunities for all City residents. Analysis will focus on business needs, housing, and how to reduce displacement, while creating a high level of accessibility for new development.

Goal: To support business retention efforts during large-scale construction projects such as Main Street Streetscape, Interstate Bridge Replacement, and other projects.

EO.PM.6 Percentage of businesses that are open at the start of the project through completion, relative to typical business closure rates

The percentages that stay open and maintain their business during the duration and completion of long-term construction projects.²⁶

Why it matters

Supporting existing business to reduce the disruption to their operations due to City infrastructure projects demonstrates the importance of local businesses to our community. City staff stewardship will protect the best interests of our residents and businesses.

24 Census data and Massachusetts Institute of Technology's Living Wage Calculator

25 Completed EDIA's for development projects

26 Business License data, Washington Secretary of State Office and City of Vancouver Financial Services

Goal: Support Visit Vancouver's Destination Master Plan implementation to increase visitation and local placemaking efforts.

EO.PM.7 Engagement by visitors and locals

The number of visits to downtown based on hotel utilization, community events hosted, and other tourism-based revenues.²⁷

Why it matters

Expanding events and cultural facilities creates a community for residents and visitors to enjoy and adds resources and revenue that benefits everyone.

Goal: To achieve successful placements in apprenticeship programs and sustainable employment outcomes for individuals experiencing homelessness, the City will implement and manage a pre-apprenticeship program.

EO.PM.8 Program enrollment rate

The number or percentage of eligible individuals experiencing homelessness who enroll in the pre-apprenticeship program.²⁸

Why it matters

Enrollment rate reflects the program's ability to attract/serve the target population.

EO.PM.9 Completion rate

Percentage of participants who successfully complete the program.²⁹

Why it matters

Assesses the program's effectiveness and ability to retain participants.

EO.PM.10 Apprenticeship placement rate

Percentage of graduates who secure placements in apprenticeship programs.³⁰

Why it matters

Transitions to apprenticeships increases education/training, likelihood of long-term career opportunities, and potential earning power.

²⁷JLARC reporting, STR reports (hotel utilization), lodging tax and sales tax revenues.

^{28,29,30} Program data collection

EO.PM.11 Employment rate

Percentage of program participants who secure sustainable employment, whether through apprenticeships or other stable employment opportunities.³¹

Why it matters

Reflects the program's effectiveness in facilitating job placement and long-term economic stability for participants. Effective worker training and job placement for participants also increases the trained workforce available to existing and prospective employers/businesses.

EO.PM.12 Participant income growth

Average income growth among participants and graduates over time.³²

Why it matters

Assesses the impact of the program in providing supportive employment services/training and improving/increasing participants' earning potential and long-term financial well-being. Greater earning potential leads to greater self-sufficiency for participants.

External Factors and Emerging Issues

- How might we ensure that all residents experience economic mobility?
- How might we maintain a resilient economy by supporting small businesses and skilled workforce that provides equitable opportunities for people and businesses?

Existing City Plans and Initiatives Related to Economic Opportunity

- Our Vancouver - Comprehensive Plan 2045
- Columbia River Economic Development Council 5 Year Regional Economic Development Plan
- 2019-2023 Consolidated Housing and Community Development Plan

³¹ Program data collection, participant surveys/exit interviews, employment partner surveys

³² Program data collection, participant surveys/interviews, HMIS



Housing and Human Needs

Strategic Outcomes - What are we trying to achieve?

Vancouver meets basic needs and partners with organizations to support its communities. All communities have access to safe and affordable housing, healthcare, food, transportation, education, and dependable access to utilities.

Community Indicators	Performance Measures
HH.CI.1 Point-in-Time Count	HH.PM.1 Unsheltered Individuals
HH.CI.2 Housing Affordability	HH.PM.2 Occupancy Rate
HH.CI.3 Rental Affordability	HH.PM.3 Exit Destinations
HH.CI.4 Children in Poverty	HH.PM.4 Diversity of Housing Stock
HH.CI.5 Healthy Food Insecurity	HH.PM.5 Number of New Housing Units
HH.CI.6 People Living in Poverty	HH.PM.6 Rental Assistance
	HH.PM.7 Annual Utility Rate Adjustments
	HH.PM.8 Annual SDC Adjustments
	HH.PM.9 Reduce City Multiplier
	HH.PM.10 Utility Service Restoration
	HH.PM.11 Broadband Internet Access
	HH.PM.12 Homeless Service Provider

Core Values



Livability



Equity & Inclusion

Long-Term Community Indicators

HH.Cl.1 Point-in-time count of individuals experiencing homelessness

A countywide count of people experiencing homelessness held during one day in January each year. Data includes the race/ethnicity and age of individuals living unsheltered, individuals living in shelters, and individuals in transitional housing programs.³³

Why it matters

Homelessness and the many factors (shortage in shelter, affordable housing, inequity in employment/housing/education, generational poverty, untreated mental health, and substance use) that contribute to it are a priority concern based on community survey results.

HH.Cl.2 Housing affordability

The Housing Affordability Index (HAI) measures whether a typical family earns enough income to qualify for a mortgage loan on a typical home. A value of 100 means that a family with the median income has exactly enough income to qualify for a mortgage on a median-priced home. For example, a composite HAI of 120 means a family earning the median family income has 120% of the income necessary to qualify for a conventional loan covering 80 percent of a median-priced existing single-family home.³⁴

Why it matters

Median home values are often tracked as an indicator of the wealth of a community. Many municipalities are funded through property tax, which is closely tied to home values. Households that are cost-burdened, characterized as spending 30% or more of household income on housing, are more likely to experience marital dissatisfaction and are less likely to spend money on child enrichment, healthcare, and food. Lack of access to affordable housing can increase commute times (leading to lower quality of life) and higher rates of eviction. Typically, a household's second-largest expenditure, transportation costs, are largely a function of the characteristics of the neighborhood in which a household chooses to live. Opposing trends are at work on housing affordability: lower mortgage costs, lower home values and the health of the market economy all contribute to a higher score.

HH.Cl.3 Rental affordability

Renter households spending more than 30% of their income on housing costs and utilities are cost burdened; those spending more than half of their income are severely cost burdened.³⁵

Why it matters

If rental housing is not affordable, people are at risk of becoming homeless.

33 Council for the Homeless, Homeless Management Information System⁵ Department of Commerce, US Census data – American Community Survey

34 Federal Reserve Economic Data (FRED)

35 HUD Comprehensive Housing Affordability Strategy data

HH.Cl.4 Children in poverty

The number of children under 18 living below the federally defined poverty line, expressed as a percentage of all children under 18. Disaggregated by race/ethnicity, special education, English language learners, and low-income.³⁶

Why it matters

Childhood poverty is strongly and negatively correlated with children's mental, emotional, and behavioral health and long-term life chances. Children in low socioeconomic status households are less likely to graduate from high school and more likely to experience developmental and academic difficulties.

HH.Cl.5 Percentage of residents who are healthy food insecure

Food insecurity is defined by the United States Department of Agriculture as the lack of access, at times, to enough food for an active, healthy life. Disaggregated by race/ethnicity and age.³⁷

Why it matters

Food insecurity is associated with numerous adverse social and health outcomes and is increasingly considered a critical public health issue. Key drivers of food insecurity include unemployment, poverty, and income shocks, which can prevent adequate access to food.

HH.Cl.6 People living in poverty

The number of people who are earning less than the federal poverty limit.³⁸

Why it matters

Poverty is associated with a host of health risks and housing instability. Reducing poverty helps build a stronger middle class and helps grow the economy.

36 US Census Bureau

37 Feeding America's Mind the Meal Gap

38 US Census Bureau

6-Year Priority Performance Measures

Goal: To meet basic needs of individuals experiencing unsheltered homelessness, reduce barriers to accessing existing services, and reduce the number of individuals living unsheltered in our community, the City will increase shelter capacity by establishing additional Safe Stay Communities and Safe Parking options and partner with community organizations/nonprofits to operate sites.

HH.PM.1 Unsheltered individuals

Number of individuals living without shelter and/or on public right-of-way within the city.³⁹

Why it matters

Adequate shelter plays a vital role in promoting and maintaining physical and mental health. It reduces exposure to the elements/harsh weather conditions, can prevent illnesses or injuries related to the experience of homelessness, provides dignity and privacy, and facilitates regular access to healthcare and other support services. Having safe and stable shelter creates a foundation for stability, which affords individuals greater mental and physical capacity to improve their lives and transition to a more permanent housing situation, obtain employment and/or participate in education or work training programs, and build community/support networks necessary for long-term stability.

HH.PM.2 Occupancy rate

Percentage of beds/units/parking spaces that are occupied at any given time.⁴⁰

Why it matters

Reflects the demand, need and/or desire for and utilization of Safe Stay/Safe Parking sites.

HH.PM.3 Exit destinations

Where individuals go after leaving the Safe Stay/Safe Parking sites.⁴¹

Why it matters

Tracking the exit destination (permanent housing, transitional housing, other shelter, family reunification, unsheltered homelessness, etc.) is reflective of the effectiveness/success of the program at facilitating pathways out of homelessness.

39 HMIS, annual PIT Count, HART

40 HMIS

41 HMIS, HART

Goal: To increase options for housing citywide, the City will propose and adopt revisions to its land use regulations (VMC Title 20) to allow a variety of housing types and sizes in low-density residential and other zoning districts and reduce or eliminate regulatory or procedural barriers to housing production when possible.

HH.PM.4 Diversity of citywide housing stock by type and size

The share of new and existing citywide housing units that are detached single family homes, duplexes and townhomes, apartments, mobile homes, accessory dwelling units, and income-restricted units. Within these categories, the number of bedrooms will also be tracked.⁴²

Why it matters

A diverse range of housing types and sizes are needed to accommodate the diversity of local household types, sizes, and income levels.

Goal: To meet new demand and close the deficit within 10 years, Vancouver must increase annual housing production to at least 2,500 new housing units, including 750 new housing units per year that are affordable to households earning 80% or less of the area median income.

HH.PM.5 Number of new housing units constructed (overall and affordable)

Number of units that receive an occupancy permit.⁴³

Why it matters

When demand for housing is high and supply is low, housing prices increase. When there is adequate housing supply or lower demand, the price will fall.

Goal: Prevent homelessness and provide housing stability for households with low incomes by temporarily assisting with housing costs.

HH.PM.6 Number of households stabilized in housing with rental assistance and/or other housing services

Households receiving rental assistance maintain their housing and do not become homeless.⁴⁴

Why it matters

Rental assistance provides a safety net for people who are struggling to make ends meet and helps them maintain a decent standard of living. Housing stability is important for employment, school, social supports, and mental and physical health.

⁴² County GIS analysis, City permit tracking

⁴³ Multifamily Development Dashboard and Affordable Housing Fund database

⁴⁴ HMIS

Goal: To protect Vancouver's water resources and ensure affordable access to water utilities, the City will implement a water resiliency framework with a financially sustainable rate approach.

HH.PM.7 Annual utility rate adjustments

The change in rates charged to customers for water utilities.⁴⁵

Why it matters

Adequate utility rates ensure that a system to protect water resources can be maintained and that all customers can afford to access this vital resource.

HH.PM.8 Annual System Development Charge (SDC) adjustments

The change in rates charged to developers when connecting to City water or sewer.⁴⁶

Why it matters

Adequate SDCs ensure that a system to protect water resources can be maintained and that the development community pays its fair share.

HH.PM.9 Reduce inside/outside city multiplier

Reduce the multiplier that the City charges water and sewer customers outside the city limits from 1.5 to 1.25 over a 15-year period.⁴⁷

Why it matters

An appropriate multiplier creates rate equity among customers and helps reduce risk for the City.

Goal: To ensure dependable utility services, the City will restore drinking water utility services within six hours of disruption and sewer utility services within eight hours of disruption.

HH.PM.10 Average time to restore utility services after disruption

The total time in hours from loss of service to restoration of services to City utility customers, whether planned or unplanned.⁴⁸

Why it matters

Access to clean, safe, and affordable water and sewer services is a foundation of public health and community vitality. Reliable utilities are key to building trust with customers. Being prepared to restore unexpected utility interruptions and communicating about planned interruptions is key to ensuring access to services and garnering public trust.

⁴⁵ Utility Billing System: Infor

^{46,47} Infor

⁴⁸ INFOR database, City GIS analysis

HH.PM.11 Percentage of residents accessing high-speed broadband Internet in their home

Percentage of the population with access to download speeds greater than 25 Mbps at home (as of 2014).⁴⁹

Why it matters

Internet access has a huge impact on businesses, allowing employees to work remotely from home and communicate more efficiently. Healthcare is another field greatly affected by the advent of the Internet. Improvements in online connectivity and communication technology allow physicians much greater access to medical resources. Government organizations use the Internet to improve organization and communication, and voters can go online to gain more information about current issues.

Goal: *The City will offer a Community Court to increase contact between homeless service providers and individuals accused of quality-of-life offenses. Vancouver is working to break barriers that have historically prevented individuals experiencing unsheltered homelessness from obtaining permanent jobs and housing while reducing quality-of-life offenses, supporting victims, and improving public trust in the justice system.*

HH.PM.12 Number of contacts between homeless service providers and individuals accused of quality-of-life offenses

The count of contacts (referrals in which recommended assistance has been completed) made between homeless service providers and individuals accused of a quality-of-life offense who opt to participate in a case plan offered through Community Court as an alternative to the traditional court docket at the District Court. A contact is counted once for each individual. Further detail may be obtained regarding the issues addressed during contact: identification, housing, substance use, mental health.⁵⁰

Why it matters

Individuals experiencing unsheltered homelessness face a wide variety of barriers that stand in the way of obtaining permanent jobs and housing. Contacts with homeless service providers have been proven to assist in breaking down barriers to obtaining services such as housing, healthcare, insurance, behavioral health treatment, trauma therapy, personal identification/licensing services, and supplemental security income (SSI)/disability income.

49 National Broadband Map

50 Vancouver's Criminal Case Management System, Clark County District Court AIMS System, Volunteer Lawyers

External Factors and Emerging Issues

- How might we increase equitably distributed options for household availability in all parts of Vancouver?
- How might we leverage both prevention and service delivery to reduce the number of people experiencing homelessness?
- How might we proactively create conditions that result in optimal physical, mental, and behavioral health, and ensure access to health services is available to all Vancouver residents?
- How might we ensure race, ethnicity, gender, age, sexual orientation, education, geographic location, and income level do not pre-determine whether individuals are able to achieve better health?

Existing City Plans and Initiatives Related to Housing and Human Needs

- Housing Action Plan
- 2019-2023 Consolidated Housing and Community Development Plan



Vibrant and Distinct Neighborhoods

Strategic Outcomes - What are we trying to achieve?

Vancouver offers a variety of accessible places and spaces to interact and enjoy nature, art, culture, food, shopping, and community. Neighbors care for each other and show up in times of need.

Community Indicators	Performance Measures	
VDN.CI.1 Neighborhood Cohesion	VDN.PM.1 Existence of Key Businesses	↑
VDN.CI.2 Diversity of Businesses	VDN.PM.2 Proximity to Services	
VDN.CI.3 Business Districts Assessment	VDN.PM.3 Active Neighborhood Associations	

Core Values



Livability



Equity & Inclusion



Trust & Relationships

Long-Term Community Indicators

VDN.CI.1 Neighborhood cohesion

Percent of adults who report a sense of high social cohesion (trust and feeling connected) in their neighborhoods.⁵¹

Why it matters

A cohesive society is one where people are protected against life risks, trust their neighbors and the institutions of the state, and can work towards a better future for themselves and their families. Social cohesion, built on social inclusion, social capital, and social mobility, is the glue that holds society together.

VDN.CI.2 Diversity of businesses in neighborhood districts

An assessment of local businesses within a neighborhood district considering sector, ownership, and size as determined by number of employees.⁵²

Why it matters

Having a diversity of businesses may help contribute to a healthy and resilient local neighborhood economy. Understanding the types of businesses and any disparities may provide information for improving equity and diversity.

VDN.CI.3 Resident assessment of neighborhood business districts

Resident satisfaction with the mix of businesses in their neighborhood business district.⁵³

Why it matters

Residents are more likely to support businesses in their neighborhood business district if they have a positive perception of the business mix in their district. How residents feel about their business district is important because a poor perception of neighborhood business districts will cause residents to spend their money elsewhere and support businesses outside of their area. Conversely, positive perceptions of neighborhood business districts will encourage local business support and promote entrepreneurship and business startups in the neighborhood.

⁵¹ Community survey

⁵² US Census Data, Annual Business Survey

⁵³ Periodic community survey

6-Year Priority Performance Measures

Goal: *To ensure that residents have the business services that they need within close proximity to where they live, the City will analyze demand and supply data to support and inform the development of neighborhood business districts.*

VDN.PM.1 Existence of key businesses in neighborhood districts

Key businesses include grocery stores, restaurants, healthcare, recreation and arts/entertainment businesses within a district defined by neighborhood boundaries.⁵⁴

Why it matters

Key businesses provide important services and improve residents' perceptions of the business mix in their district. Key businesses reduce the need to spend money elsewhere and encourage the development of neighborhood business districts.

Goal: *To increase the number of people in Vancouver that have nearby access to supermarkets and full service grocery stores, and commercial and public services and amenities, the City will propose and adopt a Comprehensive Plan, zoning, and other changes to facilitate closer location of interrelated uses by 2028.*

VDN.PM.2 Percentage of residents living within ¼ mile of supermarkets or food stores, restaurants, parks, schools or community centers

The share of city residents living within ¼ mile of a supermarket or food store and shares of City residents within 1,500 feet of a park, restaurant, park, school, or community center.⁵⁵

Why it matters

Proximity to services and amenities increases access and likelihood of use, reduces road system demand, encourages healthy transportation options, and facilitates community identity and reduced social isolation.

⁵⁴ NAICS, ESRI

⁵⁵ City GIS analysis

Goal: 85% of neighborhood associations are considered active.

VDN.PM.3 To maintain active and healthy neighborhood associations

Active status is measured by fulfilling the recognition requirements outlined in Vancouver Municipal Code 2.75 including: adopted by-laws, full slate of elected officers, following Washington state laws pertaining to open meeting and public disclosure, and holding at least one meeting per year.⁵⁶

Why it matters

Neighborhood associations provide residents with a forum to address problems, share information, offer opportunities for community input, and to undertake projects to benefit the neighborhood. Recognized neighborhood associations serve as a conduit for communication between the community and the City.

External Factors and Emerging Issues

- How might we create equitable access to parks, trails, open space, and recreational opportunities?
- How might we support more connected communities, strengthening our community well-being and enabling more effective responses and recoveries tied to major events?

Existing City Plans and Initiatives Related to Vibrant and Distinct Neighborhoods

- Culture, Arts & Heritage Plan
- Parks, Recreation and Cultural Services Comprehensive Plan

⁵⁶ City staff



Culture and Heritage

Strategic Outcomes - What are we trying to achieve?

Vancouver celebrates culture and heritage. Public events, museums, cultural centers, concerts, and exhibits offer opportunities for communities to learn about different cultures and experiences.

Community Indicators	Performance Measures
CH.CI.1 Arts-Related Businesses	CH.PM.1 Investment in Arts, Culture, and Heritage
CH.CI.2 Economic Impact	CH.PM.2 Participation in Arts, Culture, and Heritage Experiences
CH.CI.3 Creative Vitality Index	CH.PM.3 Indirect Investment in Arts, Culture, and Heritage
	CH.PM.4 Geographic Distribution of Arts, Culture, and Heritage Resources

Core Values



Livability



Equity & Inclusion

Long-Term Community Indicators

CH.Cl.1 Arts-related businesses

Total number of arts-related businesses and rate per 1,000 residents. Businesses include those in the North American Industry Classification System (NAICS) code 71: art galleries, camera and photographic supply stores, bookstores, performing arts companies, performing arts promoters, independent artists, writers and performers, musical instrument stores, compact disc and record stores, and museums.⁵⁷

Why it matters

The activities of art-related businesses and cultural and heritage organizations foster cultural and creative vitality. A growing number of arts-related businesses also provides opportunities for individuals to learn and participate in a rich array of arts, culture, and heritage activities. They are also essential to supplying arts and cultural organizations with products and services. Consequently, their number reflects, in part, the strength of the arts sector in a regional economy.

CH.Cl.2 Economic impact of arts, culture, and heritage

The portion of community members employed by arts-related businesses as defined by North American Industry Classification System (NAICS) code and the compensation they receive. The value of the goods and services produced in an area related to arts, culture, historic preservation, and heritage.⁵⁸

Why it matters

The Vancouver community recognizes the educational, recreational, aesthetic, environmental, and economic development value of having a large area replete with public art, preserved landmarked buildings, and beautiful green spaces. This indicator helps measure the economic value of arts, culture, historic preservation, and heritage in our community so that we can make informed decisions about developing a healthy local creative economy and supporting ongoing stewardship, conservation, public access, and interpretation.

CH.Cl.3 City of Vancouver's creative vitality index

Developed by the Western States Arts Federation (WESTAF) in partnership with Economic Modeling Specialists Inc. (EMSI), the Creative Vitality Index is a robust and inclusive measure of economic vitality of the arts and art-related activities in a specific geographic region of the United States.⁵⁹

Why it matters

This measure indicates the relative health of economic elements of the creative economy. It measures annual changes in the economic health of an area by using per capita concentration of creative activities in both the for-profit and non-profit sectors.

⁵⁷ US Census Data, County Business Patterns

⁵⁸ Bureau of Economic Analysis, National Endowment for the Arts, US Census Data

⁵⁹ ArtsWA, WESTAF and EMSI

6-Year Priority Performance Measures

Goal: To provide more equitable access to arts, culture, and heritage experiences across the community, the City will invest resources to support the local creative economy in locations that serve people residing in areas with a high equity index score.

CH.PM.1 City of Vancouver's direct investment in arts, culture, and heritage

Total expenditures on cultural grants; cultural events; public art installation, repair, and site preparation; preservation and interpretation of cultural and historical sites and structures; support to cultural service providers; and City staffing, supplies, and services to support these areas.⁶⁰

Why it matters

The City provides direct support to the local creative economy through budgeted projects and programs, cultural grants, public art installations and upkeep, site preservations and interpretation, and partnerships.

CH.PM.2 Number of people participating in City-funded or partnered arts, culture, and heritage experiences

Number of attendees, participants and registrants at City-funded arts, culture, and heritage events, locations, and programs, including art events, cultural grant projects, art programming, and rentals of art, cultural, or heritage spaces.⁶¹

Why it matters

The number of attendees indicates exposure to and participation in the creative economy, helping ensure that more of the community can benefit from arts, culture, and heritage. This also helps monitor progress toward reducing barriers.

CH.PM.3 Indirect investment in arts, culture, and heritage in Vancouver

Total dollar amount leveraged via cultural grants awarded and via preservation and interpretation of cultural and historical sites and structures, and value of in-kind work provided to support art installation or cultural assets.⁶²

Why it matters

The City's support can spur further investment in the local creative economy for greater overall impact to the community, such as providing a match for cultural grant recipients.

60 City of Vancouver financials; Culture, Arts & Heritage Commission, Clark County Historical Museum, The Historic Trust

61 City staff, staff at Clark County History Museum, Fort Vancouver National Historic Site, and the Historic Trust, registration software

62 Cultural grant recipient reports, Clark County Historical Museum, The Historic Trust, National Park Service, City staff from PRCS, Public Works, and other departments

Goal: To better understand equitable investment and access to cultural resources, the City will gauge engagement in, and geographic distribution of, arts, culture, and heritage experiences.

CH.PM.4 Geographic distribution of arts, culture, and heritage assets and resources

Mapping of City-owned public art; City-funded culture, arts, and heritage facilities and program locations; events; and interpretive elements.⁶³

Why it matters

Comparing the distribution of assets against participation data helps the City understand where barriers to accessing culture, art, and heritage occur. This in turn enables the City to address these barriers and focus on more equitable access across the city.

External Factors and Emerging Issues

- How might we inclusively honor and preserve Vancouver's unique and diverse history, culture, and traditions?
- How might we ensure the creative industry has equitable access to capacity building and revenue development resources and capital?
- How might we increase the supply of affordable public and private spaces (e.g., housing, work, studio, performance) for our creative industry to survive?

Existing City Plans and Initiatives Related to Culture and Heritage

- Culture, Arts & Heritage Plan
- Parks, Recreation and Cultural Services Comprehensive Plan

⁶³ City Cultural Services and GIS staff



Safe and Prepared Community

Strategic Outcomes - What are we trying to achieve?

Vancouver feels like a safe place to live, work, learn, and play. All communities are free from violence and crime and care for each other in times of need. Communities understand what to do in times of crisis because Vancouver plans for disasters and is ready to adapt to change. All communities have dependable access to utilities and buildings, bridges, and roads are designed to be modern, safe, inclusive, and accessible.

Community Indicators

- SPC.CI.1 Residents' Perception of Safety
- SPC.CI.2 Residents' Perception of Preparedness

Performance Measures

- SPC.PM.1 Violent and Property Crime Rate
- SPC.PM.2 Fire Response Time
- SPC.PM.3 Trainings for Disaster Events
- SPC.PM.4 Community Building Assessment
- SPC.PM.5 Building Seismic Code

Core Values



Livability



Equity & Inclusion



Trust & Relationships



Innovation



Sustainability & Resiliency

Long-Term Community Indicators

SPC.Cl.1 Residents' perception of safety

How residents feel about public safety in their community.⁶⁴

Why it matters

Perceptions of neighborhood crime are negatively associated with level of physical activity among youth. Poorer perceptions of neighborhood safety are associated with higher levels of depressive symptoms among adults ages 50-74. Perceptions of neighborhood crime have been positively associated with other mental health problems, such as anger, depression, and anxiety, as well as vicarious victimization by exposure to violence in the neighborhood and visual signs of disorder. However, individuals who have a strong connection to their neighbors are less likely to worry about crime, even when living in areas with high levels of disorder.

SPC.Cl.2 Residents' perception of community preparedness for disaster

How residents feel about the community's preparedness for a disaster, including individual, family, and neighborhood preparedness.⁶⁵

Why it matters

Residents are more likely to undertake disaster preparedness if they perceive it to be effective. Government trust can directly increase perceived efficacy and indirectly increase self-efficacy.

^{64,65} Community survey

6-Year Priority Performance Measures

Goal: *To contribute to a safe community, the Vancouver Police Department will continue to foster community relationships and dedicate department resources toward crime response and prevention efforts.*

SPC.PM.1 Violent and property crime rate

For state level data, crime rate is defined as the number of reported crimes per 100,000 residents. The violent crime figures include the offenses of murder, forceable sex offenses, robbery, and aggravated assault. The property crime figures include the offenses of burglary, larceny-theft, motor vehicle theft, and arson.⁶⁶

Why it matters

Violent crime rates correlate positively to poverty levels, income inequality, and residential instability. Research suggests that violent crime rates negatively correlate to the probability of arrest, the probability of imprisonments, level of social capital, and collective efficacy. Relative poverty and local segregation of high-income households from low-income households can exacerbate violent crime. Elevated crime rates correlate to decreased confidence in police and can contribute to weakened relationships between the community and police.

Goal: *To ensure fire response times under eight minutes, the City will renovate or construct five fire stations by 2029, and add additional fire response units as needed in high-demand areas, prioritizing locations where response times are longer.*

SPC.PM.2 Fire response time

The time elapsed from an emergency call alerting fire and emergency medical services response resources and arrival of emergency services at the site of the emergency.⁶⁷

Why it matters

A quick response time can save lives, reduce costs associated with damage, and build trust in public services provided the services are equitably available to all areas of the community.

Goal: *To increase the opportunities for Vancouver residents to learn about and prepare for a disaster event, the City will provide disaster preparedness training for community partners.*

SPC.PM.3 Trainings offered to residents to prepare for a disaster event

Provide quarterly disaster preparedness training opportunities for community partners.⁶⁸

Why it matters

Community members may not be aware of the sorts of issues a large-scale disaster might introduce into their lives and may not have taken any steps to prepare themselves. A prepared community is more resilient and can help mitigate the adverse effects of an event with preparation, provided they understand what to prepare for.

⁶⁶ FBI crime statistics

⁶⁷ CRESA/City of Vancouver Fire Department

⁶⁸ City staff

Goal: To increase the community's ability to prepare for and recover from a seismic disaster, the City will perform an assessment of anticipated seismic performance of existing buildings (resident, multifamily, commercial, industrial) in the community.

SPC.PM.4 Community building assessment

An inventory of the residential, multifamily, commercial, and industrial buildings in Vancouver built prior to 1990 and assessment of their ability to withstand a seismic event.⁶⁹

Why it matters

Since 1990, the building code has included specifications that address seismic resiliency. Understanding the risk associated with the building inventory prior to 1990 can assist the City in planning for recovery from or mitigation for a seismic event, increasing resiliency and reducing recovery time.

Goal: To prepare the community for a potential seismic event, the City will ensure compliance with all seismic codes for permitted projects, increasing the percentage of buildings that are seismically sound.

SPC.PM.5 Buildings meeting current seismic building codes

The percentage of buildings in the community that meet current codes for residential, multifamily, commercial, industrial, and government and are considered a lower risk.⁷⁰

Why it matters

Buildings that can withstand a seismic event will save lives and reduce costs associated with the event.

External Factors and Emerging Issues

- How might we engage and inform the community to ensure that public safety services are delivered to a diverse community and vulnerable populations in a safe, timely, and proactive manner given the challenges of significant population growth, racial inequities, and traffic congestion?
- How might we build meaningful community relationships that transform our organizations, foster trust and legitimacy, and increase compliance with laws and regulations?
- How might we strengthen local and regional partnerships to prevent, prepare for, and respond to natural and human-caused hazards?

Existing City Plans and Initiatives Related to Safe and Prepared Community

- City of Vancouver Emergency Operations Plan
- Clark Regional Natural Hazard Mitigation Plan

⁶⁹ City staff

⁷⁰ City Permit Center Infor



Climate and Natural Systems

Strategic Outcomes - What are we trying to achieve?

Environmental stewardship and efforts to address climate change ensure that everyone has a sustainable future. We recognize the intrinsic value of the land beyond the economic benefits it provides. Vancouver protects, restores, and cares for the natural environment upon which all living things depend. The health of our natural systems supports the health of all who live, work, and play in our community.

Community Indicators

- CN.CI.1 Greenhouse Gas Emissions
- CN.CI.2 Waste Diversion
- CN.CI.3 Tree Canopy
- CN.CI.4 Parkland Acreage per 1000 Residents

Performance Measures

- CN.PM.1 Proximity to Parks
- CN.PM.2 Business Inspections
- CN.PM.3 GHG Emissions Inventory
- CN.PM.4 GHG Emissions Goals
- CN.PM.5 Parking Demand Program
- CN.PM.6 Wastewater Solids Renewal Program
- CN.PM.7 PFAS Regulatory Compliance
- CN.PM.8 Organic Waste Sent to Landfill

Core Values



Livability



Equity & Inclusion



Innovation



Sustainability & Resiliency

Long-Term Community Indicators

CN.Cl.1 Greenhouse gas emissions

Greenhouse gases include carbon dioxide, methane, and nitrous oxide and cause climate change.⁷¹

Why it matters

Addressing climate change and the many impacts associated with it begins with decreasing the amount of greenhouse gases emitted. The City Council has adopted a goal of carbon neutrality – achieving net zero greenhouse gas emissions by balancing those emissions so they are equal (or less than) the emissions that get removed through the planet’s natural absorption – for both municipal operations and the broader Vancouver community by 2040.

CN.Cl.2 Waste diversion

Tons of solid waste diverted to recycling/composting as a ratio of tons of solid waste collected.⁷²

Why it matters

This indicator tracks how much solid waste is collected for recycling or otherwise diverted from disposal each year. Diverting solid waste from a landfill conserves valuable resources, saves energy, reduces greenhouse gas emissions and other harmful environmental pollutants, conserves landfill space, and creates jobs. Greater public outreach can change personal behavior and increase waste diversion.

CN.Cl.3 Tree canopy

The percentage of land area covered by tree foliage.⁷³

Why it matters

Tree canopy contributes to air and stormwater quality and minimizes the urban heat island effect. Tree canopy is directly linked to human health and community livability. For maximum benefits, a 40% cover is recommended.

71 Periodic greenhouse gas emission inventory of community and of City operations collected from various sources including, but not limited to, municipal operations, Regional Transportation Council, regional energy providers, Port of Vancouver, C-Tran.

72 City of Vancouver Public Works Solid Waste Contract reporting

73 GIS maps and aerial imaging.

CN.Cl.4 Parkland acreage per 1,000 residents

This metric is calculated by dividing the total number of City park acres by the city's population and multiplying the factor by 1,000.⁷⁴

Why it matters

According to the National Recreation and Park Association, greenspace exposure corresponds with improved physical health, including decreases in stress, blood pressure, heart rate, and risk of chronic disease (cancer, diabetes, cardiovascular heart disease). Children with access to parks and facilities have shown decreased prevalence of obesity compared to children without access. Time spent in nature positively impacts mental health by increasing cognitive performance and well-being and alleviating illnesses such as depression, attention deficit disorders, and Alzheimers. For climate benefits, parks lower ground temperatures with tree canopy, clean water, reduce flooding and contribute to healthier air. Trees and vegetation in parks help reduce air pollution directly by removing pollutants and reducing air temperature. Urban parks can improve the environment, enhance storm water management, reduce traffic noise, and increase biodiversity.

⁷⁴ City Parks, Recreation and Cultural Services Staff, Census data

⁷⁵ City GIS analysis

6-Year Priority Performance Measures

Goal: To ensure that residents have opportunities for cooling during times of excessive heat.

CN.PM.1 Number of residents within a 10-minute walk of a park that provides localized cooling through tree canopy cover or vegetative surfaces

Geographic Information system (GIS) analysis determines the percentage of residents that meet the standards. The 10-minute walk standard is a recognized national standard that allows for comparison with peer cities.⁷⁵

Why it matters

Multiple studies show that parks with trees provide a cooling effect during extreme heat events. It is important to ensure that an increasing number of residents have access to these cooling benefits

Goal: To improve water quality and prevent negative effects on habitat and wildlife, the City will inspect businesses annually to ensure pollution prevention best-management practices are properly implemented.

CN.PM.2 Number of businesses inspected annually

Target: Conduct 800 inspections annually.

The count of inspections conducted by City staff each calendar year of businesses in Vancouver that have the potential to generate pollutants to the stormwater system.⁷⁶

Why it matters

Preventing pollutants from coming into contact with stormwater and entering water resources is the best way to reduce impacts from municipal stormwater and protect receiving waters and drinking water. Site inspections educate businesses on activities that have the potential to release pollutants to water resources and provide guidance on required best practices.

⁷⁶ City of Vancouver business inspection database (MS4Front Software)

Goal: To demonstrate progress towards the Council's overall carbon neutrality goals, City staff will update the greenhouse gas emissions inventory for both municipal operations and the entire Vancouver community.

CN.PM.3 Updated greenhouse gas emissions inventory every four years

A greenhouse gas inventory is a list of emission sources and the associated emissions quantified using standardized methods.⁷⁷

Why it matters

The City shall monitor progress towards its climate goals by conducting regular updates of its greenhouse gas inventory every four years and using the updated greenhouse gas inventory to re-assess the Climate Action Framework for opportunities to maximize emission reductions, improve equitable outcomes, evaluate new technologies, leverage new funding opportunities, or achieve other community benefits.

Goal: To support the goal of achieving carbon neutrality by 2040 for both municipal operations and the broader Vancouver community, the City will look at further investments and changes to municipal policies to reduce greenhouse gas emissions, especially in the highest impact areas of transportation and buildings, to achieve an 80% reduction in emissions by 2025 for municipal operations and an 80% reduction in emissions by 2030 for the broader community.

CN.PM.4 Interim greenhouse gas emissions goals

Greenhouse gases include carbon dioxide, methane, and nitrous oxide and cause climate change.⁷⁸

Why it matters

Compliance with this early interim target will ensure that the City is on track to achieve its 2040 carbon neutrality target and that it is demonstrating leadership on climate action for the broader community.

Goal: Develop public and private partnerships within the downtown parking enforcement districts to encourage participation in the parking demand management programs, including but not limited to trip reduction programs, green alternative incentives, etc.

CN.PM.5 Number of businesses and individuals participating in the parking demand program

The count of individuals, parking lot owners, and businesses in the parking enforcement zone actively participating in the Parking Services demand management program.⁷⁹

Why it matters

Reducing the reliance of fossil fuel transportation and the number of worker trips will decrease carbon emissions.

⁷⁷ Periodic greenhouse gas emission inventory of community and of City operations collected from various sources including, but not limited to, municipal operations, Regional Transportation Council, regional energy providers, Port of Vancouver, C-Tran

⁷⁸ Periodic greenhouse gas emission inventory of community and of City operations collected from various sources including, but not limited to, municipal operations, Regional Transportation Council, regional energy providers, Port of Vancouver, C-Tran

⁷⁹ Business commitments, MOUs, and individual enrollment data.

Goal: To plan for sustainable and cost-effective management of solids to address climate change impacts by recovering treatment system biogas for energy recovery, and biosolids residuals for beneficial soil amendment, Public Works Wastewater Services will develop a 50% design plan by the end of 2028 that identifies needed facilities and technologies, funding strategies, and community partnerships to maximizes resource recovery of wastewater solids in a safe, environmentally sound, and cost-effective manner. The planning effort incorporates synergies with the City’s Climate Action Framework, Long Range Planning, Solid Waste Program and community stakeholders.

CN.PM.6 Wastewater solids renewal program plan

Progress and development of a proposed plan that identifies the facilities, technologies, funding strategies and community partnerships to maximize resource recovery. The modeled quantity of biogas and beneficial solids available for capture and beneficial use.⁸⁰

Why it matters → As the current solids system has a remaining useful life of eight to ten years, the solids renewal program plan pursues a more sustainable and beneficial direction for wastewater solids management that aligns with the City’s Climate Action Framework, while providing for safe, clean and environmentally sound facilities.

Goal: To ensure Vancouver’s drinking water is safe for the community, the public works department will monitor PFAS concentrations and invest in treatment systems that reduce PFAS in drinking water in order to meet federal drinking water regulations and reduce the concentration of PFAS in drinking water by the end of 2028.

CN.PM.7 PFAS drinking water regulatory compliance

The concentration of PFAS in drinking water as defined by federal regulations.⁸¹

Why it matters → Per- and polyfluoroalkyl substances (PFAS) have been used around the world in industry and in consumer products such as food packaging, non-stick cookware, waterproof clothing, stain-resistant fabrics, and fire fighting foam. PFAS accumulate in the body over time and have known health impacts. Drinking water is a known pathway for PFAS to enter the human body. Removal of PFAS from drinking water in order to meet federal drinking water regulations will reduce negative public health impacts.

80 Consultant-based modeling tools to measure solids system attributes (GHG emissions, biogas generation, energy production, energy usage, local air/water/land/traffic impacts, risk, capital & OM cost, revenue)
81 City of Vancouver Public Works Water Utility sampling

Goal: To reduce per capita waste and support Council’s Climate Action Framework, the City will build program capacity to divert wasted edible food to those who need it, increase the processing capacity of the existing collection and transfer system, and adopt an ordinance to require organics collection services in compliance with the Revised Code of Washington (RCW) 43.19A.150.

CN.PM.8 Tons of organic waste sent to landfill

Total tons of organic waste disposed of at landfill as measured in the Solid Waste System Waste Composition Study.⁸²

Why it matters

Diverting food waste, yard debris and other organic materials for composting or other beneficial uses provides a number of benefits, including reducing the amount of waste sent to landfills or incinerators, reducing greenhouse gas emissions from landfills.

External Factors and Emerging Issues

- How might we proactively identify, assess, and manage risks related to the quality, reliability, and access to critical infrastructure given the challenges of an aging infrastructure, greater climate impacts, and population growth?
- How might we improve our approach to facilities and infrastructure management to ensure a high-quality, efficient, and sustainable portfolio that supports both staff and the customer?

Existing City Plans and Initiatives Related to Climate and Natural Systems

- Urban Forestry Plan
- Climate Action Framework
- Comprehensive Solid Waste Management Plan
- Comprehensive Parks, Recreation, Arts & Culture Plan
- Stormwater Management Plan
- Comprehensive Plan

82 5 year state solid waste composition study



High Performing Government

Strategic Outcomes - What are we trying to achieve?

Vancouver's government is reliable, fiscally responsible, equitable, and open to compromise. Decision-making processes are transparent. City leaders have integrity and work with the community to plan for the future.

Community Indicators

- HPG.CI.1 Price of Government
- HPG.CI.2 Resident satisfaction with municipal services
- HPG.CI.3 Municipal Bond Rating

Performance Measures

- HPG.PM.1 Workforce Profile Alignment
- HPG.PM.2 Employee Satisfaction and Engagement
- HPG.PM.3 Female VPD Staff
- HPG.PM.4 Audit Results
- HPG.PM.5 Open Data Hub Datasets
- HPG.PM.6 Legal and Regulatory Training

Core Values



Equity & Inclusion



Trust & Relationships

Long-Term Community Indicators

HPG.CI.1 Price of government (city services) per capita as % of real median household income

Sum of all taxes, fees, and charges collected by a city or county as a percentage of aggregate personal income. That is, all revenue excluding that which comes from “Other Financing Sources” (long-term debt proceeds, sale of capital assets, transfers from other funds, insurance proceeds) and “Non-Revenues” (cash received for accounting purposes but is not technically revenue). Disaggregated by race/ethnicity and age.⁸³

Why it matters

This indicator allows a local government to monitor the level of resources available to provide critical services within its jurisdiction and helps inform the price range within which residents and businesses are willing to pay for living in a city with those services.

HPG.CI.2 Resident satisfaction with municipal services

How satisfied residents are with municipal services in their community. Disaggregated by race/ethnicity, age, income, English language learner, and disability.⁸⁴

Why it matters

Government services are often compulsory and serve a broad base of customers. Assessing the level of satisfaction with service can provide information about service gaps to certain populations or barriers to adequate service delivery.

HPG.CI.3 Municipal bond rating

Credit rating or assessment of the financial health of the organization as determined by third-party sources.⁸⁵

Why it matters

Bond ratings convey a sense of confidence and ability of the organization to finance projects to create a vibrant, safe, and diverse community.

83 Revenues: Washington State Auditor’s Office, City of Vancouver Budget Office. Personal Income: US Census, total population in City of Vancouver, per capita income.

84 Community survey

85 Moody’s and S&P

6-Year Priority Performance Measures

Goal: To ensure that hiring practices, workforce and careers reflect the diversity of the community across the range and depth of the organization, the City will develop a systematic approach for collecting inclusive data regarding demographics within the City's workforce by 2029.

HPG.PM.1 Align City's workforce profile with regional and national demographics

City employee demographics based on race, age and gender.⁸⁶

Why it matters

Understanding the demographics of the workforce at the City may provide insight to barriers for certain populations that can be actively addressed.

Goal: To be an "Employer of Choice" the City will improve employee engagement.

HPG.PM.2 Employee satisfaction and engagement

Percent of employees who feel that their ideas and suggestions are valued by department management.⁸⁷

Why it matters

The City believes that a healthy and happy workforce is essential to our community's success. We provide employees with events and resources that enhance the health and wellness of ourselves and our colleagues and support a balance between the demands of the workplace and our personal lives.

Goal: To increase public safety, the Vancouver Police Department will increase the representation of commissioned female recruits to 30% by 2030.

HPG.PM.3 Percentage of commissioned staff in Vancouver Police Department who are female

The percentage of all commissioned staff within the Vancouver Police Department who are female.⁸⁸

Why it matters

Approximately half of Vancouver's population is female. According to the 30x30 initiative website, women make up only 12% of sworn officers and 3% of police leadership in the U.S. This under-representation of women in policing undermines public safety. Research shows women officers use less force and less excessive force; are named in fewer complaints and lawsuits; are perceived by communities as being more honest and compassionate; see better outcomes for crime victims, especially in sexual assault cases; and make fewer discretionary arrests.

⁸⁶ Equal Employment Opportunity data, data collected by City, Workday and community Census data

⁸⁷ Employee satisfaction survey

⁸⁸ City of Vancouver Workday - Human Resources Department and Vancouver Police Training Department

Goal: *To increase public trust, the City of Vancouver will demonstrate our commitment to fiscal responsibility and transparency by having our annual audits from the Office of the Washington State Auditor completed without findings.*

HPG.PM.4 Audit results

Each year, the City receives an audit from the Office of the Washington State Auditor. The City aims for these audits to be free of any findings. Findings are internal control weaknesses that are significant enough to result in material errors, non-compliance, or lack of fiscal accountability. The independent Office of the Washington State Auditor follows Generally Accepted Auditing Standards and internal procedures to make consistent determinations on materiality regarding our annual Financial Statement, Federal Grant, and Accountability audits.⁸⁹

Why it matters

City leadership relies on the trust of the citizens to be effective in managing the operations of the City. The assurance provided by a clean audit from an independent body regarding the accuracy of the City's financial statement information and the effectiveness of internal processes to safeguard public resources is a vital tool to help increase trust through transparency.

Goal: *To increase transparency and accountability, the City will foster and develop its data governance program including developing an Open Data Hub for publishing City datasets.*

HPG.PM.5 Number of high quality datasets available in Open Data Hub

The count of datasets available through the hub. An Open Data Hub is a website location where City datasets are proactively made available to the public. Datasets in this hub have undergone a data governance review to ensure quality, accessibility and confidentiality for pertinent data.⁹⁰

Why it matters

The ability to share and access data in a timely manner is key to gaining public support and lowering barriers to vital public information.

⁸⁹ The Office of the Washington State Auditor publicly publishes the results of their Financial, Federal, and Accountability audits on their website. The audit reports for the City of Vancouver as published on the State Auditor's at SAO.wa.gov will be our source for evaluating this performance measure.

⁹⁰ ArcGIS

Goal: To increase the number of City managers, supervisors and officials who receive necessary training in applicable legal and regulatory topics to 100% by 2025, the City will ensure that employees and officials have access to training and education needed to support their efforts to build a city of the future along the Columbia River through a shared commitment to equity, stewardship, resilience and community safety.

HPG.PM.6 Percent of City managers, supervisors and officials receiving training in applicable legal and regulatory topics

The percent of employees required to receive training who were offered the course and successfully completed it through the Workday Learning module. City managers, supervisors and officials includes City elected officials, volunteers and regular part-time and full-time managers and supervisors that work at the City. Applicable legal and regulatory topics include applicable privacy and transparency laws; municipal powers, authority and corporate governance; and accessibility, human rights, and labor and employment laws.⁹¹

Why it matters

Increasing access to pertinent training supports comprehension of legal requirements related to City work. When City managers, supervisors and officials understand the constantly changing legal landscape impacting their jobs, they can better provide increased safety, support climate resiliency, and ensure equity and economic prosperity for Vancouver's residents.

External Factors and Emerging Issues

- How might we address the fact that current data maturity of the organization is individualized?
- How might we foster and model relationships of trust, welcome diverse viewpoints, and confront racism at all levels (personal, cultural, and institutional) in our community and in the City?
- How might we create systems that recognize the ability of underrepresented communities to co-create solutions with local government and with each other?
- How might we achieve more equitable outcomes and deliver services that meet or exceed the expectations of the people we serve?
- How might we continue to meet the needs of a rapidly growing city while managing organizational capacity and ensuring fiscal responsibility?
- How might we attract and retain a talented workforce that sustains a workplace culture of engagement, community focus, and high performance?
- How might we mature the City's data and technology capabilities to provide secure and scalable solutions that enable staff to deliver accessible, modern, and impactful services to all residents?

Existing City Plans and Initiatives Related to High Performing Government

- Diversity Equity and Inclusion Strategic Plan
- Financial Policies
- Water Strategy

Next Steps

This plan reflects a foundational vision for the City of Vancouver. It provides a mechanism for the City and community to ensure accountability to the core values and focus areas by assessing and measuring progress against the outlined indicators and measures.

The Strategic Plan will inform future efforts by:

- Connecting the Strategic Plan focus areas to the City budget and investments. City Council will examine budget proposals through the lens of the Strategic Plan to ensure programmatic investments and policies align with the indicators and measures.
- Creating a community dashboard to demonstrate transparency and ensure community members can evaluate progress over time.
- Aligning other City processes, plans, and policies with the overall values embraced within the Strategic Plan.
- Maintaining an ongoing committee to periodically assess progress, provide feedback, and inform decision-making as it relates to implementation of programs and actions connected to the focus areas and aligned with the core values.
- Developing and maintaining communications that support ongoing community engagement and awareness of the Strategic Plan. Sharing opportunities to participate in other planning processes connected to the indicators and measures.



Critical Areas Ordinance (CAO) Update

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Community Development

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WSP





Agenda

- Background / Purpose
- Overview of Key Issues
- Input from Focus Group Conversations
- Timeline and Next Steps
- Discussion

Background



- **GMA requires all Cities and Counties to designate and protect *Critical Areas***
- **“Include” Best Available Science (BAS) (RCW 36.70A.172)**
- **“No Net Loss of ecological functions”**
 - When impacts cannot be avoided, new activities must replace lost function and values through compensatory mitigation
- **Critical areas include:**
 - Wetlands
 - Fish and Wildlife Habitat Conservation Areas (FWHCAs)
 - Critical Aquifer Recharge Areas (CARAs)
 - Frequently Flooded Areas
 - Geologically Hazardous Areas

CAO Goals



- **Protect members of the public and public resources and facilities;**
- **Maintain healthy, functioning ecosystems**
- **Direct activities not dependent on the use of critical area resources to less ecologically sensitive**
- **Prevent cumulative adverse environmental impacts to water quality, wetlands, and fish and wildlife habitat**
- **Promote the enhancement of ecological processes through conservation and restoration measures**

Purpose and Intent of Update



- **Remain in Legal Compliance**
 - Critical areas regulations must remain up to date on Best Available Science, or provide justification for deviating from it
 - CAO last updated in 2019, new guidance has been issued
- **Evaluate improvements in permitting process, more equitable regulations**
 - Are the regulations clear, accessible and easy to understand?
 - Are small property owners able to comply with regulations?



Timeline / Scope

- Critical Areas Ordinance required to be updated by June 2025.
- Scope of changes proposed under CAO Update are mostly technical in nature – required to maintain compliance with BAS
- Opportunity to provide big picture environmental land use policy as part of the Comprehensive Plan Update
- Critical Aquifer Recharge Areas (CARA's) being updated as part of a separate effort.

Wetlands

Core Functions:

Wetlands store floodwater, recharge groundwater, remove pollutants and excess nutrients, and provide habitat for a large number of plants and animals



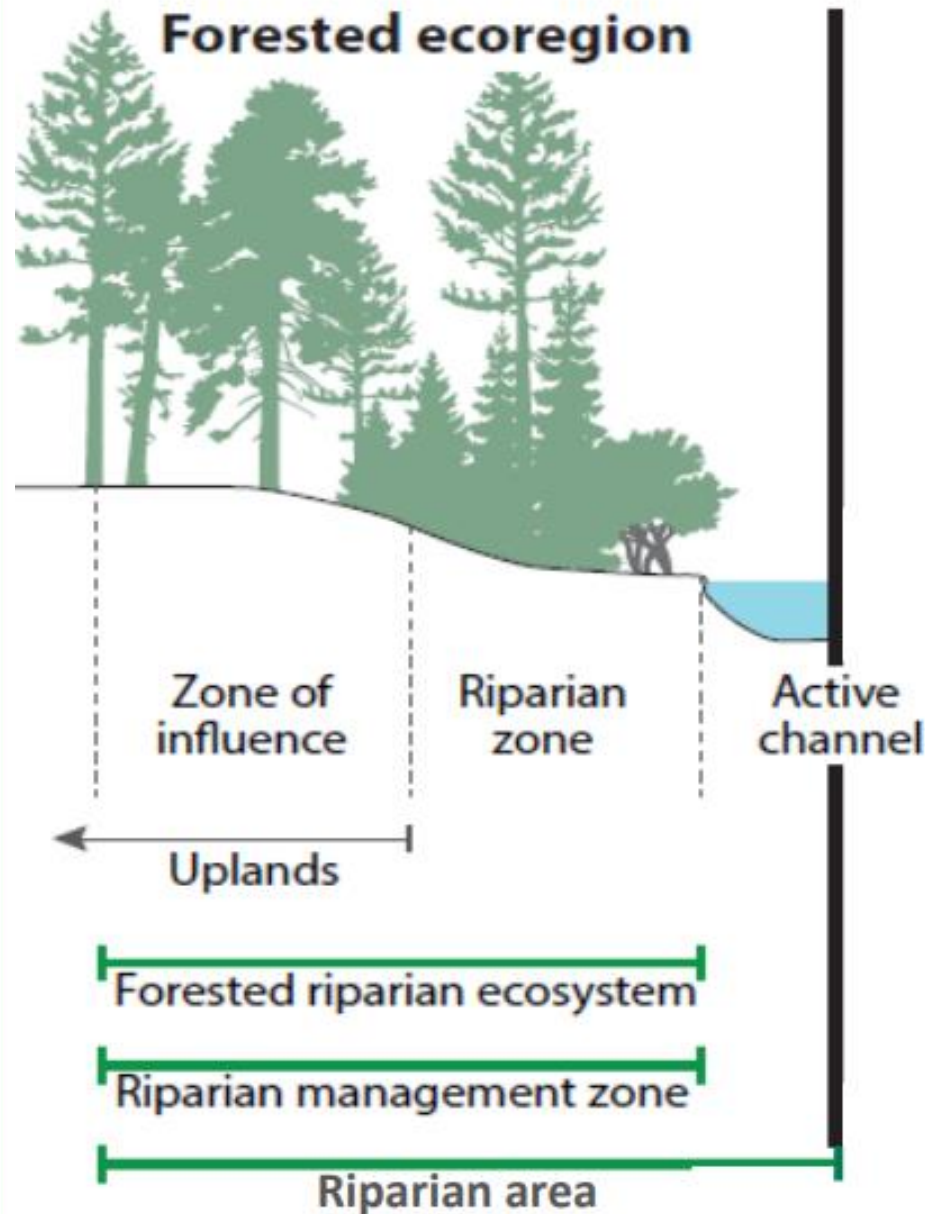
Update wetland buffers based on new Department of Ecology guidance. Four potential options:

- Option 1: use combination of wetland quality category and habitat score (most flexible option).
- Option 2: use combination of wetland quality category and adjacent land use (moderate flexibility).
- Option 3: use wetland quality category only (least flexible)
- Option 4: use a combination of the above options

Fish and Wildlife Habitat Conservation (FWHCA)

Core Functions:

includes riparian management zones, wetlands, and wetland buffers, provides buffered areas that are key to functioning wildlife habitats

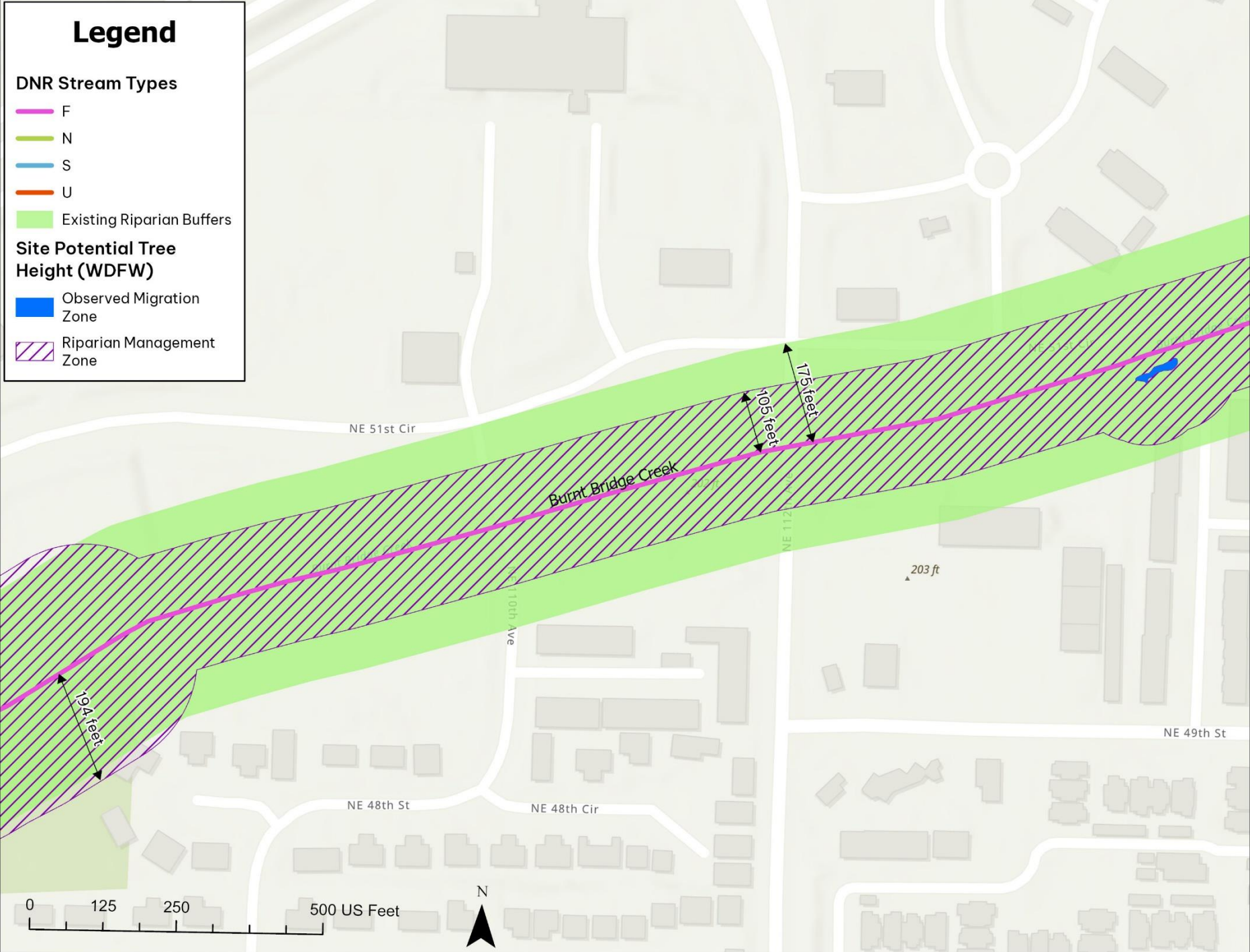


New riparian area (buffers) mapping based on 2020 Department of Fish and Wildlife (WDFW) science

- Three potential riparian area options:
 - Use WDFW science without modification
 - Average WDFW riparian areas along streams for more consistent buffer widths
 - Hybrid riparian areas based on WDFW science and local conditions

FHWCA - Riparian Management Area

Example of
application of new
Riparian
Management Area
Buffers



Geological Hazard Areas

Core Functions: Areas that are susceptible to erosion, sliding, earthquake, or other geological events. Not suitable for development, increased erosion impacts water quality



- Update definitions for Geologic, Landslide, Seismic, and Erosion Areas per Washington Administrative Code – prohibit development on slopes of 15 % (under certain conditions), rather than 25% used now
- Restrict development of critical facilities in hazard zones.
- Offer best management practices for erosion hazard to streamline review



Groups Engaged

- Columbia River Economic Development Council
- Port of Vancouver
- Washington State Departments of Fish & Wildlife, Ecology, Commerce, Natural Resources and Health
- Clark County Public Works
- Watershed Alliance of Southwest Washington
- Fourth Plain Forward
- Columbia River Neighborhood Association
- Loo Wit Group
- Southcliff Neighborhood Association

Focus Group Takeaways

- Clear, concise, and consistent code language, and consistency and flexibility with federal and State requirements.
- Need for improved informational materials (i.e., worksheets, checklists) and early awareness of requirements for small developers and individual property owners.
- Improved predictability and reliability of the permitting process early in the process
- Critical areas on properties are expensive to accommodate for permitting and impact mitigation and have disproportionate impacts to small property owners.
- More direct engagement with underrepresented groups to better consider equity and environmental justice issues related to the CAO update.

Connection to City Core Values

Climate

Ensure no net loss of critical environmental functions, maintain healthy, functioning ecosystems that are adaptive and resilient to changing climate

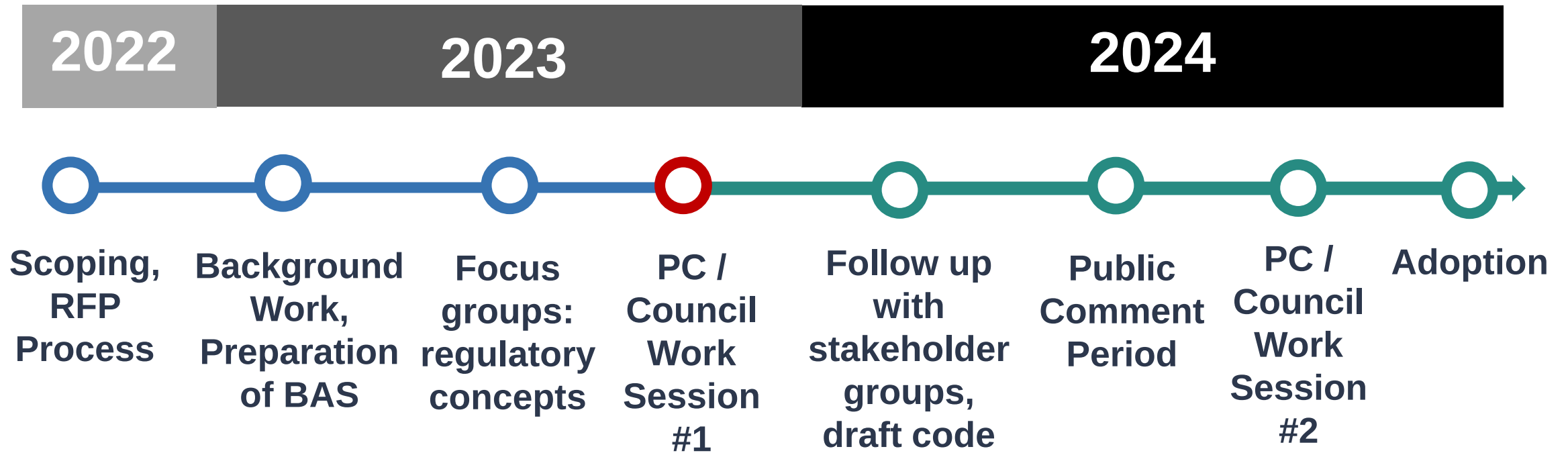
Equity

Centering concerns from equity priority communities, equitable application of regulations

Safety

Protect members of the public from adverse impacts from development activity in the City, by adopting BAS and adequate separation of uses.

Timeline + Next Steps





Discussion

- Do the proposed regulatory concepts adequately advance the stated goals and City Core values?
 - Wetlands
 - Fish and Wildlife Habitat Conservation Areas
 - Geologic Hazard Areas
 - Frequently Flooded Areas
- What other recommendations / questions do you have for protection of Critical Areas within our community?

Thank You

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DATE: December 12, 2023

TO: Chair Ledell and Planning Commission members

CC: Rebecca Kennedy, Deputy Director, Community Development

FROM: Dominique Martinelli, Senior Long Range Planner, Community Development

RE: **Critical Areas Ordinance**

Intent

Provide Council with a high-level overview of the key issues and regulatory concepts to be addressed in the Critical Areas Ordinance (CAO) update, and summary of stakeholder engagement received to date on the draft regulatory concepts.

Background

Critical areas act as valuable assets to our community, through enhancing environmental quality, providing critical ecological functions, and protecting the community and public and private property from threats resulting from natural hazards. The Growth Management Act (GMA) requires all cities and counties in the state of Washington to adopt development regulations that protect critical areas – which are further broken down into five categories: wetlands, critical aquifer recharge areas (CARA's), frequently flooded areas, geologically hazardous areas, and fish and wildlife habitat conservation areas. The City regulates most Critical Areas under Vancouver Municipal Code Section 20.740, except for CARA's which are regulated in Section 14.26 under water resources protection.

The Growth Management Act requires Counties and Cities to ensure no net loss of ecological functions within their critical area regulations. Impacts to high-quality critical areas should be prohibited except in limited circumstances. Impacts to other critical areas must be avoided and minimized. When impacts cannot be avoided, new development must replace the lost functions and values through compensatory mitigation measures. The Growth Management Act also requires Counties and Cities to utilize Best Available Science (BAS) in the development of their critical area regulations, to ensure new policies and regulations to designate and protect Critical Areas are based on reliable scientific information. As part of the CAO update, the City has documented BAS in a formalized report, based on findings from local, state and federal regulatory agencies. Non-scientific factors (legal, social, cultural, economic and political) used for the development of Critical Areas regulations are required to:

- Identify information on record that supports its decision in departing from science-based recommendations;
- Explain rationale for its departure from science-based recommendations; and
- Identify potential risks to a critical area or areas function and values, and any reducing risks with additional measures.

The City first adopted its Critical Area Ordinance under Vancouver Municipal Code (VMC) 20.740 in 2005, and completed it's most recent update in 2020, which was a minor technical update in response to a new model flood ordinance released from the Federal Emergency Management Agency (FEMA). More substantive changes occurred to the Wetlands rating systems during a 2019 update. Many components of the Critical Areas Ordinance have been updated or amended during various time periods as highlighted below:

Critical Area Ordinance Section	Year of Most Recent update
Habitats of Local Importance	2005 (Ord M-3962) – The City currently has not designated any specific habitats of local importance.
Geologic Hazard Areas	2007 (Ord M-3844)
Fish & Wildlife Habitat Conservation Areas	2009 (Ord M-3931)
Wetlands	2019 (Ord M-4289): Updated wetlands rating system
Frequently Flooded Areas	2020 (Ord M-4325): Minor updates in response to model flood ordinance
Critical Aquifer Recharge Areas	2009 (Ord M-3920)

The sections below highlight key aspects of the CAO that need to be updated in response to recently gathered BAS and input from local, state and federal regulatory agencies, in order to remain in regulatory compliance. Each section will include an overview of the regulatory concept and associated policy considerations.

Key Regulatory Concepts

Habitats of Local Importance: Washington Administrative Code Section 365-190-030 allows Cities and Counties the authority to classify and designate areas where endangered, threatened, and sensitive species are present (that are not already designated priority habitats by the State) and require additional protections to be implemented. VMC Section 20.740.110 outlines the criteria and designation process for such areas. The City has not designated any Habitats of Local Importance since the original adoption of it's CAO in 2005, and as part of the review of Best Available Science

and scoping process for the update, it was determined that there is not currently a need to designate any new areas that aren't already covered under state designations.

Wetlands: Wetlands are areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands are fragile ecosystems that serve a number of important beneficial functions. Wetlands reduce the impacts of erosion, siltation, flooding, ground and surface water pollution, and provide habitats for wildlife, plant and fisheries. Wetlands destruction or impairment may result in increased habitat degradation and public and private costs or property losses from flooding or erosion.

Wetlands are currently regulated under VMC Section 20.740.140. In these regulations, the City designates a wetlands rating system that categorizes the relative function, value, and uniqueness of various wetlands in the City. Based on the significance of the wetland, a buffer is put in place from the edge of the wetland, where development activity is restricted (except for minor allowances defined under 20.740.140(c)(a)). Wetland buffers tend to be one of the most common aspects of review under the CAO permitting process and tend to have the greatest impact on the overall site planning process for development when a significant wetland is in place.

Wetland regulations were the focus of the last major update to the Critical Areas Ordinance, which accounted for an updated wetlands rating system from the Washington Department of Ecology. In October 2022, the department of Ecology released new guidance offering three different approaches to establishing protective buffers, and modifying rating systems that need to be incorporated into the update. These three options are summarized below, including an additional hybrid option (#4):

- **Option 1(a&b):** Use a combination of the wetland quality category and the habitat score of the wetland based on the Washington State Wetland Rating System (most flexible option).
- **Option 2:** Use a combination of wetland quality category and the adjacent land use (moderate flexibility).
- **Option 3:** Use the wetland quality category only (least flexibility)
- **Option 4:** An alternate or hybrid of the above approaches.

The table below shows the proposed buffer distances for each of the three options in comparison to the existing buffer within VMC Title 20. All proposed options would represent an increase in the buffer widths for all categories of wetlands regulated by the City.



Wetland Quality	Current Buffer	Required Buffer (feet)			
		Option 1		Option 2	Option 3
		A*	B*		
Category I	50 – 300	75 – 225	100 – 300	150 – 300	300
Category II	50 – 300	75 – 225	100 – 300	150 – 300	300
Category III	40 – 150	60 – 225	80 – 300	75 – 150	150
Category IV	25 – 50	40	50	25 – 50	50

**Option 1A buffer widths can be provided if a habitat corridor and impact*

minimization measures are implemented with a development. If neither a habitat corridor nor impact minimization measures are provided, a developer/applicant must comply with the buffers of Option 1B.

For the purposes of the proposed table above, adjacent land uses are defined under the low intensity, medium intensity, and high intensity categories.

- High: All Residential, Commercial or Industrial Zones
- Moderate: Open Space Park or Open Space Greenway: General
- Low: Open Space Greenway – Lettuce Fields or Vancouver Lowlands; or Open Space Natural

The wetland quality categories are defined as follows:

- Category I – Highest Value, typically larger than one acre that are undisturbed having mature old growth and/or unique or rare wetland types
- Category II – wetlands that have a moderately high function and value
- Category III – moderate levels of function, adverse impacts can often be allowed with mitigation
- Category IV – heavily disturbed, lowest ecological value

Habitat scores are based on the [Washington State wetlands rating system](#). During the development review process, it is the responsibility of the proposed developer or landowner to hire a qualified wetlands specialist to assess and assign a wetland score using the Washington Department of Ecology Rating system.

Aside from the updated wetland rating system, other minor changes proposed for the wetland regulations include updating definitions for State compliance, establishing wetlands as a means of combatting climate change, adding clarity to habitat corridor requirements and minimization measures when developing next to a wetland and wetland buffer, and exempting certain small types of wetlands from permitting.

Critical Aquifer Recharge Areas (CARA's): CARA's are defined as areas that have a critical recharging effect on aquifers used for potable water. CARA regulations help to ensure the protection of municipal drinking water by reducing impacts from stormwater runoff and hazardous uses and

chemicals. Aquifers also have a critical recharging effect on streams, lakes, and wetlands that have an impact on fish and wildlife habitats. Because the City is wholly located within the Troutdale sole-source aquifer, and there is a presence of well-draining hydric soils, site specific impacts from industrial uses have a greater chance to affect community wide water quality outcomes, than other Cities that have a greater frequency of smaller, confined aquifers to utilize as drinking water sources. This means that in order to ensure continued water quality protection, the City should ensure greater overall regulation of wells that supply the municipal drinking water system generally. Updates to Critical Aquifer Recharge Areas regulations under VMC 14.26 will be conducted as part of a separate effort led by Public Works staff.

Frequently Flooded Areas: Frequently flooded areas are lands in the floodplain which have at least a 1 percent or greater chance of flooding in any given year, or are within areas that flood due to high groundwater. These areas can include streams, rivers, lakes, coastal areas, wetlands and areas where high groundwater forms ponds on the ground surface. Frequently flooded areas offer habitat that supports salmon and other wildlife species. Frequently flooded areas are regulated under both VMC 20.740.120 and 20.740.150.

On May 2, a letter of Final Determination was issued by the Federal Emergency Management Agency (FEMA), stating that an updated Flood Insurance Rate Map (FIRM) will go into effect starting on November 2. Each time FEMA provides a community with new or revised flood hazard data, local governments are required to update their regulations to remain compliance with the National Flood Insurance Program on the date that a new FIRM becomes effective.

Because the City is required to adopt relatively minor and technical FIRM changes to remain in federal compliance with the National Flood Insurance program by November 2 and the full scope of CAO changes will not be ready by that date, the project team included these changes as part of the 2023 Annual Code Update process (Note that these changes were approved on first reading at the December 4, 2023 Council meeting and are anticipated to be adopted at the December 18, 2023 Council meeting). A summary of the changes identified are as follows:

- Updating several definitions and defined terms.
- Modifications to the National Flood Insurance Program variance process for Historic Structures in a frequently flooded area.
- Adding language to incorporate future updates to Flood Insurance Rate Maps by reference.

Geologically Hazardous Areas: These are defined as areas that because of their susceptibility to erosion, sliding, earthquake, or other geological events, are not suited to siting commercial, residential, or industrial development consistent with public health or safety concerns. This includes Erosion hazard areas, which contain soil types that are more prone to erosion, and landslide and seismic hazard areas, which are at high risk of mass movement, landslides and liquefaction during a seismic event.

Geologically Hazardous areas are regulated under VMC 20.740.130, and haven't been substantially updated since 2007. Relatively minor changes are needed to the existing code to comply with Best

Available Science and policy direction from the Department of Ecology. Recommended changes are as follows:

- Updating the following definitions:
 - *Geologically Hazardous Area* – to include areas that are susceptible to other types of geological events.
 - *Landslide Hazards* – increase the areas in the City where development is restricted: from 25% grade or higher, to restricting some areas between 15% - 25% slopes under certain conditions.
 - *Seismic Hazard* – include areas that are likely to become unstable during a seismic event, such as steep slopes, bluffs, and areas with unstable soils.
- Given that geotechnical reports typically assess the risk of geological hazards with newly proposed development, the extent of the regulatory impact of these modified definition changes will be relatively minor, but the proposed changes will ensure alignment and compliance with State definitions.

Fish and Wildlife Habitat Conservation Areas (FWHCA's)

The Growth Management Act requires cities and counties across the state to address land use issues that directly and indirectly impact fish and wildlife habitat. Fish and wildlife habitat conservation is the management of land to ensure sufficient habitat quality, quantity, and connectivity to support long term, viable populations of fish and wildlife species and prevent the creation of isolated subpopulations within their natural geographic distribution.

FWHCA's are regulated under VMC 20.140.110, and last updated in 2009. The primary regulatory mechanism in this portion of the code to protect FWHCA's are through placing buffers from shorelines, lakes, streams, rivers, and riparian areas. In 2020, the Washington Department of Fish and Wildlife (WDFW) conducted new mapping of riparian area buffers based on best available science. This science recommends placing buffer widths based on preserving high functioning ecological areas and incentivizing restoration, and basing the width of riparian management zone based on a measurement called *Site Potential Tree Height*, which is the average maximum height of the tallest dominant tree species in a riparian area. Ultimately, this will mean all stream order types will see an increase in buffer widths if implemented in accordance with WDFW guidance.

The City has identified three possible options to regulate riparian area buffers as part of this update:

- Use WDFW science without modification – this may mean more difficulty in interpreting and implementing regulations and will represent the greatest increase in buffer widths in some circumstances, and less consistency of application on a property-by-property basis.
- Averaging riparian area tree heights along streams for more consistent buffer widths (see table below).
- Hybrid riparian area widths based on site specific review and local conditions.

Stream Type	Existing Requirement(ft)	Average of SPTH (ft)	Average % of Change (ft)
F (lakes, streams, and rivers that contain fish habitat)	175	185	+10
N (Streams and rivers that are not shorelines of the state, and do not contain fish habitat)	125	185	+60
S (Shorelines of the State)	175	140	-35
U (un-typed)	125	176	+51

Stakeholder Input

In early September, the City held focus groups on each of the regulatory areas where there will be substantive changes. Key stakeholders coming from a variety of perspectives and backgrounds were included in these conversations. The stakeholder entities that participated in the first round of stakeholder conversations are as follows:

- Columbia River Economic Development Council
- Port of Vancouver
- Washington State Departments of Fish & Wildlife, Ecology, Commerce, Natural Resources and Health
- Clark County Public Works
- Watershed Alliance of Southwest Washington
- Fourth Plain Forward
- Columbia River Neighborhood Association
- Loo Wit Group
- Southcliff Neighborhood Association

Some of the key takeaways from these conversations are as follows:

- Participants desire clear, concise, and consistent code language, and consistency and flexibility with federal and State requirements.
- There needs to be improved informational materials (i.e., worksheets, checklists) and early awareness of the CAO and critical areas in general, especially for small developers and individual property owners.
- Participants desire improved predictability and reliability of the permitting process for developers, especially early in the process, such as at the City-required pre-application meeting.
- Critical areas on properties are expensive to accommodate for permitting and impact mitigation and have disproportionate impacts to small property owners.

- The City should consider more direct engagement with underrepresented groups to better consider equity and environmental justice issues related to the CAO update.

Participants stated they would like to see flexibility built into the CAO to accommodate evolving Best Available Science (BAS), which will help streamline the update process. Participants also stated that the City should consider presenting riparian buffers as a tool to combat climate change at the local and regional levels. Participants also expressed that the mitigation sequencing process should be made clearer to developers as they typically become aware too late in the process and may end up impacting critical areas more than warranted or applicants experience delays in permitting when they are unaware of critical area requirements. Participants also mentioned a preference towards on site mitigation of impacts, rather than the City allowing for offsite mitigation measures. Other feedback included increasing public access opportunities and amenities with on-site critical area protections (especially in equity priority communities), simplifying code language generally to make regulatory requirements easier to understand, and the need for specific protection around Oregon White Oaks, which are under pressure from development.

Timeline + Next Steps

The City is required to adopt its revised CAO as part of the GMA Periodic review process by June 30, 2025, which is the same timeframe for updating the Comprehensive Plan and implementing development regulations. The proposed updates responding to the Key Regulatory Concepts are technical in nature, needed to comply with updated regulatory guidance from state level agencies, and respond to recently gathered BAS. Following the initial work sessions with Planning Commission and City Council, staff will further engage stakeholders, and begin to develop draft regulations in response to the feedback received. The draft regulations will be reviewed with Planning Commission and City Council and released for a public comment period prior to finalization and adoption. CAO updates are occurring in advance of the full Title 20 overhaul occurring as part of the Comprehensive Plan update due to the importance of critical areas, the long time frame since the last full update, and direction from state agencies. Given the technical nature of these updates, feedback received during the CAO process will also be integrated into overall environmental land use policy intended to be addressed holistically as part of the Comprehensive Plan Update process.

Attachments

Presentation
Best Available Science Report
Summary of Key Updates

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Technical Report

Best Available Science Research Vancouver Critical Areas Ordinance Update

Submitted to

**City of Vancouver
Vancouver, Washington**

September 23

Submitted by

**WSP USA
210 East 13th Street, Suite 300
Vancouver, Washington 98660-3231**

31000436.000

TECHNICAL REPORT
Best Available Science Research
Washougal Critical Areas Ordinance Update

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Appendix A. Draft Critical Areas Maps

Appendix B. Best Available Science Sources

LIST OF ACRONYMS AND ABBREVIATIONS

ASCE	American Society of Civil Engineers
ASFPM	Association of State Floodplain Managers, Inc.
BAS	best available science
BMP	best management practice
CAO	critical areas ordinance
CARA	critical aquifer recharge area
City	City of Vancouver
CMZ	channel migration zone
CRS	community rating system
DNR	Washington State Department of Natural Resources
DOH	Washington State Department of Health
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	flood insurance rate map
GMA	Growth Management Act
I-5/I-205	Interstate 5/Interstate 205
I-Codes	International Codes (2018, 2015, 2012, and 2009)
LIDAR	light detection and ranging
LWD	large woody debris
NAI	No Adverse Impact
NEHRP	National Earthquake Hazard Reduction Program
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NRC	National Research Council
PHS	priority habitats and species
PRM	permittee-responsible mitigation
RCW	Revised Code of Washington
RMZ	riparian management zone
SEPA	State Environmental Policy Act
SFHA	special flood hazard area
SMA	Shoreline Management Act
SPTH ₂₀₀	200-year site potential tree height
SR 14/SR 500	State Route 14/State Route 500
UGA	urban growth area
USACE	U.S. Army Corps of Engineers
USDA-NRCS	U.S. Department of Agriculture Natural Resources Conservation Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VMC	Vancouver Municipal Code
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WSDOT	Washington State Department of Transportation

1.0 INTRODUCTION

As a fully planning county, Clark County and all municipalities within it, including the City of Vancouver (City), are required to periodically update their critical areas ordinance (CAO) on the schedule set out in the Growth Management Act (GMA) (see Revised Code of Washington [RCW] Sections 36.70A.130 and 36.70A.172). The CAO update needs to comply with the GMA, State Environmental Policy Act (SEPA), and must also meet requirements of the Shoreline Management Act (SMA) for regulation of critical areas within shorelines. The Washington Administrative Code (WAC) provides additional requirements for designation of critical areas in WAC 365-190. The deadline for the update of the CAO, other regulations as necessary, and the Comprehensive Plan of the City of Vancouver is June 30, 2025.

Critical areas in Vancouver are currently protected by the City's CAO (Vancouver Municipal Code [VMC] 20.740), first adopted in 2005, as required by RCW 36.70A.172. The protection of these critical areas is important to preserve the ecological functions and values of the City's natural environment and for the protection of public health, safety, and welfare of Vancouver's residents. Critical areas include habitats of local importance, fish and wildlife habitat conservation areas, frequently flooded areas, geologically hazardous areas, wetlands, and critical aquifer recharge areas (CARAs). CARAs are regulated under VMC 14.26, "Water Resources Protection," separately from the City's other critical areas provisions contained in VMC 20.740.

The CAO was most recently updated in 2020, specifically an amendment to Frequently Flooded Areas. Evolving best available science (BAS) for critical areas means the City's CAO may not reflect the latest science or guidance from the State of Washington. BAS is defined in WAC 365-195 (see further discussion below under Section 3.0 of this report). As an example, the City's CAO needs to be updated to meet the most recent riparian management guidance from the Washington Department of Fish and Wildlife (WDFW) – *Riparian Ecosystems, Volume 1: Science Synthesis and Management Implications* (Quinn et al. 2020) and *Riparian Ecosystems, Volume 2: Management Recommendations* (Rentz et al. 2020). City staff have also mentioned that they would prefer that the CARA regulations in VMC 14.26 be integrated with the other critical areas regulations in VMC 20.740.

This report consists of a background of the City's existing critical areas landscape, review of BAS and critical area resource documents, and guidance that provide BAS-based approaches to protecting the functions and values of critical areas. The BAS review includes peer-reviewed literature, gray literature, expert opinion and the anecdotal experience of professionals that is relevant to the City, documents prepared for other jurisdictions, guidance prepared by state and federal agencies, and research from across the country regarding the effectiveness of existing standards and the state of the science. This document presents the findings of the review and **Appendix B** lists the literature, data, and reports used to review the state of BAS for each regulated critical area.

2.0 VANCOUVER'S CRITICAL AREAS LANDSCAPE

The geography of Vancouver's critical areas is discussed in this section. As a supplement to this section, see the critical areas maps contained in Appendix A. Together, the description and maps provide the general distribution of Vancouver's critical areas. Also discussed below are how critical areas are designated areas as per the City's CAO and any differences in designation compared with WAC 365-190.

2.1 HABITATS OF LOCAL IMPORTANCE

Habitats of Local Importance (VMC 20.740.100) are critical areas for fish and wildlife habitat that are not designated as priority habitats and species by the State, but are designated as locally significant by the City. These are determined by a need for protection due to existing high diversity of fish or wildlife species, declining populations, habitat scarcity, areas sensitive to disturbance from human activity or development, or other unique local habitat functions. Designated areas also need to be sufficient in size to support the species or habitat functions and this designation will not compromise the ability of the City to achieve Comprehensive Plan goals. A habitat of local importance must also have a proposed management strategy that describes how the functions of the habitat will be protected after designation. Vancouver has not designated any habitats of local importance and they are, therefore, not discussed further in this report.

2.2 WETLANDS

Wetlands are areas that support vegetation adapted to life in saturated soil conditions under normal circumstances (VMC 20.740.140). Wetlands must be designated in accordance with the definition in RCW 36.70A.030 and in accordance with the federal wetland delineation manual and regional supplements (WAC 173-22-035). Wetlands include swamps, marshes, bogs, and similar areas, but do not include artificial wetlands intentionally created (e.g., irrigation and drainage ditches, canals, and detention facilities). Counties and cities must adopt a rating system for wetlands. The rating system most frequently used (also used by Vancouver) is the joint rating system developed by the Washington State Department of Ecology (Ecology) and the U.S. Army Corps of Engineers (USACE).

Areas in the City that have prevalent wetland areas are along the banks of the Columbia River, Vancouver Lake, Burnt Bridge Creek, Fisher Creek, and Love Creek; areas between Vancouver Lake and the Columbia River; Curtin Springs Wildlife Habitat; Vancouver Lake Park; Centerpointe Park; areas west of Northeast Padden Parkway and Northeast Andresen Road; areas in the Port of Vancouver; and other mapped areas as shown in Appendix A.

2.3 CRITICAL AQUIFER RECHARGE AREAS

CARAs are areas where rainfall and surface water can infiltrate into the subsurface and recharge aquifers used for potable water. CARAs are regulated under VMC 14.26, which was recently updated in City Ordinance M-4372 codified in August 2022. The purpose of this code is to protect the City's water resources by reducing risks of groundwater contamination by establishing development regulations and minimum standards (VMC 14.26). Aquifer areas must be classified according to

the vulnerability of an aquifer, which is determined by the combined effect of hydrogeological susceptibility to contamination and the potential contaminant releases that may impact the aquifers (WAC 365-190-100). The entire area within the City's jurisdictional boundaries is designated as CARA under VMC 14.26.115.B. The City further identifies Special Protection Areas within the citywide CARA that are those areas within 1,900 feet of any municipal water supply well.

2.4 GEOLOGICALLY HAZARDOUS AREAS

Landslide, seismic, and erosion hazard areas are geologically hazardous areas (VMC 20.740.130). Coal mine and volcanic hazards also qualify as geologically hazardous areas (WAC 365-190-120), but these do not occur in Vancouver.

Landslides: Landslide areas are generally characterized by the following identifying potential factors per the City's CAO: slopes greater than 25 percent on a property and adjacent areas within 100 feet and areas of historic or active landslides. WAC 365-190-120 defines landslide areas as areas delineated by the U.S. Department of Agricultural Natural Resources Conservation Service (USDA-NRCS) as having significant limitations for building development; coastal areas mapped as Classes u (unstable), uos (unstable old slides), and urs (unstable recent slides) in Ecology's Coast Atlas; or areas designated as quaternary slumps, earthflows, mudflows, lahars, or landslides on maps published by the U.S. Geological Survey (USGS) or Washington State Department of Natural Resources (DNR). Also, it includes areas with slopes steeper than 15 percent; hillsides intersecting geological contacts with a permeable sediment overlaying an impermeable sediment or bedrock; and springs or groundwater seepage. WAC goes further in defining landslides as areas that have shown movement during the Holocene epoch or which are underlain or covered by mass wastage debris from this epoch; slopes parallel or subparallel to planes of weakness in subsurface materials; slopes having gradients steeper than 80 percent subject to rockfall during seismic shaking; areas potentially unstable as a result of rapid stream incision, erosion, and undercutting by wave action, including stream channel migration zones; areas that show evidence or are at risk from snow avalanches; areas located in a canyon or on an active alluvial fan subject to inundation by catastrophic flooding; and any area with a slope of 40 percent or steeper with a vertical relief of 10 or more feet and not composed of bedrock.

Areas of the City that are identified as areas of potential instability landslide areas by information provided by Clark County Maps Online are slopes south of and above Burnt Bridge Creek in central Vancouver and bordering Burnt Bridge Creek on both sides from Falk Road to NW Fruit Valley Road; slopes above the Columbia River paralleling State Route 14 (SR 14) and Evergreen Boulevard; parallel to Fruit Valley Road; and areas along Southeast Evergreen Highway east of Interstate 205 (I-205) between SR 14 and the Columbia River and west of Southeast 192nd Avenue. The only areas mapped as areas of historic or active landslides are along Burnt Bridge Creek immediately east of Vancouver Lake and along Evergreen Highway east of I-205. Mapped landslide areas of high confidence by the USGS Landslide Inventory are located around Burnt Bridge Creek Park; along the eastern side Northwest Fruit Valley Road and north of West 39th Street; areas north of SR 500 at Arnold Park and

Bosco Farm Neighborhood Park; areas south of SR 500 along Burnt Bridge Creek and Burnt Bridge Creek Park; an area in Dubois Park; and area just west of Dubois Park and between East Mill Plain Boulevard and East Evergreen Boulevard (see Appendix A).

Seismic Hazard Areas: The City designates seismic hazard areas as those with low to moderate, moderate, moderate to high, or high liquefaction susceptibility, or Peat Deposits; areas of fill; National Earthquake Hazard Reduction Program (NEHRP) ground shaking amplification soils C to D, D, D to E, and E; and fault rupture hazard areas. WAC 365-190-120 defines seismic hazard areas as those subject to a severe risk of damage as a result of ground shaking induced by an earthquake, slope failure, settlement or subsidence, surface faulting, or tsunamis. It also includes areas with a historical record of earthquake damage.

Areas mapped with liquefaction susceptibility risk are typically found in Vancouver along the Columbia River generally west of Southeast Ellsworth Road; areas between the Columbia River and Vancouver Lake; areas along Burnt Bridge Creek; Spring Branch Creek; and areas north and south of SR -500 and Northeast 95th Street. Areas of the City with NEHRP ground shaking amplifications of C to D or higher are generally located west of I-5 near Vancouver Lake. The area north of SR 500 and between I-5 and I-205 are generally Class D; south of SR 500 and east of I-205 are generally Site Class C; faults associated with the Quaternary Lacamas fault zone are present on the eastern side of Vancouver, that generally trends southeast starting at Northeast 28th Street and Northeast 38th Avenue to the Columbia River and ending east of Government Island. Related faults also traverse the very northeast corner of the city, generally around Northeast Fourth Plain Boulevard and Northeast 162nd Avenue.

Erosion Hazard Areas: Erosion hazard areas under Vancouver's CAO are areas identified as having a severe erosion hazard by the 1972 USDA Soil Conservation Service Soil Survey of Clark County Washington. These include erosion hazard areas along banks, streams, and rivers due to flow patterns creating regression or retreat of these banks. Erosion hazard areas are defined by WAC 365-190-120 as areas that are likely to become unstable, such as bluffs, steep slopes, and areas with unconsolidated soils. In the City, erosion hazard areas are found generally along Burnt Bridge Creek adjacent and west of I-5, east of Northwest Fruit Valley Road between West 39th Street and Burnt Bridge Creek, along the Portland Vancouver Junction Rail line between I-5 and Northeast Saint James Road, an area bounded to the west and east by Fort Vancouver Way and Northeast 87th Avenue and to the north and south by East 18th Street and SR 14, and other mapped areas as shown in Appendix A.

2.5 FREQUENTLY FLOODED AREAS

Frequently Flooded Areas are areas of special flood hazards (VMC 20.740.120) determined by the Federal Emergency Management Agency (FEMA) and scientific and engineering reports entitled Flood Insurance Study effective September 5, 2012 and any subsequent revisions. Areas designated as frequently flooded areas as defined by WAC 365-190-110 are those that affect human health and safety and to public

facilities and services. Jurisdictions may optionally designate and consider the future flow flood plain; the potential effects of a tsunami; high tides with strong winds; sea level rise and extreme weather events, including those resulting from global climate change; and greater surface runoff caused by increased impervious surfaces.

Frequently flooded areas in the City are found along the Columbia River, Burnt Bridge Creek, and Vancouver Lake and areas between Vancouver Lake and the Columbia River.

2.6 FISH AND WILDLIFE HABITAT CONSERVATION AREAS

Areas that are determined as fish and wildlife habitat conservation areas (VMC 20.740.110) are based on site conditions and varying available data. These areas include habitat used for any life stage of an endangered, threatened, or sensitive fish or wildlife species; priority habitats and areas associated with priority species as determined by the Washington Department of Fish and Wildlife (WDFW); rivers, lakes, streams and naturally occurring ponds; locally significant habitat areas or habitats of local importance; and riparian management areas are riparian buffers. WAC 395-190-130 defines fish and wildlife habitat conservation areas as those that are commercial and recreational shellfish areas; kelp and eelgrass beds; herring, smelt, and other forage fish spawning areas; naturally occurring ponds under 20 acres and their submerged aquatic beds; waters of the state; and state natural area preserves, natural resource conservation areas, and state wildlife areas.

Primary fish and wildlife habitat conservation areas in the city, including riparian and non-riparian habitat areas, and species areas that can be found along the Columbia River, Burnt Bridge Creek, Fisher Creek, Love Creek, Vancouver Lake and areas between the lake and the Columbia River, South Vancouver Lake Lowlands, Burnt Bridge Creek Greenway, parks along the banks of the Columbia River, Biddlewood Natural Area, Henry J. Biddle Natural Area, Mimsi Marsh, Ellsworth Springs East, David Douglas Park, Blandford Canyon West, Meadowbrook Marsh, along the Portland Vancouver Junction Rail between I-5 and Northeast Saint James Road, and other areas as mapped in Appendix A.

3.0 WHAT IS BEST AVAILABLE SCIENCE?

A foundational element of all CAO updates is documenting the BAS that supports the new and/or revised regulations. As regulated by RCW 36.70A.172, BAS must be used in developing policies and development regulations in order to protect functions and values of critical areas. BAS is utilizing the best, most current information available from a valid scientific process or sources that have been adopted by the scientific community. According to WAC 365-195-905, counties and cities may use a list of identified resources from local, state, or federal natural resources that have met the criteria of BAS. The responsibility of including BAS in development and implementation of critical areas policies or regulations rests on each jurisdiction. However, counties and cities should consult with a qualified scientific expert or team to identify scientific information, determine BAS, and assess applicability to critical areas. The scientific expert or experts may use professional judgment regarding

critical areas but shall use criteria set out in WACs 365-195-900 through 365-195-925 and any other technical guidance provided by the department. Characteristics of BAS include:

- **WAC 365-195-900** – Jurisdictions must identify and include BAS in accordance with WAC for updates and adoption of policies and regulations, including for periodic review and evaluation to determine a jurisdiction is meeting statutory obligations.
- **WAC 365-190-905** – Assessment criteria are provided for jurisdictions to determine whether information gathered for development of critical areas policies and regulations is adequate for BAS. It also provides guidance on the types of information that can be used, determining qualified professionals, setting responsibilities of jurisdictions, and validating scientific information.
- **WAC 365-190-910** – Obtaining BAS is regulated by this statute and includes consulting with state and federal natural resource agencies and tribes for efficient development of scientific information and recommendations. Counties or cities may also have their own scientific data that is or can be eligible for BAS.
- **WAC 365-190-915** – Criteria are listed for using BAS in the development of policies and development regulation and shall protect the functions and values of the critical areas. BAS shall be included in the decision-making process. Jurisdictions shall use BAS with variances and exemptions determinations regarding generally applicable critical areas policies and development regulations. Nonscientific information (legal, social, cultural, economic, and political) used for critical area policies and regulations departing from BAS shall:
 - Identify information on record that supports its decision in departing science-based recommendations;
 - Explain rationale for its departure from science-based recommendations; and
 - Identify potential risks to a critical area or areas function and values, and any reducing risks with additional measures.
- **WAC 365-190-920** – Inadequate scientific information relating to a jurisdiction's critical areas shall utilize a “precautionary or a no risk approach” or use a formal adaptive management program that relies on scientific methods.
- **WAC 365-190-925** – Jurisdictions must give “special consideration” for necessary conservation or protection measures to preserve or enhance anadromous fisheries. Record evidence shall be provided with protected habitat that includes all life stages of anadromous fish.

Scientific information can be produced only through a valid scientific process as listed above and BAS must be used in developing policies and development regulations in order to protect functions and values of critical areas (RCW 36.70A.172). The BAS research presented below meets State requirements and includes scientific information that is readily available, is of high quality, and/or has been independently peer-reviewed.

4.0 WETLANDS

Wetlands are highly productive and valuable ecosystems that provide high-quality habitat to various terrestrial and aquatic flora and fauna, protect water quality by filtering contaminants and promoting infiltration, provide aquifer recharge, and slow the velocity of and retain flood waters protecting downstream communities from the impacts of flooding. Current BAS for wetlands includes guidance for the identification, classification, and categorization of wetlands, information regarding useful and effective protective buffers, and guidance for mitigating impacts to wetlands, including mitigation sequencing and compensatory mitigation, all of these are factors in protecting and maintaining wetland functions and values. This section of the report discusses the functions and values provided by wetlands and information regarding their identification, classification/characterization, and protection and management.

4.1 FUNCTIONS AND VALUES

4.1.1 Functions in General

Wetland functions are the interactions between the structural components of the wetland, and the physical, chemical, and biological processes within the wetland and surrounding landscape (Sheldon et al. 2005). Because wetlands provide functions at many scales, from the microscopic to watershed level, functions are generally grouped into one of three categories: biochemical, hydrologic, and habitat functions. Not all wetlands provide the same level of functions, and most functions are dependent on a number of factors that include the presence and kind of vegetation, soil type, water regime and residence time of water, and position within the landscape. Additionally, the value of an individual wetland may differ from another because of external factors, such as the presence of nearby contaminant sources (e.g., agricultural practices), runoff from adjacent impervious surfaces, proximity to resident and anadromous fish-bearing streams, precipitation patterns, likelihood of flooding, and/or changes in regional climate conditions. The following sections provide a broad overview of the functions provided by wetlands, and examples of the value of these functions to society. The discussion is not exhaustive but is meant to show representative examples of the findings of existing science regarding the functions provided by wetlands (Sheldon et al. 2005).

4.1.2 Biochemical Functions

Biochemical functions include nutrient cycling, removal and retention of metal and toxic organic compounds, and sediment stabilization, among others. Water quality can be impaired by the presence of contaminants, including sediments, phosphorous, metals and organic compounds, and/or pathogens. As discussed in Ecology's *Wetlands in Washington State Volume 1 – A Synthesis of the Science* (Sheldon et al. 2005), wetlands improve water quality by promoting sedimentation, absorbing and precipitating contaminants, biodegrading contaminants by supporting microbes that break them down, removing nitrogen through nitrification and denitrification processes, and helping retain and remove pathogens by detaining water and aiding microorganisms that feed on bacteria. These natural processes provide water quality protection that reduces society's dependency on water quality treatment facilities,

protect local resources such as fish stocks that may be impaired by contaminated water, and help promote the health and safety of communities by limiting the presence of pathogens, metals, and toxic organic compounds in the drinking water that is provided by groundwater and surface water resources (Sheldon et al. 2005).

4.1.3 Hydrologic Functions

The hydrologic functions provided by wetlands include flood attenuation, groundwater recharge, decreased downstream erosion, and reduction in peak flows, among others. The hydrologic functions of wetlands are related to their ability to retain more surface water than terrestrial habitats; the many wetlands across a watershed retain and gradually release runoff and surface water that would otherwise flow directly into surface waters (Adamus et al. 1991, *in* Sheldon et al. 2005). While these functions are associated with water storage, an individual wetland's ability to store surface or subsurface water is additionally influenced by a number of factors, including the wetland's location within the landscape, soils and vegetation, and the type or class of the wetland (Sheldon et al. 2005). These functions can contribute to the long-term health, safety and financial benefits to downstream communities; for example, wetlands in floodplains dissipate the erosive forces of flood waters, and can store large volumes of surface water; these functions act to protect downstream communities from flooding events, and channel migration, and minimize damage to structures and other assets such as cropland.

4.1.4 Habitat Functions

Wetlands provide habitats for various species, including species that are dependent on wetland habitat for their entire life cycle, species that rely on wetlands for a single life stage, and species that use wetlands on occasion, such as for drinking water, or as a stopover point during migration (Johnson and O'Neil 2001). Wetlands support anadromous and resident fish, reptiles and amphibians, waterfowl and migratory birds, and terrestrial species, as well as a variety of aquatic invertebrates and microorganisms. The use of a wetland by any specific animal or group of animals depends on factors that include hydrologic regime, structure and complexity of vegetation, proximity to other habitat, climate/seasonality, and topography, among others (Adamus et al. 1991, Mitsch and Gosselink 2000). Many of the species that rely on wetlands for all or part of their life cycle have unique societal and cultural values. For example, wetlands provide juvenile rearing habitat for salmon, and they provide habitat for waterfowl that are valued for recreation (e.g., birding and hunting). Wetlands supply habitat for protected species, such as migratory birds, WDFW priority species, and state and federally listed threatened and endangered species.

4.1.5 Carbon Sequestration Functions

According to RCW 70A.45.010, carbon sequestration is defined as the process of capturing and storing atmospheric carbon dioxide through biologic, chemical, geologic, or physical processes. Wetlands are known to be some of the largest stores of carbon on the planet (USGCRP 2018). Wetland soils are anoxic (oxygen-poor), and therefore slow decomposition and lead to the accumulation of organic matter (Nahlik and Fennessy 2016). The amount of carbon storage depends upon wetland

type and size, vegetation, the depth of wetland soils, groundwater and nutrient levels, pH, and other factors. Wetland soils also store carbon that flows in from upland areas, through soil erosion or movement of vegetative debris (Kusler and Christie 2011). Climate modeling has shown a potential favorable ratio of greenhouse gas production to sequestration in future climate change scenarios, meaning wetlands could become an even greater carbon sink than during current conditions. Global warming may affect the period of time it takes a wetland to become a net sink, but may also increase the amount of sequestered carbon significantly depending on local climate conditions (Mitsch et al. 2013). However, disturbed or warmed wetlands typically release greenhouse gases that contribute the most to global warming (i.e., carbon dioxide, methane, and nitrous oxide) (Mitsch et al. 2013).

4.1.6 Impacts

Disturbances to wetlands and the functions they provide can occur at several geographic scales, and can be created by and depend on a variety of land uses, the land use intensity/severity, and the scale at which the disturbance occurs (Sheldon et al. 2005). Disturbances include vegetation removal and increased impervious surfaces, agricultural practices, logging and development, and other activities that alter natural drainage patterns, fill wetlands, and increase inputs of pollutants. Each of these disturbances may affect the functions and values of wetlands by increasing water volume and flow rates after storm events; increasing sediment and other pollutants in runoff; contributing to habitat fragmentation; increasing erosion, and/or reducing biodiversity (Sheldon et al. 2005).

Protecting wetland resources entails the regulation of direct and indirect impacts to wetlands and should be guided by BAS. Direct wetland impacts are activities that include filling, draining, or adversely impacting the vegetation within a wetland. Indirect impacts result from changes to the surrounding landscape that negatively influence the physical, chemical, or biological characteristics of a wetland, such as its hydroperiod, microclimate or habitat connectivity, for example (McMillan 2000).

4.2 IDENTIFICATION AND CLASSIFICATION

Section 365-190-090 of the WAC and RCW 36.70A.030 define wetlands as,

... areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands do not include those artificial wetlands intentionally created from non-wetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after 1 July 1990, that were unintentionally created as a result of the construction of a road, street, or highway. Wetlands may include those artificial wetlands intentionally created from non-wetland areas to mitigate the conversion of wetlands.

To address regional wetland characteristics and improve the accuracy of wetland delineations, the USACE issued regional supplements to its wetland delineation manual (1987) on which the state manual is based. Therefore, current wetland methodology is based on the USACE manual and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Version 2.0) (regional supplement) (USACE 2010). The USACE manual provides the methodology for identifying jurisdictional wetlands based on an examination of vegetation, soils, and hydrology. Vancouver's CAO references the "approved federal wetland delineation manual and applicable regional supplements but does not specifically reference the manual and supplement by name (see VMC 20.740.120).

WAC 365-190-090 also indicates that when designating wetlands, counties and cities should use a rating system that evaluates the existing wetland functions and values to determine what functions must be protected, and, when developing wetland rating systems, jurisdictions should consider using the wetland rating system developed jointly by Ecology and the USACE. Ecology's *Wetland Rating System for Western Washington* (Hruby 2014) is the most commonly used and regionally accepted wetland classification system, and categorizes wetlands based on their specific attributes, including rarity, sensitivity, and the functions they provide. To identify and classify wetlands, the system incorporates other classification systems, including the hydrogeomorphic classification and classification of plant communities (Cowardin et al. 1979), as well as classification based on special characteristics. As described in the Ecology guidance, the rating system was designed to "differentiate between wetlands based on their sensitivity to disturbance, their significance, their rarity, our ability to replace them, and the functions they provide" (Hruby 2014). The intent of the system is to provide a basis for developing standards to protect and manage wetlands. Vancouver's CAO uses the *Wetland Rating System for Western Washington* (Hruby 2014) in compliance with WAC 365-190-090.

4.3 BEST AVAILABLE SCIENCE FOR WETLAND PROTECTION

The protection of the functions and values provided by wetlands is generally recognized as achievable (in part) by using protective wetland buffers. Buffers are vegetated areas adjacent to an aquatic resource (a wetland for purposes of this discussion) that can, through various processes, reduce the impacts of adjacent land uses (Sheldon et al. 2005). Functions provided by buffers include removing sediments, excess nutrients, and toxics; influencing the microclimate; maintaining habitat connectivity; and minimizing adjacent disturbances. The effectiveness of buffers to protect wetland functions and values is generally related to the type of wetland function to be protected, the activities that are being buffered, and the characteristics of both the wetland and its associated buffer. For example, differing widths for effective buffers for water quality protection, and habitat for a specific species have been documented. Additionally, different buffer widths to protect a similar function may be necessary depending on the stressors associated with the different wetlands that provide the function. Generally, the characteristics that most influence buffer functions include vegetation, slope of the buffer, the soils, and the

width of the buffer; of these, just vegetation and buffer width can be manipulated or controlled easily (Sheldon et al. 2005).

It is generally accepted that the width of a buffer should be related to the wetland functions that need protecting, the intensity of the adjacent land use, and the condition of the adjacent buffer. While the BAS states unanimously that buffers are effective in protecting wetlands functions and values, there is significant debate about how much buffer is necessary to protect particular functions. In order to protect the ecological functions and values of wetlands, it is necessary for regulators to consider a number of ecological principles, and their implications for development and the use of natural resources. These principals include factors such as temporal and spatial functions of ecological processes and implications of development, direct and cumulative impacts, and the type, intensity, and duration of impacts to natural resources.

As stated in Ecology's *Wetlands in Washington State Volume 2 – Protecting and Managing Wetlands* (Granger et al. 2005),

[a]uthors who synthesized the literature on the effectiveness of buffer widths suggest buffers between 25 and 75 feet for wetlands with minimal wildlife habitat functions and adjacent low-intensity land uses; 50 to 150 feet for wetlands with moderate habitat functions or adjacent high-intensity land uses; and 150 to 300 feet for wetlands with high habitat functions. Effective buffer widths for protecting water quality ranged from 25 to 50 feet for 60 percent removal of pollutants, to 150 to 200 feet for 80 percent removal of pollutants.

Ecology suggests assessing the potential risk to wetlands as a result of development and the amount of risk that is acceptable; this risk assessment can offer a local jurisdiction insight on appropriate protective measures for implementation (Granger et al. 2005). This means that regulations implementing larger, rather than smaller, buffers around all wetlands would be characterized as lower risk for preserving functions and values, whereas a jurisdiction that implements narrower buffers would have a higher risk of impacting functions and values, and the narrower buffers would be unlikely to provide all of the functions necessary to protect wetlands.

In October 2022, Ecology released new guidance offering three different approaches to establishing protective buffers. Buffer Option 1 offers the most flexibility in buffer widths based on the wetland category, level of impacts from adjacent land uses, and the functions of the wetland (i.e., habitat, special characteristics, etc.), and offers opportunities for buffer reductions (Ecology 2022b). Buffer Option 2 established buffer widths based on wetland category and the existing or proposed adjacent land use, with no options for buffer averaging or reductions. Buffer Option 3 includes fixed buffer widths based solely on the wetland category with no opportunity for buffer reductions or averaging. These three options offer local jurisdictions different approaches with different risk tolerances to choose from when developing or updating their critical areas ordinances.

4.4 SCIENCE OF IMPACTS AND MITIGATION

When a change in land use has the potential to adversely affect a wetland, regulatory agencies require the applicant to conduct wetland mitigation, as part of a national “no net loss” policy toward protecting wetlands. “No net loss of wetland functions and values” is a federal and state policy goal that emerged in 1989 and has been a mainstay of land use regulations since then (National Research Council [NRC] 2001). To date, the no net loss policy has been interpreted to mean that wetlands should be conserved wherever possible, and that wetlands converted to other uses must be offset through compensatory mitigation to provide the same functions and values that have been lost (NRC 2001). As described in the 1990 Memorandum of Agreement between the U.S. Environmental Protection Agency (EPA) and the USACE (EPA and USACE 1990), the mitigation sequence is a three-step sequence that helps guide decisions and to determine the type and level of mitigation required under Clean Water Act Section 404/401 Regulations. The Washington SEPA (Chapter 43-21C RCW), administered by Ecology, also requires that a sequence of actions be taken for proposals that will impact wetlands (mitigation sequence). The following are the steps in the mitigation sequence according to the implementing rules of SEPA (Chapter 197-11-768 WAC):

- Avoiding the impact altogether by not taking a certain action or parts of an action;
- Minimizing impacts by limiting the degree or magnitude of the impacts;
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;
- Compensating for the impact by replacing, enhancing, or providing substitute resources or environments; and/or
- Monitoring the impact and taking appropriate corrective measures.

If, through mitigation sequencing, it is determined that compensatory mitigation is necessary, an applicant has several alternatives for how to approach compensation. The alternatives, reviewed and described by Ecology et al. (2021), are prioritized as follows:

- Mitigation bank credits: Allows applicants to compensate for wetland loss by purchasing credits from a bank that is commissioned to restore, create, enhance, or preserve wetland areas in providing compensatory mitigation for authorized impacts to wetlands.
- In-lieu fee program credits: Allows applicants to compensate for wetland losses by paying a fee to a third party, such as a government agency or conservation organization, where the fee is used to ensure wetland protection, creation, and enhancement of wetlands.
- Permittee-responsible mitigation (PRM) under a watershed approach.

- PRM that is on site and in-kind.
- PRM that is off site and/or out-of-kind.

PRM includes the following approaches:

- Restoration: Re-establishment of wetland conditions where they formerly, but no longer, exist.
- Creation: Establishment of wetland conditions in a location where wetland conditions previously did not exist or that has not been a wetland within the last 100 to 200 years.
- Enhancement/Exchange: Modifying a specific structural feature of an existing degraded wetland to improve one or more functions based on management objectives.
- Preservation: Protection of an existing and well-functioning wetland from perspective future development threats.
- Mixed Compensatory Mitigation: Involves more than one of the listed types of compensatory mitigation.

Additionally, Ecology adopted an approach for estimating the functions lost when a wetland is altered, and to estimate the gain in functions that may result from restoration, creation, enhancement, and/or preservation (Hruby 2011). This methodology estimates the type and area of compensation to be provided based on functions of the wetland being altered (i.e., debits) and the amount the proposed compensatory mitigation will create (i.e., credits). The guidance establishes that the proposed compensatory mitigation is acceptable when the “credit” score for the mitigation project is higher than the “debit” score for the impacted wetland (Hruby 2011)

As a result of failure of many previous mitigation projects, USACE, Ecology, and some Washington jurisdictions are encouraging the use of mitigation banks and in-lieu fee programs because these can offer greater assurance for mitigation success to both the applicant and the jurisdiction (USACE and EPA 2008; Ecology 2009).

4.5 SUMMARY EVALUATION OF EXISTING ORDINANCE AND RECOMMENDATIONS

To maintain consistency with state and federal wetland delineation methods, the City should adopt the latest federal wetland delineation manual and its supplements for use in delineating wetlands. This is not expected to change the outcome of wetland delineation efforts within the City, as state and federal regulators already require this methodology to determine wetland boundaries.

Additionally, to be consistent with state and federal guidance on the use of mitigation banks and in-lieu fee programs for compensatory mitigation, the City should update the mitigation code section (VMC 20.740.140[C][2]) to reflect this preference. This is

not expected to change the options available to applicants but to clarify the preference for banks and in-lieu fee programs over permittee-responsible options that have not shown a high likelihood of success.

Finally, to be consistent with state wetland protection guidance, the City should update the code to reflect recent guidance published by Ecology in October 2022. . The recent guidance includes the following additional recommendations that should be included in the updated code:

- Reformatted buffer tables, including the incorporation of previous adjustments to the range of habitat scores based on review of the referenced wetland data used to calibrate the Washington wetland rating system
- Updated and expanded minimization measures table for use with the buffer tables
- Functionally disconnected buffers
- Clarified corridor requirements and expanded applicability
- Clarified geographic scope of exemption guidance for small wetlands
- Recommendations from the 2021 interagency wetland mitigation guidance document
- Updated definitions
- New language addressing the role of wetland functions in mitigating climate change (e.g., carbon sequestration)

These updates may have some changes on how wetlands are protected with buffers and the ability to reduce buffers based on the new guidance.

5.0 CRITICAL AQUIFER RECHARGE AREAS

The GMA requires the protection of public groundwater drinking supplies. The supply of public drinking water depends on the availability of groundwater, and without replenishment, the amount of water in aquifers can be diminished or even depleted (Ecology 2021a). CARAs are “areas with a critical recharging effect on aquifers used for potable water where an aquifer that is a source of drinking water is vulnerable to contamination that would affect the potability of the water” (WAC Chapter 365-190). By protecting CARAs, a community can focus its efforts and resources on protecting the most critical groundwater drinking supplies.

CARAs are regulated by Section 14.26 of the VMC.

5.1 FUNCTIONS AND VALUES

Regulating CARAs protects public drinking water from contamination by hazardous materials and waterborne pathogens, helps ensure the future availability of groundwater, and is less expensive than post-contamination cleanup or treatment of groundwater. Studies have shown that funding initiatives to protect groundwater is more cost-effective than cleaning up groundwater after contamination occurs (Ecology 2021a). Contaminated public drinking water can cause illness, bring about the ingestion of chemicals or other harmful substances, and incur costs as new wells must be developed or contaminated soils and/or groundwater must be remediated (Ecology 2021a).

5.2 IDENTIFICATION AND CLASSIFICATION

The Washington State Department of Health (DOH) regulates and maps drinking water wells. CARAs recommended for protection by WAC 365-190-100 include:

- **Wellhead Protection Areas:** These areas are defined as “the boundaries of the 10-year time of groundwater travel”. Clark County Maps Online maps wellhead locations based on information from DOH and the 1-, 5-, and 10-year time of travel zones around these wellheads. Time-of-travel zone information comes from DOH’s Source Water Assessment Program mapping tool.
- **Sole Source Aquifers:** These areas are designated by the EPA pursuant to the Federal Safe Drinking Water Act. Nearly all of Clark County and the city of Vancouver are located within the Troutdale Sole Source Aquifer (EPA 2006).
- **Susceptible Groundwater Management Areas:** These areas are designated as moderately or highly vulnerable or susceptible in an adopted groundwater management program developed pursuant to WAC Chapter 173-100. There is no adopted groundwater management program for Vancouver or mapped groundwater management areas in the city.
- **Special Protection Areas:** These areas are defined by WAC 173-200-090 and designated by Ecology. There are special protection areas currently mapped for Vancouver.
- **Moderately or Highly Vulnerable Recharge Areas:** These areas are moderately or highly vulnerable to degradation or depletion because of hydrogeologic characteristics as delineated in a hydrogeologic study. These areas are not mapped.

CARAs are identified by their vulnerability. Vulnerability is the combination of hydrogeological susceptibility (the high potential for surface recharge and infiltration in CARAs due to the permeability of the soil around them) and the potential of contamination sources based on an analysis of existing land uses. Clark County designates Municipal Wellhead Protection Areas shown on Clark County MapsOnline that indicate different zones that estimate the time it would take for a pollutant release to reach the wellhead area. Vancouver’s CAO designates Special Protection Areas within CARAs as those within 1,900 feet of any municipal wellheads. These areas are mapped by Clark County MapsOnline.

5.3 BEST AVAILABLE SCIENCE FOR CARAS

BAS for protecting CARAs recommends addressing both recharge and discharge areas. Aquifer recharge occurs where stormwater, irrigation water, and other water infiltrates into the ground. Using resources and land in various ways can impact aquifer recharge areas; some examples of risks include the contamination of CARAs by hazardous materials or reducing recharging effects by increasing impervious surfaces. Discharge areas are locations where groundwater flows from the surface such as a spring, wetland, or well. Discharge areas are typically protected by other critical areas regulations such as wetland and riparian area requirements.

BAS recommends protecting public groundwater by limiting potential contamination risks within CARAs and promoting land use and development standards that maintain groundwater quality, withdrawals and recharge. In order to support the adequate recharge of its aquifers, a municipality can limit impervious surfaces, encourage low impact development, and use other stormwater best management practices (BMPs) such as raingardens. A commonly used resource for identifying BMPs that will protect groundwater recharge and water quality is the *Stormwater Management Manual for Western Washington* (Ecology 2019).

Some land use activities have been identified as high risk for groundwater contamination, and jurisdictions should consider prohibiting these uses within priority CARAs or requiring strict pollution prevention requirements to further mitigate potential risks. BAS also recommends the identification and monitoring of existing high-risk uses within CARAs. Examples of high-risk uses in CARAs include landfills, wood treatment facilities, chrome platers, tank farms, and facilities that treat, store, or dispose of hazardous waste (Ecology 2021a).

Other uses may present a moderate or low risk of contamination within a CARA, and can be permitted as conditional uses, provided that they meet BMPs and other requirements to ensure protection of the CARA.

Groundwater wells and construction of groundwater wells are potential conduits that could connect the aquifer with potential overlying contaminants. Well construction standards in WAC 246-290 and 246-291 are intended to help reduce the risk of contamination. However, many wells were installed prior to adoption of well construction standards. Jurisdictions often distinguish between Group A and Group B wells as defined by the Washington Department of Health. Group A wells are “water systems providing service to 15 or more service connections used by year-round residents for 180 or more days within a calendar year regardless of the number of people, or regularly serving at least 25 year-round residents for more than 180 days per year.” Group B water systems serve less than 15 service connections and less than 25 people per day or 25 or more people per day during fewer than 180 days per calendar year. (WAC 246-290-020). Both types of wells have the potential to act as conduits and, therefore, the City of Vancouver should consider regulating, not only Group A wells, but also Group B wells.

5.3.1 Science of Impacts and Mitigation

Protection of water supply well heads in a sole-source aquifer is of primary importance to the City of Vancouver. Designation of CARAs is intended to protect the water supply by adopting and enforcing regulations that are supported by science-based mitigation measures. Potential releases of pollutants can infiltrate into the ground and ultimately to groundwater where they can then travel with the groundwater. Where contaminated groundwater is withdrawn from supply wells, these wells may require treatment to remove pollutants or reduce them to non-hazardous levels. The science behind wellhead protection areas considers the path from surface release to wellhead and aims to identify specific sensitive areas that can

be protected with appropriate land-use controls to minimize potential future contamination and costs related to treatment.

The groundwater management areas and program requirements cited in WAC 173-100 should be considered in Vancouver's municipal code revisions. The WAC includes additional detailed elements that provide a more comprehensive technical characterization of groundwater resources and how they are managed. As an example, elements pertaining to groundwater quality, wellhead protection areas, and groundwater quantity evaluations within a coordinated program would likely add value to the City's water resources protection and management.

5.4 SUMMARY EVALUATION OF EXISTING ORDINANCE AND RECOMMENDATIONS

The current Special Wellhead Protection Areas designated by the City (VMC 14.26.115[B][2]). are solely based on the 1,900-foot radius around a production well. While groundwater flow in the immediate vicinity of the well may be primarily circular, and thus support a radius-based zone, the science suggests that larger areas upgradient of a wellhead will be more capable of bringing contaminated groundwater to a well than an equal distance downgradient of the wellhead. This is shown by the Clark County maps that represent different "residence" time zones for groundwater travel to a wellhead. These expanded wellhead protection zones should be based on state of the practice groundwater flow modelling to establish the radius of wellhead "capture zones" that should provide better, more science-based protection zones than a standard 1,900-foot radius. It is recommended that Special Protection area boundaries be modified to reflect physical processes that are involved with groundwater infiltration and potential contamination, similar to what has been done for Clark County.

Designations of CARAs should be reconciled with those listed in WAC 365-190-100.

The City should consider regulating Group B wells in addition to Group A wells. Once draft regulations are developed, the City should look use test case reviews to determine that regulations are effective and tailored to meet the City's objectives and BAS standards.

6.0 GEOLOGICALLY HAZARDOUS AREAS

6.1 FUNCTIONS AND VALUES

The GMA recognizes four main types of geologic hazards: landslide hazard areas, erosion hazard areas, seismic hazard areas, and areas subject to other geologic events such as coal mine hazards and volcanic hazards. All of these geologic events are risks to human health and safety and can damage property. Managing geologically hazardous areas is necessary to ensure the safety and wellbeing of city residents, and to prevent avoidable damage and/or loss of public and private property. In addition, according to the Washington Department of Commerce, "geologically hazardous areas also have an important function in maintaining habitat integrity." Geologic processes, including mass wasting events, such as landslides and debris flows,

contribute needed sediment and wood for building complex instream habitats, estuarine marshes, and beaches important for fisheries, wildlife, and recreation.” (Commerce 2021) The section below addresses the BAS for designating and mapping geologically hazardous critical areas in the interests of human health, structural safety, and the contributions of these areas to the natural environment.

6.2 IDENTIFICATION AND CLASSIFICATION

The DNR website “Geologic Hazards and the Environment” provides information and maps of seismic hazards, landslides, and erosion hazards and is an important BAS mapping source. DNR’s Geologic Information Portal is a BAS information source for mapping landslide, seismic, and erosion hazards. Erosion hazards are also mapped by corresponding soil type through the USDA-NRCS online web soil survey of Clark County. Geologic hazards are also commonly identified through site-specific geologic or geotechnical engineering studies where agency-produced hazard mapping is insufficient.

The city landscape has various environments susceptible to geologic hazards as noted in Section 2.0 of this report; many of these areas are also subject to erosion hazards (see the Geologically Hazardous critical areas map in Appendix A). Seismic hazard areas are also discussed below, and coal mine and volcanic hazards do not exist within Vancouver.

6.3 BEST AVAILABLE SCIENCE FOR LANDSLIDE HAZARDS

According to DNR, “Washington is one of the most landslide-prone states in the country, with hundreds to thousands of events each year” (DNR 2021a). Landslides are mass wasting events with soil and rock moving downslope and are more frequent after precipitation events when ground becomes saturated and soil loses its strength. Gravity, water, and friction all play a role in landslides. There are many different types of landslides, but slides generally fall into two categories: shallow and deep-seated (DNR 2021a). Literature tends to focus on how to categorize and map these hazards. DNR’s Division of Geology and Earth Resources recently completed landslide hazard mapping in the Columbia River Gorge and this data is available on DNR’s Geologic Information Portal website and is considered BAS for designation of landslides in the city in the absence of site-specific studies. These mapped features are located east of Vancouver.

Site-specific geotechnical studies with a delineation of landslide hazards and recommended mitigation measures for building in and/or near these areas are considered BAS based on the criteria in WAC 365-195-905. The literature contains mitigation measures and best practices for site development near landslide hazards. According to the USGS, “the simplest means of dealing with landslide hazards is to avoid construction on steep slopes and existing landslides; however, this is not always practical” (Highland and Brobrowsky 2008). The USGS recommends other mitigation, including slope stabilization, by channeling drainage away from the landslide, draining groundwater away from the landslide, minimizing surface irrigation, using retaining walls, retaining/planting vegetation, and seeking professional advice (Highland and Brobrowsky 2008). Burns and Mickelson (2012)

recommends a buffer from the top of shallow landslide-prone slopes equal to twice the vertical height of the slope for high or moderate susceptibility landslide areas or an average of 30 feet.

6.3.1 Science of Impacts and Mitigation

Slope instability is attributable to natural and man-made causes. While large geologically controlled landslides are found further up the Columbia River valley, these types of large landslides are not typically found within the Vancouver city limits. The types of landslides that may occur in the city are smaller slope failures associated with over-steepened slopes along rivers, streams or bluff edges. While these areas of instability may not be extensive, local mitigation activities can be implemented to minimize the potential damages associated with them, similar to erosion hazards.

6.4 SUMMARY EVALUATION OF EXISTING ORDINANCE AND RECOMMENDATIONS

The City should update the landslide hazard areas section of their development code based on the current WAC definitions. VMC 20.740.130(A)(1) currently lists indicators for potential landslide hazard areas in the City and are not entirely inclusive or current with the State-defined indicators. This section of the VMC should be revised to directly define and reference the definition of landslide hazard areas pursuant WAC 365-190-120(6).

Potentially unstable slopes will typically coincide with areas of soil erosion hazards within the city of Vancouver. Grading, construction, or slope erosion mitigation activities in these areas should include consultation of a licensed engineering geologist to help ensure that the potential for instability has been appropriately evaluated and mitigation measures appropriately designed and established. The City should consider including BMPs in its code for landslide hazard areas. If applicants implement these BMPs, then they could avoid filing a critical areas report.

6.5 BEST AVAILABLE SCIENCE FOR EROSION HAZARDS

Erosion is “the wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep” (Washington State Department of Transportation [WSDOT] 2021). The 1972 USDA-NRCS soil survey of Clark County classifies the erosion potential of soil types as slight, moderate, severe, and very severe. According to “Understanding Soil Risks and Hazards, Using Soil to Survey to Identify Areas with Risks and Hazards to Human Life and Property,”

...construction activities can have serious detrimental effects on the soil on construction sites. Topsoil removal, grading, and filling drastically reduce soil quality on these sites, resulting in long-term adverse impacts on plant growth and runoff. Removal of topsoil inhibits biological activity and reduces the supply of organic matter and plant nutrients ... Erosion from construction sites has offsite environmental and economic impacts. (USDA-NRCS 2004). Further, the VMC Chapter 14.24 meets BAS regarding avoidance and mitigation of erosion activities.

The 1972 soil survey is considered BAS for erosion hazards generally in the city and the county. The geography of erosion hazard areas in Vancouver is noted in Section 2.0 of this report. Soils rated by USDA-NRCS as “severe” or “very severe” are those with an erodibility index of 0.75 or greater and, in most jurisdictions across the state, are classified as regulated critical areas. In addition to the 1972 soil survey, Clark County MapsOnline also includes a Severe Erosion Hazards Area map that should also be considered BAS. BMPs for development or alteration in erosion hazard areas tend to focus not on prohibiting development, but on requiring erosion controls during construction, eliminating clearing activities during the wet season, and directing the drainage around these areas so as not to exacerbate pre-existing erosion potential. Ecology’s *Stormwater Management Manual for Western Washington* (Ecology 2019) is considered a BAS document for erosion control methods. In “Understanding Soil Risks and Hazards,” which is considered to be BAS, USDA-NRCS recommends the following erosion control techniques during construction:

- Divide the project into smaller phases, clearing smaller areas of vegetation.
- Schedule excavation during low-rainfall periods when possible.
- Fit development to the terrain.
- Excavate immediately before construction instead of exposing the soil for months or years.
- Cover disturbed soils with vegetation or mulch as soon as possible and thus reduce hazard of erosion.
- Divert water from disturbed areas.
- Control concentrated flow and runoff, thus reducing the volume and velocity of water from work sites and preventing the formation of rills and gullies.
- Minimize the length and gradient of slopes (e.g., use bench terraces).
- Prevent the movement of sediment to off-site areas.
- Inspect and maintain all structural control measures.
- Install windbreaks to control wind erosion.
- Avoid soil compaction by restricting the use of trucks and heavy equipment to limited areas.
- Break up or till compacted soils prior to vegetating or placing sod.
- Avoid dumping excess concrete or washing trucks on site.
- Revegetate exposed surfaces to provide immediate permanent or intermittent cover.

6.5.1 Science of Impacts and Mitigation

Erosion hazard impacts include unstable slopes that may threaten structures, as well as potentially excessive sediment contributions to surface waters of the City.

Mitigation of these impacts can be addressed with BMPs outlined above, as well as preventing activities that over-steepen slopes that can contribute to slope instability and threaten infrastructure installations.

6.6 SUMMARY EVALUATION OF EXISTING ORDINANCE AND RECOMMENDATIONS

For construction or development work that is performed in erosion hazard areas, it is recommended that erosion mitigation work to be performed by a certified erosion and sediment control lead in accordance with Ecology requirements.

Additional structure for the regulations could be added to link to WAC 220-660-120 and 220-660-130 to expand BAS for erosion protection.

The City should consider including BMPs in its code for erosion hazard areas. If applicants implement these BMPs, then they could avoid filing a critical areas report.

6.7 BEST AVAILABLE SCIENCE FOR SEISMIC HAZARDS

Earthquakes can be incredibly expensive and destructive natural hazard events that can level buildings and damage public infrastructure. According to DNR, “Washington has the second highest risk of large and damaging earthquakes in the nation as a result of its geologic setting” (DNR 2021b). WAC 365-190-120 defines seismic hazards as geologically hazardous areas and requires that jurisdictions adopt CAOs regulating development in them. This same WAC section defines seismic hazard areas as “areas subject to a severe risk of damage as a result of earthquake induced ground shaking, slope failure, settlement or subsidence, soil liquefaction, surface faulting or tsunamis.”

According to USGS, “ground shaking or ground motion is the movement of the earth’s surface due to earthquakes and is produced by seismic waves that are generated by sudden slip on a fault and travel through the earth and along its surface” (USGS 2021). Ground shaking is the most frequently observed effect of an earthquake. The degree of ground shaking will depend on the geologic conditions and soil types for a given area. The NEHRP has delineated “site classes” to characterize the degree of shaking and or amplification that can occur in response to an earthquake. Clark County MapsOnline includes a map of NEHRP site class for Vancouver that should be considered BAS for seismic design to mitigate earthquake effects. Generally the City is dominated by Site Classes C and D, with areas around drainages and Vancouver Lake including areas with more severe site classes of D and E.

The USGS defines liquefaction as “the phenomenon that occurs when loose, saturated sediments at or near the ground surface lose their strength in response to strong ground shaking from an earthquake” (USGS 2021). Clark County MapsOnline includes a map of Liquefaction Susceptibility that should be considered BAS for Vancouver. Throughout most of Vancouver, the liquefaction susceptibility is low to very low; however, a susceptibility of moderate to high has been mapped around the Vancouver Lake area, as well as low lying areas adjacent to the Columbia River.

Further some areas with higher groundwater levels associated with surface streams also indicate a liquefaction susceptibility of low to moderate.

DNR's Washington Geologic Survey and its Geologic Information Portal have online map information for active faults, seismic scenarios, and liquefaction susceptibility that is considered to be BAS for seismic hazards. Clark County MapsOnline shows faults running southeast to northwest on the east side of the city that appear to be associated with the Lacamas Fault zone aligned slightly further east through Lacamas Lake. The design level earthquake in the city is a Cascadia Subduction Zone earthquake, which would have strong shaking intensity.

The following documents represent BAS for earthquake design:

- NEHRP Recommended Seismic Provisions for New Buildings and Other Structures (FEMA 2020)
- Minimum Design Loads for Buildings and Other Structures, American Society of Civil Engineers (ASCE) 7 (2016 ASCE-7 Standard) (ASCE 2016)
- 2018 International Building Code (International Code Council 2018)

6.7.1 Science of Impacts and Mitigation

Mitigation of ground shaking due to seismic events requires recognition of the appropriate site class for a given site, as well as appropriate construction standards and seismic design considerations. Use of appropriate construction methods that consider the earthquake hazards and site response will minimize potential impacts from earthquake events.

6.8 SUMMARY EVALUATION OF EXISTING ORDINANCE AND RECOMMENDATIONS

Soft-story structures that possess little structural shear resistance on lower levels of a building are specifically recognized as susceptible to severe damage from a seismic event. Many municipalities have implemented soft-story seismic retrofit ordinances to address these risks and help mitigate earthquake-related structural damage.

Seismic shaking hazards (VMC 20.740.130[A][2][b]) for the city should be amended to add Site Class E as areas around Vancouver Lake are appropriately categorized and thus should also be amended for liquefaction areas of moderate to high and above (VMC 20.740.130[A][2][a][1]).

7.0 FREQUENTLY FLOODED AREAS

7.1 FUNCTIONS AND VALUES

Good management of frequently flooded areas can protect downstream areas and reduce the risk of flooding to public safety and property. In addition, floodplains also provide valuable instream and off-channel habitat to a variety of species and are important for water quality protection. Floodplains enhance biological productivity and help maintain biodiversity and the ecological value of ecosystems (FEMA 2007).

7.2 IDENTIFICATION AND CLASSIFICATION

Frequently flooded areas are defined as areas that will be inundated by a flood event having a 1 percent chance of being equaled or exceeded in any given year. The 1 percent annual chance flood is also referred to as the base flood or 100-year flood. In Washington, jurisdictions are required to regulate the 100-year floodplain as a critical area, at a minimum, but may also optionally regulate other areas, including channel migration zones, areas inundated by the flood of record, areas subject to groundwater flooding, or streams where the path of flood waters can be unpredictable (Ecology 2021b).

As part of its continuing effort to improve floodplain management practices, FEMA encourages communities to steer development away from the floodplains documented in flood insurance rate map (FIRM) panels. FIRM panels are official maps of communities in which FEMA has delineated special flood hazard areas (SFHAs) and the risk premium zones applicable to the community. As the impacts of climate change become more prevalent, floods are expected to become more frequent. Revised FIRMs and the Flood Insurance Study for Clark County became effective September 5, 2012 and revised maps for properties along the Washougal River, Little Washougal River, and behind the Port of Camas-Washougal's levee on the Columbia River became effective January 19, 2018 (Clark County Public Works 2021). Flood hazard areas within Vancouver include those referenced in Section 2.0 of this report.

7.3 BEST AVAILABLE SCIENCE FOR FREQUENTLY FLOODED AREAS

Development within floodplains has always been popular because humans want to live near water and use it for recreation and commercial and industrial purposes. However, development within a floodplain results in a problematic cycle, as development alters the natural flow and drainage patterns of the floodplain, and the development is in turn damaged by flooding in the altered floodplain (FEMA 2007).

Developing or updating frequently flooded areas ordinances can be an opportunity to promote flood safety and protect ecological habitat through locally appropriate standards (Ecology et al. 2021). The fundamental floodplain management program that most ordinances are built on is FEMA's National Flood Insurance Program (NFIP). FEMA manages NFIP in order to provide disaster assistance for properties subject to flood damage. The minimum requirements of the NFIP protect the health, safety, and welfare of the community by protecting buildings from the 100-year flood, which FEMA refers to as SFHAs.

FEMA encourages communities to use the FEMA elevation certificate as an official record showing that new buildings and substantial improvements in all identified SFHAs have been properly elevated. This elevation information is also needed to show compliance with the floodplain management ordinance and can be used by the property owner to obtain flood insurance.

Limiting development within floodplains reduces the need for "structural solutions," which are both expensive and disruptive to the local environment (Association of State Floodplain Managers, Inc. [ASFPM] 1993). BAS recommends limiting all

development within floodplains (including grading and fill) and prohibiting new residential development. Repairs, reconstruction, or improvements to an existing structure within the floodplain may be allowed, but consideration should be given to the design and structural integrity of these improvements.

The BAS for development within floodplains is generally agreed upon as being the applicable flood resistant provisions of the 2021, 2018, 2015, 2012, and 2009 International Codes (I-Codes); the referenced standard ASCE 24, Flood Resistant Design and Construction; and NFIP requirements. FEMA has compiled the applicable I-Codes provisions into a single document, “Flood Resistant Provisions of the 2021 International Codes” (FEMA 2021). General recommendations for development within a floodplain include:

- For buildings located within more than one SFHA, the provisions associated with the most restrictive SFHA should apply.
- It should be demonstrated through hydrologic and hydraulic analyses performed by an accredited professional that the grading and/or fill will not result in any increase in flood levels.
- Grading and fill should not be approved unless fill is placed, compacted, and sloped to minimize shifting, slumping, and erosion during the rise and fall of flood water.
- Exterior walls extending below the base flood elevation should be constructed with flood-damage-resistant materials.
- The finished ground level of an under-floor space (e.g., a crawl space) should be equal to or higher than the outside finished ground level on one side or more.
- Anchoring to prevent flotation.
- Using flood-resistant construction materials and methods.
- Preventing infiltration of flood waters in utility systems.
- Elevating residential and nonresidential construction above the base flood elevation.

7.3.1 Science of Impacts and Mitigation

The most common types of direct human disturbance to floodplains are filling and clearing—often associated with residential development, agriculture, forest practices, or infrastructure improvements—and channelization. The combination of these activities often results in a disconnection of the channel from its floodplains. Floodplains can also be affected indirectly, through alterations of flow regime resulting from flow regulation (e.g., dams and reservoirs) and water withdrawals (e.g., irrigation). Climate change will also affect the flow regime, potentially exacerbating other types of human disturbance within floodplains (ESA 2014).

The BAS for development within floodplains encourages addressing floodplain development to promote flood safety and ecological habitat protection by developing

standards beyond the minimum NFIP requirements. The NFIP encourages such activities through the community rating system (CRS), which provides reduced flood insurance premiums in participating communities (FEMA 2010b, ASFPM 2016).

ASFPM's No Adverse Impact (NAI) floodplain management describes how a community's mitigation program can be augmented and improved (ASFPM 2016). It also identifies how communities can receive CRS credits for implementing NAI tools, which include:

- Flood Acquisition and Relocation Mitigation Projects
- Waterway Restoration through Dam Removal
- Nonstructural Erosion Control and Shoreline Stabilization
- Sustainable Stormwater Management, and
- Mitigating Critical Facilities
- Similarly, Ecology's enhanced flood safety steps include: Habitat protection and endangered species protection.
- Higher regulatory standards beyond the FEMA minimums: For example, some jurisdictions use the "flood of record" elevations to regulate the minimum elevation of structures, where the record flood is higher than the 100-year flood elevation used by FEMA.
- Climate change and unique circumstances: A jurisdiction may have unique risks due to the potential for tsunamis, high tides with strong winds, sea level rise or extreme weather events that it may want to address.

Washington State law (RCW 86.16) contains some additional requirements that are more restrictive than the NFIP, and FEMA requires that communities meet state standards as well. WAC 173-158 outlines administrative rules for implementing RCW 86.16. In addition to adopting the NFIP standards in 44 Code of Federal Regulations parts 59 and 60, WAC 173-158 sets additional standards regarding construction in the floodway and avoiding negative impacts on wetlands.

A Regional Guidance was prepared for communities in the Puget Sound Basin to assist them in meeting the ESA requirements as clarified in the Biological Opinion issued by National Marine Fisheries Service (FEMA 2010b). The Regional Guidance can be used as a reference by communities who wish to prepare studies considering the foreseeable future land use changes in establishing future base flood elevations.

7.3.1.1 Climate Change

WAC 365-190-110 requires classifications of frequently flooded areas to include, at a minimum, the FEMA 100-year floodplain designation. It also states that communities should consider the future flow floodplain at build out, the potential effects of climate change, and the effects of increasing impervious surfaces.

The current FEMA guidelines for assessing flood frequency are based on the assumptions that flood distribution is not significantly affected by climatic trends or longer-term cycles and that historical flood behavior is representative of future events. As such, flood studies and floodplain mapping that has been developed based on FEMA guidance may not reflect future watershed and floodplain conditions as affected by climate change (FEMA 2010b, ESA 2014).

FEMA published the impact of climate change and population growth on the NFIP through the year 2100 (FEMA 2013b). Changes to precipitation, land use and sea level rise were considered. The study shows that by the year 2100, the 100-year floodplain depth and lateral size are projected to increase, on average, by 45 percent above current levels across the nation.

In Washington, climate change is expected to exacerbate flooding due to increasing temperature, decreasing snowpack, higher intensity rain events and sea level rise. Further from the coast, flooding is more sensitive to changes in river flow than sea level rise. The highest river flows and heavy rainfall events are generally expected to increase in rain-dominant and in mixed rain and snow watersheds (Mauger and Kennard 2017).

7.3.1.2 Future Land Use

Nationally, about 70 percent of the future increases in the 100-year floodplain areas and flood depth can be attributed to climate change while the remaining 30 percent represents the influence of normal population growth (i.e., land use) (FEMA 2013b). On the contrary, future hydrologic and floodplain conditions in the Puget Sound are more influenced by changes in land cover and land use than by climate change (FEMA 2010b). As such, there is little concrete guidance for how to interpret BAS in determining and mapping future floodplain conditions locally. General agreement is that it is most important to capture future conditions for smaller streams that are in or near areas that are likely to urbanize, such as in or near a city or its urban growth area (UGA).

FEMA recommends that communities evaluate changes to the base flood from expected future watershed development based on the development patterns laid out in their local long range land use plans. At the request of a community and with the approval of FEMA, FIRMs, and Flood Insurance Study reports may include, for informational purposes, flood hazard areas based on projected- or future-conditions hydrologic and hydraulic analyses (FEMA 2019).

7.3.1.3 Channel Migration Zones (CMZ)

Channel migration is a natural geologic process, which describes how a stream or river channel moves over time. Streams and rivers may change course or migrate through a variety of factors, such as erosion and deposition of sediments, which alter their geology, geometry, and functionality. As streams and rivers change course, their potential hazards also change. While these processes normally occur over long periods of time, quick avulsions in a single storm, flooding, or human influences can

rapidly affect the speed at which a channel changes course or migrates over time (Rapp and Abbe 2003).

In unconfined valleys of Western Washington, lateral channel migration is the primary physical process that creates biodiversity on floodplains. This channel migration also presents a hazard to adjacent communities and infrastructure. These costs and benefits of channel migration make it a central consideration in floodplain management and restoration. The Washington State Shoreline Master Program (SMP) Guidelines require counties to identify the general location of CMZs as part of the shoreline planning process. Managing development within the CMZ allows for the occurrence of fluvial processes, maintains channel complexity and habitat diversity, and reduces potential damage to infrastructure within hazardous areas (Ecology 2014). Ecology has developed tools to guide identification of CMZs from basic planning level assessments to detailed project level assessments (Rapp and Abbe 2003, Legg and Olson 2014, Legg et al. 2014, Olson et al. 2014, Legg and Olson 2015).

Potential CMZs have been identified and mapped throughout Clark County (Clark County 2010). Stream and river reaches are identified as having a Moderate-Low, Moderate, Moderate-High, and High potential for channel migration based on review of existing data. In some cases, field checks were performed on streams that WDFW thought had migrated. Existing relevant data used in this analysis include channel characteristics, such as confinement and gradient; geographic information system soils and geology data; aerial photographs; maps; light detection and ranging (LIDAR); and/or spatial and temporal data (Clark County 2010). Streams that have High CMZ ranking within Vancouver or its UGA are predominantly Salmon Creek and some parts of Burnt Bridge Creek.

7.4 SUMMARY EVALUATION OF EXISTING ORDINANCE AND RECOMMENDATIONS

Vancouver's frequently flooded areas ordinance (VMC 20.740.120) is generally consistent with state (RCW 86.16) and federal NFIP requirements for flood control and protection. VMC 20.740.120 identifies regulated flood hazard areas, provides procedures for development permits, review, and enforcement, and floodproofing requirements.

Vancouver could also consider the future flow floodplain at buildout, the potential effects of climate change, and the effects of increasing impervious surfaces when designating and frequently flooded areas (WAC 365-190-110).

Recommendation: Require, or at a minimum encourage, consideration of future conditions during investigation of base flood elevation. Updated standards could reference available guidance for future conditions (FEMA 2010b, FEMA 2013, FEMA 2019), Washington RiskMAP program (Ecology 2022a) or other more useful and applicable methods that may become available in the future.

Clark County’s approach to classification and definition of CMZs is consistent with approaches described in literature on CMZ mapping. Map 27 in the Clark County (2010) Shoreline Inventory and Characterization Report, which shows the potential CMZs, is incorporated by reference in VMC 20.740.120 and development in the CMZ is regulated similar to a SFHA that is not the floodway. The determination of what land use is allowed within different parts of the CMZ is based upon a policy decision rather than a science-based determination, and therefore not restricted by BAS criteria. Jurisdictions, such as King County and Pierce County, regulate severe risk CMZs as floodways.

Recommendation: Consider regulating severe risk CMZs as floodways, where new development is generally not allowed.

8.0 FISH AND WILDLIFE HABITAT CONSERVATION AREAS

Fish and wildlife habitat conservation areas are the various highly productive and diverse ecosystems that provide resources and functions necessary for fish and wildlife and the surrounding human populations. These critical area functions include, but are not limited to, the protection of sensitive species, water quality, and bank stability, and the provision of corridors for movement between habitat and of habitat for foraging, nesting, overwintering, rearing, escape, and cover. These areas also benefit local communities by providing water quality improvements and protection from flooding, and financial opportunities related to recreation, tourism, and education, among others. BAS indicates that the identification and characterization of these areas, and providing protective measures such as buffers for them, is critical to maintaining the functions and values they provide. This report relies primarily on WDFW management recommendations, which are a consolidation of scientific literature and information on the importance of various habitats.

8.1 IDENTIFICATION AND CLASSIFICATION

The following fish and wildlife habitat conservation areas are applicable to the city and must be considered for classification and designation per WAC 365-190-130:

- a) Areas where endangered, threatened, and sensitive species have a primary association, including federal and state species (WDFW priority habitats and species, including riparian habitat areas) and state priority habitat areas associated with state priority species.
- b) Habitats and species of local importance, as determined locally; including heritage tree sites within the city.
- c) Naturally occurring ponds under 20 acres and their submerged aquatic beds that provide fish or wildlife habitat.
- d) Waters of the state:
 - Type S waters are all waters, within their bankfull width, as inventoried as “shorelines of the state” under RCW Chapter 90.58 and the rules promulgated pursuant to Chapter 90.58, including periodically inundated areas of their associated wetlands. Type S shorelines are regulated under the city’s shoreline

master program (1974) that the City is currently updating. The Columbia River and Washougal River within the city are Type S waters.

- Type F waters are segments of natural waters that are not classified as Type S waters and have a high fish, wildlife, or human use. These are segments of natural waters and the periodically inundated areas of their associated wetlands. Gibbons Creek is an example of a Type F water within the city.
 - Type Np waters are all segments of natural waters within defined channels that are perennial non-fish habitat streams. Perennial streams are waters that do not go dry at any time of a year of normal rainfall. However, for the purpose of water typing, Type Np waters include the intermittently dry portions of the perennial channel below the uppermost point of perennial flow.
 - Type Ns waters are all segments of natural waters within defined channels that are not Type S, F, or Np waters. These are seasonal, non-fish habitat streams in which surface flow is not present for at least some portion of a year of normal rainfall and are not located downstream from any stream reach that is a Type Np water. Type Ns waters must be physically connected by an aboveground channel system to a Type S, F, or Np water.
- e) Lakes, ponds, streams, and rivers planted with game fish by a governmental or tribal entity.
- f) State natural area preserves, natural resource conservation areas, and state wildlife areas.

The fish and wildlife habitat conservation areas described above have been identified by the WAC for their intrinsic value and because they contribute to the state's biodiversity. This review addressed the BAS regarding the functions and values of these habitat conservation areas and the measures recommended to protect them. Each of the fish and wildlife habitat conservation areas noted above that are present within the city are important to various ecosystems. For example, riparian areas cover a relatively small area but they support a higher diversity and abundance of fish and wildlife than any other habitat (Rentz et al. 2020). Riparian areas also support a significant number of threatened, endangered, sensitive, and priority species, and directly influence instream habitat; therefore, protecting riparian areas is directly linked to several fish and wildlife habitat conservation areas listed above (i.e., waters of the state). Protecting riparian habitat areas meets several of the goals and policy recommendations of WAC 365-190.130 Fish and Wildlife Habitat Conservation Areas. The BAS regarding the protection of riparian habitats is discussed below.

Additionally, areas associated with federally listed threatened, endangered, sensitive, and candidate species are determined by the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) Fisheries. Areas associated with state-listed threatened, endangered and sensitive species are determined by WDFW. Determinations of state and federally listed species are made (by mandate of the WAC and ESA, respectively) solely on the basis of the best scientific and commercial data available. Thus, the protection of these species, by nature of their designation, is rooted in BAS. Furthermore, both the USFWS and NOAA Fisheries have developed rigorous species assessments in order to collect data

about a given species. The data includes, but is not limited to, information about the life history, biology, population structure and abundance, and threats and vulnerability to the species. In addition to aiding in the determination of species listings, the information collected in these assessments is used to support and advise on policy and management recommendations. As their designations and protection are rooted in BAS, these species are not discussed in detail in this report.

8.2 BEST AVAILABLE SCIENCE FOR FISH AND WILDLIFE HABITAT CONSERVATION AREAS

8.2.1 Riparian Areas

Riparian areas are situated adjacent to aquatic habitat and are transitional areas that contain elements of both aquatic and upland ecosystems, which mutually influence each other.

Functions provided by riparian areas include water quality, streambank stabilization, maintaining moist and mild microclimates and cool stream temperatures, nutrient cycling/inputs, and flood control. Riparian areas also offer multilayered habitat structure and complexity that provide habitat for breeding, rearing, forage, cover, escape, and migration, and habitat connectivity between aquatic and terrestrial habitats. Functioning riparian habitat is essential for a number of threatened, endangered, sensitive, and priority species, including salmon and steelhead, reptiles and amphibians, cavity nesting birds, and migratory birds, among others (Rentz et al. 2020). While protecting these areas can be controversial and restrict the development potential of private and public property, on the other hand, limiting development in riparian areas can benefit humans by protecting water quality in streams and rivers used as drinking water and can promote healthy fish populations that are a source of food for people.

WDFW's *Management Recommendations* indicates that the protection of riparian habitat may yield the greatest gains for fish and wildlife (and by extension humans) while involving the least amount of area, when compared to other habitats, because riparian habitat:

- covers a relatively small area yet supports a higher diversity and abundance of fish and wildlife than any other habitat;
- provides important fish and wildlife breeding habitat, seasonal ranges, and movement corridors;
- is highly vulnerable to alteration; and
- has important social values, including water purification, flood control, recreation, and aesthetics.

Approximately 85 percent of Washington's wildlife species have been known to use riparian habitat associated with rivers and streams (Thomas 1979). Many of these species are dependent on riparian areas for at least one stage in their life cycles, while others may use riparian areas only occasionally or to move between habitats

(O’Connell et al. 1993). Reptiles, amphibians, cavity nesting ducks and other waterfowl, beaver, otter, and great blue heron are examples of species that rely almost exclusively on riparian area habitats and their proximity to water, and mild microclimates for breeding, nesting, rearing, forage, and cover. Other species, such as migratory birds, rely on these highly productive habitats as stopover locations during seasonal migration, or as breeding and rearing habitat before or after migration, and thus may be present only during specific seasons (Andelman and Stock 1994).

Riparian areas are linked by definition to instream fish habitat and support its functions for fish. Seventy-seven species of fish inhabit freshwater in Washington for all or a portion of their lives (Wydoski and Whitney 1979), including ESA-listed salmon and various other native aquatic species. Riparian areas provide a number of physical, chemical, and biological processes for instream habitats, including maintaining appropriate water temperatures; stabilizing stream channels and banks; providing inputs of large woody debris (LWD); regulating stream velocity; storing, conserving, and purifying water; providing nutrient inputs and cycling; and providing and maintaining migratory habitat (Cummins 1974, Harmon et al. 1986, Beschta 1978, Sullivan et al. 1987, Meehan and Bjornn 1991, Swanston 1991). LWD inputs from riparian areas provide complex stream structure, including pools and riffles, and cover for hiding and escape. Side channels, backwater wetlands, and floodplains also provide invaluable rearing, hiding, cover, and escape habitat for juvenile salmon.

Riparian areas are not just valuable as fish and wildlife habitat, they provide important water quality, flood control, recreation, and aesthetics functions for people as well. Functioning riparian areas can filter 40 to 90 percent of organic debris and environmental pollutants from surface water before the pollutants enter stream channels (Lowrance et al. 1984, Rhodes et al. 1985). The natural water quality functions provided by riparian areas can reduce the contamination, and ease our reliance on water quality treatment facilities. When flood waters move through riparian areas, vegetation acts to slow stream water velocity, and the slowed flood waters deposit sediment loads, and infiltrate soils. Because functioning riparian areas retain flood waters and reduce their velocity and erosive forces, these areas protect downstream communities from flooding and stream bank erosion, and minimize flood damage to structures and other assets such as cropland (Griggs 1984, Roseboom and Russell 1985, Booth 1991). In addition to their preventive functions for people (water quality and flood prevention), riparian areas also provide financial benefits by supporting recreational opportunities for hunting and fishing (Theurer et al. 1985). Other recreational activities supported by functioning riparian habitat include hiking, bird watching, camping, and tourism (Knutson and Naef 1997).

8.2.2 Priority Habitats and Species

8.2.2.1 Biodiversity Areas and Corridors

Biodiversity areas and corridors are areas of habitat that are relatively important to various species of native fish and wildlife. WDFW’s mapping tool for priority habitats and species (PHS) identifies a biodiversity area within the City associated with Burnt Bridge Creek. Biodiversity areas that have been identified as biologically

diverse through a scientifically based assessment conducted over a landscape scale (e.g., ecoregion, countywide or citywide, watershed, etc.). These areas could also be within a city or a UGA and contain habitat that is valuable to fish or wildlife and is mostly comprised of native vegetation. Relative to other vegetated areas in the same city or UGA, the mapped area is vertically diverse (e.g., multiple canopy layers, snags, or downed wood), horizontally diverse (e.g., contains a mosaic of native habitats), or supports a diverse community of species as identified by a qualified professional who has a degree in biology or closely related field and professional experience related to the habitats or species occurring in the biodiversity area. These areas may have more limited wildlife functions than other priority habitat areas due to the general nature and constraints of these sites in that they are often isolated or surrounded by highly urbanized lands (WDFW 2008).

Corridors are areas of relatively undisturbed and unbroken tracts of vegetation that connect fish and wildlife habitat conservation areas, priority habitats, areas identified as biologically diverse, or valuable habitats within a city or UGA (WDFW 2008).

8.2.2.2 Oregon White Oak Woodlands

Oregon white oak (*Quercus garryana*) is Washington's only native oak. WDFW's PHS mapping tool identifies several areas of Oregon white oak in the city. Although limited and declining, oaks and their associated floras comprise distinct woodland ecosystems. The various plant communities and stand age mixtures within oak forests provide valuable habitat that contributes to wildlife diversity statewide. In conjunction with other forest types, oak woodlands provide a mix of feeding, resting, and breeding habitat for many wildlife species. More than 200 vertebrate and a profusion of invertebrate species use Washington's oak woodlands. Some species occur in especially high densities, whereas others are not typically found in Washington. Oaks provide habitat for species that are state listed as Sensitive, Threatened, Endangered, or candidates for these listings (Larsen and Morgan 1998).

"Priority Oregon white oak woodlands are stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is $\geq 25\%$; or where total canopy coverage of the stand is < 25 percent, but oak accounts for at least 50 percent of the canopy coverage present. The latter is often referred to as an oak savanna. In non-urbanized areas west of the Cascades, priority oak habitat is stands 0.4 hectare (1 acre) in size. In urban or urbanizing areas, single oaks, or stands of oaks < 0.4 hectare (1 acre), may also be considered priority habitat when found to be particularly valuable to fish and wildlife (i.e., they contain many cavities, have a large diameter at breast height, are used by priority species, or have a large canopy)" (Larsen and Morgan 1998).

Oregon white oak woodlands are used by an abundance of mammals, birds, reptiles, and amphibians. Many invertebrates, including various moths, butterflies, gall wasps, and spiders, are found exclusively in association with this oak species. Oak/conifer associations provide contiguous aerial pathways for animals such as the State Threatened western gray squirrel, and they provide important roosting, nesting, and

feeding habitat for wild turkeys and other birds and mammals. Dead oaks and dead portions of live oaks harbor insect populations and provide nesting cavities. Acorns, oak leaves, fungi, and insects provide food. Some birds, such as the Nashville warbler, exhibit unusually high breeding densities in oak. Oaks in Washington may play a critical role in the conservation of neotropical migrant birds that migrate through, or nest in, Oregon white oak woodlands (Larsen and Morgan 1998).

The decline of Oregon white oak woodlands has been accelerated by human activities—primarily oak removal. Conifer encroachment is a significant threat to remaining oaks, particularly on the west side of the Cascades and in portions of the Columbia Gorge, and is aggravated by urban development, fire suppression, timber conversion, and cattle grazing. Grazing is a primary use of oak woodlands and reduces species richness of ground cover, increases soil moisture, compacts soils, and disturbs sod, all of which may promote conifer growth and encroachment west of the Cascades. East of the Cascades, these pressures may also affect oak woodlands. In addition, the selective harvest of east-side conifers is detrimental to those wildlife species that depend on mixed oak/conifer associations. Fire suppression has also contributed to the decline of Oregon white oak woodlands. Natural fires and those intentionally set by Native Americans historically played a paramount role in oak forest ecology, especially natural oak regeneration. Frequent low-intensity fires curbed conifer encroachment, controlled stand density, and initiated oak sprouting. Today, managed burning can help restore degraded oak habitat (Larsen and Morgan 1998).

8.3 SCIENCE OF IMPACTS AND MITIGATION

8.3.1 Riparian Ecosystems

The scientific literature supports the importance of riparian ecosystems and the importance of maintaining riparian vegetation to support stream channel stability and the longitudinal, lateral, and vertical connectivity to quality fish and wildlife habitat. Management of riparian areas should regulate all land use activities that affect riparian ecosystems to ensure that the existing functions and values are protected from development. Land use impacts include impacts from forestry, road infrastructure, agriculture, urbanization, and stream channel modification. These impacts can affect important stream and riparian ecosystem components that create diverse habitats including large wood recruitment, nutrient inputs, diverse stream channel morphology (i.e., riffles, pools, runs, etc.), stream temperature regulation, groundwater recharge, pollutant removal, filtering of sediment and nutrients, etc.

Large Wood

Impacts from land uses, including forestry, agriculture, and urbanization affecting riparian forests, remove riparian forests and can lead to a reduction in the availability of large wood to fish bearing streams. Riparian forest management is key to conservation of fish habitats in forested areas in Washington.

Stream Temperature

Studies have clearly shown that a reduction of stream shade from vegetation removal results in warmer summer stream temperatures (Sridhar et al. 2004; Allen et al. 2007).

The type and condition of riparian vegetation plays an important role in the amount of solar radiation reaching a stream's surface. Management of vegetation in riparian areas can affect stream temperatures, which impacts fish, amphibians, and invertebrate populations and survival. Fish can be sensitive to altered thermal regimes, especially salmonids, which can be sensitive to high water temperatures and have a narrow thermal tolerance (Farrell et al. 2008; Eliason et al. 2011; Ayllon et al. 2013).

Pollutant Removal

Riparian buffers help reduce the flow of pollutants to aquatic ecosystems with removal functions depending on the complex interactions between vegetation, soil, and hydrology. Because of the variability between vegetation, soil, and hydrology, as well as spatial and temporal variability, pollutant removal functions can vary greatly between and within riparian sites. This variability can make management decisions regarding riparian buffer width difficult to determine, as there has been no widely accepted recommendations on buffer width. Desired pollutant removal outcomes should be based on:

1. Factual information regarding the anticipated impacts or outcomes of policy options (i.e., science);
2. An understanding of stakeholders' priorities and preferences (i.e., values); and
3. A process for using science and values to explore tradeoffs amongst policy options (Wilhere and Quinn 2018).

Filtering of Sediment and Nutrients

Riparian areas provide filtration for sediment and crucial sources and sinks for organic matter and nutrients for streams. Riparian areas are important areas that facilitate the movements of nutrients between upland areas and streams. Impacts to riparian areas that result in a physical disconnection or degradation of the integrity of the riparian area function will negatively affect the ability of the riparian area to provide filtering or removal of sediment and nutrients.

8.3.1.1 Management Recommendations

Generally, recommendations include limiting or restricting activities that may affect riparian areas negatively; examples include tree and vegetation removal, road building, agriculture and grazing, and clearing and earth moving for development (Knutson and Naef 1997). There is limited specific information regarding the level of development or activity a riparian area can withstand, and while they provide similar functions, all riparian areas are different, and support different communities of species; therefore, WDFW recommends a conservative approach to riparian habitat protection. To protect the functions and values of riparian areas, WDFW recommends designating riparian areas that are wide enough to allow proper functioning of riparian and aquatic ecosystems, including protection of instream habitat through temperature and sediment control, preservation of fish and wildlife habitat, and connectivity between aquatic, riparian, and upland habitats. The goal of this recommendation is to protect the full range of riparian functions, not just instream habitat by buffering adjacent, more upland uses. WDFW-published literature showed

that widths recommended for riparian management zones (RMZs) that protect the full range of ecological functions necessary to support fish and wildlife is estimated by one 200-year site potential tree height (SPTH₂₀₀). The RMZ in areas of the state that currently or historically supported forests (i.e., Vancouver) is defined as the distance of one SPTH, where the SPTH₂₀₀ is the average maximum height attained by dominant trees at 200 years of age, measured from the edge of the active channel or CMZ, whichever is wider. The RMZ describes the area that has the potential to provide full riparian function, regardless of its current conditions. Measuring the RMZ width at the outer edge of the CMZ ensures that when the stream migrates, it will still be adjacent to the zone of influence that can provide riparian function (Rentz et al. 2020).

The RMZ is a scientifically based description of the area adjacent to rivers and streams that has the potential to provide full functions based on the SPTH₂₀₀ conceptual framework (Rentz et al. 2020). WDFW notes that most riparian areas in forested ecoregions the SPTH₂₀₀ is 100 feet or greater, and so the RMZ is delineated using one SPTH₂₀₀. However, if the SPTH₂₀₀ is less than 100 feet, WDFW recommends that the RMZ be delineated based on the pollution removal function, which is considered a minimum of 100 feet because this distance will achieve 95 percent or more removal efficacy of phosphorous, sediment, and most pesticides (Rentz et al. 2020).

Current site conditions should always be considered when reviewing regulations, with the ultimate goal of maintaining remaining riparian functions. Additional management recommendations include improving functions through voluntary restoration, and maintaining and enhancing connectivity laterally along the stream. Areas closer to the stream provide the greatest conservation benefit and should be prioritized for preservation, replanting, or restoration. Using low impact development techniques to better manage stormwater, and adopting a stormwater design manual equivalent to Ecology's most current version of Stormwater Management Manual for Western Washington are also recommended (Rentz et al. 2020).

To aid with site-specific RMZ delineation, WDFW created an internet-based mapping tool that reports recommended widths for RMZs statewide based on SPTH₂₀₀. The tool also notes instances where a 100-foot RMZ should be applied to support the pollution removal function. Appendix 1 of the management recommendations provides guidance on how to use these interactive maps. The guidance notes that in highly altered areas where soil data are not available, it may be necessary to estimate SPTH₂₀₀ values based on nearby soils.

8.3.1.2 Mitigation

A near consensus of scientific opinion holds that the most effective and reliable means of maintaining viable self-sustaining fish, especially salmon, is to maintain/restore ecosystems to conditions that resemble or emulate their historical range of natural variability (Swanson et al. 1994; Reeves et al. 1995; Bisson et al. 2009). This opinion is based in part on the complexity of processes that affect the expression of habitats over time and space.

The following steps in the mitigation sequence according to the implementing rules of SEPA (Chapter 197-11-768 WAC) would apply to riparian areas:

- Avoiding the impact altogether by not taking a certain action or parts of an action;
- Minimizing impacts by limiting the degree or magnitude of the impacts;
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;
- Compensating for the impact by replacing, enhancing, or providing substitute resources or environments; and/or
- Monitoring the impact and taking appropriate corrective measures.

8.3.2 Priority Habitat and Species

WDFW's PHS list is periodically updated and includes species and habitats for which special conservation measures should be taken. The PHS list explains why each priority habitat and species is on the list, shows which counties have that species or habitat, and provides links to PHS management recommendations. Cities and counties use the PHS list when designating and protecting Fish and Wildlife Habitat Conservation Areas under the GMA and SMA.

8.3.2.1 Oregon White Oak Woodlands Management Recommendations

WDFW's *Management Recommendations* for Oregon white oak woodlands are designed to maintain and enhance the integrity of Oregon white oak woodlands, reverse the trend of oak habitat loss, and promote the protection of oak habitat that is presently in good condition. Oaks west of the Cascades and in wetter sites along the Columbia Gorge should be cut only for stand enhancement. Replacing the wholesale removal of mixed oak/conifer stands with selective cutting would reduce fragmentation and conifer encroachment, and it would benefit structural and vegetative species diversity within oak forests. Encroaching conifers within oak groves should be thinned, and conifers adjacent to these stands should be retained for wildlife. An alternative to removing trees is to leave them standing as snags (Larsen and Morgan 1998).

Specific recommendations include the following:

- Do not cut Oregon white oak woodlands except for habitat enhancement.
- Allow only early spring, low-impact cattle grazing.
- Allow low-impact recreation (hunting, fishing, hiking, and mushroom and acorn collecting).
- Selectively harvest individual oaks to improve stand age-class and structural diversity.

- Thin encroaching conifers in oak woodlands west of the Cascades and along the Columbia Gorge; do not remove conifers from mixed stands east of the Cascades.
- Retain large, dominant oaks and standing dead and dying trees.
- Create snags when thinning oaks or conifers instead of removing trees.
- Leave fallen trees, limbs, and leaf litter for foraging, nesting, and denning sites.
- Retain contiguous aerial pathways.
- Conduct prescribed burns where appropriate.

8.4

SUMMARY EVALUATION OF EXISTING ORDINANCE AND RECOMMENDATIONS

The City should update the Fish and Wildlife Conservation Areas section (VMC 20.740.110) of their development code based on the current RCWs and WACs, including (1) revising the definition of fish and wildlife habitat conservation areas to be consistent with the State's definition, (2) add language to the existing ordinance that addresses priority habitat and species and their associated management recommendations (i.e., habitat associated with listed species, oak woodlands, biodiversity areas, etc.), (3) add language to the existing ordinance that addresses changes in how riparian management areas are determined and protected, and (4) add conservation and protection measures that preserve or enhance anadromous fish and their habitat important for all life stages.

Specific recommendations by WDFW associated with riparian management areas for urban riparian ecosystems include the following (Rentz et al. 2020):

- Update riparian area widths to meet WDFW guidance.
- Delineate urban RMZs to protect what areas remain and to highlight lost or degraded areas to target for restoration.
- Quantify current conditions, with a goal of maintaining and improving functions through regulatory and voluntary means.
- Identify and prioritize restoration opportunities and projects within the RMZ
 - Protect riparian functions that remain, especially in places that are relatively high functioning; implement actions that enhance degraded functions
 - Prioritize opportunities to maintain and restore in-stream and riparian connectivity.
 - Adopt a stormwater design manual equivalent to Ecology's most current manual for western Washington
 - Manage stormwater by adopting Ecology's latest manual regarding LID for new development, redevelopment and retrofit projects.
- When replacing or removing existing infrastructure within an RMZ:
 - Map RMZ to pinpoint the best sites to restore – consider connectivity and adjacency to other priority habitats;
 - Improve aquatic connectivity by replacing culverts and removing barriers to movement;

- Revegetate with native plants and consider improvements for wildlife by integrating structures necessary for nesting, breeding and foraging;
- As infrastructure is remodeled or replaced, incorporate additional setbacks for streams;
- Control access to RMZ to limit soil compaction; and
- Avoid operating equipment near the stream to reduce sedimentation and soil compaction; and avoiding using chemicals in the RMZ that are not approved for use there by Ecology.

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APPENDIX A

DRAFT CRITICAL AREAS MAPS

APPENDIX B

BEST AVAILABLE SCIENCE SOURCES

RESEARCH SOURCES

Wetlands

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Existing Code	Key Updates
General	
General Provisions. None.	General Provisions: Improve and streamline the permitting process for low-impact projects such as small expansions to a single-family home or some types of small businesses. Ideas including developing exemptions for small residential expansions, a fee-in-lieu or standardized planting requirements for small riparian impacts/mitigations. Effect of Change: Improved/streamlined City permitting process.
Fish and Wildlife Habitat Conservation Areas (FWHCAs)	
Definition: “Fish and Wildlife Habitat Conservation Areas” include habitat for endangered, threatened and sensitive species; priority habitats and areas associated with priority species, riparian management areas, habitats of local importance, and water bodies. (VMC 20.150.040B)	Definition: Update definition of FWHCAs to be consistent with State’s definition by including forage fish spawning areas, naturally occurring ponds under 20 acres, waters of the state, natural area preserves, natural resource conservation areas, and state wildlife areas. Effect of Change: Potentially increased habitat areas protected as FWHCAs.
Designation & Management Recommendations: FWHCAs designations include for federally and state listed species including state or federally designated endangered, threatened, or sensitive, priority habitats/species, water bodies, habitats of local importance (none designated), riparian management areas and buffers. (VMC 20.740.110{A}).	Designation & Management Recommendations: Update language to address and include changes in species listings and management recommendations for listed species as changes occur in the future. Effect of Change: Adding flexibility to the code to accommodate frequent updates to species listings and species protections recommendations.
Development Standards (Anadromous Fish): FWHCAs have performance standards for: regulating development or clearing activities; ensuring no net loss of FHWCA function; and specific measures for riparian buffers (VMC 20.740.110[C]).	Development Standards (Anadromous Fish): Add specific measures to preserve or enhance anadromous fish for riparian areas and aquatic habitats based on State recommendations. For example, measures could be added for habitat protection measures such as stream flow, water quality and temperature, spawning substrates, migratory access, and/or maintenance of salmon prey species. Effect of Change: Improved habitat functions and conditions for anadromous fish, like salmon.
Development Standards (Buffers): Established riparian buffer widths are determined by type of stream (fish bearing vs non fish bearing and perennial vs annual) and the intensity of the adjacent land use. Total habitat areas range from 25 feet for small, disconnected Type N streams to 175 feet (Type S, F, large N streams) to VMC 20.740.110.	Development Standards (Buffers): Adjust riparian buffers to address BAS and focus on preservation of high-functioning areas and incentivizing restoration. Establish a three-tiered review system: (1) accept code-specified buffer widths (2) use State-recommended buffer widths if different than the code or (3) conduct a site-specific habitat study to establish a customized buffer width where existing conditions dictate. Buffer width options include: (1) keeping existing habitat widths (2) using SPTH recommended habitat widths or (3) average habitat widths along streams for consistency or (3) develop hybrid buffers that consider BAS but deviate for specific circumstances. Option 2-3 likely to result in larger buffers of 200-250 feet, but with functional isolation provision to recognize existing development. Effect of Change: Change of riparian buffer widths resulting in a change of riparian areas protected; likely increased widths.
Frequently Flooded Areas	
Definitions: “Frequently flooded areas” are areas of special flood hazards. VMC 20.150.040B.	Definitions: Updating definitions for floodplain/special flood hazard areas per Federal Emergency Management Agency (FEMA) regulations. Effect of Change: Updated regulations to remain FEMA compliant.
Administration: Floodplain administrator designated to administer, implement, and enforce floodplains and includes a list of duties and responsibility of the floodplain administrator. VMC 20.150.040(H).	Administration: Updated development review procedures for variance to allow historic structures in the floodplain. Effect of Change: Increased allowance for historic structures in floodplains.
Development Standards: Additional critical area report requirements, which includes base flood elevations; location of the channel migration zone; description of strategies to avoid, minimize, and mitigate impacts; and certification, documentation, and demonstration by a qualified professional to support “no rise” (VMC 20.740.120[I]).	Development Standards: Require or encourage consideration of future conditions (climate change) for base flood elevations and reference available guidance for these future conditions. Effect of Change: Account and plan for increased flooding events caused by climate change. Where data is available, increased flood hazard areas.
Geologic Hazard Areas	
Definitions: “Geologic hazard areas” include landslide, seismic, and erosion hazard areas as designated (VMC 20.150.040B). “Landslide hazard areas” are potential landslide areas that are identified as slopes greater than 25% and/or areas of historic or active landslides, potential instability, or older landslide debris (VMC 20.740.130[A][1]). “Seismic hazard areas” include liquefaction or dynamic settlement, ground shaking amplification, and fault rupture hazard areas (VMC 20.740.130[A][1]).	Definitions: Update definitions of “geologically hazardous areas”, “landslide hazards”, “erosion hazard”, and “seismic hazard” consistent with State definitions. Update “geologically hazardous areas” definition to include areas that are susceptible to other geological events and are not suited for the siting of commercial, residential, or industrial development consistent with public health and safety concerns.

“Erosion hazard areas” include soil erosion and bank erosion hazard areas. VMC 20.150.040B and VMC 20.740.130(A)(1-3).	Update definition of “landslide hazards” to include areas delineated by various federal and state agencies, includes areas of slopes greater than 15 percent, and other historical and current site indicators. Update definition of “seismic hazard” to include areas that are a severe risk of damage from ground shaking by an earthquake, slope failure, settle or subsidence, surface faulting, or tsunamis. This also includes areas with a historical record of earthquake damage. Update definition of “erosion hazard” to include areas that are likely to become unstable, such as steep slopes, bluffs, and areas with unstable soils. <i>Effect of Change(s):</i> Likely no effect since geotechnical reports assess the risk of geologic hazard.
Development Standards: None.	Development Standards: Include provisions to restrict development of critical facilities in hazard zones. Example facilities include wastewater treatment plants and emergency services. <i>Effect of Change:</i> Reducing public risks and hazards by prohibiting essential facilities in hazard areas.
Development Standards: Performance standards listed for development in landslide, soil erosion, and bank erosion hazard areas. VMC 20.740.130(C)	Development Standards: Include Best Management Practices (BMPs) for landslide hazard areas and erosion hazard areas. If applicants apply these, they can avoid filing a critical areas report. BMPs for areas <i>only</i> mapped with erosion hazard areas (cannot also contain mapped landslide hazards) are to implement the BMPs for example: • Erosion prevention (surface roughening, vegetation, mulch, and erosion blankets); • Perimeter control (silt fences, bio-filter bags and fiber rolls, undisturbed vegetative buffers, storm drain inlet protection, and inlet inserts); and • Stormwater control (dikes and swales, check dams, pipe slope drain, stormwater barriers, and sediment traps and ponds). <i>Effect of Change:</i> Improving/streamlining the permitting process and standardizing development requirements and practices in these hazard areas.
Development Standards: Performance measures include requirements such as plans for revegetation and landscape maintenance; clearing, grading, uprooting, other soil impairment actions; drainage; and bank stabilization. VMC 20.740.130(C)	Development Standards: Add language to require erosion mitigation work to be performed by a certified erosion and sediment control lead in accordance with Washington State Department of Ecology (Ecology) requirements. <i>Effect of Change:</i> Increasing confidence that erosion mitigation work is to State standards.
Development Standards: Special performance measures are provided for seismic hazard areas such as complying with the building and construction requirements of VMC Title 17 and fault rupture hazard area requirements. VMC 20.740.130(C)(2).	Development Standards: Update seismic hazard areas to implement soft-story seismic retrofit ordinance (a type of earthquake retrofitting) to address potential risks and mitigate earthquake-related structural damage. <i>Effect of Change:</i> Allow/encourage retrofitting to reduce earthquake-related structural impacts.
Designations: Not addressed in existing code.	Designations: Seismic shaking hazards designations should be updated to include areas of moderate to high risk and above. Designate erosion hazard areas as “severe” and “very severe” erosion hazards as mapped by NRCS. <i>Effect of Change:</i> Decreased areas protected as geologically hazardous areas.
Wetlands	
Development Regulations: Wetland ratings per Ecology’s wetland rating system, Washington State Wetland Rating System for Western Washington – 2014 update [VMC 20.740.140[A][2]. Wetland buffers are established by wetland rating and adjacent intensity of land use using outdated Ecology guidance. VMC 20.740.140(C)(1)(b). Compensatory mitigation methods for impacts to wetlands are listed including creation, reestablishment, rehabilitation, and enhancement; type and location of mitigation; mitigation ratios; and mitigation banks. VMC 20.740.140(C)(2).	Development regulations: Updates to wetland buffers and wetland mitigation methods per new Ecology guidance. Wetland buffer options are: (1) regulate by category and quality, and habitat score. and adjacent land use with required minimization techniques and a habitat corridor (2) regulate by category and habitat score (3) regulate by category only. Update to include a mitigation priority sequence. <i>Effect of Change:</i> Change in the width of wetland buffers and priority of mitigation methods to emphasize banks.
General: Wetland regulations include: • Definition and designation of wetlands • Wetland regulations do not address climate change, • Habitat corridor requirements for buffer width reductions, • Example minimization measures (Table 20.740.140-7), • No exemption guidance for small wetlands. VMC 20.740.140.	General: Include additional provisions per the updated Ecology guidance such as: • Amended definition and designation of “wetlands” • Wetlands are subject to a local government’s regulatory authority if they meet the definition of wetlands in RCW 36-70A030(31). This includes non-federally regulated wetlands (sometimes referred to as isolated wetlands). The GMA requires local governments to designate and protect wetlands and grants them the authority to do so—regardless of federal jurisdiction. • Role of wetland functions in mitigating climate change, • Wetlands and their buffers are important in sequestering carbon and help to mitigate climate change

	• Clarified habitat corridor requirements, • Corridor should have a minimum width of 100’ and connect wetlands that score 6 or more habitat points to other important protected areas. • Updated and expanded minimization measures, • Including minimizing disturbances from lights, noise, toxic runoff, stormwater runoff, pets and human disturbances, and dust during construction. • Clarified geographic scope of exemption guidance for small wetlands. Effect of Change(s): Updated definitions for State compliance, establishing wetlands as a means of combatting climate change, adding clarity to habitat corridor requirements and minimization measures when developing next to a wetland and wetland buffer, and exempting certain small wetlands from permitting.
Critical Aquifer Recharge Areas	
Designations: CARAs are designated as areas within the boundary of the City of Vancouver and includes special protection areas (properties within 1,900 feet of any municipal wellhead). VMC 14.26.115(B).	Designations: Use standard CARA designations including wellhead protection areas (Group A and Group B), sole source aquifers, susceptible groundwater management areas, special protection areas, moderately or highly vulnerable/susceptible aquifer recharge areas. Effect of Change: More specifically including Group B wells and vulnerable and susceptible areas protected as CARAs.
Mapping: See above.	Mapping: CARA designations should be updated to include mapping provided by the Washington State Department of Health (DOH) for Group A wells and Clark County for Group B wells. Effect of Change: Updated mapping to protect wellheads.
Critical Areas Report Requirement: None.	Critical Areas Report Requirement: CARAs regulations shall include critical areas report requirements which would require CARA hydrogeological assessments in circumstances where necessary. Level 1 hydrogeological assessments required when proposing non-exempt development that would comply with BMP requirements. Hazardous materials and non-standard BMPs require a Level 2 report. Effect of Change(s): Adding requirements to adequately assess impacts to CARAs from a proposed use and also streamlining activities that comply with BMPs.
Exemptions: Special exemptions to the requirements of the code chapter are listed, which include stormwater permit procedural requirements and city processes. VMC 14.26.155.	Exemptions: Include adequate exemptions for certain uses and activities occurring within CARAs, such as existing development, single-family residential building permits, single and multifamily development connected to public sewers, developments for which a prior hydrogeological assessment was completed. Effect of Change: Streamlining the review process for low-impact development.
Administration: Current code chapter for CARAs regulations. VMC Chapter 14.26.	Administration: Relocate CARA regulations to VMC Chapter 20.740 (Critical Areas Protection). Responsible administrator changes from Water and Sewer Department (Engineering) to Planning Official. Effect of Change: Better integration with land use review procedures.

Memorandum

To: City of Vancouver Planning Commission & City Council

From: Dominique Martinelli, Senior Planner, City of Vancouver
Ethan Spoo, Nick Fazio, and Alec Egurrola, Consulting Planners, WSP USA

Subject: Vancouver CAO Update: Focus Groups Summary

Date: September 26, 2023

Overview and Approach

The City of Vancouver (City) is updating its Critical Areas Ordinance (CAO) concurrent with the update of its comprehensive plan, [OUR VANCOUVER](#). The CAO updates are expected to be completed in 2024 and prior to the comprehensive plan update. The CAO update primarily focuses on technical updates needed to comply with best available science (BAS) and state guidance and is required by the State of Washington. Critical areas include five types of environmentally sensitive areas, which are important fish and wildlife habitat, wetlands, frequently flooded areas, geologically hazardous areas, and areas that are critical to replenishing drinking water aquifers.

To identify and communicate ways the project team would engage and communicate with key participants and the community, the project team developed a Public Involvement and Communications Plan (PICP) in fall 2022. This PICP had an overarching goal of ensuring the project's key participants and communities were informed and engaged and was a living document that was evaluated periodically to ensure efforts remained on track.

The Public Involvement (PI) scope included:

- Four focus group discussions.
- Five webpage updates to the City's website [Be Heard Vancouver](#).
- A fact sheet mailer with FAQs.

Additional details regarding the PI scope and approach, including a summary of potential communication risks identified, can be found in the PICP, dated October 2022.

Focus Groups

In support of the project's public engagement effort, the project team conducted a series of focus groups in early September 2023 to gather input on four of the five types of critical areas: critical aquifer recharge areas (CARAs), geologically hazardous areas, fish and

wildlife habitat conservation areas (FWHCAs), and wetlands. Frequently flooded areas were not included in a focus group discussion as these critical area regulations are being updated separately as part of National Flood Insurance Program requirements. During the development of the PICP and the organization of the focus group meetings, the project team developed a list of key participants to engage for each focus group topic. The project team contacted approximately 52 agencies and organizations to gauge their interest in participating in one (or in some instances two) of the focus groups.

Focus groups were conducted as candid and informal conversations among participants and followed a discussion guide to unpack individual and organizational perspectives on proposed CAO updates and related topics. The project team shared preliminary code update concepts with participants in advance of developing draft code language. The purpose of all focus groups was to seek primarily non-technical feedback on the CAO update, but technical feedback was also accepted.

At the beginning of each session, the project team provided participants with a brief introduction and icebreaker followed by an explanation of the purpose of the CAO and its proposed updates. This was followed by a robust discussion between the project team and the participants using a discussion guide. The focus groups concluded with next steps and how to contact the project team. The following is a summary of the input received organized around each critical area topic and prompts for input. Table 1 includes key takeaways from the focus group meetings across all types of critical areas. Candid responses were encouraged, and comments are not attributed to specific individuals to provide a level of anonymity. A list of focus group invitees are included in the focus group meeting agendas in Attachment A.

Table 1: Focus Group Key Takeaways	
•	Participants desire clear, concise, and consistent code language, and consistency and flexibility with federal and State requirements.
•	There needs to be improved informational materials (i.e., worksheets, checklists) and early awareness of the CAO and critical areas in general, especially for small developers and individual property owners.
•	Participants desire improved predictability and reliability of the permitting process for developers, especially early in the process, such as at the City-required pre-application meeting.
•	Critical areas on properties are expensive to accommodate for permitting and impact mitigation and have disproportionate impacts to small property owners.
•	City should consider more direct engagement with underrepresented groups to better consider equity and environmental justice issues related to the CAO update.

Table 1: Focus Group Key Takeaways

Fish and Wildlife Habitat Conservation Areas

Important outcomes from the CAO update

Participants discussed that people and developers want to be good stewards with the natural environment, but there is a lot of gray area when using the critical areas code. It needs to be made easier to navigate for developers. One participant stated they would like to see flexibility built into the CAO to accommodate evolving BAS, which will help streamline the update process. Participants also stated that the City should consider riparian buffers as a tool to combat climate change at the local and regional levels.

Experience with the City's CAO permitting process

Several participants either directly or indirectly have had experience with the City's CAO permitting process. Participants noted that many developers or applicants going through the process are unaware of certain requirements, such as mitigation, which is expensive and can delay the permitting and timeline of the project. One participant expressed that the mitigation sequencing process should be made clearer to developers as they typically become aware too late in the process and may end up impacting critical areas more than warranted or applicants experience delays in permitting when they are unaware of critical area requirements. One participant expressed frustration with Clark County's Vacant Buildable Lands Model, which shows lands that are developable, but the development community knows these lands have large amounts of critical areas and are, therefore, unsuitable for development.

City's adequacy of protecting FWHCAs

One participant noted that there is an increased frequency of Oregon white oaks under pressure from development. This same participant mentioned additional measures should be adopted when considering new FWHCA regulations to protect and improve aquatic habitat for anadromous fish. A couple of participants stated there are opportunities on City-owned properties to restore degraded critical areas and that City-owned properties are the best areas to preserve high-functioning habitat, such as the Burnt Bridge Creek wetlands and riparian areas.

Equity issues and equitable access to recreational opportunities

One participant noted that critical areas are a public benefit, and, in the larger picture, these protections improve equity by holding those accountable that are impacting these areas. However, outdoor recreation access is always harder for those living in urban settings, so

creating more of these opportunities in urban areas will increase access. Participants added that off-site mitigation may not be the best form of mitigation because the impacts are not being mitigated on site, therefore impacting those groups who historically have less access to outdoor recreation areas.

Wetlands

Important outcomes from the CAO update

One participant said clarity in code language is important, but simpler regulations should not be the sole objective as these regulations are necessary to adequately protect wetlands and wetland buffers or sufficiently mitigate any impacts to these. Most of the participants also noted that they want further emphasis on the protection and conservation of wetlands. One participant noted that the CAO update should be used as an educational opportunity to the public to communicate the intrinsic and socioeconomic values of protecting wetlands.

Experience with the City's CAO permitting process

This topic had varied feedback from participants. One participant questioned if the current permitting process is reactive to evolving new science and if there is built-in flexibility into the code. Another participant said they would like to review the existing code language to provide more pointed feedback on this matter.

City's adequacy of protecting wetlands

Several participants noted that the City needs to balance the public interest to accommodate housing and basic needs for humans but also adequately protect wetlands and other critical areas. A couple of participants noted that public access and development is a double-edged sword because access or development in proximity to wetlands and other critical areas may result in impacts that are unaccounted for, becoming a maintenance and wetland quality issue. One participant noted that development and related infrastructure, such as stormwater facilities, can negatively impact wetlands, so they need to be designed thoughtfully with wetland impacts in mind.

Reducing burden on property owners and developers

A participant noted that one way of reducing wetland mitigation costs is with local, on-site mitigations. One participant noted that there are resource organizations beyond the City, such as Clark Conservation District, which can help developers or property owners through the complex permitting process and the City should provide these resources early in the permitting process.

Equity issues

One participant noted that disadvantaged neighborhoods are often historically near poor quality wetlands that do not have “quality access” and noted the Fruit Valley neighborhood as an example. Another participant discussed that ordinances and code are hard to explain, especially to groups who speak languages other than English, lower economic status, different educational background, etc. These groups struggle to understand these policies and the City should simplify materials and consider making them available in multiple languages. Participants noted that real estate groups and the consultant community should be further engaged in the CAO update.

Critical Aquifer Recharge Areas

Important outcomes from the CAO update

Most participants noted that there can be additional regulations and referenced resources that can be included as part of the CARAs CAO update. One participant noted that they run into very few activities that are of concern when reviewing projects under CARAs and that a more comprehensive list of prohibited or unsuitable uses or activities should be included for reviews. Noticing and educating property owners was a concern of one participant and noted that this should be improved as part of the update, with a specific suggestion to notice all property owners within a wellhead protection area for a proposed development.

City’s adequacy of protecting CARAs and drinking water

A consensus amongst the participants was made that more could be done to better protect CARAs and drinking water sources with positive reception that the City is exploring this. A few participants noted that the City’s current regulations do not consider many sources of pollution, especially beyond heavy industrial or commercial uses. There is new data and research showing there are other chemicals and sources, such as vehicle tires and chemicals, from residential wastes that are not considered. Also, the City should consider runoff from developed sites as potential impacts for CARAs. Two participants discussed the current designation of special protection areas as any property within 1,900 feet of a municipal wellhead and that this severely limits adequate review of potential impacts of activities and uses beyond this radius and that the City should consider revising the code. One participant noted that the hydrogeological assessment requirements are insufficient but is glad to hear the City is working on improving this. The same participant also noted the City should consider climate change and water scarcity in the CAO update as there are communities in the state where aquifer levels are declining and will continue to do so.

Experience with the City's CAO permitting process

Several participants noted that there is confusion or a misunderstanding when there is redevelopment of a site or a change of user and the applicability of the CARAs regulations that causes inadequate assessments and enforcement of these uses. One participant expanded on this saying that many uses that are excluded from CARAs review should be assessed for impacts as there is more sources and research showing that there are many unaccounted contaminants/pollutants to drinking water resources. A participant followed up saying they agree with this as not many activities are regulated under CARAs review that should be. One participant noted that many developers are not the end users of development, and the end users are unaware of the permitting process and the regulatory requirements with the active use. This makes it hard to go back to these uses and enforce regulations when the end user is unaware.

Equity issues

Two participants noted that historically, at national and local levels, areas populated with disadvantaged groups have had issues with access or reliable clean drinking water. One participant noted that there is a lot of risk generally in the City due to well-draining soils; therefore, there is a lot of vulnerability, especially to disadvantaged groups.

Geologically Hazardous Areas

Important outcomes from the CAO update

One participant noted that it should prioritize protecting people from geologic hazards and consider earthquake resiliency. Another participant said the mapping should include escarpment areas as it is a high-hazard area. The same participant noted that there are neighborhoods along the Columbia River that will subside when “the big one” occurs and new development should be designed to minimize impacts from this large seismic event.

Most important geological hazard area

Two participants responded saying that all three geologically hazardous areas (erosion, landslide, and seismic) are important to consider. One participant noted that there should be extra protection for areas developed on fill and that trees and vegetation in these areas are important to reduce risk and ground movement. One participant noted that two of the three geologically hazardous areas are recognized and regulated in land use code (erosion and landslide) whereas seismic hazards are generally regulated through building code. This participant noted that it is difficult to implement seismic hazards for land use but would like to see this explored more as is done in California. This participant also noted that landslide hazards are a high concern in Washington and the Washington Geologic Survey has updated information for landslide hazards and other geologically hazardous areas.

Experience with the City's CAO permitting process

One participant stated that they help review critical area permits and is shocked that there are site-specific geotechnical assessments that conclude it's feasible to develop on some geologically hazardous areas. Participants noted that it would be helpful for the City to have a geotechnical engineer in-house or access to a consultant to better review geotechnical reports provided by applicants.

Equity issues

One participant noted that underrepresented groups are generally more hesitant to participate or are actively excluded in planning processes because of eroded trust in government authorities. A participant was curious to know if there are any populations that are disproportionately living in geologically hazardous areas. One participant noted that people with greater incomes generally build on properties with geological hazards because of premium views and can pay for expensive permitting and geotechnical reports. This was followed up with a discussion if there are marginalized groups living downslope of these homes in landslide areas and that this should be considered.

Next Steps

In support of the project's public engagement, the Project team will take all input received under consideration in the development of draft code language for the CAO update. The updated and draft CAO will be provided to the City's Planning Commission and City Council in a series of workshops and public hearings for review and adoption in spring 2024.

An aerial architectural rendering of the Vancouver Innovation Center. The central feature is a large, white, semi-circular building with a curved roofline. Surrounding this central building are various other structures, including rectangular buildings and parking lots. The site is landscaped with numerous trees and green spaces. In the top left corner, there is a circular inset showing a close-up of a green area with a person walking. The text "Vancouver Innovation Center Proposed Revised Master Plan and Development Agreement" is overlaid in large, bold, black letters across the center of the image.

Vancouver Innovation Center Proposed Revised Master Plan and Development Agreement



Joana Filgueiras, Real Estate Project Manager, Economic Prosperity and Housing

Mark Person, Senior Planner, Community Development

Agenda

- Master Plan Revisions
- Development Agreement
- Forested Area
- Sustainability
- Next Steps

Master Plan Revisions:

- Consolidation of industrial areas to optimize opportunity for employment-generating development
- Enhanced integration of uses to allow for greater density
- Additional open space
- Multi-modal ring road to create an accessible commercial corridor





The Trail



Industrial Grove

Forested Tract

Wetland Corridor



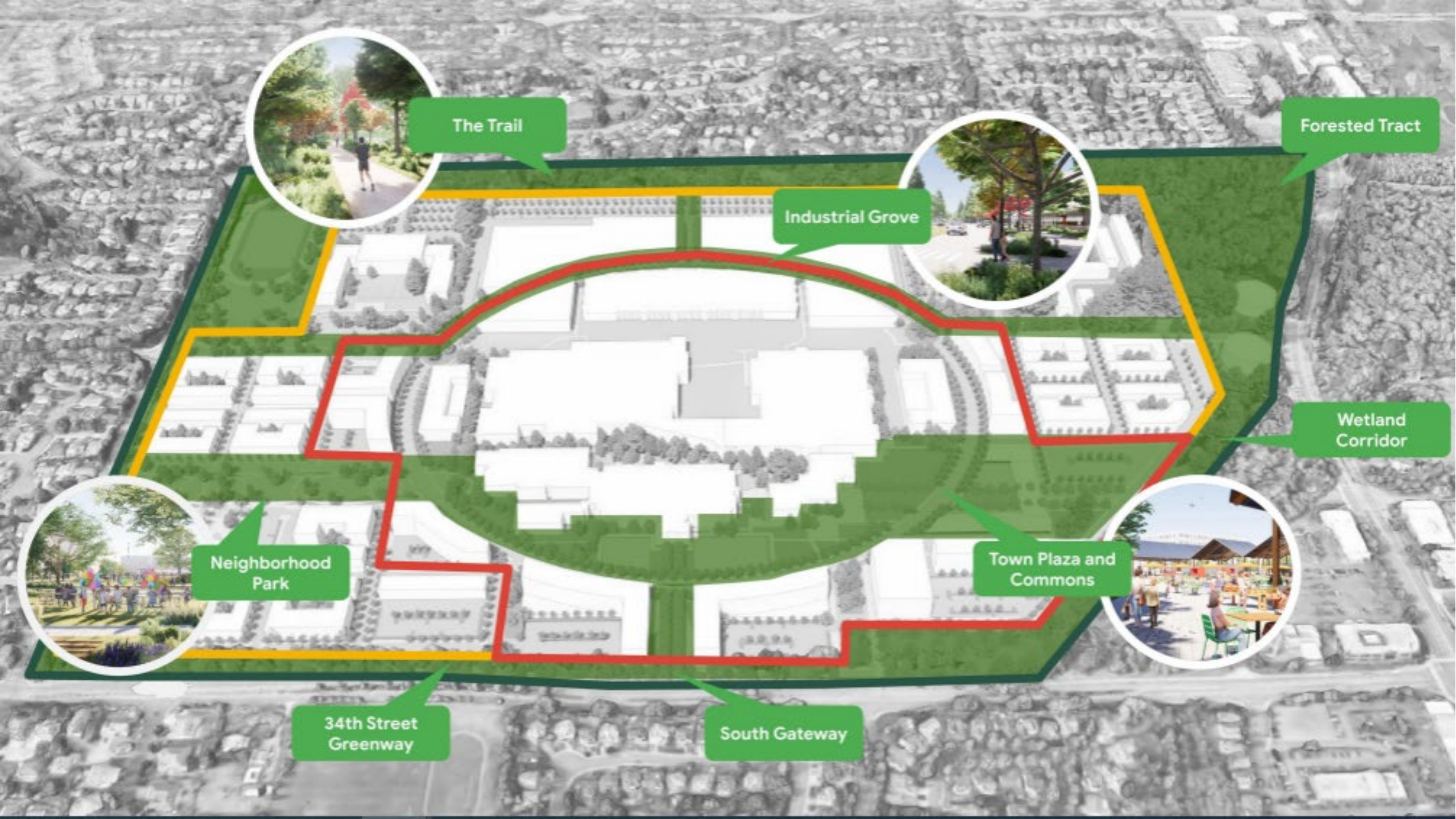
Neighborhood Park



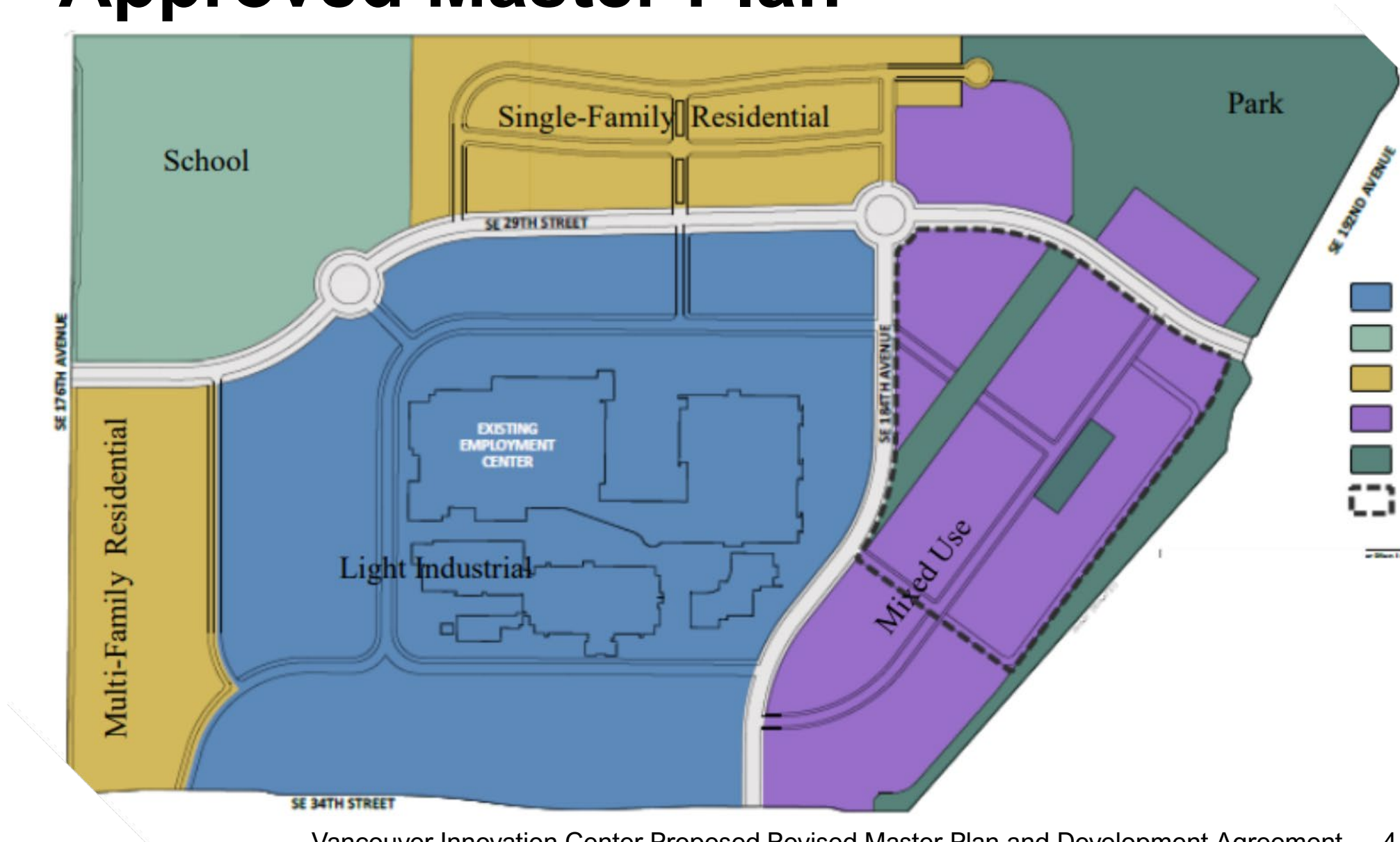
Town Plaza and Commons

34th Street Greenway

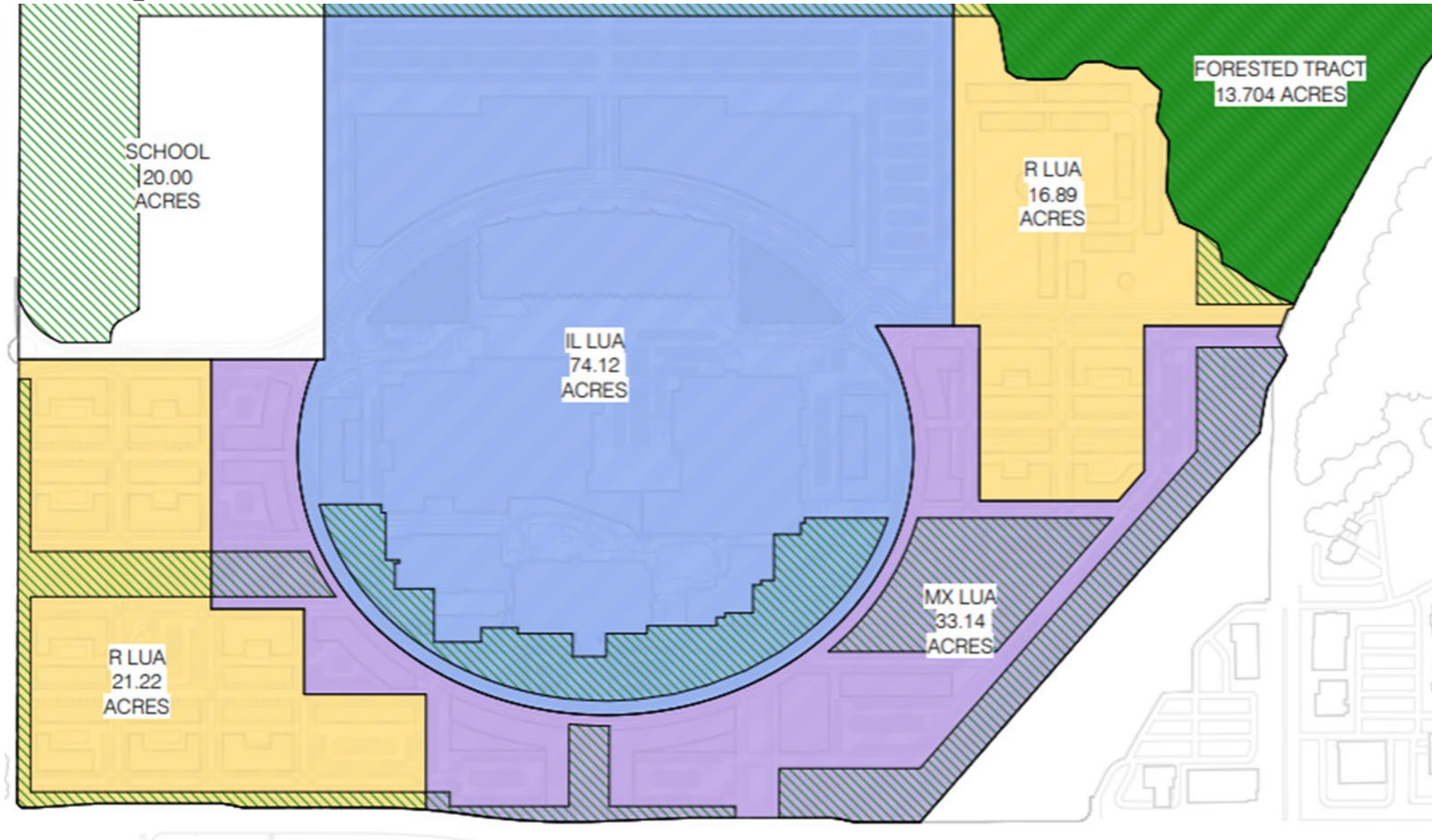
South Gateway



Approved Master Plan



Proposed Master Plan



Approved vs. Proposed LUAs

Approved	
LUA	Acres
School	20
Open Space	19.1
LI	67.2
Residential	30.4
Mixed Use	31.9
ROW	10.5
Total	179.1

Proposed	
LUA	Acres
School	20
Forested Tract	13.704
LI	74.12
Residential	38.11
Mixed Use	33.14
ROW	Within the LUA
Total	179.1

Open Space, outside of the Forested Area, is within each LUA. 24 Acres total proposed Open Space

SE 29TH STREET

SE 30TH AVENUE

SE 34TH AVENUE

SE 34TH STREET

SE 35TH AVENUE

SE 36TH AVENUE

SE 37TH AVENUE

SE 38TH AVENUE

SE 39TH AVENUE

SE 40TH AVENUE

SE 41ST AVENUE

SE 42ND AVENUE

SE 43RD AVENUE

SE 44TH AVENUE

SE 45TH AVENUE

SE 46TH AVENUE

SE 47TH AVENUE

SE 48TH AVENUE

SE 49TH AVENUE

SE 50TH AVENUE

SE 51ST AVENUE

SE 52ND AVENUE

SE 53RD AVENUE

SE 54TH AVENUE

SE 55TH AVENUE

SE 56TH AVENUE

SE 57TH AVENUE

SE 58TH AVENUE

SE 59TH AVENUE

SE 60TH AVENUE

SE 61ST AVENUE

SE 62ND AVENUE

SE 63RD AVENUE

SE 64TH AVENUE

SE 65TH AVENUE

SE 66TH AVENUE

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SE 68TH AVENUE

SE 69TH AVENUE

SE 70TH AVENUE

SE 71ST AVENUE

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SE 81ST AVENUE

SE 82ND AVENUE

SE 83RD AVENUE

SE 84TH AVENUE

SE 85TH AVENUE

SE 86TH AVENUE

SE 87TH AVENUE

SE 88TH AVENUE

SE 89TH AVENUE

SE 90TH AVENUE

SE 91ST AVENUE

SE 92ND AVENUE

SE 93RD AVENUE

SE 94TH AVENUE

SE 95TH AVENUE

SE 96TH AVENUE

SE 97TH AVENUE

SE 98TH AVENUE

SE 99TH AVENUE

SE 100TH AVENUE

EXISTING EMPLOYMENT CENTER

FORESTED TRACT

PROMENADE

URBAN PLAZA

LINEAR GREENWAY

TIER I - CENTRALIZED GATHERING SPACE

TIER II - COMMON AREAS AND LINKAGES

0 50 100 FEET

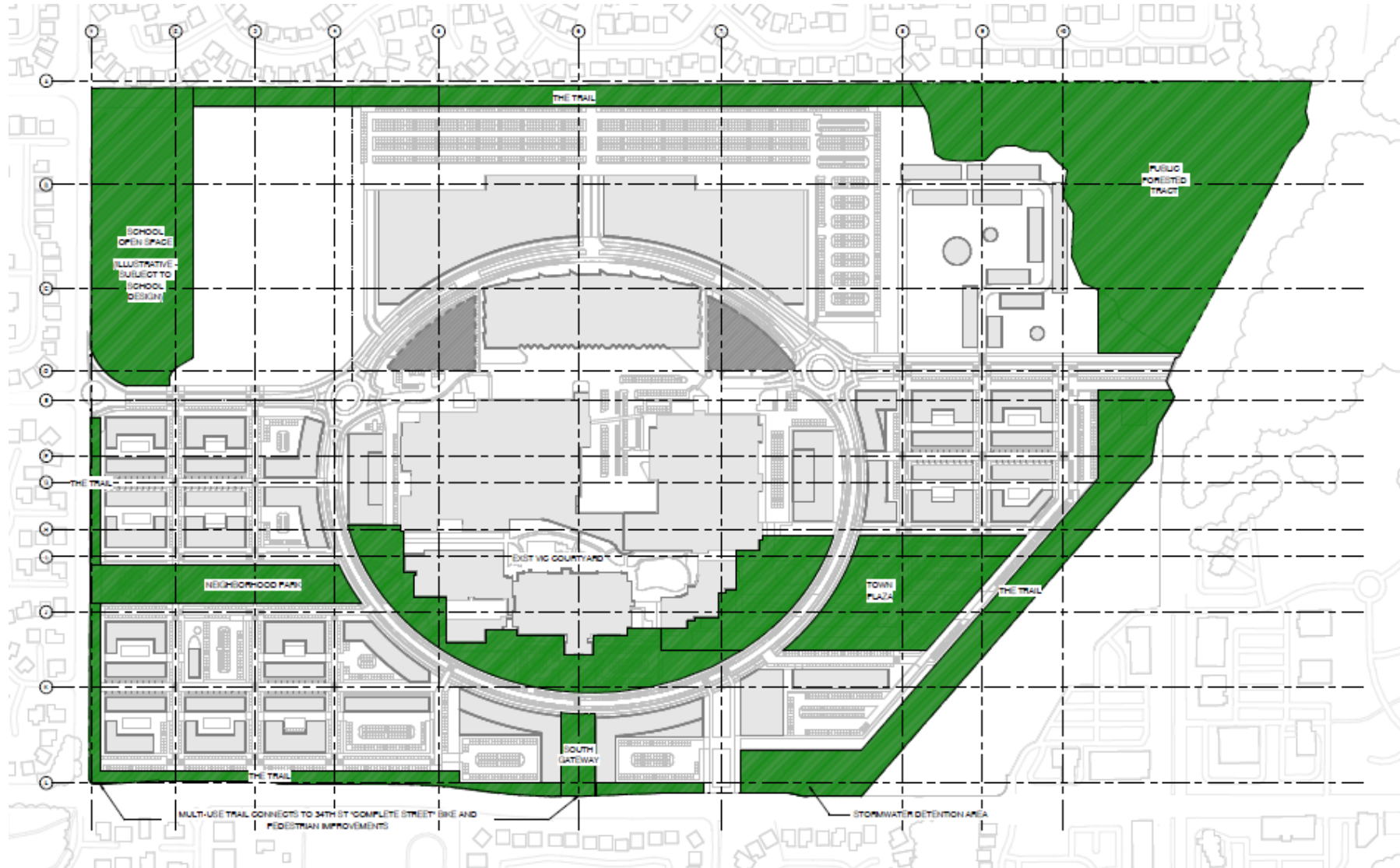
0 50 100 FEET

Open Space Synopsi				
Open Space Tier	Area Description	Area (acres)	of 19.1 acres	Percentage of Each Use
Tier 1 Centralized Gathering Space	Forested Tract	15.8	of 19.1 acres	71.2%
	Urban Plaza	0.6	of 19.1 acres	3.1%
	Promenade	2.1	of 19.1 acres	11.0%
	Linear Greenway	2.6	of 19.1 acres	14.7%
Tier 2 Common Areas and Linkages	Use/Employment	7.0	of 67.2 acres	10.4%
	Residential	1.7	of 30.1 acres	5.6%
	Mixed-Use	3.5	of 31.9 acres	11.0%
Total		34.3		

- 19.7 total acres
of publicly
accessible
open space

Open Space Synopsis				
Open Space Tier	Area Description	Area (acres)		Percentage of Each Use
Tier 1 Centralized Gathering Spaces	Penned-in Trails	15.8	of 19.1 acres	71.2%
	Urban Plaza	0.6	of 19.1 acres	3.1%
	Promenade	2.1	of 19.1 acres	11.0%
	Linear Greenway	2.8	of 19.1 acres	14.7%
Tier 2 Corridor Areas and Linkages	Live/Work/play	7.0	of 67.2 acres	10.4%
	Residential	1.7	of 30.4 acres	5.6%
	Mixed-Use	3.5	of 31.9 acres	11.0%

Proposed New Open Space

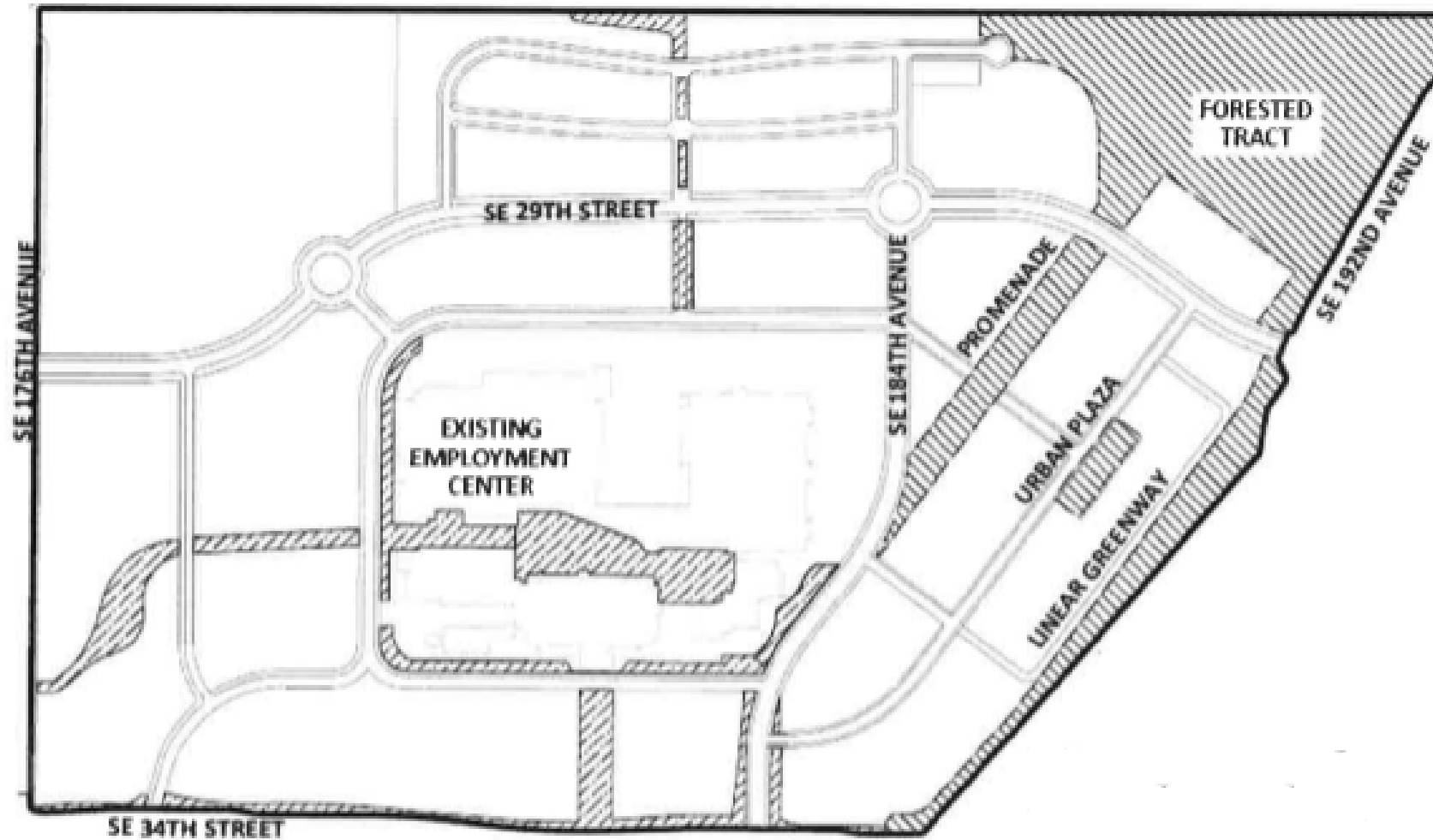


Forested Area – **13.7 Acres**

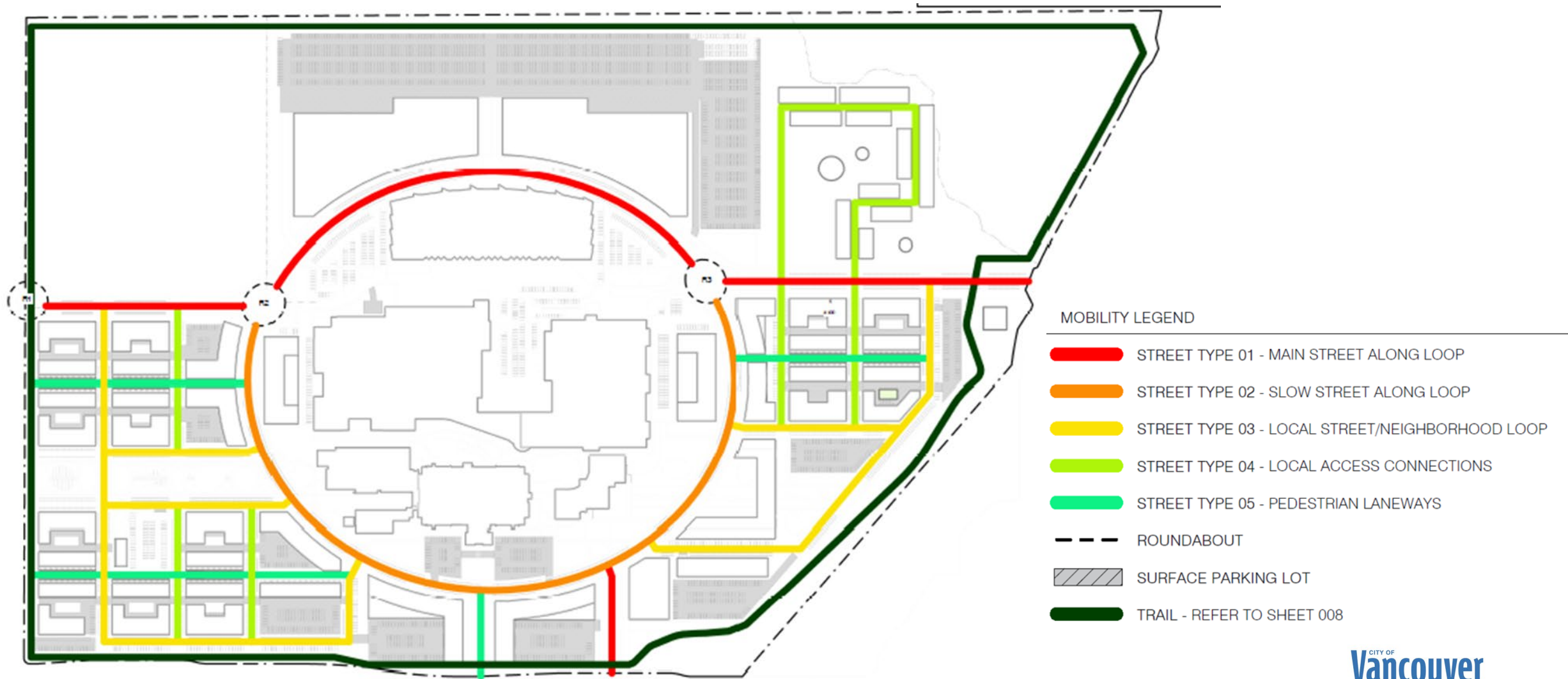
Open Space throughout the Campus – **8.3 Acres.**

Total **24 Acres** of Open Space

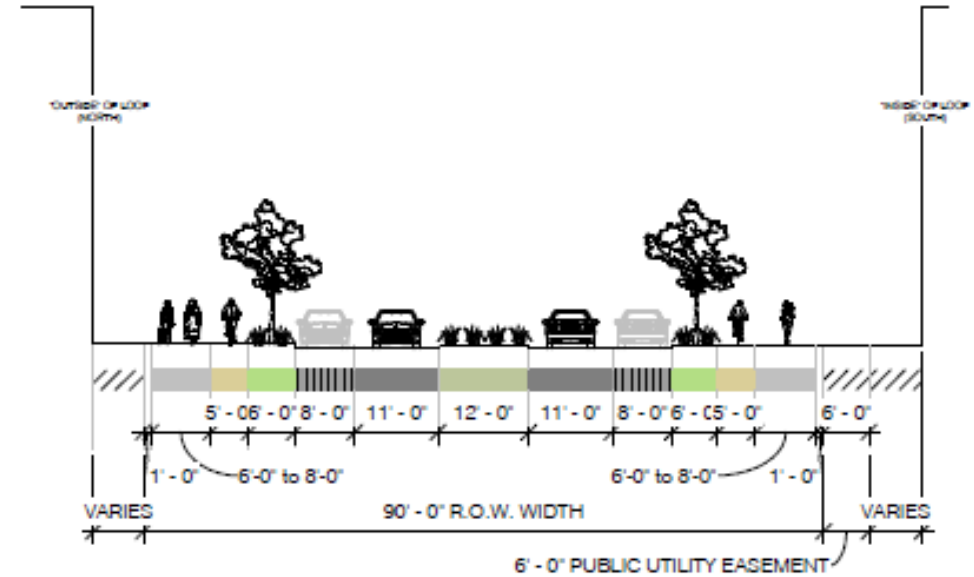
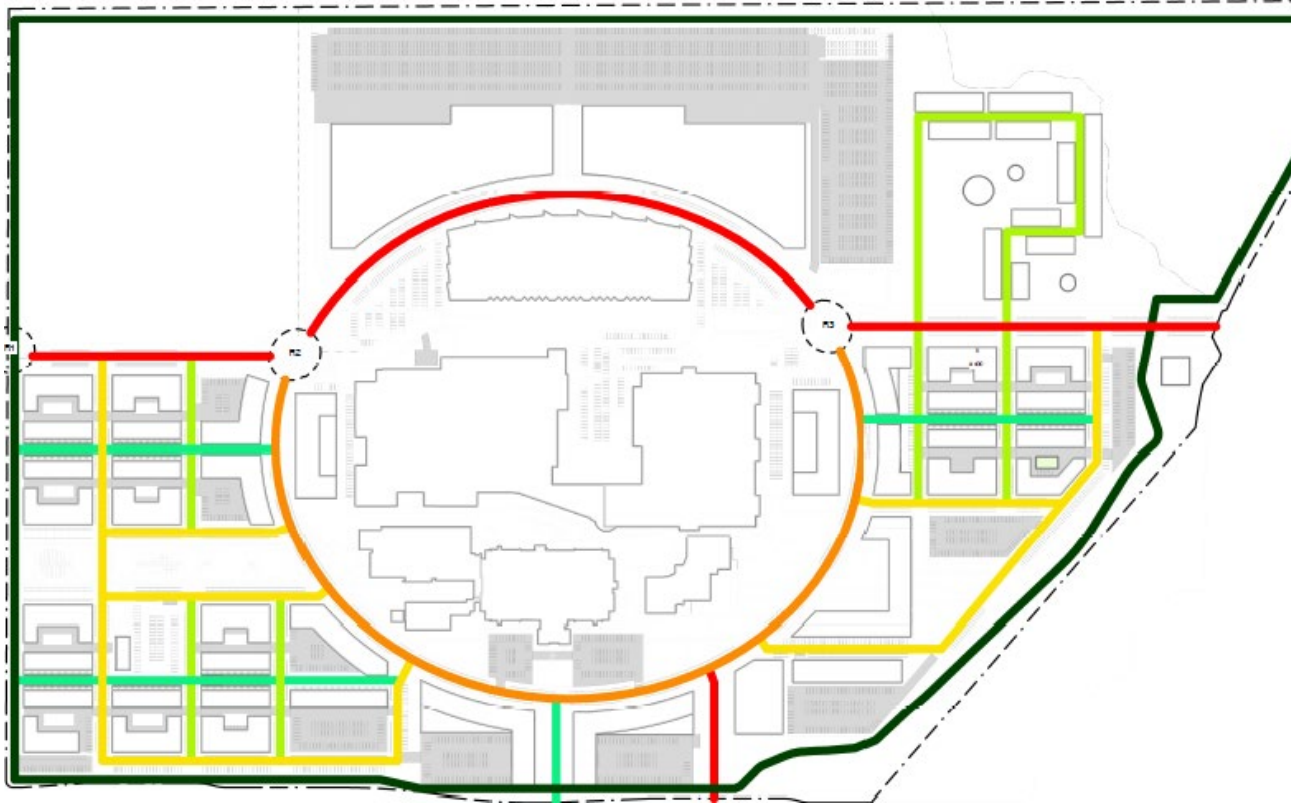
Approved Streets Plan



Proposed Street Plan



Proposed Streetscape

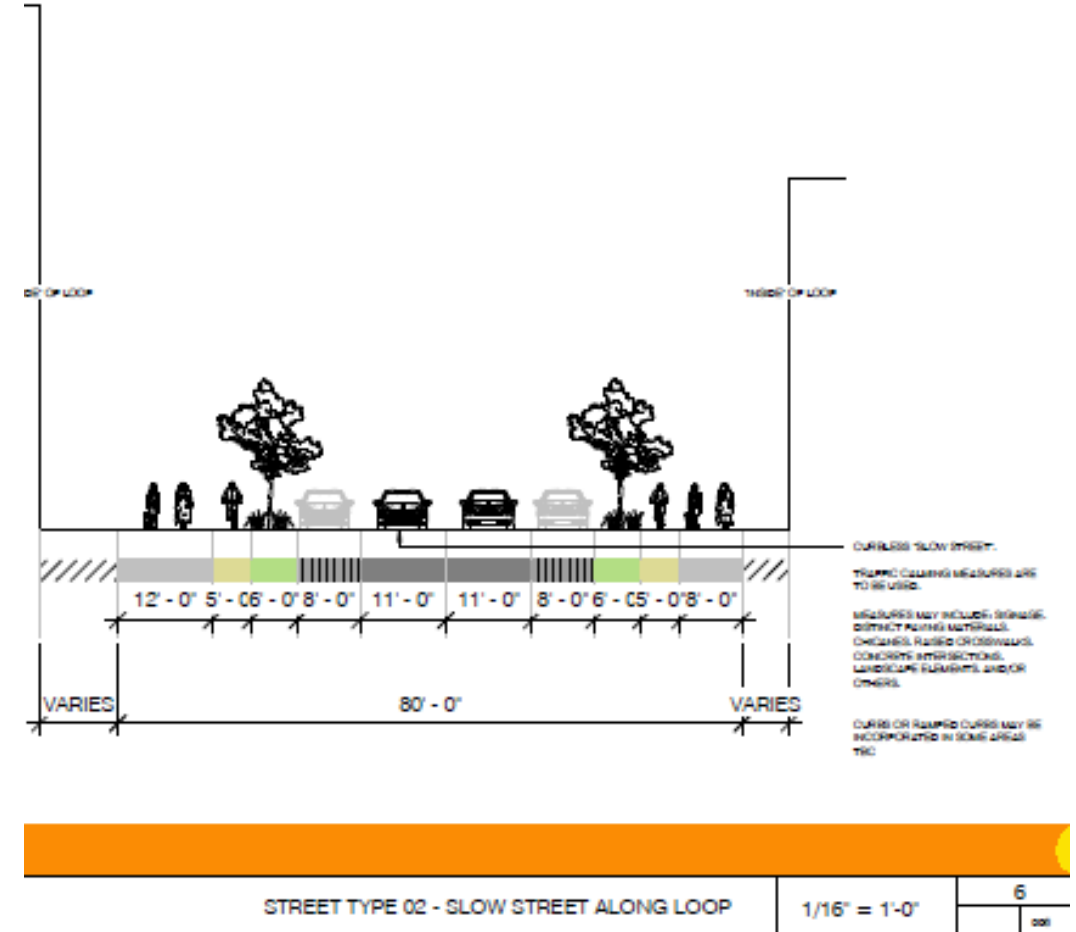
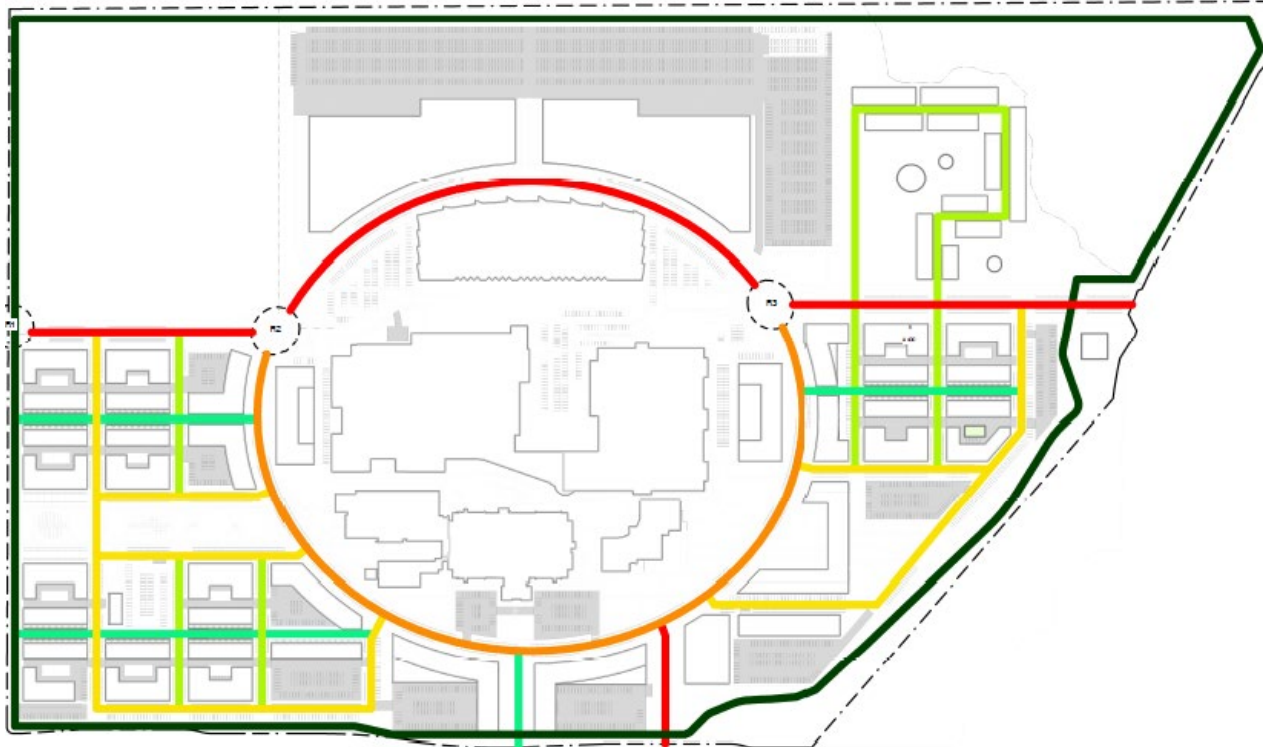


STREET TYPE 01 - 29TH ST. COLLECTOR - LOOP ROAD

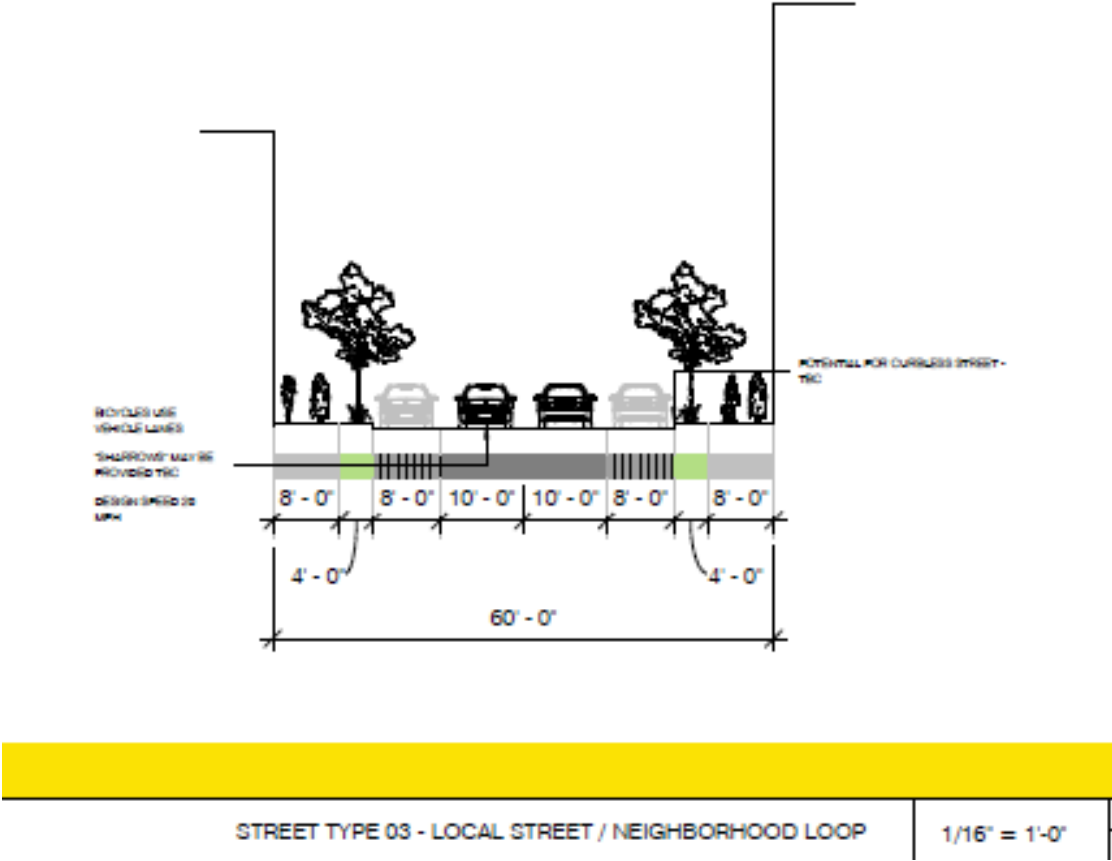
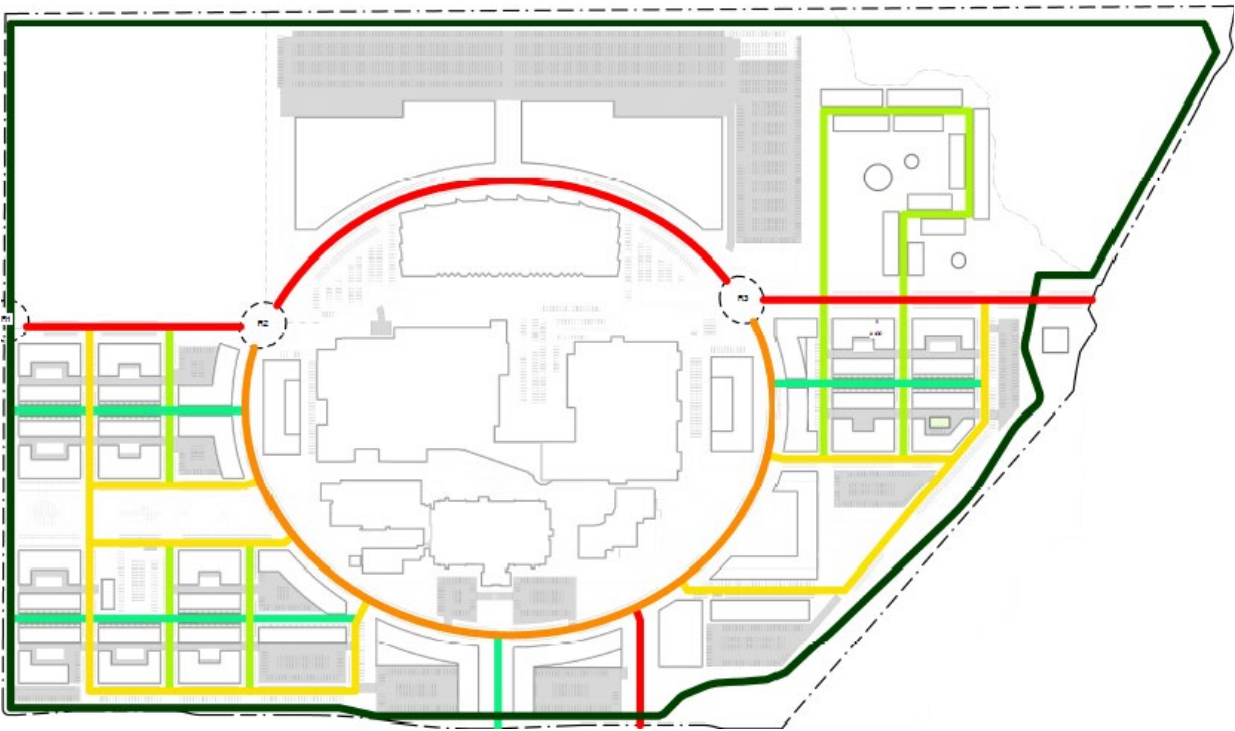
1/16" = 1'-0"

1
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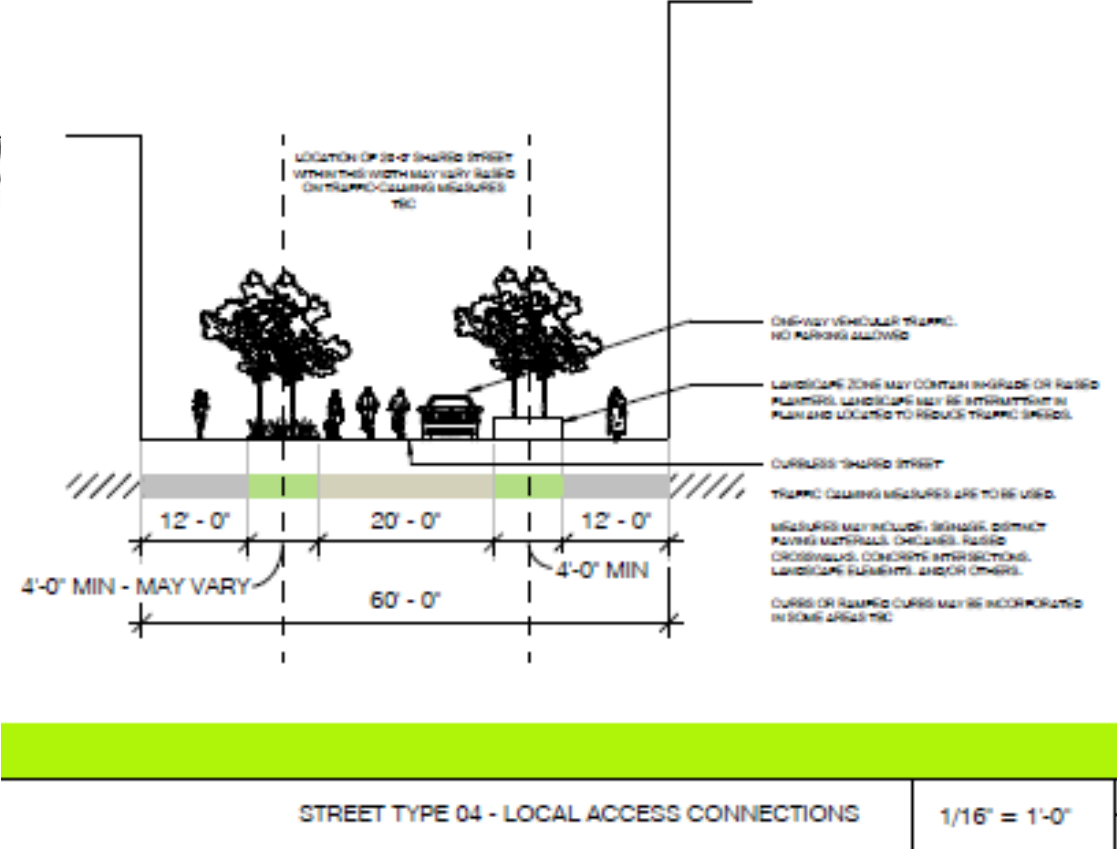
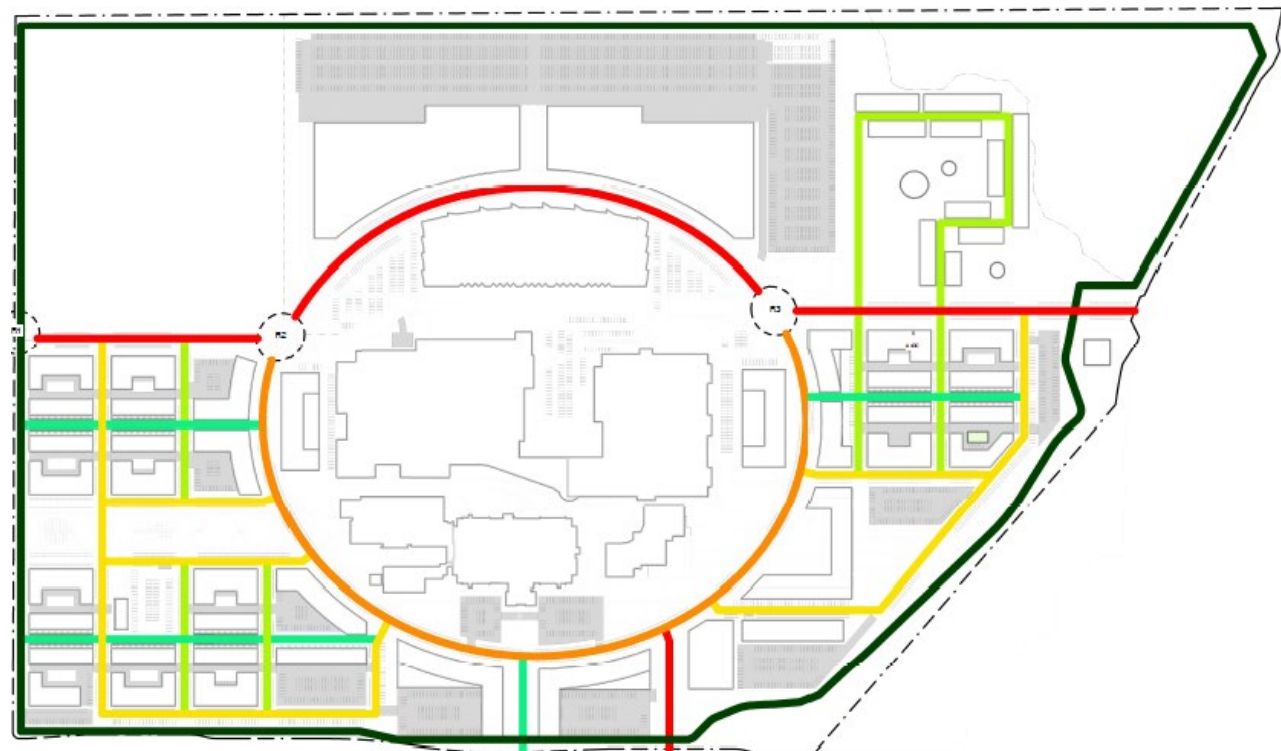
Proposed Streetscape



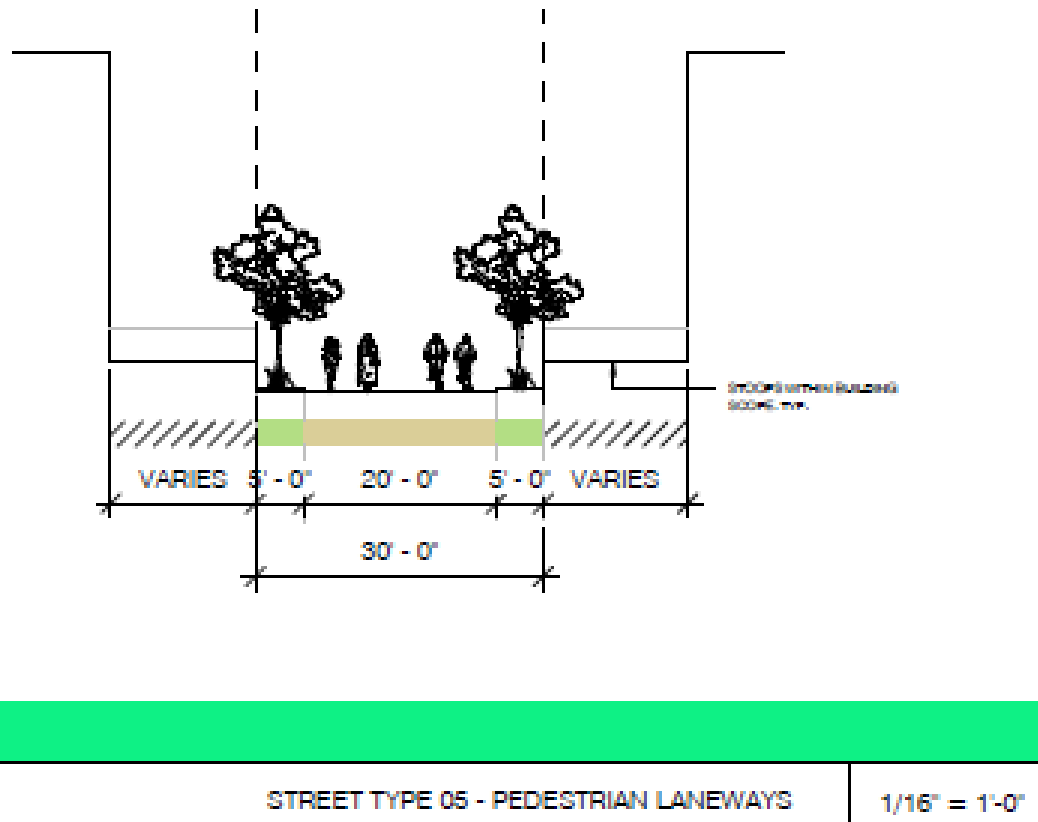
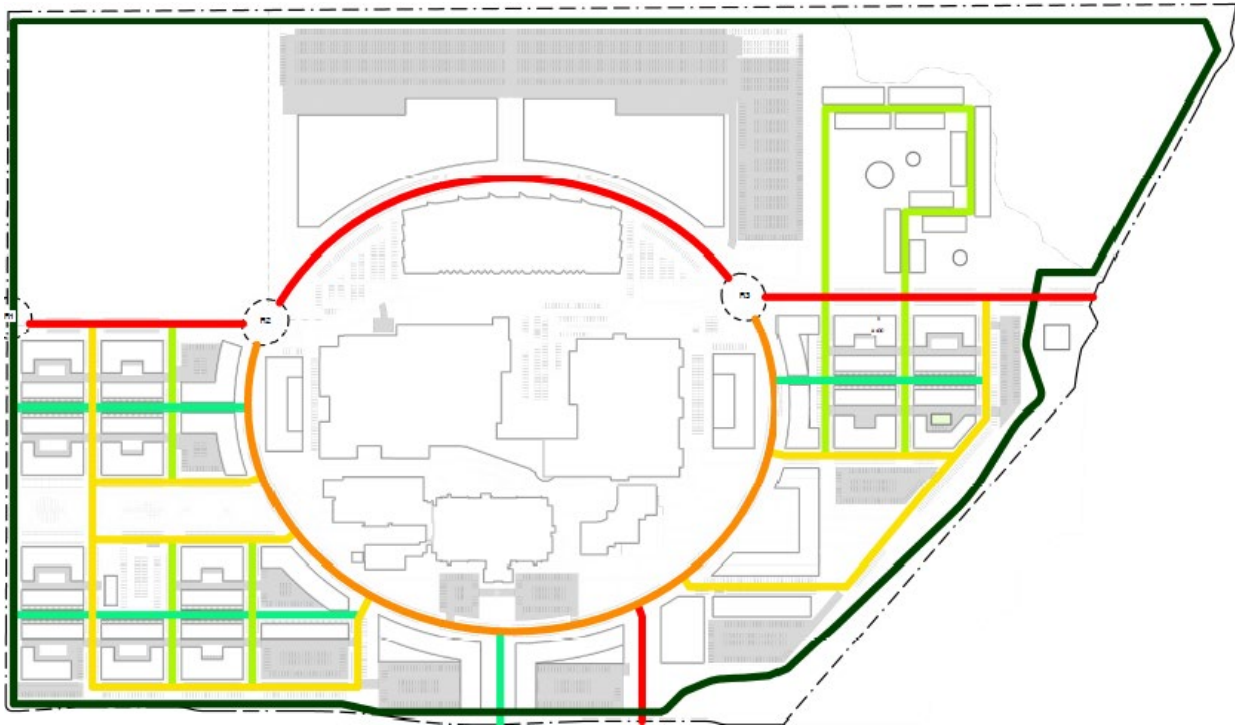
Proposed Streetscape cont.



Proposed Streetscape cont.



Proposed Streetscape cont.



Development Agreement (DA)

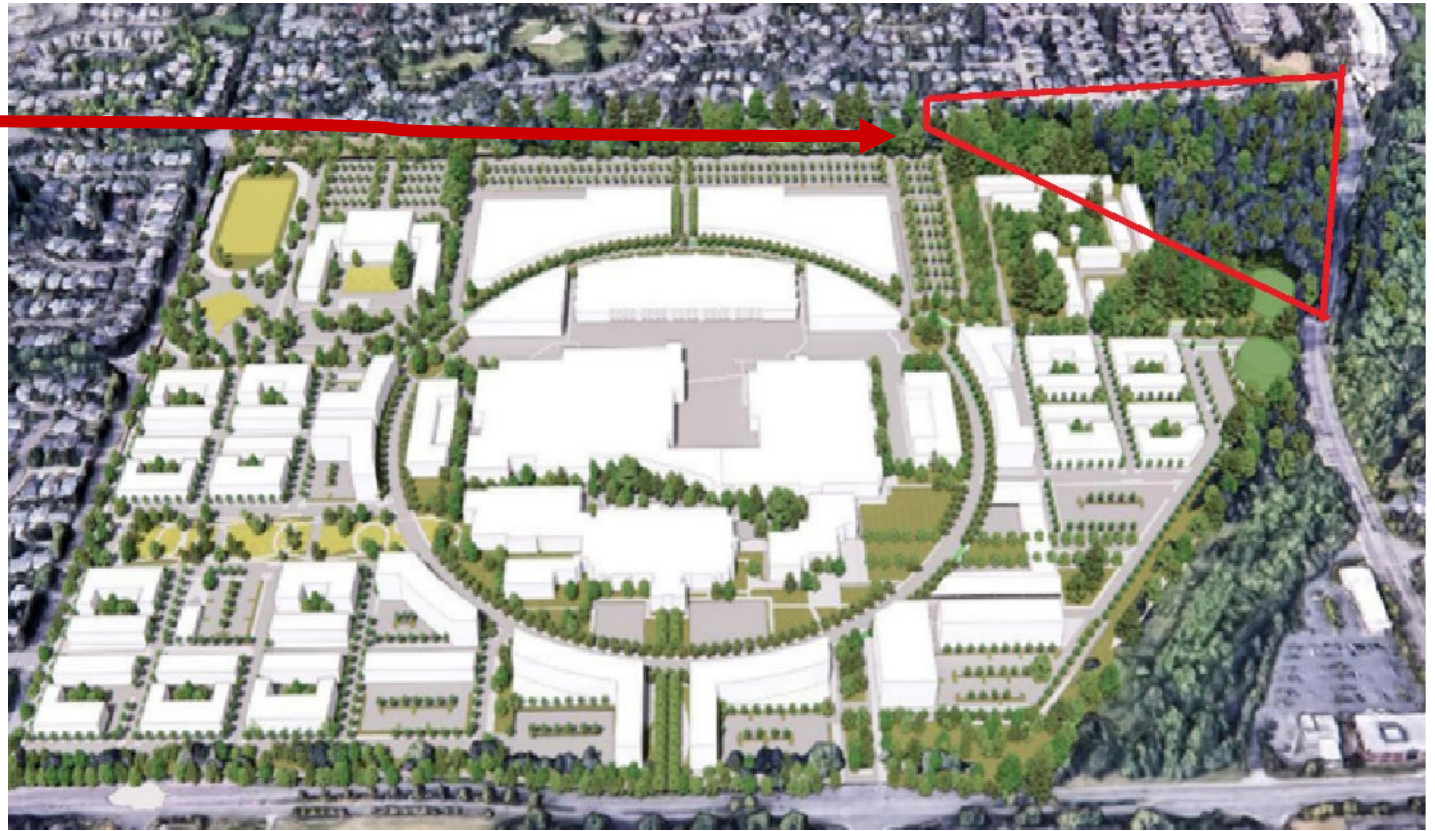
“If a development agreement is proposed in conjunction with a Type II, III or IV land use application under Chapter [20.210](#) VMC, Decision-Making Procedures, the development agreement shall be presented to City Council at a public hearing for approval by ordinance or resolution, after approval of the Type II or III application or after Planning Commission action on a Type IV application. The review body for the Type II, III or IV application shall not make a final decision on that portion of the application related to the development agreement but shall make a recommendation of approval or denial of the development agreement to City Council. If no appeal is filed on the underlying land use application, the Planning Official shall send written notice of the public hearing at least 10 days prior to City Council consideration of the development agreement to all parties entitled to a Notice of Decision for the applicable application under Section [20.210.050\(I\)](#) VMC or [20.210.120\(B\)\(11\)](#) VMC.”

Development Agreement Changes

- Forested area acquisition and development
- Central loop ring road reconfiguration
- Revised land use areas
- Consolidation of residential areas
- Increased density
- Elimination of detached Single-family homes
- Removing phasing
- Updated Design Guidelines
- Affordable Housing commitment
- Sustainability Plan
- Shared parking
- Vesting trips from previous DA
- Hotel and Community space allowance

Forested Area

- 13.7 Acre Forested Area to be acquired by the City and developed into a Community Park
- First phase of Park development to be delivered within 3 years from PSA signed.



- The City will also acquire land adjacent to the Forested Area to be used as parking.
- Trees required to be replaced due to the parking development will be replaced on Campus

Tree Canopy

Commitment to achieving Silver Leaf Tree Cap: property reaches the canopy cover goal for its zoning level.

Coverage Goals:

Neighborhood Level= 30%



Commercial Uses

- Replacing the Town Center with Commercial Corridor.
- Removing the 860,000 maximum allowance for employment space.
- Allowing office uses to be developed as market demands.
- Buildings in the MX LUA, adjacent to the ring road must be at least 3-stories
- Removing transfer requirements
- Allowing for employment uses to be developed sooner than other uses, if needed.



Residential

- Increasing from 1,200 to 1,800 residential units.
- Eliminating Detached Single-Family homes.
- Replacing Single-Family Residential (SFR) and Multi-Family Residential (MFR) areas with Residential Land Use Area (R LUA).
- Developer's commitment to applying to MFTE for all residential buildings (20% of units at 80% AMI)



Sustainability

- Adaptive Reuse (existing building)
 - Improved the building's energy efficiency- estimated savings of 6,300,000 KWh and 345,000 terms
 - Replaced water systems to reduce water usage
 - Installed sub-meters
 - Implemented sustainable requirements to tenants
 - Installed showers and bike storages



Sustainability cont.

- Increase in Open Space area
- Shared Parking
- EV Charging
- Optimizing building performance
 - Solar Ready
 - Electric Systems
 - Heat Pumps



Sustainability cont.

- Mixed-use neighborhood– Park, School, Retail, Restaurants, commercial, and more.
- On site rainwater runoff infiltration
- Multi-Modal accessibility
- Heat Island reduction: Tree Canopy Silver achievement
- Integrative Design
- Landscape design to reduce water usage



Other Traffic Related Changes:

- 25th Street to be removed from the City's Capital Plan
- 29th Street to be added to the Capital Plan to allow developer to get TIF credits
- Change to be made at the Spring Supplemental Budget Adjustment

Traffic Impact Analysis

Vesting the Net New Trips from the Approved Master Plan.

Approved MP Vested Trips

- Net new trips – 26,982 (ADTs)
- 2,088 AM peak Hours
- 1,991 PM peak hours

Trips based on proposed MP

- Net new trips – 26,668
- 2,229 AM peak hours
- 1,991 PM peak hours

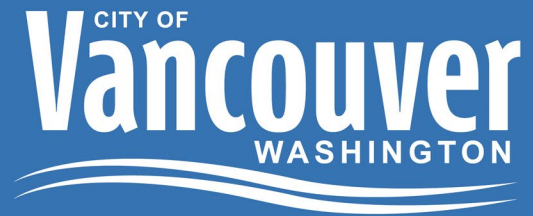
Other Changes to the DA

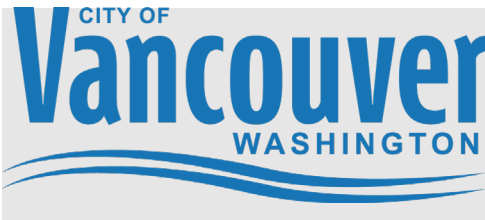
- Hotel and community space allowed within the MX area as a Type II application instead of a Type III
- Design Guidelines updated to match other changes.
- Development phasing approach removed allowing development to follow infrastructure development and market demand.
- Designated Open Space areas replaced with Open Space Overlay.

Next Steps

- Forth Coming Planning Commission and City Council review - TBD
- February 2024- Tentative Planning Commission Public Hearing pending December 12th discussion
- March 2024- Tentative City Council Workshop

Thank You





MEMORANDUM

DATE: December 12, 2023

TO: Chair Ledell and Planning Commission members

CC: Rebecca Kennedy, Deputy Director, Community Development Department

FROM: Mark Person, Senior Planner, Community Development Department
Joana Filgueiras, Real Estate Project Manager, Economic Prosperity and Housing

RE: **Vancouver Innovation Center Master Plan and Development Agreement Revision**

Background and History

The Vancouver Innovation Center (VIC) encompasses approximately 179 acres and is located at 8110 SE 34th Street. The site consists of parcels 986060362, 986056494, 126455000, and 126816000 within the NE, NW, SW, and SE ¼ of Section 6, Township 1N, Range 3E of the Willamette Meridian.

The 179-acre site was originally developed by Hewlett-Packard prior to annexation to Vancouver in 1997 and was sold to S-E Incorporated in 2009. New Blueprint Partners purchased the existing building complex in the center of the site in 2020. The approximately 47-acre light industrial building complex encompasses approximately 715,000 square feet in six linked buildings, surrounded by approximately 2,100 surface parking stalls. Since acquiring the site, the applicant has made substantial upgrades to the existing buildings that include energy efficiency and modernization. Most of the undeveloped portion of the rezone site is grasslands, except for the northeast area which remains heavily forested.

The site is located among single family neighborhoods on three sides. SE 34th Street, a four-lane arterial road with a center landscaped median, forms the southern edge of the site and the main access point, and is served by the C-Tran #37 bus with 15-minute peak hour service intervals to downtown and the Fisher's Landing Transit center. Note that SE 34th Street will be reconfigured in 2024 to one travel lane in each direction and new protected mobility lanes, transit platforms and enhanced crossings, as part of the SE 34th Street Safety & Mobility Project. Traffic modeling conducted as part of this included all trips associated with the updated VIC master plan, and the final design has been endorsed by the Transportation & Mobility Commission and approved by Council. Below 34th Street are master planned single-family subdivisions, and the Fisher's Landing Elementary School. SE 176th Avenue, a two-lane collector road, forms the western edge of the rezone site, and west of that are additional master planned single family subdivisions. Single family development is also north of the

rezone site, but without any separating roadway. To the east the site is bounded by 192nd Avenue and Fisher's Creek. Beyond the creek to the east is a commercial development consisting of a tire store, bank and offices.

Proposed Changes to Original Plan

Vancouver Planning Commission reviewed and recommended approval of the original master plan ("Original Plan") and a zone change in 2021. The Original Plan was reviewed at six Planning Commission public workshops held virtually on August 11, September 8, November 10, and December 8, 2020 and on January 26 and May 11, 2021. At the July 6, 2021 public hearing, Planning Commission recommended approval. Vancouver City Council approved the Original Plan, zone change and an accompanying development agreement at a consent hearing on August 9, 2021 and public hearing on August 16, 2021.

New Blueprint Partners and Rabina LLC ("Developer") are proposing changes to the Original Plan and the development agreement dated September 15, 2021 ("Original Agreement") to optimize opportunity for employment-generating development, create higher integration of uses, allow for greater density, and create additional open space.

Proposed changes to the Original Plan and Original Agreement include:

- Central Loop/ ring road configuration change
 - o A loop in the center of the campus creates a commercial corridor and allows for better mobility throughout the site, eliminating the Town Center described on the previous DA.
 - o Buildings fronting the ring road, within the Mixed-Use LUA, must be at least 3-story tall.
 - o Buildings adjacent to the ring road, within the MX LUA, must have active uses on street level.
 - o Parking lots must be behind buildings within the ring road.
- Revised Land Use Areas
 - o Land Use areas have been revised and moved to create a more integrated neighborhood
 - o A new Open Space LUA is designated as an overlay and not a specific area within the plan.
 - o A minimum of 600,000 SF of new employment space will be maintained but the maximum of 860,000 SF will be removed (a traffic study will be required for employment space development beyond 860,000 SF)
- Increase density and the elimination of detached single-family residential.
 - o Raising the maximum residential units allowed from 1,200 to 1,800.
 - o Residential LUAs will have a minimum density of R-30 and maximum of R-35.
 - o MX Height maximum allowed throughout the campus.
 - o Removing Residential Transfer limitations.

- Consolidate Residential Areas
 - o Removing Single-Family Residential (SFR) and Multi-Family Residential (MFR) areas and replacing it with Residential Land Use Area (R LUA)
- Remove phasing
 - o Allowing applicant to develop office spaces when supported by the market.
 - o Allowing applicant to develop additional employment land if needed, without complying with MX mix requirements.
 - o Ensuring that project still complies with the concept of a 20-minute neighborhood.
- Hotel and community center allowed as a Type II instead of Type III application.
 - o A Traffic Impact Analysis will be required with the application.
- Updated Design Guidelines
 - o Removing balcony requirements for buildings facing the ring road.
 - o Removing Single Family detached guidelines.
- Affordable Housing Requirement
 - o Applicant will apply to the Multi-Family Tax Exemption (MFTE) for all residential buildings and designate 20% of residential units to be affordable to households earning 80% of Area Median Income (AMI). This designation will be in effect for 12 years.
- Green Building Compliance
 - o Applicant is required to meet the City's interim green building policy, which requires projects to meet a LEED Gold or equivalent standard. A sustainability plan meeting the City's interim policy and consistent with the City's adopted Climate Action Framework will be attached to the amended development agreement ("Amended Agreement").
- Shared Parking
 - o Applicant will collaborate on providing shared parking without limiting their ability to comply with tenants' demands.
- Forested Area Acquisition
 - o The applicant will continue negotiating a Purchase and Sale Agreement for the sale of the Forested Area to the City of Vancouver, to be developed by the City into a Community Park.
 - o The first phase of the park is to be developed within 3 years from the PSA execution.
 - o The City will maintain the park to its standards.

Staff and applicant believe that the changes support the project's goal of creating a 20-minute neighborhood by providing access to quality employment, residences, recreation, and supportive services.

On September 12, 2023, the Vancouver Planning Commission held an initial workshop to review proposed changes to the Original Plan. In response to questions raised during that workshop, additional information on the changes to the Original Plan is shared below:

- Number of jobs created on campus - the Original Plan estimated 5,000 jobs being

created on site. The square footage for the employment area has not changed in the proposed master plan, so the potential for job creation remains the same. Market conditions have changed, though, and work-from-home has become more prevalent, which may impact how many employees are on-site on a typical day.

- Difference in size for each land use type from the Original Plan to the proposed one:
 - o Light Industrial – From 67.2 acres to 74.12 acres
 - o Residential – From 30.4 acres to 38.11 acres
 - o Mixed-Use – from 31.9 acres to 33.14 acres
 - o Open Space – From 19.1 acres to 24 acres
- 29th Street Timeline – Once 29th Street is included into the City's Capital Facilities Transportation Plan and becomes eligible for Transportation Improvement Fee Credits, the developer will start the construction of the road.
- Sustainability Plan – A sustainability plan addressing campus-wide initiatives will be attached to the Amended Agreement. The sustainability plan does not address future buildings so the developer will have to comply with the City's green building policy in effect at the time permit applications are submitted for those projects.

Outreach

As part of the master plan revision and development agreement update, the applicant has published a website for public comments, and has held two online open houses, one on January 30th, 2023, and one on January 31, 2023. The site is located within the Fisher's Landing East Neighborhood Association, which is directly south of 34th Street. The applicant has also informed the Fisher's Creek and Fisher's Landing East Neighborhood Associations about the proposed changes to the Original Plan.

Review Authority

VMC 20.285 assigns the Vancouver Planning Commission as the review body for Mixed-Use Master Plans greater than 25 acres in size, and development agreements accompanying any proposal already before the Commission. Planning Commission recommendations are forwarded to the Vancouver City Council for further public hearing review and final decision.

Mixed Use Master Plan standards and approval criteria are included as an attachment to this memorandum.

As per VMC 20.250.050 B, the following procedure applies to the approval of a development agreement:

"If a development agreement is proposed in conjunction with a Type II, III or IV land use application under Chapter 20.210 VMC, Decision-Making Procedures, the development

agreement shall be presented to City Council at a public hearing for approval by ordinance or resolution, after approval of the Type II or III application or after Planning Commission action on a Type IV application. The review body for the Type II, III or IV application shall not make a final decision on that portion of the application related to the development agreement but shall make a recommendation of approval or denial of the development agreement to City Council. If no appeal is filed on the underlying land use application, the Planning Official shall send written notice of the public hearing at least 10 days prior to City Council consideration of the development agreement to all parties entitled to a Notice of Decision for the applicable application under Section 20.210.050(I) VMC or 20.210.120(B)(11) VMC."

Alignment with the [Strategic Plan](#)

- Livability
- Equity and Inclusion
- Innovation
- Sustainability & Resiliency
- Trust & Relationships

Staff is seeking Planning Commission's input on the updated master plan concept.

Next Steps:

- February, Tentative Planning Commission Public Hearing

Mark Person, Senior Planner, Community Development Department
mark.person@cityofvancouver.us 360-487-7885

Joana Filgueiras, Real Estate Project Manager, Economic Prosperity and Housing
Joana.filgueiras@cityofvancouver.us 360-601-1196

Attachment(s):

Draft Developer Agreement
Proposed Master Plan
Applicant Narrative
Mixed Use Master Plan Standards and Approval Criteria
Revised Traffic Impact Analysis
Sustainability Plan
Revised Design Guidelines

[City Council Materials from August 16, 2021 Public Hearing](#)

**RECORDING REQUESTED BY
AND WHEN RECORDED RETURN TO:**

Maren L. Calvert, Attorney
Schwabe, Williamson & Wyatt P.C.
700 Washington Street, Suite 701
Vancouver, WA 98660

DRAFT IN REVIEW AS OF 12/08/2023

**VANCOUVER INNOVATION CENTER (VIC)
FOURTH AMENDED AND RESTATED DEVELOPMENT AGREEMENT**

City (Grantor):	City of Vancouver, a Washington municipal corporation
Developer (Grantee):	The VIC Building Owner LLC, a Delaware limited liability company Evergreen School District No. 114, a Washington public school district
Abbreviated Legal:	#5&7 6-1-3E #10 MARTIN DLC,#22N,41,36,13 SIMMONS DLC 52.65A; #5&7 6-1-3E #10 MARTIN DLC,#22N,41,36,13 SIMMONS DLC 104.52A; #172 WM SIMMONS DLC 1.24A
Assessor's Tax Parcel Nos.:	126455000; 126816000; 986056494; 986060362
Full Legal Description:	See Exhibit A
Reference Numbers of Related Documents:	3343884, 5809816, 5979934 AMD, 6017326 COV

**VANCOUVER INNOVATION CENTER (VIC)
FOURTH AMENDED AND RESTATED DEVELOPMENT AGREEMENT**

This Vancouver Innovation Center (VIC) Fourth Amended and Restated Development Agreement (this "VIC DA") is entered into on this _____ day of _____, 2024, by and among the City of Vancouver, a Washington municipal corporation (the "City" or "Grantor") The VIC Building Owner LLC, a Delaware limited liability company (the "VIC"), and Evergreen School District No. 114, a Washington public school district ("ESD"), with the VIC and ESD individually and collectively as "Developer" or "Grantee". City and Developer are referred to as the "Parties."

BACKGROUND

A. WHEREAS, in the 1970's, Hewlett-Packard ("HP") acquired approximately 179 acres of real property, located at 18110 SE 34th Street, Vancouver, Washington, formerly known as the HP Campus and now commonly known as the Vancouver Innovation Center (VIC), for the purpose of developing a large manufacturing campus for its own purposes pursuant to an HP South Campus Master Plan and, after building 715,000 square feet of office space, HP sold the VIC in 2009 to S-E, Inc., a Delaware corporation ("SE") subject to the a development agreement; and

B. WHEREAS, the Property, as legally described on Exhibit A attached hereto, is currently encumbered by that certain Third Amended and Restated Development Agreement by and among SE, the Developer, and the City, dated September 15, 2021 (the "Restated DA") and the VIC is the successor in interest to SE on the Property and the Restated DA, except for any portion designated as the School LUA Property (Clark County Tax Parcel 986060362; abbreviated legal description #17 SEC 6 T1N R3EWM 20.00A), as legally described on Exhibit A-3 attached hereto, which SE sold to ESD on November 30, 2021; and

C. WHEREAS, on August 16, 2021, the City adopted Ordinance No. M-4346 amending the Property's Vancouver Comprehensive Plan and zoning map designation from Light Industrial (IL) to Mixed Use (MX) (the "Zoning Change"), adopting the Developer's Mixed Use Master Plan (the "VIC Master Plan") and approving the Restated DA; and

D. WHEREAS, as required by the Restated DA, that certain Restrictive Covenant, as corrected and re-recorded February 8, 2022 (6017326 COV) (the "Forested Tract Covenant") was recorded on the real property defined therein as the "Forested Tract" prohibiting development of the Forested Tract for any purpose other than park or open space uses; and

E. WHEREAS, the Property includes six existing connected buildings encompassing approximately 700,000 square feet that were constructed by HP (the "Existing Building") and, subsequent to the Parties entering into the Restated DA, the Developer obtained City approval to construct a 200,981 square foot industrial building pursuant to Type II Site Plan Review; and

F. WHEREAS, on May 5, 2023, Developer submitted a land use application for Major revisions, including but not limited to, the VIC Master Plan (the VIC Master Plan 2.0, as later defined herein) pursuant to Section 7 of the Restated DA requesting to amend certain master plan elements for the purposes of: consolidating industrial areas to optimize opportunities for employment-generating development, increasing residential density and affordable housing; integrating more open space; revising the transportation network to include a public marketplace within a central ring road commercial corridor to replace the Town Center Master Plan Amendment required by the Restated DA; allowing for hotel and community center development as a Type II conditional use permit; and updating the land use areas, phasing, and design standards;

G. WHEREAS, while retaining the Property's MX zoning designation and the Forested Tract Covenant development restrictions, modifications to the Restated DA and the VIC Master Plan currently encumbering the Property are necessary to facilitate development of the Property as proposed, and the Parties desire to facilitate development of the Property under the terms and conditions described below;

NOW, THEREFORE, for good and valuable consideration, the sufficiency of which is acknowledged, the Parties agree set forth in this VIC DA.

AGREEMENT

Section 1. Recitals. The above background recitals are incorporated in this VIC DA.

Section 2. History of Development Agreements.

2.1 On June 4, 2001, HP and the City of Vancouver entered into a Development Agreement (“Original DA”) for the Property with an initial term of 15 years. This Original DA provided HP with reserved traffic capacity, master plan approval, vesting to existing land use codes, and required dedication of right-of-way on SE 192nd Ave.

2.2 On November 16, 2009, the City approved the First Amendment to the Original DA extending its term to June 4, 2020 (“First Amendment”) and a Second Amendment, approved on June 1, 2020, further extended the term another two years (“Second Amendment”).

2.3 On May 21, 2020, a pre-application conference was held between City staff, applicant representatives and a local neighborhood representative for consideration of the proposed Zoning Change, Restated DA, and VIC Master Plan. Application materials were submitted beginning on June 15, 2020.

2.4 Duly advertised Planning Commission workshops on the proposed Zoning Change, Restated DA, and VIC Master Plan were held on August 11, 2020, September 8, 2020, November 10, 2020, December 8, 2020, January 26, 2021, and May 11, 2021, and a Planning Commission public hearing was held on July 6, 2021. Duly advertised City Council workshops on the proposed Zoning Change, Restated DA, and VIC Master Plan were held on November 23, 2020, December 21, 2020, and July 12, 2021, followed by a City Council First Reading on August 9, 2021 and public hearing on August 16, 2021.

2.5 Pursuant to the public hearing, on August 16, 2021, the City Council adopted Ordinance M-4346 implementing the Zoning Change by amending the Vancouver Comprehensive Plan and Zoning map designation for parcels adjacent tax lots 126455000 and 126816000, located at 18110 SE 34th Street, adopting the VIC Master Plan, and authorizing the Restated DA, which was originally recorded on October 25, 2021 and re-recorded on February 8, 2022 to correct the cover page to include reference to Parcel 986056494 as it existed on October 25, 2021.

2.6 On October 25, 2021 the Forested Tract Covenant was recorded, and then re-recorded on February 8, 2022 to correct the Assessor’s Parcel Number referenced on the first page.

2.7 Duly advertised Planning Commission workshops on this VIC DA and the VIC Master Plan 2.0 were held on September 12, 2023, December 12, 2023, and [TBD], and a Planning Commission hearing was on [DATE]. Duly advertised City Council workshops were held on [DATES], followed by a City Council First Reading on [DATE] and public hearing on [DATE].

Section 3. Effective Date and Purpose. The “Effective Date” of this VIC DA is the date upon which the Vancouver City Council adopts an ordinance approving this VIC DA. That date will be written on the first page of this VIC DA, regardless of the date upon which the Parties’ signatures are affixed below. The purpose of this VIC DA is to:

3.1 Provide approval of a revised employment centered mixed-use master plan for the Property (“VIC Master Plan 2.0” defined below);

3.2 Continue to reserve a certain amount of traffic capacity set forth in the Original DA for the term of this VIC DA;

DRAFT IN REVIEW AS OF 12/08/2023

3.3 Vest the Property and VIC Master Plan 2.0 approved under those land use regulations as provided herein;

3.4 Identify desired land uses that are approved and outright allowed under the VIC Master Plan 2.0;

3.5 Identify transportation improvements Developer agrees to construct to benefit the community and the Property, pursuant to the implementation of the VIC Master Plan 2.0; and

3.6 Identify the Park Parcel (as defined herein) that City has requested Developer sell to City, contingent upon execution of a mutually satisfactory purchase and sale agreement, and community park improvements the City will develop and operate.

Section 4. Description of the Proposed Development of the Property. The development of the Property will be a mixed use, 20-minute community where business, industry, residences, and the outdoors intersect. The Property will be developed consistent with the terms and provisions of this VIC DA and the VIC Master Plan 2.0, approved pursuant to Section 6 below.

Section 5. Approval and Vesting. The VIC Master Plan 2.0 will be fully and finally approved by the Vancouver City Council simultaneously with the approval of this VIC DA, in accordance with VMC 20.430.060(C)(3), after review and recommendation to the Vancouver City Council by the Vancouver Planning Commission. The Property shall be developed in accordance with the Vancouver Municipal Code (VMC) in effect as of the date the application for the VIC Master Plan 2.0 was received, which was December 1, 2022 (the “VIC 2.0 Application Date”), as modified by this VIC DA (including the VIC Master Plan 2.0), and (b) subject to the exception provided in Section 15, the VIC Master Plan 2.0 shall be vested to existing land use regulations and standards as of the VIC 2.0 Application Date.

5.1 Any permit or approval issued by the City for the Property after the Effective Date and before the termination of this VIC DA must be consistent with this VIC DA.

5.2 Through a Type I Process land use application process, as defined in the VMC, Developer may request that the Property be subject to later-enacted laws, regulations, and ordinances initiated and adopted by the City. Developer must demonstrate how the later-enacted ordinance(s) will benefit both the project, and the City while maintaining consistency with the City’s Comprehensive Plan. Developer must also demonstrate that use of later-enacted ordinances will not conflict with other ordinances to which the development is subject and will not be significantly detrimental to the health, safety, or general welfare of the City. An application to subject a development project to a subsequently enacted development regulation will cause the entire development project to be subject to all subsequently enacted development regulations in effect for the date of that application rather than the Effective Date, unless the City and Developer agree otherwise by amending this VIC DA. The Planning Director shall review and either approve the request, or determine that a new application must be submitted without reference to the later-enacted ordinance(s).

5.3 The amount and type of any impact fees associated with a proposed development will not vest, but rather, will be determined for each project specific development application in accordance with then applicable law. Environmental laws or development requirements, including standards related to sustainability and climate action, also will not vest.

5.4 The Property is located within the City’s Multifamily Housing Tax Exemption (MFTE) East Vancouver Residential Target Area defined in VMC Section 3.22.030(C)(4) and Developer must apply for the MFTE tax exemption program for any residential development of the Property, in

accordance with the eligibility and application criteria of VMC Chapter 3.22 and will diligently initiate and pursue MFTE applications for all residential units developed on the Property in accordance with the application procedures set forth in VMC 3.22.040(E), issuance of a conditional MFTE certificate in accordance with VMC 3.22.040(G), and application and issuance of a final MFTE certificate in accordance with VMC 3.22.040(J) and VMC 3.22.040(K). For any MFTE application approved by the City on the Property, Developer shall, as an independent obligation of this VIC DA comport with all MFTE program requirements, provided that such program requirements are not more restrictive than those established by the City as of this VIC DA Effective Date.

Section 6. VIC Master Plan 2.0. The VIC Master Plan 2.0 approved by this VIC DA includes the information provided in this Section 6 and Exhibits B, C, D, E, F, G, & H (including sub-exhibits) of this VIC DA. Exhibit B-1 provides a Master Plan Proposed Land Use Plan; and Exhibit E-1 (Design Guidelines) provides VIC Master Plan 2.0 renderings, depicting the intended look and feel of the fully developed Property. Any inconsistencies between Exhibit B-1 and its sub-exhibits B-2 through B-5 will be resolved in favor of Exhibit B-1. The VIC Master Plan 2.0, attached hereto as Exhibit B-2, is hereby approved and incorporated fully by reference into this VIC DA.

6.1 Land Use Areas. The Property contains three Land Use Areas (“LUAs”): Light Industrial (IL); Mixed Use (MX); and Residential (R), as well as the Forested Tract. Exhibit B-1 provides a Full Site Utilization Plan for the Property, identifying the location and intended use for each LUA and depicting an open space overlay. With the exception of the MX LUA, Developer shall submit site plans or subdivision applications, as appropriate for development of the LUAs, or portions thereof, in accordance with Title 20 VMC and the synchronicity and phasing provisions outlined in Sections 6.4 and 6.5, below.

6.2 Allowed Uses. Notwithstanding any limitations contained within the mixed-use provisions of VMC Title 20, the permitted uses for each LUA will be those uses that are permitted for each type of LUA specified in section 6.1, as of the VIC 2.0 Application Date, as modified by this VIC DA and Exhibit C.

6.3 Development Standards. Although the entire Property is zoned Mixed Use, each LUA will utilize development standards that more closely match its LUA designation, as modified by this VIC DA. For example, parking and lot size standards for the Light Industrial (IL) LUA will be held to the parking and lot size standards within the IL zoning code, as modified by this VIC DA. Parking standards and set back requirements for the Mixed Use (MX) LUA will be subject to the MX zone parking standards, as modified by this VIC DA and the VIC Master Plan 2.0. Attached hereto as Exhibit D is a list of approved development standards for the indicated LUAs, that deviate from current VMC and including those that are deemed modified by this DA. . Any variations from the applicable VMC development standards (as modified by this VIC DA) will be approved in accordance with VMC Title 20 as of the VIC 2.0 Application Date. Approval of such variations will be granted in accordance with applicable law and sections 7.2e and 7.3 below.

a. Vesting. The Property will vest to the development standards provided in VMC Title 20, applicable to each type of LUA specified in section 6.1, as of the VIC 2.0 Application Date, as modified by this VIC DA and Exhibit D.

b. New Buildings. Developer shall build 600,000 to 860,000 square feet of new employment square footage (new non-residential, non-parking gross square footage, with approximately 216,000 square feet of that employment square

footage to be built in the IL LUA. Developer may build up to 1,800 residential units throughout the Property. Developer may build more than 860,000 square feet of new employment square footage or more than 1,800 residential units only if Developer obtains a new traffic impact analysis, updating the April 28, 2023 *Kittelson & Associates Traffic Impact Analysis for the Revised Vancouver Innovation Center (The VIC) Mixed Use Master Plan* on file with the City.

c. *Building Height.* MX height standards apply to all LUAs throughout the Property (up to 75 feet).

6.4 Synchronicity. The sequencing of development of the various LUAs within the VIC Master Plan 2.0 is critical to achieving a successful mixed-use development and 20- minute communities. The VIC Master Plan 2.0 is, at its core, an employment based mixed use development. However, to obtain the on-site traffic recapture and to comply with VMC 20.430.060 (which requires at least 20% of the combined gross floor area of the buildings to be devoted to residential uses), residential development must be properly synchronized with employment land development. Notwithstanding anything to the contrary in VMC chapter 20.430, the following synchronicity rules apply to the timing of development of the LUAs.

a. There is no limit on the timing or pace of development of the **light industrial (IL) LUA** depicted on the Master Plan. Developer has already begun and intends to complete renovations and capital improvements in the Existing Building in the IL LUA by December 31, 2023. Residential units in the IL LUA, if any, shall be on the second floor, or above.

b. There shall be no limit on the timing or pace of development of a school on the School LUA Property. If the School LUA Property is not developed into a school, the 20-acre area retains its mixed use (MX) comprehensive plan designation, unless and until the School LUA Property owner applies for a comprehensive plan/map amendment in accordance with applicable law.

c. In the **mixed-use (MX) LUA** depicted in the VIC Master Plan 2.0 the timing and pace of development needs to include a mix of residential and commercial to support development of 20-minute communities.

d. There is no limit on Developer's ability to submit, entitle, and obtain land use approval for developing residential units in the **residential (R) LUA**.

6.5 Phasing. Developer is focusing current development efforts on the interior of the Existing Building. Subsequent development is expected to occur in phases. Each phase of development may overlap with the other and will follow the infrastructure phasing as described in Figure 2 of the April 28, 2023 *Kittelson & Associates Traffic Impact Analysis for the Revised Vancouver Innovation Center (The VIC) Mixed Use Master Plan* on file with the City (the "2023 VIC TIA"), which provides for development in four phases.

6.6 Design Standards. All new building development (except in the School LUA) must comply with this VIC Master Plan 2.0 and the Design Guidelines provided in Exhibit E to this VIC DA. In addition, all new building development (except in the School LUA) must be consistent with the November 2023 Comprehensive Sustainability Plan outlined in Exhibit E-2.

6.7 Parking Plan. Parking will be provided in accordance with the requirements of each LUA, as may be modified by this VIC DA, and the VIC Master Plan 2.0, as set forth in Table 1.0 below. Developer and City may coordinate a residential parking permit program within the R-LUA that limits on-street public parking to permitted residents only during certain hours. If Developer allows shared public parking on private commercial surface lots during non-peak hours for existing uses and not to conflict with commercial tenant demands, Developer will be allowed to count on-street public parking immediately adjacent to the respective building for which Developer is seeking to satisfy the LUA parking requirements. Each site plan or subdivision application must demonstrate how it contributes toward compliance of the entire Property with the parking requirements of VMC 20.430.060(C)(2)(h) (including the 25% variance, if necessary) at full Property build out. ESD shall provide parking on the School LUA Property in accordance with VMC Table 20.945.070-2.

Table 1.0. Revised VIC Master Plan Parking Ratios

Program	Proposed for Masterplan 2.0
Single Family Attached (TH) within R LUA and MX LUA	1 stall/DU min.
Multifamily within R LUA and MX LUA except for Studios	1.5 stall/DU min.
Senior Housing in all LUAS	0.3 stall/DU min.
Studio units in all LUAs(MP2.0)	1 stall/DU min.
MX LUA (Non-Residential)	2 – 2.5 stalls/ 1,000 SF
IL LUA	Minimum per VMC 20.945.070; no maximum

6.8 Open Space. Developer shall create various open spaces as an overlay throughout the Property in accordance with the VIC Master Plan 2.0.

a. In addition to the Forested Tract and any private residential parks, the open space must include one or more outdoor publicly accessible features to encourage interaction and gathering, centrally located on the Property. Publicly accessible open spaces must equal to at least five percent (5%) of the total Property in accordance with VMC 20.430.060(C)(2)(d)(4).

b. Each site plan, subdivision application, or building permit application must demonstrate compliance with the fifteen percent (15%) minimum landscaping requirement of VMC 20.430.040(B), with any given site plan application, no less than 15% of the cumulative area of all approved and pending site plan applications within the Property shall be landscaped and Developer shall provide a chart demonstrating compliance with same.

6.9 Community Park. Developer has set aside the approximately 13.70-acre Forested Tract in the northeast corner of the Property as open space for purposes of forest preservation, open space, public recreation, and natural habitat and Developer has reserved the Park Access Area for a future parking and public entryway to the Forested Tract, with both the Forested Tract and the Park Access Area. Although

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Developer is willing to retain ownership of the Forested Tract for the uses set forth in this section, the City has expressed a desire to acquire the Forested Tract for development by the City as a public community park. The Forested Tract is part of the open space identified in the VIC Master Plan 2.0. The Forested Tract is more specifically depicted on Exhibit A-1. The Park Access Area is generally depicted on Exhibit A-2.

a. *Restrictive Covenant.* Developer and City have recorded the Forested Tract Covenant, prohibiting development of the Forested Tract for any purpose other than open space. Such covenant does not prohibit installation of community park amenities. For the purpose of more effective tree canopy preservation, Developer and City shall modify the Forested Tract Covenant within thirty (30) business days of the Effective Date to update the Forested Tract legal description to that attached hereto on Exhibit A-1. The Forested Tract Covenant cannot be otherwise modified or removed without Vancouver City Council approval.

b. *Creditable.* Whether or not the City acquires the Forested Tract, it will count toward the open space requirements under applicable chapters of the VMC for a mixed-use master plan. The trees existing within the Forested Tract will be evaluated for any requirement of the VMC and the VIC Master Plan 2.0 applicable to tree preservation, tree unit calculation, tree canopy calculations. Tree density calculations will be based upon a Tree Plan developed by the Developer's project arborist in conjunction with the City of Vancouver Urban Forester and submitted by Developer to the City for review designating trees in the Forested Tract and on the Property either for retention or removal (the "Tree Plan"). Based upon the Tree Plan, tree density calculations for the Property will be established in accordance with VMC Section 20.770.080(B).

c. *Creation of Park Parcel.* If Developer and the City reach agreement as to the Sale of the Forested Tract, Developer shall cause the creation of separate legal lot from the existing Property, which separate lot will consist of the combined Forested Tract and Park Access Area (the "Park Parcel").

d. *Public Acquisition.* Provided that the City determines to provide improvements for public use and enjoyment consistent with the community park designated in the City's Capital Facility Plan and consistent with the VIC Master Plan 2.0, the City may seek to acquire the Park Parcel utilizing budgeted and reserved Park Impact Fee funds from the park service area in which the Park Parcel is located (formerly District 4, now designated as District C) in accordance with RCW 82.02.070 for this purpose. Developer and City will negotiate in good faith to enter into a purchase and sale agreement for the Park Parcel pursuant to this VIC DA ("Park PSA"). However, if the Developer and the City cannot reasonably enter into a Park PSA, then the exercise of City's power of eminent domain in order to fulfill a fundamental public purpose by causing the Park Parcel to become a community park will be imminent. Notwithstanding the foregoing, the City must comply with Chapter 8.12 RCW and all applicable laws and procedures for any condemnation action. If Developer and City negotiate and enter into the Park PSA, Developer and City agree as follows:

(i) Fair Market Value. The purchase price to be paid by the City for the Park Parcel shall be determined by the fair market value of the real

property as determined by an appraisal dated within 24 months of the effective date of the purchase and sale agreement, using the Uniform Standards of Professional Appraisal Practice (“USPAP”) methodologies based on the Park Parcel’s best and highest use as a mixed-use zoned property (the “Appraisal Value”). The purchase price to be paid by the City for the Park Access Area portion of the Park Parcel shall be the Appraisal Value and the purchase price to be paid by the City for the Forested Tract portion of the Park Parcel shall be fifty percent (50%) of the Appraisal Value, calculated on the basis of the per square footage valuation.

(ii) Qualified Appraiser. The parties shall attempt to agree on a single MAI real estate appraiser to conduct the USPAP appraisal and share that cost equally. If the parties are unable to agree upon a single appraiser, then the City shall choose an appraiser who shall be a certified general real estate appraiser licensed by the State of Washington who is a member of the Appraisal Institute of America (MAI) and who has at least five (5) years’ commercial appraisal experience in Clark County and who has not been regularly employed or retained as a consultant, appraiser or agent of either party during the prior twelve (12) months (herein “Qualified Appraiser”) and Developer shall choose an appraiser who shall also be a Qualified Appraiser. Each Party will pay for the cost of their Qualified Appraiser. If the appraisers are unable to agree upon the Appraisal Value within fifteen (15) days, the two Qualified Appraisers so appointed shall select a third Qualified Appraiser within five (5) days (whose cost will be shared equally between the Developer and the City). Within fifteen (15) days following the selection of a third Qualified Appraiser, a majority of the Qualified Appraisers shall attempt to reach agreement on the Appraisal Value of the Park Parcel. If a majority of the Qualified Appraisers are unable to agree on the Appraisal Value, the three appraisals shall be added together, and their total divided by three; the resulting quotient shall be the Appraisal Value. If, however, the low appraisal and/or high appraisal is more than ten percent (10%) lower and/or higher than the middle appraisal, the lower appraisal and/or the higher appraisal shall be disregarded. If only one appraisal is discarded, the remaining two appraisals shall be added together, and their total divided by two and the resulting quotient shall be the Appraisal Value. If both the low appraisal and the high appraisal are disregarded, the middle appraisal shall be the Appraisal Value.

(iii) Park Rules. Upon acquisition by the City, the Park Parcel will be subject to the versions of VMC Chapter 15.04 (“Park Rules”) and VMC Chapter 15.08 that are in effect as of the VIC 2.0 Application Date.

(iv) Community Park Design. The Park Parcel will be planned to meet the City’s current community park standard, as of the Effective Date. The community park master planning and design process for the Park Parcel will consider the Revised Design Standards of this VIC DA, be congruent

with the VIC Master Plan 2.0, integrate passive recreation space and natural resource areas, provide public restrooms, accommodate public parking in the Park Access Area, and engage the surrounding community. The Developer shall have input during the Park Parcel planning and design process, which will include a detailed needs and community park site assessment to determine size, scale, and final selection of specific amenities. The Park Parcel design will include a wide variety of amenities that seek to serve all segments of the surrounding community and may include a selection of recreation improvements for organized activities such as sports fields, skate parks, picnic shelters, community gardens, trails, event spaces, and public art and cultural features within the Forested Tract.

(v) Community Park Development. Based on the City's recent community park design efforts, the City anticipates that the following Initial Improvements to the Park Parcel would be constructed within three (3) years of the City's acquisition:

- (1) Preservation of tree canopy and tree density preservation as a design priority;
- (2) Dedicated public parking, including ADA accessible parking, constructed in the Park Access Area;
- (3) Provision for replacement by the City in accordance with VMC 20.770.080 of any tree density removal from the Park Access Area that is necessitated by parking development with trees planted on-site (within the Property) and restricted from future removal;
- (4) Siting and construction of public restrooms;
- (5) Playground installation;
- (6) Hard surface paths making all major amenities pedestrian accessible; and
- (7) Nature trails, which may be soft surface.

The City will issue a Request for Qualification (RFQ) within sixty (60) days following execution of the Park PSA for a qualified landscape architect to create and implement the Park Parcel design. The Developer shall have input on the RFQ specifications and standards for approval in the City's selection of a qualified landscape architect. The RFQ will allow a thirty (30) day response period, and, assuming a qualified response is received, the City will award the contract within sixty (60) days of the RFQ closing. The City will allow eight (8) months from the award of contract for a community park design draft and an additional two (2) months for issuance of Initial Improvements plans and specifications.

The City will report annually to the VIC on progress made to complete the Initial Improvements design, planning, and construction. The City must demonstrate commercially reasonable efforts to meet major milestones

and to budget adequate funds to timely complete the Initial Improvements. The VIC will notify the City of any perceived deficiencies in performance within thirty (30) days of receipt of such progress report.

Should Developer and the City fail for any reason to enter into the Park PSA for the Forested Tract, and further, should the City institute a condemnation proceeding to acquire the Forested Tract, nothing included in this VIC DA may be used by the City as evidence in such proceeding as to the Developer's willingness to sell the Forested Tract to the City or for purposes of demonstrating public use and necessity.

6.10 Landscape Plan. The Property currently has a 47-acre tree canopy, which is 26% of the total acreage. Once developed, the Property will have more tree canopy coverage than the Property currently enjoys and, including the School LUA Property and the Forested Tract, is projected to have 55-acres of tree canopy, covering more than the City's aspirational target of 30% of the total acreage. Developer shall submit more detailed landscape plans with each site plan/subdivision application, detailing the drought-resistant, native plants that will be used in each LUA, demonstrating compliance with tree density requirements in VMC 20.770.080, and demonstrating progress toward the 5-, 10-, 15-, and 20-year tree canopy targets. Landscaping throughout the Property will be consistent with and complimentary to the native plants in the Forested Tract.

6.11 Ring Road Commercial Corridor. Within the IL LUA and MX LUA, there is an identified commercial corridor created by a loop road that rings the Existing Building and plaza. Improvements adjacent to the ring road within the MX LUA must have predominantly active uses on first floor of frontages facing the ring road. Development of all improvements adjacent to the ring road in the MX LUA must be at least three-stories high and have a setback from the ring road of no more than 20 feet, unless there is a public plaza, market, or pavilion in the setback. Parking for buildings on the ring road must be located behind buildings and/or effectively buffered from the ring road. Notwithstanding the above, the planning official shall have the ability to deviate from specific aspects of these Ring Road Commercial Corridor requirements (including but not limited to building height, number of floors and setback requirements) to the extent that the plan proposed is in keeping with the overall vision of an activated commercial street and otherwise compliant with building code. The ring road commercial corridor must be attractive, active and accessible and the Developer must coordinate wayfinding for the ring road with the City.

6.12 Compliance. Developer shall comply with this VIC DA and the VIC Master Plan 2.0 – including but not limited to all associated exhibits. All development proposed by an entity other than Developer will be reviewed by a design review committee, chaired by Developer, to ensure compliance with the VIC Master Plan 2.0, the VIC DA.

Section 7. Master Plan Revisions. There are three categories of VIC Master Plan 2.0 revisions: Major, Minor, and De Minimis revision requests. Developer may request Major revisions to the VIC Master Plan 2.0 no more than once in any calendar year, unless mutually agreed to by the City. All proposed revisions shall be considered under the approval criteria identified below.

7.1 Major Revisions. Requests to modify or revise the VIC Master Plan 2.0 as follows are deemed Major and subject to a Type IV review process, requiring concurrent amendment of this VIC DA.

- a. Greater than 10% increase in total residential units on the Property, except as provided in Section 6.3;

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- b.** A reduction of non-residential square footage on the Property by more than 10%;
- c.** Increase of parking by more than 10%;
- d.** Greater than 10% decrease in the amount of open space approved in the VIC Master Plan 2.0;
- e.** New uses not included in the VIC Master Plan 2.0 and this VIC DA;
- f.** Changes in the boundaries between LUAs that alter the total acreage of any LUA by more than 10%;
- g.** Development of the School LUA Property for any purpose other than as a school, to modify the use limitation in Exhibit C and address the requirements of VMC 20.430.060(C)(2)(e)(4); and
- h.** A change from a residential use to any other use for structures along the Forested Tract.

7.2 Minor Revisions: The following will be considered Minor Revisions to the VIC Master Plan 2.0, subject to Type II Review:

- a.** Access points of any LUA provided the resulting site plan or subdivision proposal is consistent with the Full Site Utilization Plan;
- b.** New buildings, so long as the additional development can be accommodated with only minor changes to the transportation, water, sewer, storm drainage systems, or the Full Site Utilization Plan, in the approved Master Plan;
- c.** Significant changes to street locations or capacity, as determined by the Planning Director;
- d.** Reduction of parking by more than 10%;
- e.** Approval of development and design standard variations in excess of the variations allowed by applicable VMC; and
- f.** Any other changes that are not Major Revisions, that the Planning Director or Parks and Recreation Director, regarding changes to the Forested Tract, determines are not de minimis.

7.3 De Minimis Revisions: The Planning Director may review and approve any change to the VIC Master Plan 2.0 that are not specifically addressed above, if the Planning Director determines such change to be de minimis.

7.4 Approval Criteria. All Major, Minor, and De Minimis changes to the VIC Master Plan 2.0 will be reviewed according to the following approval criteria:

- a.** The proposed change meets the intent of the adopted VIC Master Plan 2.0;
- b.** The proposed change will not result in a substantial impact to transportation, water, sewer or storm water management systems, after considering all mitigation plans;

- c. The proposed change will not result in adverse impacts to adjacent properties or uses, after considering all mitigation plans; and
- d. The proposed change is consistent with the then current Vancouver Municipal Code and Vancouver Comprehensive Plan.

Section 8. Parcelization. Developer may divide the Property into separate legal lots so long as those lots are created utilizing the land division processes or exemptions thereto contained in applicable law and are not inconsistent with the VIC Master Plan 2.0 and this VIC DA. Any new parcel or lot thereby created will be bound by the terms and conditions of the VIC Master Plan 2.0 and this VIC DA.

Section 9. Park Impact Fee Credits and Reductions. Developer shall be entitled to Park Impact Fee exemptions and reductions available by law, including but not limited to VMC 20.915.080 and .090.

Section 10. Traffic and Trips.

10.1 Retained Traffic Capacity. Exhibit F to this VIC DA sets forth the AM peak hour trips, PM peak trips and total vehicle trips per day that were reserved under the Restated DA and remain reserved through this VIC DA, hereunder. Also attached as part of Exhibit F is the VIC Site Trip Generation Estimate provided in Table 4 of the 2023 VIC TIA.

10.2 Surrendered Traffic Capacity. Exhibit G to this VIC DA sets forth the AM peak hour trips, PM peak hour trips and total vehicle trips per day that were vested and reserved under the Restated DA, and trips surrendered to the City through the Original Development Agreement.

10.3 Trip Utilization Accounting. Developer shall prepare a Transportation Compliance Letter for each proposed new development site, in conjunction with site plan application to document the utilization of vested, retained traffic capacity. Trips generated by the Forested Tract will not be charged against the Retained Traffic Capacity. The Transportation Compliance Letter for each proposed new development must provide:

- a. The number of net new weekday daily, weekday AM peak hour and weekday PM peak hour trips estimated to be generated by the proposed use based on trip rates in the *Trip Generation Manual, 11th Edition* as published by the Institute of Transportation Engineers, or the then-current version as agreed between the parties, for the site. Internal trip allocations will be documented following the assumptions made in the 2023 VIC TIA.
- b. A debiting summary comparing the total net new weekday AM peak hour and weekday PM peak hour trips vested to the Property (as set forth in Exhibit F attached hereto), net new weekday AM and PM peak hour trips consumed to date, and net new weekday AM and PM peak hour trips remaining for future development after accounting for approved and proposed site development(s).
- c. The net new Weekday PM peak hour site-generated trips associated with the proposed development, projected to travel through the SR-14/SE 192nd Avenue westbound terminal will be developed using the trip distribution pattern identified in Figure 5 of the 2023 VIC TIA, as set forth on Exhibit F attached hereto as most applicable to the proposed use.
- d. The net new Weekday PM peak hour site-generated trips associated with the proposed development projected to travel through the SE 20th Street/SE 176th

Avenue intersection will be developed using the trip distribution pattern identified in Figure 5 of the 2023 VIC TIA, as set forth on Exhibit F attached hereto as most applicable to the proposed use.

e. The net new Weekday PM peak hour site-generated trips associated with the proposed development projected to travel through the SE 34th Street/SE 192nd Avenue will be developed using the trip distribution pattern identified in Figure 5 of the 2023 VIC TIA, as set forth on Exhibit F attached hereto as most applicable to the proposed use.

f. In the event the sum of the total net new trips generated by a development within the Property plus the sum of total net new trips previously allocated to development within the Property exceed the total net new weekday AM and PM peak hour trips vested to the property in Exhibit F, Developer shall prepare a new traffic impact analysis to assess the impact of the excess trips.

Section 11. Transportation Improvements. Developer agrees to construct those transportation improvements and dedicate necessary right of way identified in Exhibit H to this VIC DA. Timelines will be established by the individual project phases identified in Table 1 of the 2023 VIC TIA. Notwithstanding anything to the contrary in this VIC DA, the City Transportation Manager may approve changes to the individual project phases in Table 1; such changes will not be considered revisions to this VIC DA. Developer's efforts to improve the Existing Building will not be contingent upon or require the development of any Transportation Improvements as a condition of approval. Developer may pay to have the City, or a third party, construct the transportation improvements in whole, or in part. If the total number of trips allocated to the Property remain below the vested, Retained Traffic Capacity provided in Exhibit F, Developer shall not be obligated to accomplish any other transportation improvements or other transportation mitigation as a condition of approval for any development on the Property. In the event the total net new trips generated by a proposed development on the Property triggers the requirements of Section 10.3f above, Developer may be required to accomplish transportation improvements or mitigation measures related solely to the impact of those excess trips.

Section 12. "Proportionate Share" Payments. Although the estimated trips for the Property are already vested, and thus future development of the Property pursuant to this VIC DA will not increase the presently calculated burden on the City's transportation system, Developer voluntarily agrees to pay fees as outlined in this section, as if it were participating in a "proportional share" transportation impact overlay area. Notwithstanding anything to the contrary herein, Developer's efforts to improve the Existing Building will not be contingent upon or require the development of any "Proportionate Share" payments. Prior to building occupancy permit issuance for any new building to be built on the Property, Developer shall pay:

12.1 a \$2,000 "proportionate share" fee for each weekday PM peak hour site-generated trip projected to travel through the **SR-14/SE 192nd Avenue** westbound terminal intersection, as documented in the Trip Compliance Letter;

12.2 a \$400 "proportionate share" fee for each weekday PM peak hour site-generated trip projected to travel through the **SE 176th Avenue/SE 20th Street** intersection, as documented in the Trip Compliance Letter.; and

12.3 a \$150 "proportionate share" fee for each weekday PM peak hour site-generated trip projected to travel through the **SE 34th Street/SE 192nd Avenue** intersection, to reconstruct that intersection to a concrete surface, as documented in the Trip Compliance Letter. The precise amount of this

fee will be calculated and mutually agreed upon between the City of Vancouver Streets/Transportation Manager and Developer. Such an agreement will not require a revision of this VIC DA.

12.4 Any other proportionate share projects that have been developed by the City as of the Effective Date of this VIC DA to which development of the Property will distribute new peak hour trips, provided that the City shall provide Developer with a list of such projects within 90 days following the Effective Date.

Section 13. SE 29th Street. The City shall add SE 29th Street between SE 176th Avenue and SE 192nd Avenue to its Capital Facilities Plan by way of the Spring 2024 Supplemental Budget process and its Transportation Impact Fee (TIF) Program project list, in accordance with VMC 20.915.090(A)(1) and pursuant to Developer timely providing the City with an engineered cost estimate that reflects the value of the public works prevailing wage construction cost unit price. Additionally, although not required for these improvements to qualify for TIF credits, the City will consider adding SE 29th Street (between 176th Avenue and 192nd Avenue) to its 2025-2030 Six-Year Transportation Improvement Program, which will be finalized and approved by City Council on or before June 30, 2024. The Property requires access onto both SE 176th Avenue and SE 192nd Avenue from SE 29th Street and Developer is obligated to design and construct SE 29th Street between SE 176th Avenue and SE 192nd Avenue, including a single lane roundabout at SE 176th Avenue and a traffic signal at SE 192nd Avenue.

Section 14. Traffic Impact Fee Credits and Reductions.

14.1 As provided herein, Developer shall construct SE 29th Street from 176th Avenue through the Property to 192nd Avenue as conceptually shown on the VIC Master Plan 2.0, based on the project phases in the 2023 VIC TIA. Notwithstanding VMC 20.915.090(A)(3), Developer shall be entitled to traffic impact fee credits, for the full value of the impact fee calculated for the SE 29th Street improvements.

14.2 Developer shall be entitled to Traffic Impact Fee credits for any and all other transportation improvements provided by Developer so long as such improvements are located on the Traffic Impact Fee Program's list of projects at the time such improvements are made.

14.3 Developer shall be entitled to Traffic Impact Fee reductions in accordance with VMC 20.915.090(D).

Section 15. Sustainability and Environment. Environmental laws or development requirements shall not vest. Developer shall comply with all current environmental law requirements including standards related to sustainability and climate action such as the City's Interim Green Building Policy as set forth in the Developer's Sustainability Plan (Exhibit E-2), which are in effect and applicable at the time of development approval for any project within the Property.

Section 16. Reserved Authority of City. Anything in this VIC DA to the contrary notwithstanding, the City shall have the authority to impose new or different regulations to the extent required by a serious threat to public health and safety as required by RCW 36.70B.170 to the extent that such threat is proximate cause, or is proximately aggravated by the impacts of the proposed development of the Property, or any portion thereof; provided, however that such action will only be taken by legislative act of the Vancouver City Council after appropriate public process, Developer reserves all rights to contest and/or appeal the implementation of such new or different regulation(s) and further reserves the right to seek any damages they may be lawfully entitled to, to the extent such new or different regulation(s) impact(s) property rights conveyed under this VIC DA.

Section 17. Miscellaneous Provisions

17.1 Counterparts. This VIC DA may be executed in counterparts; however, all signature pages will be recorded together, and the complete recorded VIC DA constitutes the final instrument.

17.2 Termination. This VIC DA will terminate upon the mutual agreement of the Parties in writing, which will be recorded, or upon expiration of the Term, whichever first occurs.

17.3 Authorization. The persons executing this VIC DA on behalf of City and Developer are authorized to do so and, upon execution by such parties, this VIC DA will be a valid and binding obligation of such parties in accordance with its terms. The Parties have each obtained any and all consents required to enter into this VIC DA and to consummate or cause to be consummated the transactions contemplated hereby.

17.4 Run with the Land. This VIC DA will run with the land and inure to the benefit of and be binding on the Parties' successors and assigns and will be recorded with the County Auditor.

17.5 Public Hearing. The City's authority to execute this VIC DA is granted by the Vancouver City Council in accordance with the requirements of VMC Chapter 20.250.

17.6 Dispute Resolution. Should a disagreement arise between the Parties, the Parties agree to attempt to resolve the disagreement by first meeting and conferring. If such meeting proves unsuccessful to resolve the dispute, the disagreement may be resolved by a civil action.

17.7 Venue. This VIC DA will be construed in accordance with the laws of the State of Washington, and venue is in the Clark County Superior Court.

17.8 Attorneys' Fees. If a suit, action, or other proceeding of any nature whatsoever (including any proceeding under the U. S. Bankruptcy Code) is instituted in connection with any controversy arising out of this VIC DA or to interpret or enforce any rights or obligations hereunder, the prevailing party will be entitled to recover its attorney, paralegal, accountant, and other expert fees and all other fees, costs, and expenses actually incurred and reasonably necessary, as determined by the court at trial or on any appeal, or by any mediator, arbitrator, hearing examiner, or other dispute review, in addition to all other amounts provided by law.

17.9 Performance. In the event either Party fails to perform the terms and provisions of this VIC DA, which failure continues uncured for a period of sixty (60) days following written notice from the other Party (unless the Parties have mutually agreed in writing to extend this period) will constitute a default under this VIC DA. Any notice of default must specify the nature of the alleged default and, where appropriate, the way the alleged default may be satisfactorily cured. If the nature of the alleged default is such that it cannot be reasonably cured within the sixty (60) day period, then the commencement of actions to cure the alleged default within the sixty (60) day period and diligent prosecution of such actions necessary to complete the cure of the alleged default, will be deemed to be a cure within the sixty (60) day period. Upon a default that is not cured as provided above, the non-defaulting Party may institute legal proceedings to enforce the terms of this VIC DA. If the default is cured, then no default exists, and the noticing Party shall take no further action.

17.10 Severability. If any portion of this VIC DA will be invalid or unenforceable to any extent, the validity of the remaining provisions will not be affected thereby. If a material provision of this VIC DA is held invalid or unenforceable such that a Party does not receive the benefit of its bargain, then

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the other Parties will renegotiate in good faith terms and provisions that will effectuate the spirit and intent of the Parties' agreement herein.

17.11 Inconsistencies. If any provisions of the VMC and land use regulations are deemed inconsistent with this VIC DA, the provisions of this VIC DA will prevail, excepting the City's reserved authority described above and in accordance with VMC 20.250.020(A).

17.12 Amendments. This VIC DA and its Exhibits may only be amended as provided herein. Where specific amendment or revision clauses are not provided in this VIC DA, then all other amendments or revisions to this VIC DA will be made only by mutual written agreement of the Parties, and all amendments will be recorded in the Clark County deed records. Agreement by the City may only be obtained through a Type IV legislative proceeding.

17.13 Survival. Any covenant or condition set forth in this VIC DA, the full performance of which is not specifically required prior to the expiration or earlier termination but which by its terms is to survive the termination of this VIC DA, will survive the expiration or earlier termination of this VIC DA and will remain fully enforceable thereafter.

17.14 No Benefit to Third Parties. The Parties are the only parties to this VIC DA and are the only parties entitled to enforce its terms, except as otherwise specifically provided in this VIC DA. There are no third-party beneficiaries.

17.15 Entire Agreement. This VIC DA supersedes the Original DA, the First Amendment to DA, the Second Amendment to DA, and the Restated DA in their entirety. This VIC DA, as amended from time to time, constitutes the entire agreement between the Parties as to the subject matter.

17.16 Non-Waiver. Waiver by any Party of strict performance of any provision of this VIC DA will not be deemed a waiver of or prejudice a Party's right to require strict performance of the same or any other provision in the future. A claimed waiver must be in writing and signed by the Party granting a waiver. A waiver of one provision of this VIC DA will be a waiver of only that provision. A waiver of a provision in one instance will be a waiver only for that instance, unless the waiver explicitly waives that provision for all instances.

17.17 Interpretation of VIC DA; Status of Parties. This VIC DA is the result of arm's-length negotiations between the Parties and will not be construed against any Party by reason of its preparation of this VIC DA. Nothing contained in this VIC DA will be construed as creating the relationship of principal and agent, partners, joint ventures, or any other similar relationship between the Parties.

17.18 Future Assurances. Each of the Parties will promptly execute and deliver such additional documents and will do such acts that are reasonably necessary, in connection with the performance of their respective obligations under this VIC DA to carry out the intent of this VIC DA.

17.19 Term. The Term of this VIC DA continues the Term of the Restated DA and therefore is 15 years from the effective date of the Restated DA, commencing on September 15, 2021 and expiring on September 14, 2036. The Term of this VIC DA may be extended after public hearing by the Vancouver City Council.

17.20 List of Exhibits

- A Property Legal Descriptions
 - A-1 Legal Description of Forested Tract
 - A-2 Diagram of the Proposed Park Access Area

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- A-3 Legal description of the School LUA Property
- B VIC Master Plan 2.0
 - B-1 VIC Master Plan 2.0
 - B-2 Site Open Space Plan
 - B-3 Site Plan Mobility
 - B-4 Site Streetscape Plan
 - B-5 Site Trail Sections Plan
- C Allowed Uses
- D Approved Development Standards
- E Design Standards
 - E-1 Revised Design Guidelines (Appendix F)
 - E-2 November 2023 Comprehensive Sustainability Plan
- F Retained Traffic Capacity
- G Restated DA Surrendered Traffic Capacity
- H Transportation Improvements

[SIGNATURE PAGES FOLLOW]

DRAFT IN REVIEW AS OF 12/08/2023

CITY OF VANCOUVER, a Washington municipal corporation

By: _____

Date: _____

By: Eric Holmes, City Manager

PO Box 1995

Vancouver, WA 98668-1995

Attest:

By: _____

By: Natasha Ramras, City Clerk (or designee)

Approved as to form only:

By: _____

By: Jonathan Young, City Attorney (or designee)

STATE OF WASHINGTON }
 }
COUNTY OF CLARK } SS

I certify that I know or have satisfactory evidence that Eric Holmes is the person who appeared before me, acknowledged that they signed this instrument, and on oath stated that they were authorized to execute the instrument and acknowledged it as the City Manager of the City of Vancouver, a Washington municipal corporation, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated this ____ day of _____, 20____.

By: _____

Notary Public in and for the State of Washington

My appointment expires: _____

DRAFT IN REVIEW AS OF 12/08/2023

THE VIC BUILDING OWNER, LLC, a Delaware limited liability company

By: _____

Date: _____

By: Joshua Rabina, Manager

505 5th Avenue, FL 27

New York, NY 10017-4907

STATE OF _____ }
 } SS
COUNTY OF _____ }

I certify that I know or have satisfactory evidence that Joshua Rabina is the person who appeared before me, acknowledged that they signed this instrument, and on oath stated that they were authorized to execute the instrument and acknowledged it as the Manager of The VIC Building Owner LLC, a Delaware limited liability company, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated this ____ day of _____, 20____.

By: _____

Notary Public in and for the State of _____

My appointment expires: _____

DRAFT IN REVIEW AS OF 12/08/2023

EVERGREEN SCHOOL DISTRICT NO. 114, a Washington public school district

By: _____
Print Name: _____
Title: _____

Date: _____

13501 NE 28TH Street
Vancouver, WA 98668-8910

Approved as to Form:

By: _____
Name: _____
Title: _____

STATE OF WASHINGTON}
 } SS
COUNTY OF CLARK }

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, acknowledged that they signed this instrument, and on oath stated that they were authorized to execute the instrument and acknowledged it as the Superintendent of Evergreen School District No. 114, a Washington public school district, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated this ____ day of _____, 20____.

By: _____
Notary Public in and for the State of Washington
My appointment expires: _____

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EXHIBIT A – Property Legal Descriptions

EXHIBIT A-1 – Forested Tract Legal Description



VANCOUVER OFFICE

1325 SE Tech Center Drive, Suite 140 • Vancouver, WA 98683
360.695.3411 • info@mackaysposito.com

17356LD14
9/3/2021
GAH

EXHIBIT A
VANCOUVER INNOVATION CENTER
FOREST PARCEL DESCRIPTION

A TRACT OF PROPERTY SITUATED IN THE NORTHEAST QUARTER OF SECTION 6, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN, IN CLARK COUNTY, WASHINGTON, BEING DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SAID SECTION 6; THENCE SOUTH 01°12'07" WEST ALONG THE EAST LINE OF SAID SECTION 6, A DISTANCE OF 1298.25 FEET TO A POINT ON THE NORTH LINE OF THAT TRACT OF LAND AS SURVEYED BY MACKAY AND SPOSITO JANUARY 9, 1979 AND RECORDED IN BOOK 9 OF SURVEYS, PAGE 116 OF CLARK COUNTY RECORDS; THENCE ALONG SAID NORTH LINE NORTH 89°09'22" WEST A DISTANCE OF 146.43 FEET TO THE WESTERLY RIGHT-OF-WAY OF SE 192ND AVENUE, AS DEDICATED TO THE CITY OF VANCOUVER BY STATUTORY WARRANTY DEED RECORDED JULY 2, 2001 AS AUDITOR'S FILE NO. 3340502 AND THE **POINT OF BEGINNING**; THENCE CONTINUING ALONG THE NORTH LINE OF SAID TRACT NORTH 89°09'22" WEST 1325.35 FEET; THENCE LEAVING SAID NORTH LINE SOUTH 00°50'38" WEST 86.31 FEET TO A POINT ON THE ARC OF A 25.00 FOOT RADIUS CURVE, THENCE FROM A TANGENT BEARING SOUTH 89°09'22" EAST, ALONG SAID CURVE TO THE LEFT, THROUGH A CENTRAL ANGLE OF 45°14'10", AN ARC DISTANCE OF 19.74 FEET TO A POINT OF REVERSE CURVATURE WITH A 46.00 FOOT RADIUS CURVE; THENCE CONTINUING ALONG SAID CURVE TO THE RIGHT, THROUGH A CENTRAL ANGLE OF 168°09'13", AN ARC DISTANCE OF 135.00 FEET; THENCE SOUTH 89°09'25" EAST 45.09 FEET TO A POINT OF CURVATURE WITH A 200.00 FOOT RADIUS CURVE; THENCE ALONG SAID CURVE TO THE RIGHT, THROUGH A CENTRAL ANGLE OF 90°00'00", AN ARC DISTANCE OF 314.16 FEET; THENCE SOUTH 0°50'35" WEST 203.94 FEET; THENCE SOUTH 37°25'49" WEST 47.17 FEET TO A POINT ON THE ARC OF AN 815.00 FOOT RADIUS CURVE, THENCE FROM A TANGENT BEARING SOUTH 59°36'54" EAST, ALONG SAID CURVE TO THE RIGHT, THROUGH A CENTRAL ANGLE OF 07°02'52", AN ARC DISTANCE OF 100.25 FEET; THENCE NORTH 37°25'49" EAST 223.15 FEET; THENCE SOUTH 52°23'47" EAST 461.97 FEET; THENCE SOUTH 37°27'30" WEST 179.71 FEET; THENCE SOUTH 67°32'30" EAST 93.63 FEET; THENCE NORTH 22°27'30" EAST 5.00 FEET; THENCE NORTH 70°02'48" EAST 14.92 FEET TO THE WESTERLY RIGHT OF WAY LINE OF SAID SE 192ND AVENUE AND A POINT ON THE ARC OF A 1235.00 FOOT RADIUS CURVE, THENCE ALONG SAID WESTERLY RIGHT OF WAY THE FOLLOWING COURSES:

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THENCE FROM A TANGENT BEARING NORTH 24°46'53" EAST, ALONG SAID CURVE TO THE RIGHT, THROUGH A CENTRAL ANGLE OF 03°38'24", AN ARC DISTANCE OF 78.46 FEET; THENCE NORTH 29°55'05" EAST 536.02 FEET; THENCE NORTH 29°34'02" EAST 150.03 FEET; THENCE NORTH 41°45'35" EAST 56.33 FEET TO A POINT OF CURVATURE WITH A 1085.00 FOOT RADIUS CURVE; THENCE FROM A TANGENT BEARING NORTH 28°14'11" EAST, ALONG SAID CURVE TO THE LEFT, THROUGH A CENTRAL ANGLE OF 02°45'08", AN ARC DISTANCE OF 52.12 FEET; THENCE NORTH 12°49'19" WEST 39.78 FEET; THENCE NORTH 11°55'07" EAST 102.02 FEET TO THE **POINT OF BEGINNING**.

EXCEPTING THERE FROM ANY PORTION LYING WITHIN SE 192ND AVENUE.

CONTAINING 13.704 ACRES, MORE OR LESS

SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD.



9/3/2021

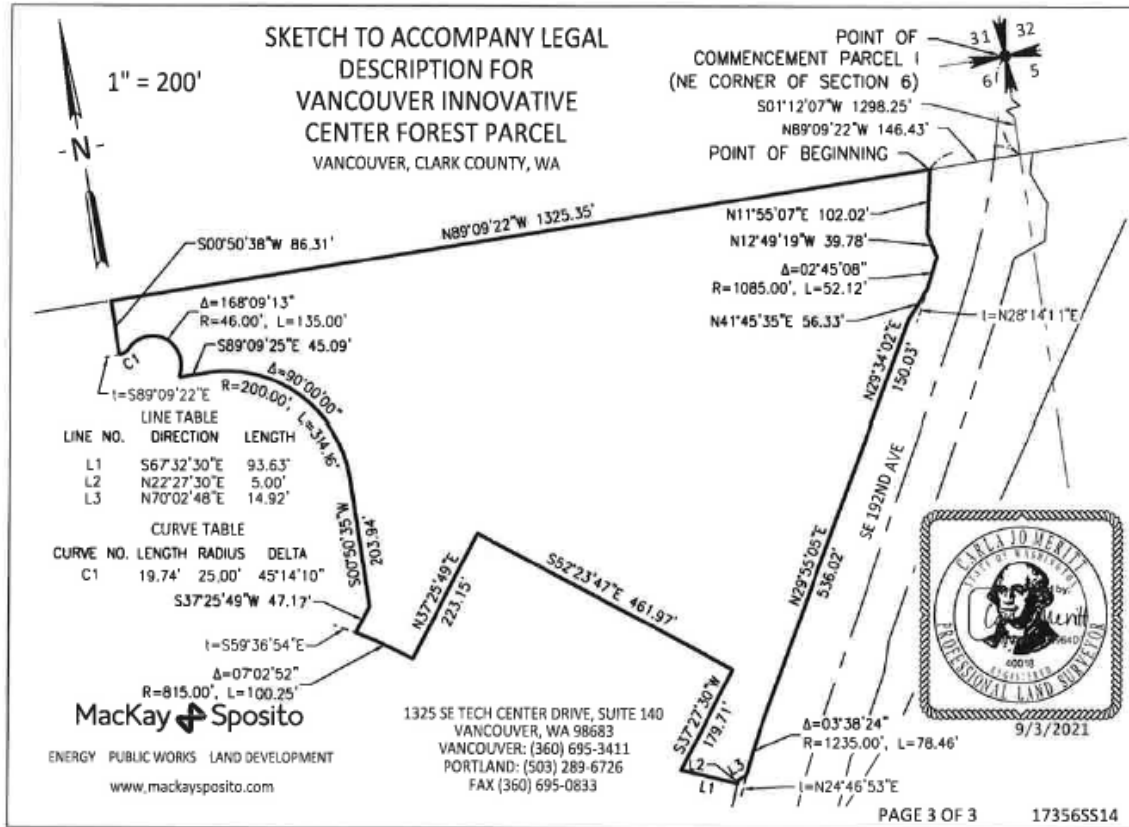


EXHIBIT A-2 – Park Access Area Legal Description

[Insert legal description of the property adjacent to the Forested Tract but exempt from the covenant, intended for use as park parking to be acquired at Fair Market Value (MX) and improved by the City.]

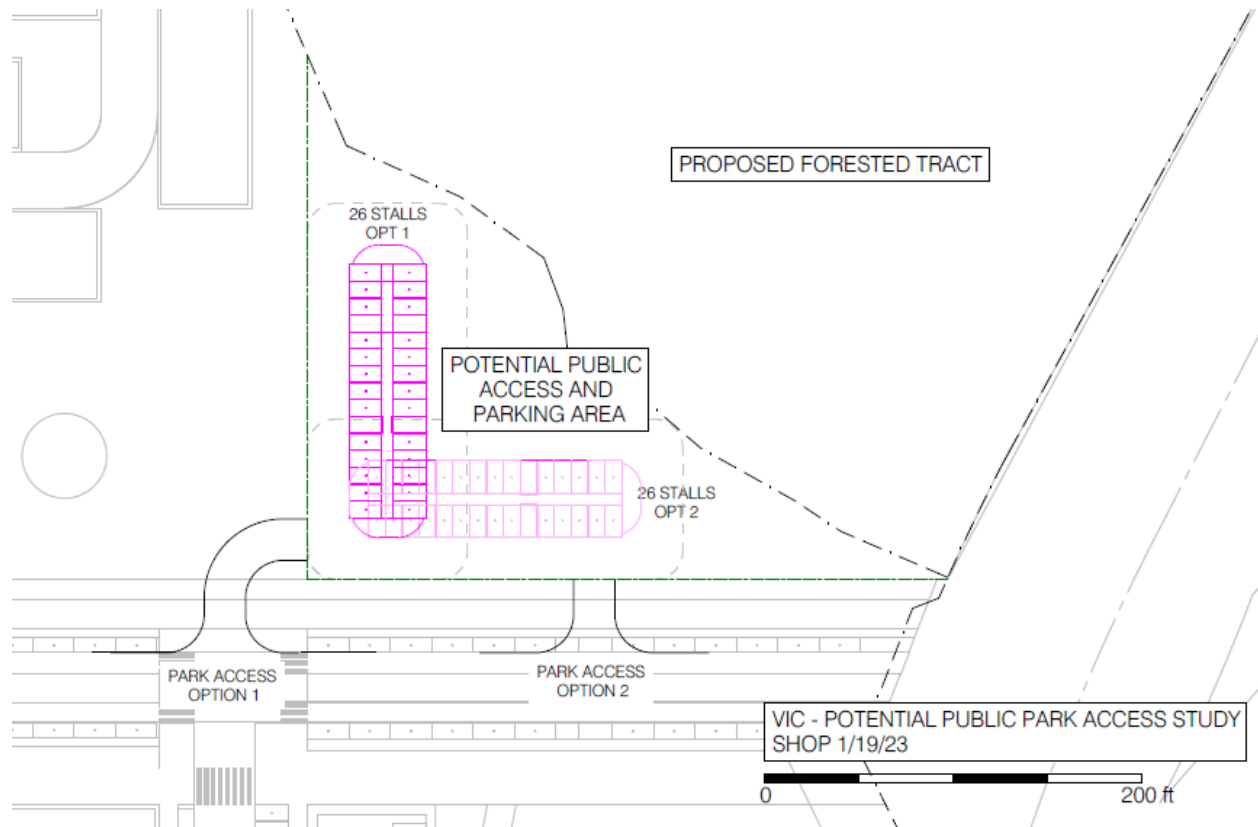


EXHIBIT A-3 – School LUA Property Legal Description (Parcel 986060362)



17356LD1
10/29/2020
GAH

VANCOUVER OFFICE

1325 SE Tech Center Drive, Suite 140 • Vancouver, WA 98683
360.695.3411 • info@mackaysposito.com

EXHIBIT A
VANCOUVER INNOVATION CENTER
PROPOSED EVERGREEN PARCEL DESCRIPTION

REAL PROPERTY SITUATED WITHIN THAT TRACT OF LAND CONVEYED TO S-E INC., UNDER AUDITOR'S FILE NO. 4577169, CLARK COUNTY DEED RECORDS, LOCATED IN SECTION 6, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN, IN THE CITY OF VANCOUVER, CLARK COUNTY, WASHINGTON, BEING DESCRIBED AS FOLLOWS:

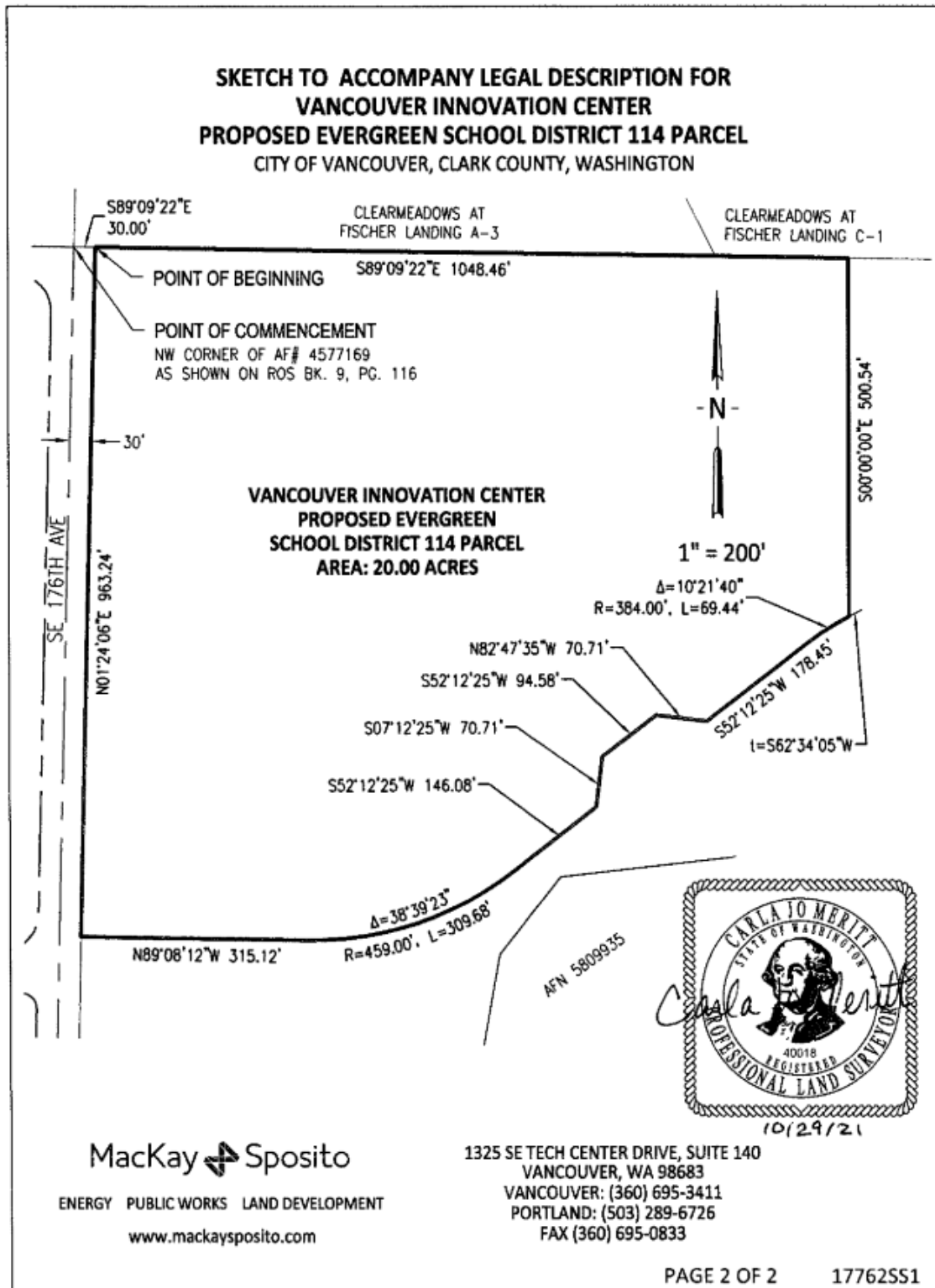
COMMENCING AT THE NORTHWEST CORNER OF SAID S-E INC. PARCEL AS SHOWN ON A MACKAY AND SPOSITO RECORD-OF-SURVEY, DATED JANUARY 9, 1979 AND RECORDED IN BOOK 9 OF SURVEYS, PAGE 116 OF CLARK COUNTY RECORDS; THENCE SOUTH 89°09'22" EAST ALONG THE NORTH LINE OF SAID S-E INC. PARCEL 30.00 FEET TO THE EAST RIGHT-OF-WAY LINE OF SE 176TH AVENUE AND THE **POINT OF BEGINNING**; THENCE CONTINUING ALONG SAID NORTH LINE, SOUTH 89°09'22" EAST 1048.46 FEET; THENCE LEAVING SAID NORTH LINE SOUTH 00°00'00" EAST 500.54 FEET TO A POINT ON A NON-TANGENT CURVE WITH A 384.00 FOOT RADIUS AND A TANGENT BEARING OF SOUTH 62°34'05" WEST INTO SAID CURVE; THENCE ALONG SAID CURVE TO THE LEFT, THROUGH A CENTRAL ANGLE OF 10°21'40" AN ARC DISTANCE OF 69.44 FEET TO A POINT OF TANGENCY; THENCE SOUTH 52°12'25" WEST 178.45 FEET; THENCE NORTH 82°47'35" WEST 70.71 FEET; THENCE SOUTH 52°12'25" WEST 94.58 FEET; THENCE SOUTH 07°12'25" WEST 70.71 FEET; THENCE SOUTH 52°12'25" WEST 146.08 FEET TO A POINT ON A 459.00 FOOT RADIUS CURVE TO THE RIGHT; THENCE ALONG SAID CURVE TO THE RIGHT, THROUGH A CENTRAL ANGLE OF 38°39'23" AN ARC DISTANCE OF 309.68 FEET TO A POINT OF TANGENCY; THENCE NORTH 89°08'12" WEST 315.12 FEET TO SAID EAST RIGHT-OF-WAY LINE; THENCE NORTH 01°24'06" EAST ALONG SAID EAST LINE 963.24 FEET TO THE **POINT OF BEGINNING**.

EXCEPTING THEREFROM ANY PORTION LYING WITHIN SE 176TH AVENUE.

CONTAINING 20.00 ACRES



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EXHIBIT B – VIC Master Plan 2.0

EXHIBIT B-1 –MASTER PLAN LAND USE



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EXHIBIT B-2 – SITE PLAN OPEN SPACE

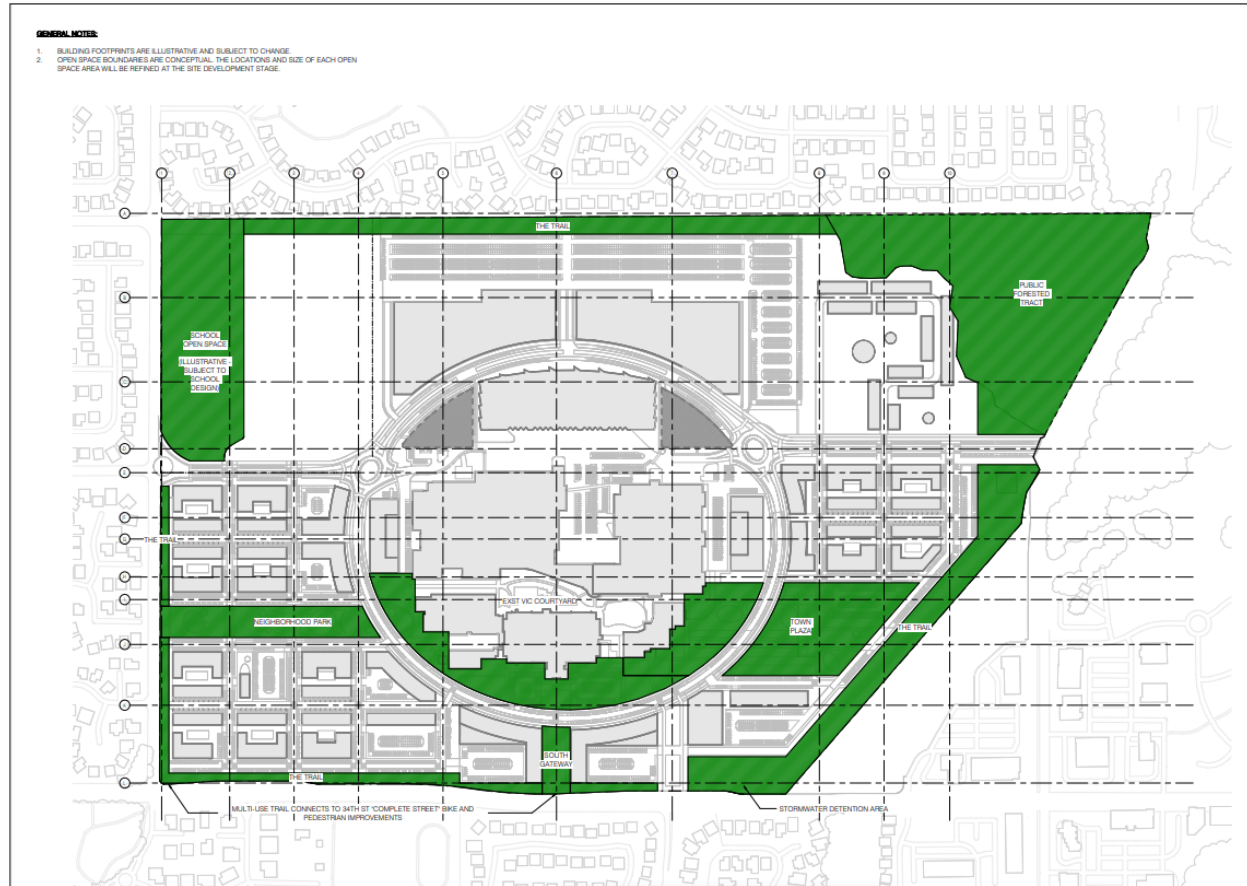


EXHIBIT B-3 – SITE PLAN MOBILITY

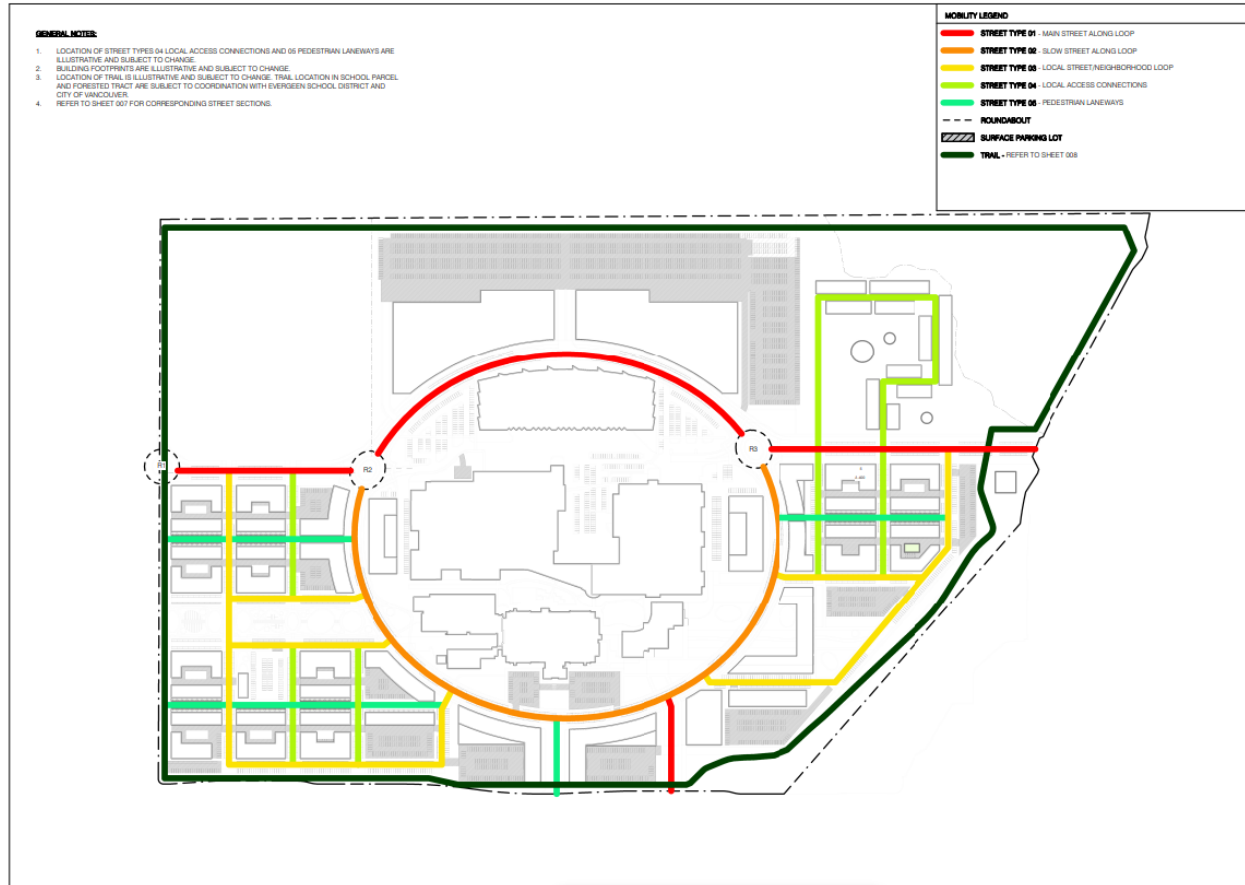
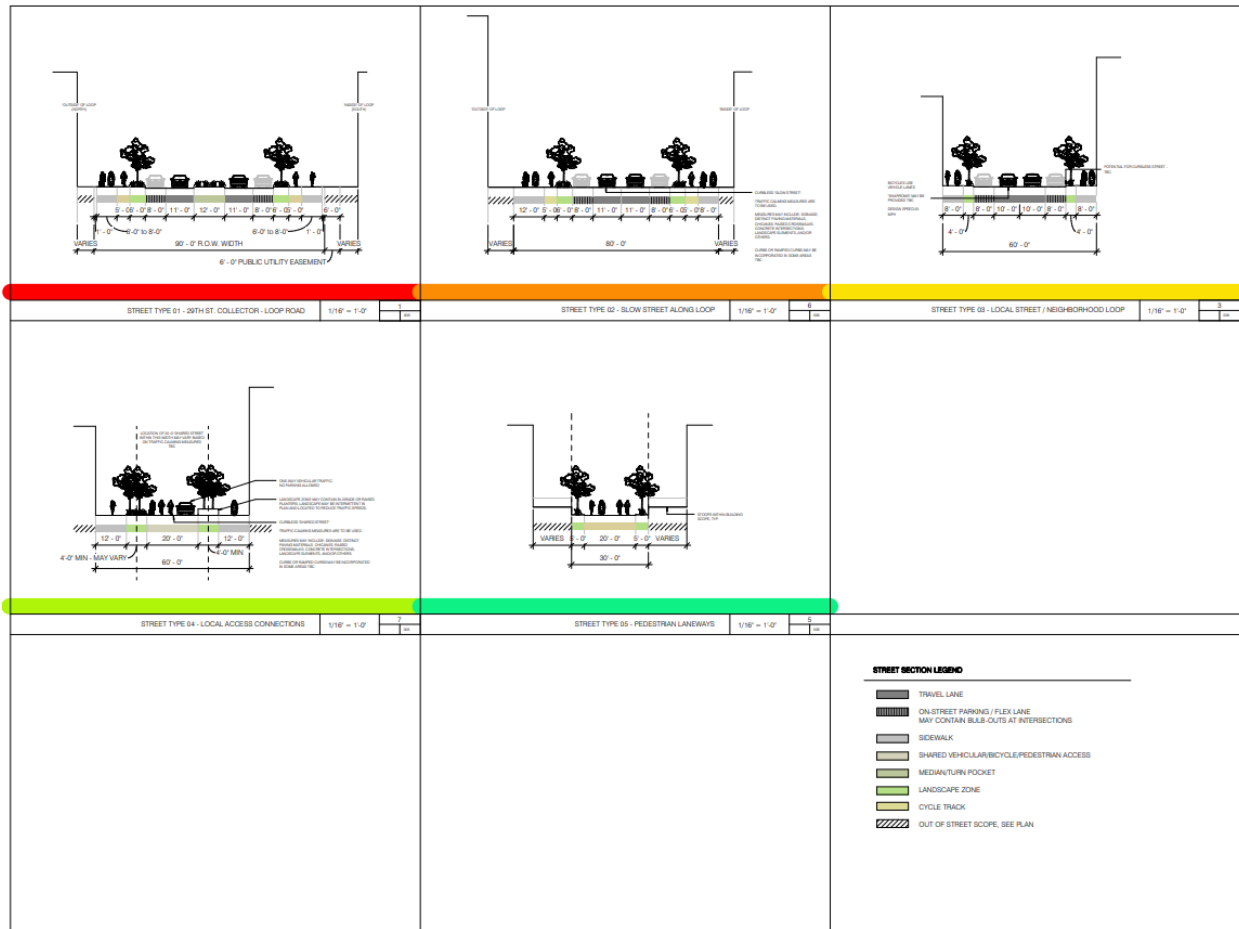
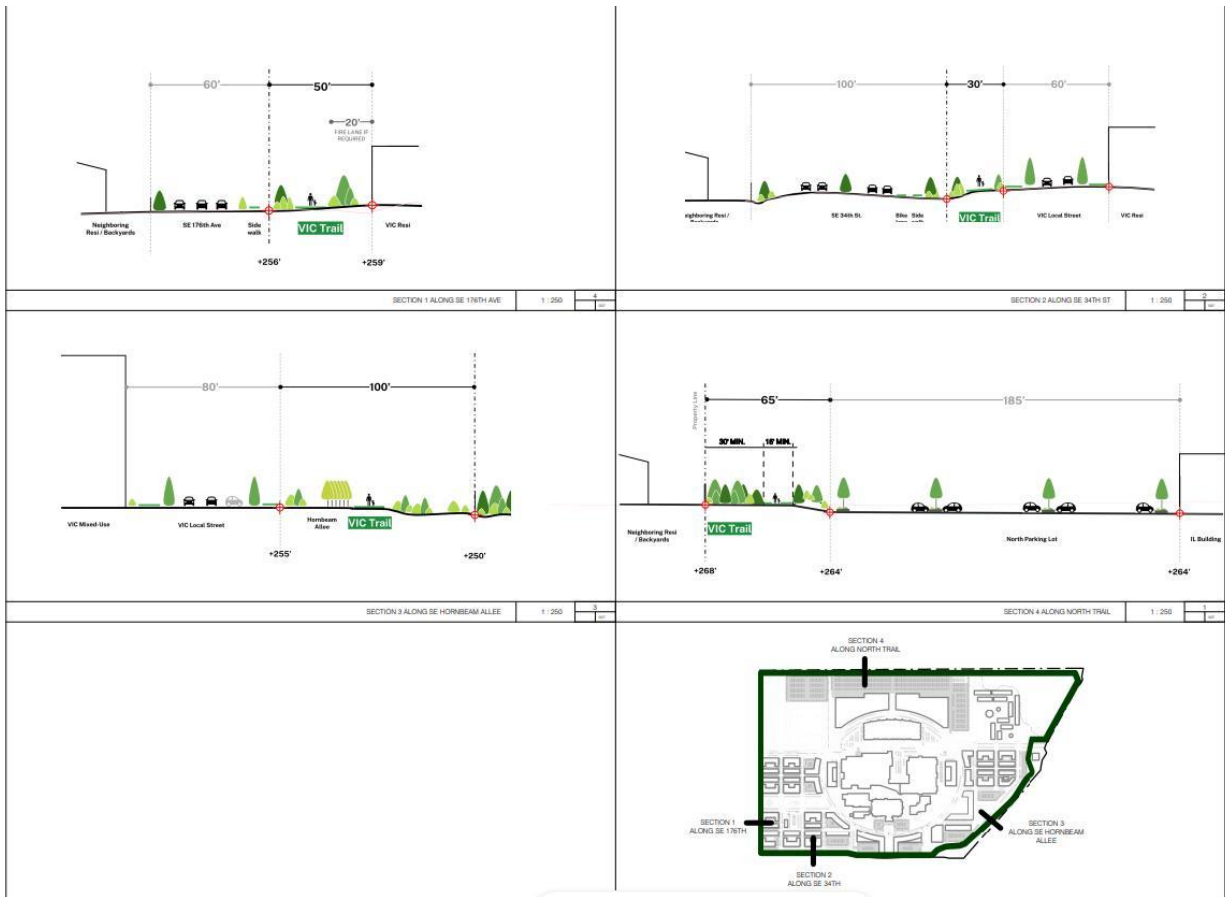


EXHIBIT B-4 – STREETSCAPE



EXHBIT B-5 – TRAIL SECTIONS



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EXHIBIT C - Allowed Uses

R LUA – Uses are those identified in VMC Table 20.420.030-1 for R-30 zoned properties, as of the VIC 2.0 Application Date. Family Child Day Care Homes and Child Care Centers are permitted uses, subject to the provisions of VMC chapter 20.840.

MX LUA – Uses are those identified in VMC Table 20.430.030-1, as of the VIC 2.0 Application Date, as modified here. Family Child Day Care Homes and Child Care Centers are permitted uses, subject to the provisions of VMC chapter 20.840. In addition to those uses allowed by VMC Table 20.430.030-1, the following uses are also allowed:

Use	MX LUA
Commercial	
Artisan and Specialty Goods Production	P
Office	
• Extended	P
-Community Center	P
-Hotel	P
Industrial	
Industrial Services	P
Manufacturing and Production	P
Research and Development	P
Warehouse/Freight Movement (as ancillary use)	P
Other	
Wireless Communication Facilities	
• Subject to the limitations on this use provided in VMC Table 20.430.030-1;	P

School LUA – Uses shall be consistent with VMC 20.160.020(B)(12).

[see next page for IL LUA]

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IL LUA – Uses are those identified in VMC Table 20.440.030-1 as of the VIC 2.0 Application Date, as modified here. Family Child Day Care Homes and Child Care Centers are permitted uses, subject to the provisions of VMC chapter 20.840. In addition to the uses allowed by VMC Table 20.440.030-1, the following uses are also allowed, as a permitted or limited use, as indicated below:

Use	IL LUA
Residential	
Multi-Dwelling Units - Allowed above ground floor only as specified by VMC 20.430.060(B)(2). - One caretaker residence permitted per use. - May be permitted only after 125,000 square feet of new construction in the LI LUA has been built and if Developer demonstrates residential units will not limit or interfere with Developer's ability to construct the light industrial square footage identified in the VIC Master Plan 2.0	L
Civic	
Colleges - Provided they have a functional relationship with existing industrial uses, and do not exceed 25,000 square feet in aggregate	L
Child Care Center - Child care centers allowed, subject to a Type II procedure. - Child care centers are permitted in order to provide service for those employees working or residents living anywhere on the Property, subject to provisions in Chapter 20.840 VMC, Child Care Centers.	L
Commercial	
Eating/Drinking Establishments - Provided they are located within an industrial building and consume no more than [15] percent of the building's total gross square footage.	L
Artisan Small Scale Manufacturing	P
Industrial	
Warehouse/Freight Movement (as ancillary use) - Permitted as limited use provided all activities, except outdoor storage of materials, are wholly contained within building(s).	L
Warehouse/Freight Movement (as primary use): • Permitted as limited use provided all activities, except outdoor storage of materials, are wholly contained within building(s). • Limited to 50,000 sf aggregate cap for any new construction after January 1, 2021. • Building 4 in the northeast portion of the Existing Building, has 24 to 35 foot ceilings and is designed as a large bay warehouse. This 130,000 sf area shall be allowed to continue as a preexisting nonconforming use for warehouse/freight movement.	L
Wireless Communication Facilities - Subject to requirements in Chapter 20.890 VMC, Wireless Telecommunications Facilities.	L

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Conditional Use	
Warehouse/Freight Movement (as ancillary use) - Permitted as limited use provided all activities, except outdoor storage of materials, are wholly contained within building(s).	L

EXHIBIT D – Approved Development Standards

The following standards supplement the requirements of the City of Vancouver, Title 20, Land Use and Development Code. To the extent there is a conflict between the Development Standards outlined in the VIC DA and this Exhibit D, and VMC Title 20, the provisions of this VIC DA and Exhibit D control.

1. Residential (R) LUA - Development standards of the R LUA are those of the R-30 zoning district pursuant to VMC chapter 20.420 unless stated otherwise herein.
 - a. Building Design
 - i. 30-foot setback for the primary structure from the western Park Parcel boundary for the adjacent building perimeter to create a residential unit buffer
 - ii. 50% of street frontage occupied space
 - b. Residential Unit Density
 - i. Minimum residential unit density shall be R-30 (22.1 units per net acre as measured by the total number of residential units divided by the portion of the site devoted to residential use, not including public or private streets, or critical areas and associated buffers on that portion) and maximum residential unit density is R-35 (35 units per net acre as measured by the total number of residential units divided by the portion of the site devoted to residential use, not including public or private streets, or critical areas and associated buffers on that portion).
 - ii. Density calculations are based the overall R-LUA acreage
 - c. c. Bicycle Parking
 - i. One covered, long term bicycle parking space is required per two dwelling units.
 - ii. Balcony or patio bicycle storage is discouraged and if proposed must be screened from street review.
 - d. Building Height – per VIC DA Section 6.3(c)
 - e. Frontage Standards - The R LUA shall not be required to comply with frontage standards requirements in VMC 20.430.060(C)(2)(f)(1).
2. Light Industrial (IL) LUA - Development standards of the IL LUA are those of the IL zoning district pursuant to VMC Chapter 20.440 unless stated otherwise herein. The following supplemental development standards apply to buildings and sites developed in the IL LUA after 2020:
 - a. Exterior building design.
 - i. Publicly identifiable entry/office on street wall required on ground floor on streets and Outdoor Public Spaces.
 - ii. Exteriors should be no more than 4 stories in height to be on scale with adjacent uses.
 - b. Fences - Maximum 10% of property may be fenced or walled for concealment of trash/recycling and storage.
 - c. Building Height – per VIC DA Section 6.3(c)
3. Mixed Use (MX) LUA - Development standards are those of the MX zoning district pursuant to VMC Chapter 20.430 unless stated otherwise herein. The standards outlined in VMC 20.430.060(C)(2) apply to the MX LUA, except as outlined below:
 - a. VMC 20.430.060(C)(2)(a) does not apply;

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- b. The last sentence of VMC 20.430.060(C)(2)(d)(1) (“Complete segregation of use types, such as placement of multiple commercial structures all on one side of a mixed use site and multiple residential structures all on the other shall be prohibited”) does not apply;
 - c. VMC 20.430.060(C)(2)(e)(1) does not apply; required minimum residential density is 22.1 units per net acre, as measured by the total number of residential units divided by the portion of the site devoted to residential use, not including public or private streets, or critical areas and associated buffers on that portion.
4. School LUA - If the School LUA is developed as a school, it should comply with VMC 20.430.060(C)(2)(e)(4). The School LUA shall not be required to comply with frontage standards requirements in VMC 20.430.060(C)(2)(f)(1).

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EXHIBIT E-1 – DESIGN Guidelines



EXHIBIT E DESIGN GUIDELINES

Vancouver Innovation Center Master Plan

Updated April 2023

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Placemaking Goals	

PURPOSE

These design guidelines are intended to ensure that development within the Vancouver Innovation Center is cohesive in both form and function and is consistent with the brand pillars of the VIC. These brand pillars form the foundation of the design principles that will guide project implementation. These brand pillars and the associated VIC design principles are described further below:



Natural

Connected to nature in all that we do

Design Principle

Provide a network of both passive and active open space areas that utilize existing trees and natural resources for recreation and relaxation.



Balanced

physical, mental, and spiritual

Design Principle

Provide a balance of community gathering spaces and areas for personal escape.



Authentic

Urban style and refinement, built with taste, personalization and ease in mind

Design Principle

Create a compact urban form composed of well-articulated buildings and ample pedestrian areas to encourage multi-modal travel throughout the site between the various on-site uses and open space areas.



Blended

Contemporary convenience, modern collaboration

Design Principle

Design buildings to encourage pedestrian access, ground floor visibility and community spaces for socialization and collaboration.



Community

Inclusivity and shared knowledge, energy and passion

Design Principle

Design with an eye towards the future. Incorporate sustainability and energy efficiency measures including things such as vehicle charging stations, solar panels, and low impact development (LID) stormwater management approaches. Continuously evaluate project performance related to parking and space efficiency, vehicular trips and sustainability with the goal of design refinements and improvements throughout project buildout, with the goal of the project becoming a "living laboratory." Provide a network of well defined and accessible pedestrian corridors to encourage access through the site for all individuals.

APPLICABILITY

These guidelines will apply to new development and remodels of existing development within the Residential, Light Industrial, Mixed-Use, and Open Space LUAs within the VIC masterplan. Demonstration of project adherence to these guidelines will be required with land use permit submittals for new development on the site.



DESIGN GUIDELINES



Mobility

All new developments will demonstrate:

- a. Support for a 20-Minute Neighborhood by providing means to reduce need for vehicle trips;
- b. Functional connections to the site-wide bicycle and walking path network outlined in the Masterplan;
- c. Compliance with Washington State electric vehicle charging standards in effect at the time of land use application;
- d. Curbside ride share drop off or pull-out areas shall be incorporated at major entry points to all new buildings in the IL LUA; and
- e. Shared parking strategies.
- f. Compliance with the City of Vancouver Complete Street Policy, including infrastructure designed to be safe for all users, ages and abilities regardless of their mode of travel.



Energy

Developer is installing HVAC and lighting upgrades for the Existing Building. All new developments will demonstrate:

- a. Compliance with the 2018 Washington State Energy Code, at a minimum;
- b. Compliance with environmental standards in effect at the time of building permit application (i.e. environmental development standards do not vest on the Restated DA Effective Date;
- c. That every new building is designed to accommodate ready access for installation of solar panels that would occupy at least 10% of the building footprint. This includes the necessary structural and electrical infrastructure to accommodate the solar panels; and
- d. Infrastructure for electric vehicle charging stations.
- e. Advancement of "District Energy Conditions" as identified in Appendix A – Vancouver Innovation Center Master Plan Sustainability Framework.

Water

The VIC will prioritize use reductions, efficiency strategies, and surface water quality in its design. All new development applications will include:

- a. Water-saving plumbing fixtures in all new buildings;
- b. Native and adaptive plant selections that do not require excessive irrigation; and
- c. A surface stormwater strategy synopsis describing anticipated collection, treatment, and discharge strategies including any Low Impact Development (LID) BMPs planned for the project.
- d. An evaluation of means to reduce potable water use consistent with Appendix A – Vancouver Innovation Center Master Plan Sustainability Framework.





Building Design

a. Blank Walls

- i. At least 75% of the width of any new first-story building wall facing a street shall be devoted to interest-creating features, pedestrian entrances, transparent show or display windows, or windows affording views into retail, office or lobby space.
- ii. In all areas other than the IL LUA, building surfaces over 2,000 sf shall be broken up with window openings and/or changes in material.
- iii. Blank walls longer than 20 feet without windows or an unbroken series of garage doors are not permitted on any street frontage.
- iv. Any face of a building that is over 50' wide shall have varied horizontal plane and/or vertical façade shifts to break up the building's mass.

b. Corner Buildings

- i. New IL LUA buildings on a corner will have an entrance within 75 feet of the corner.

c. Ground Floor

- i. Buildings should engage with the "sidewalk zone" to bring visual interest, variation, and intimacy to the streetscape, while maintaining the pedestrian through-routes that link the land use areas on the site.
- ii. Pedestrian access to primary building entrances should be close to and visible from circulation facilities that include a pedestrian component such as a sidewalk, trail, or pedestrian plaza. Primary building entrances may not be from non-pedestrian oriented areas. Each primary building entrance should be attractive and have weather protection and highlight the presence of the entrance to pedestrians through the use of architectural treatments such as changes in the street-facing wall and lighting. Entrances from primary pedestrian corridors should be visually more prominent than
- iii. The design of buildings, above and below should be pedestrian scaled, intimate, and inviting.

d. Roofs

- i. Roof materials shall screen roof top mechanical equipment from ground-level views
- ii. Buildings shall have primarily flat roofs - architectural detailing and rooftop decks shall be allowed.



Exterior Building Finishes

To create a unique identity for the VIC, material selection and application is required to adhere to exterior finish standards.

- a. Major color themes are to predominantly be earth tones of grey, brown, and tan.
- b. Materials exhibiting patina are encouraged – including weathered wood, rusted steel, singed wood.
- c. Material changes shall be offset by a minimum 3 ½" horizontal or vertical relief.
- d. Materials that expose their natural state are encouraged such as exposed wood and concrete.
- e. First floor window framing shall be either wood or aluminum (does not apply to Residential LUAs)
- f. Opportunity for more industrial and technological materials, such as steel, aluminum, and heavy timber.

Maximum Building Heights

See Development Standards applicable to each LUA under Exhibit D of the Restated DA.

Single Family Residential

Single family residential attached designs should incorporate the material and pedestrian orientation provisions of these guidelines. See Appendix B – Single Family Residential Design Reference Guide.

Signage

- a. Monument signs will have a uniform color and typeface throughout the property.





Tree canopy

Every development application must demonstrate how it complies with the Tree Canopy Plan (Section 6.10 of the Restated DA) and provide an tree canopy assessment for its site and a 5-, 10-, 15-, and 20-year forecast for the tree canopy on the entire Property.

Open Space

All site plans will demonstrate adherence to the Masterplan and Appendix C - Placemaking Goals.

- a. Open spaces shall be directly accessible from all buildings in the development (building occupants should not have to walk around the building to get outside)
- b. Avoid inconvenient or circuitous ped access to amenities.
- c. Both greenscaping and useable accessible hardscaping elements shall count as open space
- d. Hardscape open spaces shall be designed for four season use and durable for urban intensity.
- e. Neighborhood open spaces
 - i. Refer to Circulation and Open Public Space Plan for targeted locations.
 - ii. Neighborhood open spaces shall be a minimum of 2,000 sf.
 - iii. Neighborhood open spaces shall incorporate interactive amenities such as pavilions, picnic facilities, and play structures.

Street Cross Sections

See DA for street section implementation options for the Vancouver Innovation Center.

APPENDIX A

Single Family Residential Design Reference Guide

Vancouver Innovation Center Master Plan

Updated April 2023



SINGLE FAMILY ATTACHED



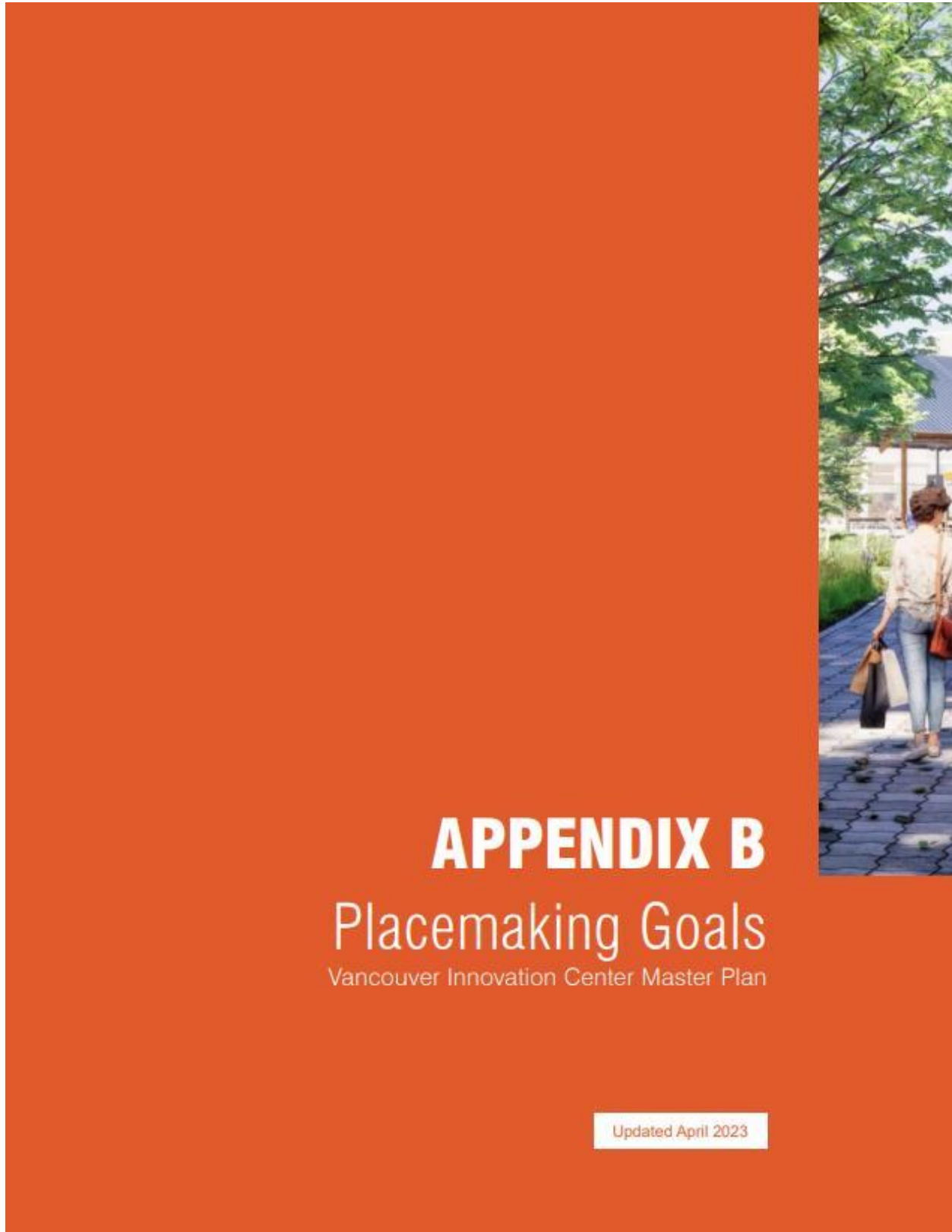
- a. Find opportunities to alley-load attached single family residential units to minimize driveway and garage exposure.
- b. Orient residential buildings to the "sidewalk zone" through the use of front porch features.
- c. Incorporate a range of natural color tones, architectural styles and horizontal and vertical relief.
- d. Seek opportunities to orient units to courtyards and open spaces.
- e. Create visual interest through horizontal and vertical relief and variation of architectural styles of adjoining attached units.
- f. Encourage reduced setbacks for residential units to engage entrances with the sidewalk.



SINGLE FAMILY ATTACHED – *CONTINUED*

- g.** Allow front-loaded attached units when accessed from a local street and when the garage exposure is minimized by site and building design features.
- h.** Allow for a mix of scale and size of attached product including larger duplexes.
- i.** Natural material elements including wood and stone should be prioritized for use.
- j.** Provide substantial window and trim relief on units to break up the potential for monolithic appearances on taller units.
- k.** For continuous banks of attached units, provide vertical, horizontal and roof relief variation to minimize the scale of the structures.

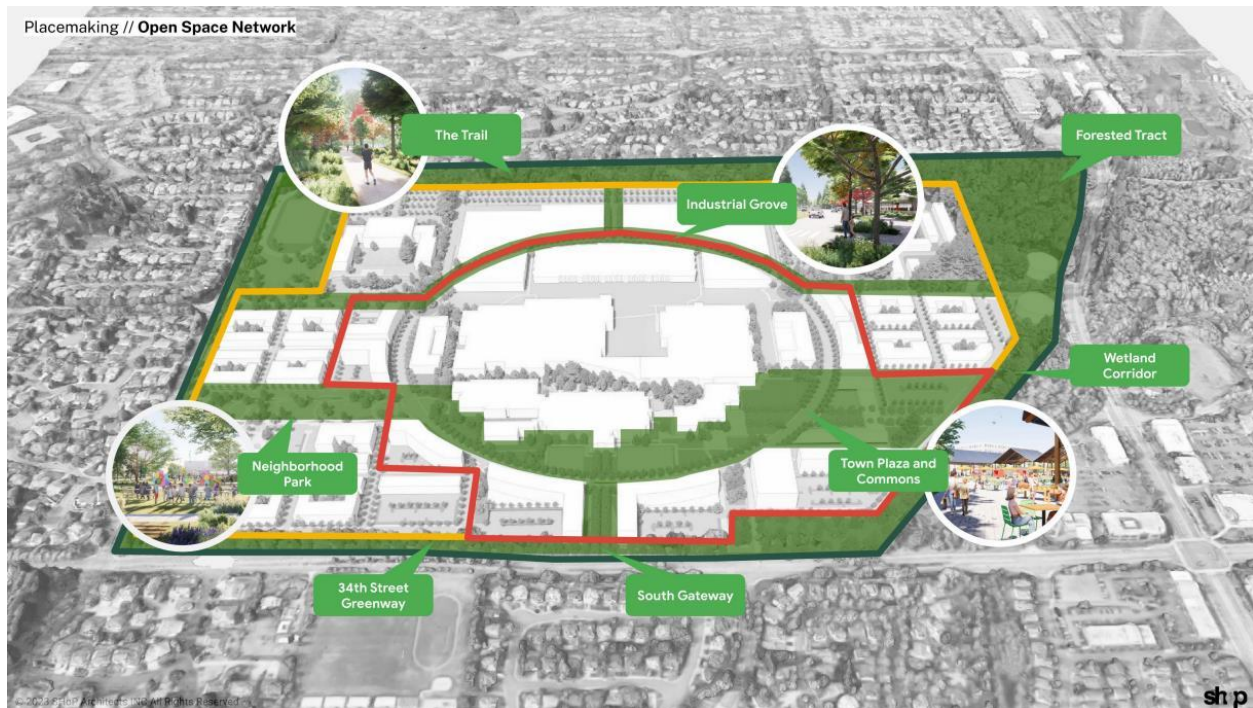
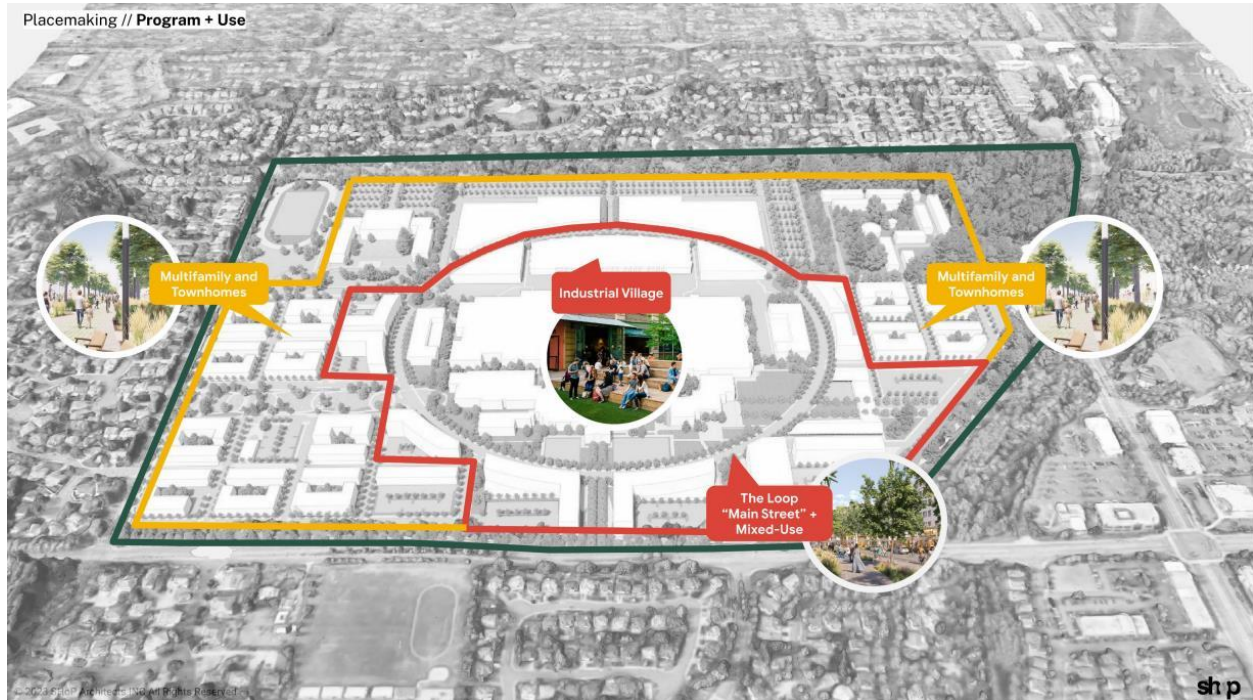




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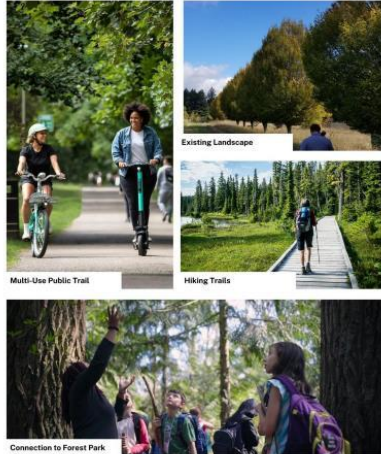


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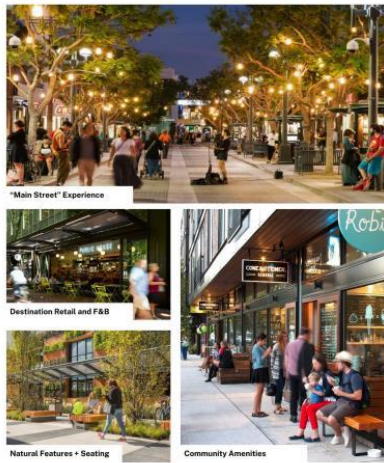
Placemaking // The Trail



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Placemaking // The Loop



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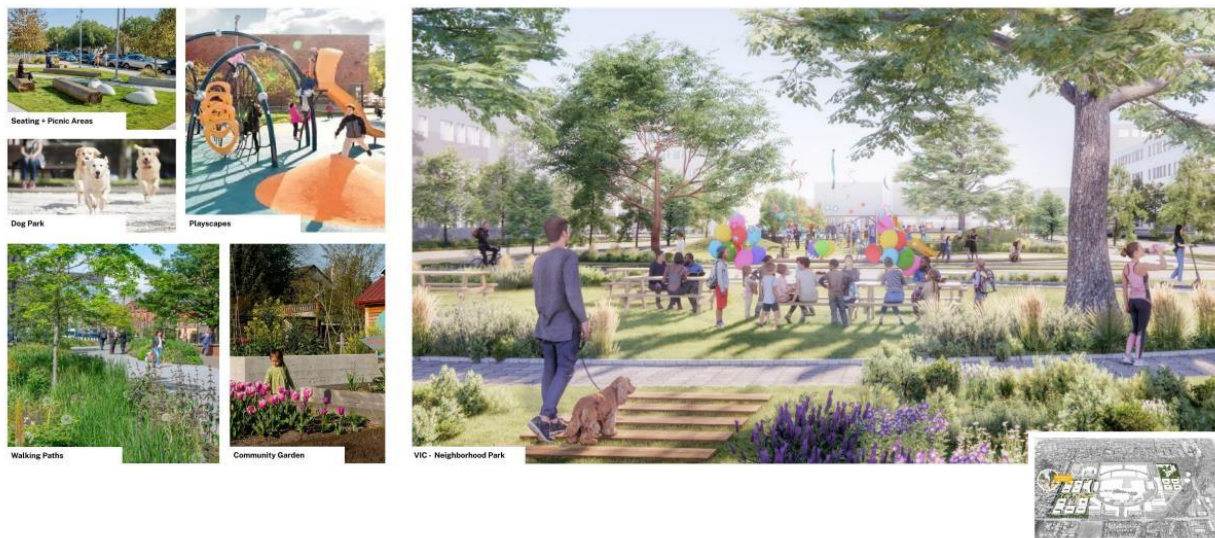
Placemaking // Town Plaza and VIC Commons



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Placemaking // Multi-family and Townhomes - Neighborhood Park

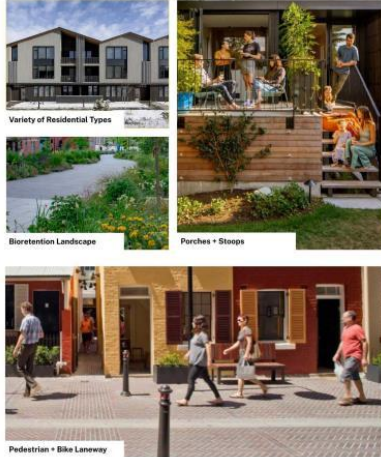


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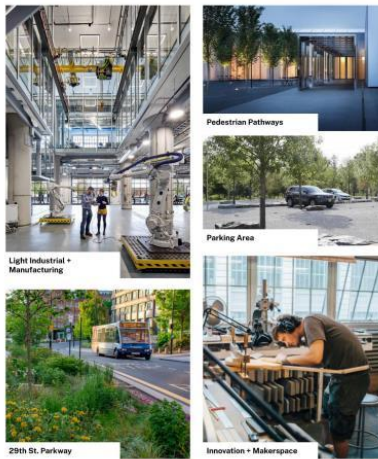
Placemaking // Multi-family and Townhomes - Pedestrian Laneways



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Placemaking // Industrial Grove



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EXHIBIT E-2 – November 2023 Comprehensive Sustainability Plan

Sustainability Improvements Implemented for Existing 715,000 SF Industrial Buildings:

- **Energy Efficiency Improvements:** Developer has worked with Clark PUD and Energy Trust of Oregon to improve energy efficiency at the existing industrial buildings as follows:
 - Installed new, more efficient chillers.
 - Replaced pumps and installed new VFDs in central plant.
 - Installed new building HVAC control systems.
 - Converting point controls from pneumatic to digital.
 - Installed exterior LED lighting.
 - Replacing all common area and house lighting with state-of-the-art LED and lighting control system.

The total estimated annual savings from the above installed improvements is estimated to be 6,300,000 KWh and 345,000 Therms.

- Additional energy efficiency upgrades and sustainability initiatives to date include:
 - Upgraded bathrooms with waterless and reduced flow systems to achieve **indoor water use reduction**.
 - Replaced water fountains with bottle filling stations.
 - Installed new electrical sub-metering system for better monitoring of electrical and water usage.
 - Participant in Clark PUD's Community Solar Program.
- All new tenants are required to install LED lighting and controls within their space.
- Installed showers and bicycle storage space to promote biking to work.
 - Creating long term program to replace a portion of current landscaping with native plants species.
- **Adaptive Reuse, Access to Recreation Facilities:**
 - The existing 715,000 SF of buildings is at the heart of this campus and substantial sustainability investments have been made as noted above. The Developer also renovated underutilized former corporate cafeteria into an activated community space with an upscale café and coffee bar, living room/lounge space, conference rooms, expanded fitness center with fully renovated locker rooms, a yoga and meditation studio, etc.

Sustainability Plan for New Development (VIC Masterplan 2.0)

Overall Campus & Vision:

- **Walkable Streets, Compact Development, Mixed-Use Neighborhoods, Smart Location, Access to Recreation Facilities:** The campus is designed as a 20-minute, walkable, mixed-use neighborhood providing convenient, safe pedestrian-oriented access to places and services that residents, employees, and neighbors need every day – including work, transit, shopping, quality food, school, parks, open space, and social activities.

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- **Neighborhood Schools:** The campus includes a 20-acre parcel that is owned by the Evergreen School District and will be home to a future middle school.
- **Site Design for Habitat Conservation:** A 13.7-acre Forested Tract that has a restrictive covenant to remain as open space. The Developer intends to sell this Forested Tract to the City of Vancouver.
- **Housing Types and Affordability, Housing and Jobs Proximity:** Developer commits to participating in the MFTE program whereby 20% of the 1,800 units (i.e., 360 units) will be available at 80% AMI. All residential units are within walking distance of all employment opportunities on campus.
- **Connected and Open Community, Access to Civic and Public Space, Access to Recreation Facilities, Local Food Production:** Developer will provide a perimeter trail and neighborhood park open to the general public. The trail will be connected to the Forested Tract. The trail will also link together all of the developments within the campus. Community gardens will be available to residents and tenants. The Town Plaza is an optimal location for a local farmers market to operate on the campus.
- **Community Outreach and Involvement:** Masterplan 2.0 was developed in concert with community and municipal input through feedback from the Masterplan 1.0 approval process, community engagement sessions on the proposed Masterplan 2.0, and ongoing conversations with City staff.

Building Design:

- **Optimize Building Energy Performance:** Developer will achieve GHG emissions reduction targets stated in the City's Climate Action Framework as outlined in Appendix I of the application (Appendix I is part of Developer's Sustainability Plan).
- **Optimize Building Energy Performance:** All new buildings will include the following:
 - All electric heating, cooling and domestic hot water.
 - Efficient heat pump selections for space heating and domestic hot water
 - for all new residential buildings, all electric appliances
- **Solar Orientation:** All new buildings will be solar ready per code.
- **Rainwater Management:** For new buildings, Developer will be infiltrating all runoff on site.
- **Electric Vehicles:** Developer will comply with City code for EV infrastructure requirements with each project's site plan approval.

Transportation and Mobility:

- **Compact Development, Walkable Streets, Mixed-Use Neighborhoods, Connected and Open Community, Transportation Demand Management, Housing and Jobs Proximity, Smart Location:** Masterplan 2.0 allows for greater integration of uses than Masterplan 1.0. The entire campus will be walkable/bikeable with ample opportunities to live and work on campus. Small retail and commercial services will be within a 5-minute walk of any residential neighborhood or commercial/industrial tenant. The reconfiguration of Masterplan 2.0 also achieves added density with the same number of vested trips in Masterplan 1.0. Masterplan 2.0 also creates a

more efficient street network that allows for separation of industrial related truck traffic from residential and mixed-use traffic.

- **Walkable Streets, Transit Facilities, Bike Facilities, Smart Location:** Road networks will be designed and coordinated with City transportation staff to ensure safe, comfortable and complete connections for various modes of transportation (vehicular, pedestrian, bicycles, etc.) o Once ESD develops the school, Developer will have bikeable/walkable laneways for students to be able to walk or bike to school safely.
- **Bicycle Facilities, Smart Location:** Developer will include infrastructure to support bike parking and will have bike sharing programs. Developer renovated locker rooms, showers and changing facilities at the existing buildings to help encourage habitual biking for its tenants. The perimeter trail and bike paths throughout the campus will encourage recreational physical activity.
- **Transportation Demand Management, Smart Location:** Developer will deploy shared parking strategies where applicable. The campus design encourages multimodal travel. Developer is eliminating an entrance on 34th Street to reduce traffic congestion at 176th Avenue and 34th Street. Campus entrances/exits at 34th Street are being coordinated with the City's efforts along that corridor to ensure offsite improvements result in a smooth and safe pedestrian experience.
- **Access to Quality Transit and Transit Facilities, Smart Location:** Developer will work with CTran, ESD and City staff to coordinate safe and efficient placement of bus stops within the campus. The VIC campus already has a bus stop along 34th Street and the campus will have pedestrian laneways to provide safe access to the existing bus stop.

Open Space, Natural Systems, and Water Resources:

- **Site Design for Habitat Conservation and Long-Term Conservation Management of Habitat, Connected and Open Community, Access to Recreation Facilities:** Preservation of 13.7 acre Forested Tract
 - Developer worked with a local arborist to adjust the boundary line of the Forested Tract to create a better edge condition for the trees allowing for a more resilient tree canopy and preservation of native and climate resilient species.
- **Connected and Open Community, Access to Civic and Public Space, Access to Recreation Facilities, Connected and Open Community, Access to Recreation Facilities:** Masterplan 2.0 increases the amount of open space/parks/trails by 26% from 19 acres of open space to 24 acres.
- **Tree Lined and Shaded Streetscapes and Heat Island Reduction:** Canopy coverage per Restated DA which is above and beyond the code minimum for all use types. Developer also commits to achieving Tree CAP certification for all projects (minimum Silver Leaf Achievement). Both canopy coverage & Tree Cap Silver will reduce the heat island effects within the campus.
- **Outdoor Water Use Reduction:** Developer will favor nature scaping in lieu of high maintenance turf for streetscapes.
- **Rainwater Management:** For new buildings, Developer will be infiltrating all runoff on site.

EXHIBIT F – Retained Traffic Capacity

Total Vested Average Daily Trips: 26,982

- Total vested trips reflect those trips expected to be utilized by and reserved for the VIC Master Plan 2.0 after reductions for internal trips within the VIC Master Plan 2.0 and pass by trips for the VIC Master Plan 2.0 retail uses.
- Total vested trips include trips utilized by existing onsite buildings.

Total Vested AM Peak Hour Trips: 2,229

Total Vested PM Peak Hour Trips: 1,991

VIC Site Trip Generation Estimate

(From Table 4 of the 2023 VIC TIA):

Table 4: Site Trip Generation Estimate

Land Use	ITE Code	Size	Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Existing The VIC Buildings ¹	1996 Traffic Counts	715,000 Square Feet	10,200 ²	382	262	120	444	76	368
Less Trips Internal to the Campus Area			(236)	(24)	(12)	(12)	(26)	(8)	(18)
Net New			9,964	358	250	108	418	68	350
General Light Industrial	110	600,565 Square Feet	2,925	444	391	53	390	55	335
Less Trips Internal to the Campus Area			(198)	(20)	(10)	(10)	(22)	(7)	(15)
Net New			2,727	424	381	43	368	48	320
General Office Building	710	87,500 Square Feet	949	133	117	16	126	21	105
Less Trips Internal to the Campus Area			(29)	(2)	(1)	(1)	(3)	(1)	(2)
Net New			920	131	116	15	123	20	103
Medical Office Building	720	10,000 square feet	360	31	24	7	39	12	27
Less Trips Internal to the Campus Area			(4)	(1)	(1)	(0)	(0)	(0)	(0)
Net New			356	30	23	7	39	12	27
Shopping Center	820	140,000 square feet	5,181	118	73	45	476	228	248
Less Trips Internal to the Campus Area			(1,607)	(45)	(29)	(16)	(110)	(41)	(69)
Less Pass-by Reduction			(1,036)	(21)	(13)	(8)	(106)	(54)	(52)
Net New			2,538	52	31	21	260	133	127
Multifamily Housing (Mid-Rise)	221	1,248 Units	5,666	538	124	414	487	297	190
Less Trips Internal to the Campus Area			(790)	(14)	(2)	(12)	(80)	(56)	(24)
Net New			4,876	524	122	402	407	241	166
Multifamily Housing (Low-Rise)	220	552 Units	3,720	194	47	147	258	163	98
Less Trips Internal to the Campus Area			(350)	(6)	(1)	(5)	(35)	(25)	(10)
Net New			3,370	188	46	142	223	138	85
Middle School ²	522	900 Students	1,917	522	282	240	153	75	78
Total Trips			30,918	2,362	1,320	1,042	2,373	927	1,446
Less Total Trips Internal to the Campus Area			(3,214)	(112)	(56)	(56)	(276)	(138)	(138)
Less Total Pass-by Reduction			(1,036)	(21)	(13)	(8)	(106)	(54)	(52)
Total Net New Trips			26,668	2,229	1,251	978	1,991	735	1,256
The VIC Development Agreement Vested Net New Trips			26,982	2,088	1,343	745	1,991	627	1,364
Proposed Total Net New – The VIC DA Vested Net New			-314	141	-92	233	0	108	-108
Total Net New Trips – Existing The VIC Building Net New Trips			16,704	1,871	1,001	870	1,573	667	906

¹ Source: Traffic Impact Analysis for The VIC Master Plan dated November 20, 2020.

² Trip estimates from approved 2020 The VIC Traffic Impact Analysis. The potential for internal trips associated with a school could be revisited in conjunction with a more specific school development proposal.

2023 VIC TIA – Figure 5



EXHIBIT G – Surrendered Traffic Capacity

Land Use	Average Daily Trips	Weekday AM Peak Hour Trips	Weekday PM Peak Hour Trips
RETAINED RESTATED DA AND VIC MASTER PLAN TRIPS	26,982	2,229	1,991

Land Use	Average Daily Trips	Weekday AM Peak Hour Trips	Weekday PM Peak Hour Trips
Master Plan Trips from Original HP Development Agreement	30,000	4,200	3,950
Retained VIC Master Plan Trips <i>(Exhibit F net new after reducing for internal and pass-by trips)</i>	26,982	2,088	1,991
Vested Trips Surrendered to City in Restated DA <i>(Original Development Agreement-VIC Master Plan Trips)</i>	3,018	2,112	1,959
Change in Vested Trips with Retained Restated DA and VIC Master Plan 2.0	0	+141	0
Retained Restated DA and VIC Master Plan Trips	26,982	2,229	1,991

Land Use	Average Daily Trips	Weekday AM Peak Hour Trips	Weekday PM Peak Hour Trips
Master Plan Trips from Original HP Development Agreement	30,000	4,200	3,950
Vested Trips Surrendered to City in Restated DA <i>(Original Development Agreement-VIC Master Plan Trips)</i>	-3,018	-2,112	-1,959
Retained VIC Master Plan Trips <i>(Exhibit F net new after reducing for internal and pass-by trips)</i>	26,982	2,088	1,991
Change in Vested Trips with Retained Restated DA and VIC Master Plan 2.0	0	+141	0
RETAINED RESTATED DA AND VIC MASTER PLAN 2.0 TRIPS	26,982	2,229	1,991

EXHIBIT H – Transportation Improvements

Table 1. Summary of Mitigation Recommendations

Facility	Segment/ Study Intersection ID	Mitigation Recommendation	Needed Pre- VIC Master Plan?	Triggered by VIC Master Plan Trips?	VIC Master Plan Trigger Phase?
On-Site Roadways & Intersections					
SE 29 th Street	<i>Extend collector arterial roadway across the VIC Master Plan site in three segments</i>				
	West Segment	From SE 176 th Avenue to West Loop Road	N/A	Yes	2
	North Segment	From West Loop Road to East Loop Road	N/A	Yes	3
	East Segment	From East Loop Road to SE 192 nd Avenue	N/A	Yes	3
SE 184 th Avenue	N/A	Renovate collector arterial roadway within The VIC Master Plan site from SE 34 th Street to Loop Road	N/A	Yes	2
West Loop Road	N/A	From SE 184 th Avenue to SE 29 th Street	N/A	Yes	2
East Loop Road	N/A	From SE 184 th Avenue to SE 29 th Street	N/A	Yes	4
West Loop Road/ SE 29 th Street	N/A	Construct single lane roundabout	N/A	Yes	2
East Loop Road/ SE 29 th Street	N/A	Construct single lane roundabout	N/A	Yes	3
Site-Access Changes					
West Site Access/ SE 34 th Street	7	Close and vacate motor vehicle site-access (intersection north approach)	No	No	2
SE 29 th Street/ SE 176 th Avenue	9	Reconstruct as a single lane roundabout	No	Yes	2
SE 29 th Street/ SE 192 nd Avenue	4	Install traffic signal with interconnect. Construct and stripe separate eastbound left and right turn lanes with 250 feet of storage each Stripe northbound left-turn lane with 200 feet of storage	No	Yes	3
Off-site Intersection Mitigations with Master Plan Development					
SE 29 th Street/ SE 164 th Avenue	11	Modify traffic signal to provide east-west protected/permissive left-turn phasing	No	Yes	2
		Extend westbound left-turn lane striping to provide 225 feet of storage (striping only)	No	Yes	2
		Extend southbound left-turn storage to provide 300 feet of storage (reconstruct center median area)	No	Yes	2
SE 192 nd Avenue/ SR-14 Westbound Ramp Terminal	N/A	Pay proportionate share contribution toward future capacity improvements with each site development application. Estimated total fee of \$430,000 based on assumed Master Plan land use plan.	Yes	No	Each phase based on trips added
SE 20 th Street/ SE 176 th Avenue	10	Pay proportionate share contribution toward future capacity improvements with each site development application. Estimated total fee of \$33,600 based on assumed Master Plan land use plan.	Yes	No	Each phase based on trips added
SE 34 th Street/ SE 192 nd Avenue	5	Pay proportional share contribution towards re-constructing streets with a more durable pavement treatment to reduce maintenance needs. Estimated total fee of \$83,400 based on assumed Master Plan land use plan.	Yes	No	Each phase based on trips added

N/A = Not applicable

APPENDIX B

NARRATIVE

Vancouver Innovation Center Master Plan Revision

Vancouver, Washington

A Land Use Application For:
**Major Revisions to the
Vancouver Innovation Center Master Plan**

Submitted: May 5, 2023

Prepared for:
The VIC Building Owner LLC
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New York, NY 10017
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Figure 5. North Edge Condition with Proposed Open Space – Revised VIC Master Plan

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Table 1. Revised VIC Master Plan Parking Ratio

I. Introduction

General Information

Applicant:	The VIC Building Owner LLC 505 Fifth Avenue, 27 th Floor New York, NY 10017 Contact: Jennifer Rabina Phone: 212-680-4500 Email: jrabina@rabina.com
Prepared by:	DOWL 7200 NE 41 st Street, Suite 204 Vancouver, WA 98662 Contact: Jessica Herceg Phone: 971-280-8653 Email: jherceg@dowl.com
Property Owner:	The VIC Building Owner LLC 505 Fifth Avenue, 27 th Floor New York, NY 10017 Contact: Josh Rabina Phone: 212-398-2030 Email: josh@rabina.com
Project Location	18110 SE 34 th Street
Parcel ID Numbers:	126455-000; 126816-000; 986056-494 and 986060-362
Zoning:	Mixed Use (MX)
Comprehensive Plan:	Commercial (COM)
Project Site Area:	Approximately 179 acres

II. Mixed Use Master Plan Executive Summary

Existing Conditions

The Vancouver Innovation Center (VIC) is the site of a mixed-use master plan located at the former Hewlett Packard (HP) industrial complex, encompassing an approximately 179-acre site located at 18110 SE 34th Street. The site is bound on the north by the Clearmeadows and Fisher's Grove residential subdivisions, on the south by SE 34th Street, on the east by SE 192nd Avenue and on the west by SE 176th Avenue. The site currently has six (6) existing buildings totaling approximately 715,000 square feet (SF), along with associated surface parking and circulation. These buildings were built in the 1980s and 1990s by Hewlett-Packard. Since Hewlett Packard's departure from the site, the interior of these buildings has been updated and leased to a variety of tenants with operations ranging from research and development, light manufacturing, high-tech machinery repair, and other industrial/commercial employment uses. Access to the site is provided via SE 34th Street. A private vehicle circulation route extends north into the site from the signalized intersection of SE Hiddenbrook Drive and SE 34th Street along the site frontage. The private road loops around the existing VIC building and connects with SE 34th Street at a stop-controlled intersection near the southwest corner of the site.

The former Hewlett Packard campus was subject to a Development Agreement beginning in 2001. A series of amendments occurred prior to the applicant's purchase of the property in 2020. The VIC multiple building employment focused Mixed-Use Master Plan, Comprehensive Plan Amendment (CPA), Zone Change Request and Third Amended and Restated Development Agreement (Restated DA) were approved concurrently by the Vancouver City Council by Ordinance 4346 on August 16, 2021. With the approval of the development agreement and an associated Comprehensive Plan Amendment/Zone Change, the zoning designation changed to Mixed Use (MX) with a Commercial (COM) comprehensive plan designation. See Figure 1 below for the current VIC Master Plan.

Since approval of the current VIC Master Plan, the VIC Building Owner LLC (applicant) has received Site Plan Review and construction document approvals for a new 200,981 square foot industrial building, referred to as VIC Building North, to be located immediately north of the existing buildings. The applicant completed an exempt land division to establish a discrete parcel for VIC Building North on December 6, 2022, however a new parcel number has not yet been assigned by Clark County. The documentation was recorded under Clark County Auditor's File Number 6094243 and is on file with the City of Vancouver under File LUP #82838.

Project Description

The applicant is requesting City of Vancouver (City) approval for master plan revisions to amend elements of the current VIC Master Plan. The revised master plan design consolidates industrial areas to optimize opportunities for employment-generating development without reducing the number of jobs provided for in the current master plan, provides a higher level of integration of uses to allow for greater density, thus creating an opportunity to provide more open space, and introduces a new roadway loop geometry at the center of the VIC that establishes a mixed-use center at the core of the site. The revised master plan is included as Sheet 003 of the Master Plan Design Set (Appendix E) and reflects the proposed land use area configuration.

The land use areas (LUAs) on the site include a school (approximately 20 acres), residential area (approximately 38 acres), light industrial/employment area (approximately 74 acres), mixed use area (approximately 33 acres) and a 13.7-acre forested tract. Potential open space areas are reflected across the Residential LUA (RLUA), Mixed-Use LUA (MX LUA), and Light Industrial LUA (IL LUA), and School LUA (S LUA),

but acreage and boundaries for these future open space areas are conceptual and will be refined at site development.

Noteworthy changes to the master plan include:

- A central right-of-way loop or “ring road” is proposed for main site circulation. The northern arc of the loop will serve as the SE 29th Street collector.
- Reconfiguration and relocation of land use areas to achieve the desired product type mix and scale in each LUA and provide greater integration of uses throughout the site. The consolidation allows for the development of large-footprint light industrial buildings in the IL LUA to optimize opportunities for employment-generating development and is critical to achieve both the Project’s and the City’s employment generation goals.
- The plan improves the integration of the mixed-use elements of the project by changing from the “Town Center District” within the MX LUA to a mixed-use corridor along the proposed ring road which serves as the gravitational center of the revised master plan and contemplates a substantial public plaza opposite the existing VIC Commons. The revised master plan will incorporate all necessary changes for the VIC and will not propose a separate/future master plan revision for a Town Center district within the master plan area.
- Single Family Residential (SFR) and Multi-Family Residential (MFR) land use areas (LUAs) are now consolidated and listed as “Residential Land Use Area (R LUA)” and the applicant has removed detached single family residential use from the plan.
- The master plan anticipates an overall increase in open space and will provide approximately 24 acres of open space across the master plan area including an approximately 13.7-acre forested tract. Open space projections in the revised plan represent a 26% increase over the 19 acres proposed in the current master plan. To allow greater design discretion in the precise limits of open space with future site development, the applicant is proposing to represent open space within the plan as an overlay rather than a discrete Open Space LUA, a common approach with master plan entitlements.
- The forested tract and the school parcel are identified independent of other LUA’s to reflect the separate ownership of the school parcel by the Evergreen School District and the applicant’s establishment of a tract for forest preservation. While the forested tract boundary has been altered in the revised master plan—a project arborist has made recommendations to better preserve key tree stands—the acreage of the tract has been retained.
- As opposed to the current master plan, which segregated rights of way for SE 29th Street and SE 184th Avenue from LUA acreages, the proposed revision plan has assumed that all rights of way will be internal to land use areas, similar to how rights of way would be treated in a zoning context.
- The revised master plan proposes a more fluid approach to phasing, whereby the size, location, and order of development within the property be determined by the applicant so that they may respond in real time to market conditions and demand.

New Employment Square Footage

The master plan revision proposes construction of a minimum of 600,000 square feet of gross floor area for employment uses.

Open Space

The applicant anticipates providing approximately 24 acres of open space, including the approximately 13.7-acre Forested Tract. Sheet 004 of the Master Plan Design Set (Appendix E) illustrates potential open spaces, including a two-mile multi-use trail around the entire perimeter of the property. Distinct cross sections are provided as Sheet 007 (Appendix E) to illustrate the open space design at key locations in the site, including the northern site edge. Other open space features include a neighborhood park within the Residential LUA in the southwest corner of the site and a town plaza in the southeast corner.

Residential Units and Density

The revised master plan will consolidate the Single-Family Residential LUA and Multi-Family Residential LUA into a single, non-contiguous Residential LUA. The revised master plan proposes a maximum of 1,800 dwelling units which can be constructed within either the R LUA, the MX LUA, or the IL LUA, with a maximum of 100 dwelling units allowable within the IL LUA. The proposed increase in residential density is in response to the City's continuing concern about housing availability, as well as to market demands for housing co-located with the future businesses on the site. In addition, rather than specify quantities of distinct housing types (apartments, townhomes, etc.) within each LUA, the revised master plan proposes to build housing types in response to market demand, limited to the residential housing types permitted within the VMC. Single-family detached homes, however, will be removed from the master plan.

The current and revised master plans are classified as "multiple building mixed use master plan" pursuant to VMC 20.430.060.C. Figures 1 and 2 are the Current VIC Master Plan and the proposed Revised VIC Master Plan, respectively. The figures reflect the requested changes to the land use area configuration within the site.

Figure 1. Current VIC Master Plan

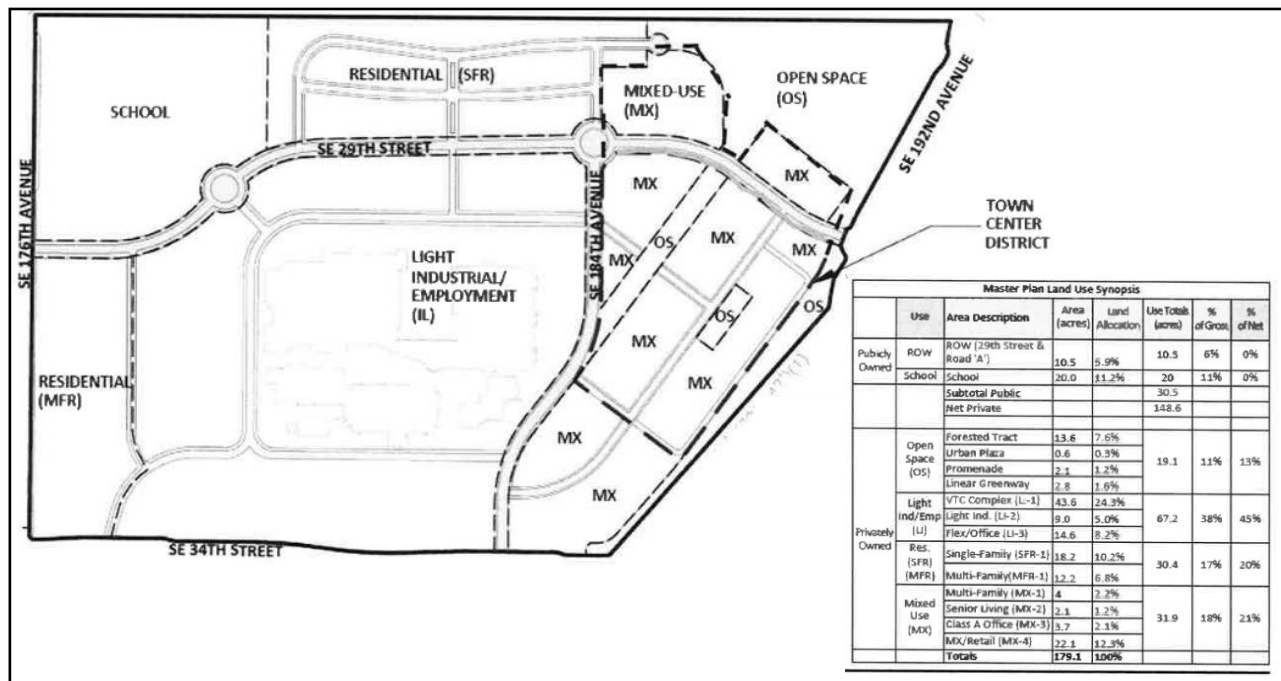
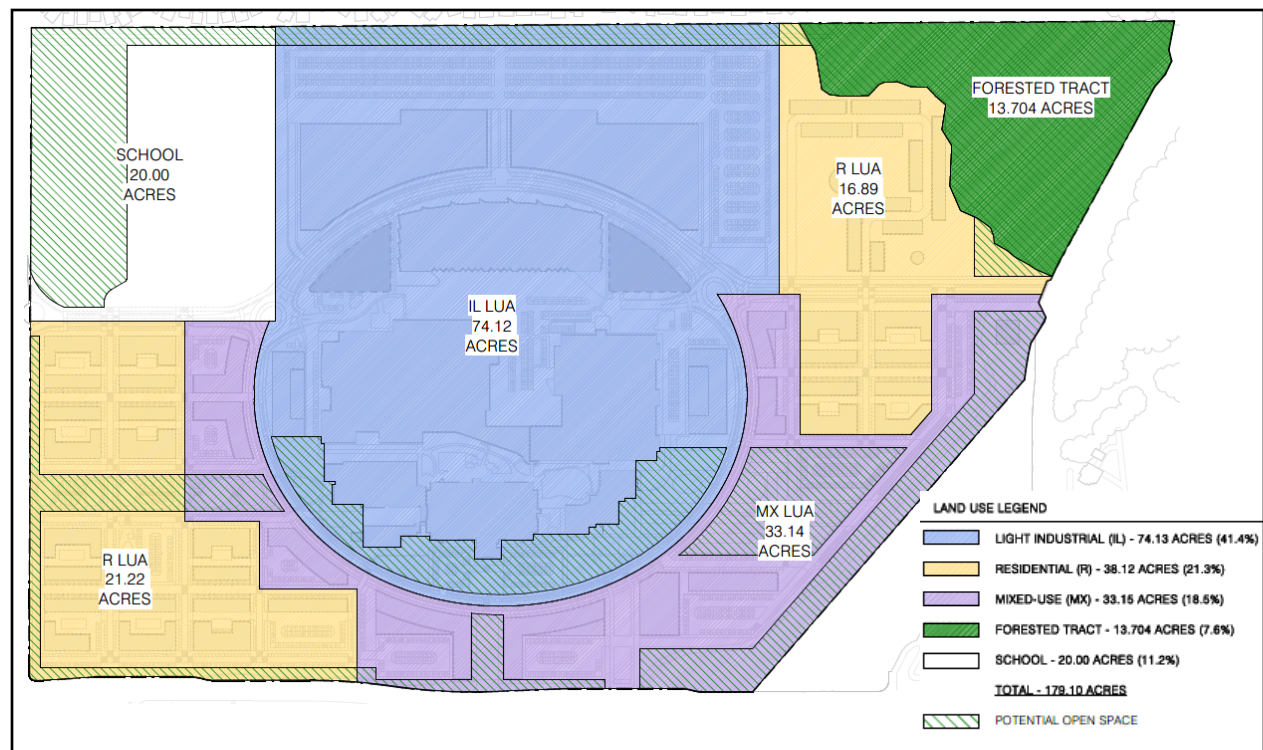


Figure 2. Revised VIC Master Plan



Phasing and Timing of Transportation Improvements

The Revised VIC Master Plan proposes a more fluid approach to phasing to provide flexibility to pursue discrete developments in response to market conditions and needs. Synchronicity standards outlined in Section 6.4 of the Restated DA will be amended to align with updated unit counts but will largely be maintained. It should be noted that a phasing plan is reflected in the Traffic Impact Analysis (TIA), prepared by Kittelson and Associates (Appendix D) to better understand the timing and trigger for transportation improvements. The plan is not intended to suggest that phases must build out in the sequence shown.

III. Applicable Review Criteria

The proposal is subject to the Section 7 Master Plan Revision provisions of the 2021 Vancouver Innovation Center Third Amended and Restated Development Agreement (Restated DA), and applicable goals and policies within the Vancouver Strategic Plan, and Vancouver Comprehensive Plan, respectively and Memorandum of Understanding between the City and the Developer proposing modifications to the Development Agreement currently being finalized. The applicable approval criteria of the Vancouver Municipal Code (VMC) Section 20.430 Mixed Use Standards and District are set forth below with findings demonstrating the project's consistency with these provisions that govern the respective request. Provisions that are not applicable to this proposal are not included.

Vancouver Innovation Center Third Amended and Restated Development Agreement

DA Section 7 Master Plan Revisions

There shall be three categories of Master Plan revisions: Major, Minor, and De Minimis Revision requests. Developer may request Major revisions to the Master Plan (including the Town Center Amendment discussed in section 6.11 of the Restated DA) no more than once in any calendar year, unless mutually agreed to by the City. All proposed revisions shall be considered under the approval criteria identified below.

Response: Pursuant to the Restated DA Section 7, the applicant is requesting a major master plan revision to the current VIC master plan. The primary objectives of the proposed changes to the master plan are to (a) consolidate industrial areas to optimize opportunities for employment-generating development and (b) more substantially integrate development types to allow for greater density, which is a key goal for the City, thus creating an opportunity to provide more open spaces throughout the site to enhance design and placemaking opportunities. As stated in the project summary, the applicant has integrated the "Town Center District" into the mixed-use corridor along the proposed ring road. The Revised VIC Master Plan will incorporate all necessary changes for the VIC and will not propose a separate/future master plan revision for a Town Center district within the master plan area. Responses to the applicable approval criteria for plan revisions are provided below.

DA Section 7.1 Major Revisions

Requests to modify or revise the Master Plan as follows shall be subject to a Type IV review process.

- a. **Greater than 10% increase in total residential units on the Property;**
- b. **A reduction of non-residential square footage on the Property by more than 10%;**
- c. **Reduction or increase of parking square footage by more than 10%;**
- d. **Greater than 10% decrease in the amount of open space approved in the Master Plan;**
- e. **New uses not included in the Master Plan and this Restated DA;**
- f. **Changes in the boundaries between LUAs that alter the total acreage of any LUA by more than 10%;**
- g. **Development of the School LUA for any purpose other than School, to modify the use limitations in Exhibit D and address the requirements of RCW 20.430.060.C.2.e.4;**
- h. **A change from a single family detached home to any other structure, along the northern boundary of the SFR LUA and the abutting neighborhood; and**

i. A reduction in size, change of location, or removal of the open space (treed) area between the SFR LUA and the abutting neighborhood.

Response: As detailed in the project summary above, a series of changes are proposed to the master plan site which meet criteria noted above and thus require a major revision subject to a Type IV process. Specific adjustments which require a major revision include:

- Increasing the maximum residential dwelling unit count from 1,200 units in the current VIC Master Plan, to a maximum of 1,800 residential dwelling units in the Revised VIC Master Plan represents a 50% increase in total residential units on the site.
- The Revised Master Plan proposes removal of the SFR LUA along the northern boundary of the site and the removal of single family detached homes from the master plan.
- The Revised Master Plan proposes significant changes to the street network, most notably the addition of a ring road at the center of the site. Further, the plan does not segregate rights of way for SE 29th and SE 184th Avenue from LUA acreages but rather assumes that all rights of way will be internal to land use areas. The combination of these refinements results in a change to the boundaries and total acreage of the MX, R and IL LUAs beyond 10%.

The applicant presented these changes to City staff through a pre-application conference. Upon review staff concluded that the proposed adjustments to the plan require a major modification subject to a Type IV process and City Council approval.

DA Section 7.4 Approval Criteria

All major, minor, and de minimis changes shall be reviewed according to the following approval criteria:

a. The proposed change meets the intent of the adopted Master Plan;

Response: The intent of the adopted master plan was (a) to reimagine the approximately 179-acre site as a “20-minute” mixed use neighborhood, (b) to meet the growing demand for light industrial, manufacturing, and commercial spaces, (c) to develop a distinct, authentic identity on the site, (d) to create a community with that connects both new and existing neighborhoods and (e) to design sustainably.

The revised master plan continues to achieve the intent of the adopted master plan with the primary objectives being (a) the consolidation of the industrial areas to optimize opportunities for employment-generating development, (b) more substantially integrate uses on campus, including the provision of additional multi-family housing, to align with the City’s density goals, (c) provide a larger, more contiguous open space network throughout the site to enhance design and placemaking opportunities, and (d) streamline the internal street network, and separation of traffic flow to enhance integration of the master plan site and neighboring residential subdivisions.

b. The proposed change will not result in a substantial impact to transportation, water, sewer or storm water management systems, after considering all mitigation plans;

Response: The Revised VIC Master Plan does not anticipate significant impact or demand to transportation, water, sewer or stormwater management systems and infrastructure as further described below.

The Restated DA between the applicant and the City vested trips for the Current VIC Master Plan. Per the Restated DA, vested net new trips include a total of 26,982 average daily trips (ADTs), 2,088 AM peak hour trips, and 1,991 PM peak hour trips. On- and off-site transportation capacity mitigation is predicated on the number of AM and PM peak hour trips while transportation concurrency corridor mitigation is determined based on PM peak hour trips.

The April 28, 2023, Traffic Impact Analysis (TIA) prepared by Kittelson and Associates, Inc. (Appendix D) demonstrates that the proposed uses within the Revised VIC Master Plan will result in a modest increase in weekday AM peak hour trip generation (141 net new trips added) and will not change the total net new PM peak hour trip generation compared to the Current VIC Master Plan. As indicated on Table 4 of the TIA, the Revised VIC Master Plan is estimated to generate 2,229 net new weekday AM peak hour trips and 1,991 net new PM peak hour trips. The TIA updated on- and off-site impacts of the project based upon the revised peak hour trip generation and recalibrated identified mitigation as appropriate. No new off-site traffic mitigation improvements were identified.

As requested by City Transportation staff in the December 1, 2022, Pre-Application Conference Summary, the TIA addresses compatibility and coordination with the City of Vancouver's on-going *SE 34th Street Safety & Mobility Project*. Future conditions in the TIA are modeled to reflect City-anticipated transportation system changes along SE 34th Street to enhance safety-based mitigation needs and mobility for all users on the SE 34th Street corridor. The applicant also coordinated with staff to provide early opportunities to review and offer feedback on the proposed street network and roadway cross sections, including modifications to SE 29th Street, a major east west collector. The proposed Mobility Plan Streetscape Summary sheets included in Appendix B reflect comments offered by staff.

Water utilities are readily available to the overall VIC site and can be feasibly extended to provide potable water for the future phased site buildout. Subsequent site plan approval for future phased development will adhere to applicable regulations and charges as necessary. As noted in the Revised Design Standards (Appendix F), the applicant will prioritize potable water use reductions, and efficiency strategies in its design through water-saving plumbing fixtures with future proposed buildings.

Sewer utilities are readily available to the overall VIC site and can be feasibly extended to provide service connections for the future phased site buildout. Subsequent site plan approval for future phased development will adhere to applicable regulations and charges as necessary.

An existing stormwater facility located in the southeast portion of the site treats surface runoff from the existing building and parking areas. The stormwater pond is designed to overflow to Fisher Creek during severe storm events. The existing facility will be maintained, matching the existing condition. New site development and disturbance of impervious surfaces within the approximately 179-acre VIC master plan site will comply with local and state stormwater management requirements including the implementation of erosion control, and low impact development (LID) Best Management Practices (BMPs) to reduce impacts on surface, ground water, runoff, and drainage patterns on the site.

As noted in the Revised Design Guidelines (Appendix F) the applicant is committing to manage stormwater on-site and promote surface water quality through native and adaptive plant selections to reduce irrigation, minimization of impervious surfaces and implementation of a surface stormwater strategy synopsis describing anticipated collection, treatment, and discharge strategies. This includes the implementation of low impact development (LID) Best Management Practices (BMPs) planned for future

development on the site. Subsequent site plan approval for future phased development will include erosion control mitigation measures during construction and post site buildout.

- c. **The proposed change will not result in adverse impacts to adjacent properties or uses, after considering all mitigation plans; and**

Response: The character of the periphery of the master plan site under the revised master plan will be generally consistent with the approved master plan with the exception of the northern boundary, where the plan has been revised to provide greater buffering and open space adjacent to this edge. Where the current master plan formerly proposed single-family uses at the site's northern boundary adjacent to the existing Clearmeadows and Fisher's Grove residential subdivisions, the proposed plan locates the IL LUA north of proposed SE 29th Street. To ensure compatibility with neighbors to the north, the Revised VIC Master Plan includes a significant approximately 65-foot-wide linear open space trail. Further, the plan contemplates placing parking lots to serve the IL between the open space and buildings, resulting in an approximately 265-foot horizontal separation between industrial buildings and the northern edge. Figures 1 and 2 below illustrate the north edge condition under the current and revised master plans.

Figure 3. North Edge Condition with Single Family Uses – Current VIC Master Plan

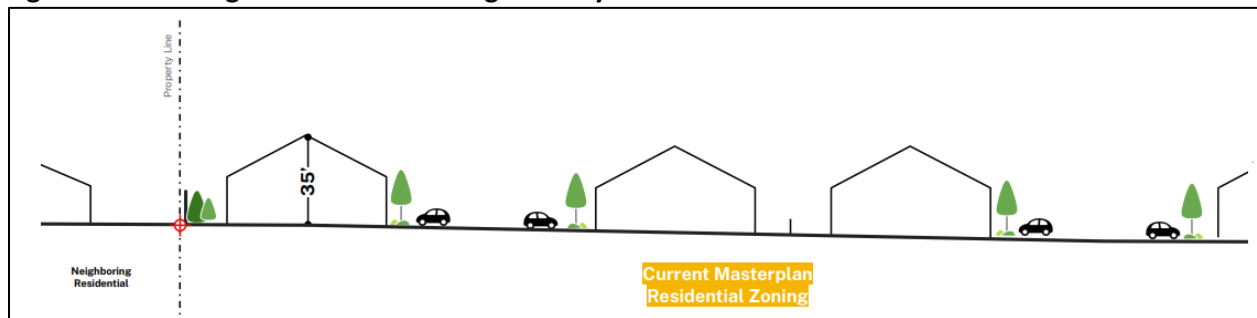


Figure not to scale.

Figure 4. North Edge Condition with Proposed Open Space – Revised VIC Master Plan

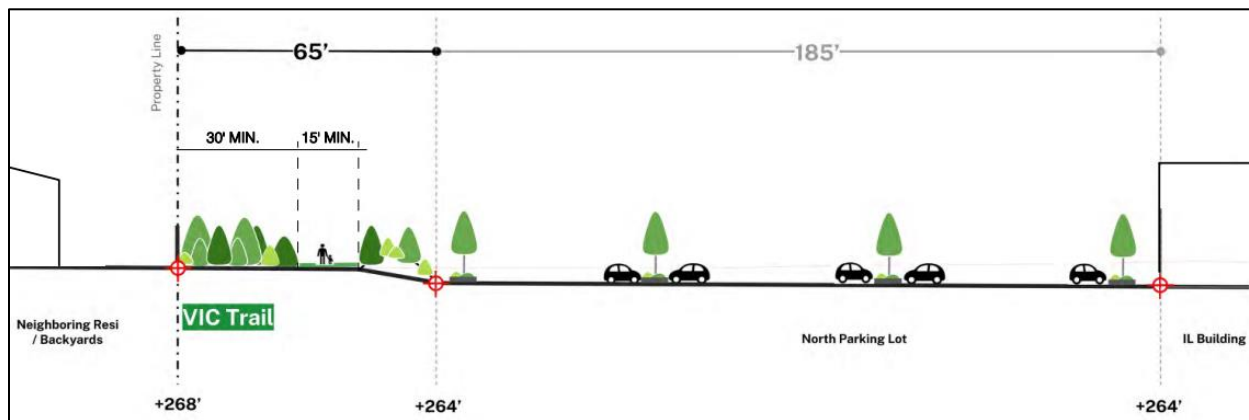


Figure not to scale.

- d. **The proposed change is consistent with Vancouver Municipal Code and Vancouver Comprehensive Plan.**

Response: The applicant demonstrates consistency with applicable criteria of the Vancouver Municipal Code, Vancouver Strategic Plan and Vancouver Comprehensive Plan within this narrative.

Vancouver Municipal Code (VMC)

VMC Title 20 Land Use and Development Code

VMC 20.430.060 Mixed Use Standards and District.

C. Multiple Building Mixed Use Sites

2. Standards – Mixed Use Sites

- a. **Overall uses. Uses shall be allowed as indicated in the MX column of Table 20.430.030-1, except that automobile service stations and drive-through facilities shall be prohibited.**

Response: Similar to the current master plan, the revised master plan envisions employees living and working on the VIC campus within a “20-minute” neighborhood. The revised master plan design creates a better integration of uses whereby those living and/or working on the campus will now be within a five-minute walk of mixed-use opportunities and those living in the nearby neighborhoods will be within a 20-minute walk. Allowed land uses on the site are consistent with those provided in Vancouver Municipal Code for the most-closely analogous land use area. For example, the southwest corner will be designated residential land use area (LUA), near the residential neighborhoods to the west. The northern part of the property, which abuts a residential neighborhood, will have a school land use area, a linear open space that buffers an IL LUA, and an approximately 13.7-acre forested tract to be used as park space. The denser light industrial and mixed-use land use areas (LUAs) will generally be in the core, to the south, and to the east of the property, to ensure a smooth transition toward the more commercial areas along SE 192nd Avenue.

The majority of the proposed land use areas (LUAs) on the site are permitted outright in the MX column of Table 20.430.030-1 (e.g., uses such as general and medical offices, general retail, multi-family housing, parks/open space, and a school) with the exception of light industrial (IL) uses that comprise a large portion of the overall site. Within the IL LUA, the applicant is proposing a variety of light industrial land uses (e.g., research and development, manufacturing, and production) consistent with IL uses in VMC Table 20.440.030-1. These uses are intended to support and attract employment-based businesses on the site, and are consistent with the current tenant mix at the VIC

There are no automobile service stations or drive-through facilities proposed.

- b. **Site Mix. At least 20% of the combined gross floor area of the buildings proposed on the site shall be devoted to residential uses, and at least 20% to nonresidential uses. Parking garages or portions of garages devoted to residential or nonresidential uses may be counted towards this requirement, but surface parking may not.**

Response: The applicant is proposing residential uses throughout the site, primarily within the MX and R LUAs however, as many as 100 residential units may also be constructed within the IL LUA, consistent with

the Current VIC Master Plan. It is anticipated that the revised master plan will include approximately 2,407,798 gross square feet (GSF) of residential uses and 1,703,065 GSF of non-residential uses. Overall, the revised master plan is anticipated to provide a total of 4,110,863 GSF of building area, with approximately 59 percent of total building area for residential uses and approximately 41 percent for non-residential uses. Therefore, this standard is met.

- c. Functional integration of uses. Land uses in mixed use sites shall be selected and designed to encourage interaction among uses. Examples include but are not limited to commercial developments which are significantly used for shopping by on-site or adjacent residents or office workers.**

Response: Like the current approved master plan, the revised master plan has been designed to be a “20-minute neighborhood”, a term used to describe neighborhoods in which all of life’s daily needs—work, recreation, school, commercial services, etc.—are located within a 20-minute walk from home. The reconfigured LUA orientation further integrates uses across the site and as a result has ensured that all residential uses are within a 5-minute walk of a mixed-use site. The design is compatible with on-site and off-site uses while activating the site and optimizing use synergies. Examples of the applicant’s functional integration of uses on the site include:

- *Public schools* – The northwest corner of the development is designated for a 20-acre middle school site for the Evergreen School District. This new site, in combination with the existing Fisher’s Landing Elementary school located on the south side of SE 34th Street opposite the site, will provide K-8 educational services within walking distance of proposed residential uses within the project.
- *Outdoor public spaces* – The applicant has designed the site to provide active and passive recreation including the 13.7-acre forested tract in the northeast corner of the site, and a variable width trail along the perimeter of the project. Other opportunities for open space are contemplated across the site as reflected in the Potential Open Space plan.
- *Shared parking* –Significant expanses of surface parking exist from the former HP facilities. Because the peak parking period for the employment uses and residential uses are not the same, the applicant anticipates that surface parking for the light industrial LUA will be utilized for multiple use areas in an interim basis as the site builds out. As development occurs new parking areas will be constructed in concert with buildings and uses. Shared parking is expected to continue throughout the site including the use of on-street parking as well as the potential development of standalone parking facilities. Note that the City intends to provide dedicated parking for the Forested Tract adjacent to the site on additional land purchased from the applicant.
- *Gradation of use intensity* – The applicant has intentionally located residential-compatible land uses adjacent to the existing single-family residences to the west and north and has located the highest density use, the mixed use towards the center and southeast portion of the site, locations that are substantially shielded from off-site views from the north and from residences farther to the west. The MX LUA and IL LUA are oriented along the loop road and will have convenient access to SE 192nd Avenue, SE 176th Avenue and SE 34th Street which should minimize the need for vehicles to travel through residential areas to exit the site. The northern part of the property, which abuts a residential neighborhood, will have a school land use area, a linear open space feature that buffers IL LUA, and a park. Denser areas of light industrial and mixed-use land use areas are intentionally located in the core, to the south, and to the east of the property, to ensure a smooth transition toward the more commercial areas along SE 192nd Avenue.

d. Physical integration of uses.

- 1. All buildings and improvements on the site shall be located and designed to look and function as an integrated development and to encourage pedestrian travel between buildings and uses. Complete segregation of use types, such as placement of multiple commercial structures all on one side of a mixed use site and multiple residential structures all on the other, shall be prohibited.**

Response: The applicant has planned the project to ensure that uses will look and function as an integrated development. As reflected on the Proposed Land Use plan (Sheet 003) the project features a school site, consolidated IL LUA, two RLUA areas and a MX LUA which is concentrated in the southeast of the site and extends along the south half of the loop road ensuring that residential uses are within a short walk to services. The loop road, coupled with the pedestrian laneways and other proposed infrastructure, provides multi-modal connection between the uses while the Forested Tract, VIC Trail, Town Plaza and other potential open space areas identified on the Potential Open Space plan (Sheet 004) provide alternative connections between LUAs.

The Revised Design Guidelines included in Appendix F provide details regarding the design and character of future buildings to ensure high quality design within the development. In addition, the applicant plans to establish and maintain thematic elements throughout the development to solidify a sense of place throughout the project. These include uniform wayfinding signage, public street furniture elements (benches, waste receptacles, etc.), playground design, bicycle racks, street lighting, street trees and other consistent treatments. The combination of land planning and implementation of district wide design guidelines will produce a well-integrated, cohesive development consistent with this standard.

- 2. Separate buildings shall be connected through pedestrian linkages delineated through landscaping, differentiated surface materials or texture. Delineation through striping alone shall not be considered sufficient.**

Response: Pedestrian linkages through the site will be delineated through designated laneways, landscaping and/or different surface materials. The precise treatments will be defined with future site plan review requests within each LUA.

- 3. One or more similar design characteristics among separate structures shall be provided, including but not limited to similar or complimentary building facades, surface materials, colors, landscaping, or signage.**

Response: The applicant has proposed limited revisions to the design guidelines approved with the current VIC Master Plan, primarily removing references to single-family detached dwellings, and other refinements to better align with the Revised VIC Master Plan. The Revised Design Guidelines are included as Appendix F. With adherence to the revised guidelines structures within the district will have complimentary building facades, surface materials, colors, landscaping, and signage. The Open Space Plan Sheet 004 (Appendix E) and the Mobility Plan Sheet 005 (Appendix E) illustrate the corridors that will facilitate bicycle and pedestrian travel between each development on the property. The applicant will

ensure each site plan, plat or other preliminary entitlement application is consistent with these design standards.

4. **One or more outdoor publicly accessible features shall be provided to encourage interaction among residents or users of the site, including but not limited to courtyards, delineated gathering spaces, or seating areas. These areas may be paved and/or landscaped and must comprise at least 5% of the total site area and be centrally located within the site to fullest extent possible.**

Response: The applicant is proposing numerous outdoor publicly accessible open space areas throughout the project as indicated in the Potential Open Space plan Sheet 004 (Appendix E). Exact dimensions and boundaries of publicly accessible open space areas are not yet known; however, the applicant intends to provide a neighborhood park, town plaza and other open space areas along the south portion of the loop to establish a band of open space and publicly accessible amenities from east to west. A perimeter trail has also been identified and will vary in width and character along different site boundaries as reflected on the Enlarged Trail Sections plan (Sheet 007, Appendix E). The revised plan maintains the 13.7-acre forested tract identified in the prior plan. The applicant is diligently working with the City to negotiate a Purchase and Sale Agreement to sell the Forested Tract to the City to be developed into a municipal park. The applicant previously recorded a deed restriction preserving the Forested Tract and limiting its development as outlined in the current Master Plan. The applicant has committed to providing a minimum of 24 acres of open space features within the master plan site which equates to approximately 13.4 percent thereby exceeding the minimum required.

e. **Development and building density/intensity standards.**

1. **Residential buildings shall achieve a minimum density of at least 12 units per net acre, as measured by the total number of residential units divided by the portion of the site devoted to residential use, not including public or private streets, or critical areas and associated buffers on that portion.**

Response: After subtracting out the school site (20-acres), the proposed forested tract and open space area (24-acres), right of way (21.79-acres) and industrial use area (74.12-acres) from the 179-acre site area total, the net master plan area available for residential use is approximately 39.09 acres and is comprised of both the R LUA and MX LUA. With an anticipated maximum buildout of 1,800 residential dwelling units, the resulting density within residential and/or mixed-use areas is approximately 46.05 units per acre, thereby exceeding the minimum density standard above. Given the availability of the IL LUA for up to 100 dwelling units per this proposed master plan, the density of the residential area may ultimately be slightly below this 46.05 units per acre target but will not affect the project's compliance with this provision. Specific compliance with the 12 units per net acre will be demonstrated with each Site Plan Review request within the master plan.

2. **Non-residential buildings shall achieve a floor area ratio (FAR) of at least .5, as measured by the gross square footage of the nonresidential buildings divided by the site area or areas devoted to nonresidential use. Individual nonresidential buildings and associated attached structures shall be counted as floor space. The site or portion of the site**

devoted to those buildings, not including public right-of-way, parks or pedestrian trails, shall be counted as site area. Parking garages may be counted towards the FAR requirement provided that 60% of the ground floor is devoted to an office or commercial use.

Response: Because the project is planned for highly integrated mixed-use buildings, the only LUAs that will contain minimal to no residential component are the School LUA and the IL LUA. Consistent with the Current VIC Master Plan, the applicant proposes to apply the development standards most analogous to each LUA within each LUA, thus the .5 FAR does not apply to the Residential, School, or Light Industrial LUAs within the Revised VIC Master Plan.

3. Development standards shall be as indicated in the MX column of Table 20.430.040-1.

Response: The applicant is proposing to apply development standards for these areas that align with existing development standards for comparable land use districts in the City as provided for and modified in the Restated DA. For example, the applicant is proposing to apply the light industrial development standards found in VMC 20.440, for intended light industrial uses and R-30 development standards outlined in VMC 20.420 for the RLUA. Limited exceptions to those standards were authorized with the Current VIC Master Plan as detailed in Exhibit D of the Restated DA. Updates to the Restated DA are anticipated to align with the Revised VIC Master Plan proposal.

4. Screening. Non-residential uses, including off-street parking, which directly abut off-site single-family residential zones without an intervening public or private street shall provide screening as per 20.440.030(C)(3).

Response: The only instance in which non-residential uses will abut a single-family zone without an intervening street is along the northern boundary of the VIC site where the School and IL LUA's abut an existing single-family residential neighborhood. As reflected in the Master Plan Design Set (Appendix E) a minimum 65-foot-wide open space area is proposed along the northern boundary of the site and will include a minimum 30-foot-wide vegetative buffer, a minimum 15-foot-wide trail, with an approximate 20-foot transitional area between the trail and future parking areas for buildings within the IL LUA. The combination of buffer and horizontal separation will adequately screen the neighborhood from the non-residential uses proposed within the site.

f. Frontage standards.

1. Buildings shall be placed to encourage pedestrian activity within and along the site. No more than 50% of each site frontage along arterial or collector streets shall be devoted to off-street parking or vehicular access. Portions of site frontages devoted to off-street parking or access shall include design features such as landscaping or columns so as to maintain visual continuity of the street and sidewalk to the fullest extent possible.

Response: All three roads on the perimeter of the site are either a collector (SE 176th Avenue) or an arterial (SE 34th Street and SE 192nd Avenue). In addition, the northern half of the loop road, SE 29th

Street, is proposed as a new urban collector arterial which will run east- through the site. Tentative massing and development diagrams reflected on the Master Plan Design Set (Appendix E) indicate that the use along the site frontages will be predominantly occupied by buildings and will likely incorporate landscaping and pedestrian facilities between buildings and the right of way. While some parking and vehicular access areas will be present, they will not occupy more than 50% of the site frontage. Demonstration of compliance with this provision will be provided at the site plan review stage with each future development request. The applicant has sold the school LUA to Evergreen School District (ESD). ESD will address this frontage requirement as part of its school site development proposal.

- 2. At least one fully functional and visibly identifiable public entrance shall be provided along the frontage of each building adjacent to an arterial or collector street.**

Response: The property will be designed to comply with this provision. The site is bounded by a collector (SE 176th Avenue), and arterial streets (SE 34th Street and SE 192nd Avenue). Due to SE 29th Street's designation as an urban collector arterial, minimal access points have been proposed to facilitate vehicular circulation to the north IL LUA area. Roundabouts along the loop road will provide access to an internal private vehicular accessway to serve the existing VIC and VIC Building North which recently obtained construction plan approval. Buildings fronting these higher classification roadways can incorporate public entrances to comply with this criterion.

- 3. Blank walls longer than 30 feet without windows or an unbroken series of garage doors are not permitted on any street frontage, including frontage to controlled access highways and freeways.**

Response: Per the Revised Design Guidelines (Appendix F), blank walls longer than 20 feet without windows or an unbroken series of garage doors are not to be permitted on any street frontage. Demonstration of compliance with this provision will be provided at the time of site plan review submittal for future developments.

- g. Multiple parcel sites. Mixed use sites may be developed pursuant to this chapter on sites which consist of multiple parcels and internal public or private roads, provided that all applicable standards herein are met. Pedestrian connections required by 20.430.060 (C)(2)(d)(2) crossing internal arterial streets shall not require differentiated surface materials if striping is provided.**

Response: The applicant's request involves a mixed-use master plan on a site with multiple parcels. Demonstration of project compliance with the standards of this chapter is provided throughout this narrative and the remaining application materials.

- h. Parking – The following shall apply in addition to the standards of VMC 20.945.**
 - 1. The maximum number of spaces provided shall be no more than 125% of applicable minimum requirement for sites 10 acres or less, and no more than 115% of the minimum for sites larger than 10 acres.**

Response: The current master plan developed parking strategies centered around utilization of existing surface parking facilities. As reflected in the revised master plan, many of the existing parking facilities

will not be retained. Most of the facilities located to the south, east and west of the existing VIC will be incrementally demolished as development occurs within the site. New parking lots, stalls, and/or facilities will be constructed with each phase of new development. The applicant will provide parking consistent with the ratios specified in the Restated DA with the following exceptions:

- Given that the applicant anticipates having studio apartments on campus, the applicant proposes a parking ratio of 1 stall/studio dwelling unit. The current DA does not specify a parking ratio for studio apartments.
- As noted during the pre-app, there was a scrivener's error in the approved DA stating that parking in the IL LUA was to be at a minimum of 4.5 stalls/1,000 SF. This should have stated that 4.5 stalls/1,000 SF was the maximum allowed. Applicant proposes to adhere to VMC 20.945.070 requirements as the minimum for parking in the IL LUA. The maximum for the light industrial LUA is being removed and not being reinstated as 4.5 stalls/1,000 SF in order to allow the applicant to respond to tenant/market demand
- Uses in all LUAs may count available on-street and off-site parking spaces which are within 1,000-foot walking distance (4 minutes) to the development toward the minimum on-site parking requirement.
- The table below summarizes the proposed parking ratios to be used throughout the Revised VIC Master Plan site.

Table 1. Revised VIC Master Plan Parking Ratio

Program	Prior DA (Masterplan 1.0)	Proposed for Masterplan 2.0	Proposed Change
SFR	1 – 2 stall/DU	1 stall/DU min.	No change
MFR	1.5 - 2 stall/DU	1.5 stall/DU min.	No change
SFR/MFR/MX/IL Senior	0.3 stall/DU	0.3 stall/DU min.	No change
SFR/MFR/MX/IL Studio	N/A	1 stall/DU min.	Masterplan 1.0 did not address parking ratio for studios so proposing to include one
MX Non-residential	2 – 2.5 stalls/1,000 SF	2 – 2.5 stalls/ 1,000 SF	No change
IL Non-Residential	4.5 stalls/1,000 SF	min per VMC 20.945.070; remove maximum	Reduced minimum; removed maximum

2. **The Planning Official may authorize shared or joint use parking among uses which are likely to be visited with a single driving trip and are adequately linked to their parking, provided an adequate legal agreement for the joint parking usage for the duration of the arrangement is recorded.**

Response: The applicant is anticipating the use of shared or joint parking across the site. The variety of uses proposed within the site do not have coinciding peak parking demands and therefore, provide a unique opportunity to allow shared parking. Additionally, as noted above, the applicant is seeking the use

of shared off-site parking facilities and on-street parking to satisfy parking demand for each use. Instances such as these in which the applicant seeks joint parking will be requested in conjunction with site plan review requests for future development actions. As noted previously, the City intends to provide its own dedicated parking for the Forested Tract so shared parking will not be needed for that use.

- 3. The Planning Official may authorize shared or joint use parking among uses which have differing hours of operation or usage, such as residences and offices, provided an adequate legal agreement for the joint parking usage for the duration of the arrangement is recorded.**

Response: As discussed above, the applicant anticipates that joint parking will be utilized in instances where adjoining uses have different peak parking demands.

- 4. The Planning Official may authorize up to a 25% reduction in required parking if transit service is available to the site.**

Response: A request for reduced parking is not anticipated at this time. C-TRAN Route 37 provides loop service between SE 164th Avenue and Mill Plain Boulevard. Bus stops currently exist in both directions on SE 34th Street at SE 189th Avenue and on SE 192nd Avenue at SE 31st Street. The future intersection of SE 29th Street at SE 192nd Avenue is only approximately 800-feet north of the current bus stops at SE 192nd Avenue and SE 31st Street. Pedestrian facilities through the site will facilitate access to these bus stops to encourage the redevelopment of the site, and, in particular, the dense MX LUA at the center of the site. The applicant is interested in facilitating additional bus routes to and through the property, with C-TRAN's concurrence.

- i. Vesting**
Vesting and concurrency provisions shall be as indicated in 20.260.090 and 20.260.100.

Response: Vesting and concurrency has been addressed in previous development agreements for the site. Concurrent with the current VIC Master Plan, the applicant requested City approval of the Restated DA that updated the vesting and transportation concurrency provisions to reflect the specific uses and implemented standards anticipated for future development of the site.

3. Review Process – Mixed Use Sites

- a. Mixed Use Plan. Initial development of a multiple building mixed use site or portions of a mixed use site shall require submittal and approval of a Mixed Use Master Plan, unless already subject to previous Mixed Use or Master Plan approval. The following requirements shall apply:**
 - 2. Approval Criteria and Zoning. Proposed Mixed Use Master Plans 25 acres or larger in size shall be reviewed as Type IV application by the Planning Commission. Proposals less than 25 acres shall be reviewed as Type IV applications by the hearings Examiner. Approvals, or approval with conditions shall be granted upon findings that:**

- a. **The Master Plan and associated conditions of approval ensure future development will meet all applicable criteria of this chapter; and**

Response: Compliance with the provisions of this chapter is demonstrated in the responses provided throughout this narrative and in the associated application materials. Subsequent site plan approval will meet all applicable criteria of the VMC 20.430.060 multiple building mixed use standards unless modified by the Development Agreement and this Master Plan.

- b. **The proposal complies with applicable rezone criteria of VMC 20.285.080; and**

Response: Per Ordinance 4346 on August 6, 2021, the site has been rezoned from Industrial to Mixed Use. Compliance with the rezone criteria found in VMC 20.285.080 is not required to be demonstrated with this application.

- c. **There is or will be sufficient capacity within the transportation system and public sewer, water, police, fire, and stormwater services to adequately serve all portions of the site at the time of development; and**

Response: The revised TIA prepared by Kittelson and Associates, Inc. (Appendix D) demonstrates that the proposed uses within the master plan will generate a modest increase in weekday AM peak hour trips and the same number of weekday PM peak hour trips as compared to those already reserved for the site through the existing development agreement. The combined impact of refinements to the on-site transportation network, closure of one existing VIC campus vehicular access on SE 34th Street and revised site land uses results in changes to off-site proportional share contribution amounts but does not trigger new off-site transportation capacity mitigation construction beyond those measures required of the current VIC Master Plan development agreement. Because the City's transportation planning department has already reserved capacity in the system for the trips associated with the site, sufficient capacity exists within the transportation system with resolution of infrastructure improvements and other mitigation requirements outlined in the revised TIA. Consistent with the current VIC Master Plan, the applicant will improve the long-term capacity of the surrounding road network to address future growth in part by completing a segment of SE 29th Street from SE 192nd Avenue to SE 176th Avenue to provide an alternate east-west corridor to help relieve demands on SE 34th Street between SE 164th and SE 192nd Avenues. The revised TIA finds there will be sufficient capacity within the transportation system to adequately serve all portions of the site at the time of development and identifies implementation timing for each of the recommended mitigation measures associated with project phases. No new off-site mitigation measures were identified in the revised TIA.

Water and sewer utilities are readily available to the site and can be feasibly extended to serve the properties. All stormwater runoff from impervious surfaces on the site will be treated and infiltrated on-site as noted above. Stormwater runoff will be addressed in detail with future development plans and Stormwater Technical Information Report(s) with site plan review requests. Police, fire, and emergency services are generally available to serve the site and project impacts on these services will be incremental over the course of the buildout of the master plan.

- d. **A change in circumstances has occurred since existing zoning designations at the site were originally adopted. For the purposes of a multiple building mixed use plan only, compliance with the development standards of VMC 20.430.060.C.2 and the applicable Comprehensive Plan policies shall be sufficient to demonstrate that a change in circumstances has occurred.**

Response: Per Ordinance 4346 on August 6, 2021, the site has been rezoned from Industrial to Mixed Use. Compliance with the rezone criteria found in VMC 20.285.080 is not required to be demonstrated with this application. The revision to the prior master plan does not change the overall composition of the mixed-use master plan but rather reconfigures land use areas within the boundaries for larger, consolidated industrial sites and increases residential density in response to unprecedented demand for housing.

3. **Proposed modifications to previously approved mixed use concept plans shall require Type I, II or III review depending on the modification required, as specified in VMC 20.260.030.**

Response: The applicant is requesting a modification to an approved mixed use master plan, and pursuant to DA Section 7, the requested changes constitute a major revision thus prompting a Type IV review.

- b. **Development proposals on sites subject to an existing Mixed Use Master Plan or existing mixed use zoning:**

1. **Development on sites or portions of sites subject to Mixed Use Master Plan approval under this chapter, or under equivalent mixed use approval prior to this chapter, shall require site plan approval as Type II review under VMC 20.270. Approval or approval with conditions shall be granted if the proposal is fully consistent with the approved Mixed Use Master Plan or equivalent, applicable portions of this chapter, and VMC 20.270 procedural standards.**

Response: The applicant anticipates site plan review submittals for future development requests within the master plan.

2. **Development on sites or portions of sites zoned MX but not subject to an approved Mixed Use Master Plan under this chapter or other shall submit for master plan review under this chapter as a Type III application for sites less than 25 acres, and a Type IV application for sites 25 acres or larger.**

Response: The entire site area was previously rezoned to Mixed Use (MX) and therefore, will be subject to review under the governing land use entitlements associated with this revised mixed use master plan request.

- 3. No more than 50% of the total square footage envisioned by the Master Plan for any one major use type (commercial, office or residential) can be granted occupancy permit approval until occupancy permit approval is provided for at least 25% of the total square footage of all of the major use types envisioned in the Master Plan. This requirement may be waived by the planning official, if the applicant provides a security or other form of binding assurance that the remaining major use types contemplated in the Master Plan will be built.**

Response: The Restated DA includes “Synchronicity” provisions. These provisions limit the extent of residential uses allowed on the site based on the applicant’s delivery of new employment use square footage within the development. Specifically, Section 6.4(d) of the Restated DA stipulates that the applicant will be unable to construct greater than 50% of the residential units within the project until the developer has built at least 215,000 SF (25%) of the proposed new employment square footage on the site. Refinement of this language is anticipated to address additional housing units proposed with the project. However, as previously stated, the applicant has recently secured final engineering and building permit approvals for a new 200,981 square foot industrial building, VIC Building North, which largely meets this initial obligation for non-residential square footage.

- D. Adjustment to Numerical Standards – Single Building and Mixed Use Sites. Numerical standards contained in this chapter may be adjusted by up to 25% if a clear demonstration is provided that the proposed mixed use development with the adjustment would fully comply with the purpose statement and all other applicable standards of this chapter, and that the proposal would clearly not be able to comply with those standards without the proposed adjustments.**

Response: The applicant proposed land use area-specific development standard adjustments with the Restated DA that was approved by the Vancouver City Council by Ordinance 4346 on August 16, 2021. An adjustment to numerical standards is not proposed as part of the revised master plan request at this time, however, application of this provision may be requested at the time of individual site development.

- E. Incentives – Single Building and Mixed Use Sites. Traffic impact fees for mixes use developments shall be reduced to account for internal trips between uses on the site or building as demonstrated by an approved traffic study.**

Response: The TIA prepared by Kittelson and Associates (Appendix D) has considered an internalization factor for trips that will be retained on site due to the proposed mixture of land uses. It is assumed that any traffic impact fees applicable to future developments within the site would be based on the net increase of trips after this internalization factor is applied.

Vancouver Strategic Plan

GOAL 1: Ensure our built urban environment is one of the safest, most environmentally responsible and well maintained in the Pacific Northwest.

Response: The revision to the VIC mixed use master plan serves Goal 1 as the developer is committed to ensuring a safe, environmentally responsible, and well-maintained property. The applicant demonstrates

this commitment through the Revised Design Guidelines (Appendix F) for the site that promote design principles to incorporate sustainability and energy efficiency measures such as vehicle charging stations, solar panels, low impact development (LID) stormwater management approaches, shared parking strategies, and site design that supports a 20-Minute Neighborhood. The concept of the 20-Minute Neighborhood, and the 5-Minute derivative proposed with the Revised VIC Master Plan is to encourage accessibility, active (walking, cycling) transport and public transport in proximity to housing, employment opportunities, recreational opportunities, and open spaces. The Revised VIC Master Plan proposes a network of passive and active open space areas that utilize existing trees and natural resources, a balance of community gathering spaces and areas, the creation of a compact urban form composed of well-articulated buildings and ample pedestrian areas to encourage multi-modal travel throughout the site between the various on-site uses and open space areas and enable building design that encourages pedestrian access, ground floor visibility and community spaces for socialization and collaboration.

GOAL 4: Ensure that Vancouver's parks and trails system is the highest quality and most complete in the region.

- **Objective 4.1: Increase maintenance levels and accessibility to parks**
- **Objective 4.2: Increase recreational opportunities in our parks**

Response: As demonstrated with the Potential Open Space Site Plan Sheet 004 (Appendix E), the revised master plan serves Goal 4 by promoting a town plaza, neighborhood parks and providing a network of active and passive open space areas on the site including a multi-use trail that connects to 34th Street as part of the City's Complete Streets Program to enhance safety, efficiency, and mobility for all users. The master plan preserves an approximately 13.7-acre designated forested tract at the northeast corner of the site. Additionally, the Mobility Plan Sheet 005 (Appendix E) demonstrates functional connections to the site-wide bicycle and walking path network.

GOAL 6: Facilitate the creation of neighborhoods where residents can walk or bike to essential amenities and services—"20-minute neighborhoods"

- **Objective 6.1: Support a strong, active neighborhood program that enhance livability and community connections**
- **Objective 6.2: Improve amenities and services that allow residents to "age in place"**

Response: As mentioned, the proposed mixed use master plan supports the 20-minute neighborhood concept that encourages accessibility, active (walking, cycling) transport and public transport in proximity to housing, employment opportunities, recreational opportunities, and open spaces. The Mobility Plan Sheet 005 (Appendix E) demonstrates functional connections to the site-wide bicycle and walking path network. This mixed-use community will strengthen east Vancouver's commercial, light industrial, retail and community districts, helping to build a strong, resilient economy.

GOAL 8: Strengthen commercial, retail and community districts throughout the city

- **Objective 8.1: Make downtown Vancouver a vibrant destination for the community and the region**
- **Objective 8.2: Strengthen neighborhood business districts**

Response: The Revised VIC Master Plan proposes a more integrated mixed-use community in east Vancouver in a location where residents can work, shop, go to school and recreate all within a 20-minute walk from home. The diversity of residential housing products will offer a diversity of price points to allow housing opportunities for persons of a wide range of incomes within the community. The increase in residential density within the site will respond to shortages in the market. The additional residential rooftops will help support the neighborhood retail uses within and near the master plan site, supporting the existing and future neighborhood business districts.

GOAL 9: Build the strongest, most resilient economy in the region

- **Objective 9.1: Create infrastructure and policies that support job creation**

Response: The Revised VIC Master Plan reconfigures land use areas to provide greater integration of uses throughout the site including development of large-footprint light industrial buildings which allow for more flexibility to respond to market demands and tenant needs and is critical to achieve both the project and City's employment generation goals. As demonstrated with the Master Plan – Proposed Land Use Sheet 003 (Appendix E), of the approximately 179-acre site, approximately 74 acres of IL land and approximately 33 acres of MX land is proposed to create infrastructure that supports job creation and employment opportunities in research and development, light industrial/manufacturing uses, professional office, medical, retail, education and in the short term, construction and trade industries. The mixed-use environment enhances the experience for residents, employees and patrons by offering a variety of services and amenities which will not only support the immediate businesses within the site but will support other uses in the broader Vancouver area.

In addition, the developer will be constructing a segment of SE 29th Street between SE 192nd Avenue and SE 176th Avenue through the site. The facility is planned as an urban collector arterial and will relieve east-west congestion occurring on SE 34th Street and increase mobility and convenience in east Vancouver. The addition of this facility and other public infrastructure will enhance the marketability and interest in the employment uses on the site. The proposed location for SE 29th Street and the SE 29th Street streetscape will provide a transition between residential, and office/flex uses on the site, provide for truck traffic to and through the IL LUA, and offer safe and convenient pedestrian and bicycle access between the uses on the site.

Vancouver Comprehensive Plan

EC-1 Jobs-housing balance

Increase the ratio of jobs to residents in the City of Vancouver and the region.

Response: The June 30, 2020, Market & Economic Analysis for Vancouver Innovation Center, prepared by Eric Hovee discusses the various market factors influencing the development of the site and the respective benefits of the applicant's proposal to diversify the uses within the site and broaden the array of employment uses allowed. The study estimated that the Current VIC Master Plan could add approximately 3,500 net new jobs at build out. As discussed throughout this narrative and reflected in the various appendices, the Revised VIC Master Plan maintains the nonemployment square footage targets and thus the potential job creation is consistent. The increase in residential density will improve the jobs to residents ratio in the East Vancouver area.

EC-2 Family-wage employment

Promote the formation, recruitment, retention and growth of businesses that provide a wide range of employment opportunities, particularly family-wage employment. Prioritize family-wage employment in land use policies and practices.

Response: New jobs anticipated at build-out will provide a wide range of employment – in tech and light industrial activities, good paying professional/technical office-related occupations, and including entry-level and part-time retail/service employment suited to a range of employee interests and needs.

EC-3 Public revenue enhancement

Promote development that enhances revenue generation for public services.

Response: Per Clark County GIS, from 2006-2019, property taxes paid on the HP property declined by approximately 22%. Re-occupancy of the full existing space should stem this erosion. New development will add substantially to the property values and resulting tax revenues (in amounts not yet estimated). While on-going sales tax potential is greatest for commercial retail, dining and personal service uses (as compared with many industrial or office activities), the City will also generate considerable one-time sales tax revenue from new construction over the course of development to project build-out.

EC-4 Industrial and business park sanctuaries

Provide an adequate supply of industrial and/ or business park areas with opportunities for family-wage employment and revenue generation.

Response: The Revised VIC Master Plan concept can accommodate approximately 5,000 jobs including significant and diverse family-wage employment opportunities consistent with the current master plan. The revised master plan will maintain the mix of residential and commercial uses contemplated in the current plan, uses which yield higher per square foot values than industrial-only uses, resulting in increases to both property and sales tax revenue beyond what would be generated by less-intensely developed industrial-only uses.

EC-5 No net loss of employment capacity

Restrict zone changes or legislative land use approvals that would lessen long-term capacity for high-wage employment unless accompanied by other changes within the same review cycle that would compensate for the lost capacity or unless the proposed change would promote the long-term economic health of the city.

Response: As noted with the current VIC Master Plan, it is expected that a highly integrated mixed-use center that incorporates housing and amenities with employment will result in a greater employment potential on the site and greater business retention. When formerly considering if the property should be zoned from industrial to MX, Jones Lang LaSalle Americas, Inc. prepared a Comparative Valuation Analysis on December 8th, 2020, that concluded: “the property will exceed its current value significantly under the proposed mixed use (MX) zoning due to the added diversity of the asset mix and the construction of retail, lifestyle, and educational amenities for tenants and the surrounding community.” The revised master plan retains the integrity of this assessment and offers an even greater degree of

mixed-use integration, which will further this objective of increasing business and business retention through the creation of place.

EC-6 Efficient use of employment land

Maximize utilization of land designated for employment through more intensive new building construction and redevelopment and intensification of existing sites.

Response: The VIC proposal serves EC-6, efficient use of employment land, by consolidating and reconfiguring the IL LUA and leveraging more shared parking strategies. The Revised VIC Master Plan offers a more efficient overall land plan that provides greater flexibility for site design and development to respond to market drivers.

EC-7 Regional focus

Work with the larger Portland-Vancouver region to leverage opportunities, unique site availability, and marketing to promote the region nationally and globally to attract new business.

Response: The vision of the revised master plan is to honor and build around the innovative roots of the site as a high-tech employment hub, by building around the existing buildings and making that the core of the community. This will create a unique environment unlike others in the region and an environment that can be promoted at both a national and global level. The applicant has already made strides by securing tenants in the existing VIC who have national and international reach in their individual business markets. The implementation of the Revised VIC Master Plan will only improve upon this tenant portfolio.

EC-8 Small business support

Support the growth of new and expanding small business through efficient permitting, incentives, and communication.

Response: The proposed master plan revision will retain the capacity for small business within the site. There is substantial opportunity for new and expanding small businesses to find a home within the existing VIC or one of its future buildings. The variety of spaces provide great flexibility for tenant configurations to meet a wide range of businesses. This is especially critical in the near term as a visible sign that Vancouver is open for business to promote economic recovery over the next 2-3 years. The applicant is interested in collaborating with the City of Vancouver to identify and promote development and employer-based incentives – most ideally with coordination offering features of one-stop permitting that should work with an already approved master plan.

Chapter 4: Housing

H-1 Housing options

Provide for a range of housing types and densities for all economic segments of the population. Encourage equal and fair access to housing for renters and homeowners.

Response: The revised master plan proposes to increase density to a maximum of 1,800 dwelling units and will allow a variety of residential product types including single family attached, garden style apartments and vertical mixed use residential. Considerable effort has been expended to evaluate market needs for the various housing types and building composition including a mix of unit sizes which will serve

demand more efficiently. These product types can provide either rental or ownership opportunities at a variety of price points. This is particularly critical to ensure that housing is available for a variety of workers in various positions within the employment uses on the site and to relieve housing shortage within the broader Vancouver area.

H-2 Affordability

Provide affordable housing by formulating innovative policies, regulations and practices, and establishing secure funding mechanisms. Target affordability programs toward households with incomes below the median.

Response: The Revised VIC Master Plan proposes to increase density to a maximum of 1,800 dwelling units and will allow a variety of residential product types including single family attached, garden style apartments and vertical mixed use residential with a wide range of price points to serve broader economic groups. If the City were to adopt an MFTE zone that included the property, the applicant may seek to participate in the program for some portions of the site.

H-3 Housing improvement

Encourage preservation, rehabilitation and redevelopment of existing housing stock. Support neighborhood based improvement efforts.

Response: There are no existing homes on the master plan site. The Revised VIC Master Plan proposes two non-contiguous R LUAs and anticipates residential uses within the MX LUA. A variety of amenities are proposed throughout the site including publicly accessible open spaces, the perimeter trail, and other pedestrian and bike friendly facilities along roadways within the site. Uses anticipated within the site including office, retail, services, employment and education will add to the nature and feel of the neighborhood and community.

H-4 Innovative zoning

Encourage innovative housing policies that provide for affordable housing and maintain neighborhood character.

Response: The MX master plan allows for higher density housing on the site, thereby increasing housing inventory and allowing new housing at multiple price points. If the City were to adopt an MFTE zone that included the property, the applicant may seek to participate in the program for some portions of the site.

H-5 Housing placement near services and centers

Facilitate siting of higher density housing near public transportation facilities and in designated centers and corridors.

Response: C-TRAN Route 37 provides loop service between SE 164th Avenue and Mill Plain Boulevard. Bus stops currently exist in both directions on SE 34th Street at SE 189th Avenue and on SE 192nd Avenue at SE 31st Street. The future intersection of SE 29th Street at SE 192nd Avenue is only approximately 800-feet north of the current bus stops at SE 192nd Avenue and SE 31st Street. Pedestrian facilities through the site will facilitate access to these bus stops to encourage and will further encourage the redevelopment of the site.

H-6 Special needs housing

Facilitate housing for special needs populations dispersed throughout Vancouver and the region. Such housing may consist of residential-care facilities, shelters, group homes, or low-income housing, and should be located near transportation and other services such as health care, schools, and stores.

Response: While the applicant is not currently planning an affordable housing project on the site, they are willing to explore such a project if the City were to help with incentives such as adopting an MFTE zone for the site.

H-7 Home ownership

Promote opportunities for home ownership and owner occupancy of single- and multifamily housing.

Response: The Revised VIC Master Plan proposes to remove single family detached units from the project and will focus on other housing typologies which will increase housing inventory in the city and will allow for new housing at a variety of price points which may be available for sale or lease.

H-8 Public-private partnerships

Facilitate enhanced partnerships between public, private, and non-profit sectors to address affordable housing.

Response: The applicant is open to pursuing public-private opportunities that would enable an affordable housing project at the site.

H-9 Funding for housing

Pursue funding mechanisms to support affordable housing.

Response: Programs such as the MFTE program, Community Development Block Grants (CDBG), Tax Increment Financing (TIF) and other opportunities exist to help facilitate affordable housing projects. The applicant is open to further dialogue over the course of the development of the Revised VIC Master Plan to develop affordable housing on the site should the City seek to partner to make incentives available for such a project.

Chapter 5: Public Facilities and Services

PFS-1 Service availability

Consider water, sewer, police, transportation, fire, schools, storm water management, and parks as necessary facilities and services. Ensure that facilities are sufficient to support planned development.

Response: The applicant and developer of the VIC will be making significant investments to develop a robust on-site infrastructure system to support the uses on the site. These investments include the development of SE 29th Street to an urban collector arterial standard, and the installation of public water, sanitary sewer, and LID stormwater facilities throughout the project site. In addition, the applicant has sold a 20-acre site to the Evergreen School District for a future middle school. The master plan also calls for significant areas of open space across the campus including the 13.7-acre forested tract identified in the prior plan which the applicant is in negotiations with the City to sell this land to be developed as a

municipal park in the future. Other open space areas are proposed including the VIC Trail which will run along the perimeter of the site, a town plaza and a neighborhood park. In total, the revised master plan proposed 24 acres of open space, approximately five (5) acres more than what was contemplated in the current master plan. Additionally, the payment of system development charges or impact fees applicable for new development as well as property taxes help fund public services including police, fire, emergency management, schools, etc.

PFS-4 Transportation system

Develop and maintain an interconnected and overlapping transportation system grid of pedestrian walkways, bicycle facilities, roadways for automobiles and freight, transit and high-capacity transit service. Include support programs such as traffic operations, transportation demand management, neighborhood traffic management, and the regional trails program. Work towards completing and sustaining individual components and programs to ensure success of the entire system.

Response: Figure 5-3 of the City's Comprehensive Plan illustrates planned connection routes through the City. This map identifies a new east-west route through the VIC site in the alignment of NE 25th Street. Following discussions with the City during the current master plan review, it was determined that this route will be provided in the alignment of NE 29th Street. This route will help ease the number of vehicular trips that have to use SE 34th Street for connectivity between SE 164th Avenue and SE 192nd Avenue so long as the exiting configuration of SE 34th Street is maintained subject to any improvements required for this project. The revised master plan maintains the NE 29th Street extension thus providing of this important link in the regional transportation network.

PFS-5 System balance

Allocate resources to balance transportation choices. Promote development of a broader range of transportation options including pedestrian, bike, and transit systems, rather than focusing all resources on satisfying peak commuting demand with roadway capacity alone.

Response: The revised master plan will include an extensive network of pedestrian pathways or trails, sidewalks, bike lanes, plaza, and promenade areas to help provide alternative routes of travel for pedestrians and bicyclists to travel within the site and to off-site locations, including transit stops located on SE 192nd Avenue at SE 31st Street and on SE 34th Street at SE 189th Avenue.

PFS-8 Transportation circulation and system connectivity

Develop a transportation grid that provides good connections to surrounding land uses and activity centers and allows for multiple circulation routes to/from each location. Close gaps and complete system connections through the development and capital improvement processes.

Response: The applicant's completion of the SE 29th Street link will be an important improvement in the local regional traffic network, which lacks a continuous grid in many areas. The installation of SE 29th Street will relieve the burden currently being placed on existing corridors for vehicular throughput.

PFS-10 Livable streets

Design streets and sidewalks and manage vehicular traffic to encourage livability, interaction, and sense

of neighborhood or district ownership in linkage with adjacent land uses. Encourage multi-modal travel, and provide accessible, human scale opportunities for transferring between travel modes.

Response: The revised master plan will include an extensive network of pedestrian pathways, sidewalks, bike lanes, plaza, and promenade areas to help provide alternative routes of travel for pedestrians and bicyclists to travel within the site and to off-site locations, including transit stops located on SE 192nd Avenue at SE 31st Street and on SE 34th Street at SE 189th Avenue.

PFS-13 Neighborhood traffic

Protect and enhance neighborhoods with an active program that focuses on safety, safe routes to school, traffic calming, education, and enforcement.

Response: The proposed future middle school is located at the northwest corner of the site and near residential uses on the site providing for shorter routes of travel for many of the residents on the site. New public sidewalks and additional trails on the site will further help to facilitate safe pedestrian routes to this school. The Mobility Plan and associated Streetscapes Summary included in the Master Plan Design Set (Appendix E) reflect a thoughtful approach to both vehicular and non-vehicular transportation. For example, the use of laneways in neighborhoods place more emphasis on pedestrian movements and shared space with lower vehicle use, while SE 29th Street is designed for higher volumes of traffic and separated bike and pedestrian facilities to buffer against traffic. The applicant has been working with City staff and has refined the designs to respond to feedback.

PFS-17 Vehicle miles traveled

Use transportation and land use measures to maintain or reduce single occupant motor vehicle miles traveled per capita to increase system efficiency and lower overall environmental impacts.

Response: One of the fundamental goals of the existing master plan was to create a 20-minute community in which residents can fulfill most of their daily trip needs within a 20-minute walk. By establishing a 20-minute community, the applicant can minimize the need for vehicular trips, which in many cases would be conducted in a single-occupant vehicle and with a significantly greater carbon footprint. The revised master plan improves upon the 20-minute community concept and now has mixed use buildings within a five-minute walk for those living and/or working on the campus.

PFS-28 Schools

Work with local school districts to facilitate an adequate supply of schools and associated facilities. Facilitate timely and efficient siting processes which allow for assessment and mitigation of impacts.

Response: The applicant worked with the ESD to reserve an approximately 20-acre site on the property for a future middle school during the entitlement for the current master plan. Since then, ESD has purchased the parcel and the applicant continues to work with them as party and some further boundary adjustments need to be made to the school parcel to align with the proposed roadway network in the revised master plan. ESD staff has indicated that the proposed boundary adjustments provide a more developable parcel for the school district and the total acreage of the parcel remains 20-acres as in the current master plan.

PFS-30 Open spaces and parks

Provide and maintain parks, open spaces, and recreational services for all segments of the community consistent with adopted level-of-service standards. Facilities and services should support recreational activities, environmental or historical resource protection, and should preserve and enhance neighborhood identity and function.

Response: The applicant began discussions with the City to reserve a 13.7-acre location at the northeast corner of the site for a park that will be open to the public during the first master plan entitlement. Discussions have continued as the applicant has refined the master plan. The forested tract is delineated within the Master Plan Design Set and reflects a slightly modified boundary to encapsulate mature and healthy trees which have been surveyed since the current master plan approval.

PFS-31 Trails

Provide a system of trails linking public and private open spaces, parks, recreational uses and transportation facilities within and between jurisdictions. Encourage use of greenspaces and riparian corridors as pedestrian and nonauto-oriented linkages within the urban area, in balance with habitat protection.

Response: The proposed master plan will include an extensive network of pedestrian pathways and trails, sidewalks, a neighborhood park, town plaza, and promenade areas to help provide alternative routes of travel for pedestrians and bicyclists to travel within the site and to off-site locations. See Sheets 004 and 5 of the Master Plan Design Set (Appendix E).

PFS-32 Parks Coordination

Plan for parks, trails, open spaces and recreational services in coordination with other local and regional public agencies and private entities. Facilitate provision of lands and/or impact fees for parks as part of the development review process.

Response: The applicant began discussions with the City during the Current VIC Master Plan entitlement process to reserve an approximately 13.7-acre location at the northeast corner of the site for a park that will be open to the public. The Revised VIC Master Plan reflects the proposed forested tract, and the applicant continues to work with the City to negotiate the terms of this reservation including the potential for additional land which the City will use to provide dedicated off-street parking for the new municipal park.

6.2.2 Coordinate with service providers to identify the land and facility requirements of each and ensure that sufficient land is provided in urban and rural areas to accommodate these uses.

- 2. How the proposal is more consistent than the existing designation with each of the following objectives as applicable:**

Response: The applicant is not proposing a Comprehensive Plan amendment or rezone application with this revised master plan submittal. This standard does not apply.

IV. Conclusion

As demonstrated in this narrative and in the associated application appendices, the proposed major revisions to the current mixed use master plan will further the goals and policies of the City's Comprehensive and Strategic Plans and facilitate investment in the community. As the proposal has been found to meet the approval criteria governing the request, the applicant respectfully requests City approval of these land use applications.

Mixed Use Master Plan Standards and Approval Criteria

Multiple Building Mixed Use Sites

2. Standards – Mixed Use Sites (*VMC20.430.060.C.2*).

a. *Overall uses. Uses shall be allowed as indicated in the MX column of Table 20.430.030-1, except that automobile service stations and drive-through facilities shall be prohibited.*

Not applicable per existing DA

b. *Site Mix. At least 20% of the combined gross floor area of the buildings proposed on the site shall be devoted to residential uses, and at least 20% to nonresidential uses. Parking garages or portions of garages devoted to residential or nonresidential uses may be counted towards this requirement, but surface parking may not.*

c. *Functional integration of uses. Land uses in mixed use sites shall be selected and designed to encourage interaction among uses. Examples include but are not limited to commercial developments which are significantly used for shopping by on-site or adjacent residents or office workers.*

d. *Physical integration of uses.*

1. *All buildings and improvements on the site shall be located and designed to look and function as an integrated development and to encourage pedestrian travel between buildings and uses. Complete segregation of use types, such as placement of multiple commercial structures all on one side of a mixed use site and multiple residential structures all on the other, shall be prohibited.*

The last sentence of Subsection 2.d.1 above does not apply per existing DA

2. *Separate buildings shall be connected through pedestrian linkages delineated through landscaping, differentiated surface materials or texture. Delineation through striping alone shall not be considered sufficient.*

3. *One or more similar design characteristics among separate structures shall be provided, including but not limited to similar or complimentary building facades, surface materials, colors, landscaping, or signage.*

4. *One or more outdoor publicly accessible features shall be provided to encourage interaction among residents or users of the site, including but not limited to courtyards, delineated gathering spaces, or seating areas. These areas may be paved and/or landscaped, and must comprise at least 5% of the total site area, and be centrally located within the site to fullest extent possible.*

e. *Development and building density/intensity standards.*

1. Residential buildings shall achieve a minimum density of at least 12 units per net acre, as measured by the total number of residential units divided by the portion of the site devoted to residential use, not including public or private streets, or critical areas and associated buffers on that portion.

Does not apply per existing DA

2. Non-residential buildings shall achieve a floor area ratio (FAR) of at least .5, as measured by the gross square footage of the nonresidential buildings divided by the site area or areas devoted to nonresidential use. Individual nonresidential buildings and associated attached structures shall be counted as floor space. The site or portion of the site devoted to those buildings, not including public right-of-way, parks or pedestrian trails, shall be counted as site area. Parking garages may be counted towards the FAR requirement provided that 60% of the ground floor is devoted to an office or commercial use.

3. Development standards shall be as indicated in the MX column of Table 20.430.040-1.

Shall apply only in the MX LUA and as modified by the Town Center Master Plan Amendment per the existing DA

4. Screening. Non-residential uses, including off-street parking, which directly abut off-site single-family residential zones without an intervening public or private street shall provide screening as per [20.440.030\(C\)\(3\)](#).

Shall apply only to the School LUA per existing DA

f. Frontage standards.

Following does not apply to the SFR LUA, the MFR LUA, or the School LUA per the existing DA

1. Buildings shall be placed to encourage pedestrian activity within and along the site. No more than 50% of each site frontage along arterial or collector streets shall be devoted to off-street parking or vehicular access. Portions of site frontages devoted to off-street parking or access shall include design features such as landscaping or columns so as to maintain visual continuity of the street and sidewalk to the fullest extent possible.

2. At least one fully functional and visibly identifiable public entrance shall be provided along the frontage of each building adjacent to an arterial or collector street.

3. Blank walls longer than 30 feet without windows or an unbroken series of garage doors are not permitted on any street frontage, including frontage to controlled access highways and freeways.

- g. Multiple parcel sites. Mixed use sites may be developed pursuant to this chapter on sites which consist of multiple parcels and internal public or private roads, provided that all applicable standards herein are met. Pedestrian connections required by [20.430.060](#) (C)(2)(d)(2) crossing internal arterial streets shall not require differentiated surface materials if striping is provided.*
- h. Parking- The following shall apply in addition to the standards of VMC [20.945](#).*
- 1. The maximum number of spaces provided shall be no more than 125% of applicable minimum requirement for sites 10 acres or less, and no more than 115% of the minimum for sites larger than 10 acres.*
 - 2. The Planning Official may authorize shared or joint use parking among uses which are likely to be visited with a single driving trip and are adequately linked to their parking, provided an adequate legal agreement for the joint parking usage for the duration of the arrangement is recorded.*
 - 3. The Planning Official may authorize shared or joint use parking among uses which have differing hours of operation or usage, such as residences and offices, provided an adequate legal agreement for the joint parking usage for the duration of the arrangement is recorded.*
 - 4. The Planning Official may authorize up to a 25% reduction in required parking if transit service is available to the site.*

Approval Criteria ([VMC 20.430.060.C.3.a.2](#))

2. Approval Criteria and Zoning. proposed Mixed Use Master Plans 25 acres or larger in size shall be reviewed as Type IV application by the Planning Commission. Proposals less than 25 acres shall be reviewed as Type IV applications by the hearings Examiner. Approvals, or approval with conditions shall be granted upon findings that:

- a. The Master Plan and associated conditions of approval ensure future development will meet all applicable criteria of this chapter; and*
- b. The proposal complies with applicable rezone criteria of VMC [20.285.080](#); and*
- c. There is or will be sufficient capacity within the transportation system and public sewer, water, police, fire, and stormwater services to adequately serve all portions of the site at the time of development; and*

d. A change in circumstances has occurred since existing zoning designations at the site were originally adopted. For the purposes of a multiple building mixed use plan only, compliance with the development standards of VMC [20.430.060](#)C2 and the applicable Comprehensive Plan policies shall be sufficient to demonstrate that a change in circumstances has occurred.

Also:

The multiple building mixed use sites standards of VMC [20.430.060.C.2](#) shall apply unless otherwise noted in the development agreement.

VMC 20.430.060.D. Adjustment to Numerical Standards – Single Building and Mixed Use Sites Numerical standards contained in this chapter may be adjusted by up to 25% if a clear demonstration is provided that the proposed mixed use development with the adjustment would fully comply with the purpose statement and all other applicable standards of this chapter, and that the proposal would clearly not be able to comply with those standards without the proposed adjustments.

VMC 20.430.060.E. Incentives – Single Building and Mixed Use Sites Traffic impact fees for mixed use developments shall be reduced to account for internal trips between uses on the site or building as demonstrated by an approved traffic study.

Subsequent applications for development within the master plan will be reviewed under the procedures outlined in VMC [20.210](#), in most cases a Type II Site Plan.

APPENDIX D

REVISED TRAFFIC IMPACT ANALYSIS

April 28, 2023

Project #: 27715.5

Eric Hahn, PE
City of Vancouver Public Works
4500 SE Columbia Way
Vancouver, WA 97668-1995

RE: Traffic Impact Analysis for the Revised Vancouver Innovation Center (The VIC) Mixed Use Master Plan

Dear Eric,

The VIC Building Owner LLC (the Applicant) proposes revisions to The VIC Mixed Use Master Plan and Development Agreement¹. Primary objectives of the revisions are to 1) consolidate industrial areas to optimize opportunities for employment-generating development and 2) more substantially integrate development types to allow for greater density while creating an opportunity to provide more open spaces throughout the site to enhance design and placemaking opportunities.

From a traffic impact perspective, key changes associated with the revised Master Plan include:

- A small reduction in overall daily campus trip generation, a modest increase in AM peak hour trip generation, and no change in the PM peak hour trip generation compared to the current approvals and trip vesting;
- Refinement of the on-site transportation network;
- Elimination of one existing campus vehicular access on SE 34th Street; and
- Refinement of the on and-off site transportation mitigation measures into four distinct project phases.

In addition to the Master Plan changes noted above, this study incorporates transportation system changes anticipated associated with the City of Vancouver's *SE 34th Street Safety & Mobility Project*². The documentation presented in this report is prepared to inform updates to the Development Agreement, in particular memorialization of The VIC trip vesting and transportation mitigation requirements with additional specificity by each of four master plan phases.

BACKGROUND

The VIC is an approximately 179-acre site located at 18110 SE 34th Street and is developed with approximately 715,000 square feet of campus building area supported by surface parking. Today, the

¹ Third Amended and Restated Development Agreement (Restated DA) approved by the Vancouver City Council by Ordinance 4346 on August 16, 2021.

² <https://www.cityofvancouver.us/cdd/page/se-34th-street-safety-and-mobility-project>

campus is accessible at two locations on SE 34th Street including 1) a private vehicle circulation route that extends north into the site from the signalized intersection of SE Hiddenbrook Drive and 2) a private vehicle route that extends north into the site from the stop-controlled intersection near the southwest corner of the site aligned with SE 177th Avenue to the south. Figure 1 shows the site vicinity map and Figure 2 illustrates the revised Master Plan land use areas.

Master Plan development is generally anticipated in four phases that each have different supporting transportation infrastructure, with Phases 2-4 providing new on-site public roadways:

- Phase 1 includes the VIC Building North and up to 300 homes using existing campus access.
- Phase 2 will construct the southwest portion of a new on-site loop road between SE Hiddenbrook Drive and SE 29th Street, SE 29th Street between the new west loop road roundabout and a new roundabout at SE 176th Avenue, and will close the existing The VIC campus roadway connection to SE 34th Street aligned with SE 177th Avenue upon completion of the on-site loop road and Hiddenbrook Drive renovations.
- Phase 3 will extend SE 29th travel from the Phase 2 west roundabout terminus east across the VIC campus to a new signalized intersection at SE 192nd Avenue.
- Phase 4 will complete the loop road between a new east roundabout on the loop road and SE Hiddenbrook Drive to the south. Upon completion of Phase 4 all roadways shall be complete.

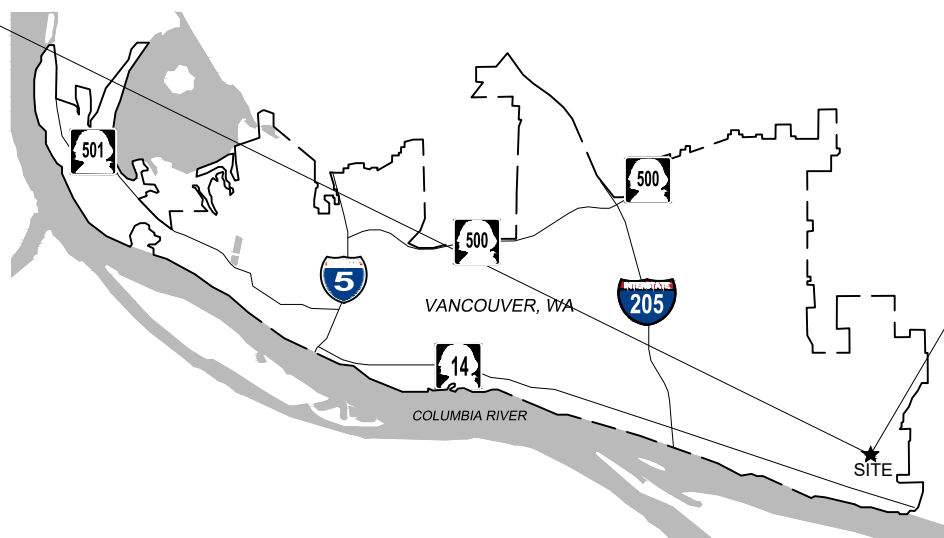
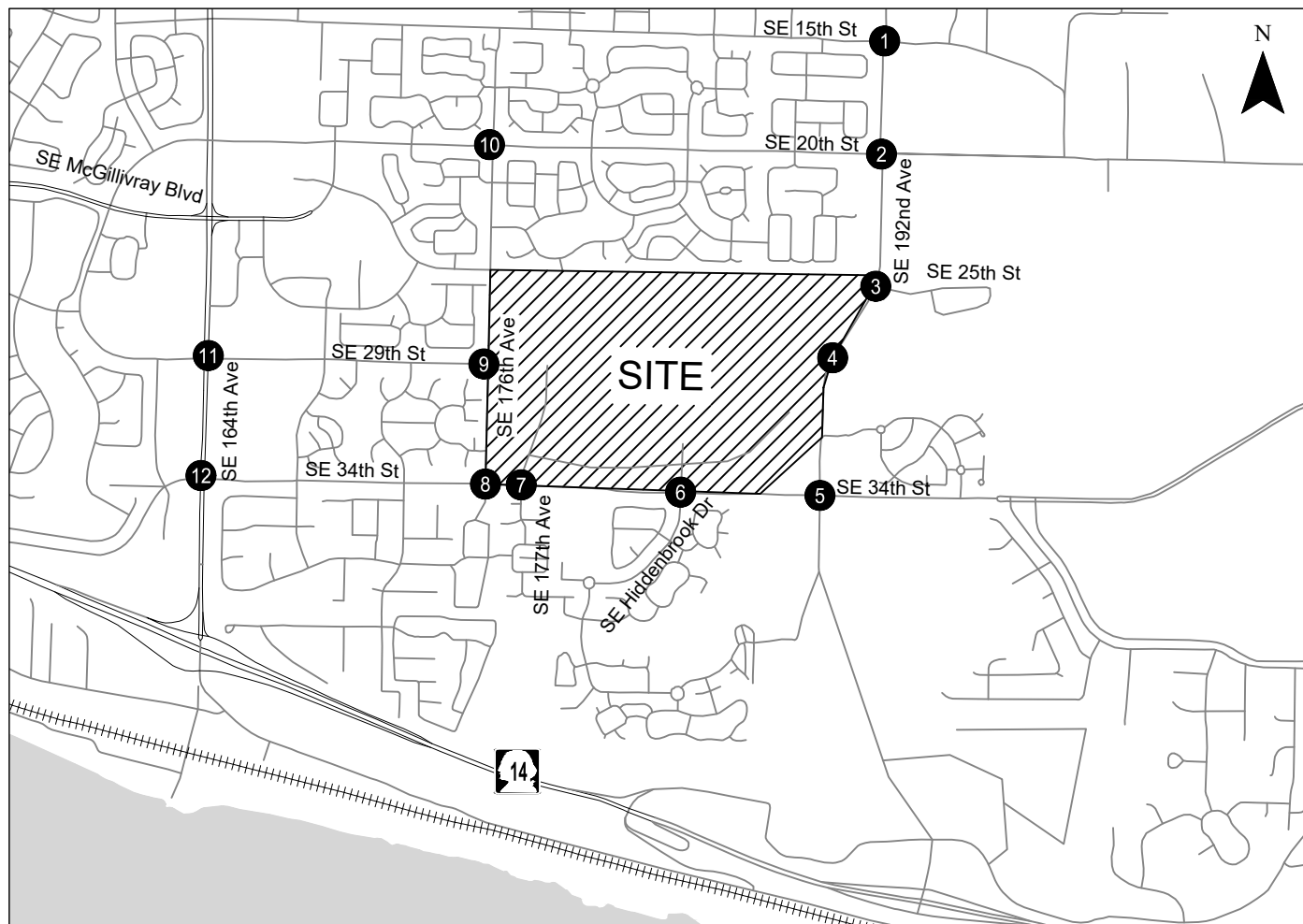
Some site development was already underway at the time this report was prepared consistent with the approved master plan and development agreement. Consistent with the prior master plan, full build-out and occupancy is anticipated to occur over a 15-year period. Accordingly, current and future year 2038 transportation conditions were analyzed.

This letter documents the methodology and findings of a traffic impact analysis (TIA) prepared for the proposed revisions to the Master Plan. Consistent with current obligations, future site development applications under the proposed revised Master Plan and Development Agreement will each be required to demonstrate compliance with the Master Plan transportation requirements through preparation of a Transportation Compliance letter.

TRANSPORTATION MITIGATION SUMMARY

In addition to typical roadway frontage improvements along the streets abutting VIC, several transportation improvements are recommended in conjunction with Master Plan site development (subject to City of Vancouver approval). Table 1 summarizes the recommended transportation improvements and reflects which are triggered by the VIC Master Plan versus those needed regardless of any additional development within the campus. Further details on each improvement are described more fully in later sections of this report.

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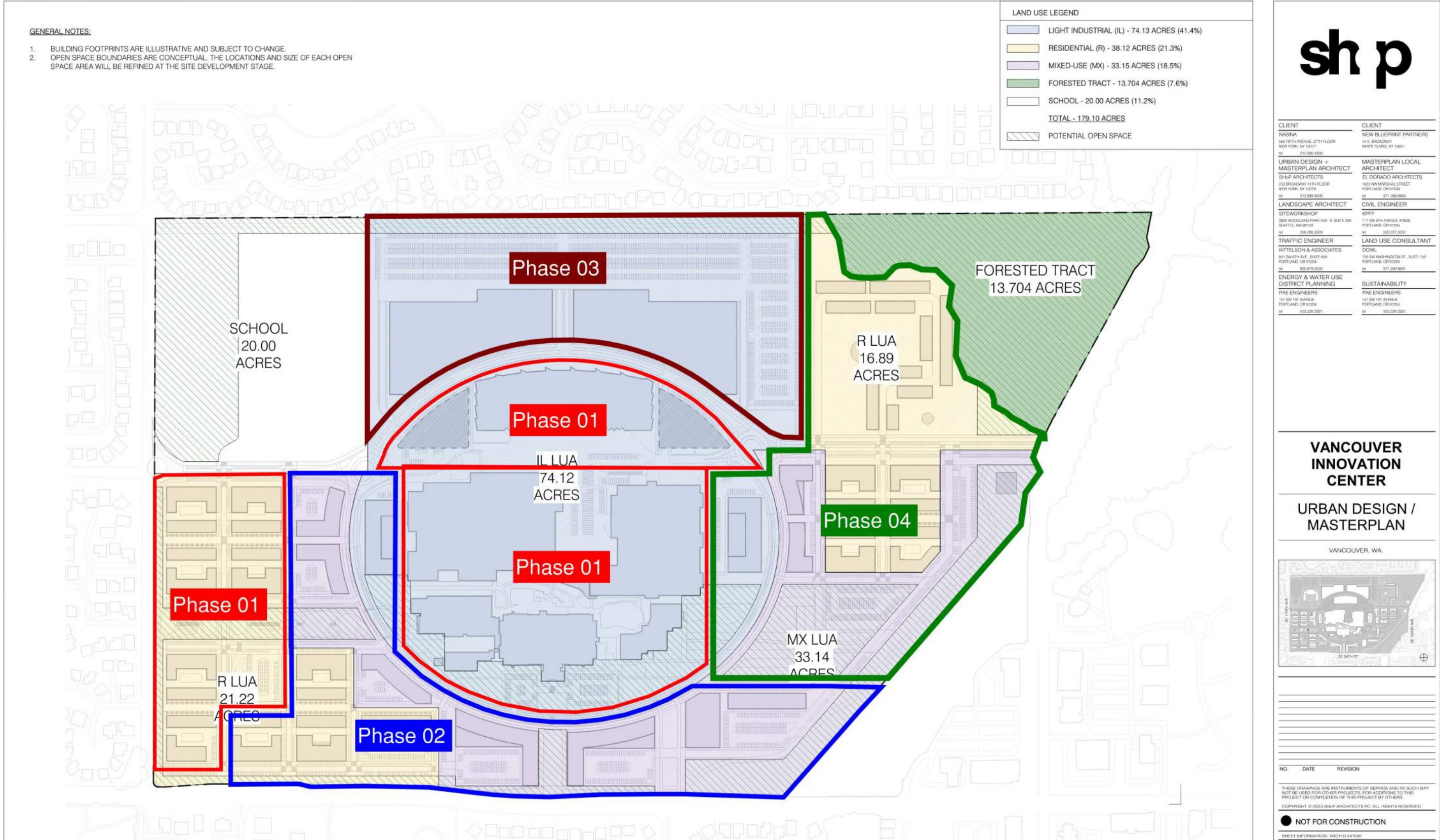


Study Intersections

Site Vicinity Map
 Vancouver, Washington

Figure
 1

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Phasing plan provided by The VIC Building Owner, LLC 4/6/2023

Proposed Master Plan
Vancouver, WA

Figure
2

Table 1. Summary of Mitigation Recommendations

Facility	Segment/ Study Intersection ID	Mitigation Recommendation	Needed Pre- VIC Master Plan?	Triggered by VIC Master Plan Trips?	VIC Master Plan Trigger Phase?
On-Site Roadways & Intersections					
SE 29 th Street	<i>Extend collector arterial roadway across the VIC Master Plan site in three segments</i>				
	West Segment	From SE 176 th Avenue to West Loop Road	N/A	Yes	2
	North Segment	From West Loop Road to East Loop Road	N/A	Yes	3
	East Segment	From East Loop Road to SE 192 nd Avenue	N/A	Yes	3
SE 184 th Avenue	N/A	Renovate collector arterial roadway within The VIC Master Plan site from SE 34 th Street to Loop Road	N/A	Yes	2
West Loop Road	N/A	From SE 184 th Avenue to SE 29 th Street	N/A	Yes	2
East Loop Road	N/A	From SE 184 th Avenue to SE 29 th Street	N/A	Yes	4
West Loop Road/ SE 29 th Street	N/A	Construct single lane roundabout	N/A	Yes	2
East Loop Road/ SE 29 th Street	N/A	Construct single lane roundabout	N/A	Yes	3
Site-Access Changes					
West Site Access/ SE 34 th Street	7	Close and vacate motor vehicle site-access (intersection north approach)	No	No	2
SE 29 th Street/ SE 176 th Avenue	9	Reconstruct as a single lane roundabout	No	Yes	2
SE 29 th Street/ SE 192 nd Avenue	4	Install traffic signal with interconnect Construct and stripe separate eastbound left and right turn lanes with 250 feet of storage each Stripe northbound left-turn lane with 200 feet of storage	No	Yes	3
Off-site Intersection Mitigations with Master Plan Development					
SE 29 th Street/ SE 164 th Avenue	11	Modify traffic signal to provide east-west protected/permissive left-turn phasing	No	Yes	2
		Extend westbound left-turn lane striping to provide 225 feet of storage (striping only)	No	Yes	2
		Extend southbound left-turn storage to provide 300 feet of storage (reconstruct center median area)	No	Yes	2
SE 192 nd Avenue/ SR-14 Westbound Ramp Terminal	N/A	Pay proportionate share contribution toward future capacity improvements with each site development application. Estimated total fee of \$430,000 based on assumed Master Plan land use plan.	Yes	No	Each phase based on trips added
SE 20 th Street/ SE 176 th Avenue	10	Pay proportionate share contribution toward future capacity improvements with each site development application. Estimated total fee of \$33,600 based on assumed Master Plan land use plan.	Yes	No	Each phase based on trips added
SE 34 th Street/ SE 192 nd Avenue	5	Pay proportional share contribution towards re-constructing streets with a more durable pavement treatment to reduce maintenance needs. Estimated total fee of \$83,400 based on assumed Master Plan land use plan.	Yes	No	Each phase based on trips added

N/A = Not applicable

SCOPE OF THE REPORT

The TIA identifies the transportation-related impacts associated with the proposed development. Per Vancouver Municipal Code (VMC) Section 11.80.130, a TIA is needed given the trips collectively generated by the proposed Master Plan land uses will exceed 20 net new weekday PM peak hour trips.

The study intersections and overall study area for the Master Plan were determined based on a review of the prior master plan, existing travel patterns, TIA requirements pursuant to Vancouver Municipal Code (VMC) Sections 11.80.080 and 11.80.130 as well as scoping direction provided by City staff.

Study Intersections

As coordinated with City staff, the following 12 intersections were analyzed:

- 1) SE 15th Street/SE 192nd Avenue
- 2) SE 20th Street/SE 192nd Avenue
- 3) SE 25th Street/SE 192nd Avenue
- 4) SE 29th Street/SE 192nd Avenue (analyzed in year 2038 with Master Plan development only)
- 5) SE 34th Street/SE 192nd Avenue
- 6) SE 34th Street/SE Hiddenbrook Drive-East Site Access
- 7) SE 34th Street/SE 177th Place-West Site Access
- 8) SE 34th Street/SE 176th Avenue
- 9) SE 29th Street/SE 176th Avenue
- 10) SE 20th Street/SE 176th Avenue
- 11) SE 29th Street/SE 164th Avenue
- 12) SE 34th Street/SE 164th Avenue

Additionally, though not a study intersection, future site-generated trips projected to travel through the SR-14/SE 192nd Avenue westbound ramp terminal are documented to estimate proportional share contributions that will be required of future Master Plan development site plan applications.

Analysis Periods

Weekday AM and PM peak hour conditions were assessed for three analysis periods:

- Existing conditions;
- Future 15-year conditions (year 2038) that do not include any Master Plan build-out; and
- Year 2038 Build Out conditions with full Master Plan development and occupancy.

Report Format

The remaining sections of this report address the following transportation issues:

- Existing land use and transportation system conditions near The VIC;
- Study intersection crash history review;
- Trip generation and distribution estimates for the proposed The VIC land uses;
- Concurrency corridor trip assignment;
- Forecast future year (2038) baseline traffic conditions;
- Forecast future year (2038) Phase 1 to Phase 4 build out traffic conditions;
- A review of potential mitigation options;
- Intersection sight distance considerations; and,
- Findings and recommendations.

ANALYSIS METHODOLOGY

Intersection Levels-of-Service

Study intersection performance was evaluated using Synchro 11 and Sidra 9 software. All level-of-service (LOS) analyses for the intersections described in this report were performed in accordance with the procedures stated in the *Highway Capacity Manual 6th Edition* (HCM, Reference 1).

Queuing Analysis

Queuing analyses were prepared by reporting Synchro 95th percentile queues for the peak 15-minute analysis during both the weekday AM and PM peak hours.

Operating Standards

City of Vancouver Municipal Code Section 11.80.130.B states the following:

A proposed development that adds at least five net new peak hour trips to an intersection approach operating at a LOS E or lower within the required traffic impact analysis area may be denied based upon any of the following:

- 1. For signalized intersections, when off-site intersection conditions are at a LOS F, or*
- 2. For signalized intersections, when the LOS E and the volume to capacity ratio is greater than 0.95, or*
- 3. For unsignalized intersections, when the volume to capacity ratio for any lane on any approach is greater than 0.95, and*
- 4. When significant traffic hazards would be caused or materially aggravated by the proposed development.*

The above operating standards are applicable to all study intersections. Existing and year 2038 operational analyses at the study intersections were prepared using Synchro 11 and Sidra 9 software and compared to these standards. Current timing parameters and phasing information for the signalized study intersections was provided by City staff.

Existing Conditions Traffic Volume Development

Turning movement counts were obtained at the study intersections on a mid-week day during the morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak hour periods. Traffic counts collected at the SE 34th Street corridor study intersections by the City of Vancouver in early December 2022 were used in this study (the December 2022 counts were conducted as part of the City's *SE 34th Street Safety and Mobility Project* to provide consistency in the base existing conditions analyses presented in this report and the City's study). Traffic counts at the remaining study intersection counts were completed on a mid-week day in January 2023 while local schools were in-session when no inclement weather occurred that would alter traffic patterns³. *Appendix "A" provides the traffic count data sheets.*

EXISTING CONDITIONS

The existing conditions analysis identifies site conditions and the current operational and geometric characteristics of roadways within the study area. These conditions are compared with future conditions later in this report.

³ At the time of the traffic counts, a portion of the existing buildings on the VIC campus had been leased but not yet re-occupied. Trips associated with re-occupancy of the vacant space are addressed in the future 2038 baseline analysis.

Site Conditions and Adjacent Land Uses

Today, a portion of the VIC campus is occupied by a total building area of 715,000 square feet and associated surface parking lots. The campus has two gated accesses to SE 34th Street and is bounded by existing residential developments to the north, west and south with a commercial development and SE 192nd Avenue to the east. Fisher's Landing Elementary School is located south across SE 34th Street and is accessed via SE Hiddenbrook Drive.

Adjacent Roadway Facilities

Table 2 summarizes the existing transportation facilities and roadways in the study area.

Table 2: Existing Transportation Facilities and Roadway Designations

Roadway	Functional Classification ¹	Number of Travel Lanes	Posted Speed (mph)	Sidewalks?	Bicycle Lanes?	Median?	On-Street Parking?
SE 15 th Street	Collector Arterial	2	30	Yes ²	Yes ³	No	No
SE 20 th Street	Minor Arterial	2-3	40	Yes	Yes	Striped	No
SE 192 nd Avenue	Principal Arterial	4-5	40	Yes	Yes	Raised	No
SE 34 th Street	Principal Arterial	4-5	40	Yes	No	Raised	No
SE Hiddenbrook Drive	Local Street	2	25	Yes ⁴	Yes	No	No
SE 177 th Place	Local Street	2	25	Yes	No	No	Yes
SE 176 th Avenue	Collector Arterial	2	35	Yes	No	Striped	No
SE 29 th Street	Collector Arterial	2	25	Yes	Yes	No	No
SE 164 th Avenue	Principal Arterial	5-6	40	Yes	No	Raised	No

¹ Source: *City of Vancouver Arterial Street System and Classification Map*, Adopted June 27, 2022 (Reference 2).

² Continuous sidewalks only provided on the south side of SE 15th Street, west of SE 192nd Avenue. Sidewalks terminate approximately 900 feet east of SE 192nd Avenue.

³ Bicycle lanes are only provided west of SE 192nd Avenue.

⁴ Continuous sidewalks only provided on west side on SE Hiddenbrook Drive.

Transit Facilities

C-Tran currently offers multiple fixed transit routes that service the Fisher's Landing Transit Center (Reference 3) located approximately two-thirds of a mile west of the VIC. Route 30 - *Burton* operates daily along the SE 164th Avenue/NE 162nd Avenue corridor and has a stop located between SE 29th Street and SE 34th Street, approximately ½ mile west of the site. Additionally, Route 37 - *Mill Plain/Fisher's* operates along SE 164th Avenue, SE 192nd Avenue and along the site frontage on SE 34th Street, with daily service. A posted westbound transit stop for Route 37 is provided near both existing The VIC site access points on SE 34th Street. No shelter area is provided at either stop location.

Crash Analysis

Table 3 summarizes the crash frequency at the study intersections. Generally, the City of Vancouver considers a crash rate greater than one crash per million entering vehicles (MEV) to be an indicator that a potential geometric or operational issue may exist, and that further evaluation should be considered.

Table 3: Study Intersection Crash Frequency and Severity (January 2018 through December 2022)

Study Intersection		Crash Type ¹						Severity			Total	Crash Rate ³
ID	Location	Angle	Turn	Rear-End	Side Swipe	Fixed Object	Ped/Bike	PDO ²	Injury	Fatal		
1	SE 15 th Street/ SE 192 nd Avenue	4	1	3	-	-	-	5	3	0	8	0.18
2	SE 20 th Street/ SE 192 nd Avenue	2	1	5	1	1	-	6	4	0	10	0.21
3	SE 25 th Street/ SE 192 nd Avenue	-	-	-	-	-	-	0	0	0	0	0.00
4	SE 29 th Street/ SE 192 nd Avenue	No data reported (Future Intersection)										
5	SE 34 th Street/ SE 192 nd Avenue	3	14	-	-	-	-	8	9	0	17	0.34
6	SE 34 th Street/ SE Hiddenbrook Drive (East Site Access)	-	1	-	-	-	-	1	0	0	1	0.06
7	SE 34 th Street/ SE 177 th Place (West Site Access)	1	-	-	-	-	-	1	0	0	1	0.06
8	SE 34 th Street/ SE 176 th Avenue	1	5	-	-	2	-	4	4	0	8	0.38
9	SE 29 th Street/ SE 176 th Avenue	1	-	-	-	-	1	1	1	0	2	0.24
10	SE 20 th Street/ SE 176 th Avenue	1	1	6	-	-	1	7	2	0	9	0.41
11	SE 29 th Street/ SE 164 th Avenue	-	2	-	-	-	-	2	0	0	2	0.04
12	SE 34 th Street/ SE 164 th Avenue	8	4	11	-	-	-	15	8	0	23	0.33

¹ No backing or head-on crashes were reported.

² PDO = Property Damage Only

³ Crash rate is calculated as the number of crashes per million entering vehicles (Crashes/MEV). Average daily traffic volumes were estimated using PM peak hour total entering volume at the intersection.

As shown in Table 3, there were no reported fatal collisions, and each study intersection experienced a crash rate less than 1.0 per million entering vehicles. Three trends were noted in reviewing the crash data. First, the SE 34th Street/SE 176th Avenue intersection was noted to have two fixed object collisions, both of which involved a median placed traffic sign on the east-west intersection approaches. The median on the west approach to the intersection was observed to interface with the marked crosswalk. Considering the crash history and current median placement, regardless of the proposed Master Plan, the City may consider reinstallation/replacement of the median end treatments nearest the intersection on SE 34th Street, additional median nose striping, or reflective bollards to increase the visibility of the narrow median curb and signs (the existing end treatments are shown in Exhibits 1 and 2 for reference).

Such changes could be evaluated and addressed as part of the City's planned *SE 34th Street Safety & Mobility Project*.

Exhibit 1: Facing East at the SE 34th Street/ SE 176th Avenue intersection (image source Google Earth)



Exhibit 2: Facing West at the SE 34th Street / SE 176th Avenue intersection (image source Google Earth)



A second apparent trend amongst the crash data is that 6 of the reported 11 rear-end crashes at the SE 34th Street/SE 164th Avenue intersection involved southbound vehicles. This pattern may be reflective of the tendency for motorists to congregate towards the right-most through lane to reach the single SR-14 westbound on-ramp lane to the south of the intersection.

The third trend amongst the crash data is that 12 of the reported 14 turning crashes at the SE 34th Street/SE 192nd Avenue intersection involved eastbound (6) and westbound (6) vehicles turning left to travel north and south respectively. This pattern may be reflective of the motorists who error in selecting

gaps to complete their turn during the permissive portion of the protected/permissive left-turn phase. The City's 34th Street Safety & Mobility project may be changing the intersection lane configuration as discussed later in this report which would impact gap acceptance.

There were two reported crashes involving a cyclist:

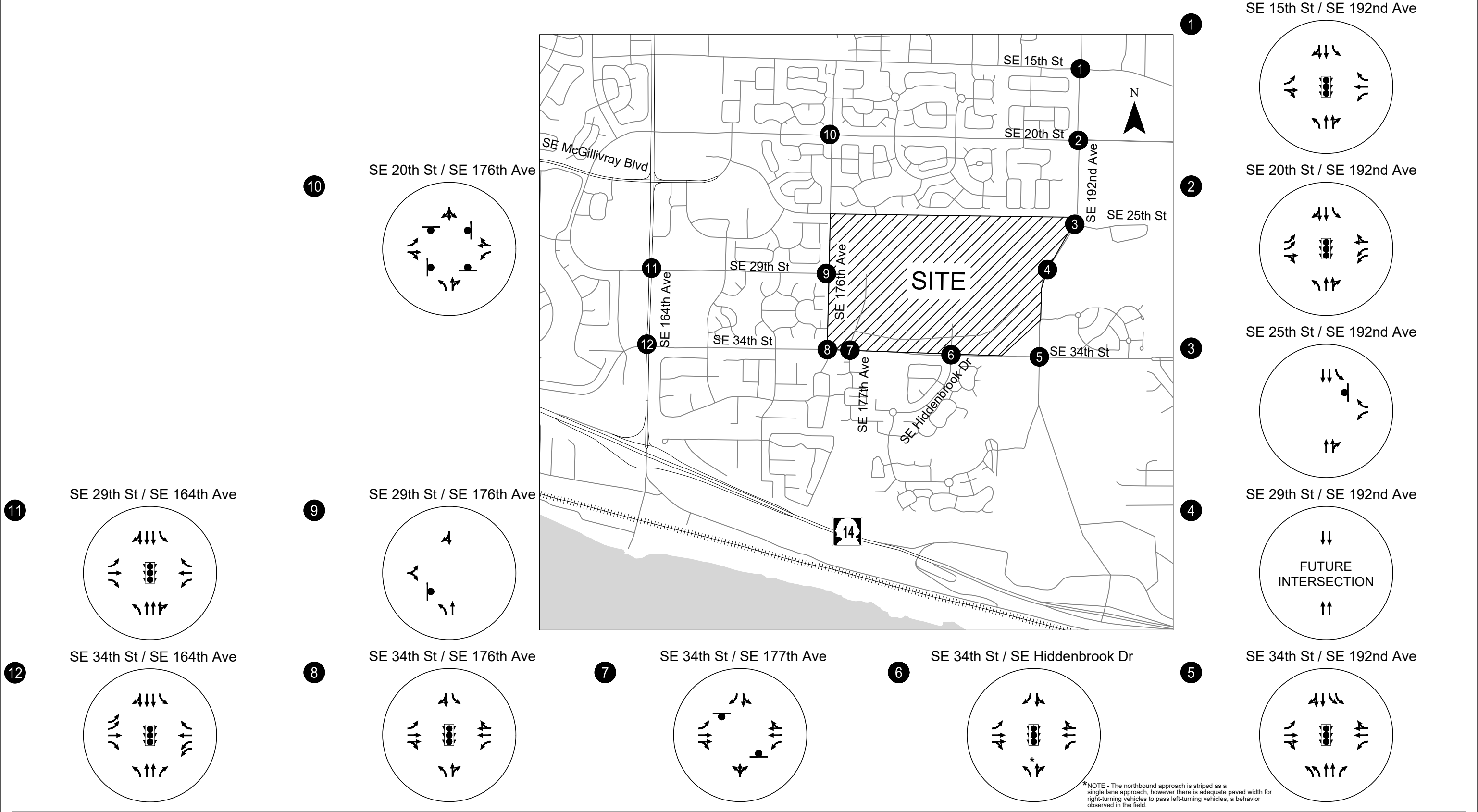
- In July 2020 on a clear dry day, a motorist struck a cyclist at the SE 20th Street/SE 176th Avenue AWSC intersection. No cause of the crash was provided in the crash report.
- In May 2022 on a wet rainy day, a motorist struck a cyclist at the SE 29th Street/SE 176th Avenue TWSC intersection. Per the crash report, the driver was inattentive.

No other safety-based mitigation needs were identified through review of the available crash data. *Appendix "B" includes the crash data provided for each of the study intersections.*

Existing Traffic Conditions

Figure 3 illustrates the existing lane configuration and traffic control devices at each of the study intersections. Figure 4 presents the existing traffic volumes and corresponding intersection operations during the weekday AM and PM peak hours. As shown, all intersections currently satisfy applicable City standards during both peak hours. *Appendix "C" contains the existing conditions operational analysis worksheets.*

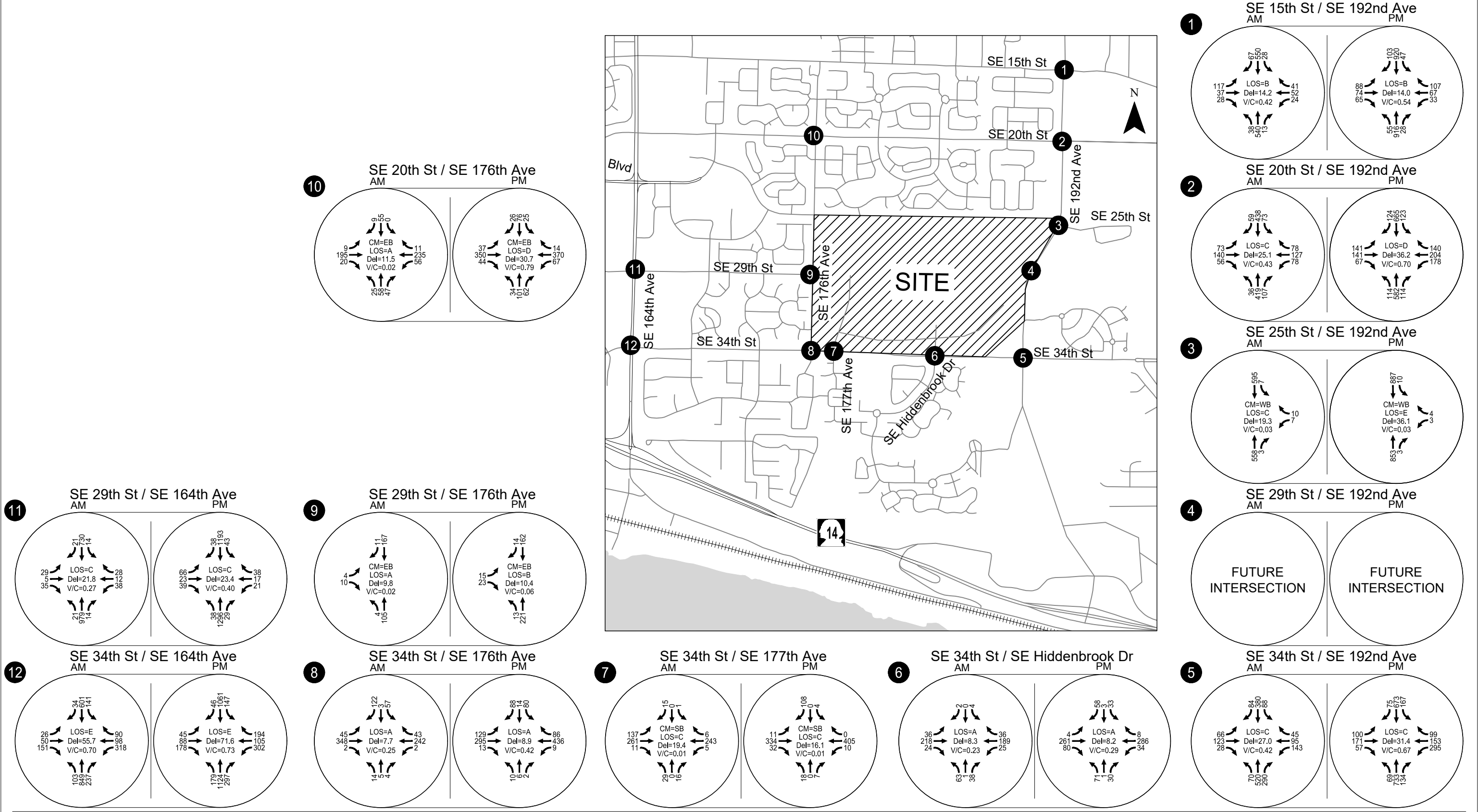
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Existing Lane Configurations and
Traffic Control Devices
Vancouver, WA

Figure
3

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CM = Critical Movement (Unsignalized)
LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)
Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)
V/C = Intersection Volume-to-Capacity Ratio (Signalized) / Critical Movement Volume-to-Capacity Ratio (Unsignalized)

Existing Year 2023 Traffic Conditions
Weekday AM & PM Peak Hour
Vancouver, WA
Figure 4

PROPOSED MASTER PLAN

The VIC Building Owner LLC is requesting City of Vancouver approval of a major revision to the VIC Mixed Use Master Plan that was approved by the Vancouver City Council by Ordinance 4346 on August 16, 2021. The Revised Master Plan maintains a mixture of uses and land use areas (LUAs) on the site similar to the original plan. The proposed LUAs on the site include a school (approximately 20 acres), residential (approximately 38.12 acres), light industrial/employment area (approximately 74.13 acres), mixed use area (approximately 33.15 acres) and open space (approximately 24 acres) including the approximately 13.7-acre forested tract. The master plan revision proposes a maximum of 1,800 residential dwelling units and a minimum of 1,703,065 square feet of gross floor area for employment uses.

Key transportation elements of the revised Master Plan vision include:

- The east-west extension of SE 29th Street as a new collector arterial across the campus;
- A central right-of-way loop or “ring road” for main site circulation, the northern arc of the loop will serve as the SE 29th Street collector;
- A vibrant and pedestrian friendly mixed-use corridor along the proposed ring road; and
- An enhanced pedestrian and bicycle network.

The SE 29th Street collector arterial extension east-west across the site completes the anticipated network connection identified in the City’s Transportation Plan. The addition of a future traffic signal at the SE 29th Street/SE 192nd Avenue intersection and a single lane roundabout at the SE 29th Street/SE 176th Avenue intersection are planned in conjunction with the new SE 29th Street roadway corridor. SE 29th Street will serve as the designated freight delivery route to and from the campus with trucks entering the campus at SE 192nd Avenue, traveling across SE 29th Street to the industrial areas, completing delivery, and then returning to SE 192nd Avenue across SE 29th Street upon completion of all four phases.

The northern portion of the new ring road will include two single lane roundabouts where the southern segments of the ring road intersect with SE 29th Street. The existing unsignalized western campus access to SE 34th Street aligned with SE 177th Place will be closed and vacated. Vehicular access to SE 34th Street will be via the signalized SE 34th Street/SE Hiddenbrook Drive-East Site Access intersection which will be reconstructed to one travel lane in each direction between SE 34th Street and the loop road on-site with left-turn lanes provided at SE 34th Street and the loop road.

Master Plan development is generally anticipated in four phases. Phase 1, uses by right, will allow for the VIC Building North (previously entitled) and up to 300 homes using the existing site access. Phase 1 access will be via the two existing campus roadway connections to SE 34th Street. Phase 2 will provide the southwest portion of the new on-site loop road between SE Hiddenbrook Drive and SE 29th Street as well as construction of SE 29th Street between the new west loop road roundabout and a new roundabout at SE 176th Avenue. The existing VIC campus roadway connection to SE 34th Street (aligned with SE 177th Avenue to the south) will be closed and vacated with Phase 2 site development. Phase 3 will extend SE 29th Street from the Phase 2 west roundabout terminus east across the VIC campus to a new signalized

intersection at SE 192nd Avenue. Phase 4 will complete the loop road between a new east roundabout on the loop road and SE Hiddenbrook Drive to the south.

Trip Generation Estimates

Trip generation estimates for The VIC Master Plan land uses were developed using trip rates contained within the *Trip Generation Manual, 11th Edition* as published by the Institute of Transportation Engineers (Reference 4)⁴. The trip estimates account for “internal trip-making” that reflects the interaction between the employment, residential, and retail uses within the VIC campus (including the existing VIC buildings but excluding the potential middle school). Table 4 presents the trip estimates. Peak hour trip estimates for the residential uses were developed using the fitted equation trip rates while the average peak hour trip rates were used for the remaining new uses as well as for all the daily trip estimates. Trips associated with the existing VIC buildings are shown for the purpose of tracking internal trip sharing that will occur as a function of the proposed new uses.

Given no new PM peak hour trips are anticipated because of the proposed mater plan revisions, the Applicant requests that the current daily and PM peak hour trip vesting in the VIC Development Agreement be retained to allow maximum flexibility to respond to market conditions over the life of the master plan.

⁴ Weekday AM and PM peak hour trips associated with the 715,000 square feet of existing building at VIC were included in the existing conditions analysis based on trip rates previously measured at the campus when it was in full use.

Table 4: Site Trip Generation Estimate

Land Use	ITE Code	Size	Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Existing The VIC Buildings ¹	1996 Traffic Counts	715,000 Square Feet	10,200 ²	382	262	120	444	76	368
Less Trips Internal to the Campus Area			(236)	(24)	(12)	(12)	(26)	(8)	(18)
Net New			9,964	358	250	108	418	68	350
General Light Industrial	110	600,565 Square Feet	2,925	444	391	53	390	55	335
Less Trips Internal to the Campus Area			(198)	(20)	(10)	(10)	(22)	(7)	(15)
Net New			2,727	424	381	43	368	48	320
General Office Building	710	87,500 Square Feet	949	133	117	16	126	21	105
Less Trips Internal to the Campus Area			(29)	(2)	(1)	(1)	(3)	(1)	(2)
Net New			920	131	116	15	123	20	103
Medical Office Building	720	10,000 square feet	360	31	24	7	39	12	27
Less Trips Internal to the Campus Area			(4)	(1)	(1)	(0)	(0)	(0)	(0)
Net New			356	30	23	7	39	12	27
Shopping Center	820	140,000 square feet	5,181	118	73	45	476	228	248
Less Trips Internal to the Campus Area			(1,607)	(45)	(29)	(16)	(110)	(41)	(69)
Less Pass-by Reduction			(1,036)	(21)	(13)	(8)	(106)	(54)	(52)
Net New			2,538	52	31	21	260	133	127
Multifamily Housing (Mid-Rise)	221	1,248 Units	5,666	538	124	414	487	297	190
Less Trips Internal to the Campus Area			(790)	(14)	(2)	(12)	(80)	(56)	(24)
Net New			4,876	524	122	402	407	241	166
Multifamily Housing (Low-Rise)	220	552 Units	3,720	194	47	147	258	163	98
Less Trips Internal to the Campus Area			(350)	(6)	(1)	(5)	(35)	(25)	(10)
Net New			3,370	188	46	142	223	138	85
Middle School ²	522	900 Students	1,917	522	282	240	153	75	78
Total Trips			30,918	2,362	1,320	1,042	2,373	927	1,446
Less Total Trips Internal to the Campus Area			(3,214)	(112)	(56)	(56)	(276)	(138)	(138)
Less Total Pass-by Reduction			(1,036)	(21)	(13)	(8)	(106)	(54)	(52)
Total Net New Trips			26,668	2,229	1,251	978	1,991	735	1,256
The VIC Development Agreement Vested Net New Trips			26,982	2,088	1,343	745	1,991	627	1,364
Proposed Total Net New – The VIC DA Vested Net New			-314	141	-92	233	0	108	-108
Total Net New Trips – Existing The VIC Building Net New Trips			16,704	1,871	1,001	870	1,573	667	906

¹ Source: Traffic Impact Analysis for The VIC Master Plan dated November 20, 2020.

² Trip estimates from approved 2020 The VIC Traffic Impact Analysis. The potential for internal trips associated with a school could be revisited in conjunction with a more specific school development proposal.

Trip Distribution and Assignment

The site-generated trips shown in Table 4 (total net new trips less the existing VIC buildings net new trips along with the pass-by trips) were assigned to the study area roadways based on four trip distribution patterns developed for the VIC campus. The distribution estimates and associated vehicular trips at campus buildout are shown in Figure 5 and Figure 6 and summarized below.

- *On-site employment trip distribution pattern:* applied to office and light industrial uses, this distribution pattern was derived from the Southwest Washington Regional Transportation Council travel demand model transportation analysis zone (TAZ 1758) for the VIC site⁵.
- *Residential trip distribution pattern:* this pattern was estimated based on review of other recent traffic studies prepared for nearby residential areas, review of the surrounding land uses and review of the existing traffic turning movement patterns.
- *Middle school trip distribution pattern:* this pattern was estimated based on review of the existing school district middle schools and boundaries, surrounding residential uses as well as the roadway network (the school distribution estimate is preliminary given there was no specific school proposal or boundary change proposed at the time this study was prepared). No vehicle trips were assigned between the school site and homes within the VIC, rather, these were assumed to be walking trips. The full school site vehicle trip generation was assigned off-site from the VIC.
- *Retail trip distribution pattern:* this pattern was estimated based on the location of other commercial/retail uses in the area and in recognizing that the anticipated retail uses within The VIC are expected to be smaller, locally serving retail type uses (as opposed to destination or “big box” retailers).

⁵ The land use assumptions in the RTC model for this TAZ were reflective of employment uses only and do not offer insight as to residential or retail use travel patterns.

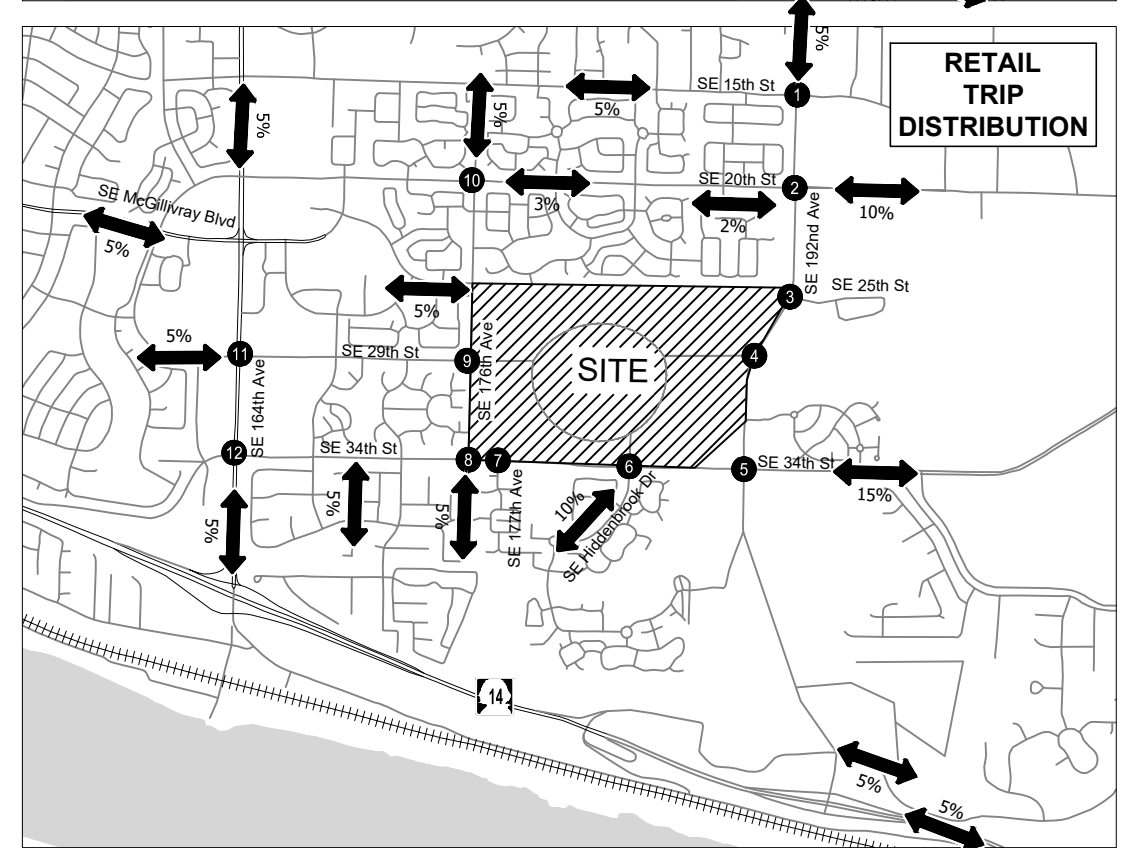
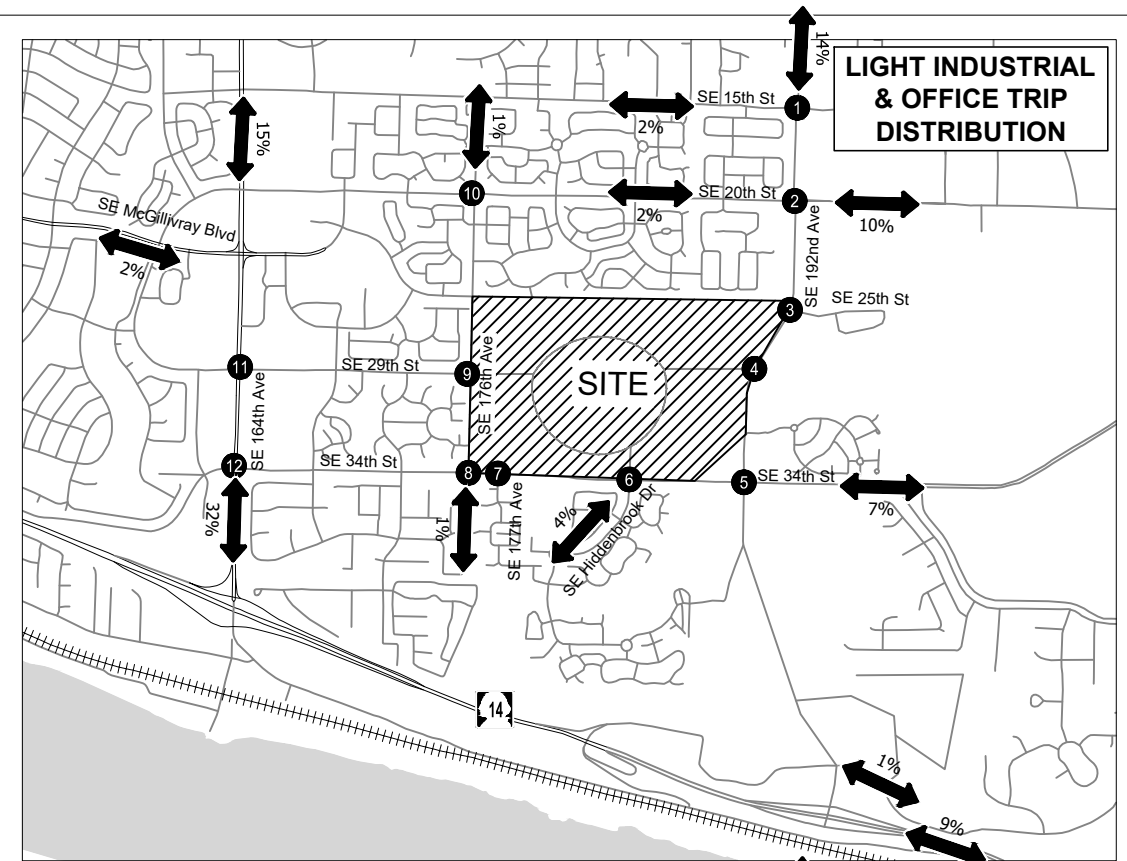
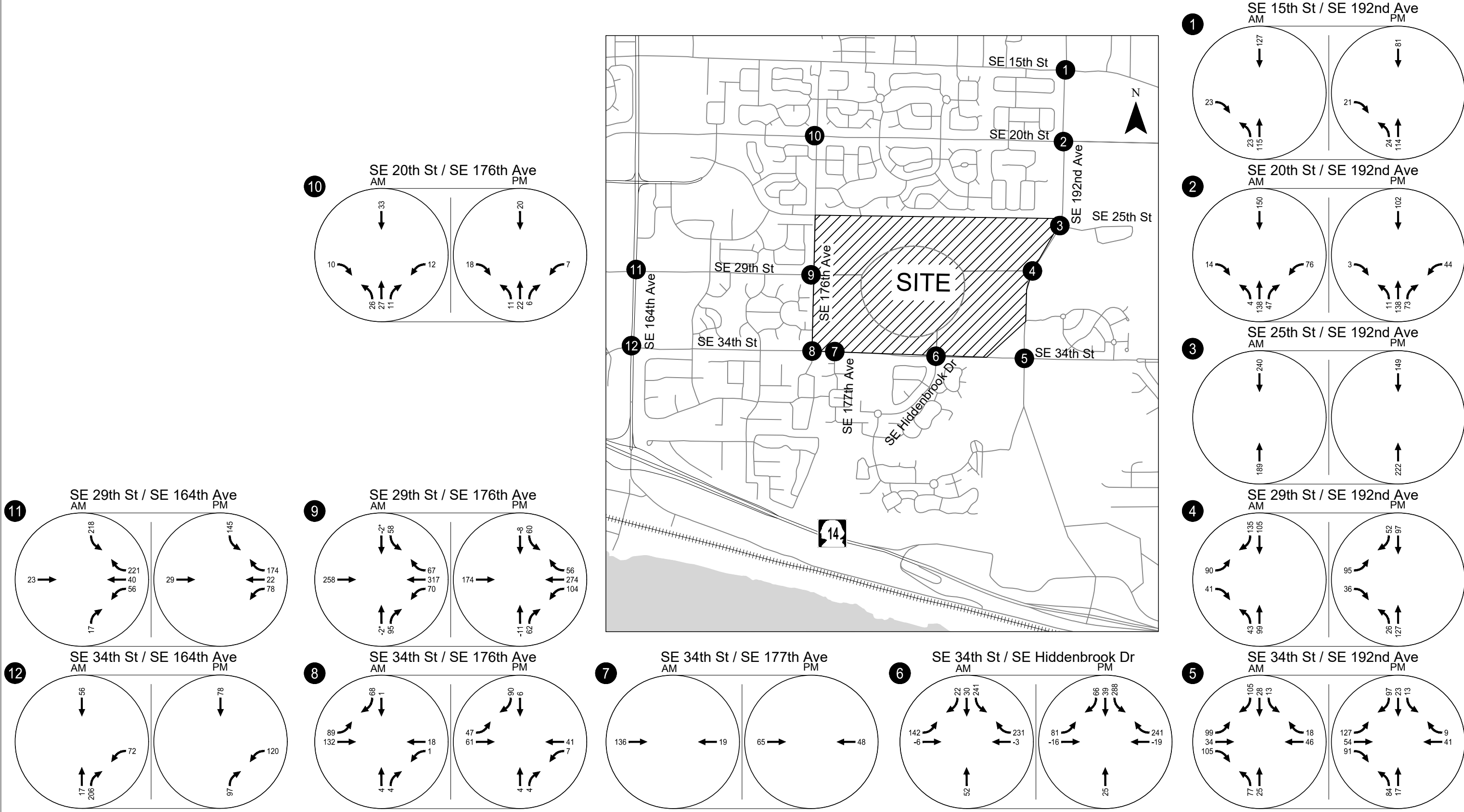


Figure
5

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NOTE - Trips shown include net new trip assignment (all land uses) and pass-by trip assignment (retail use only).
Negative trips represent pass-by trips.

Trip Assignment at Campus Buildout (Phase 1 - 4)
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
6

CONCURRENCY CORRIDOR TRIP ASSIGNMENT

Per City of Vancouver requirements, Table 5 summarizes the estimated number of complete build-out site-generated weekday PM peak hour trips entering each of the City's adopted concurrency corridors per development phase. Assigned trips were recorded counting trips only once along each of the specified corridors. Further concurrency corridor tracking by individual buildings or phases can be provided with subsequent trip compliance letters if needed.

Table 5: Concurrency Corridor Weekday PM Peak Hour Trip Assignment

Corridor Name	Corridor Limit	PM Peak Trips to Corridor
Mill Plain Blvd.	Fourth Plain to I-5	0
	I-5 to Andresen	0
	Andresen to I-205	5
	I-205 to 136 th Ave.	9
	136 th Ave. to 164 th Ave.	86
	164 th Ave. to 192 nd Ave.	10
St. Johns / Ft. Van Way	Mill Plain to 63 rd St.	0
Fourth Plain Blvd.	Mill Plain to I-5	0
	I-5 to Andresen	0
	Andresen to I-205	0
	I-205 to 162 nd Ave.	6
Andresen Road	Mill Plain to SR500	2
	SR500 to 78 th St.	2
112 th Avenue	Mill Plain to 28 th St.	2
	28 th St. to 51 st St.	1
164 th /162 nd Avenue	SR14 to SE 1 st St.	388
	SE 1 st St. to Fourth Plain	250
Burton Road / 28 th Street	18 th St. to 112 th Ave.	3
	112 th Ave. to 138 th Ave.	5
	138 th Ave. to 162 nd Ave.	10
18 th Street	112 th Ave. to 138 th Ave.	1
	138 th Ave. to 164 th Ave.	26
136 th /137 th Avenue	Mill Plain to 28 th St.	6
	28 th St. to Fourth Plain	2
192 nd Avenue	SR14 to NE 18 th St.	498

TRAFFIC IMPACT ANALYSIS

The remainder of this report documents intersection operations under future year conditions without and with phased Master Plan development. Four phases of site development were considered to inform the traffic mitigations analysis. While the site land uses will buildout incrementally over the life of the master plan based on market conditions, the traffic impacts were assessed by phase using a common future horizon year of 2038.

FUTURE YEAR 2038 BASELINE TRAFFIC CONDITIONS

The baseline traffic analysis identifies how the study intersections will operate in the proposed 15-year horizon of the Master Plan Development Agreement after accounting for traffic growth from approved in-process developments within the study area and anticipated regional traffic growth, but only assuming full occupancy of the existing VIC site buildings (no additional Master Plan development assumed).

To reflect the anticipated re-use of the vacant existing building space on-site, previously documented trips associated with typical operations of the site were added to the study intersections to arrive at existing AM and PM peak period traffic volumes.⁶

Study Intersection Changes

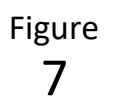
The City of Vancouver's *SE 34th Street Safety & Mobility Project* proposes to implement several changes at the study intersections to improve safety and mobility on SE 34th Street between SE 164th Avenue and SE 192nd Avenue. The project anticipates repurposing a travel lane in each direction to add dedicated space for people walking, biking, rolling, and using mobility-assistance devices, and other safety improvements in the corridor for all users. The following changes were assumed at the study intersections by year the 2038 as part of the City project:

- Intersection 5, SE 34th Street/SE 192nd Avenue:
 - Remove 1 northbound left-turn lane
 - Remove 1 eastbound and 1 westbound through lane

⁶ For reference, a total of 382 weekday AM peak hour trips (262 in/120 out) and 444 weekday PM peak hour trips (76 in/368 out) were previously documented to be generated by the existing 715,000 square feet of campus buildings. The traffic volumes measured at the campus access points in December 2022 were increased and the additional trips assigned to the study intersections to reflect full occupancy. Further details of the volume adjustments are presented in Appendix "D".

- Intersection 6), SE 34th Street/SE Hiddenbrook Drive-East Site Access
 - Remove 1 eastbound and 1 westbound through lane
- Intersection 7) SE 34th Street/SE 177th Place-West Site Access
 - Remove 1 eastbound and 1 westbound through lane
 - Add 1 westbound right-turn lane
- Intersection 8) SE 34th Street/SE 176th Avenue
 - Remove 1 eastbound and 1 westbound through lane
- Intersection 12) SE 34th Street/SE 164th Avenue
 - Remove 1 eastbound and 1 westbound left-turn lane

Figure 7 illustrates the assumed lane configurations and traffic control devices at the study intersections under year 2038 baseline conditions.



In-process Developments

Trips from the following approved but not yet constructed (in-process) developments were included in the future baseline traffic volumes estimates per coordination with City Transportation staff.

- 192nd Station West II Lofts (located northwest of the SE 192nd Avenue/SE 34th Street intersection);
- Columbia Palisades Subdivision (located within the Columbia Palisades Master Plan area; 30% of the units were assumed to be sold and occupied at the time of the traffic counts for this study);
- Valley View Estates (located near the intersection of SE Grand Ridge Drive and SE 40th Street);
- The Casey (formerly Kate's Woods located along SE 34th Street to the east of SE Payne Road);
- Dawson's Ridge (located near the intersection of NW Sacajawea Street and NW McIntosh Road);
- First Street Village (located near intersection SE 1st Street/NE 197th Avenue);
- Vancouver Clinic Phase 2 (located within the Columbia Palisades master plan area along SE Columbia Palisades Drive);
- Columbia Palisades Lots 2 & 3 (located within the Columbia Palisades master plan area with access via the west leg of the SE Brady Road/SE Columbia Palisades Drive roundabout);
- Fisher's Creek Subdivision (located at 17700 SE Evergreen Highway);
- Kirkland Car Wash and Medical Building (located on the east side of SE 192nd Avenue and north of SE 20th Street);
- Oak Tree Station (located near the intersection of NW Lake Road/NW Friberg-Strunk Street);
- Lacamas Creek Tech Center (located near the intersection of NE 13th Street/NW Friberg-Strunk Street);
- Panattoni Industrial Building Lot 6 (located near the intersection of NE Goodwin Road/NW Camas Meadows Drive);
- Camas Business Center (located at 4704 NW Lake Road); and,
- Parklands Archery Business Center – Commercial component (located at 542 NW 218th Street); Section 30 (located north of SE 1st Street, including HP);
- PeaceHealth Ambulatory Care Center (located at the southeast corner of the SE 1st Street/SE 192nd Avenue intersection)

Regional Traffic Growth

In addition to the in-process development trips, a 0.5 percent annual growth rate was identified along public roadway corridors to account for regional growth over the next 15 years. This growth rate was derived based on review of the Travel Demand Model 2015 and 2040 PM peak hour model outputs provided by the Southwest Washington Regional Transportation Council (RTC) for the study area and in consideration of the numerous in-process development trips identified for inclusion by City staff.

FUTURE YEAR 2038 BASELINE TRAFFIC OPERATIONS

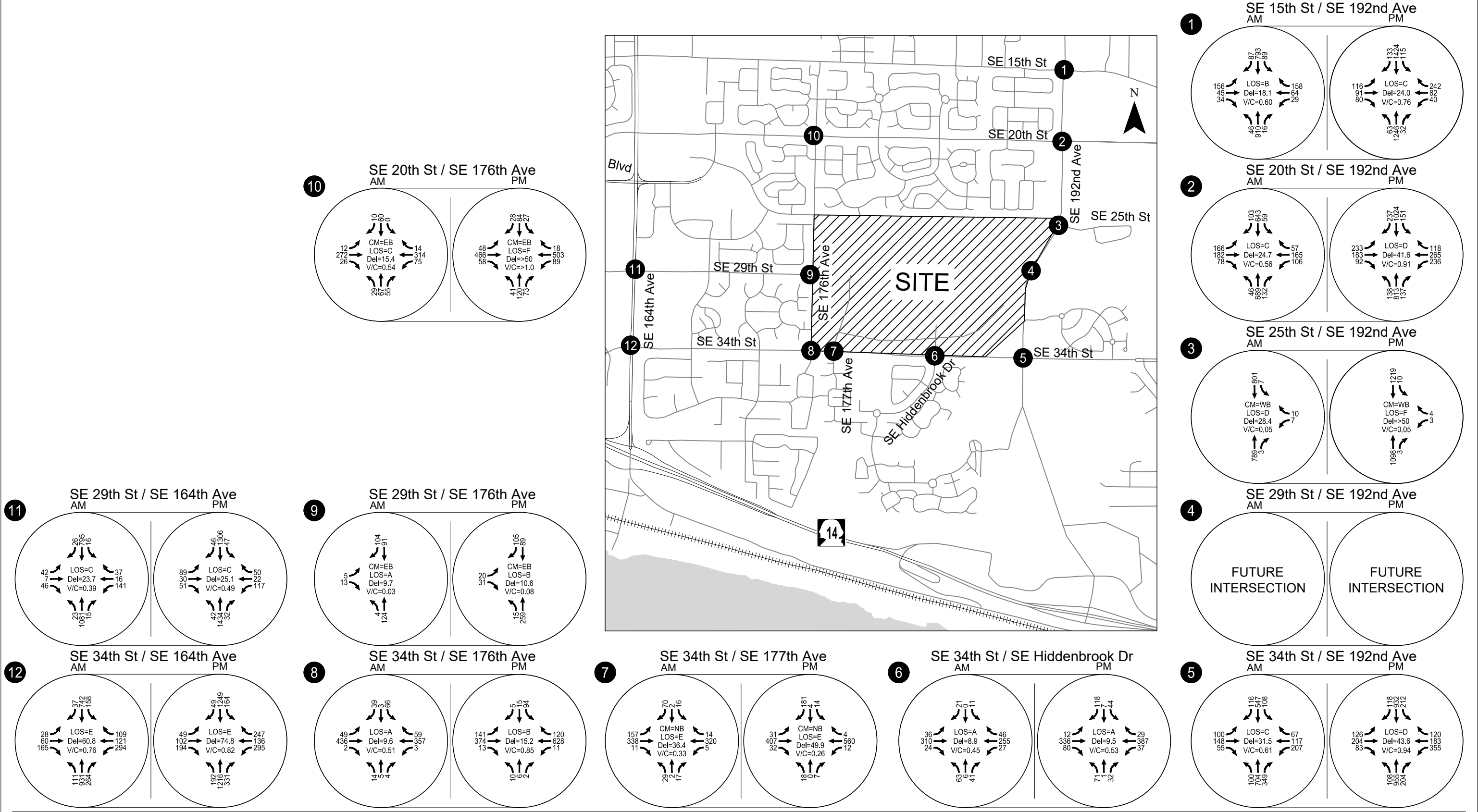
Figure 8 shows the projected 2038 baseline traffic volumes and resulting operations for all study intersections during the weekday AM and PM peak hours. Although the study intersections are projected to operate acceptably per City standards during the AM peak hour, two are projected to exceed City standards during the PM peak hour, including:

- The stop-controlled westbound left-turn movement on SE 25th Street at SE 192nd Avenue (Intersection #3) is projected to operate at LOS F during the PM peak hour but well under capacity (V/C ratio of 0.05). Despite the high delays forecast for this movement, a review of the projected weekday PM peak hour volumes at the intersection confirms that installation of a traffic signal is not warranted.
- The SE 20th Street/SE 176th Avenue intersection (Intersection #10) is forecast to operate at LOS F with the eastbound and westbound approaches over capacity during the weekday PM peak hour. The City of Vancouver is collecting proportional share mitigation fees in the amount of \$400 for each weekday PM peak hour trip added to this intersection.

Note the SE 34th Street/SE 192nd Avenue intersection (Intersection #5) is forecast to operate at an acceptable LOS D with the westbound left-turn lane at capacity (V/C ratio of 1.0). The City of Vancouver is collecting proportional share mitigation fees in the amount of \$150 for each weekday PM peak hour trip added to this intersection. Further, the SE 34th Street/SE 164th Avenue intersection (Intersection #12) is forecast to operate at LOS E during both the AM and PM peak hours. The westbound left-turn V/C ratio is projected to be 1.1 during the AM peak hour and 1.72 with a 35+ vehicle 95th percentile queue during the PM peak hour.

Appendix "E" contains the 2038 baseline operational analysis worksheets and Figure E-1 (a summary of the cumulative in-process trip assignment that was included in the baseline 2038 volumes).

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CM = Critical Movement (Unsignalized)
LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)
Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)
V/C= Intersection Volume-to-Capacity Ratio (Signalized) / Critical Movement Volume-to-Capacity Ratio (Unsignalized)

Future Year 2038 Baseline Traffic Conditions
Weekday AM & PM Peak Hour
Vancouver, WA
Figure 8

FUTURE YEAR 2038 WITH PROJECT TRAFFIC CONDITIONS

The with project traffic analysis identifies how the study intersections will operate in the proposed 15-year horizon of the Master Plan Development Agreement upon phased development of the VIC. The proposed transportation infrastructure, site trip generation and corresponding traffic impacts associated with each phase of master plan site development were assessed as documented herein.

Master Plan Roadway Network

Multiple roadway network and study intersection changes are anticipated in conjunction with continued The VIC Master Plan development. As previously indicated, implementation is expected to occur in four distinct phases with the following transportation changes anticipated by phase (refer also to Figure 9).

Master Plan Phase 1

- No changes to the transportation system, access to the VIC campus will remain as it exists today.

Master Plan Phase 2

- Construct SE 29th Street between SE 176th Avenue and the west portion of the loop road within the VIC campus;
- Implement the previously identified VIC capacity mitigations at the signalized SE 29th Street/SE 164th Avenue intersection including:
 - Convert the existing east-west left-turn permissive signal phasing on SE 29th Street to protected/permissive left-turn phasing;
 - Extend the westbound left-turn lane striping to provide 225 feet of storage; and
 - Extend the existing southbound left-turn lane on SE 162nd Avenue at SE 29th Street to provide 300 feet of left-turn storage (the existing left-turn storage is approximately 135 feet long; the extension will required reconstruction of the existing median area and drainage facilities within the median).
- Construct the southwest portion of the loop road within the VIC campus between the SE Hiddenbrook site access and SE 29th Street;
- Close and vacate the existing west campus access connection to SE 34th Street (the site access aligned with SE 177th Avenue);
- Reconstruct the existing east campus access connection to SE 34th Street (the site access aligned with SE Hiddenbrook Drive) to have one northbound lane, one southbound left-turn lane and one southbound shared through/right lane at the SE 34th Street traffic signal;
- Construct a new single lane roundabout at SE 29th Street/SE 176th Avenue; and
- Construct a new single lane roundabout at SE 29th Street/west loop road intersection.



Master Plan Phase 3

- Extend SE 29th Street to SE 192nd Avenue, including signalization of the intersection at SE 192nd Avenue.

Master Plan Phase 4

- Construct the southeast portion of the loop road within the VIC campus between the SE Hiddenbrook site access and SE 29th Street, completing the loop road.

Trip Generation

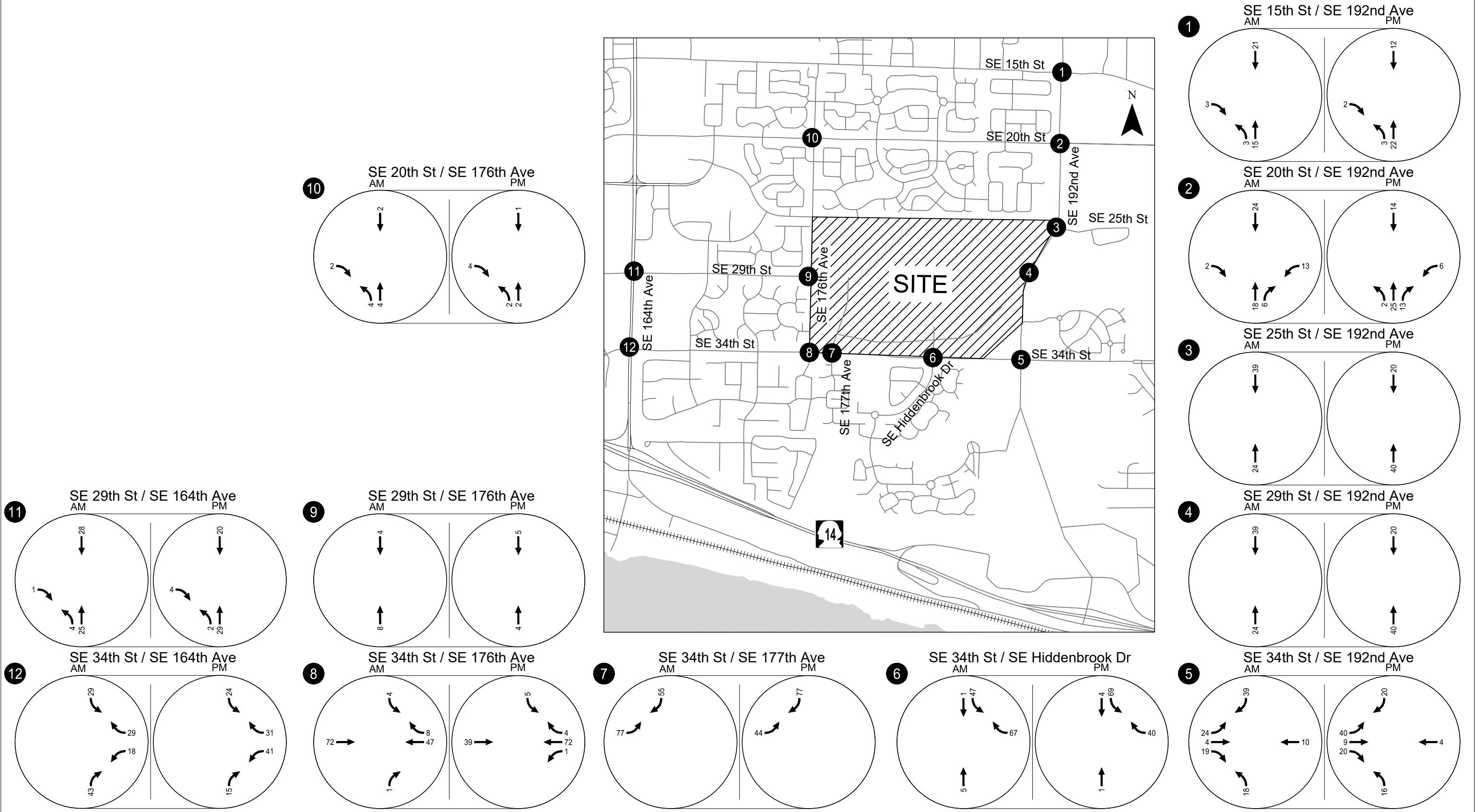
The VIC site trip generation estimates by phase are shown in Tables 6 through 9 and are a subset of the trip generation previously presented in Table 4. Figures 10 through 13 show the corresponding site-generated trip assignment to the study intersections. Note that Master Plan Phase 1 site development reflects uses that are approved “by right” under the current VIC development agreement. The Phase 1 uses and their traffic impacts can be constructed today.

Table 6: Phase 1 Site Trip Generation Estimate

Land Use	ITE Code	Size	Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
General Light Industrial ¹	110	200,700 (Square Feet)	995	140	123	17	126	16	110
Less Trips Internal to the Campus Area			(43)	(4)	(2)	(2)	(4)	(0)	(4)
Net New			952	136	121	15	122	16	106
Multifamily Housing (Mid-Rise)	221	134 units	608	58	13	45	52	32	20
Less Trips Internal to the Campus Area			(85)	(1)	(0)	(1)	(9)	(6)	(3)
Net New			523	57	13	44	43	26	17
Multifamily Housing (Low-Rise)	220	174 units	1,173	61	15	46	81	51	30
Less Trips Internal to the Campus Area			(110)	(2)	(0)	(2)	(11)	(8)	(3)
Net New			1,063	59	15	44	70	43	27
Total Trips			2,776	259	151	108	259	99	160
Less Total Trips Internal to the Campus Area			(238)	(7)	(2)	(5)	(24)	(14)	(10)
Total Net New Trips			2,538	252	149	103	235	85	150

¹ Source: Refer to September 2, 2022 VIC Building North Trip Compliance Letter (PRJ-168116, PIR-82415)

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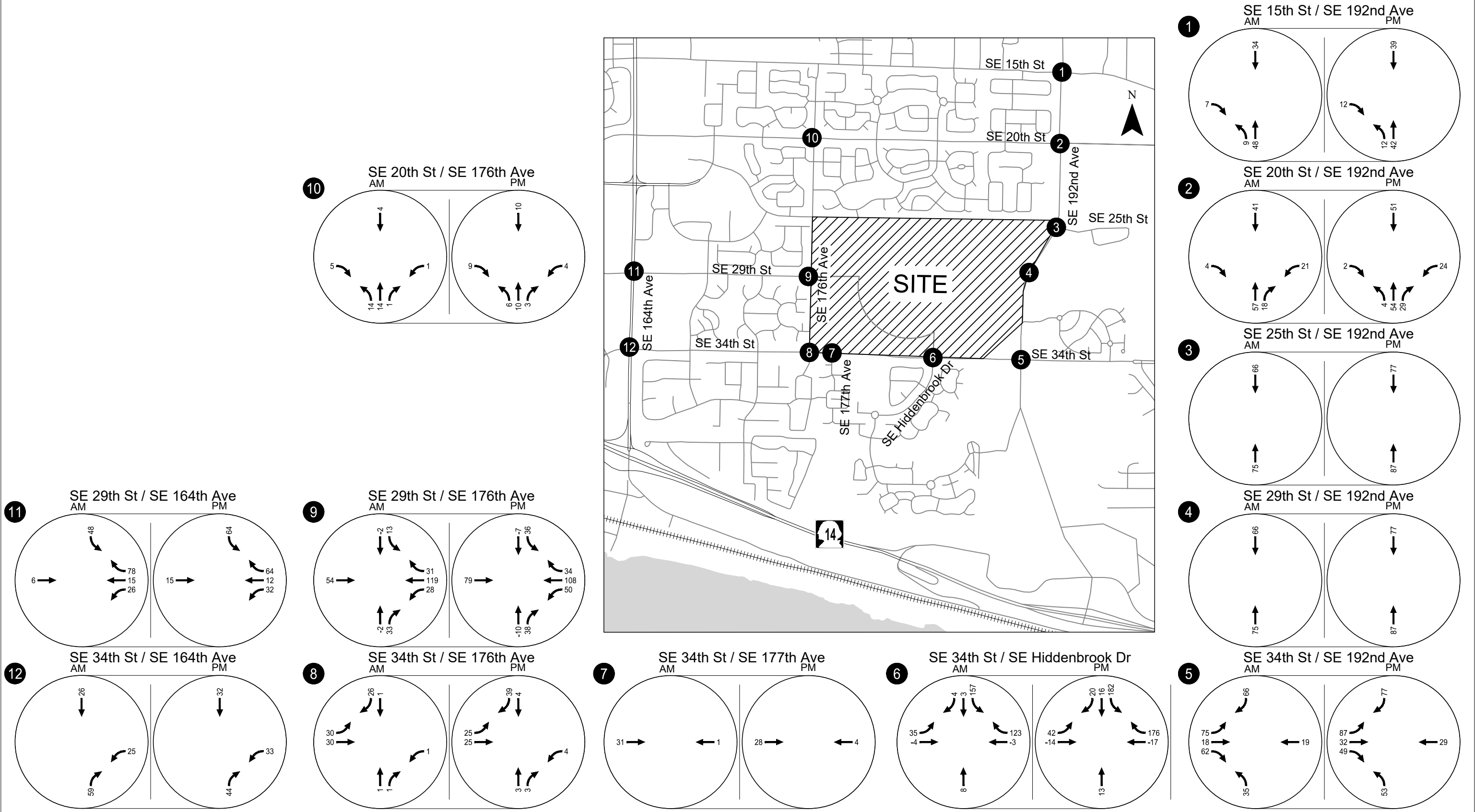
NOTE - Trips shown include net new trip assignment (all land uses) and pass-by trip assignment (retail use only).

Phase 1 Trip Assignment
Weekday AM & PM Peak Hour
Vancouver, WA
Figure 10

Table 7: Phase 2 Site Trip Generation Estimate

Land Use	ITE Code	Size	Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
General Light Industrial	110	34,439 Square Feet	166	26	23	3	22	3	19
Less Trips Internal to the Campus Area			(13)	(2)	(1)	(1)	(2)	(1)	(1)
Net New			153	24	22	2	20	2	18
Medical Office Building	720	8,200 Square Feet	295	26	20	6	32	1	22
Less Trips Internal to the Campus Area			(3)	(1)	(1)	(0)	(0)	(0)	(0)
Net New			292	25	19	6	32	10	22
General Office Building	710	71,750 square feet	778	109	96	13	103	17	86
Less Trips Internal to the Campus Area			(24)	(2)	(1)	(1)	(3)	(1)	(2)
Net New			754	107	95	12	100	16	84
Shopping Center	820	123,200 square feet	4,559	103	64	39	419	201	218
Less Trips Internal to the Campus Area			(1,414)	(40)	(26)	(14)	(97)	(36)	(61)
Less Pass-by Reduction			(912)	(18)	(11)	(7)	(94)	(48)	(46)
Net New			2,233	45	27	18	228	117	111
Multifamily Housing (Mid-Rise)	221	824 Units	3,741	355	82	273	322	196	126
Less Trips Internal to the Campus Area			(522)	(9)	(1)	(8)	(53)	(37)	(16)
Net New			763	43	11	32	51	32	19
Multifamily Housing (Low-Rise)	220	125 Units	842	44	11	33	59	38	21
Less Trips Internal to the Campus Area			(79)	(1)	(0)	(1)	(8)	(6)	(2)
Net New			763	43	11	32	51	32	19
Total Phase 2 Trips			10,381	663	296	367	957	465	492
Less Total Trips Internal to the Campus Area			(2,055)	(55)	(30)	(25)	(163)	(81)	(82)
Less Total Pass-by Reduction			(912)	(18)	(11)	(7)	(94)	(48)	(46)
Total Phase 2 Net New Trips			7,414	590	255	335	700	336	364

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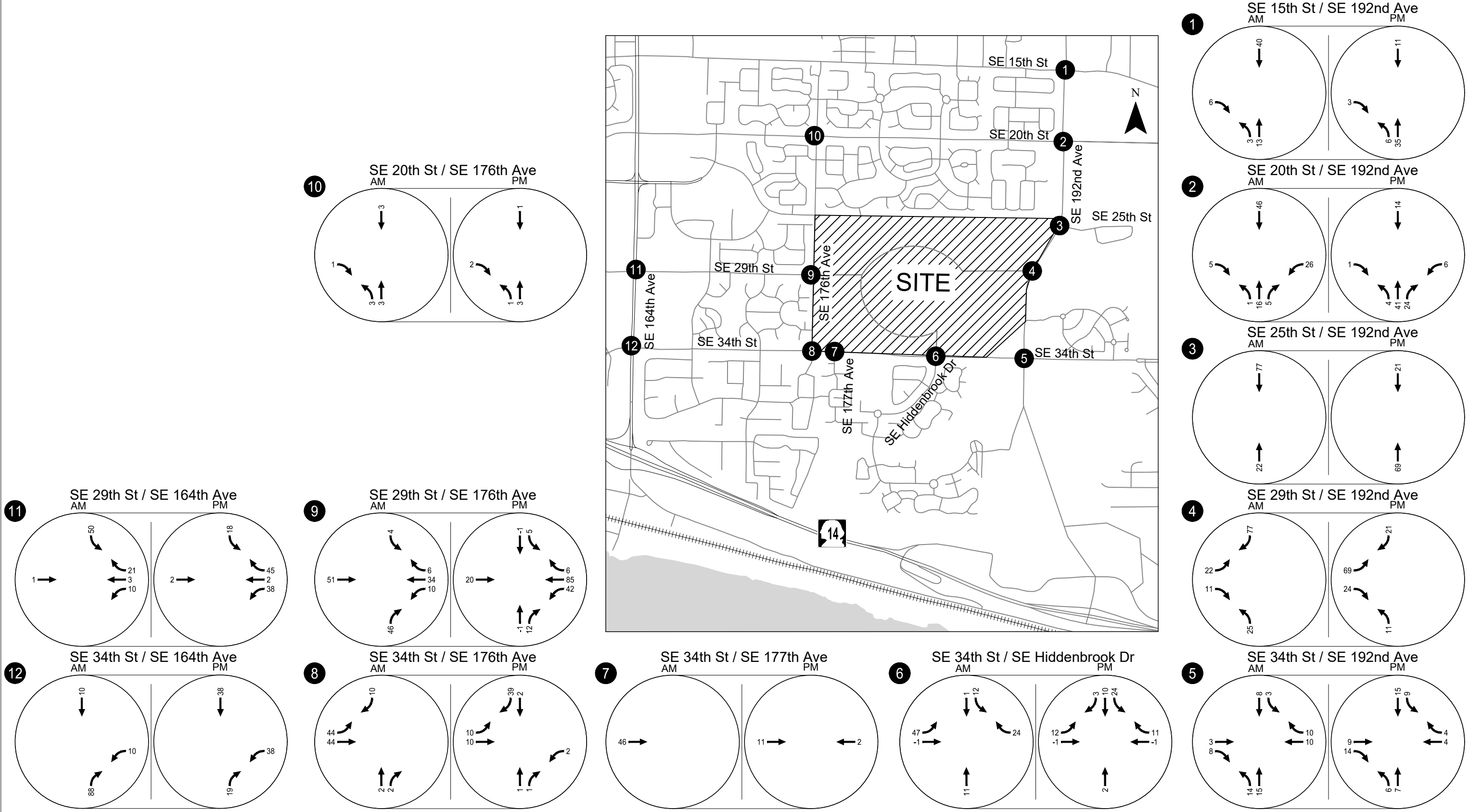
NOTE - Trips shown include net new trip assignment (all land uses) and pass-by trip assignment (retail use only). Negative trips represent pass-by trips.

Phase 2 Trip Assignment
Weekday AM & PM Peak Hour
Vancouver, WA
Figure 11

Table 8: Phase 3 Site Trip Generation Estimate

Land Use	ITE Code	Size	Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
General Light Industrial	110	365,426 Square Feet	1,764	278	245	33	242	36	206
Less Trips Internal to the Campus Area			(142)	(14)	(7)	(7)	(16)	(6)	(10)
Net New			1,622	264	238	26	226	30	196
Medical Office Building	720	1,800 Square Feet	65	5	4	1	7	2	5
Less Trips Internal to the Campus Area			(1)	(0)	(0)	(0)	(0)	(0)	(0)
Net New			64	5	4	1	7	2	5
General Office Building	710	15,750 square feet	171	24	21	3	23	4	19
Less Trips Internal to the Campus Area			(5)	(0)	(0)	(0)	(0)	(0)	(0)
Net New			166	24	21	3	23	4	19
Shopping Center	820	11,200 square feet	415	10	6	4	38	18	20
Less Trips Internal to the Campus Area			(129)	(3)	(2)	(1)	(9)	(3)	(6)
Less Pass-by Reduction			(83)	(2)	(1)	(1)	(8)	(4)	(4)
Net New			203	5	3	2	21	11	10
Multifamily Housing (Mid-Rise)	221	154 Units	699	66	15	51	60	37	23
Less Trips Internal to the Campus Area			(97)	(2)	(0)	(2)	(9)	(7)	(2)
Net New			602	64	15	49	51	30	21
Multifamily Housing (Low-Rise)	220	52 Units	350	18	4	14	24	15	9
Less Trips Internal to the Campus Area			(33)	(1)	(1)	(0)	(3)	(2)	(1)
Net New			317	17	3	14	21	13	8
Total Phase 3 Trips			3,464	401	295	106	394	112	282
Less Total Trips Internal to the Campus Area			(407)	(20)	(10)	(10)	(37)	(18)	(19)
Less Total Pass-by Reduction			(83)	(2)	(1)	(1)	(8)	(4)	(4)
Total Phase 3 Net New Trips			2,974	379	284	95	349	90	259

H:\27\2715 - VIC Implementation\005 - Master Plan Update TIA\report\figs\2715-Figures_For TIA.dwg Apr 04, 2023 - 2:21pm - ckeyhans Layout Tab: Fig 12_Phase 3 Trip Assignment



NOTE - Trips shown include net new trip assignment (all land uses) and pass-by trip assignment (retail use only).
Negative trips represent pass-by trips.

Phase 3 Trip Assignment
Weekday AM & PM Peak Hour
Vancouver, WA
Figure 12

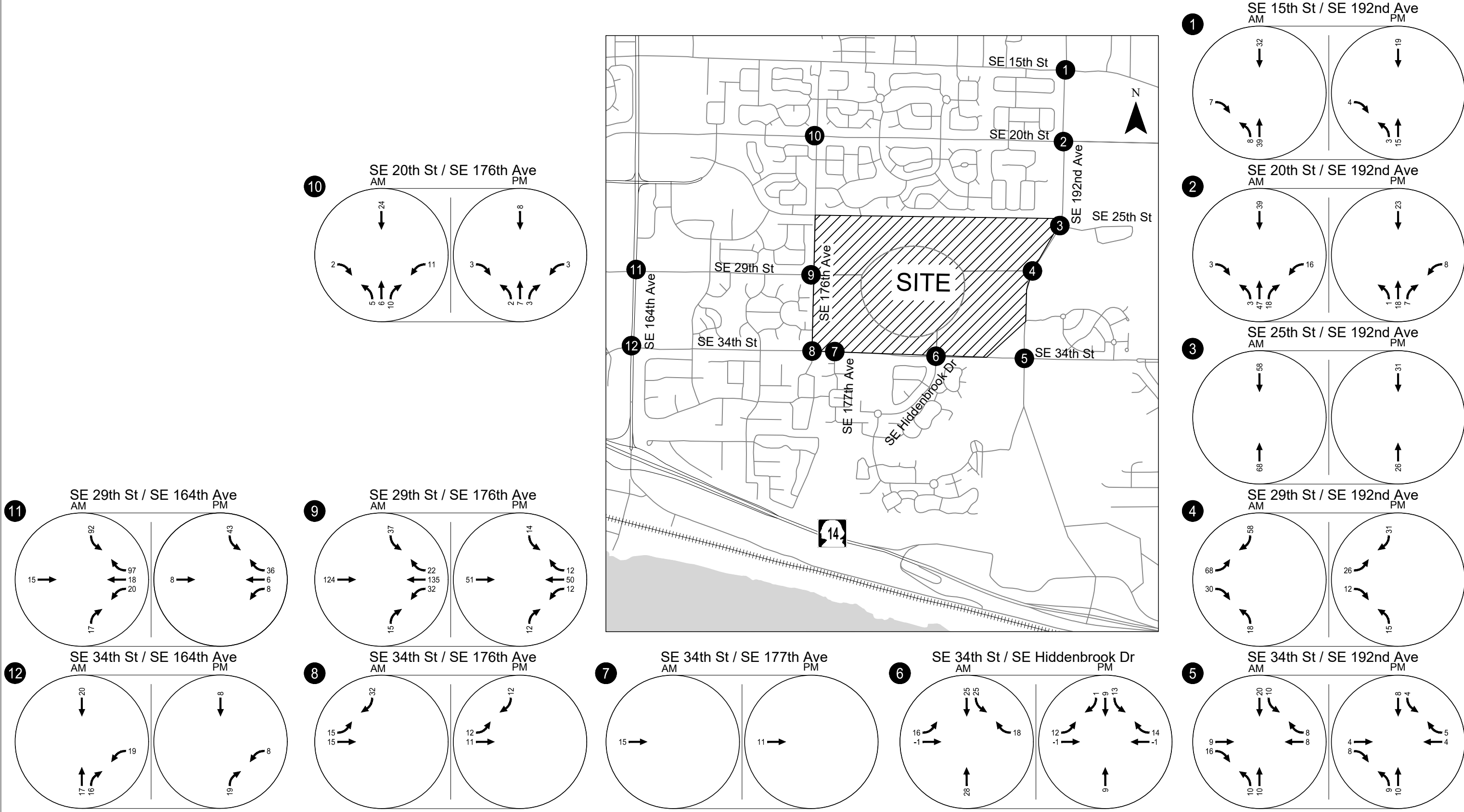
Table 9: Phase 4 Site Trip Generation Estimate

Land Use	ITE Code	Size	Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Shopping Center	820	5,600 square feet	207	5	3	2	19	9	10
<i>Less Trips Internal to the Campus Area</i>			(64)	(2)	(1)	(1)	(4)	(2)	(2)
<i>Less Pass-by Reduction</i>			(41)	(1)	(1)	(0)	(4)	(2)	(2)
Net New			102	2	1	1	11	5	6
Multifamily Housing (Mid-Rise)	221	136 Units	618	59	14	45	53	32	21
<i>Less Trips Internal to the Campus Area</i>			(86)	(2)	(1)	(1)	(9)	(6)	(3)
Net New			532	57	13	44	44	26	18
Multifamily Housing (Low-Rise)	220	201 Units	1,355	71	17	54	94	59	35
<i>Less Trips Internal to the Campus Area</i>			(128)	(2)	(0)	(2)	(13)	(9)	(4)
Net New			1,227	69	17	52	81	50	31
Middle School ²	522	900 Students	1,917	522	282	240	153	75	78
Total Phase 4 Trips			4,097	657	316	341	319	175	144
<i>Less Total Trips Internal to the Campus Area</i>			(278)	(6)	(2)	(4)	(26)	(17)	(9)
<i>Less Total Pass-by Reduction</i>			(41)	(69)	(17)	(52)	(81)	(50)	(31)
Total Phase 4 Net New Trips			3,778	582	297	285	212	108	104

¹ Source: Traffic Impact Analysis for VIC Master Plan dated November 20, 2020.

² Trip estimates from approved 2020 VIC Traffic Impact Analysis. The potential for internal trips associated with a school could be revisited in conjunction with a more specific school development proposal.

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NOTE - Trips shown include net new trip assignment (all land uses) and pass-by trip assignment (retail use only).
Negative trips represent pass-by trips.

Phase 4 Trip Assignment
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
13

FUTURE YEAR 2038 MASTER PLAN TRAFFIC CONDITIONS

The site-generated trips associated with each phase were added to the baseline traffic volumes to yield with project traffic volumes that were then analyzed. Re-routing of localized trips was assumed in conjunction with the introduction of new road connections by phase where appropriate. The discussion below summarizes key changes and findings by development phase.

Phase 1 With Project Conditions

Vehicle access to and from the VIC campus will remain the same as it is today under Phase 1 master plan development. As such, the Phase 1 site-generated trips (reflected in Figure 10) were added to the baseline traffic volumes in Figure 8 to result in the Master Plan build-out traffic volumes and intersection operations reflected in Figure 14. Note that actual build-out of Phase 1 is allowed by-right today and is anticipated well before 2028 as previously noted.

Two study intersections are projected to not satisfy City performance standards with buildout of the Phase 1 Master Plan land uses:

- SE 25th Street/SE 192nd Avenue (did not satisfy standards under baseline conditions)
- SE 20th Street/SE 176th Avenue (did not satisfy standards under baseline conditions)

Additional details regarding the operations of the two intersections above and mitigation considerations is described below. *Appendix "F" contains the 2038 With Project Phase 1 operational analysis worksheets.*

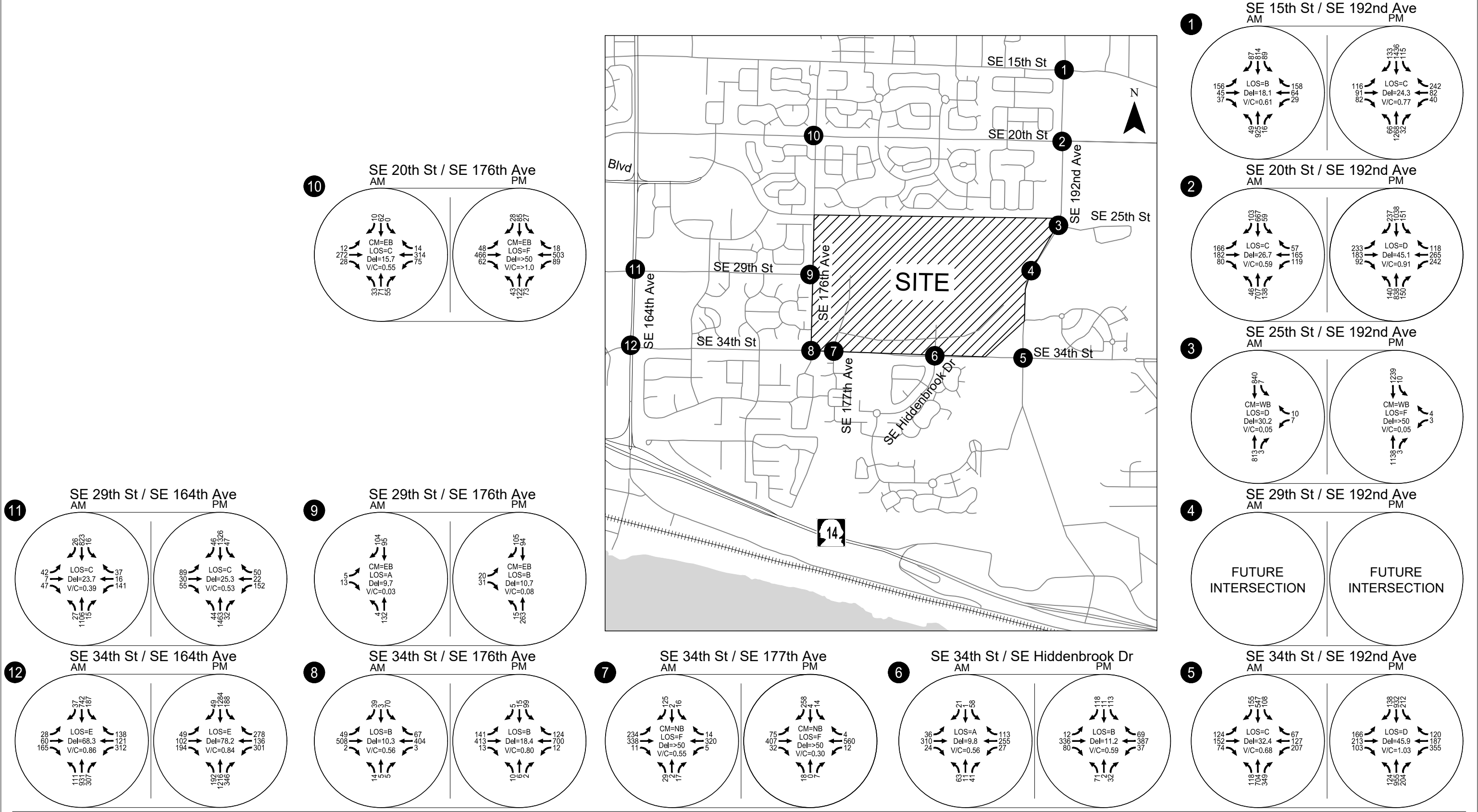
SE 25th Street/SE 192nd Avenue (Study Intersection #3)

The stop-controlled westbound left-turn lane on SE 25th Street is projected to continue to operate at LOS F during the weekday PM peak hour but well under capacity (V/C ratio of 0.05). The proposed The VIC project is not projected to add any turning movements to the westbound approach and therefore does not trigger mitigation per Vancouver Municipal Code Section 11.80.130.B.

SE 20th Street/SE 176th Avenue (Study Intersection #10)

Consistent with 2038 Baseline conditions, intersection is forecast to continue to operate at LOS F with the eastbound and westbound approaches over capacity during the weekday PM peak hour. As previously noted, the City of Vancouver has previously identified capacity mitigation needs at the intersection and is collecting proportional share mitigation fees from new development (current fee of \$400 per weekday PM peak hour trip added to the intersection) to be used to fund the intersection improvements. Accordingly, the proposed development will be required to pay a proportional share contribution to the SE 20th Street/SE 176th Avenue intersection for mitigation purposes. Further details on the proportionate share amounts to be assessed are documented separately in this report.

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CM = Critical Movement (Unsignalized)
LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)
Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)
V/C= Intersection Volume-to-Capacity Ratio (Signalized) / Critical Movement Volume-to-Capacity Ratio (Unsignalized)

Future Year 2038 Phase 1 With-Project Traffic Conditions
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
14

Phase 2 With Project Conditions

The Phase 2 site-generated volumes shown in Figure 11 were added to the Phase 1 with project volumes to obtain the Phase 2 Master Plan build-out traffic volumes and intersection operations shown in Figure 15. In addition to assigning the new site-generated trips, some existing VIC campus trips destined to the east were re-routed from the existing SE 34th Street campus access to the assumed new SE 29th Street connection to SE 192nd Avenue (re-routing reflects more direct campus connection to SE 192nd Avenue for buildings on the western portion of the VIC campus, refer to Appendix “G” Figure G-1 and Figure G-2).

Upon buildout of the Phase 2 Master Plan transportation network and land uses, study intersections projected to not satisfy City performance standards and/or that experience projected 95th percentile queues that exceed the available queue storage include:

- SE 25th Street/SE 192nd Avenue (did not satisfy standards under baseline conditions)
- SE 34th Street/SE 192nd Avenue
- SE 20th Street/SE 176th Avenue (did not satisfy standards under baseline conditions)

Additional details regarding the operations of the three intersections above and mitigation considerations are described below. *Appendix “G” contains the 2038 With Project Phase 2 operational analysis worksheets.*

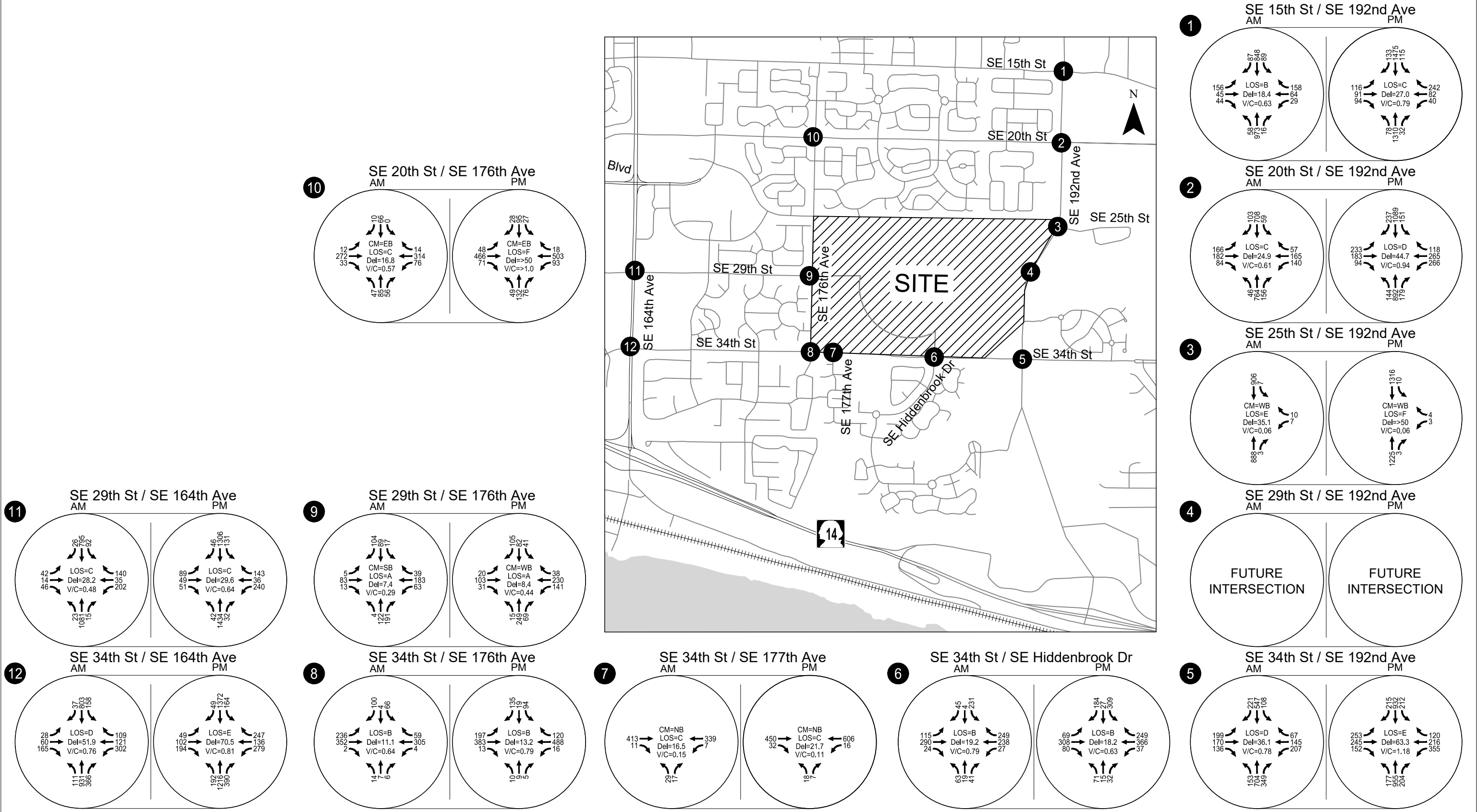
SE 25th Street/SE 192nd Avenue (Study Intersection #3)

The stop-controlled westbound left-turn lane on SE 25th Street is projected to continue to operate at LOS F during the weekday PM peak hour but well under capacity (V/C ratio of 0.06). The proposed The VIC project is not projected to add any turning movements to the westbound approach and therefore does not trigger mitigation per Vancouver Municipal Code Section 11.80.130.B.

SE 34th Street/SE 192nd Avenue (Study Intersection #5)

As shown, the SE 192nd Avenue/SE 34th Street signalized intersection is projected to at LOS E and over capacity during the weekday PM peak hour. The City of Vancouver has previously determined that no additional capacity will be added to the intersection and is collecting proportional share mitigation fees from new development (current fee of \$150 per weekday PM peak hour trip added to the intersection) to be used to reconstruct the intersection with a concrete surface. Accordingly, the proposed development will be required to pay a proportional share contribution to the SE 192nd Avenue/SE 34th Street intersection for mitigation purposes. Further details on the proportionate share amounts to be assessed are documented separately in this report.

H:\27\2715 - VIC Implementation\005 - Master Plan Update TIA\report\figs\2715-Figures_Fig 15 - Phase 2 Total Layout Tab: Fig 15 - Phase 2 Total



CM = Critical Movement (Unsignalized)
LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)
Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)
V/C= Intersection Volume-to-Capacity Ratio (Signalized) / Critical Movement Volume-to-Capacity Ratio (Unsignalized)

Future Year 2038 Phase 2 With-Project Traffic Conditions
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
15

SE 20th Street/SE 176th Avenue (Study Intersection #10)

The intersection is forecast to continue to operate over capacity during the weekday PM peak hour and the proposed development will be required to pay a proportional share contribution for mitigation purposes.

It is further noted that northbound vehicles on SE 177th Avenue at SE 34th Street experience much less delay due to closure of the opposing VIC west campus access to SE 34th Street with Master Plan Phase 2.

Phase 3 With Project Conditions

The Phase 3 site-generated volumes shown in Figure 12 were added to the 2038 Phase 2 With Project volumes shown in Figure 14 to obtain the Phase 3 Master Plan build-out traffic volumes and intersection operations shown in Figure 16. In addition to assigning the new site-generated trips, previously assigned The VIC trips were re-routed from the existing SE 34th Street campus access to the assumed new SE 29th Street connection to SE 192nd Avenue (re-routing reflects the more direct campus connection to SE 192nd Avenue for buildings on the eastern portion of the VIC campus, refer to Appendix “H” Figure H-1). Further, some local trips were also re-routed, reflecting the new alternative path compared to prior conditions where local trips use the SE 34th Street corridor to travel to and from SE 192nd Avenue.

Upon buildout of the Phase 3 Master Plan transportation network and land uses, study intersections projected to not satisfy City performance standards and/or that experience projected 95th percentile queues that exceed the available queue storage include:

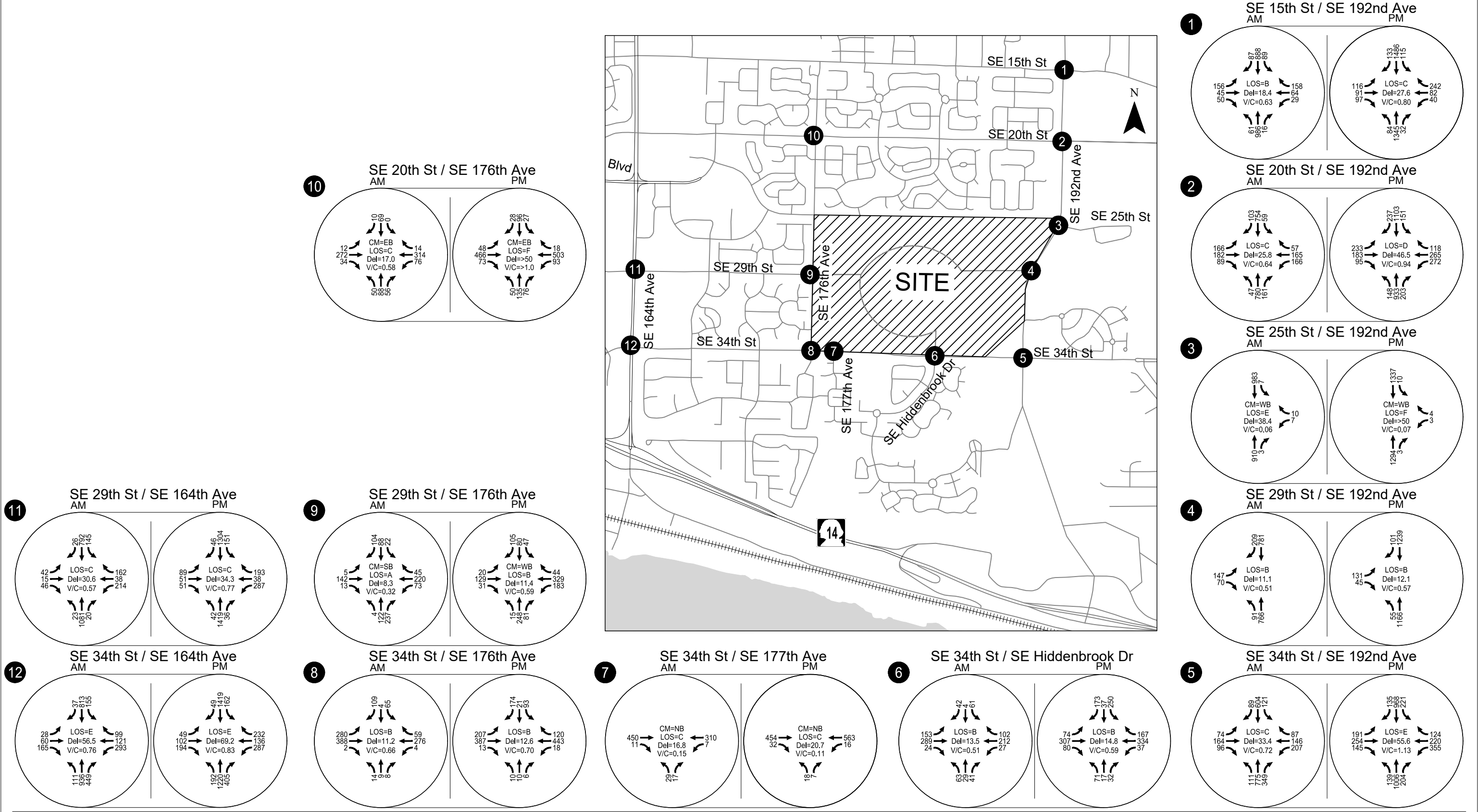
- SE 25th Street/SE 192nd Avenue (did not satisfy standards under baseline conditions)
- SE 34th Street/SE 192nd Avenue (improved compared to Phase 2 conditions)
- SE 20th Street/SE 176th Avenue (did not satisfy standards under baseline conditions)

Additional details regarding the operations of each intersection and mitigation considerations is described below. *Appendix “H” contains the 2038 With Project Phase 3 operational analysis worksheets, the traffic signal warrant analysis worksheets.*

SE 25th Street/SE 192nd Avenue (Study Intersection #3)

The stop-controlled westbound left-turn lane on SE 25th Street is projected to continue to operate at LOS F with a V/C ratio of 0.07 during the weekday PM peak hour. The proposed The VIC project is not projected to add any turning movements to the westbound approach and therefore does not trigger mitigation per Vancouver Municipal Code Section 11.80.130.B.

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CM = Critical Movement (Unsignalized)
LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)
Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)
V/C= Intersection Volume-to-Capacity Ratio (Signalized) / Critical Movement Volume-to-Capacity Ratio (Unsignalized)

Future Year 2038 Phase 3 With-Project Traffic Conditions
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
16

SE 34th Street/SE 192nd Avenue (Study Intersection #5)

The intersection is forecast to continue to operate over capacity during the weekday PM peak hour but operates comparatively better than under Phase 2 conditions due to the diversion of VIC and local traffic to the new parallel SE 29th Street corridor through the VIC campus. The proposed development will be required to pay a proportional share contribution for mitigation purposes.

SE 20th Street/SE 176th Avenue (Study Intersection #10)

The intersection is forecast to continue to operate over capacity during the weekday PM peak hour and the proposed development will be required to pay a proportional share contribution for mitigation purposes.

Phase 4 With Project Conditions

The Phase 4 site-generated volumes shown in Figure 13 were added to the 2038 Phase 3 With Project volumes shown in Figure 16 to obtain the Phase 4 Master Plan build-out traffic volumes and intersection operations shown in Figure 17.

Upon buildout of the Phase 4 Master Plan (full buildout of the VIC Master Plan uses) transportation network and land uses, study intersections projected to not satisfy City performance standards and/or that experience projected 95th percentile queues that exceed the available queue storage include:

- SE 25th Street/SE 192nd Avenue (did not satisfy standards under baseline conditions)
- SE 34th Street/SE 192nd Avenue
- SE 20th Street/SE 176th Avenue (did not satisfy standards under baseline conditions)

Additional details regarding the operations of each intersection and mitigation considerations is described below. *Appendix "I" contains the 2038 With Project Phase 4 operational analysis worksheets, .*

SE 25th Street/SE 192nd Avenue (Study Intersection #3)

The stop-controlled westbound left-turn lane on SE 25th Street is projected to continue to operate at LOS F with a V/C ratio of 0.08 during the weekday PM peak hour. The proposed The VIC project is not projected to add any turning movements to the westbound approach and therefore does not trigger mitigation per Vancouver Municipal Code Section 11.80.130.B.

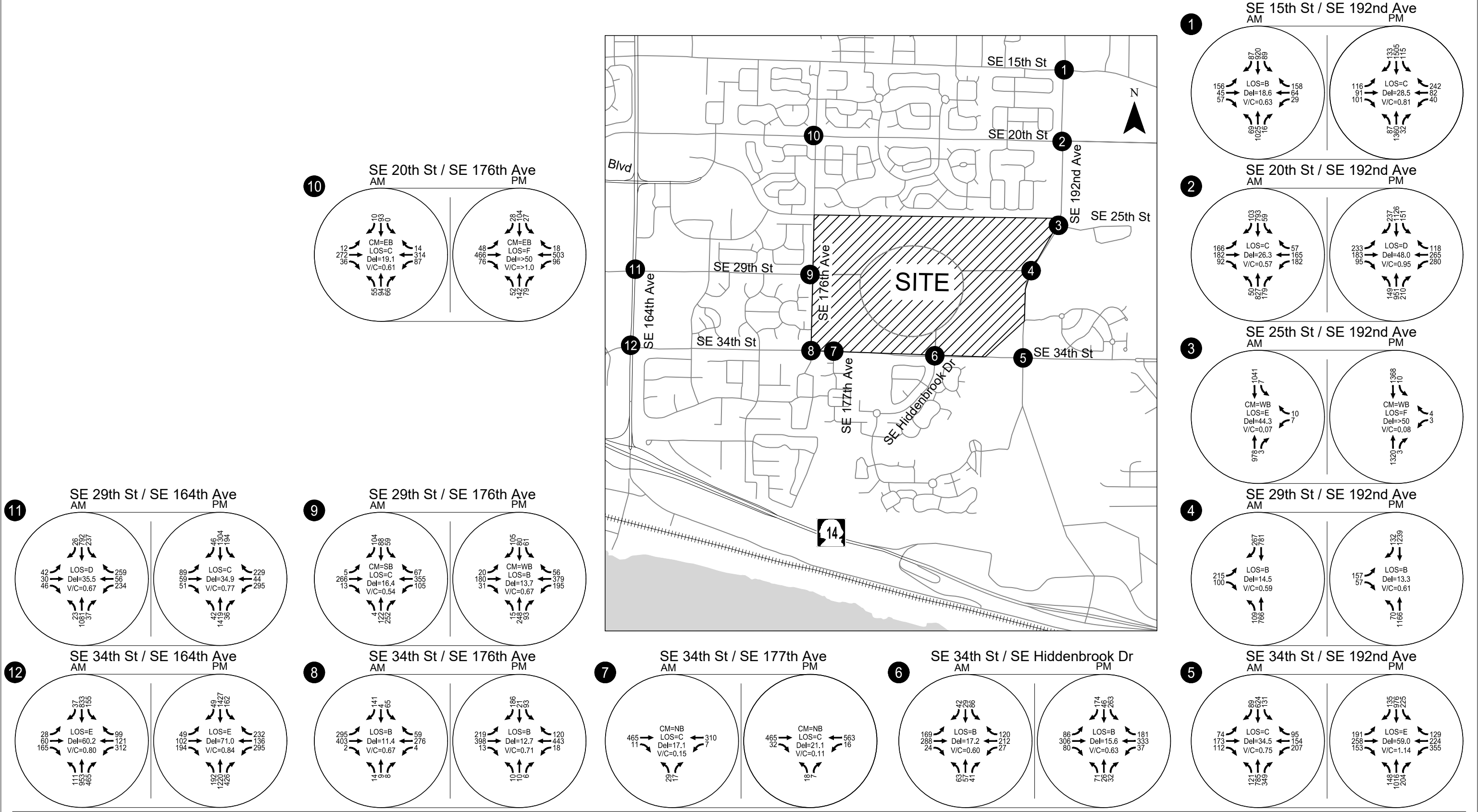
SE 34th Street/SE 192nd Avenue (Study Intersection #5)

The intersection is forecast to continue to operate over capacity during the weekday PM peak hour and proposed development will be required to pay a proportional share contribution for mitigation purposes.

SE 20th Street/SE 176th Avenue (Study Intersection #10)

The intersection is forecast to continue to operate over capacity during the weekday PM peak hour and the proposed development will be required to pay a proportional share contribution for mitigation purposes.

H:\27\2715 - VIC Implementation\005 - Master Plan Update TIA\report\figs\2715-Figures_Fig 17 - Phase 4 Total Layout Tab: Fig 17 - Phase 4 Total



CM = Critical Movement (Unsignalized)
LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)
Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)
V/C= Intersection Volume-to-Capacity Ratio (Signalized) / Critical Movement Volume-to-Capacity Ratio (Unsignalized)

Future Year 2038 Phase 4 With-Project Traffic Conditions
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
17

PROPORTIONAL SHARE FEE CONTRIBUTIONS

The City of Vancouver is collecting proportional share fee contributions from all future development adding site-generated trips to multiple intersections in the study area. Intersections impacted by the VIC Master Plan that are projected to experience concurrency failures and for mitigation is being required in the form of the proportional share fee include:

- SE 34th Street/SE 192nd Avenue
- SE 20th Street/SE 176th Avenue
- SE 192nd Avenue/SR-14 Westbound

Information about the current applicable fees and anticipated total project impact is documented for each intersection below based on the current site plan and trip estimates previously presented in Table 4. The fee amount due for each new building at The VIC will be determined at the time of site plan application and payment will be paid prior to building permit issuance.

SE 34th Street/SE 192nd Avenue (Study Intersection #5)

- A fee payment of \$150 is currently required by the City for each weekday PM peak hour site-generated trip traveling through the intersection.
- Full Master Plan buildout is projected to add 556 weekday PM peak hour trips to the intersection, resulting in a projected fee of \$83,400.

SE 20th Street/SE 176th Avenue (Study Intersection #10)

- A fee payment of \$400 is currently required by the City for each weekday PM peak hour site-generated trip traveling through the intersection.
- Full Master Plan buildout is projected to add 84 weekday PM peak hour trips to the intersection, resulting in a projected fee of \$33,600.

SE 192nd Avenue & SR-14 Westbound Ramp Terminal Mitigation

- A fee payment of \$2,000 is currently required by the City for each weekday PM peak hour site-generated trip traveling through the intersection. The fee will be used to fund the installation of a traffic signal and a second westbound right-turn lane at the intersection along with related modifications.
- Full Master Plan buildout is projected to add 215 weekday PM peak hour trips to the intersection, resulting in a projected fee of \$430,000 as follows:
 - Light industrial and office uses: 53 trips (\$106,000);
 - Residential uses: 126 trips (\$252,000);
 - Commercial retail uses: 28 trips (\$56,000); and
 - Middle School: 8 trips (\$16,000).

SITE ACCESS SIGHT DISTANCE CONSIDERATIONS

The final VIC Master Plan site plan design should provide intersection sight clear areas at each on-site intersection and connections to the public roadway network surrounding the campus in accordance with City of Vancouver standards. Further, it is recommended that above-ground utilities, monuments, fencing, and vegetation be appropriately located and maintained on-site to preserve adequate intersection sight lines per City of Vancouver standards.

FINDINGS & RECOMMENDATIONS

Based on the results of this Traffic Impact Analysis, the proposed VIC Master Plan can be developed while maintaining acceptable study intersection operations and/or mitigating site development impacts. The analysis developed the findings and recommendations listed below.

Findings

- Each of the study intersections satisfies City operating standards today.
- By the future baseline year 2038, the following study intersections do not satisfy City performance standards:
 - SE 25th Street/SE 192nd Avenue
 - SE 20th Street/SE 176th Avenue
- The VIC project will provide several new roadways and transportation capacity mitigations including construction of:
 - SE 29th Street as a collector between SE 176th Avenue and SE 192nd Avenue;
 - A new loop road within the VIC campus linking SE 34th Street and SE 29th Street;
 - A new single lane roundabout at the SE 29th Street/SE 176th Avenue intersection;
 - A new single lane roundabout at SE 29th Street/west loop road intersection;
 - A new single lane roundabout at SE 29th Street/east loop road intersection;
 - A new signalized intersection at SE 29th Street/SE 192nd Avenue intersection;
 - Capacity mitigations at the signalized SE 29th Street/SE 164th Avenue intersection including:
 - Convert the existing east-west left-turn permissive signal phasing on SE 29th Street to protected/permissive left-turn phasing;
 - Extend the westbound left-turn lane storage on SE 29th Street; and
 - Extend the existing southbound left-turn lane on SE 162nd Avenue.

- Closure of the existing west campus access connection to SE 34th Street (the site access aligned with SE 177th Avenue); and
 - Modify the existing east campus access connection to SE 34th Street (the site access aligned with SE Hiddenbrook Drive) to have one northbound lane, one southbound left-turn lane and one southbound shared through/right lane at the SE 34th Street traffic signal.
- The VIC Master Plan site-generated trips will impact three intersections where the City of Vancouver is collecting proportional share fee contributions including:
 - SE 34th Street/SE 192nd Avenue
 - SE 20th Street/SE 176th Avenue
 - SE 192nd Avenue/SR-14 Westbound

Recommended Off-site Intersection Mitigations with Master Plan Development

SE 29th Street/SE 164th Avenue (Study Intersection #11) With Phase 2 Site Development

- The existing east-west left-turn signal phasing on SE 29th Street at SE 162nd Avenue should be converted from permissive operations to protected/permissive left-turn phasing;
- The westbound left-turn lane striping should be extended to provide 225 feet of storage; and
- The existing southbound left-turn lane on SE 162nd Avenue at SE 29th Street should be extended to provide 300 feet of left-turn storage (the existing left-turn storage is approximately 135 feet long; the extension will required reconstruction of the existing median area and drainage facilities within the median).

SE 29th Street/SE 192nd Avenue (Study Intersection #4) With Master Plan Phase 3

- Construct a traffic signal along with:
 - separate left and right-turn lanes with at least 250 feet of storage on the eastbound SE 29th Street approach;
 - a separate left-turn lane with at least 200 feet of storage on the northbound approach; and
 - protected northbound left-turn phasing on SE 192nd Avenue at the intersection.

Proportional Share Contributions

The VIC should make a proportionate share contribution toward future capacity improvements at each of these three intersections with each site development application. The fee for individual site plan applications will be determined as part of each application and should be paid prior to building permit issuance.

- SE 34th Street/SE 192nd Avenue (Study Intersection #5)
 - A fee payment of \$150 is currently required by the City for each weekday PM peak hour site-generated trip traveling through the intersection.
- SE 192nd Avenue & SR-14 Westbound Ramp Terminal
 - A fee payment of \$2,000 is currently required by the City for each weekday PM peak hour site-generated trip traveling through the intersection.
- SE 20th Street/SE 176th Avenue (Study Intersection #10)
 - The VIC should make a proportionate share contribution toward future capacity improvements at the unsignalized SE 20th Street/SE 176th Avenue intersection with each site development application. A fee payment of \$400 is currently required by the City for each weekday PM peak hour site-generated trip traveling through the intersection.

Other Recommendations

- Above-ground utilities, monuments, fencing, and vegetation should be appropriately located and maintained on-site and at all site access intersections to provide adequate intersection sight lines per City of Vancouver standards.

We trust this letter adequately addresses the traffic impacts associated with the revised The VIC Master Plan proposal. Please contact us if you have any questions or comments.

Sincerely,
KITTELSON & ASSOCIATES, INC.



Chris Brehmer, PE
Senior Principal Engineer



Julia Kuhn, PE
Senior Principal Engineer



REFERENCES

- 1) Transportation Research Board. *Highway Capacity Manual*, 6th Edition. 2016.
- 2) City of Vancouver. Arterial Street System and Classification Map. 2022.
https://www.cityofvancouver.us/sites/default/files/fileattachments/public_works/page/1744/arterial_map_large_2022.pdf
- 3) C-Tran. <http://www.c-tran.com>. Accessed March 2021.
- 4) Institute of Transportation Engineers. *Trip Generation Manual*, 11th Edition. 2021.

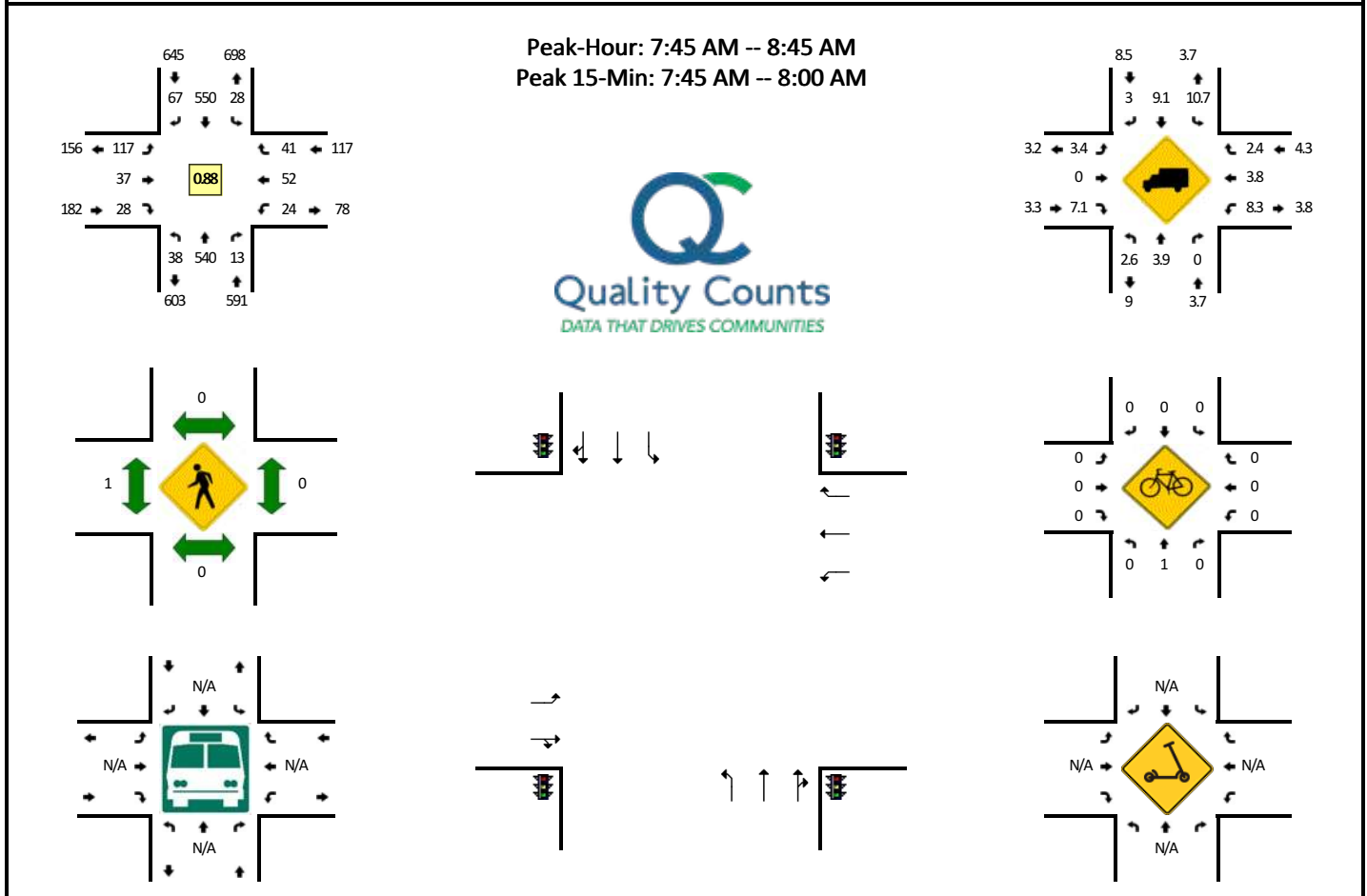
APPENDICES

- Appendix A: Traffic Count Data
- Appendix B: WSDOT Crash Data
- Appendix C: Existing Operations Worksheets
- Appendix D: The VIC Campus Volume Adjustment
- Appendix E: 2038 Baseline Operations Worksheets and Total In-process Trip Assignment
- Appendix F: 2038 With-Project Phase 1 Operations Worksheets
- Appendix G: 2038 With-Project Phase 2 Operations Worksheets and Re-route Trips
- Appendix H: 2038 With-Project Phase 3 Operations Worksheets and Re-route Trips
- Appendix I: 2038 With-Project Phase 4 Operations Worksheets

Appendix A Traffic Count Data

LOCATION: SE 192nd Ave -- SE 15th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050501
DATE: Tue, Jan 10 2023

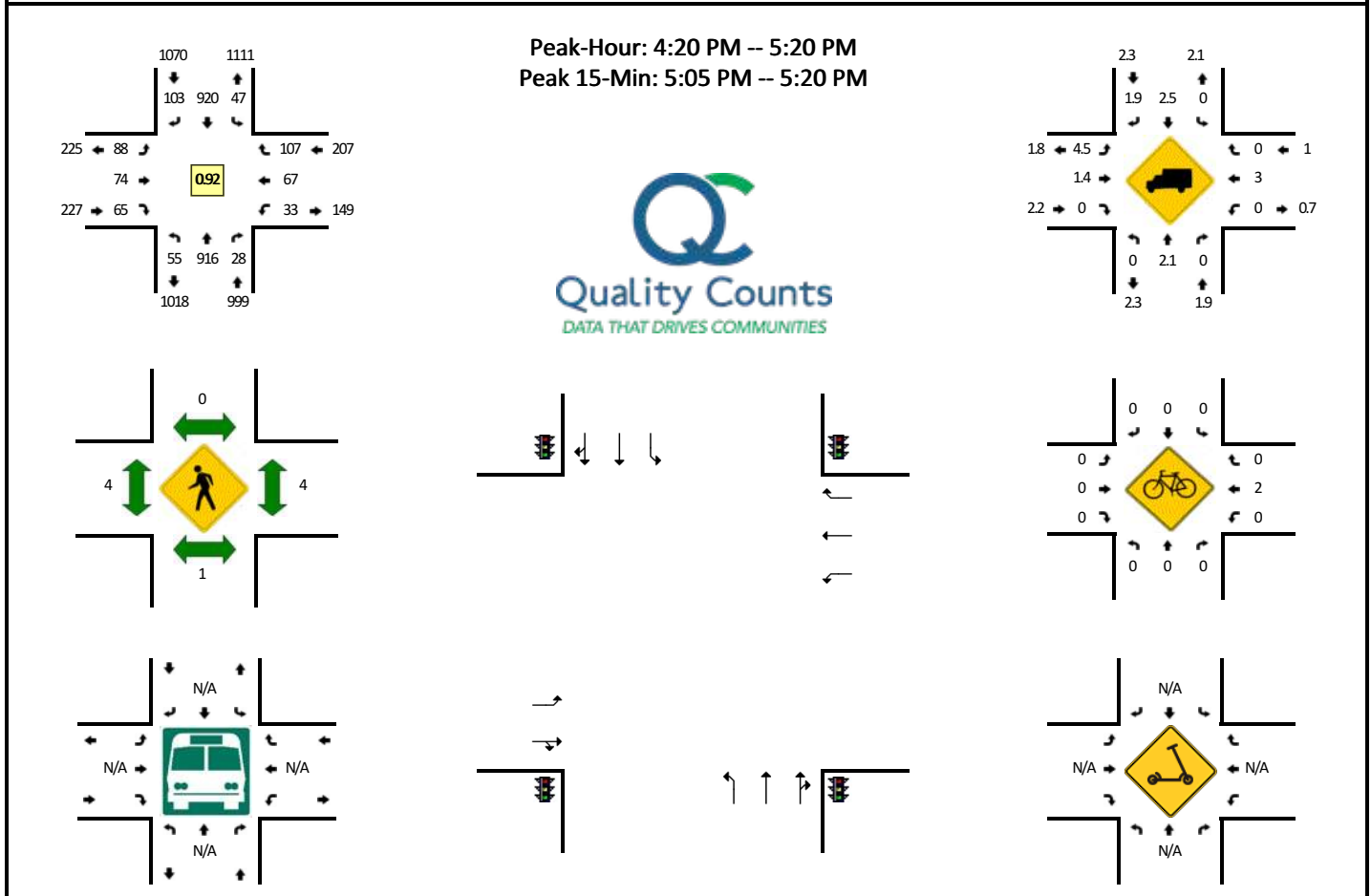


5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 15th St (Eastbound)				SE 15th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	31	0	0	1	51	4	0	2	2	1	0	0	1	0	0	94	
7:05 AM	0	23	0	0	1	35	4	0	2	1	1	0	2	0	2	0	71	
7:10 AM	2	31	0	0	0	36	3	0	6	2	3	0	1	1	1	0	86	
7:15 AM	2	39	0	0	6	36	1	0	7	6	3	0	1	0	2	0	103	
7:20 AM	4	35	0	0	1	32	3	0	7	2	2	0	1	0	6	0	93	
7:25 AM	2	39	0	1	1	39	4	0	1	2	1	0	2	6	0	0	98	
7:30 AM	1	43	2	0	0	30	4	0	2	5	2	0	2	0	3	0	94	
7:35 AM	3	46	0	0	1	37	2	0	10	1	4	0	3	3	2	0	112	
7:40 AM	1	65	3	0	1	42	2	0	11	5	3	0	3	4	3	0	143	
7:45 AM	5	56	1	0	1	50	4	0	11	4	1	0	2	4	7	0	146	
7:50 AM	2	44	1	1	4	63	4	0	10	5	4	0	3	5	5	0	151	
7:55 AM	0	39	3	0	7	59	12	0	6	3	5	0	1	2	2	0	139	1330
8:00 AM	1	41	1	0	0	43	13	0	8	3	2	0	2	5	1	0	120	1356
8:05 AM	9	39	0	0	1	43	4	0	5	1	6	0	0	6	0	0	114	1399
8:10 AM	0	35	2	0	3	38	5	0	6	4	1	0	1	8	2	0	105	1418
8:15 AM	1	43	0	0	2	27	3	0	8	2	1	0	4	4	5	0	100	1415
8:20 AM	6	43	2	0	1	51	6	0	9	2	0	0	1	4	2	0	127	1449
8:25 AM	4	51	2	0	2	42	5	0	17	3	1	0	1	3	6	0	137	1488
8:30 AM	1	41	1	0	2	31	1	0	19	6	3	0	3	5	6	0	119	1513
8:35 AM	2	57	0	0	3	52	4	0	6	1	1	0	1	4	1	0	132	1533
8:40 AM	6	51	0	0	2	51	6	0	12	3	3	0	5	2	4	0	145	1535
8:45 AM	6	43	2	0	5	47	7	0	3	1	5	0	2	9	3	0	133	1522
8:50 AM	0	62	1	0	0	45	6	0	3	4	2	0	3	3	4	0	133	1504
8:55 AM	3	57	0	0	5	45	2	0	2	5	3	0	2	5	1	0	130	1495
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	28	556	20	4	48	688	80	0	108	48	40	0	24	44	56	0	1744	
Heavy Trucks	0	4	0		8	56	4		0	0	0		0	0	0		72	
Buses																		
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

LOCATION: SE 192nd Ave -- SE 15th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050502
DATE: Tue, Jan 10 2023

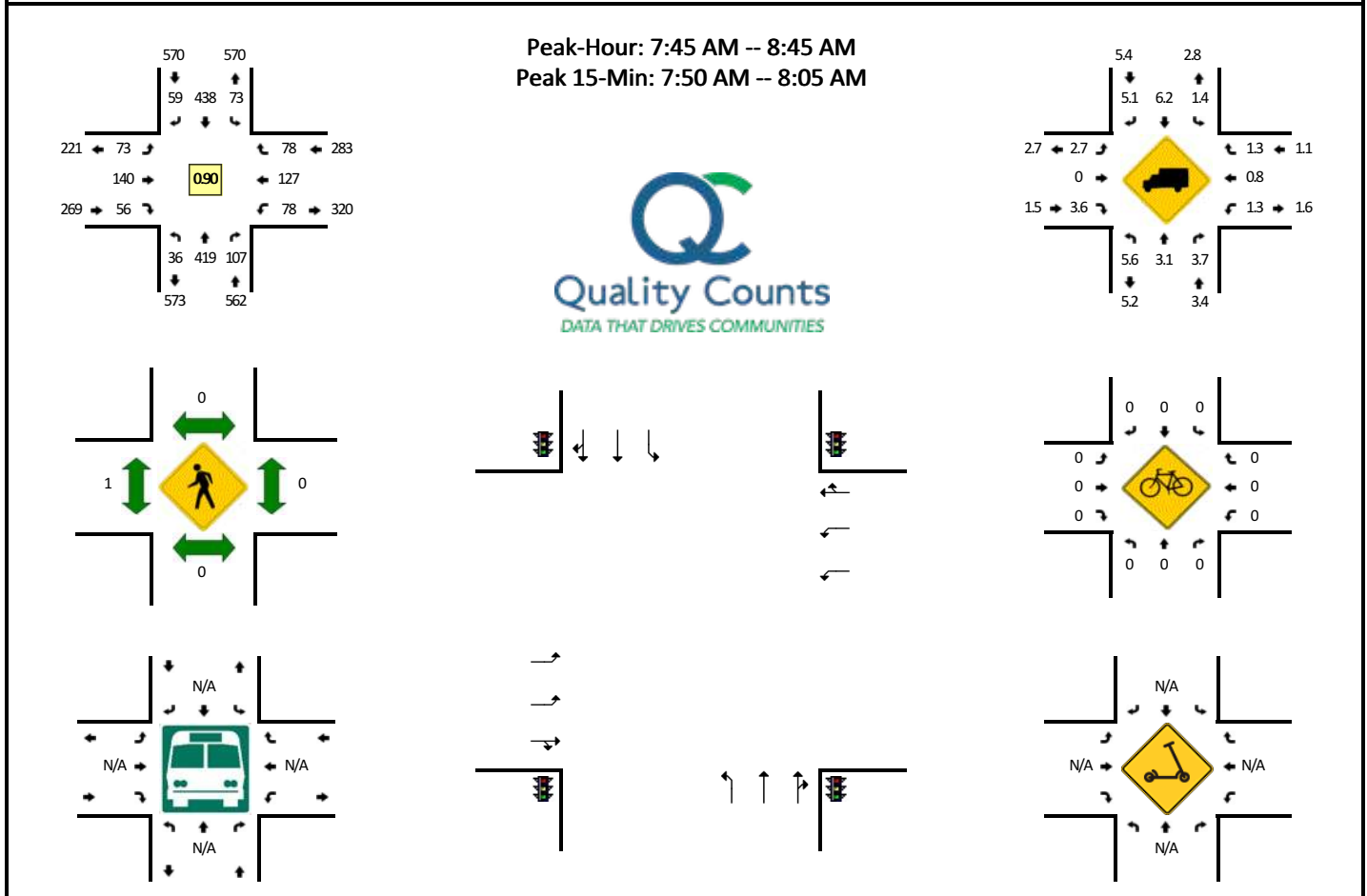


5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 15th St (Eastbound)				SE 15th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	87	0	0	2	89	14	0	10	3	3	0	4	4	11	0	231	
4:05 PM	8	66	1	0	6	70	15	1	7	6	4	0	4	7	12	0	207	
4:10 PM	13	93	2	0	1	71	9	0	5	3	5	0	1	11	11	0	225	
4:15 PM	7	79	3	0	6	48	8	0	7	8	1	0	1	4	11	0	183	
4:20 PM	1	90	3	0	3	66	9	0	10	6	6	0	5	6	12	0	217	
4:25 PM	6	66	2	0	4	86	7	0	9	3	5	0	2	2	7	0	199	
4:30 PM	7	70	3	0	5	63	8	0	4	7	4	0	2	2	3	0	178	
4:35 PM	5	77	2	0	2	69	8	0	5	6	6	0	5	5	12	0	202	
4:40 PM	4	85	1	0	2	92	9	0	12	4	0	0	2	5	6	0	222	
4:45 PM	4	85	3	0	1	76	13	0	6	9	8	0	1	4	6	0	216	
4:50 PM	10	74	2	0	2	67	4	0	5	7	8	0	3	4	4	0	190	
4:55 PM	3	93	3	0	5	66	13	0	9	5	6	0	2	3	5	0	213	2483
5:00 PM	4	70	1	0	3	74	7	0	8	5	5	0	1	3	8	0	189	2441
5:05 PM	5	47	1	0	3	87	4	0	9	3	8	0	4	9	20	0	200	2434
5:10 PM	4	79	2	0	9	87	11	0	8	9	4	0	3	12	13	0	241	2450
5:15 PM	2	80	5	0	8	87	10	0	3	10	5	0	3	12	11	0	236	2503
5:20 PM	3	78	5	0	5	76	9	0	8	8	7	0	3	4	10	0	216	2502
5:25 PM	4	60	3	0	2	56	7	0	4	10	5	0	3	3	5	0	162	2465
5:30 PM	2	59	0	0	3	68	8	0	6	7	7	0	1	7	7	0	175	2462
5:35 PM	3	72	3	0	5	57	7	0	6	4	5	0	1	3	3	0	169	2429
5:40 PM	5	57	3	0	2	61	8	0	4	4	4	0	2	3	5	0	158	2365
5:45 PM	5	59	4	0	8	66	10	0	8	8	6	0	5	7	9	0	195	2344
5:50 PM	6	72	1	0	7	63	6	0	8	8	1	0	3	9	5	0	189	2343
5:55 PM	2	72	8	0	4	57	7	0	9	6	2	0	4	6	5	0	182	2312
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	44	824	32	0	80	1044	100	0	80	88	68	0	40	132	176	0	2708	
Heavy Trucks	0	8	0	0	0	32	0	0	4	0	0	0	0	4	0	0	48	
Buses																		
Pedestrians		4				0				4				8			16	
Bicycles	0	0	0		0	0	0		0	0	0		0	8	0		8	
Scooters																		

Comments:

LOCATION: SE 192nd Ave -- SE 20th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050503
DATE: Tue, Jan 10 2023

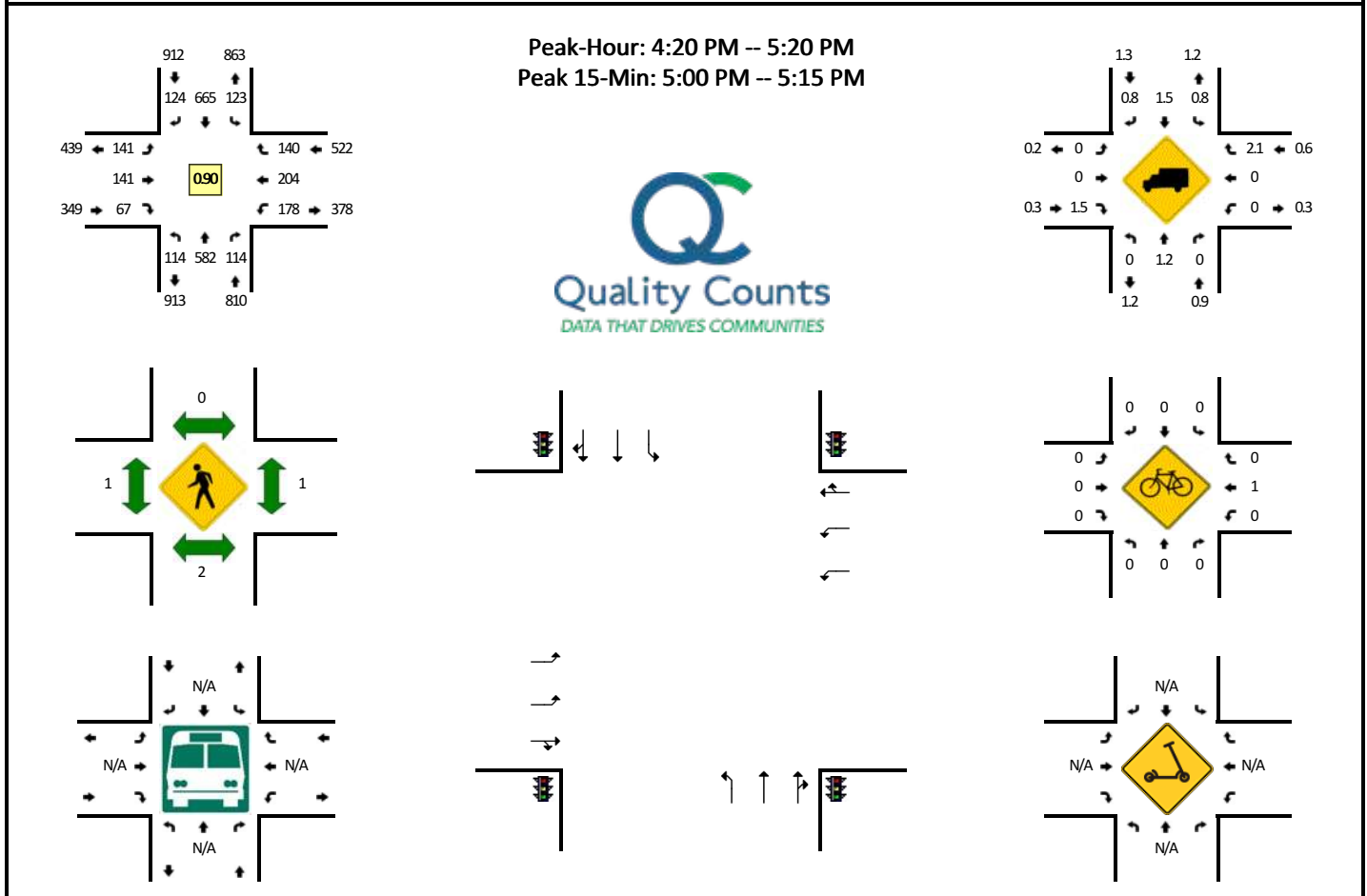


5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 20th St (Eastbound)				SE 20th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	2	16	16	0	10	32	9	0	5	9	5	0	8	2	2	0	116	
7:05 AM	2	13	13	0	5	18	5	1	3	10	4	0	8	5	9	0	96	
7:10 AM	3	20	13	0	6	31	2	0	5	6	6	0	8	9	5	0	114	
7:15 AM	1	26	9	0	5	32	4	3	4	15	7	0	6	8	8	0	128	
7:20 AM	2	32	8	0	5	24	4	0	3	11	7	0	8	4	4	0	112	
7:25 AM	3	28	12	0	8	27	2	0	7	13	4	0	8	4	8	0	124	
7:30 AM	3	23	8	0	5	32	4	0	6	13	4	0	5	7	9	0	119	
7:35 AM	0	34	14	0	4	30	1	0	8	11	7	0	6	10	8	0	133	
7:40 AM	1	34	14	0	8	35	6	0	11	13	5	0	5	8	10	0	150	
7:45 AM	3	43	10	1	6	32	8	0	11	12	4	0	7	9	4	0	150	
7:50 AM	3	29	8	0	7	46	10	0	7	20	7	0	6	13	8	0	164	
7:55 AM	5	33	10	0	8	41	7	0	3	14	7	0	8	11	4	0	151	1557
8:00 AM	1	27	18	0	6	42	7	0	2	18	2	0	6	14	10	0	153	1594
8:05 AM	2	31	11	0	6	41	4	0	5	12	7	0	6	13	8	0	146	1644
8:10 AM	2	31	12	0	8	26	2	0	4	9	3	0	7	12	3	0	119	1649
8:15 AM	2	29	5	0	4	24	5	0	6	11	3	0	4	12	9	0	114	1635
8:20 AM	7	39	4	0	10	30	3	0	4	5	4	0	6	6	7	0	125	1648
8:25 AM	1	40	4	0	7	33	4	0	11	9	3	0	6	10	4	0	132	1656
8:30 AM	4	41	10	0	1	39	1	0	8	11	4	0	8	8	5	0	140	1677
8:35 AM	1	30	5	0	5	38	6	0	8	10	4	0	8	10	10	0	135	1679
8:40 AM	4	46	10	0	5	46	2	0	4	9	8	0	6	9	6	0	155	1684
8:45 AM	2	43	4	0	6	35	15	0	4	8	7	0	9	8	5	0	146	1680
8:50 AM	7	43	5	0	3	41	2	0	9	18	3	0	3	15	7	0	156	1672
8:55 AM	4	44	5	0	5	42	6	0	2	5	4	0	11	14	7	0	149	1670
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	36	356	144	0	84	516	96	0	48	208	64	0	80	152	88	0	1872	
Heavy Trucks	0	12	0	0	0	20	4	0	4	0	0	0	0	0	0	0	40	
Buses																		
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scoters																		

Comments:

LOCATION: SE 192nd Ave -- SE 20th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050504
DATE: Tue, Jan 10 2023

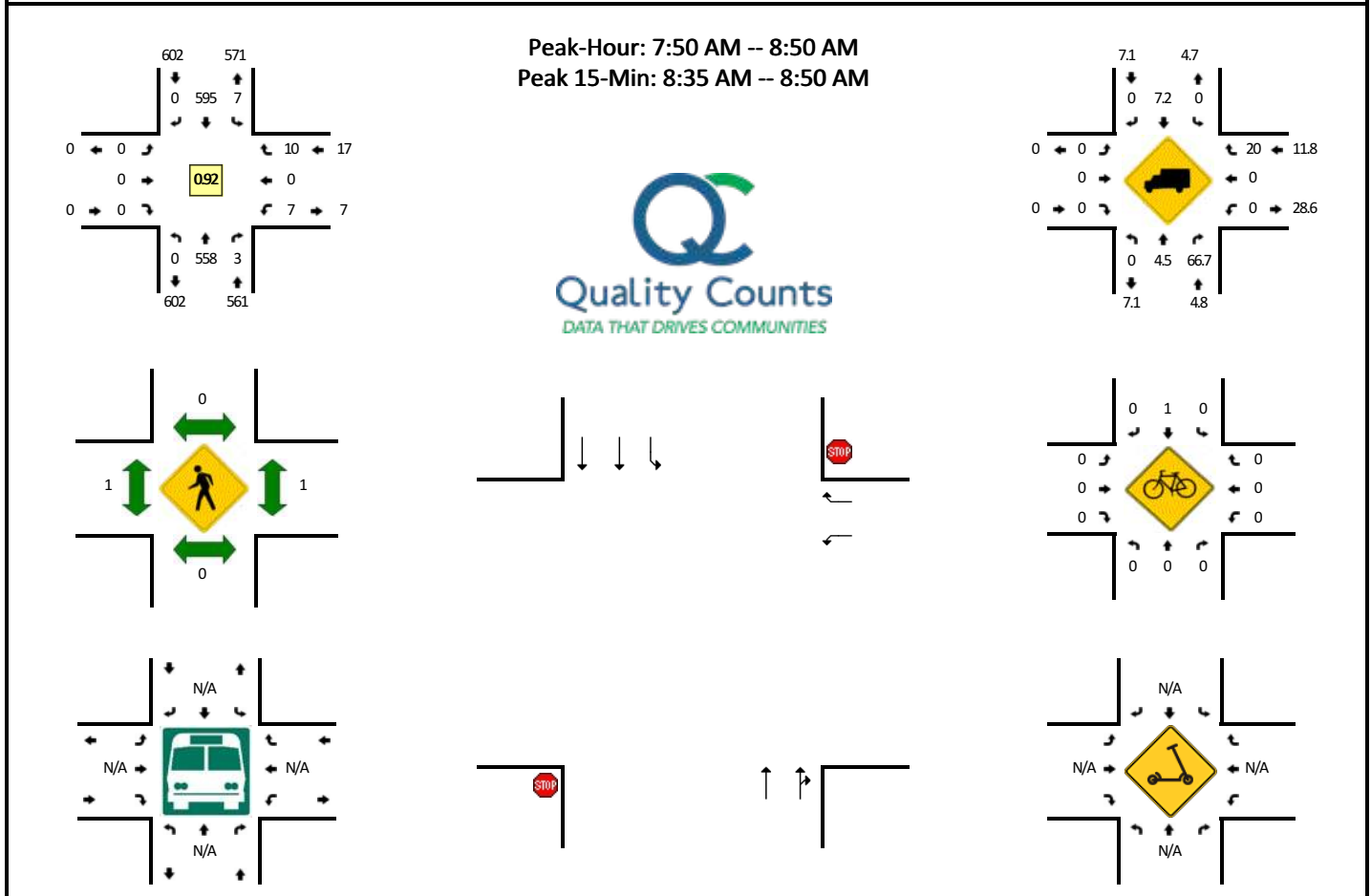


5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 20th St (Eastbound)				SE 20th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	11	59	5	0	10	51	18	0	12	16	4	0	18	13	8	0	225	
4:05 PM	14	42	7	0	11	55	12	0	19	12	8	0	31	20	16	0	247	
4:10 PM	8	68	10	0	6	64	11	0	10	17	5	0	9	16	16	0	240	
4:15 PM	8	58	8	0	4	44	11	0	15	7	2	0	17	9	8	0	191	
4:20 PM	10	72	7	0	7	48	7	0	18	9	4	0	15	15	10	0	222	
4:25 PM	14	49	8	0	7	62	14	0	17	13	6	0	13	18	6	0	227	
4:30 PM	12	47	5	0	2	56	10	0	9	10	4	0	7	12	11	0	185	
4:35 PM	9	51	6	0	9	51	12	0	8	7	5	0	19	19	11	0	207	
4:40 PM	6	38	6	0	11	58	9	0	10	9	4	0	7	12	15	0	185	
4:45 PM	8	51	9	0	16	54	11	0	14	11	13	0	11	13	10	0	221	
4:50 PM	7	46	9	1	17	47	11	0	9	7	5	0	18	15	12	0	204	
4:55 PM	9	66	10	0	10	50	7	0	10	11	0	0	16	18	12	0	219	2573
5:00 PM	7	40	17	1	9	56	11	0	14	12	7	0	18	13	8	0	213	2561
5:05 PM	8	45	12	0	13	70	9	0	5	19	3	0	20	29	13	0	246	2560
5:10 PM	9	54	18	0	6	68	9	0	14	14	10	0	17	24	15	0	258	2578
5:15 PM	12	23	7	1	16	45	14	0	13	19	6	0	17	16	17	0	206	2593
5:20 PM	10	49	12	0	11	52	15	0	13	21	5	0	7	12	7	0	214	2585
5:25 PM	11	25	7	0	8	44	14	0	6	14	8	0	4	9	11	0	161	2519
5:30 PM	9	29	4	0	11	37	9	0	10	15	5	0	6	11	11	0	157	2491
5:35 PM	7	47	16	0	5	46	9	0	9	17	4	0	7	13	9	0	189	2473
5:40 PM	12	32	8	0	8	26	10	0	10	11	3	0	7	9	7	0	143	2431
5:45 PM	6	44	8	0	13	50	9	0	8	17	5	0	8	20	8	0	196	2406
5:50 PM	4	48	8	0	11	34	7	0	9	7	8	0	6	15	8	0	165	2367
5:55 PM	8	48	13	0	9	39	8	0	12	9	3	0	4	9	9	0	171	2319
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	96	556	188	4	112	776	116	0	132	180	80	0	220	264	144	0	2868	
Heavy Trucks	0	0	0		0	8	0		0	0	0		0	0	0		8	
Buses																		
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scoters																		

Comments:

LOCATION: SE 192nd Ave -- SE 25th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050505
DATE: Thu, Jan 12 2023

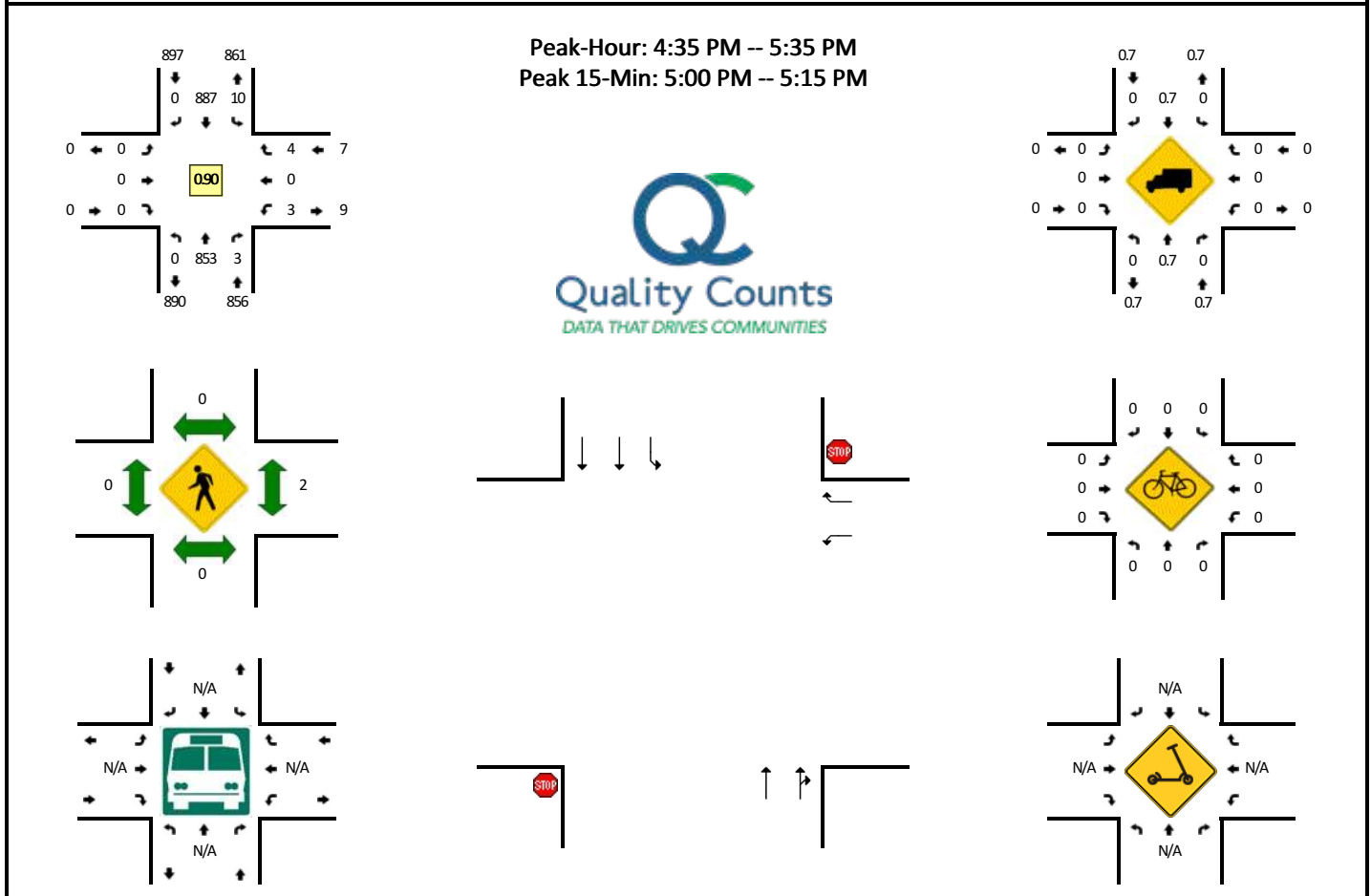


5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 25th St (Eastbound)				SE 25th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	24	0	0	0	43	0	1	0	0	0	0	1	0	1	0	70	
7:05 AM	0	30	0	0	0	30	0	0	0	0	0	0	0	0	1	0	61	
7:10 AM	0	27	0	0	1	32	0	1	0	0	0	0	0	0	0	0	61	
7:15 AM	0	35	0	0	0	42	0	0	0	0	0	0	0	0	1	0	78	
7:20 AM	0	39	0	0	1	34	0	2	0	0	0	0	0	0	0	0	76	
7:25 AM	0	35	0	0	0	40	0	2	0	0	0	0	1	0	1	0	79	
7:30 AM	0	34	0	0	0	42	0	0	0	0	0	0	0	0	0	0	76	
7:35 AM	0	52	0	0	0	37	0	0	0	0	0	0	0	0	0	0	89	
7:40 AM	0	30	0	0	0	44	0	0	0	0	0	0	0	0	0	0	74	
7:45 AM	0	40	0	0	0	52	0	1	0	0	0	0	0	0	2	0	95	
7:50 AM	0	36	0	0	0	57	0	0	0	0	0	0	1	0	2	0	96	
7:55 AM	0	38	0	0	0	60	0	0	0	0	0	0	0	0	0	0	98	953
8:00 AM	0	51	0	0	1	45	0	1	0	0	0	0	0	0	1	0	99	982
8:05 AM	0	44	1	0	0	48	0	0	0	0	0	0	0	0	1	0	94	1015
8:10 AM	0	45	1	0	0	36	0	0	0	0	0	0	1	0	3	0	86	1040
8:15 AM	0	41	0	0	1	39	0	0	0	0	0	0	0	0	1	0	82	1044
8:20 AM	0	57	0	0	0	46	0	0	0	0	0	0	1	0	0	0	104	1072
8:25 AM	0	39	0	0	1	54	0	0	0	0	0	0	0	0	1	0	95	1088
8:30 AM	0	49	0	0	0	55	0	0	0	0	0	0	1	0	0	0	105	1117
8:35 AM	0	59	1	0	1	50	0	1	0	0	0	0	0	0	1	0	113	1141
8:40 AM	0	38	0	0	0	46	0	0	0	0	0	0	3	0	0	0	87	1154
8:45 AM	0	61	0	0	0	59	0	1	0	0	0	0	0	0	0	0	121	1180
8:50 AM	0	55	1	0	0	33	0	0	0	0	0	0	0	0	0	0	89	1173
8:55 AM	0	37	1	0	1	50	0	0	0	0	0	0	0	0	2	0	91	1166
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	632	4	0	4	620	0	8	0	0	0	0	12	0	4	0	1284	
Heavy Trucks	0	40	0	0	0	48	0	0	0	0	0	0	0	0	0	0	88	
Buses																		
Pedestrians	0	0	0	0	0	0	0	0	4	0	0	0	4	0	0	0	8	
Bicycles	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	4	
Scooters																		

Comments:

LOCATION: SE 192nd Ave -- SE 25th St
CITY/STATE: Vancouver, WA

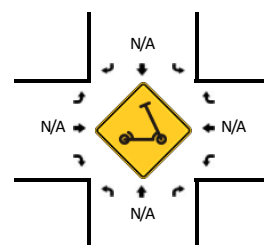
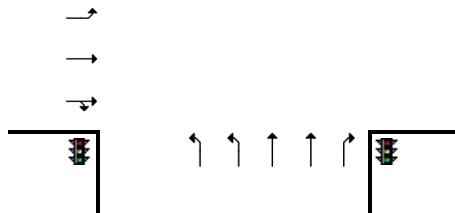
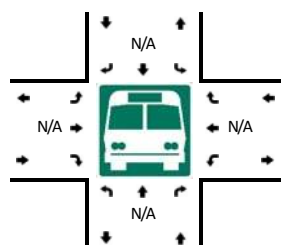
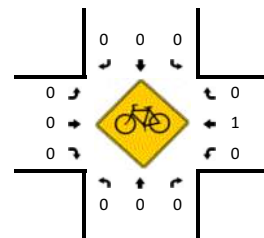
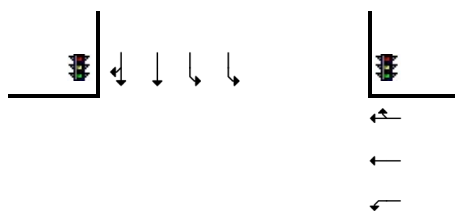
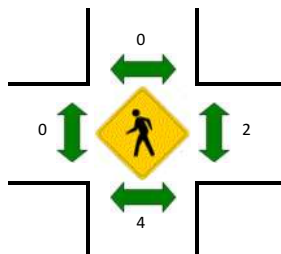
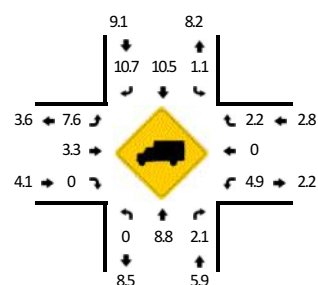
QC JOB #: 16050506
DATE: Thu, Jan 12 2023



5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 25th St (Eastbound)				SE 25th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	70	1	0	2	69	0	0	0	0	0	0	0	0	2	0	144	
4:05 PM	0	65	0	0	0	84	0	0	0	0	0	0	0	0	1	0	150	
4:10 PM	0	50	1	0	0	74	0	1	0	0	0	0	0	0	1	0	127	
4:15 PM	0	70	1	0	2	74	0	0	0	0	0	0	0	0	0	0	147	
4:20 PM	0	69	1	0	0	97	0	0	0	0	0	0	1	0	1	0	169	
4:25 PM	0	63	0	0	0	59	0	0	0	0	0	0	2	0	1	0	125	
4:30 PM	0	62	0	0	0	74	0	0	0	0	0	0	0	0	0	0	136	
4:35 PM	0	71	0	0	1	69	0	0	0	0	0	0	0	0	0	0	141	
4:40 PM	0	65	1	0	0	73	0	0	0	0	0	0	0	0	0	0	139	
4:45 PM	0	56	1	0	0	85	0	1	0	0	0	0	0	0	0	0	143	
4:50 PM	0	63	0	0	0	71	0	0	0	0	0	0	1	0	2	0	137	
4:55 PM	0	62	0	0	0	66	0	0	0	0	0	0	0	0	0	0	128	1686
5:00 PM	0	88	0	0	0	70	0	1	0	0	0	0	0	0	0	0	159	1701
5:05 PM	0	84	0	0	1	85	0	0	0	0	0	0	0	0	0	0	170	1721
5:10 PM	0	74	0	0	0	84	0	0	0	0	0	0	0	0	0	0	158	1752
5:15 PM	0	74	1	0	2	75	0	0	0	0	0	0	0	0	1	0	153	1758
5:20 PM	0	69	0	0	0	69	0	2	0	0	0	0	0	0	1	0	141	1730
5:25 PM	0	63	0	0	1	68	0	0	0	0	0	0	0	0	0	0	132	1737
5:30 PM	0	84	0	0	1	72	0	0	0	0	0	0	2	0	0	0	159	1760
5:35 PM	0	52	0	0	1	64	0	0	0	0	0	0	0	0	0	0	117	1736
5:40 PM	0	70	0	0	2	70	0	3	0	0	0	0	0	0	1	0	146	1743
5:45 PM	0	65	0	0	0	45	0	0	0	0	0	0	1	0	0	0	111	1711
5:50 PM	0	68	1	0	2	59	0	0	0	0	0	0	0	0	1	0	131	1705
5:55 PM	0	61	1	0	1	58	0	2	0	0	0	0	0	0	2	0	125	1702
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	984	0	0	4	956	0	4	0	0	0	0	0	0	0	0	1948	
Heavy Trucks	0	20	0	0	0	8	0	0	0	0	0	0	0	0	0	0	28	
Buses																		
Pedestrians		0				0				0				4			4	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

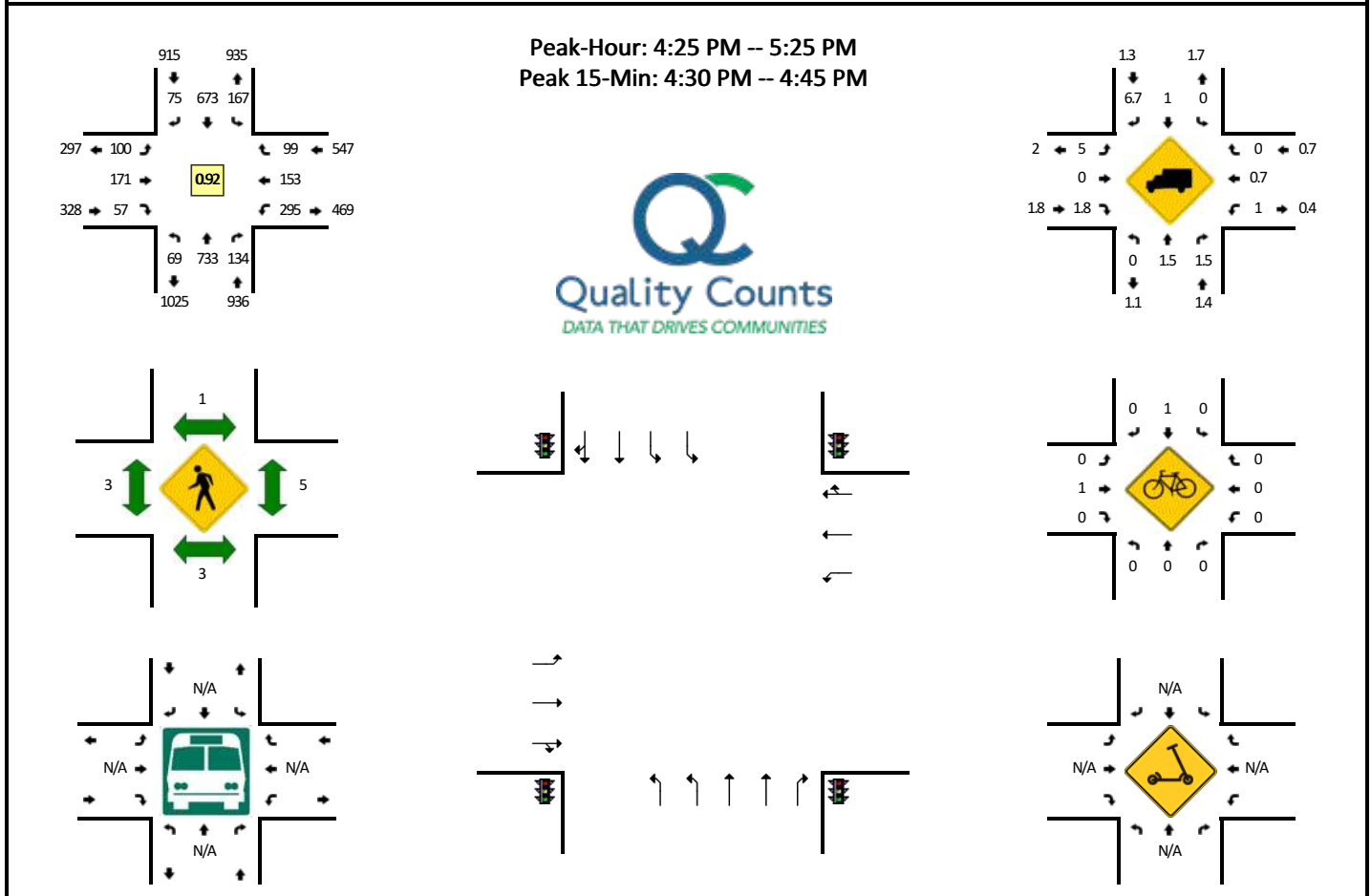
QC JOB #: 16019615
DATE: Tue, Dec 6 2022



Comments:

LOCATION: SE 192nd Ave -- SE 34th St
CITY/STATE: Vancouver, WA

QC JOB #: 16019616
DATE: Tue, Dec 6 2022

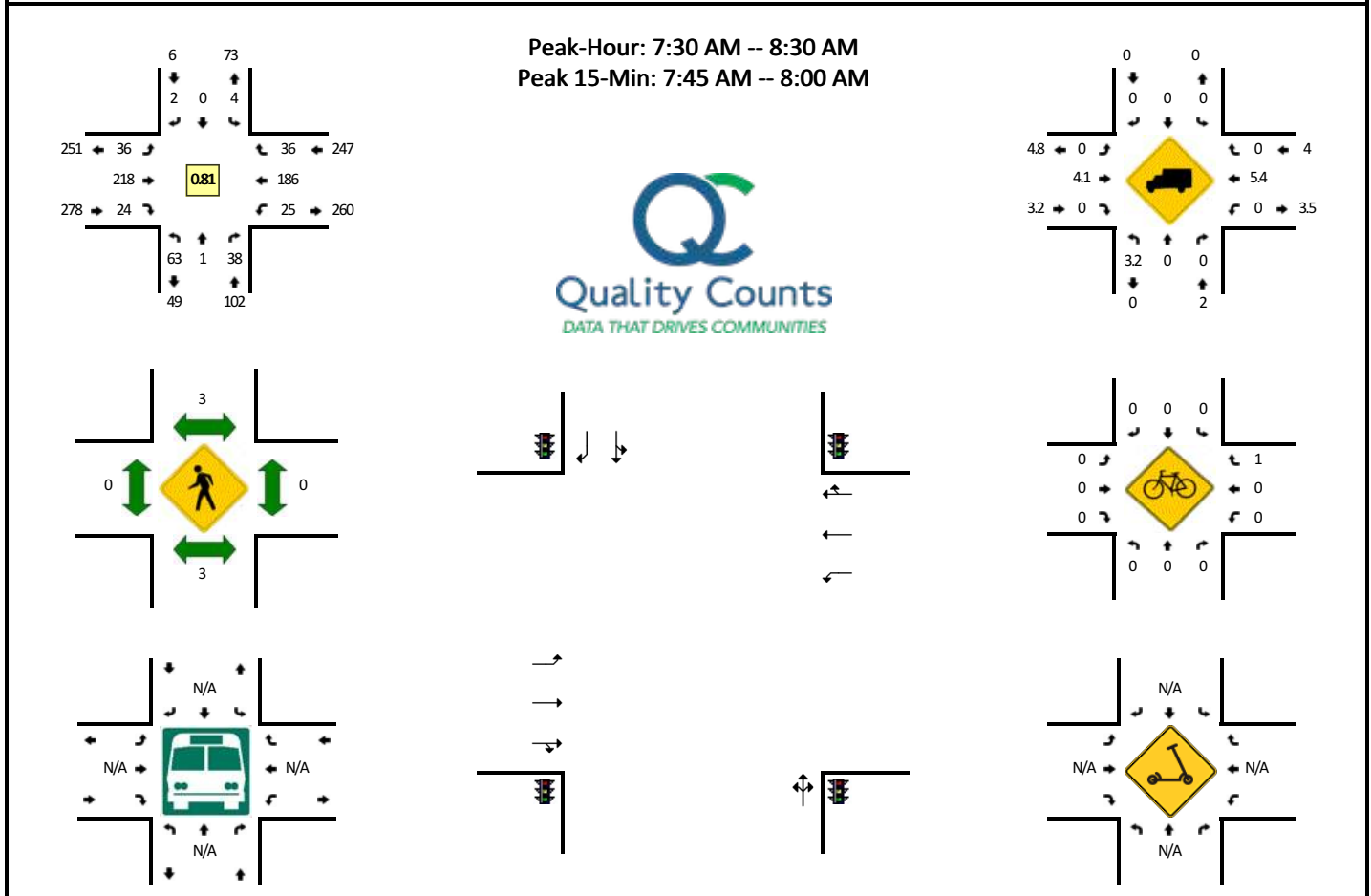


5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	10	64	13	0	17	44	9	0	12	18	4	0	28	11	11	0	241	
4:05 PM	11	68	11	0	5	68	11	0	4	9	7	0	26	12	5	0	237	
4:10 PM	12	54	13	0	13	62	9	0	9	16	3	0	26	15	11	0	243	
4:15 PM	6	61	10	0	9	48	4	1	6	18	5	0	26	12	5	0	211	
4:20 PM	4	57	7	0	11	64	5	0	12	8	3	0	22	10	10	0	213	
4:25 PM	6	72	9	0	11	65	3	0	9	13	5	0	29	14	2	0	238	
4:30 PM	8	78	12	0	10	46	7	0	4	11	2	0	22	11	11	0	222	
4:35 PM	6	65	9	0	16	57	5	0	15	15	3	0	18	13	14	0	236	
4:40 PM	5	62	18	0	19	83	6	0	9	15	4	0	33	19	6	0	279	
4:45 PM	6	56	10	0	14	38	15	0	5	15	6	0	24	15	6	0	210	
4:50 PM	8	57	7	0	9	48	6	2	9	20	5	0	16	12	5	0	204	
4:55 PM	3	41	15	0	15	49	7	0	5	11	6	0	21	10	7	0	190	2724
5:00 PM	7	62	10	0	15	50	4	0	9	7	5	0	24	14	10	0	217	2700
5:05 PM	3	59	14	0	10	66	6	0	12	11	7	0	27	9	9	0	233	2696
5:10 PM	6	51	9	0	16	61	4	0	5	18	8	0	27	15	10	0	230	2683
5:15 PM	4	62	10	0	14	69	6	0	13	18	1	0	33	11	8	0	249	2721
5:20 PM	7	68	11	0	15	41	6	1	5	17	5	0	21	10	11	0	218	2726
5:25 PM	7	51	14	0	19	52	5	0	4	18	7	0	21	16	16	0	230	2718
5:30 PM	5	55	16	0	19	31	3	0	3	19	1	0	14	12	12	0	190	2686
5:35 PM	3	46	9	1	6	39	5	0	7	10	2	0	12	7	4	0	151	2601
5:40 PM	3	52	14	0	17	46	5	0	4	17	4	0	15	4	5	0	186	2508
5:45 PM	6	60	13	0	12	43	7	0	12	9	2	0	9	4	5	0	182	2480
5:50 PM	2	42	7	0	10	60	5	0	4	7	3	0	12	9	9	0	170	2446
5:55 PM	9	49	8	0	14	41	4	0	4	9	6	0	16	8	2	0	170	2426
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	76	820	156	0	180	744	72	0	112	164	36	0	292	172	124	0	2948	
Heavy Trucks	0	16	4		0	8	4		0	0	0		4	0	0		36	
Buses																		
Pedestrians		0				4				0				12			16	
Bicycles	0	0	0		0	4	0		0	4	0		0	0	0		8	
Scoters																		

Comments:

LOCATION: SE Hiddenbrook Dr -- SE 34th St
CITY/STATE: Vancouver, WA

QC JOB #: 16019613
DATE: Tue, Dec 6 2022

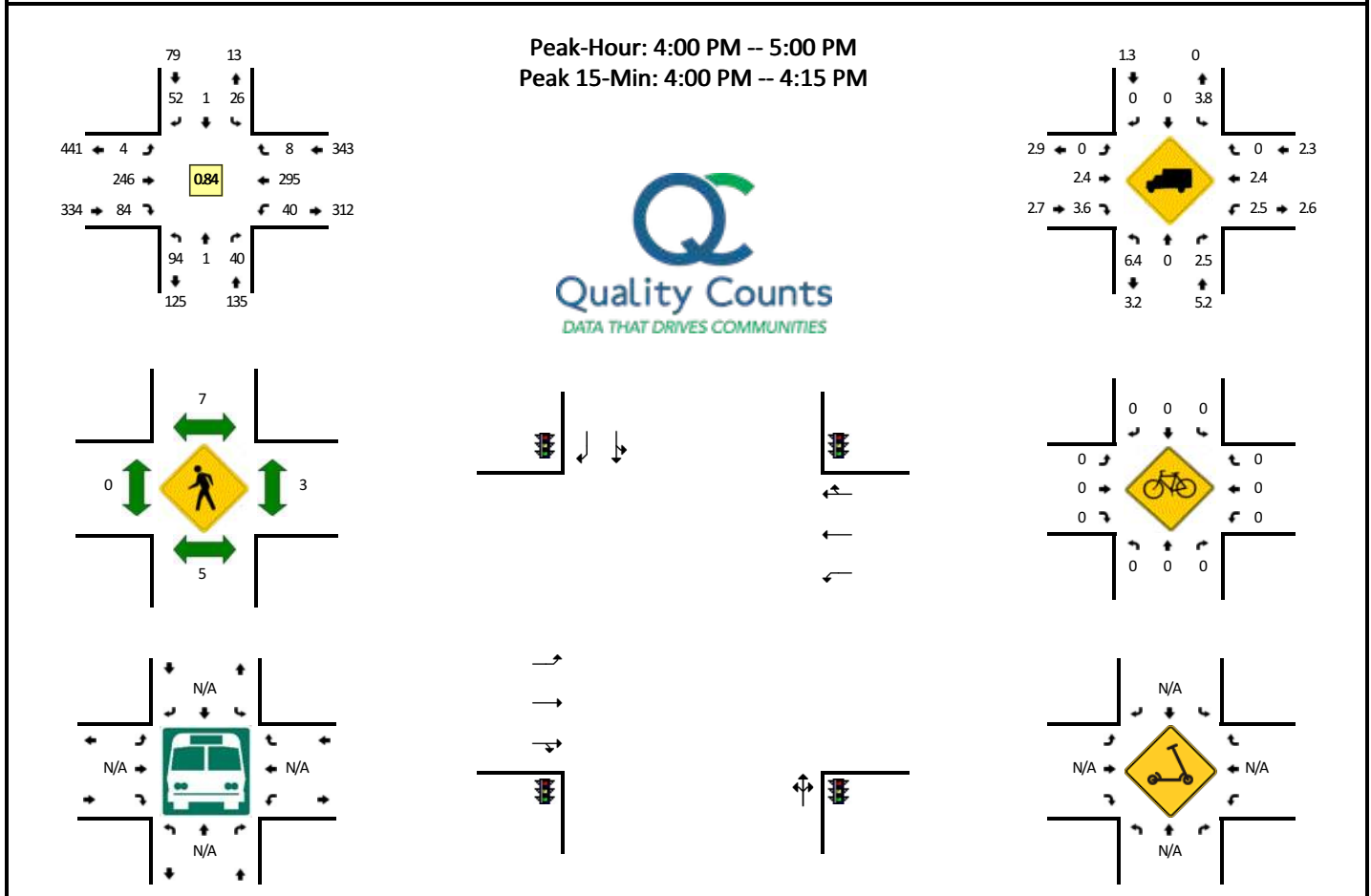


5-Min Count Period Beginning At	SE Hiddenbrook Dr (Northbound)				SE Hiddenbrook Dr (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	2	0	3	0	0	0	0	0	1	12	0	0	0	9	0	0	27	
7:05 AM	5	0	0	0	1	0	0	0	3	16	0	0	0	8	3	0	36	
7:10 AM	1	0	1	0	0	0	0	0	1	12	0	0	0	11	2	0	28	
7:15 AM	4	0	2	0	0	0	0	0	3	9	2	0	0	16	1	0	37	
7:20 AM	5	0	0	0	0	0	0	0	3	10	0	0	2	11	2	0	33	
7:25 AM	3	1	2	0	0	0	0	0	1	13	1	0	1	14	2	0	38	
7:30 AM	4	0	3	0	0	0	0	0	1	17	0	0	0	20	3	0	48	
7:35 AM	5	0	2	0	0	0	0	0	4	18	1	0	2	9	2	0	43	
7:40 AM	3	0	4	0	0	0	0	0	2	21	3	0	1	12	6	0	52	
7:45 AM	7	0	6	0	0	0	0	0	2	26	1	0	4	17	4	0	67	
7:50 AM	1	0	2	0	2	0	1	0	5	21	3	0	3	16	2	0	56	
7:55 AM	2	0	3	0	0	0	0	0	4	28	3	0	6	23	4	0	73	538
8:00 AM	7	0	2	0	0	0	0	0	3	14	1	0	2	16	3	0	48	559
8:05 AM	5	1	2	0	1	0	0	0	3	11	3	0	3	15	2	0	46	569
8:10 AM	12	0	1	0	0	0	0	0	3	8	2	0	1	23	4	0	54	595
8:15 AM	7	0	6	0	1	0	0	0	5	21	2	0	0	14	1	0	57	615
8:20 AM	5	0	5	0	0	0	0	0	2	21	2	0	1	12	2	0	50	632
8:25 AM	5	0	2	0	0	0	1	0	2	12	3	0	2	9	3	0	39	633
8:30 AM	4	1	2	0	0	0	0	0	4	16	3	0	4	13	0	0	47	632
8:35 AM	4	0	1	0	0	0	1	0	1	10	6	0	3	13	4	0	43	632
8:40 AM	9	0	0	0	0	0	1	0	2	19	5	0	2	11	2	0	51	631
8:45 AM	2	0	4	0	0	0	0	0	6	17	1	0	4	18	1	0	53	617
8:50 AM	4	0	3	0	0	0	0	0	4	15	5	0	4	19	2	0	56	617
8:55 AM	4	0	1	0	0	0	0	0	1	16	8	0	2	13	1	0	46	590
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	40	0	44	0	8	0	4	0	44	300	28	0	52	224	40	0	784	
Heavy Trucks	0	0	0	0	0	0	0	0	0	12	0	0	0	8	0	0	20	
Buses																		
Pedestrians		12				0				0				0			12	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

LOCATION: SE Hiddenbrook Dr -- SE 34th St
CITY/STATE: Vancouver, WA

QC JOB #: 16019614
DATE: Tue, Dec 6 2022

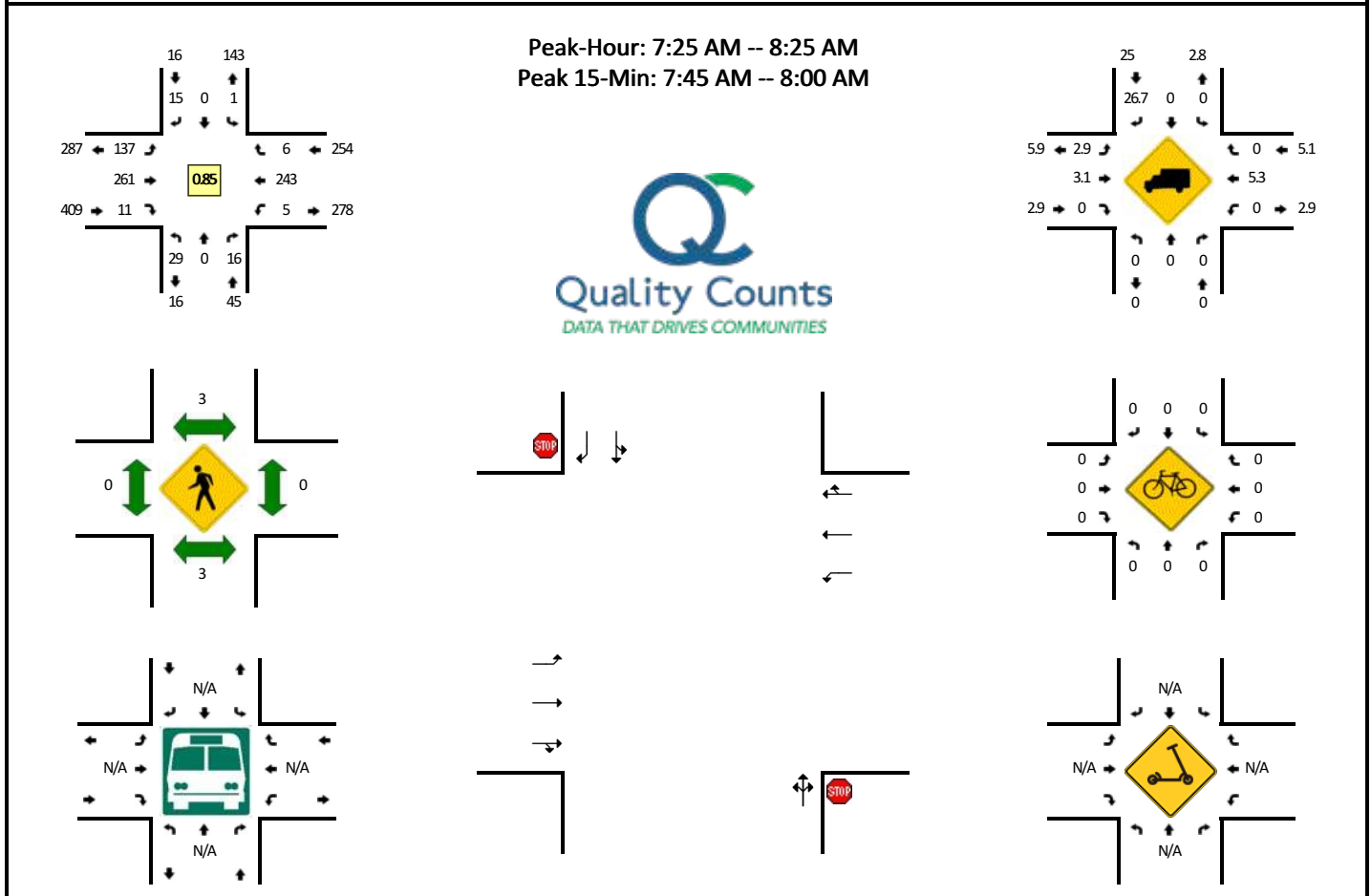


5-Min Count Period Beginning At	SE Hiddenbrook Dr (Northbound)				SE Hiddenbrook Dr (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	21	0	11	0	0	0	5	0	0	24	9	0	4	26	0	0	100	
4:05 PM	10	0	4	0	4	0	4	0	1	11	6	0	3	28	3	0	74	
4:10 PM	4	0	3	0	1	0	3	0	0	27	10	0	4	39	0	0	91	
4:15 PM	6	0	4	0	1	0	3	0	0	15	7	0	2	18	0	0	56	
4:20 PM	8	0	4	0	4	0	4	0	1	25	8	0	1	15	0	0	70	
4:25 PM	13	1	2	0	1	0	4	0	0	17	8	0	3	20	1	0	70	
4:30 PM	3	0	1	0	3	0	1	0	0	20	6	0	3	22	0	0	59	
4:35 PM	10	0	2	0	5	0	12	0	0	21	5	0	5	25	0	0	85	
4:40 PM	2	0	3	0	1	0	6	0	0	23	6	0	3	29	0	0	73	
4:45 PM	1	0	0	0	1	1	2	0	0	24	7	0	4	25	3	0	68	
4:50 PM	13	0	3	0	4	0	4	0	1	22	6	0	4	23	1	0	81	
4:55 PM	3	0	3	0	1	0	4	0	1	17	6	0	4	25	0	0	64	891
5:00 PM	3	0	5	0	1	0	9	0	0	23	6	0	3	33	1	0	84	875
5:05 PM	4	0	3	0	4	1	4	0	0	16	5	0	2	18	2	0	59	860
5:10 PM	4	0	0	0	3	1	6	0	1	30	12	0	1	30	0	0	88	857
5:15 PM	7	0	4	0	5	0	2	0	0	23	5	0	1	21	0	0	68	869
5:20 PM	5	0	1	0	2	0	3	0	0	20	7	0	2	24	0	0	64	863
5:25 PM	6	0	3	0	2	0	2	0	1	24	4	0	4	23	1	0	70	863
5:30 PM	7	0	1	0	0	0	7	0	0	19	2	0	2	19	0	0	57	861
5:35 PM	1	0	2	0	1	0	7	0	1	19	7	0	2	20	0	0	60	836
5:40 PM	1	0	1	0	2	0	8	0	1	29	3	0	1	12	2	0	60	823
5:45 PM	1	0	0	0	1	0	4	0	0	21	4	0	5	14	0	0	50	805
5:50 PM	3	0	0	0	1	0	2	0	0	15	4	0	0	15	0	0	40	764
5:55 PM	2	0	4	0	1	0	1	0	0	10	5	0	4	22	0	0	49	749
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	140	0	72	0	20	0	48	0	4	248	100	0	44	372	12	0	1060	
Heavy Trucks	16	0	4		4	0	0		0	4	4		0	12	0		44	
Buses																		
Pedestrians		4				4				0				4			12	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

LOCATION: SE 177th Ave -- SE 34th St
CITY/STATE: Vancouver, WA

QC JOB #: 16019611
DATE: Tue, Dec 6 2022

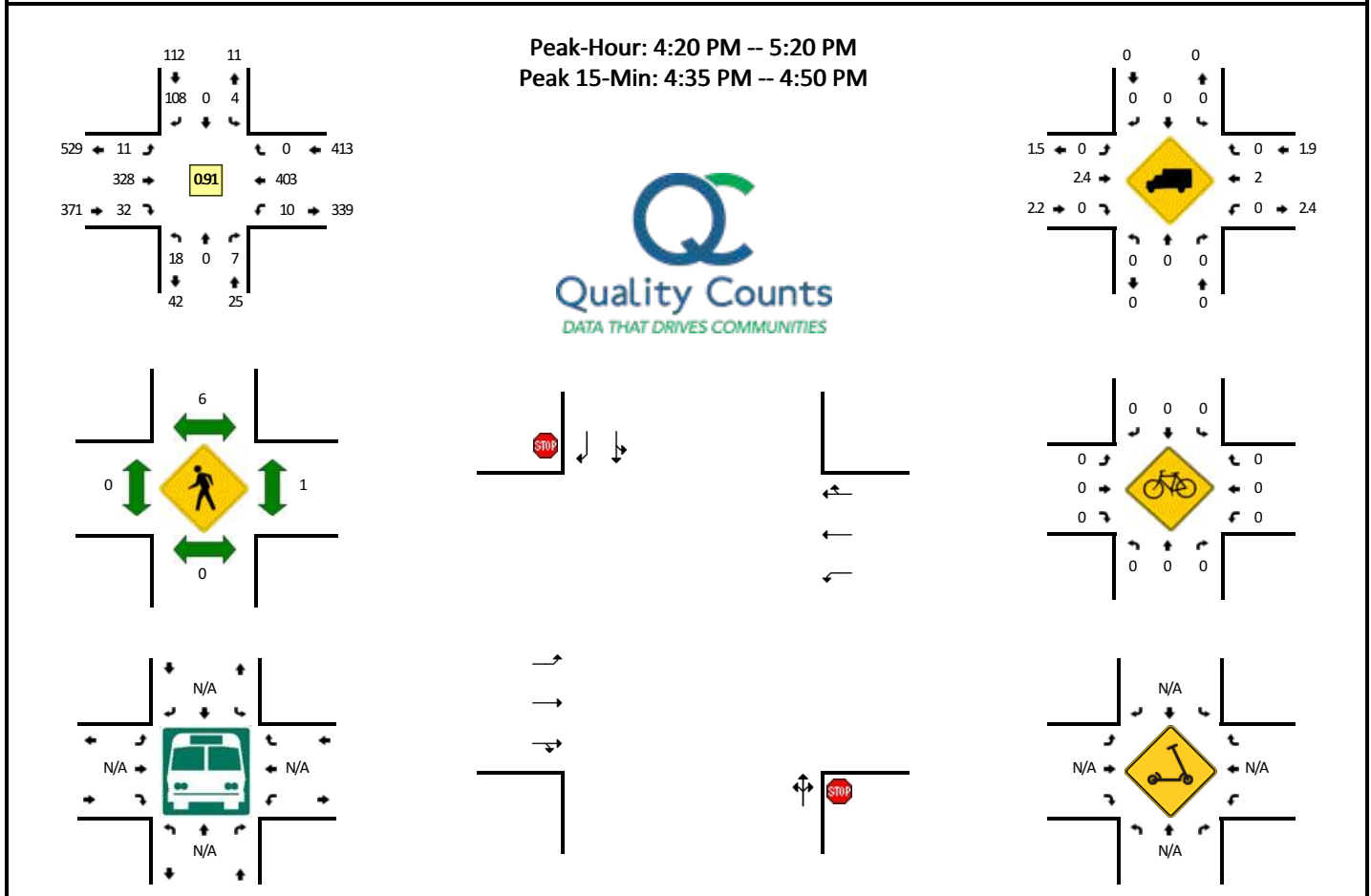


5-Min Count Period Beginning At	SE 177th Ave (Northbound)				SE 177th Ave (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	2	0	1	0	0	0	0	0	6	13	0	0	1	10	1	0	34	
7:05 AM	2	0	1	0	0	0	0	0	5	18	0	0	0	12	1	0	39	
7:10 AM	1	0	1	0	0	0	0	0	4	11	1	0	0	12	0	0	30	
7:15 AM	4	0	2	0	0	0	0	0	6	13	0	0	1	16	0	0	42	
7:20 AM	1	0	0	0	0	0	0	0	4	13	0	0	0	18	0	0	36	
7:25 AM	4	0	0	0	0	0	1	0	10	17	0	0	0	17	0	0	49	
7:30 AM	4	0	2	0	0	0	3	0	7	13	1	0	0	23	0	0	53	
7:35 AM	5	0	1	0	0	0	1	0	6	21	2	0	0	16	0	0	52	
7:40 AM	1	0	0	0	0	0	1	0	16	28	1	0	0	15	0	0	62	
7:45 AM	3	0	1	0	0	0	0	0	11	31	2	0	1	21	1	0	71	
7:50 AM	1	0	3	0	0	0	0	0	13	28	1	0	0	16	0	0	62	
7:55 AM	2	0	2	0	0	0	2	0	19	27	1	0	1	25	1	0	80	610
8:00 AM	1	0	1	0	1	0	1	0	16	16	0	0	1	22	0	0	59	635
8:05 AM	2	0	1	0	0	0	1	0	10	18	0	0	0	16	2	0	50	646
8:10 AM	2	0	0	0	0	0	3	0	12	15	0	0	1	32	1	0	66	682
8:15 AM	2	0	2	0	0	0	0	0	10	25	1	0	0	23	1	0	64	704
8:20 AM	2	0	3	0	0	0	2	0	7	22	2	0	1	17	0	0	56	724
8:25 AM	0	0	0	0	0	0	0	0	11	16	1	0	0	14	1	0	43	718
8:30 AM	0	0	0	0	1	0	3	0	7	23	2	0	1	14	0	0	51	716
8:35 AM	1	0	0	0	0	0	0	0	4	15	0	0	0	18	0	0	38	702
8:40 AM	4	0	3	0	0	0	1	0	9	22	0	0	0	21	0	0	60	700
8:45 AM	2	0	1	0	0	0	0	0	5	22	0	0	0	14	0	0	44	673
8:50 AM	2	0	1	0	0	0	0	0	7	25	1	0	0	27	2	0	65	676
8:55 AM	1	0	0	0	0	0	1	0	8	27	1	0	1	15	0	0	54	650
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	24	0	24	0	0	0	8	0	172	344	16	0	8	248	8	0	852	
Heavy Trucks	0	0	0	0	0	0	4	0	0	12	0	0	0	8	0	0	24	
Buses																		
Pedestrians		4				0				0				0			4	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scoters																		

Comments:

LOCATION: SE 177th Ave -- SE 34th St
CITY/STATE: Vancouver, WA

QC JOB #: 16019612
DATE: Tue, Dec 6 2022

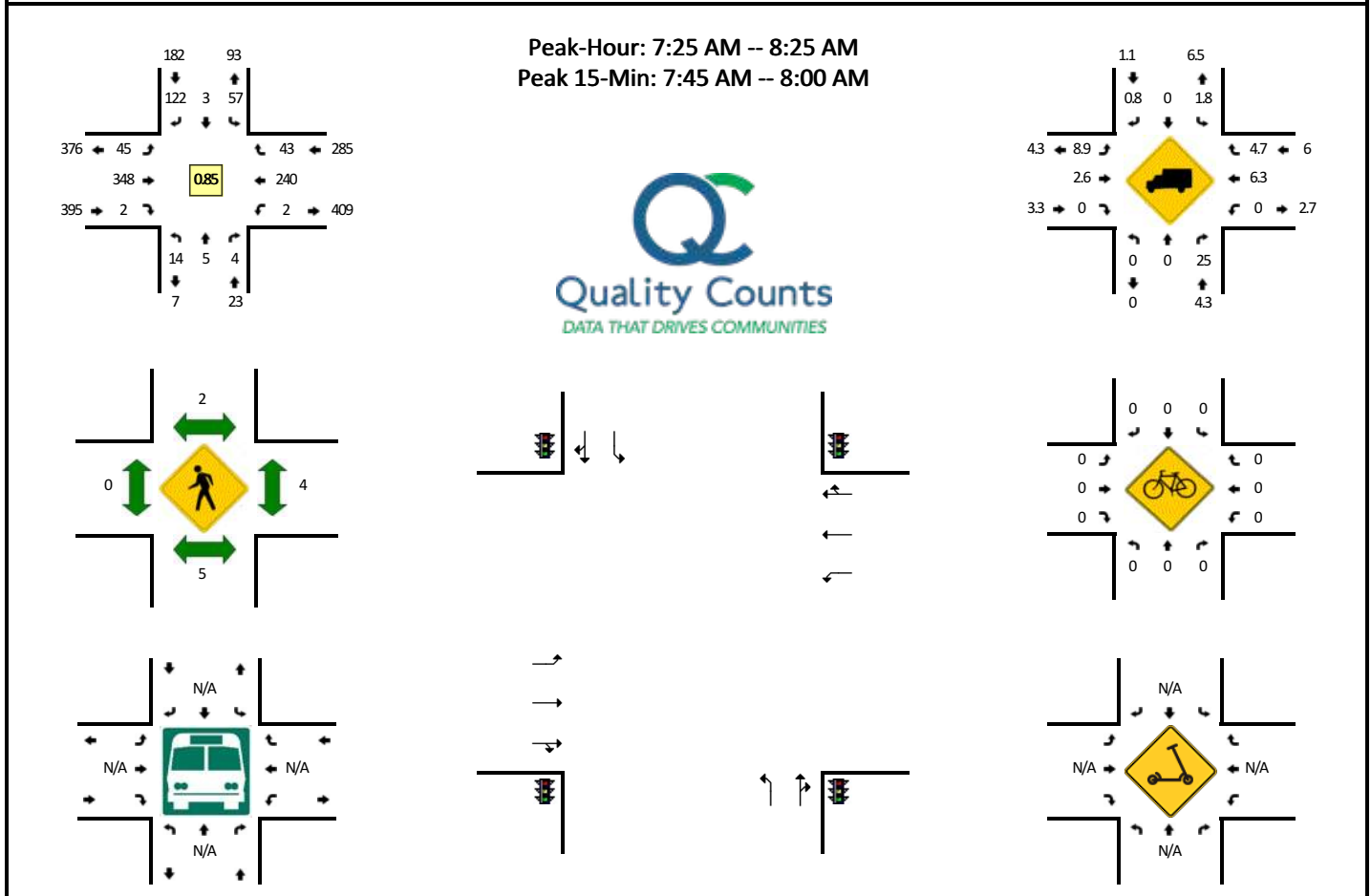


5-Min Count Period Beginning At	SE 177th Ave (Northbound)				SE 177th Ave (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	0	0	0	0	0	4	0	0	29	2	0	1	49	1	0	88	
4:05 PM	1	0	1	0	0	0	10	0	0	20	1	0	1	39	0	0	73	
4:10 PM	2	0	0	0	0	0	5	0	0	32	1	0	1	47	1	0	89	
4:15 PM	0	0	0	0	1	0	9	0	0	25	1	0	1	28	0	0	65	
4:20 PM	1	0	1	0	1	0	8	0	2	26	4	0	0	27	0	0	70	
4:25 PM	1	0	0	0	0	0	5	0	1	29	1	0	1	35	0	0	73	
4:30 PM	1	0	0	0	0	0	7	0	3	21	4	0	0	24	0	0	60	
4:35 PM	1	0	0	0	0	0	12	0	0	29	4	0	1	44	0	0	91	
4:40 PM	4	0	0	0	1	0	20	0	0	25	1	0	0	41	0	0	92	
4:45 PM	2	0	0	0	0	0	6	0	0	36	2	0	1	23	0	0	70	
4:50 PM	1	0	0	0	0	0	3	0	2	24	3	0	2	38	0	0	73	
4:55 PM	0	0	1	0	1	0	10	0	0	23	2	0	0	38	0	0	75	919
5:00 PM	3	0	1	0	0	0	12	0	0	27	3	0	0	42	0	0	88	919
5:05 PM	3	0	0	0	0	0	11	0	1	28	1	0	0	24	0	0	68	914
5:10 PM	0	0	1	0	1	0	5	0	0	34	5	0	3	40	0	0	89	914
5:15 PM	1	0	3	0	0	0	9	0	2	26	2	0	2	27	0	0	72	921
5:20 PM	0	0	2	0	1	0	5	0	0	23	1	0	1	34	0	0	67	918
5:25 PM	0	0	0	0	0	0	6	0	0	27	3	0	0	32	0	0	68	913
5:30 PM	0	0	1	0	0	0	2	0	0	24	4	0	0	28	0	0	59	912
5:35 PM	2	0	0	0	0	0	4	0	0	24	6	0	0	31	0	0	67	888
5:40 PM	0	0	0	0	0	0	6	0	0	30	2	0	0	22	0	0	60	856
5:45 PM	3	0	1	0	1	0	3	0	2	24	3	0	3	16	0	0	56	842
5:50 PM	1	0	0	0	0	0	7	0	1	17	1	0	0	21	0	0	48	817
5:55 PM	0	0	0	0	0	0	0	0	0	17	4	0	0	24	0	0	45	787
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	28	0	0	0	4	0	152	0	0	360	28	0	8	432	0	0	1012	
Heavy Trucks	0	0	0	0	0	0	0	0	0	8	0	0	0	4	0	0	12	
Buses																		
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scoters																		

Comments:

LOCATION: SE 176th Ave -- SE 34th St
CITY/STATE: Vancouver, WA

QC JOB #: 16019609
DATE: Tue, Dec 6 2022

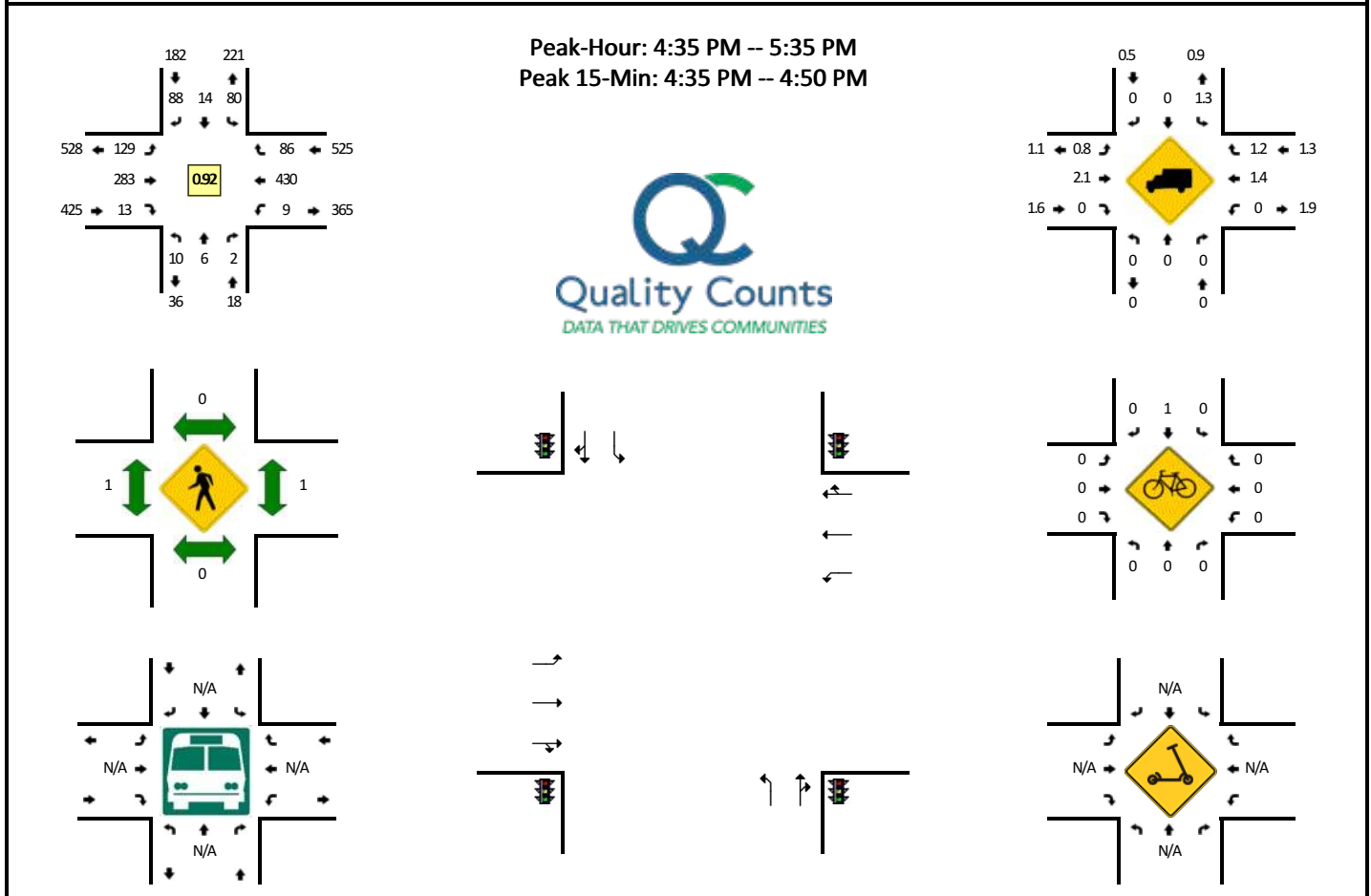


5-Min Count Period Beginning At	SE 176th Ave (Northbound)				SE 176th Ave (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	1	0	0	3	0	6	0	2	15	0	0	1	10	1	0	40	
7:05 AM	3	2	1	0	2	0	10	0	4	20	0	0	0	12	2	0	56	
7:10 AM	2	2	0	0	1	0	11	0	2	15	0	0	0	11	1	0	45	
7:15 AM	2	2	0	0	1	0	7	0	3	18	0	0	0	18	3	0	54	
7:20 AM	1	1	0	0	0	0	8	0	4	16	1	0	0	16	3	0	50	
7:25 AM	1	0	0	0	2	0	10	0	5	25	0	0	0	20	2	0	65	
7:30 AM	1	0	1	0	3	0	10	0	3	20	0	0	0	24	4	0	66	
7:35 AM	2	1	0	0	4	0	10	0	1	23	0	0	0	19	4	0	64	
7:40 AM	2	0	1	0	3	0	13	0	3	41	0	0	0	14	4	0	81	
7:45 AM	0	0	1	0	7	0	14	0	9	35	0	0	0	20	4	0	90	
7:50 AM	2	1	0	0	6	1	8	0	4	37	1	0	0	14	3	0	77	
7:55 AM	1	1	1	0	5	0	10	0	5	42	0	0	2	24	3	0	94	782
8:00 AM	1	0	0	0	3	1	12	0	6	28	0	0	0	21	2	0	74	816
8:05 AM	1	0	0	0	4	0	8	0	3	23	1	0	0	18	3	0	61	821
8:10 AM	1	1	0	0	2	1	10	0	2	27	0	0	0	30	6	0	80	856
8:15 AM	0	0	0	0	10	0	6	0	2	26	0	0	0	22	3	0	69	871
8:20 AM	2	1	0	0	8	0	11	0	2	21	0	0	0	14	5	0	64	885
8:25 AM	2	1	0	0	1	0	8	0	1	27	0	0	0	13	3	0	56	876
8:30 AM	0	0	0	0	7	0	8	0	2	27	0	0	0	10	6	0	60	870
8:35 AM	3	0	0	0	0	0	10	0	2	20	1	0	1	16	3	0	56	862
8:40 AM	0	0	0	0	8	1	20	0	2	21	2	0	0	20	7	0	81	862
8:45 AM	1	1	0	0	3	0	5	0	3	25	1	0	0	14	2	0	55	827
8:50 AM	3	0	0	0	5	1	8	0	4	35	0	0	0	24	5	0	85	835
8:55 AM	0	2	0	0	6	0	4	0	4	23	0	0	1	12	5	0	57	798
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	12	8	8	0	72	4	128	0	72	456	4	0	8	232	40	0	1044	
Heavy Trucks	0	0	0	0	4	0	0	0	0	8	0	0	0	8	4	0	24	
Buses																		
Pedestrians		8				4				0				4			16	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

LOCATION: SE 176th Ave -- SE 34th St
CITY/STATE: Vancouver, WA

QC JOB #: 16019610
DATE: Tue, Dec 6 2022

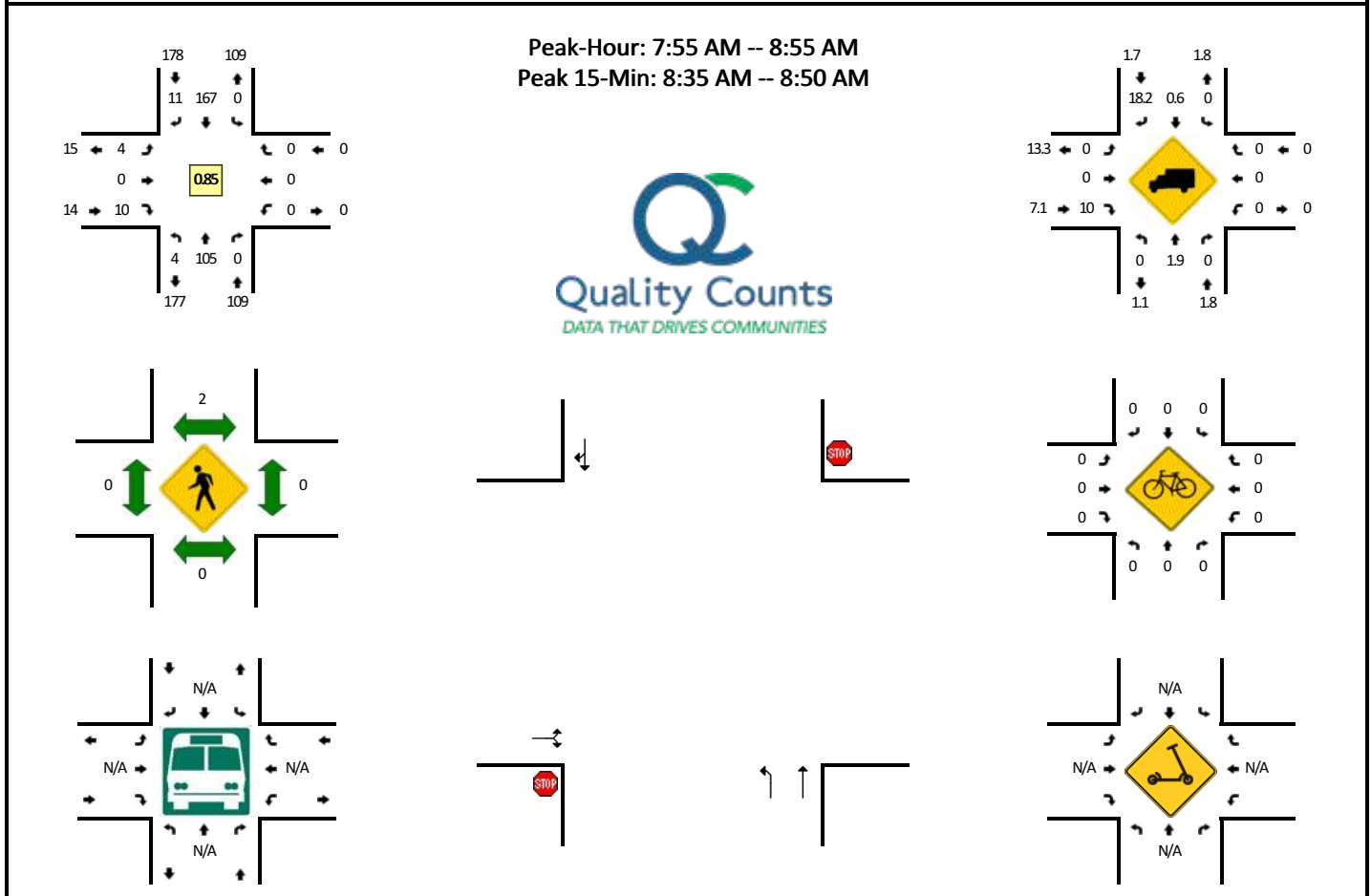


5-Min Count Period Beginning At	SE 176th Ave (Northbound)				SE 176th Ave (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	1	0	0	0	11	1	4	0	12	19	0	0	0	46	9	0	103	
4:05 PM	5	2	0	0	6	2	9	0	6	13	4	0	0	36	11	0	94	
4:10 PM	3	0	0	0	7	2	7	0	5	27	2	0	1	45	11	0	110	
4:15 PM	0	1	0	0	9	0	4	0	6	17	0	0	1	29	8	0	75	
4:20 PM	0	1	0	0	7	0	3	0	13	25	0	0	0	29	7	0	85	
4:25 PM	1	0	0	0	7	0	4	0	10	25	0	0	0	33	7	0	87	
4:30 PM	1	0	0	0	6	2	5	0	11	22	1	0	0	18	11	0	77	
4:35 PM	1	0	0	0	7	0	10	0	6	26	1	0	1	51	9	0	112	
4:40 PM	0	1	0	0	8	1	11	0	11	19	0	0	0	46	10	0	107	
4:45 PM	1	0	0	0	5	2	4	0	9	33	2	0	0	36	3	0	95	
4:50 PM	1	2	0	0	5	2	14	0	11	24	2	0	0	32	9	0	102	
4:55 PM	1	0	2	0	5	1	6	0	8	19	2	0	2	36	9	0	91	1138
5:00 PM	1	0	0	0	7	0	9	0	14	24	1	0	0	51	5	0	112	1147
5:05 PM	0	0	0	0	1	1	5	0	9	26	0	0	1	31	8	0	82	1135
5:10 PM	0	1	0	0	19	3	3	0	7	22	1	0	2	37	5	0	100	1125
5:15 PM	0	0	0	0	5	1	3	0	10	24	1	0	2	29	5	0	80	1130
5:20 PM	3	0	0	0	5	2	5	0	17	19	2	0	1	25	8	0	87	1132
5:25 PM	1	1	0	0	5	0	10	0	13	25	1	0	0	33	8	0	97	1142
5:30 PM	1	1	0	0	8	1	8	0	14	22	0	0	0	23	7	0	85	1150
5:35 PM	2	2	0	0	4	1	13	0	14	24	1	0	0	29	8	0	98	1136
5:40 PM	1	2	1	0	11	1	7	0	9	21	3	0	0	25	2	0	83	1112
5:45 PM	4	0	0	0	4	2	6	0	11	26	4	0	0	21	1	0	79	1096
5:50 PM	1	0	0	0	6	2	3	0	14	12	0	0	0	22	9	0	69	1063
5:55 PM	0	1	0	0	7	2	7	0	5	14	1	0	0	15	7	0	59	1031
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	8	4	0	0	80	12	100	0	104	312	12	0	4	532	88	0	1256	
Heavy Trucks	0	0	0	0	0	0	0	0	0	8	0	0	0	4	0	0	12	
Buses																		
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

LOCATION: SE 176th Ave -- SE 29th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050509
DATE: Tue, Jan 10 2023

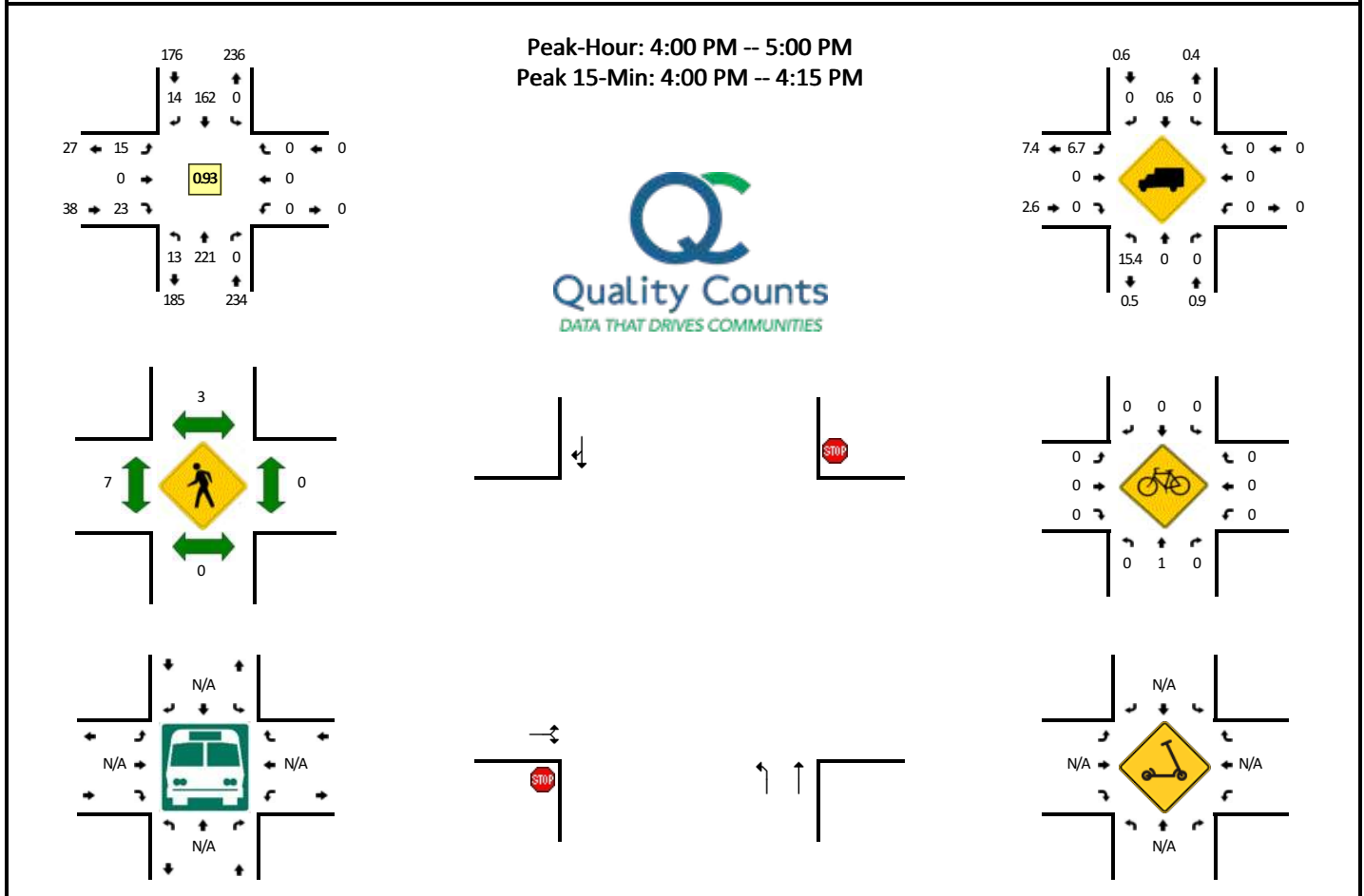


5-Min Count Period Beginning At	SE 176th Ave (Northbound)				SE 176th Ave (Southbound)				SE 29th St (Eastbound)				SE 29th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	6	0	0	0	12	0	0	1	0	0	0	0	0	0	0	20	
7:05 AM	0	3	0	0	0	12	1	0	0	0	0	0	0	0	0	0	16	
7:10 AM	1	9	0	0	0	11	3	0	3	0	1	0	0	0	0	0	28	
7:15 AM	0	7	0	0	0	11	1	0	0	0	0	0	0	0	0	0	19	
7:20 AM	1	7	0	0	0	13	0	0	0	0	0	0	0	0	0	0	21	
7:25 AM	0	8	0	0	0	3	1	0	2	0	0	0	0	0	0	0	14	
7:30 AM	0	4	0	0	0	8	1	0	1	0	0	0	0	0	0	0	14	
7:35 AM	0	7	0	0	0	12	0	0	1	0	0	0	0	0	0	0	20	
7:40 AM	0	6	0	0	0	9	1	0	0	0	2	0	0	0	0	0	18	
7:45 AM	0	4	0	0	0	6	0	0	2	0	1	0	0	0	0	0	13	
7:50 AM	1	7	0	0	0	7	0	0	2	0	0	0	0	0	0	0	17	
7:55 AM	0	7	0	0	0	17	2	0	0	0	1	0	0	0	0	0	27	227
8:00 AM	0	11	0	0	0	13	2	0	0	0	1	0	0	0	0	0	27	234
8:05 AM	0	8	0	0	0	13	1	0	0	0	2	0	0	0	0	0	24	242
8:10 AM	0	6	0	0	0	14	0	0	1	0	0	0	0	0	0	0	21	235
8:15 AM	0	9	0	0	0	14	1	0	0	0	0	0	0	0	0	0	24	240
8:20 AM	0	11	0	0	0	12	0	0	0	0	1	0	0	0	0	0	24	243
8:25 AM	1	7	0	0	0	13	0	0	1	0	0	0	0	0	0	0	22	251
8:30 AM	0	6	0	0	0	12	1	0	0	0	0	0	0	0	0	0	19	256
8:35 AM	0	9	0	0	0	14	0	0	1	0	1	0	0	0	0	0	25	261
8:40 AM	1	13	0	0	0	16	2	0	1	0	2	0	0	0	0	0	35	278
8:45 AM	1	12	0	0	0	12	2	0	0	0	2	0	0	0	0	0	29	294
8:50 AM	1	6	0	0	0	17	0	0	0	0	0	0	0	0	0	0	24	301
8:55 AM	1	6	0	0	0	8	0	0	0	0	3	0	0	0	0	0	18	292
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	8	136	0	0	0	168	16	0	8	0	20	0	0	0	0	0	356	
Heavy Trucks	0	4	0	0	0	0	0	0	0	0	4	0	0	0	0	0	8	
Buses																		
Pedestrians		0				4				0				0			4	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

LOCATION: SE 176th Ave -- SE 29th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050510
DATE: Tue, Jan 10 2023

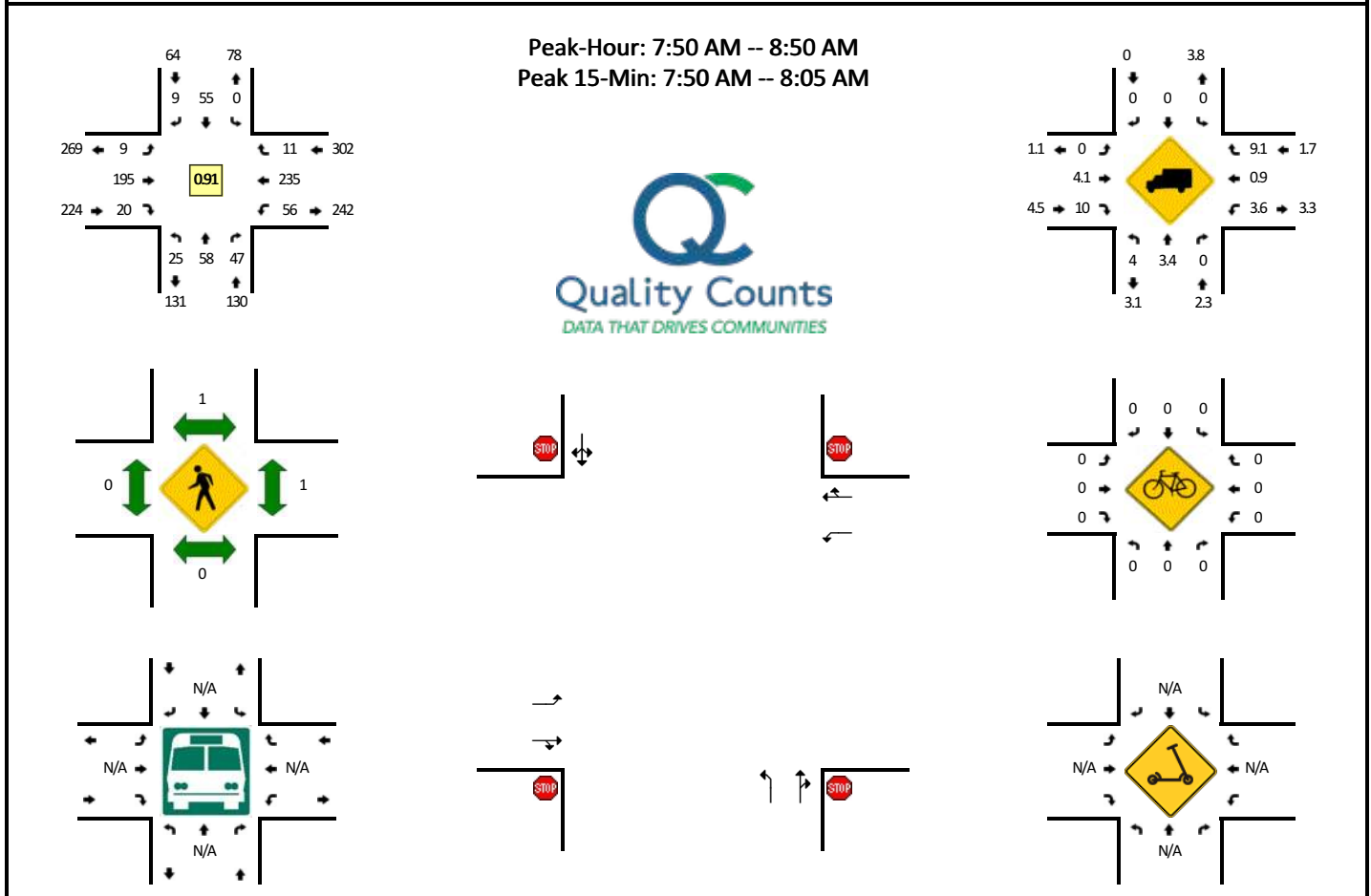


5-Min Count Period Beginning At	SE 176th Ave (Northbound)				SE 176th Ave (Southbound)				SE 29th St (Eastbound)				SE 29th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	21	0	0	0	11	0	0	4	0	2	0	0	0	0	0	40	
4:05 PM	0	21	0	0	0	14	4	0	2	0	2	0	0	0	0	0	43	
4:10 PM	0	19	0	0	0	12	3	0	0	0	3	0	0	0	0	0	37	
4:15 PM	2	18	0	0	0	12	2	0	1	0	1	0	0	0	0	0	36	
4:20 PM	2	18	0	0	0	11	1	0	1	0	1	0	0	0	0	0	34	
4:25 PM	0	18	0	0	0	10	1	0	2	0	0	0	0	0	0	0	31	
4:30 PM	1	24	0	0	0	17	3	0	1	0	3	0	0	0	0	0	49	
4:35 PM	3	15	0	0	0	15	0	0	1	0	4	0	0	0	0	0	38	
4:40 PM	1	11	0	0	0	12	0	0	1	0	3	0	0	0	0	0	28	
4:45 PM	1	22	0	0	0	17	0	0	0	0	4	0	0	0	0	0	44	
4:50 PM	1	14	0	0	0	20	0	0	1	0	0	0	0	0	0	0	36	
4:55 PM	0	20	0	0	0	11	0	0	1	0	0	0	0	0	0	0	32	448
5:00 PM	0	19	0	0	0	13	3	0	2	0	0	0	0	0	0	0	37	445
5:05 PM	0	22	0	0	0	13	1	0	1	0	1	0	0	0	0	0	38	440
5:10 PM	2	12	0	0	0	7	1	0	1	0	1	0	0	0	0	0	24	427
5:15 PM	2	15	0	0	0	10	2	0	2	0	0	0	0	0	0	0	31	422
5:20 PM	1	14	0	0	0	15	2	0	2	0	1	0	0	0	0	0	35	423
5:25 PM	0	18	0	0	0	10	3	0	1	0	1	0	0	0	0	0	33	425
5:30 PM	0	12	0	0	0	12	2	0	3	0	1	0	0	0	0	0	30	406
5:35 PM	0	16	0	0	0	15	1	0	0	0	0	0	0	0	0	0	32	400
5:40 PM	0	15	0	0	0	12	1	0	4	0	2	0	0	0	0	0	34	406
5:45 PM	0	20	0	0	0	10	0	0	1	0	1	0	0	0	0	0	32	394
5:50 PM	0	16	0	0	0	12	1	0	3	0	1	0	0	0	0	0	33	391
5:55 PM	0	19	0	0	0	12	2	0	0	0	0	0	0	0	0	0	33	392
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	8	244	0	0	0	148	28	0	24	0	28	0	0	0	0	0	480	
Heavy Trucks	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	4	
Buses																		
Pedestrians	0				0				4				0				4	
Bicycles	0	4	0		0	0	0		0	0	0		0	0	0		4	
Scooters																		

Comments:

LOCATION: SE 176th Ave -- SE 20th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050507
DATE: Tue, Jan 10 2023

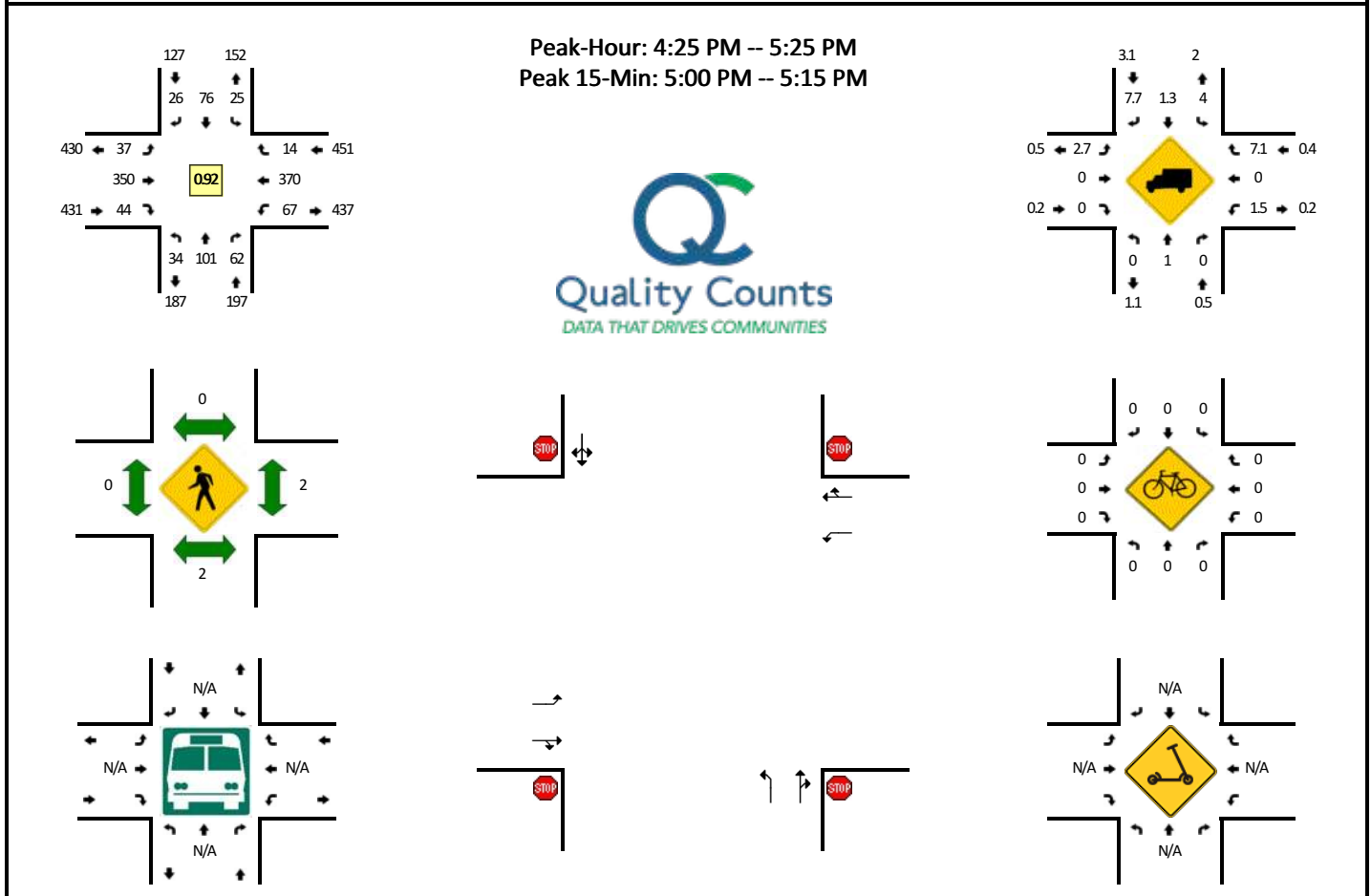


5-Min Count Period Beginning At	SE 176th Ave (Northbound)				SE 176th Ave (Southbound)				SE 20th St (Eastbound)				SE 20th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	2	3	0	0	4	3	0	1	12	1	0	3	8	0	0	38	
7:05 AM	0	0	2	0	1	3	3	0	1	11	2	0	3	10	2	0	38	
7:10 AM	1	2	3	0	0	4	3	0	0	14	1	0	3	14	0	0	45	
7:15 AM	0	2	2	0	0	4	1	0	0	8	1	0	5	12	1	0	36	
7:20 AM	1	2	0	0	0	5	2	0	0	19	1	0	1	18	0	0	49	
7:25 AM	1	4	6	0	0	4	0	0	0	17	2	0	5	10	0	0	49	
7:30 AM	1	2	3	0	0	4	1	0	1	11	1	0	5	18	2	0	49	
7:35 AM	0	6	6	0	0	7	1	0	0	15	0	0	4	8	0	0	47	
7:40 AM	3	3	6	0	1	5	3	0	1	21	1	0	5	22	3	0	74	
7:45 AM	1	1	4	0	1	5	1	0	0	13	0	0	4	15	1	0	46	
7:50 AM	1	7	4	0	0	3	1	0	0	27	3	0	7	19	1	0	73	
7:55 AM	5	5	4	0	0	10	0	0	1	13	1	0	5	18	2	0	64	608
8:00 AM	4	5	1	0	0	6	0	0	0	21	0	0	6	17	1	0	61	631
8:05 AM	1	3	5	0	0	5	2	0	0	13	4	0	1	27	1	0	62	655
8:10 AM	0	1	6	0	0	5	1	0	0	16	1	0	6	18	1	0	55	665
8:15 AM	1	6	2	0	0	2	0	0	1	8	2	0	3	22	1	0	48	677
8:20 AM	3	4	4	0	0	3	2	0	2	13	1	0	6	24	1	0	63	691
8:25 AM	1	7	4	0	0	6	0	0	1	14	2	0	3	20	1	0	59	701
8:30 AM	0	4	5	0	0	4	1	0	2	20	3	0	1	17	1	0	58	710
8:35 AM	2	4	2	0	0	2	1	0	1	18	0	0	3	17	1	0	51	714
8:40 AM	2	6	5	0	0	6	1	0	1	13	2	0	7	15	0	0	58	698
8:45 AM	5	6	5	0	0	3	0	0	0	19	1	0	8	21	0	0	68	720
8:50 AM	3	3	4	0	1	7	2	0	2	12	1	0	3	20	1	0	59	706
8:55 AM	0	2	2	0	1	3	0	0	1	10	4	0	0	22	1	0	46	688
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	40	68	36	0	0	76	4	0	4	244	16	0	72	216	16	0	792	
Heavy Trucks	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	8	
Buses																		
Pedestrians		0				0				0				4			4	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

LOCATION: SE 176th Ave -- SE 20th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050508
DATE: Tue, Jan 10 2023

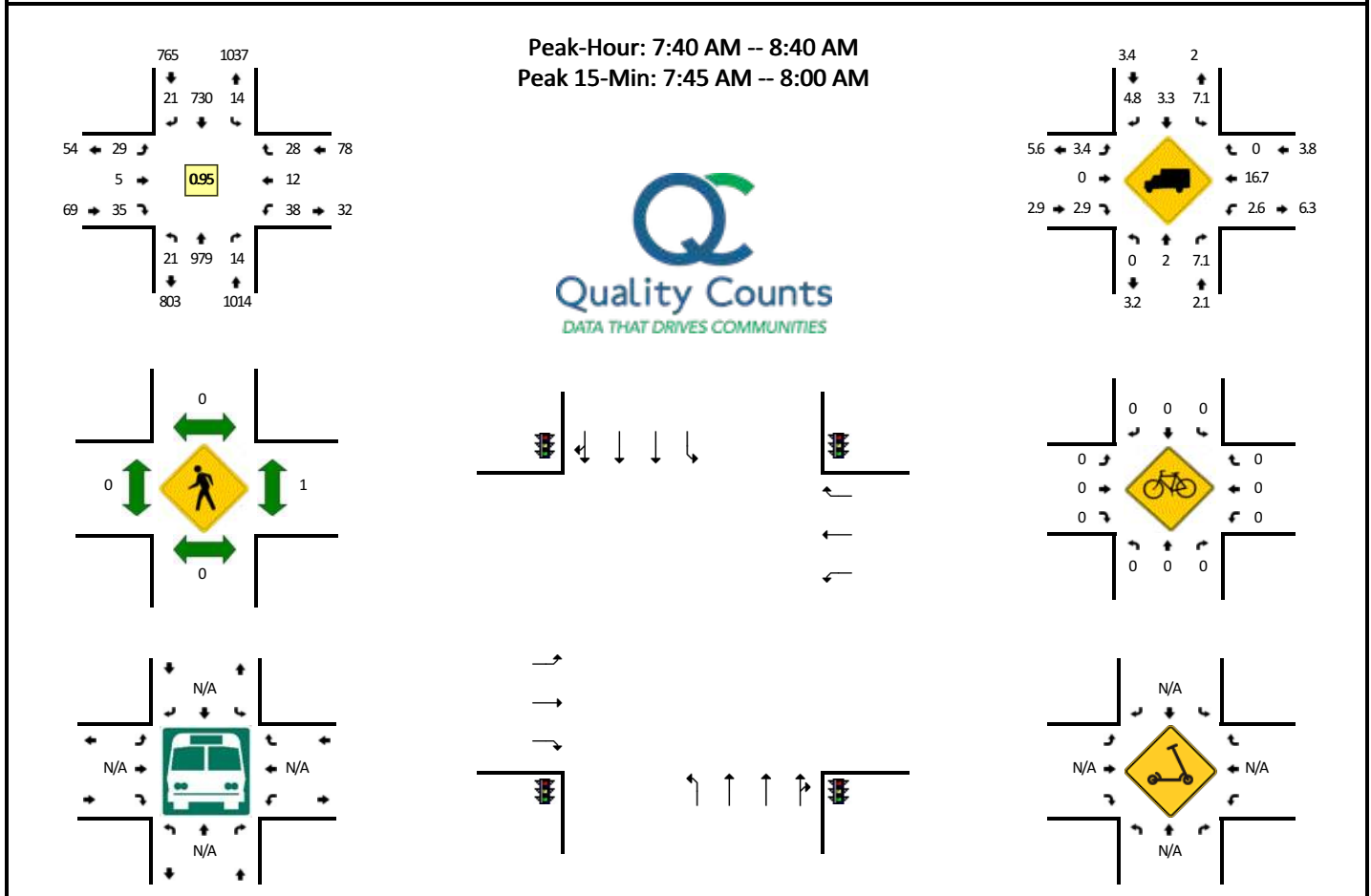


5-Min Count Period Beginning At	SE 176th Ave (Northbound)				SE 176th Ave (Southbound)				SE 20th St (Eastbound)				SE 20th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	6	5	0	3	10	2	0	4	31	0	0	3	32	1	0	99	
4:05 PM	2	9	8	0	1	11	1	0	2	35	1	0	6	37	1	0	114	
4:10 PM	3	3	9	0	4	3	2	0	1	30	2	0	2	33	1	0	93	
4:15 PM	2	5	7	0	0	8	2	0	5	18	2	0	7	23	1	0	80	
4:20 PM	4	3	10	0	0	5	1	0	2	23	2	0	1	27	0	0	78	
4:25 PM	2	3	3	0	1	6	5	0	2	32	5	0	4	36	1	0	100	
4:30 PM	4	12	9	0	2	6	3	0	7	20	2	0	8	30	0	0	103	
4:35 PM	0	9	5	0	2	7	2	0	2	20	3	0	3	35	1	0	89	
4:40 PM	2	10	3	0	3	8	1	0	4	30	2	0	5	24	3	0	95	
4:45 PM	4	8	7	0	2	3	3	0	2	33	6	0	4	21	0	0	93	
4:50 PM	3	10	5	0	1	7	2	0	4	26	4	0	4	38	1	0	105	
4:55 PM	9	12	3	0	3	4	3	0	3	31	2	0	5	29	0	0	104	1153
5:00 PM	3	10	9	0	0	6	0	0	5	23	7	0	7	36	0	0	106	1160
5:05 PM	2	8	5	0	3	13	1	0	1	34	6	0	10	32	2	0	117	1163
5:10 PM	3	6	4	0	2	3	3	0	2	36	3	0	6	35	2	0	105	1175
5:15 PM	2	5	3	0	3	8	1	0	2	34	2	0	5	27	1	0	93	1188
5:20 PM	0	8	6	0	3	5	2	0	3	31	2	0	6	27	3	0	96	1206
5:25 PM	2	11	4	0	1	9	4	0	3	21	2	0	5	29	1	0	92	1198
5:30 PM	2	5	4	0	1	7	1	0	1	26	2	0	5	27	1	0	82	1177
5:35 PM	1	2	5	0	2	8	1	0	1	19	1	0	9	22	2	0	73	1161
5:40 PM	1	7	9	0	2	3	3	0	6	25	2	0	7	21	2	0	88	1154
5:45 PM	2	5	9	0	2	2	2	0	2	28	2	0	4	22	1	0	81	1142
5:50 PM	3	8	8	0	0	4	0	0	2	19	3	0	4	28	1	0	80	1117
5:55 PM	2	6	11	0	1	8	2	0	3	15	2	0	0	22	2	0	74	1087
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	32	96	72	0	20	88	16	0	32	372	64	0	92	412	16	0	1312	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Buses																		
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scoters																		

Comments:

LOCATION: SE 164th Ave -- SE 29th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050511
DATE: Tue, Jan 10 2023

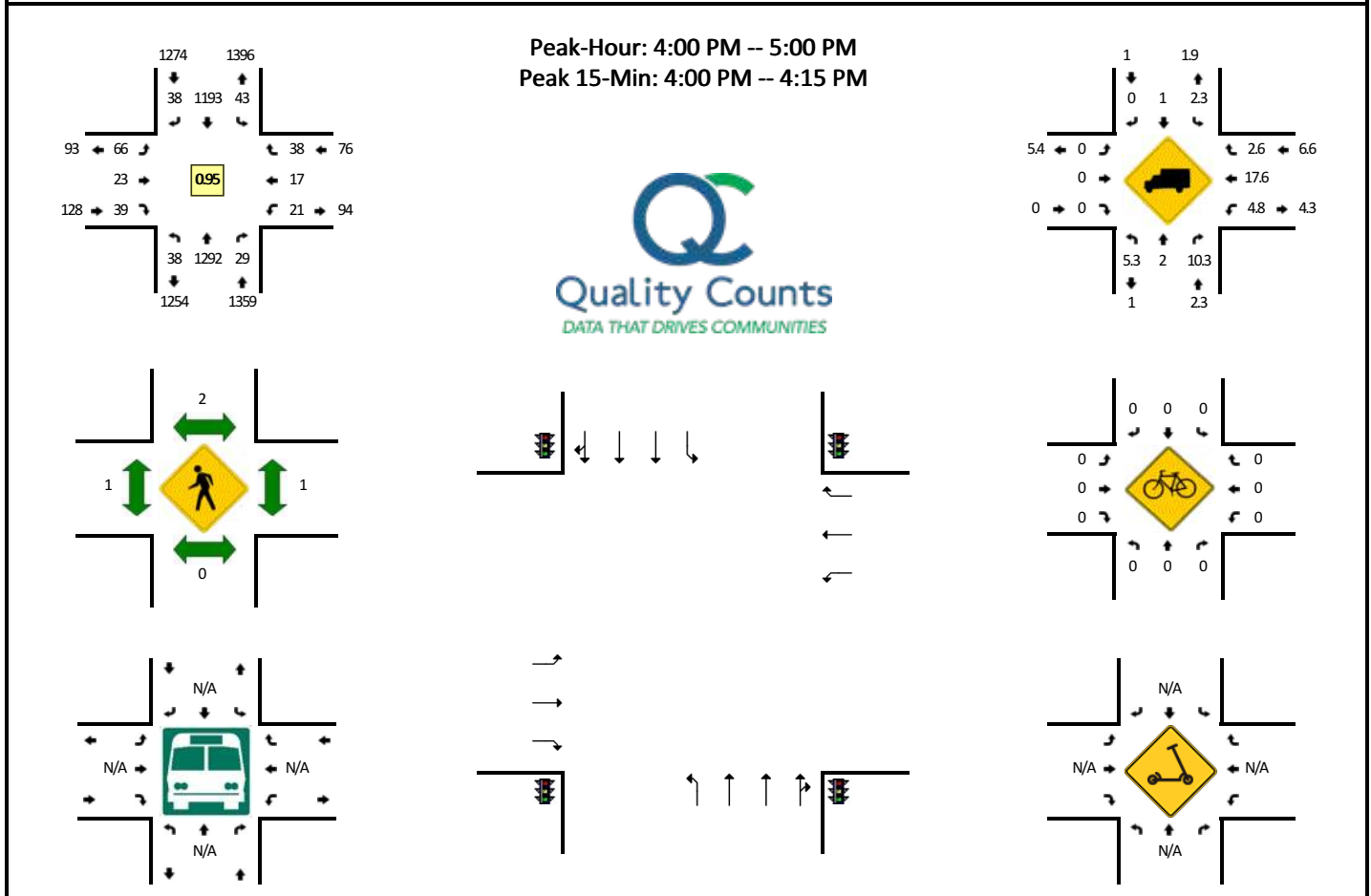


5-Min Count Period Beginning At	SE 164th Ave (Northbound)				SE 164th Ave (Southbound)				SE 29th St (Eastbound)				SE 29th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	3	25	0	0	0	54	1	0	0	1	0	0	5	1	2	0	92	
7:05 AM	1	26	0	0	1	71	2	0	2	0	1	0	3	0	2	0	109	
7:10 AM	0	39	0	0	0	46	1	1	0	0	4	0	10	0	4	0	105	
7:15 AM	2	50	2	0	1	59	1	0	0	1	1	0	5	1	1	0	124	
7:20 AM	0	41	1	0	2	60	1	1	1	0	1	0	7	0	1	0	116	
7:25 AM	1	60	1	0	3	67	5	0	0	0	0	0	3	2	1	0	143	
7:30 AM	1	67	3	0	1	47	3	0	1	0	3	0	2	2	2	0	132	
7:35 AM	1	55	0	0	0	52	2	0	5	0	3	0	1	0	1	0	120	
7:40 AM	2	77	1	0	1	57	2	0	3	0	7	0	5	1	5	0	161	
7:45 AM	1	89	0	0	2	59	1	0	1	2	2	0	3	1	3	0	164	
7:50 AM	2	95	3	0	1	50	2	0	5	0	4	0	4	0	2	0	168	
7:55 AM	3	94	0	0	1	64	4	0	1	0	2	0	3	2	1	0	175	1609
8:00 AM	3	90	1	0	1	45	1	0	1	1	0	0	2	1	3	0	149	1666
8:05 AM	2	63	2	0	1	78	1	0	5	0	4	0	2	0	2	0	160	1717
8:10 AM	2	98	2	0	1	48	1	1	2	1	4	0	2	1	5	0	168	1780
8:15 AM	1	57	2	0	2	70	0	0	2	1	2	0	1	1	4	0	143	1799
8:20 AM	0	95	1	0	0	62	1	0	3	0	1	0	4	2	1	0	170	1853
8:25 AM	3	82	0	0	2	71	1	0	2	0	3	0	2	2	0	0	168	1878
8:30 AM	1	69	2	0	0	48	3	0	2	0	3	0	7	1	1	0	137	1883
8:35 AM	1	70	0	0	1	78	4	0	2	0	3	0	3	0	1	0	163	1926
8:40 AM	2	71	1	0	0	56	1	0	1	1	2	0	3	2	1	0	141	1906
8:45 AM	4	87	1	0	0	67	3	0	2	1	0	0	3	1	1	0	170	1912
8:50 AM	2	91	0	0	0	46	2	0	2	2	1	0	3	1	3	0	153	1897
8:55 AM	3	73	0	0	0	60	0	0	2	1	1	0	2	0	3	0	145	1867
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	24	1112	12	0	16	692	28	0	28	8	32	0	40	12	24	0	2028	
Heavy Trucks	0	8	0	0	0	28	0	0	0	0	0	0	0	0	0	0	36	
Buses																		
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

LOCATION: SE 164th Ave -- SE 29th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050512
DATE: Tue, Jan 10 2023

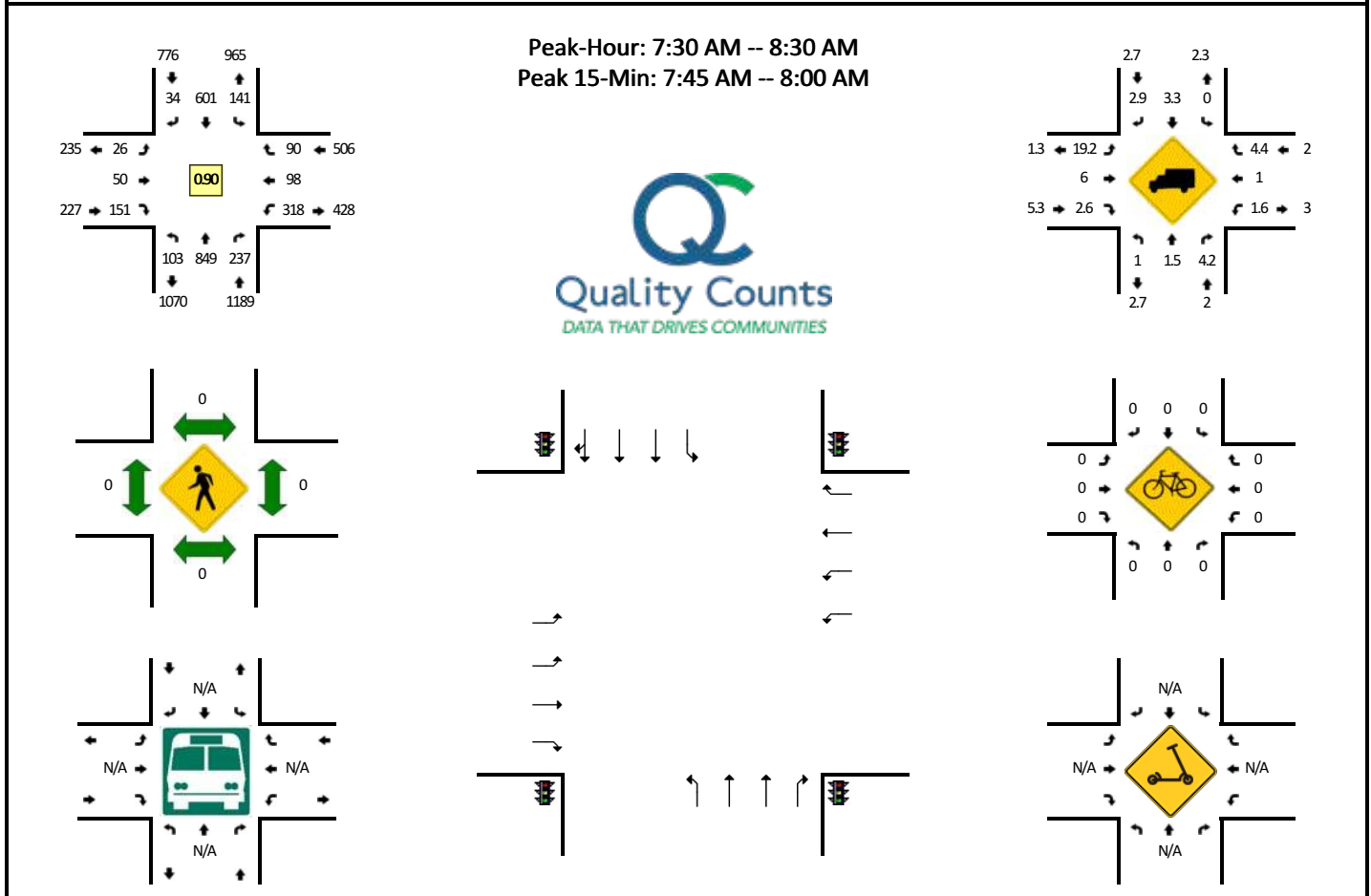


5-Min Count Period Beginning At	SE 164th Ave (Northbound)				SE 164th Ave (Southbound)				SE 29th St (Eastbound)				SE 29th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	108	4	0	3	111	4	0	8	2	1	1	0	3	2	0	249	
4:05 PM	4	114	0	0	7	81	1	0	7	5	3	0	3	3	5	0	233	
4:10 PM	1	112	1	0	5	125	3	1	3	3	2	0	1	1	4	0	262	
4:15 PM	1	118	7	1	3	91	2	0	4	0	4	0	2	4	1	0	238	
4:20 PM	5	83	3	0	6	110	3	0	6	1	0	0	3	1	4	0	225	
4:25 PM	5	110	2	0	5	64	4	0	5	0	5	0	0	3	6	0	209	
4:30 PM	0	86	0	0	2	110	7	0	2	4	7	0	1	0	3	0	222	
4:35 PM	4	112	1	0	3	89	5	0	6	4	3	0	2	2	3	0	234	
4:40 PM	5	115	5	0	3	121	2	0	14	3	2	0	5	0	4	0	279	
4:45 PM	1	130	2	0	1	87	2	0	3	0	1	0	2	0	1	0	230	
4:50 PM	3	96	2	0	2	113	4	0	4	1	6	0	0	0	1	0	232	
4:55 PM	6	108	2	0	2	91	1	0	3	0	5	0	2	0	4	0	224	2837
5:00 PM	2	81	4	0	7	108	1	0	5	2	4	0	0	0	2	0	216	2804
5:05 PM	1	99	6	1	2	99	2	0	5	3	1	0	4	1	5	0	229	2800
5:10 PM	0	87	2	0	6	128	1	0	8	0	6	0	0	1	4	0	243	2781
5:15 PM	2	117	3	0	6	89	1	2	4	2	7	0	2	0	2	0	237	2780
5:20 PM	3	87	2	0	5	125	5	2	7	3	5	0	0	1	8	0	253	2808
5:25 PM	3	70	1	0	1	77	2	0	3	2	4	0	5	4	6	0	178	2777
5:30 PM	1	72	5	0	3	110	1	3	5	1	2	0	1	2	5	0	211	2766
5:35 PM	2	105	6	0	8	72	3	0	9	1	0	0	1	0	1	0	208	2740
5:40 PM	4	94	4	0	3	99	3	0	9	2	2	0	2	3	2	0	227	2688
5:45 PM	4	96	6	0	3	72	1	0	6	4	2	0	0	1	3	0	198	2656
5:50 PM	2	97	6	0	6	105	4	1	2	1	10	0	2	0	2	0	238	2662
5:55 PM	4	70	5	0	4	63	0	1	5	1	3	0	4	0	2	0	162	2600
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	28	1336	20	0	60	1268	32	4	72	40	24	4	16	28	44	0	2976	
Heavy Trucks	0	32	4	0	4	12	0	0	0	0	0	0	4	4	0	0	60	
Buses																		
Pedestrians	0	0			0	0			0	0			4				4	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scoters																		

Comments:

LOCATION: SE 164th Ave -- SE 34th St
CITY/STATE: Vancouver, WA

QC JOB #: 16019601
DATE: Tue, Dec 6 2022

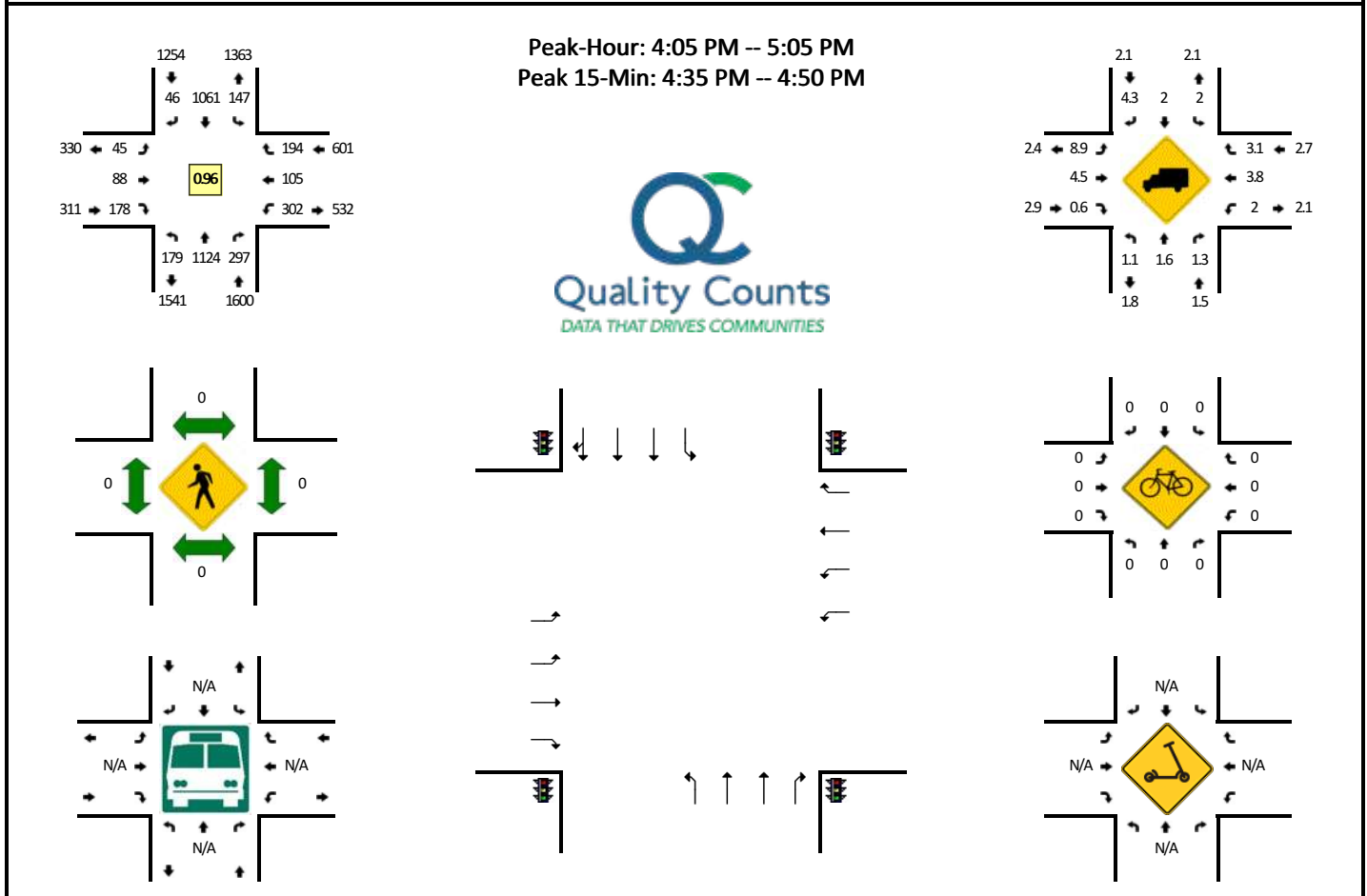


5-Min Count Period Beginning At	SE 164th Ave (Northbound)				SE 164th Ave (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	6	49	8	0	6	31	1	0	3	2	8	0	20	4	1	0	139	
7:05 AM	7	44	10	0	9	46	3	0	1	3	13	0	16	3	4	0	159	
7:10 AM	5	31	7	0	3	48	3	0	0	3	15	0	23	7	2	0	147	
7:15 AM	4	50	18	0	9	46	2	0	4	2	11	0	27	4	6	0	183	
7:20 AM	9	54	11	0	5	41	1	0	0	4	11	0	22	11	5	0	174	
7:25 AM	2	65	12	0	10	58	2	0	3	5	8	0	26	5	8	0	204	
7:30 AM	10	43	10	0	8	47	1	0	1	4	14	0	33	20	7	0	198	
7:35 AM	5	68	21	0	13	59	4	0	2	2	8	0	22	5	10	0	219	
7:40 AM	9	54	19	0	9	58	3	0	3	5	12	0	32	8	5	0	217	
7:45 AM	12	86	27	0	19	57	6	0	1	4	6	0	24	1	9	0	252	
7:50 AM	8	81	23	0	10	46	3	0	2	8	13	0	31	11	3	0	239	
7:55 AM	7	95	24	0	19	55	4	0	0	6	15	0	24	8	4	0	261	2392
8:00 AM	8	56	22	0	13	32	0	0	4	2	9	0	27	10	13	0	196	2449
8:05 AM	8	73	16	0	14	68	3	0	0	4	5	0	32	11	7	0	241	2531
8:10 AM	11	58	25	0	4	34	1	0	3	6	15	0	25	6	9	0	197	2581
8:15 AM	10	93	17	0	14	50	5	0	2	1	19	0	16	7	12	0	246	2644
8:20 AM	9	62	15	0	8	39	3	0	5	4	24	0	30	6	7	0	212	2682
8:25 AM	6	80	18	0	10	56	1	0	3	4	11	0	22	5	4	0	220	2698
8:30 AM	10	50	9	0	11	46	4	0	4	4	12	0	23	1	9	0	183	2683
8:35 AM	5	63	12	0	14	60	1	0	1	4	10	0	20	4	6	0	200	2664
8:40 AM	8	70	16	0	7	47	2	0	2	7	9	0	29	4	12	0	213	2660
8:45 AM	4	68	18	0	15	67	4	0	2	0	8	0	33	4	6	0	229	2637
8:50 AM	9	69	22	0	11	38	0	0	2	8	16	0	17	14	9	0	215	2613
8:55 AM	8	83	21	0	9	57	2	0	2	4	8	0	26	5	4	0	229	2581
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	108	1048	296	0	192	632	52	0	12	72	136	0	316	80	64	0	3008	
Heavy Trucks	0	8	0	0	0	24	4	0	4	8	0	0	12	0	0	0	60	
Buses																		
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Scoters																		

Comments:

LOCATION: SE 164th Ave -- SE 34th St
CITY/STATE: Vancouver, WA

QC JOB #: 16019602
DATE: Tue, Dec 6 2022



5-Min Count Period Beginning At	SE 164th Ave (Northbound)				SE 164th Ave (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	11	81	26	0	10	70	7	0	5	3	9	0	31	10	11	0	274	
4:05 PM	18	116	26	0	6	79	3	0	3	6	24	0	24	8	15	0	328	
4:10 PM	14	84	23	0	16	94	3	0	1	8	10	0	40	10	18	0	321	
4:15 PM	19	104	31	0	8	89	4	0	1	3	14	0	13	5	15	0	306	
4:20 PM	10	73	31	0	16	106	2	0	3	7	11	0	24	7	13	0	303	
4:25 PM	17	125	23	0	14	75	6	0	1	1	17	0	19	9	12	0	319	
4:30 PM	12	81	26	0	13	80	3	0	3	7	9	0	28	3	13	0	278	
4:35 PM	18	105	22	0	5	84	5	0	6	10	20	0	24	11	13	0	323	
4:40 PM	11	77	26	0	13	96	4	0	10	10	14	0	36	14	28	0	339	
4:45 PM	22	114	21	0	14	77	5	0	2	9	17	0	21	8	12	0	322	
4:50 PM	11	81	20	0	17	80	3	0	8	13	11	0	20	10	21	0	295	
4:55 PM	17	98	26	0	11	94	6	0	2	4	12	0	22	12	16	0	320	3728
5:00 PM	10	66	22	0	14	107	2	0	5	10	19	0	31	8	18	0	312	3766
5:05 PM	16	106	23	0	12	89	4	0	5	9	17	0	23	4	16	0	324	3762
5:10 PM	8	72	24	0	14	107	5	0	4	6	14	0	27	14	21	0	316	3757
5:15 PM	11	114	29	0	10	74	1	0	4	8	14	0	14	6	9	0	294	3745
5:20 PM	11	59	26	0	18	83	0	0	2	5	10	0	22	6	18	0	260	3702
5:25 PM	19	101	32	0	10	88	3	0	6	7	17	0	12	13	15	0	323	3706
5:30 PM	12	63	24	0	21	77	3	0	1	10	16	0	19	8	15	0	269	3697
5:35 PM	15	113	35	0	10	73	2	0	5	3	14	0	26	3	11	0	310	3684
5:40 PM	6	84	23	0	10	104	1	0	8	6	15	0	27	7	9	0	300	3645
5:45 PM	14	89	35	0	5	74	6	0	3	4	10	0	16	1	9	0	266	3589
5:50 PM	11	75	25	0	7	83	3	0	0	3	13	0	22	4	9	0	255	3549
5:55 PM	17	70	21	0	7	57	2	0	3	4	9	0	12	1	10	0	213	3442
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	204	1184	276	0	128	1028	56	0	72	116	204	0	324	132	212	0	3936	
Heavy Trucks	0	28	8		0	12	4		4	8	4		0	12	0		80	
Buses																		
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

Appendix B WSDOT Crash Data

Under 23 U.S. Code § 148 and 23 U.S. Code § 407, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or roadway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

JURISDICTION		CITY	COUNTY	PRIMARY CITY AVENUE	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	COMP DIR FROM REF PT	REFERENCE NAME	MILEPOST	A/B	S/R ONLY	REPORT NUMBER	DATE	TIME	TYPE	# IN	# AT	# VEN	# FDS	# BIKES	VEHICLE TYPE	SHIP	WEATHER	N	E	S	W			
ION	CITY	COUNTY	CITY AVENUE	NUMBER	AVENUE	POINT	MI or FT	POINT	NAME	MILEPOST	A/B	SUSPENSE	NUMBER	DATE	TIME	TYPE	# IN	# AT	# VEN	# FDS	# BIKES	VEHICLE TYPE	SHIP	WEATHER	N	E	S	W			
City Street Clark	Vancouver	SE 15TH ST	O	0 SE 192ND AVE					No E748665						2:14 Possible Injury		1	0	1	0	0	P Passenger Car	At Intersection Clear	On Dry	Dusk	Dark-Street Utility Box Making Right Turn	West				
City Street Clark	Vancouver	SE 15TH ST	9900 SE 192ND AVE						No E755332						15:40 Possible Injury		3	0	2	0	0	O Truck (Flat)Passenger / At Intersection Clear	On Dry	Dusk	Enterng at Going Straigh Ahead	South					
City Street Clark	Vancouver	SE 15TH ST	O	0 SE 192ND AVE					No E98464					12/20/2000			0	0	2	0	0	P Passenger / Passenger / At Intersection Clear	On Dry	Daylight	Enterng at Going Straigh Ahead	North					
City Street Clark	Vancouver	SE 16TH N	O	0 SE 29TH ST					No E813314						16:4 Unknown		0	0	2	0	0	O Pickup/Pan/Pickup Pan At Intersection Clear	On Dry	Daylight	From oppo Making Left Going Stra North	East					
City Street Clark	Vancouver	SE 16TH N	2900			300 F	S	SE 29TH ST	No E634753						21:00 No Appare		0	0	1	0	0	O Pickup-Pan/Truck or Not at InterClear or Pa Wet		Daylight	Dark-Street Tree or Stu Going Straight Ahead	South					
City Street Clark	Vancouver	SE 16TH N	2800			41 F	N	SE 29TH ST	No E965788						19:17 No Appare		0	0	2	0	0	O Passengr / Passenger / At Intersection Clear	Standing	W/Dark-Str	Enterng at Going Straigh Ahead	South					
City Street Clark	Vancouver	SE 16TH N	O	0 SE 20TH ST					No E766777					18/20/2005		2	0	1	0	0	O Passenger Car	At Intersection Overcast	Wet	Daylight	Dark-Street Metal Sign Making Left Turn	North					
City Street Clark	Vancouver	SE 16TH N	17500 SE 34TH ST						No E998165					9/6/2019		11:28	No Appare	0	1	0	0	O Passenger Car	At Intersection Clear	On Dry	Daylight	Dark-Street Metal Sign Making Left Turn	East				
City Street Clark	Vancouver	SE 16TH N	O	0 SE 192ND AVE					No E98464					5/7/2013		9:56	No Appare	0	2	0	0	O Passenger / Passenger / At Intersection Clear	On Dry	Daylight	Enterng at Going Straigh Ahead	South					
City Street Clark	Vancouver	SE 192ND	1498 SE 15TH ST						No EC52801					6/3/2022		10:27	Possible Injury	1	0	3	0	0	O Pickup/Pan/Pickup Pan At Intersection Raining	Wet	Daylight	Enterng at Going Stra Stopped at East	South				
City Street Clark	Vancouver	SE 192ND	O	0 SE 15TH ST					No E880276					17/7/2019		10:55	No Appare	0	0	2	0	0	O Passenger / Passenger / At Intersection Clear	On Dry	Daylight	Dark-Street From same Going Stra Stopped at North	South				
City Street Clark	Vancouver	SE 192ND	O	0 SE 15TH ST					No AO7004							16:40	No Appare	0	2	0	0	O Pickup-Pan Passenger / At Intersection Raining	Wet	Daylight	Dark-Street Enterng at Going Straigh North	South					
City Street Clark	Vancouver	SE 192ND	O	0 SE 15TH ST					No E980184					4/4/2019		11:56	Supected	1	0	2	0	0	O Passenger / Passenger / At Intersection Clear	On Face	Daylight	From same Going Stra Making Left South	West				
City Street Clark	Vancouver	SE 192ND	9900 SE 20TH ST						No E697125							10:45	No Appare	0	0	2	0	0	O Passenger / Passenger / At Intersection Clear	On Dry	Daylight	From same Slowing Slowing South	North				
City Street Clark	Vancouver	SE 192ND	2000 SE 34TH ST						No E849012							14:21	Possible Injury	1	0	2	0	0	O Passenger / Passenger / At Intersection Clear	On Dry	Daylight	Enterng at Going Straigh North	South				
City Street Clark	Vancouver	SE 192ND	O	0 SE 15TH ST					No E43262							9:46	No Appare	0	0	2	0	0	O Truck (Flat)Passenger / At Intersection Clear	On Dry	Daylight	From same Going Straigh Ahead	South				
City Street Clark	Vancouver	SE 192ND	O	0 SE 20TH ST					No E995917							12:49	No Appare	0	0	1	0	0	O Passenger Car	At Intersection Clear	Dry	Daylight	Signal Rope Going Straight Ahead	North			
City Street Clark	Vancouver	SE 192ND	O	0 SE 34TH ST					No E944498							7:36	No Appare	0	0	2	0	0	O Pickup-Pan Passenger / At Intersection Clear	On Dry	Daylight	From oppo Making Left Going Stra West	North				
City Street Clark	Vancouver	SE 192ND	SE 34TH ST						E73455							16:18	Possible Injury	1	0	2	0	0	O Pickup-Pan Passenger / At Intersection Clear	Wet	Daylight	From oppo Making Left Going Stra West	North				
City Street Clark	Vancouver	SE 192ND AVE	SE 34TH ST						No E841694							9:23	Supected	1	0	2	0	0	O Passenger / Passenger / At Intersection Clear	On Dry	Daylight	Dark-Street Enterng at Going Straigh West	East				
City Street Clark	Vancouver	SE 192ND	1400			93 F	N	SE 15TH ST	No E988844						13:40	Possible Injury	1	0	3	0	0	O Pickup/Pan/Pickup Pan At Intersection Clear	Wet	Daylight	From same Going Stra Stopped at North	South					
City Street Clark	Vancouver	SE 192ND	1600			318 F	S	SE 15TH ST	No E988844					4/2/2018		16:10	No Appare	0	0	2	0	0	O Pickup-Pan/Pickup Pan At Intersection Clear	On Face	Daylight	From same Going Stra Stopped at North	South				
City Street Clark	Vancouver	SE 192ND	2100			334 F	S	SE 20TH ST	No EC0318						11:18	Supected	1	0	2	0	0	O Truck - Doo/Pickup/Pan Not at InterClear	On Dry	Daylight	From same Going Straigh North	South					
City Street Clark	Vancouver	SE 192ND	2000			250 F	S	SE 20TH ST	No EC37243						13:59	No Appare	0	0	2	0	0	O Pickup/Pan/Pickup Pan Intersection Raining	Wet	Daylight	From same Going Stra Slowing South	North					
City Street Clark	Vancouver	SE 192ND	2000			54 F	SE	SE 20TH ST	No E762873						10:57	Possible Injury	2	0	2	0	0	O Passenger / Passenger - Intersection Overcast	Wet	Daylight	From same Stopped at Going Stra Vehicle Str North	West					
City Street Clark	Vancouver	SE 192ND	1900			162 F	N	SE 20TH ST	No E98424						14:59	No Appare	0	0	2	0	0	O Passenger / Passenger / At Intersection Clear	On Dry	Daylight	From same Going Stra Stopped at East	South					
City Street Clark	Vancouver	SE 192ND	1900			114 F	N	SE 20TH ST	No E635440						12:40	No Appare	0	0	3	0	0	O Truck (Flat)Pickup/Pan At Intersection Clear	On Dry	Daylight	From same Going Stra Stopped at North	South					
City Street Clark	Vancouver	SE 192ND	1700			492 F	N	SE 20TH ST	No E841909						16:04	No Appare	0	0	2	0	0	O Pickup/Pan/Pickup Pan Intersection Clear	On Dry	Daylight	From same Stopped at Going Stra Vehicle Str North	West					
City Street Clark	Vancouver	SE 192ND	2000			44 F	N	SE 20TH ST	No E937443					5/3/2019		13:44	No Appare	0	0	2	0	0	O Passenger - Passenger / Not at InterClear or Pa Wet		Daylight	From same Going Stra Slowing North	South				
City Street Clark	Vancouver	SE 192ND	2000			137 F	S	SE 20TH ST	No E937443					4/6/2020		9:59	No Appare	0	0	2	0	0	O Pickup/Pan/Pickup Pan Intersection Raining	Wet	Daylight	From same Going Stra Slowing North	South				
City Street Clark	Vancouver	SE 192ND	2100			291 F	S	SE 20TH ST	No EC15456						16:02	Possible Injury	1	0	2	0	0	O Passenger / Passenger / At Driveway Clear	Dry	Dusk	Enterng at Making Right Going Stra East	West					
City Street Clark	Vancouver	SE 192ND	2000			86 F	N	SE 25TH ST	No EA42584						2:52	No Appare	0	0	1	0	0	O Pickup-Pan/Truck or Not at InterClear	Dry	Daylight	Dark-Street Tree or Stu Going Straight Ahead	North					
City Street Clark	Vancouver	SE 192ND	2500			0.13 M	SW	SE 25TH ST	No E771195						22:37	No Appare	0	0	0	0	0	O Passenger Car	Not at Interfowning	Snow/Su/D	Dark-Street Tree or Stu Going Straight Ahead	South					
City Street Clark	Vancouver	SE 192ND	2700			0.21 M	SW	SE 25TH ST	No E937443						10:57	No Appare	0	0	1	0	0	O Pickup-Pan/Truck or Not at InterClear	Wet	Daylight	Dark-Street Tree or Stu Going Straight Ahead	South					
City Street Clark	Vancouver	SE 192ND	2700			476 F	NE	SE 25TH ST	No E802199						22:00	No Appare	0	0	1	0	0	O Passenger Car	Not at InterClear	Dry	Dark-Street Vehicle Str Going Straight Ahead	North					
City Street Clark	Vancouver	SE 192ND	2900			0.25 M	N	SE 34TH ST	No EA65610					7/5/2020		17:47	Died in Hor	0	1	0	0	0	O Passenger Car	Not at InterClear	Dry	Daylight	Utility Pole Going Straight Ahead	South			
City Street Clark	Vancouver	SE 192ND	2900			0.5 M	SE	SE 34TH ST	No E931056						13:35	Possible Injury	1	0	1	0	0	O Pickup-Pan/Truck or Not at InterClear or Pa Dry		Daylight	Vehicle Str Going Straight Ahead	West					
City Street Clark	Vancouver	SE 192ND	2900			0.5 M	SE	SE 34TH ST	No E931056						13:35	Possible Injury	1	0	1	0	0	O Passenger / Passenger / At Intersection Clear	On Dry	Daylight	From same Going Stra Stopped at East	West					
City Street Clark	Vancouver	SE 20TH ST	16602 SE 176TH AVE						No E869366						20:57	No Appare	0	0	2	0	0	O Passenger / Passenger / At Intersection Clear	On Dry	Daylight	Dark-Street From same Going Stra Stopped at East	West					
City Street Clark	Vancouver	SE 20TH ST	16602 SE 176TH AVE						No E803804						11:09	Supected	2	0	2	0	0	O Passenger / Pickup/Pan At Intersection Overcast	Dry	Daylight	From same Going Stra Stopped at East	West					
City Street Clark	Vancouver	SE 20TH ST	16602 SE 176TH AVE						No E72011						19:35	No Appare	0	0	1	0	0	O Pickup/Pan/Pickup Pan At Intersection Clear	On Dry	Daylight	From same Going Stra Making Left West	Vehicle Str					
City Street Clark	Vancouver	SE 20TH ST	16602 SE 176TH AVE						No EA48810						15:53	Supected	1	0	1	0	0	1	Pickup-Pan/Truck or At Intersection Clear	Wet	Daylight	Vehicle Str Starting in Traffic Lane West	Vehicle Str				
City Street Clark	Vancouver	SE 20TH ST	16700 SE 176TH AVE						No EC10568						13:08	No Appare	0	0	2	0	0	O Passenger / Pickup/Pan At Intersection Clear	On Dry	Daylight	From same Going Stra Stopped at East	West					
City Street Clark	Vancouver	SE 20TH ST	16602 SE 176TH AVE						No AO2843						10:11	No Appare	0	0	2	0	0	O Passenger / Pickup/Pan At Intersection Clear	On Dry	Daylight	From same Going Stra Stopped at East	West					
City Street Clark	Vancouver	SE 20TH ST	16602 SE 176TH AVE						No EC929951						21:50	No Appare	0	0	2	0	0	O Street From same Going Stra Stopped at East	Wet	Daylight	From same Going Stra Stopped at East	West					
City Street Clark	Vancouver	SE 20TH ST	2000 SE 192ND AVE						No AO17782						19:29	Possible Injury	2	0	2	0	0	O Passenger / Passenger / At Intersection Raining	Wet	Daylight	Dark-Street From oppo Going Stra Making Left East	East					
City Street Clark	Vancouver	SE 20TH ST	O SE 192ND AVE						No E90718						17:38	Supected	1	0	1	0	0	1	P Passenger Car	At Intersection Clear	On Dry	Daylight	Vehicle - P-Making Right Turn	West			
City Street Clark	Vancouver	SE 20TH ST	16500			76 F	W	SE 176TH AVE	No E953636						15:11	No Appare	0	0	2	0	0	O Passenger / Passenger / Not at InterClear or Pa Dry		Daylight	From same Going Stra Going Stra East	West					
City Street Clark	Vancouver	SE 20TH ST	16500			70 F	E	SE 176TH AVE	No E929565						17:23	No Appare	0	0	2	0	0	O Passenger / Passenger / At Intersection Raining	Wet	Daylight	From same Going Stra Slowing West	North					
City Street Clark	Vancouver	SE 20TH ST	16500			300 F	W	SE 176TH AVE	No E923433						8:07	Supected	1	0	1	0	0	1	School Bus	Not at InterClear or Pa Dry	Daylight	Pedalcycls Legally Parked, Occupied	Occupied				
City Street Clark	Vancouver	SE 20TH ST	16501 SE 164TH AVE						No E7A7887						17:00	Possible Injury	1	0	1	0	0	O Passenger Car	At Intersection Raining	Wet	Daylight	Dark-Street Tree or Stu Making Left Turn	East				
City Street Clark	Vancouver	SE 20TH ST	SE 164TH AVE						No EC70778					7/8/2022		0:32	No Appare	0	0	1	0	0	O Passenger / Passenger / At Intersection Clear	On Dry	Daylight	Dark-Street From oppo Making Left Going Stra East	South				
City Street Clark	Vancouver	SE 20TH ST	16501 SE 164TH AVE						No E937443						16:10	No Appare	0	0	2	0	0	O Passenger / Passenger / At Intersection Clear	On Dry	Daylight	From same Going Stra Stopped at East	South					
City Street Clark	Vancouver	SE 20TH ST	17020 SE 176TH AVE						No EC47000					5/5/2022		9:25	Supected	1	0	1	0	0	1	Pickup-Pan/Truck or At Intersection Raining	Wet	Daylight	Vehicle Str Going Straight Ahead	East			
City Street Clark	Vancouver	SE 24TH ST	17308 SE 176TH AVE						No EC03811						14:46	No Appare	0	0	2	0	0	O Passenger / Pickup/Pan At Intersection Overcast	Dry	Daylight	From oppo Making Left Going Stra West	North					
City Street Clark	Vancouver	SE 24TH ST	O SE 176TH AVE						No E728146						11:12	Supected	1	0	1	0	0	1	P Passenger Car	At Intersection Clear	On Dry	Daylight	Vehicle Turn Making Left Turn	North			
City Street Clark	Vancouver	SE 24TH ST	17308 SE 176TH AVE						No EC32616					6/2/2022		19:55	Possible Injury	1	0	1	0	0	O Pickup-Pan/Pickup Pan At Intersection Raining	Wet	Daylight	From same Going Stra Stopped at East	North				
City Street Clark	Vancouver	SE 24TH ST	O SE 176TH AVE						No E757233						17:11	Possible Injury	2	0	2	0											

[illegible]

Appendix C Existing Operations Worksheets

Timings
1: SE 192nd & SE 15th St

Vancouver Innovation Center
Existing AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	117	37	24	52	41	38	540	28	550
Future Volume (vph)	117	37	24	52	41	38	540	28	550
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	20.0	29.0	20.0	29.0	14.0	15.0	37.0	14.0	36.0
Total Split (%)	20.0%	29.0%	20.0%	29.0%	14.0%	15.0%	37.0%	14.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	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	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effct Green (s)	10.8	16.9	5.7	9.8	18.8	6.3	57.4	6.0	59.1
Actuated g/C Ratio	0.11	0.17	0.06	0.10	0.19	0.06	0.57	0.06	0.59
v/c Ratio	0.71	0.23	0.28	0.33	0.13	0.39	0.32	0.33	0.36
Control Delay	62.4	21.8	52.5	44.1	2.8	59.1	12.5	53.7	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.4	21.8	52.5	44.1	2.8	59.1	12.5	53.7	15.3
LOS	E	C	D	D	A	E	B	D	B
Approach Delay		47.9		31.2			15.5		17.0
Approach LOS		D		C			B		B

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 9 (9%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 21.2

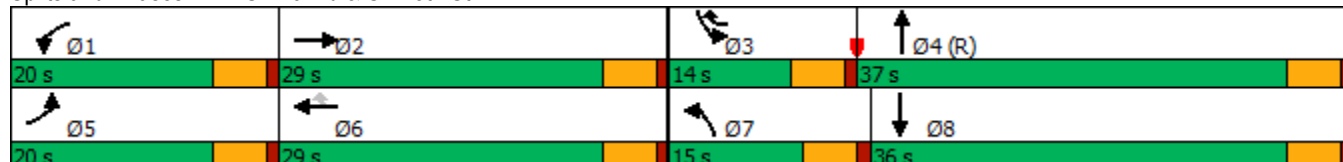
Intersection LOS: C

Intersection Capacity Utilization 49.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Existing AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	37	28	24	52	41	38	540	13	28	550	67
Future Volume (veh/h)	117	37	28	24	52	41	38	540	13	28	550	67
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1900	1796	1781	1841	1870	1856	1841	1900	1737	1767	1856
Adj Flow Rate, veh/h	133	42	1	27	59	0	43	614	14	32	625	69
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	0	7	8	4	2	3	4	0	11	9	3
Cap, veh/h	162	215	5	45	93	127	62	2194	50	49	1898	209
Arrive On Green	0.09	0.12	0.12	0.03	0.05	0.00	0.07	1.00	1.00	0.03	0.62	0.62
Sat Flow, veh/h	1767	1848	44	1697	1841	1585	1767	3493	80	1654	3048	336
Grp Volume(v), veh/h	133	0	43	27	59	0	43	307	321	32	344	350
Grp Sat Flow(s),veh/h/ln	1767	0	1892	1697	1841	1585	1767	1749	1824	1654	1678	1706
Q Serve(g_s), s	7.4	0.0	2.1	1.6	3.1	0.0	2.4	0.0	0.0	1.9	9.7	9.8
Cycle Q Clear(g_c), s	7.4	0.0	2.1	1.6	3.1	0.0	2.4	0.0	0.0	1.9	9.7	9.8
Prop In Lane	1.00		0.02	1.00		1.00	1.00		0.04	1.00		0.20
Lane Grp Cap(c), veh/h	162	0	220	45	93	127	62	1098	1146	49	1045	1062
V/C Ratio(X)	0.82	0.00	0.20	0.60	0.63	0.00	0.70	0.28	0.28	0.66	0.33	0.33
Avail Cap(c_a), veh/h	265	0	454	254	442	427	177	1098	1146	149	1045	1062
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.95	0.95	0.95	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.6	0.0	40.0	48.2	46.5	0.0	46.0	0.0	0.0	48.0	9.0	9.0
Incr Delay (d2), s/veh	4.0	0.0	0.2	4.8	2.6	0.0	5.0	0.6	0.6	5.5	0.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.0	0.0	1.7	1.3	2.7	0.0	1.9	0.3	0.3	1.5	6.0	6.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.6	0.0	40.1	52.9	49.2	0.0	51.0	0.6	0.6	53.5	9.8	9.8
LnGrp LOS	D	A	D	D	D	A	D	A	A	D	A	A
Approach Vol, veh/h	176			86			671			726		
Approach Delay, s/veh	46.5			50.3			3.8			11.7		
Approach LOS	D			D			A			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.6	16.6	7.9	67.8	14.2	10.1	8.5	67.3				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	24.0	9.0	32.0	15.0	24.0	10.0	31.0				
Max Q Clear Time (g_c+I1), s	3.6	4.1	3.9	2.0	9.4	5.1	4.4	11.8				
Green Ext Time (p_c), s	0.0	0.0	0.0	1.1	0.0	0.1	0.0	1.3				
Intersection Summary												
HCM 6th Ctrl Delay	14.2											
HCM 6th LOS	B											

Timings
2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Existing AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	73	140	78	127	36	419	73	438
Future Volume (vph)	73	140	78	127	36	419	73	438
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	17.0	29.0	17.0	29.0	15.0	39.0	15.0	39.0
Total Split (%)	17.0%	29.0%	17.0%	29.0%	15.0%	39.0%	15.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effct Green (s)	6.8	15.6	6.9	15.7	7.0	52.5	8.9	52.4
Actuated g/C Ratio	0.07	0.16	0.07	0.16	0.07	0.52	0.09	0.52
v/c Ratio	0.35	0.73	0.36	0.75	0.34	0.33	0.51	0.31
Control Delay	48.2	50.7	48.2	50.0	68.1	5.9	54.0	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.2	50.7	48.2	50.0	68.1	5.9	54.0	20.7
LOS	D	D	D	D	E	A	D	C
Approach Delay		50.0		49.5		9.9		25.0
Approach LOS		D		D		A		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 28.1

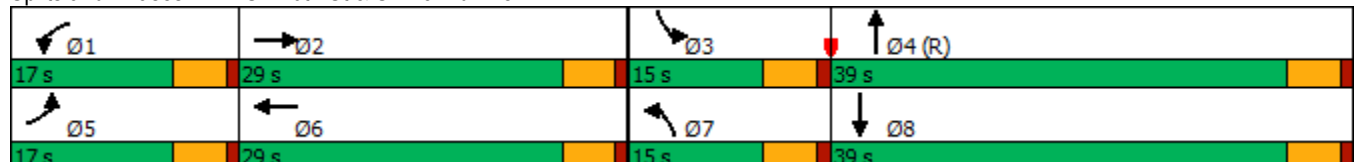
Intersection LOS: C

Intersection Capacity Utilization 54.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: SE 20th St & SE 192nd Ave



HCM 6th Signalized Intersection Summary

2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Existing AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	140	56	78	127	78	36	419	107	73	438	59
Future Volume (veh/h)	73	140	56	78	127	78	36	419	107	73	438	59
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1900	1841	1885	1885	1885	1811	1856	1841	1885	1811	1826
Adj Flow Rate, veh/h	81	156	44	87	141	60	40	466	100	81	487	57
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
Percent Heavy Veh, %	3	0	4	1	1	1	6	3	4	1	6	5
Cap, veh/h	153	190	54	159	169	72	86	1628	347	104	1772	207
Arrive On Green	0.04	0.13	0.13	0.05	0.13	0.13	0.05	0.56	0.56	0.06	0.57	0.57
Sat Flow, veh/h	3428	1426	402	3483	1255	534	1725	2890	616	1795	3104	362
Grp Volume(v), veh/h	81	0	200	87	0	201	40	283	283	81	269	275
Grp Sat Flow(s),veh/h/ln	1714	0	1828	1742	0	1789	1725	1763	1744	1795	1721	1746
Q Serve(g_s), s	2.3	0.0	10.6	2.4	0.0	11.0	2.3	8.4	8.5	4.5	8.0	8.0
Cycle Q Clear(g_c), s	2.3	0.0	10.6	2.4	0.0	11.0	2.3	8.4	8.5	4.5	8.0	8.0
Prop In Lane	1.00		0.22	1.00		0.30	1.00		0.35	1.00		0.21
Lane Grp Cap(c), veh/h	153	0	244	159	0	240	86	993	982	104	982	997
V/C Ratio(X)	0.53	0.00	0.82	0.55	0.00	0.84	0.46	0.29	0.29	0.78	0.27	0.28
Avail Cap(c_a), veh/h	411	0	439	418	0	429	172	993	982	180	982	997
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.94	0.94	0.94
Uniform Delay (d), s/veh	46.7	0.0	42.2	46.7	0.0	42.2	46.2	11.4	11.4	46.5	10.9	10.9
Incr Delay (d2), s/veh	1.0	0.0	2.6	1.1	0.0	3.0	1.4	0.7	0.7	4.4	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.8	0.0	8.4	1.9	0.0	8.5	1.8	5.7	5.7	3.7	5.3	5.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.8	0.0	44.8	47.8	0.0	45.2	47.6	12.1	12.1	50.9	11.6	11.6
LnGrp LOS	D	A	D	D	A	D	D	B	B	D	B	B
Approach Vol, veh/h	281			288			606			625		
Approach Delay, s/veh	45.6			46.0			14.5			16.7		
Approach LOS	D			D			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.6	18.3	10.8	61.3	9.5	18.4	10.0	62.1				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	24.0	10.0	34.0	12.0	24.0	10.0	34.0				
Max Q Clear Time (g_c+I1), s	4.4	12.6	6.5	10.5	4.3	13.0	4.3	10.0				
Green Ext Time (p_c), s	0.1	0.5	0.0	2.0	0.1	0.5	0.0	1.9				

Intersection Summary

HCM 6th Ctrl Delay 25.1
HCM 6th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	10	558	3	7	595
Future Vol, veh/h	7	10	558	3	7	595
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	230	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	20	4	67	0	7
Mvmt Flow	8	11	607	3	8	647
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	950	306	0	0	611	0
Stage 1	610	-	-	-	-	-
Stage 2	340	-	-	-	-	-
Critical Hdwy	6.8	7.3	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.5	-	-	2.2	-
Pot Cap-1 Maneuver	262	639	-	-	978	-
Stage 1	510	-	-	-	-	-
Stage 2	698	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	260	638	-	-	977	-
Mov Cap-2 Maneuver	260	-	-	-	-	-
Stage 1	509	-	-	-	-	-
Stage 2	692	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	14.2	0	0.1			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 260 638	977	-		
HCM Lane V/C Ratio	-	- 0.029 0.017	0.008	-		
HCM Control Delay (s)	-	- 19.3 10.7	8.7	-		
HCM Lane LOS	-	- C B	A	-		
HCM 95th %tile Q(veh)	-	- 0.1 0.1	0	-		

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Existing AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	66	123	143	95	70	520	290	88	380
Future Volume (vph)	66	123	143	95	70	520	290	88	380
Turn Type	pm+pt	NA	pm+pt	NA	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6	7	4	1	3	8
Permitted Phases	2		6				4		
Detector Phase	5	2	1	6	7	4	1	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	15.0	36.0	15.0	36.0	15.0	34.0	15.0	15.0	34.0
Total Split (%)	15.0%	36.0%	15.0%	36.0%	15.0%	34.0%	15.0%	15.0%	34.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	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	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	None	Max
Act Effect Green (s)	19.0	11.9	24.1	16.2	6.0	51.8	62.1	9.0	54.8
Actuated g/C Ratio	0.19	0.12	0.24	0.16	0.06	0.52	0.62	0.09	0.55
v/c Ratio	0.31	0.41	0.55	0.27	0.38	0.35	0.30	0.33	0.31
Control Delay	29.0	34.7	35.3	24.8	50.2	18.2	1.8	36.9	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.0	34.7	35.3	24.8	50.2	18.2	1.8	36.9	11.1
LOS	C	C	D	C	D	B	A	D	B
Approach Delay		33.0		30.1		15.3			15.2
Approach LOS		C		C		B			B

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 19.4

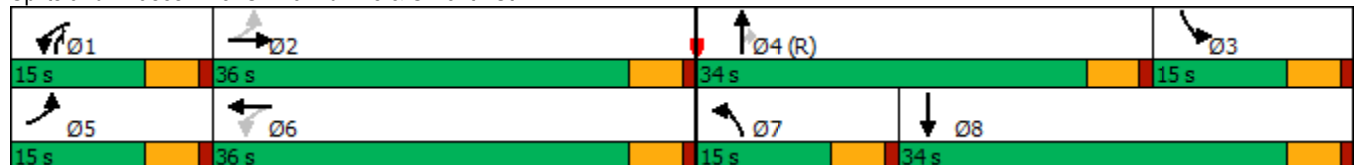
Intersection LOS: B

Intersection Capacity Utilization 56.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Existing AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	123	28	143	95	45	70	520	290	88	380	84
Future Volume (veh/h)	66	123	28	143	95	45	70	520	290	88	380	84
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1728	1803	1847	1943	2018	1988	2018	1883	1988	1832	1684	1684
Adj Flow Rate, veh/h	77	143	4	166	110	1	81	605	177	102	442	83
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	8	3	0	5	0	2	0	9	2	1	11	11
Cap, veh/h	266	302	8	315	514	5	167	1037	652	1094	1530	285
Arrive On Green	0.05	0.09	0.09	0.10	0.13	0.13	0.04	0.29	0.29	0.32	0.57	0.57
Sat Flow, veh/h	1646	3402	95	1850	3892	35	3728	3578	1681	3385	2691	502
Grp Volume(v), veh/h	77	72	75	166	54	57	81	605	177	102	262	263
Grp Sat Flow(s),veh/h/ln	1646	1712	1784	1850	1917	2011	1864	1789	1681	1693	1600	1593
Q Serve(g_s), s	4.2	4.0	4.0	7.9	2.5	2.5	2.1	14.5	1.6	2.1	8.4	8.6
Cycle Q Clear(g_c), s	4.2	4.0	4.0	7.9	2.5	2.5	2.1	14.5	1.6	2.1	8.4	8.6
Prop In Lane	1.00		0.05	1.00		0.02	1.00		1.00	1.00		0.32
Lane Grp Cap(c), veh/h	266	152	159	315	253	265	167	1037	652	1094	909	906
V/C Ratio(X)	0.29	0.47	0.47	0.53	0.21	0.21	0.49	0.58	0.27	0.09	0.29	0.29
Avail Cap(c_a), veh/h	341	531	553	319	594	623	373	1037	652	1094	909	906
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.5	43.3	43.3	35.3	38.8	38.8	46.6	30.3	8.9	23.6	11.1	11.2
Incr Delay (d2), s/veh	0.2	0.8	0.8	0.7	0.2	0.1	0.8	2.4	1.0	0.0	0.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	3.0	3.2	6.3	2.1	2.2	1.8	10.4	2.8	1.5	5.2	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.7	44.2	44.1	36.1	38.9	38.9	47.5	32.7	9.9	23.6	11.9	12.0
LnGrp LOS	D	D	D	D	D	D	D	C	A	C	B	B
Approach Vol, veh/h		224			277			863			627	
Approach Delay, s/veh		42.3			37.2			29.4			13.8	
Approach LOS		D			D			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.8	13.9	37.3	34.0	10.5	18.2	9.5	61.9				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	31.0	10.0	29.0	10.0	31.0	10.0	29.0				
Max Q Clear Time (g_c+I1), s	9.9	6.0	4.1	16.5	6.2	4.5	4.1	10.6				
Green Ext Time (p_c), s	0.0	0.2	0.0	1.3	0.0	0.2	0.0	0.9				
Intersection Summary												
HCM 6th Ctrl Delay			27.0									
HCM 6th LOS			C									

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Existing AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	36	218	25	189	63	1	4	0	2
Future Volume (vph)	36	218	25	189	63	1	4	0	2
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6		8		4	
Permitted Phases					8		4		4
Detector Phase	5	2	1	6	8	8	4	4	4
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	27.0	10.0	27.0	32.0	32.0	34.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%	26.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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	5.0	5.0	5.0	5.0		5.0	5.0
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 Effect Green (s)	5.5	24.3	5.5	22.3	8.8	8.8		8.8	8.8
Actuated g/C Ratio	0.13	0.58	0.13	0.53	0.21	0.21		0.21	0.21
v/c Ratio	0.18	0.15	0.13	0.15	0.27	0.13		0.02	0.01
Control Delay	24.1	8.4	24.0	9.5	16.0	6.1		13.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	24.1	8.4	24.0	9.5	16.0	6.1		13.2	0.0
LOS	C	A	C	A	B	A		B	A
Approach Delay		10.4		10.9		12.2		9.5	
Approach LOS		B		B		B		A	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 41.8

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.27

Intersection Signal Delay: 10.9

Intersection LOS: B

Intersection Capacity Utilization 39.9%

ICU Level of Service A

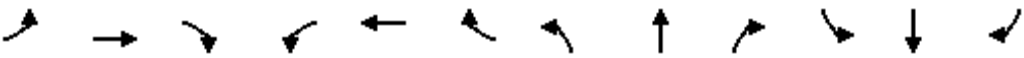
Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

		
10 s	85 s	35 s
		
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary 6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Existing AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	218	24	25	189	36	63	1	38	4	0	2
Future Volume (veh/h)	36	218	24	25	189	36	63	1	38	4	0	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1841	1900	1876	1802	1876	1832	1876	1876	1900	1900	1900
Adj Flow Rate, veh/h	44	269	19	31	233	24	78	1	0	5	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
Percent Heavy Veh, %	0	4	0	0	5	0	3	0	0	0	0	0
Cap, veh/h	90	1493	105	67	1374	140	320	150	0	322	0	129
Arrive On Green	0.05	0.45	0.45	0.04	0.44	0.44	0.08	0.08	0.00	0.08	0.00	0.00
Sat Flow, veh/h	1810	3314	233	1787	3136	320	1388	1876	0	1430	0	1610
Grp Volume(v), veh/h	44	141	147	31	126	131	78	1	0	5	0	0
Grp Sat Flow(s),veh/h/ln	1810	1749	1798	1787	1712	1743	1388	1876	0	1430	0	1610
Q Serve(g_s), s	0.8	1.7	1.7	0.6	1.6	1.6	1.7	0.0	0.0	0.1	0.0	0.0
Cycle Q Clear(g_c), s	0.8	1.7	1.7	0.6	1.6	1.6	1.9	0.0	0.0	0.1	0.0	0.0
Prop In Lane	1.00		0.13	1.00		0.18	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	90	788	810	67	750	764	320	150	0	322	0	129
V/C Ratio(X)	0.49	0.18	0.18	0.47	0.17	0.17	0.24	0.01	0.00	0.02	0.00	0.00
Avail Cap(c_a), veh/h	261	4031	4144	257	3947	4019	1409	1622	0	1450	0	1392
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	16.1	5.7	5.7	16.4	5.9	5.9	15.5	14.7	0.0	14.8	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.0	1.9	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.5	0.6	0.6	0.4	0.5	0.5	0.9	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.6	5.7	5.7	18.2	6.0	6.0	15.7	14.7	0.0	14.8	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	B	A	B	A	A
Approach Vol, veh/h	332			288			79			5		
Approach Delay, s/veh	7.3			7.3			15.7			14.8		
Approach LOS	A			A			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.3	20.6		7.8	6.7	20.2		7.8				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	2.6	3.7		2.1	2.8	3.6		3.9				
Green Ext Time (p_c), s	0.0	0.5		0.0	0.0	0.4		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	8.3											
HCM 6th LOS	A											

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	137	261	11	5	243	6	29	0	16	1	0	15
Future Vol, veh/h	137	261	11	5	243	6	29	0	16	1	0	15
Conflicting Peds, #/hr	3	0	3	3	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	95	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	3	3	0	0	5	0	0	0	0	0	0	27
Mvmt Flow	161	307	13	6	286	7	34	0	19	1	0	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	296	0	0	323	0	0	794	947	163	781	950	150
Stage 1	-	-	-	-	-	-	639	639	-	305	305	-
Stage 2	-	-	-	-	-	-	155	308	-	476	645	-
Critical Hdwy	4.16	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	7.44
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.23	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.57
Pot Cap-1 Maneuver	1255	-	-	1248	-	-	282	263	859	288	262	796
Stage 1	-	-	-	-	-	-	436	474	-	685	666	-
Stage 2	-	-	-	-	-	-	838	664	-	544	471	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1251	-	-	1244	-	-	247	226	857	252	226	794
Mov Cap-2 Maneuver	-	-	-	-	-	-	247	226	-	252	226	-
Stage 1	-	-	-	-	-	-	379	411	-	595	661	-
Stage 2	-	-	-	-	-	-	815	659	-	464	409	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.8			0.2			17.9			10.2		
HCM LOS							C			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	331	1251	-	-	1244	-	-	252	794
HCM Lane V/C Ratio	0.16	0.129	-	-	0.005	-	-	0.005	0.022
HCM Control Delay (s)	17.9	8.3	-	-	7.9	-	-	19.4	9.6
HCM Lane LOS	C	A	-	-	A	-	-	C	A
HCM 95th %tile Q(veh)	0.6	0.4	-	-	0	-	-	0	0.1

Timings 8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Existing AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	45	348	2	242	14	5	57	3
Future Volume (vph)	45	348	2	242	14	5	57	3
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	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	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	24.9	22.8	24.7	21.3	8.7	8.7	8.7	8.7
Actuated g/C Ratio	0.61	0.56	0.61	0.53	0.21	0.21	0.21	0.21
v/c Ratio	0.08	0.21	0.00	0.19	0.06	0.03	0.22	0.33
Control Delay	6.7	9.5	7.0	9.5	13.4	10.6	15.0	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	9.5	7.0	9.5	13.4	10.6	15.0	5.5
LOS	A	A	A	A	B	B	B	A
Approach Delay		9.2		9.5		12.2		8.5
Approach LOS		A		A		B		A

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 40.5

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.33

Intersection Signal Delay: 9.2

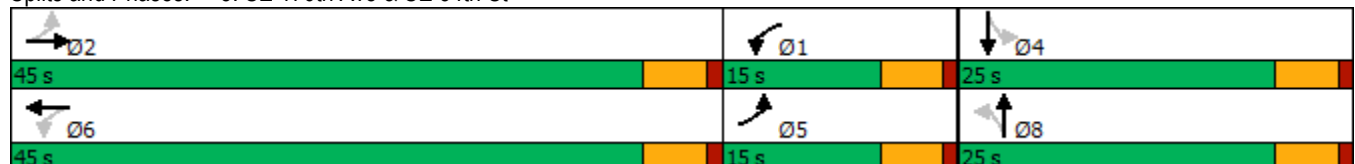
Intersection LOS: A

Intersection Capacity Utilization 41.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Existing AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	348	2	2	242	43	14	5	4	57	3	122
Future Volume (veh/h)	45	348	2	2	242	43	14	5	4	57	3	122
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1767	1856	1900	1900	1811	1826	1900	1900	1530	1870	1900	1885
Adj Flow Rate, veh/h	53	409	1	2	285	30	16	6	0	67	4	3
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
Percent Heavy Veh, %	9	3	0	0	6	5	0	0	25	2	0	1
Cap, veh/h	657	1510	4	648	1321	138	343	199	0	342	105	79
Arrive On Green	0.06	0.42	0.42	0.06	0.42	0.42	0.10	0.10	0.00	0.10	0.10	0.10
Sat Flow, veh/h	1682	3608	9	1810	3142	328	1415	1900	0	1394	1004	753
Grp Volume(v), veh/h	53	200	210	2	155	160	16	6	0	67	0	7
Grp Sat Flow(s),veh/h/ln	1682	1763	1854	1810	1721	1750	1415	1900	0	1394	0	1757
Q Serve(g_s), s	0.0	2.7	2.7	0.0	2.1	2.1	0.4	0.1	0.0	1.6	0.0	0.1
Cycle Q Clear(g_c), s	0.0	2.7	2.7	0.0	2.1	2.1	0.5	0.1	0.0	1.7	0.0	0.1
Prop In Lane	1.00		0.00	1.00		0.19	1.00		0.00	1.00		0.43
Lane Grp Cap(c), veh/h	657	738	776	648	724	736	343	199	0	342	0	184
V/C Ratio(X)	0.08	0.27	0.27	0.00	0.21	0.22	0.05	0.03	0.00	0.20	0.00	0.04
Avail Cap(c_a), veh/h	1030	1964	2065	1044	1917	1949	984	1058	0	973	0	978
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.4	6.8	6.8	6.4	6.6	6.6	14.7	14.4	0.0	15.2	0.0	14.5
Incr Delay (d2), s/veh	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.3	1.0	1.1	0.0	0.8	0.8	0.2	0.1	0.0	0.8	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.5	6.9	6.9	6.4	6.7	6.7	14.7	14.5	0.0	15.3	0.0	14.5
LnGrp LOS	A	A	A	A	A	A	B	B	A	B	A	B
Approach Vol, veh/h	463			317			22			74		
Approach Delay, s/veh	6.9			6.7			14.6			15.2		
Approach LOS	A			A			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.1	20.0		8.8	7.1	20.1		8.8				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	4.7		3.7	2.0	4.1		2.5				
Green Ext Time (p_c), s	0.0	1.4		0.1	0.0	1.1		0.0				

Intersection Summary

HCM 6th Ctrl Delay	7.7
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	10	4	105	167	11
Future Vol, veh/h	4	10	4	105	167	11
Conflicting Peds, #/hr	0	2	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	10	0	2	1	18
Mvmt Flow	5	12	5	124	196	13
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	337	205	209	0	-	0
Stage 1	203	-	-	-	-	-
Stage 2	134	-	-	-	-	-
Critical Hdwy	6.4	6.3	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	2.2	-	-	-
Pot Cap-1 Maneuver	663	816	1374	-	-	-
Stage 1	836	-	-	-	-	-
Stage 2	897	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	660	814	1374	-	-	-
Mov Cap-2 Maneuver	660	-	-	-	-	-
Stage 1	833	-	-	-	-	-
Stage 2	897	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9.8	0.3		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1374	-	763	-	-	
HCM Lane V/C Ratio	0.003	-	0.022	-	-	
HCM Control Delay (s)	7.6	-	9.8	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	195	20	56	235	11	25	58	47	0	55	9
Future Vol, veh/h	9	195	20	56	235	11	25	58	47	0	55	9
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
Heavy Vehicles, %	0	4	10	4	1	9	4	3	0	0	0	0
Mvmt Flow	10	214	22	62	258	12	27	64	52	0	60	10
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	11.4	11.5	10	10.1
HCM LOS	B	B	A	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	55%	0%	91%	0%	96%	86%
Vol Right, %	0%	45%	0%	9%	0%	4%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	25	105	9	215	56	246	64
LT Vol	25	0	9	0	56	0	0
Through Vol	0	58	0	195	0	235	55
RT Vol	0	47	0	20	0	11	9
Lane Flow Rate	27	115	10	236	62	270	70
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.051	0.189	0.017	0.366	0.103	0.41	0.122
Departure Headway (Hd)	6.732	5.892	6.086	5.584	6.049	5.461	6.224
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	533	609	591	647	595	662	576
Service Time	4.463	3.623	3.794	3.291	3.756	3.168	4.258
HCM Lane V/C Ratio	0.051	0.189	0.017	0.365	0.104	0.408	0.122
HCM Control Delay	9.8	10	8.9	11.5	9.5	11.9	10.1
HCM Lane LOS	A	A	A	B	A	B	B
HCM 95th-tile Q	0.2	0.7	0.1	1.7	0.3	2	0.4

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Existing AM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations											
Traffic Volume (vph)	29	5	35	38	12	28	21	979	14	730	
Future Volume (vph)	29	5	35	38	12	28	21	979	14	730	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	
Protected Phases		2			6		7	4	3	8	
Permitted Phases	2		2	6		6					
Detector Phase	2	2	2	6	6	6	7	4	3	8	
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	15.0	5.0	15.0	
Minimum Split (s)	39.0	39.0	39.0	38.0	38.0	38.0	10.0	32.0	10.0	32.0	
Total Split (s)	39.0	39.0	39.0	39.0	39.0	39.0	17.0	64.0	17.0	64.0	
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	14.2%	53.3%	14.2%	53.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag							Lead	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max	
Act Effct Green (s)	14.6	14.6	14.6	14.6	14.6	14.6	5.6	95.1	5.3	92.8	
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.05	0.79	0.04	0.77	
v/c Ratio	0.18	0.02	0.15	0.24	0.07	0.12	0.26	0.26	0.20	0.20	
Control Delay	46.2	40.2	3.9	47.7	42.3	1.5	39.6	18.0	61.4	6.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	46.2	40.2	3.9	47.7	42.3	1.5	39.6	18.0	61.4	6.3	
LOS	D	D	A	D	D	A	D	B	E	A	
Approach Delay		24.4			30.5			18.4		7.3	
Approach LOS		C			C			B		A	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 85 (71%), Referenced to phase 8: SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.26

Intersection Signal Delay: 14.7

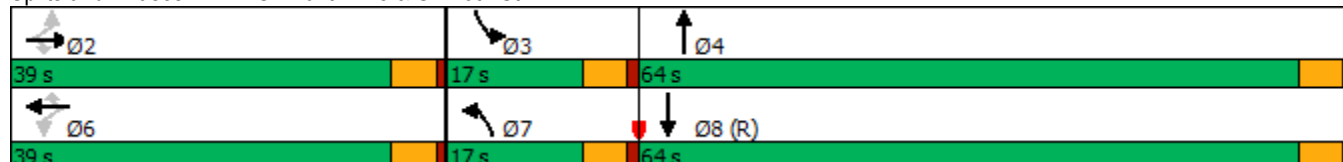
Intersection LOS: B

Intersection Capacity Utilization 51.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Existing AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	5	35	38	12	28	21	979	14	14	730	21
Future Volume (veh/h)	29	5	35	38	12	28	21	979	14	14	730	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1900	1856	1856	1648	1900	1900	1870	1796	1796	1856	1826
Adj Flow Rate, veh/h	31	5	2	40	13	2	22	1031	15	15	768	21
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	0	3	3	17	0	0	2	7	7	3	5
Cap, veh/h	160	151	125	168	131	128	39	2577	37	28	2492	68
Arrive On Green	0.08	0.08	0.08	0.08	0.08	0.08	0.02	0.50	0.50	0.02	0.49	0.49
Sat Flow, veh/h	1387	1900	1572	1397	1648	1610	1810	5185	75	1711	5069	138
Grp Volume(v), veh/h	31	5	2	40	13	2	22	677	369	15	511	278
Grp Sat Flow(s),veh/h/ln	1387	1900	1572	1397	1648	1610	1810	1702	1857	1711	1689	1830
Q Serve(g_s), s	2.5	0.3	0.1	3.3	0.9	0.1	1.4	15.0	15.0	1.0	10.9	10.9
Cycle Q Clear(g_c), s	3.4	0.3	0.1	3.6	0.9	0.1	1.4	15.0	15.0	1.0	10.9	10.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.04	1.00		0.08
Lane Grp Cap(c), veh/h	160	151	125	168	131	128	39	1692	923	28	1660	900
V/C Ratio(X)	0.19	0.03	0.02	0.24	0.10	0.02	0.56	0.40	0.40	0.53	0.31	0.31
Avail Cap(c_a), veh/h	443	538	446	453	467	456	181	1692	923	171	1660	900
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.85	0.85	0.85	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.8	51.0	50.9	52.6	51.2	50.9	58.1	19.0	19.0	58.6	18.3	18.3
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.3	0.1	0.0	3.9	0.6	1.1	5.7	0.5	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.6	0.3	0.1	2.1	0.7	0.1	1.3	9.5	10.3	0.9	7.6	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.0	51.0	50.9	52.9	51.4	50.9	62.1	19.6	20.1	64.3	18.8	19.2
LnGrp LOS	D	D	D	D	D	D	E	B	C	E	B	B
Approach Vol, veh/h	38			55			1068			804		
Approach Delay, s/veh	52.7			52.4			20.6			19.7		
Approach LOS	D			D			C			B		
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	14.5		7.0	64.6		14.5		7.6	64.0			
Change Period (Y+Rc), s	5.0		5.0	5.0		5.0		5.0	5.0			
Max Green Setting (Gmax), s	34.0		12.0	59.0		34.0		12.0	59.0			
Max Q Clear Time (g_c+I1), s	5.4		3.0	17.0		5.6		3.4	12.9			
Green Ext Time (p_c), s	0.0		0.0	4.7		0.1		0.0	3.3			
Intersection Summary												
HCM 6th Ctrl Delay	21.8											
HCM 6th LOS	C											

Timings
12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Existing AM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	26	50	151	318	98	90	103	849	237	141	601
Future Volume (vph)	26	50	151	318	98	90	103	849	237	141	601
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	22.5	32.0	10.0	10.0	31.0	22.5	10.0	28.0
Total Split (s)	20.0	33.0	20.0	25.0	38.0	17.0	20.0	45.0	25.0	17.0	42.0
Total Split (%)	16.7%	27.5%	16.7%	20.8%	31.7%	14.2%	16.7%	37.5%	20.8%	14.2%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	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	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	5.3	7.5	21.7	20.0	24.2	45.6	11.2	58.1	83.1	16.4	63.3
Actuated g/C Ratio	0.04	0.06	0.18	0.17	0.20	0.38	0.09	0.48	0.69	0.14	0.53
v/c Ratio	0.23	0.51	0.51	1.07	0.29	0.15	0.70	0.56	0.23	0.65	0.27
Control Delay	59.5	69.5	30.2	116.8	42.9	4.8	74.0	25.2	1.6	55.1	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.5	69.5	30.2	116.8	42.9	4.8	74.0	25.2	1.6	55.1	15.7
LOS	E	E	C	F	D	A	E	C	A	E	B
Approach Delay		42.3			82.5			24.7			22.9
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 15 (13%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.07

Intersection Signal Delay: 36.5

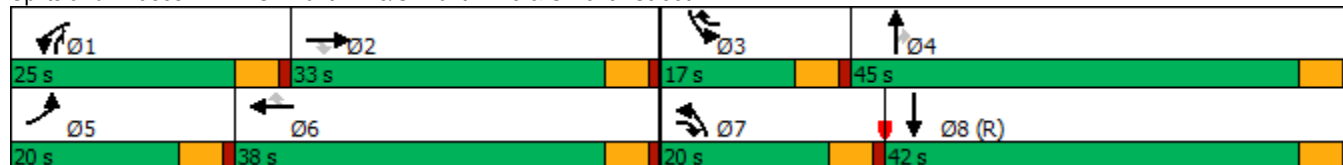
Intersection LOS: D

Intersection Capacity Utilization 59.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave/SE164th Ave & SE 34th Street



HCM 6th Signalized Intersection Summary

12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Existing AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	50	151	318	98	90	103	849	237	141	601	34
Future Volume (veh/h)	26	50	151	318	98	90	103	849	237	141	601	34
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1565	1758	1803	1870	1885	1841	1791	1776	1746	1806	1761	1761
Adj Flow Rate, veh/h	29	56	108	353	109	22	114	943	157	157	668	35
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
Percent Heavy Veh, %	19	6	3	2	1	4	1	2	4	0	3	3
Cap, veh/h	75	143	248	333	419	503	138	1125	740	172	1649	86
Arrive On Green	0.03	0.08	0.08	0.17	0.22	0.22	0.08	0.33	0.33	0.03	0.12	0.12
Sat Flow, veh/h	2892	1758	1528	1995	1885	1560	1706	3375	1480	1720	4679	244
Grp Volume(v), veh/h	29	56	108	353	109	22	114	943	157	157	457	246
Grp Sat Flow(s),veh/h/ln	1446	1758	1528	998	1885	1560	1706	1687	1480	1720	1603	1717
Q Serve(g_s), s	1.2	3.6	7.6	20.0	5.7	1.2	7.9	31.0	7.1	10.9	15.9	16.0
Cycle Q Clear(g_c), s	1.2	3.6	7.6	20.0	5.7	1.2	7.9	31.0	7.1	10.9	15.9	16.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.14
Lane Grp Cap(c), veh/h	75	143	248	333	419	503	138	1125	740	172	1130	605
V/C Ratio(X)	0.39	0.39	0.44	1.06	0.26	0.04	0.83	0.84	0.21	0.91	0.40	0.41
Avail Cap(c_a), veh/h	362	410	480	333	518	585	213	1125	740	172	1130	605
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
Uniform Delay (d), s/veh	57.5	52.3	45.3	50.0	38.5	28.0	54.3	37.0	16.8	57.5	41.3	41.4
Incr Delay (d2), s/veh	1.2	0.6	0.4	66.6	0.1	0.0	8.1	7.5	0.7	43.3	1.1	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.8	2.9	5.2	12.9	4.7	0.8	6.6	19.5	4.4	11.4	11.3	12.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.7	52.9	45.8	116.6	38.6	28.0	62.5	44.5	17.4	100.8	42.4	43.4
LnGrp LOS	E	D	D	F	D	C	E	D	B	F	D	D
Approach Vol, veh/h		193			484			1214			860	
Approach Delay, s/veh		49.8			95.0			42.7			53.3	
Approach LOS		D			F			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.0	14.8	17.0	45.0	8.1	31.7	14.7	47.3				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	20.0	28.0	12.0	40.0	15.0	33.0	15.0	37.0				
Max Q Clear Time (g_c+I1), s	22.0	9.6	12.9	33.0	3.2	7.7	9.9	18.0				
Green Ext Time (p_c), s	0.0	0.1	0.0	2.7	0.0	0.2	0.0	2.6				
Intersection Summary												
HCM 6th Ctrl Delay			55.7									
HCM 6th LOS			E									

Timings

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Existing PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	88	74	33	67	107	55	916	47	920
Future Volume (vph)	88	74	33	67	107	55	916	47	920
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	15.0	29.0	15.0	29.0	16.0	14.0	40.0	16.0	42.0
Total Split (%)	15.0%	29.0%	15.0%	29.0%	16.0%	14.0%	40.0%	16.0%	42.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	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	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effct Green (s)	8.2	14.5	6.0	10.2	16.9	6.8	56.9	6.6	58.7
Actuated g/C Ratio	0.08	0.14	0.06	0.10	0.17	0.07	0.57	0.07	0.59
v/c Ratio	0.68	0.52	0.33	0.39	0.34	0.49	0.51	0.43	0.54
Control Delay	67.9	33.3	53.1	45.3	11.9	54.2	14.8	55.3	17.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.9	33.3	53.1	45.3	11.9	54.2	14.8	55.3	17.5
LOS	E	C	D	D	B	D	B	E	B
Approach Delay		46.8		29.3			16.9		19.2
Approach LOS		D		C			B		B

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 21.6

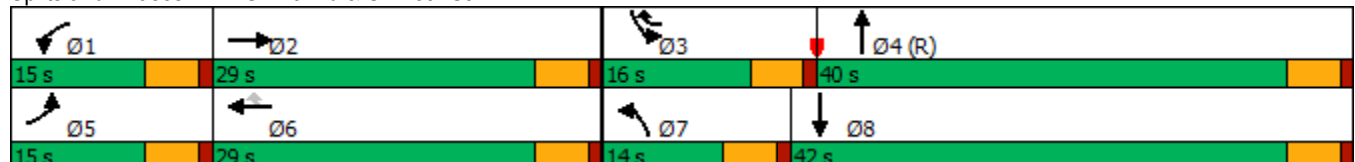
Intersection LOS: C

Intersection Capacity Utilization 61.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Existing PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	88	74	65	33	67	107	55	916	28	47	920	103
Future Volume (veh/h)	88	74	65	33	67	107	55	916	28	47	920	103
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1885	1900	1900	1856	1900	1900	1870	1900	1900	1870	1870
Adj Flow Rate, veh/h	96	80	32	36	73	13	60	996	29	51	1000	105
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
Percent Heavy Veh, %	5	1	0	0	3	0	0	2	0	0	2	2
Cap, veh/h	120	131	52	57	119	162	77	2216	65	69	2024	212
Arrive On Green	0.07	0.10	0.10	0.03	0.06	0.06	0.09	1.00	1.00	0.04	0.62	0.62
Sat Flow, veh/h	1739	1279	512	1810	1856	1572	1810	3526	103	1810	3244	341
Grp Volume(v), veh/h	96	0	112	36	73	13	60	502	523	51	548	557
Grp Sat Flow(s),veh/h/ln	1739	0	1791	1810	1856	1572	1810	1777	1851	1810	1777	1808
Q Serve(g_s), s	5.4	0.0	6.0	2.0	3.8	0.7	3.2	0.0	0.0	2.8	16.8	16.8
Cycle Q Clear(g_c), s	5.4	0.0	6.0	2.0	3.8	0.7	3.2	0.0	0.0	2.8	16.8	16.8
Prop In Lane	1.00		0.29	1.00		1.00	1.00		0.06	1.00		0.19
Lane Grp Cap(c), veh/h	120	0	183	57	119	162	77	1117	1164	69	1108	1128
V/C Ratio(X)	0.80	0.00	0.61	0.63	0.61	0.08	0.78	0.45	0.45	0.74	0.49	0.49
Avail Cap(c_a), veh/h	174	0	430	181	445	438	163	1117	1164	199	1108	1128
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.77	0.77	0.77	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.8	0.0	43.0	47.8	45.6	40.6	45.3	0.0	0.0	47.6	10.2	10.2
Incr Delay (d2), s/veh	9.3	0.0	1.2	4.2	1.9	0.1	4.8	1.0	1.0	5.8	1.6	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.7	0.0	4.8	1.7	3.3	0.5	2.7	0.6	0.6	2.4	10.2	10.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.2	0.0	44.2	52.0	47.4	40.7	50.1	1.0	1.0	53.4	11.8	11.8
LnGrp LOS	E	A	D	D	D	D	D	A	A	D	B	B
Approach Vol, veh/h		208			122			1085			1156	
Approach Delay, s/veh		49.3			48.1			3.7			13.6	
Approach LOS		D			D			A			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.2	15.2	8.8	67.9	11.9	11.4	9.3	67.4				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	24.0	11.0	35.0	10.0	24.0	9.0	37.0				
Max Q Clear Time (g_c+I1), s	4.0	8.0	4.8	2.0	7.4	5.8	5.2	18.8				
Green Ext Time (p_c), s	0.0	0.1	0.0	2.0	0.0	0.1	0.0	2.2				
Intersection Summary												
HCM 6th Ctrl Delay			14.0									
HCM 6th LOS			B									

Timings
2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center
Existing PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 		 			 		 
Traffic Volume (vph)	141	141	178	204	114	582	123	665
Future Volume (vph)	141	141	178	204	114	582	123	665
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	20.0	27.0	20.0	27.0	15.0	35.0	18.0	38.0
Total Split (%)	20.0%	27.0%	20.0%	27.0%	15.0%	35.0%	18.0%	38.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effect Green (s)	8.9	16.0	17.7	24.7	9.6	35.4	11.0	36.8
Actuated g/C Ratio	0.09	0.16	0.18	0.25	0.10	0.35	0.11	0.37
v/c Ratio	0.50	0.75	0.32	0.83	0.74	0.62	0.70	0.68
Control Delay	48.8	51.4	37.8	49.4	84.4	17.2	67.9	28.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.8	51.4	37.8	49.4	84.4	17.2	67.9	28.7
LOS	D	D	D	D	F	B	E	C
Approach Delay		50.3		45.5		26.7		34.0
Approach LOS		D		D		C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 93 (93%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 36.2

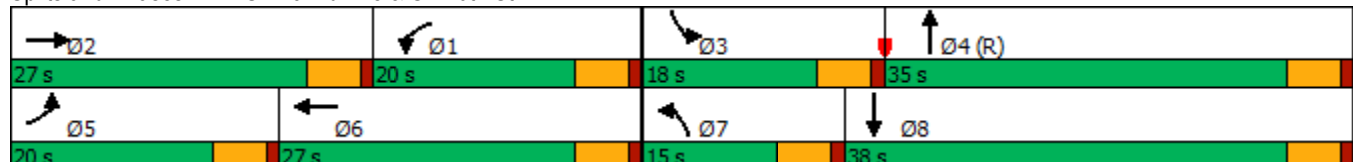
Intersection LOS: D

Intersection Capacity Utilization 68.9%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: SE 192nd Ave & SE 20th St



HCM 6th Signalized Intersection Summary

2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center

Existing PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	141	67	178	204	140	114	582	114	123	665	124
Future Volume (veh/h)	141	141	67	178	204	140	114	582	114	123	665	124
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1885	1900	1900	1870	1900	1885	1900	1885	1870	1885
Adj Flow Rate, veh/h	157	157	54	198	227	129	127	647	110	137	739	121
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
Percent Heavy Veh, %	0	0	1	0	0	2	0	1	0	1	2	1
Cap, veh/h	229	191	66	495	246	140	161	1292	219	171	1309	214
Arrive On Green	0.07	0.14	0.14	0.14	0.22	0.22	0.09	0.42	0.42	0.10	0.43	0.43
Sat Flow, veh/h	3510	1350	464	3510	1130	642	1810	3062	520	1795	3056	500
Grp Volume(v), veh/h	157	0	211	198	0	356	127	378	379	137	430	430
Grp Sat Flow(s),veh/h/ln	1755	0	1814	1755	0	1772	1810	1791	1791	1795	1777	1780
Q Serve(g_s), s	4.4	0.0	11.3	5.1	0.0	19.7	6.9	15.5	15.5	7.5	18.2	18.2
Cycle Q Clear(g_c), s	4.4	0.0	11.3	5.1	0.0	19.7	6.9	15.5	15.5	7.5	18.2	18.2
Prop In Lane	1.00		0.26	1.00		0.36	1.00		0.29	1.00		0.28
Lane Grp Cap(c), veh/h	229	0	257	495	0	385	161	756	756	171	761	762
V/C Ratio(X)	0.68	0.00	0.82	0.40	0.00	0.92	0.79	0.50	0.50	0.80	0.56	0.56
Avail Cap(c_a), veh/h	527	0	399	527	0	390	181	756	756	233	761	762
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.83	0.83	0.83
Uniform Delay (d), s/veh	45.7	0.0	41.7	39.1	0.0	38.3	44.6	21.2	21.2	44.3	21.5	21.6
Incr Delay (d2), s/veh	1.4	0.0	4.0	0.2	0.0	26.8	16.2	2.4	2.4	7.8	2.5	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.4	0.0	8.9	3.9	0.0	16.5	6.7	10.8	10.8	6.4	11.8	11.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.1	0.0	45.7	39.3	0.0	65.1	60.8	23.5	23.6	52.1	24.1	24.1
LnGrp LOS	D	A	D	D	A	E	E	C	C	D	C	C
Approach Vol, veh/h		368			554			884			997	
Approach Delay, s/veh		46.3			55.9			28.9			27.9	
Approach LOS		D			E			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.1	19.2	14.5	47.2	11.5	26.7	13.9	47.8				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	22.0	13.0	30.0	15.0	22.0	10.0	33.0				
Max Q Clear Time (g_c+I1), s	7.1	13.3	9.5	17.5	6.4	21.7	8.9	20.2				
Green Ext Time (p_c), s	0.2	0.4	0.1	2.4	0.2	0.1	0.0	2.8				
Intersection Summary												
HCM 6th Ctrl Delay			36.2									
HCM 6th LOS			D									

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	4	853	3	10	887
Future Vol, veh/h	3	4	853	3	10	887
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	230	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	3	4	948	3	11	986
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1465	476	0	0	951	0
Stage 1	950	-	-	-	-	-
Stage 2	515	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	121	541	-	-	730	-
Stage 1	341	-	-	-	-	-
Stage 2	570	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	119	541	-	-	730	-
Mov Cap-2 Maneuver	119	-	-	-	-	-
Stage 1	341	-	-	-	-	-
Stage 2	561	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	22.2	0	0.1			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 119 541	730	-		
HCM Lane V/C Ratio	-	- 0.028 0.008	0.015	-		
HCM Control Delay (s)	-	- 36.1 11.7	10	-		
HCM Lane LOS	-	- E B	B	-		
HCM 95th %tile Q(veh)	-	- 0.1 0	0	-		

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Existing PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	100	171	295	153	69	733	134	167	673
Future Volume (vph)	100	171	295	153	69	733	134	167	673
Turn Type	pm+pt	NA	pm+pt	NA	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6	7	4	1	3	8
Permitted Phases	2		6				4		
Detector Phase	5	2	1	6	7	4	1	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	14.0	32.0	19.0	37.0	13.0	34.0	19.0	15.0	36.0
Total Split (%)	14.0%	32.0%	19.0%	37.0%	13.0%	34.0%	19.0%	15.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	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	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	20.0	12.3	31.0	18.3	5.8	44.0	57.7	10.0	50.2
Actuated g/C Ratio	0.20	0.12	0.31	0.18	0.06	0.44	0.58	0.10	0.50
v/c Ratio	0.42	0.54	0.87	0.38	0.36	0.50	0.15	0.53	0.47
Control Delay	29.3	36.8	52.7	21.8	50.0	23.3	1.7	36.3	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	36.8	52.7	21.8	50.0	23.3	1.7	36.3	13.2
LOS	C	D	D	C	D	C	A	D	B
Approach Delay		34.5		38.4		22.1			17.4
Approach LOS		C		D		C			B

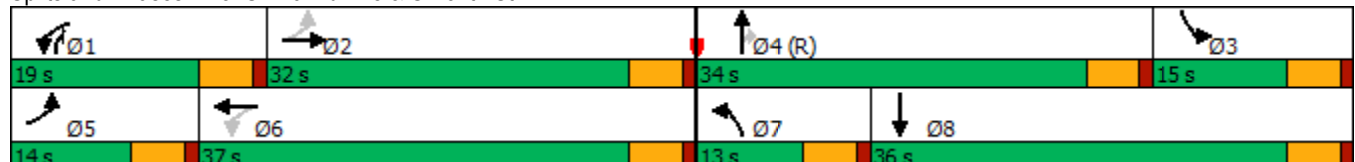
Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 36 (36%), Referenced to phase 4:NBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 25.3
 Intersection Capacity Utilization 67.7%
 Analysis Period (min) 15

Intersection LOS: C

ICU Level of Service C

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Existing PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	171	57	295	153	99	69	733	134	167	673	75
Future Volume (veh/h)	100	171	57	295	153	99	69	733	134	167	673	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	1.00		0.99	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1773	1847	1817	2003	2003	2018	2018	1988	2003	1847	1832	1743
Adj Flow Rate, veh/h	109	186	20	321	166	12	75	797	78	182	732	75
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
Percent Heavy Veh, %	5	0	2	1	1	0	0	2	1	0	1	7
Cap, veh/h	305	304	32	387	582	42	163	1095	727	937	1658	170
Arrive On Green	0.07	0.10	0.10	0.14	0.16	0.16	0.04	0.29	0.29	0.27	0.52	0.52
Sat Flow, veh/h	1688	3192	339	1908	3600	258	3728	3777	1689	3413	3182	326
Grp Volume(v), veh/h	109	101	105	321	87	91	75	797	78	182	400	407
Grp Sat Flow(s),veh/h/ln	1688	1755	1776	1908	1903	1955	1864	1889	1689	1706	1741	1768
Q Serve(g_s), s	5.7	5.5	5.7	14.0	4.0	4.1	2.0	19.0	0.7	4.1	14.3	14.3
Cycle Q Clear(g_c), s	5.7	5.5	5.7	14.0	4.0	4.1	2.0	19.0	0.7	4.1	14.3	14.3
Prop In Lane	1.00		0.19	1.00		0.13	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	305	167	169	387	308	316	163	1095	727	937	907	921
V/C Ratio(X)	0.36	0.60	0.62	0.83	0.28	0.29	0.46	0.73	0.11	0.19	0.44	0.44
Avail Cap(c_a), veh/h	332	474	480	387	609	626	298	1095	727	937	907	921
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.9	43.4	43.5	34.3	36.8	36.9	46.7	31.9	6.6	27.8	14.9	14.9
Incr Delay (d2), s/veh	0.3	1.3	1.4	13.1	0.2	0.2	0.7	4.2	0.3	0.0	1.6	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.2	4.3	4.5	12.8	3.3	3.5	1.6	13.8	0.9	2.9	9.4	9.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.2	44.7	44.8	47.4	37.0	37.0	47.4	36.2	6.9	27.8	16.5	16.4
LnGrp LOS	D	D	D	D	D	D	D	D	A	C	B	B
Approach Vol, veh/h		315			499			950			989	
Approach Delay, s/veh		42.1			43.7			34.7			18.5	
Approach LOS		D			D			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	14.5	32.5	34.0	12.4	21.2	9.4	57.1				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	14.0	27.0	10.0	29.0	9.0	32.0	8.0	31.0				
Max Q Clear Time (g_c+I1), s	16.0	7.7	6.1	21.0	7.7	6.1	4.0	16.3				
Green Ext Time (p_c), s	0.0	0.3	0.0	1.5	0.0	0.3	0.0	1.4				
Intersection Summary												
HCM 6th Ctrl Delay			31.4									
HCM 6th LOS			C									
Notes												
User approved pedestrian interval to be less than phase max green.												

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Existing PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	4	261	34	286	71	1	33	3	58
Future Volume (vph)	4	261	34	286	71	1	33	3	58
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6		8		4	
Permitted Phases					8		4		4
Detector Phase	5	2	1	6	8	8	4	4	4
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	30.0	10.0	30.0	32.0	32.0	34.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%	26.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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	5.0	5.0	5.0	5.0		5.0	5.0
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 Effect Green (s)	5.5	22.0	5.5	24.0	8.6	8.6		8.6	8.6
Actuated g/C Ratio	0.13	0.53	0.13	0.58	0.21	0.21		0.21	0.21
v/c Ratio	0.02	0.20	0.16	0.15	0.28	0.10		0.13	0.16
Control Delay	23.5	8.8	23.6	8.4	16.4	6.8		14.6	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	23.5	8.8	23.6	8.4	16.4	6.8		14.6	5.8
LOS	C	A	C	A	B	A		B	A
Approach Delay		8.9		10.0		13.5		9.1	
Approach LOS		A		A		B		A	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 41.2

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.28

Intersection Signal Delay: 9.9

Intersection LOS: A

Intersection Capacity Utilization 41.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

		
10 s	85 s	35 s
		
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary 6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Existing PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	261	80	34	286	8	71	1	30	33	3	58
Future Volume (veh/h)	4	261	80	34	286	8	71	1	30	33	3	58
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1870	1841	1832	1847	1876	1817	1876	1832	1900	1900	1900
Adj Flow Rate, veh/h	4	278	53	36	304	7	76	1	3	35	3	7
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	2	4	3	2	0	4	0	3	0	0	0
Cap, veh/h	10	1276	240	73	1629	37	324	47	140	338	21	182
Arrive On Green	0.01	0.43	0.43	0.04	0.46	0.46	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1810	2982	560	1745	3506	81	1358	412	1236	1285	189	1603
Grp Volume(v), veh/h	4	164	167	36	152	159	76	0	4	38	0	7
Grp Sat Flow(s),veh/h/ln	1810	1777	1765	1745	1754	1832	1358	0	1648	1474	0	1603
Q Serve(g_s), s	0.1	2.1	2.2	0.7	1.8	1.8	1.9	0.0	0.1	0.6	0.0	0.1
Cycle Q Clear(g_c), s	0.1	2.1	2.2	0.7	1.8	1.8	2.7	0.0	0.1	0.8	0.0	0.1
Prop In Lane	1.00		0.32	1.00		0.04	1.00		0.75	0.92		1.00
Lane Grp Cap(c), veh/h	10	761	756	73	815	851	324	0	187	359	0	182
V/C Ratio(X)	0.41	0.22	0.22	0.49	0.19	0.19	0.23	0.00	0.02	0.11	0.00	0.04
Avail Cap(c_a), veh/h	251	3948	3921	242	3898	4069	1301	0	1373	1407	0	1336
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.8	6.5	6.5	16.9	5.6	5.7	15.8	0.0	14.2	14.5	0.0	14.2
Incr Delay (d2), s/veh	9.6	0.1	0.1	1.9	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	0.8	0.8	0.5	0.6	0.6	1.0	0.0	0.0	0.4	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.5	6.5	6.6	18.8	5.7	5.7	15.9	0.0	14.2	14.5	0.0	14.2
LnGrp LOS	C	A	A	B	A	A	B	A	B	B	A	B
Approach Vol, veh/h	335			347			80			45		
Approach Delay, s/veh	6.8			7.0			15.8			14.5		
Approach LOS	A			A			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.5	20.4		9.1	5.2	21.7		9.1				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	2.7	4.2		2.8	2.1	3.8		4.7				
Green Ext Time (p_c), s	0.0	0.6		0.1	0.0	0.5		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				8.2								
HCM 6th LOS				A								

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	334	32	10	405	0	18	0	7	4	0	108
Future Vol, veh/h	11	334	32	10	405	0	18	0	7	4	0	108
Conflicting Peds, #/hr	6	0	0	0	0	6	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	95	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	2	0	0	2	0	0	0	0	0	0	0
Mvmt Flow	12	367	35	11	445	0	20	0	8	4	0	119

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	451	0	0	402	0	0	654	882	202	682	899	229
Stage 1	-	-	-	-	-	-	409	409	-	473	473	-
Stage 2	-	-	-	-	-	-	245	473	-	209	426	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1120	-	-	1168	-	-	356	287	811	340	281	780
Stage 1	-	-	-	-	-	-	596	600	-	546	562	-
Stage 2	-	-	-	-	-	-	743	562	-	779	589	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1114	-	-	1168	-	-	297	280	810	329	274	776
Mov Cap-2 Maneuver	-	-	-	-	-	-	297	280	-	329	274	-
Stage 1	-	-	-	-	-	-	589	593	-	537	554	-
Stage 2	-	-	-	-	-	-	623	554	-	763	583	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.2			15.8			10.7		
HCM LOS							C			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	361	1114	-	-	1168	-	-	329	776
HCM Lane V/C Ratio	0.076	0.011	-	-	0.009	-	-	0.013	0.153
HCM Control Delay (s)	15.8	8.3	-	-	8.1	-	-	16.1	10.5
HCM Lane LOS	C	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0	0.5

Timings
8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Existing PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	129	295	9	436	10	6	80	14
Future Volume (vph)	129	295	9	436	10	6	80	14
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	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	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	27.0	27.4	24.6	21.4	9.2	9.2	9.2	9.2
Actuated g/C Ratio	0.60	0.61	0.54	0.47	0.20	0.20	0.20	0.20
v/c Ratio	0.24	0.16	0.02	0.34	0.04	0.02	0.30	0.27
Control Delay	9.1	9.2	7.1	12.2	13.9	12.4	17.7	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	9.2	7.1	12.2	13.9	12.4	17.7	6.7
LOS	A	A	A	B	B	B	B	A
Approach Delay		9.2		12.2		13.2		11.5
Approach LOS		A		B		B		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 45.2

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.34

Intersection Signal Delay: 11.0

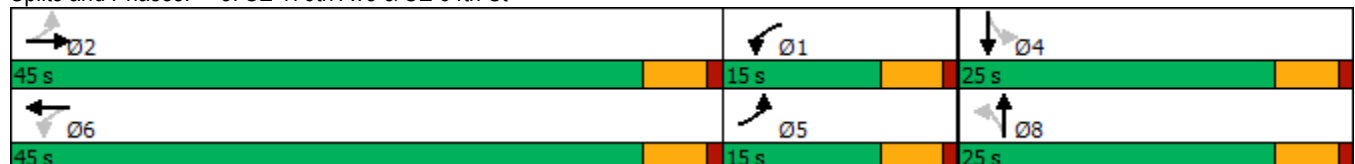
Intersection LOS: B

Intersection Capacity Utilization 45.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Existing PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	129	295	13	9	436	86	10	6	2	80	14	88
Future Volume (veh/h)	129	295	13	9	436	86	10	6	2	80	14	88
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1870	1900	1900	1885	1885	1900	1900	1900	1885	1900	1900
Adj Flow Rate, veh/h	140	321	11	10	474	69	11	7	0	87	15	8
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
Percent Heavy Veh, %	1	2	0	0	1	1	0	0	0	1	0	0
Cap, veh/h	626	1394	48	734	1249	181	319	195	0	331	119	63
Arrive On Green	0.10	0.40	0.40	0.10	0.40	0.40	0.10	0.10	0.00	0.10	0.10	0.10
Sat Flow, veh/h	1795	3506	120	1810	3139	455	1407	1900	0	1416	1159	618
Grp Volume(v), veh/h	140	162	170	10	269	274	11	7	0	87	0	23
Grp Sat Flow(s),veh/h/ln	1795	1777	1849	1810	1791	1803	1407	1900	0	1416	0	1777
Q Serve(g_s), s	0.0	2.3	2.3	0.0	4.0	4.1	0.3	0.1	0.0	2.2	0.0	0.4
Cycle Q Clear(g_c), s	0.0	2.3	2.3	0.0	4.0	4.1	0.7	0.1	0.0	2.3	0.0	0.4
Prop In Lane	1.00		0.06	1.00		0.25	1.00		0.00	1.00		0.35
Lane Grp Cap(c), veh/h	626	707	735	734	712	717	319	195	0	331	0	182
V/C Ratio(X)	0.22	0.23	0.23	0.01	0.38	0.38	0.03	0.04	0.00	0.26	0.00	0.13
Avail Cap(c_a), veh/h	919	1885	1961	1029	1900	1913	920	1008	0	937	0	942
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.3	7.5	7.5	6.0	8.0	8.1	15.7	15.2	0.0	16.3	0.0	15.4
Incr Delay (d2), s/veh	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.2	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.9	1.0	1.0	0.0	1.7	1.8	0.1	0.1	0.0	1.1	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.4	7.6	7.6	6.0	8.2	8.2	15.7	15.3	0.0	16.5	0.0	15.5
LnGrp LOS	A	A	A	A	A	A	B	B	A	B	A	B
Approach Vol, veh/h	472			553			18			110		
Approach Delay, s/veh	7.8			8.1			15.6			16.3		
Approach LOS	A			A			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.8	20.0		8.9	8.8	20.0		8.9				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	4.3		4.3	2.0	6.1		2.7				
Green Ext Time (p_c), s	0.0	1.1		0.1	0.1	2.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay 8.9
HCM 6th LOS A

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	23	13	221	162	14
Future Vol, veh/h	15	23	13	221	162	14
Conflicting Peds, #/hr	0	3	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	7	0	15	0	1	0
Mvmt Flow	16	25	14	238	174	15
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	448	185	189	0	-	0
Stage 1	182	-	-	-	-	-
Stage 2	266	-	-	-	-	-
Critical Hdwy	6.47	6.2	4.25	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.3	2.335	-	-	-
Pot Cap-1 Maneuver	559	862	1311	-	-	-
Stage 1	837	-	-	-	-	-
Stage 2	767	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	553	860	1311	-	-	-
Mov Cap-2 Maneuver	553	-	-	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	767	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	10.4	0.4		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1311	-	705	-	-	
HCM Lane V/C Ratio	0.011	-	0.058	-	-	
HCM Control Delay (s)	7.8	-	10.4	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	

Intersection	
Intersection Delay, s/veh	24.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	350	44	67	370	14	34	101	62	25	76	26
Future Vol, veh/h	37	350	44	67	370	14	34	101	62	25	76	26
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
Heavy Vehicles, %	3	0	0	1	0	7	0	1	0	4	1	8
Mvmt Flow	40	380	48	73	402	15	37	110	67	27	83	28
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	29	26.6	14.2	14.7
HCM LOS	D	D	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	20%
Vol Thru, %	0%	62%	0%	89%	0%	96%	60%
Vol Right, %	0%	38%	0%	11%	0%	4%	20%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	34	163	37	394	67	384	127
LT Vol	34	0	37	0	67	0	25
Through Vol	0	101	0	350	0	370	76
RT Vol	0	62	0	44	0	14	26
Lane Flow Rate	37	177	40	428	73	417	138
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.085	0.37	0.082	0.795	0.147	0.778	0.309
Departure Headway (Hd)	8.289	7.518	7.33	6.686	7.266	6.711	8.057
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	432	477	488	540	493	538	444
Service Time	6.053	5.282	5.085	4.441	5.022	4.466	6.133
HCM Lane V/C Ratio	0.086	0.371	0.082	0.793	0.148	0.775	0.311
HCM Control Delay	11.8	14.7	10.7	30.7	11.3	29.3	14.7
HCM Lane LOS	B	B	B	D	B	D	B
HCM 95th-tile Q	0.3	1.7	0.3	7.5	0.5	7.1	1.3

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Existing PM Peak Hour Conditions

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	66	23	39	21	17	38	38	1296	43	1193
Future Volume (vph)	66	23	39	21	17	38	38	1296	43	1193
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA
Protected Phases		2			6		7	4	3	8
Permitted Phases	2		2	6		6				
Detector Phase	2	2	2	6	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	39.0	39.0	39.0	38.0	38.0	38.0	10.0	32.0	19.5	32.0
Total Split (s)	39.0	39.0	39.0	39.0	39.0	39.0	15.0	66.0	15.0	66.0
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	12.5%	55.0%	12.5%	55.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max
Act Effct Green (s)	14.7	14.7	14.7	14.7	14.7	14.7	6.1	87.3	9.0	90.2
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.05	0.73	0.08	0.75
v/c Ratio	0.40	0.10	0.14	0.13	0.09	0.14	0.46	0.38	0.34	0.34
Control Delay	52.8	43.6	1.0	44.5	43.1	1.0	52.3	18.3	59.3	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.8	43.6	1.0	44.5	43.1	1.0	52.3	18.3	59.3	8.0
LOS	D	D	A	D	D	A	D	B	E	A
Approach Delay		35.3			22.4			19.3		9.7
Approach LOS		D			C			B		A

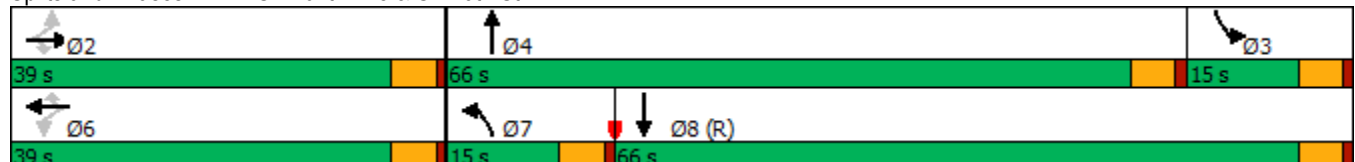
Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 112 (93%), Referenced to phase 8:SBT, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.46
 Intersection Signal Delay: 15.8
 Intersection Capacity Utilization 54.9%
 Analysis Period (min) 15

Intersection LOS: B

ICU Level of Service A

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Existing PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	23	39	21	17	38	38	1296	29	43	1193	38
Future Volume (veh/h)	66	23	39	21	17	38	38	1296	29	43	1193	38
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1826	1633	1856	1826	1870	1752	1870	1885	1900
Adj Flow Rate, veh/h	69	24	2	22	18	2	40	1364	30	45	1256	38
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	5	18	3	5	2	10	2	1	0
Cap, veh/h	180	182	153	173	156	150	53	2613	57	58	2618	79
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.03	0.51	0.51	0.03	0.51	0.51
Sat Flow, veh/h	1406	1900	1600	1344	1633	1563	1739	5141	113	1781	5133	155
Grp Volume(v), veh/h	69	24	2	22	18	2	40	903	491	45	840	454
Grp Sat Flow(s),veh/h/ln	1406	1900	1600	1344	1633	1563	1739	1702	1850	1781	1716	1857
Q Serve(g_s), s	5.7	1.4	0.1	1.8	1.2	0.1	2.7	21.3	21.3	3.0	19.0	19.0
Cycle Q Clear(g_c), s	6.9	1.4	0.1	3.2	1.2	0.1	2.7	21.3	21.3	3.0	19.0	19.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.06	1.00		0.08
Lane Grp Cap(c), veh/h	180	182	153	173	156	150	53	1730	940	58	1750	947
V/C Ratio(X)	0.38	0.13	0.01	0.13	0.12	0.01	0.75	0.52	0.52	0.78	0.48	0.48
Avail Cap(c_a), veh/h	444	538	453	425	463	443	145	1730	940	148	1750	947
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.79	0.79	0.79	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.8	49.7	49.1	51.2	49.6	49.1	57.7	19.7	19.7	57.6	19.1	19.1
Incr Delay (d2), s/veh	0.5	0.1	0.0	0.1	0.1	0.0	6.1	0.9	1.6	8.1	0.9	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.7	1.2	0.1	1.1	0.9	0.1	2.3	12.4	13.5	2.6	11.9	13.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.3	49.8	49.1	51.3	49.7	49.1	63.8	20.6	21.4	65.7	20.0	20.8
LnGrp LOS	D	D	D	D	D	D	E	C	C	E	C	C
Approach Vol, veh/h		95			42			1434			1339	
Approach Delay, s/veh		52.3			50.5			22.1			21.8	
Approach LOS		D			D			C			C	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		16.5	8.9	66.0		16.5	8.7	66.2				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		34.0	10.0	61.0		34.0	10.0	61.0				
Max Q Clear Time (g_c+I1), s		8.9	5.0	23.3		5.2	4.7	21.0				
Green Ext Time (p_c), s		0.0	0.0	1.5		0.0	0.0	1.4				
Intersection Summary												
HCM 6th Ctrl Delay			23.4									
HCM 6th LOS			C									

Timings
12: SE 164th Ave & SE 34th Street

Vancouver Innovation Center
Existing PM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	 			 				 			  
Traffic Volume (vph)	45	88	178	302	105	194	179	1124	297	147	1061
Future Volume (vph)	45	88	178	302	105	194	179	1124	297	147	1061
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	15.0	33.0	20.0	17.0	35.0	20.0	20.0	50.0	17.0	20.0	50.0
Total Split (%)	12.5%	27.5%	16.7%	14.2%	29.2%	16.7%	16.7%	41.7%	14.2%	16.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	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	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	5.6	9.7	31.9	12.0	18.0	37.3	17.2	64.1	81.1	14.3	61.1
Actuated g/C Ratio	0.05	0.08	0.27	0.10	0.15	0.31	0.14	0.53	0.68	0.12	0.51
v/c Ratio	0.32	0.64	0.40	1.59	0.40	0.36	0.74	0.63	0.27	0.74	0.46
Control Delay	60.7	72.8	24.2	323.8	51.2	15.7	66.6	23.0	2.7	69.4	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.7	72.8	24.2	323.8	51.2	15.7	66.6	23.0	2.7	69.4	18.7
LOS	E	E	C	F	D	B	E	C	A	E	B
Approach Delay		43.3			176.9			24.1			24.6
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 40 (33%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.59

Intersection Signal Delay: 50.2

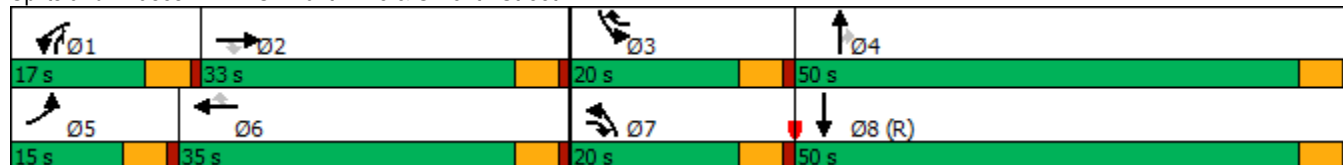
Intersection LOS: D

Intersection Capacity Utilization 67.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave & SE 34th Street



HCM 6th Signalized Intersection Summary

12: SE 164th Ave & SE 34th Street

Vancouver Innovation Center
Existing PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	88	178	302	105	194	179	1124	297	147	1061	46
Future Volume (veh/h)	45	88	178	302	105	194	179	1124	297	147	1061	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1714	1773	1832	1870	1841	1856	1791	1776	1791	1776	1776	1746
Adj Flow Rate, veh/h	47	92	134	315	109	120	186	1171	210	153	1105	45
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	9	5	1	2	4	3	1	2	1	2	2	4
Cap, veh/h	104	164	335	200	293	417	211	1325	748	179	1792	73
Arrive On Green	0.03	0.09	0.09	0.10	0.16	0.16	0.12	0.39	0.39	0.04	0.12	0.12
Sat Flow, veh/h	3166	1773	1553	1995	1841	1572	1706	3375	1518	1692	4779	195
Grp Volume(v), veh/h	47	92	134	315	109	120	186	1171	210	153	747	403
Grp Sat Flow(s),veh/h/ln	1583	1773	1553	998	1841	1572	1706	1687	1518	1692	1616	1741
Q Serve(g_s), s	1.7	6.0	8.9	12.0	6.3	7.3	12.9	38.7	9.8	10.8	26.3	26.3
Cycle Q Clear(g_c), s	1.7	6.0	8.9	12.0	6.3	7.3	12.9	38.7	9.8	10.8	26.3	26.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	104	164	335	200	293	417	211	1325	748	179	1212	653
V/C Ratio(X)	0.45	0.56	0.40	1.58	0.37	0.29	0.88	0.88	0.28	0.85	0.62	0.62
Avail Cap(c_a), veh/h	264	414	554	200	460	560	213	1325	748	211	1212	653
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Uniform Delay (d), s/veh	57.0	52.1	40.4	54.0	45.1	35.1	51.7	33.9	17.9	57.0	44.4	44.4
Incr Delay (d2), s/veh	1.1	1.1	0.3	283.1	0.3	0.1	30.8	8.8	0.9	20.6	2.2	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.3	4.8	6.1	18.5	5.2	5.0	11.6	23.5	6.3	9.7	17.2	18.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	53.3	40.7	337.1	45.4	35.2	82.5	42.7	18.9	77.6	46.6	48.5
LnGrp LOS	E	D	D	F	D	D	F	D	B	E	D	D
Approach Vol, veh/h	273			544			1567			1303		
Approach Delay, s/veh	47.9			212.1			44.3			50.8		
Approach LOS	D			F			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	16.1	17.7	52.1	9.0	24.1	19.8	50.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	28.0	15.0	45.0	10.0	30.0	15.0	45.0				
Max Q Clear Time (g_c+I1), s	14.0	10.9	12.8	40.7	3.7	9.3	14.9	28.3				
Green Ext Time (p_c), s	0.0	0.2	0.0	1.6	0.0	0.2	0.0	2.5				
Intersection Summary												
HCM 6th Ctrl Delay	71.6											
HCM 6th LOS	E											

Appendix D VIC Campus Volume Adjustment

Table 1 summarizes the combined traffic counts at 10th s main and west gates during the time intervals determined by the County in 1994. Table 1 also indicates the specific trip generation rates derived from these counts according to the actual development on HP's South Campus.

Impact of HP North Campus Development on 10th S Avenue
Page 1 of 2



	Traffic Counts	Trip Rate per Thousand Gross Square Feet
AM Peak (7:45 AM - 8:45 AM)		
Entering	261	0.37
Exiting	119	0.17
Total	380	0.53
PM Peak (4:35 PM - 5:35 PM)		
Entering	76	0.11
Exiting	146	0.21
Total	222	0.32

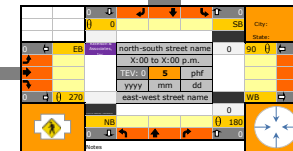
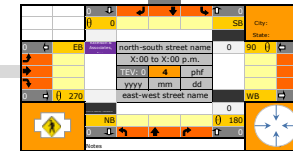
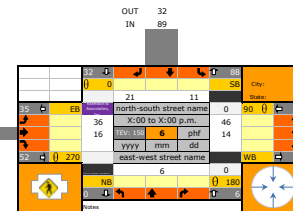
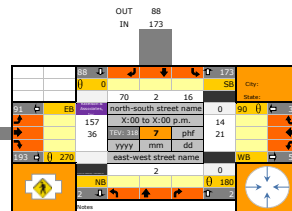
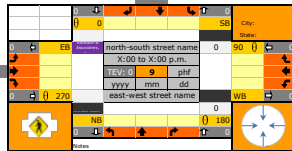
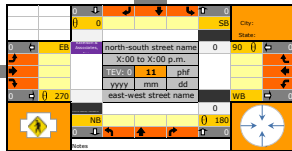
Total for 712,000K
+3,000 K since 1996 count
###

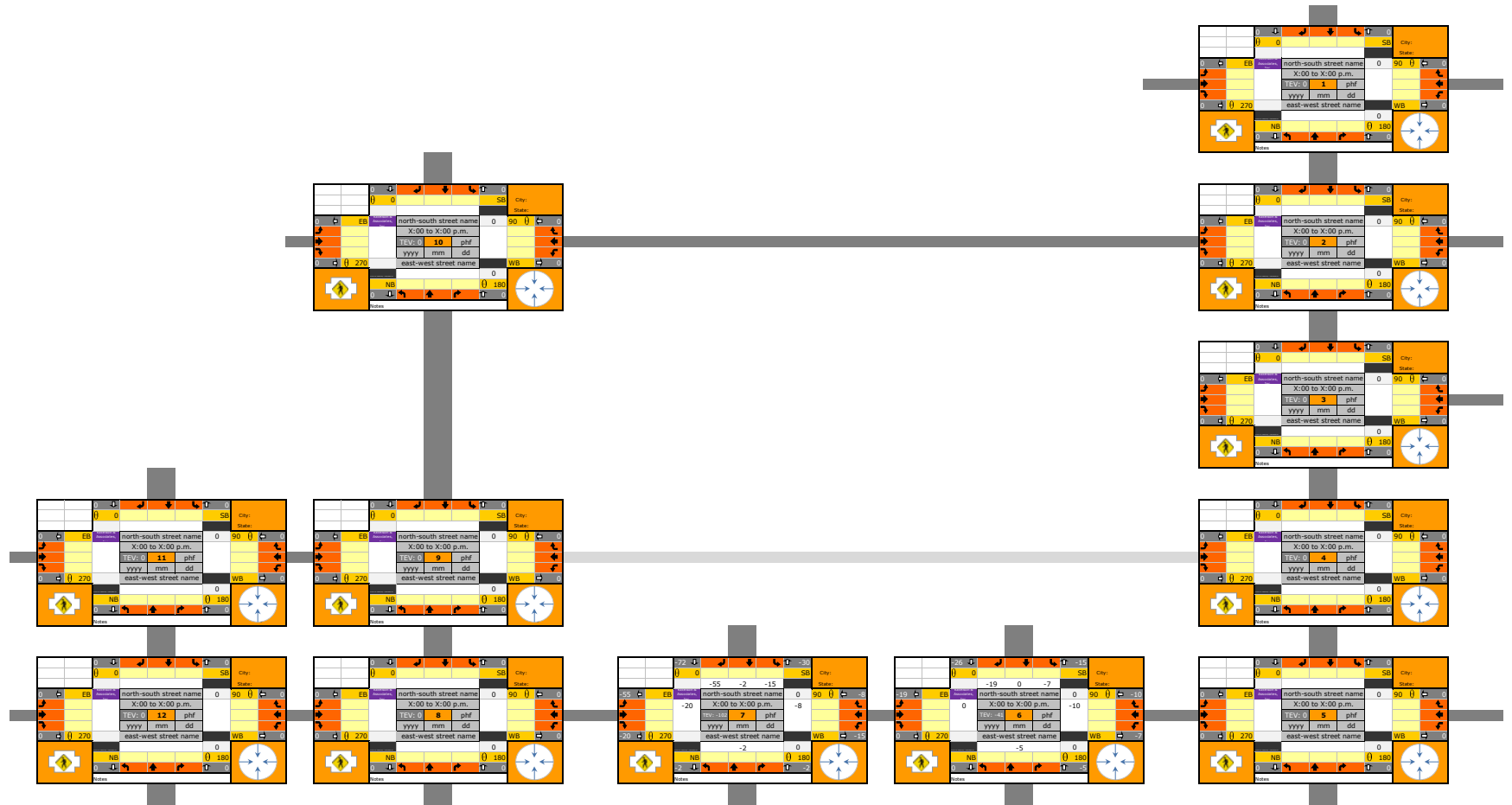
TOTAL	IN	OUT
380	261	119
2	1	1
382	262	120

Previous version - use			Latest version - in/out split		
OUT	0.65		OUT	0.75	
IN	0.60		IN	0.65	
OUT	0.73	0.18	OUT	0.33	0.06
IN	0.35	0.04	IN	0.35	0.04

Note: the outward distribution percentages programmed in the spreadsheet for intersection 7 is slightly different to what was calculated above. I kept to what was programmed in the spreadsheet.

TOTAL IN OUT
262 120
2020 Site Driveway Count Distribution - Same Pattern used for Assignment of Historic Trips





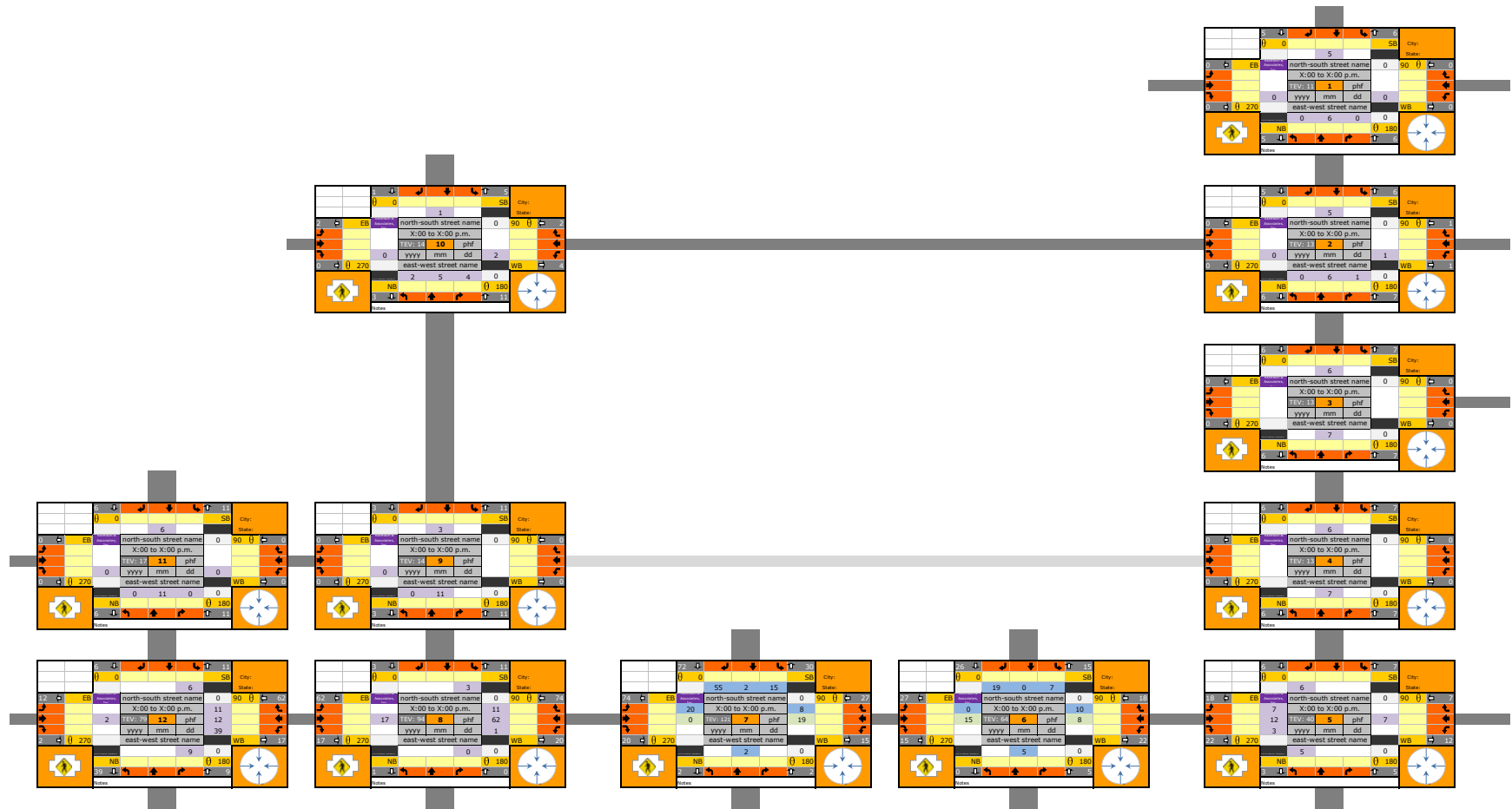


Table 1 summarizes the combined traffic counts at HP's east and west gates during the time intervals determined by the County in 1996. Table 1 also indicates the specific trip generation rates derived from these counts according to the actual development on HP's South Campus.

Report of HP South Campus Development on 104th Avenue
Page 1 of 3

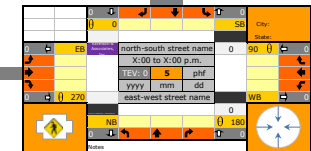
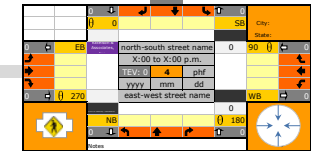
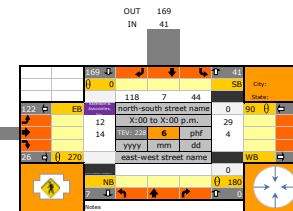
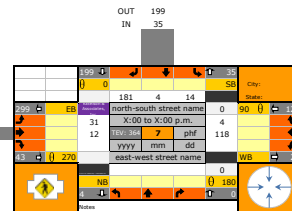
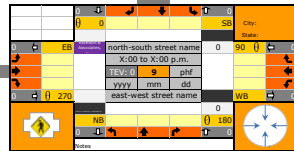
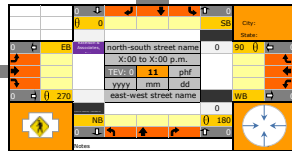


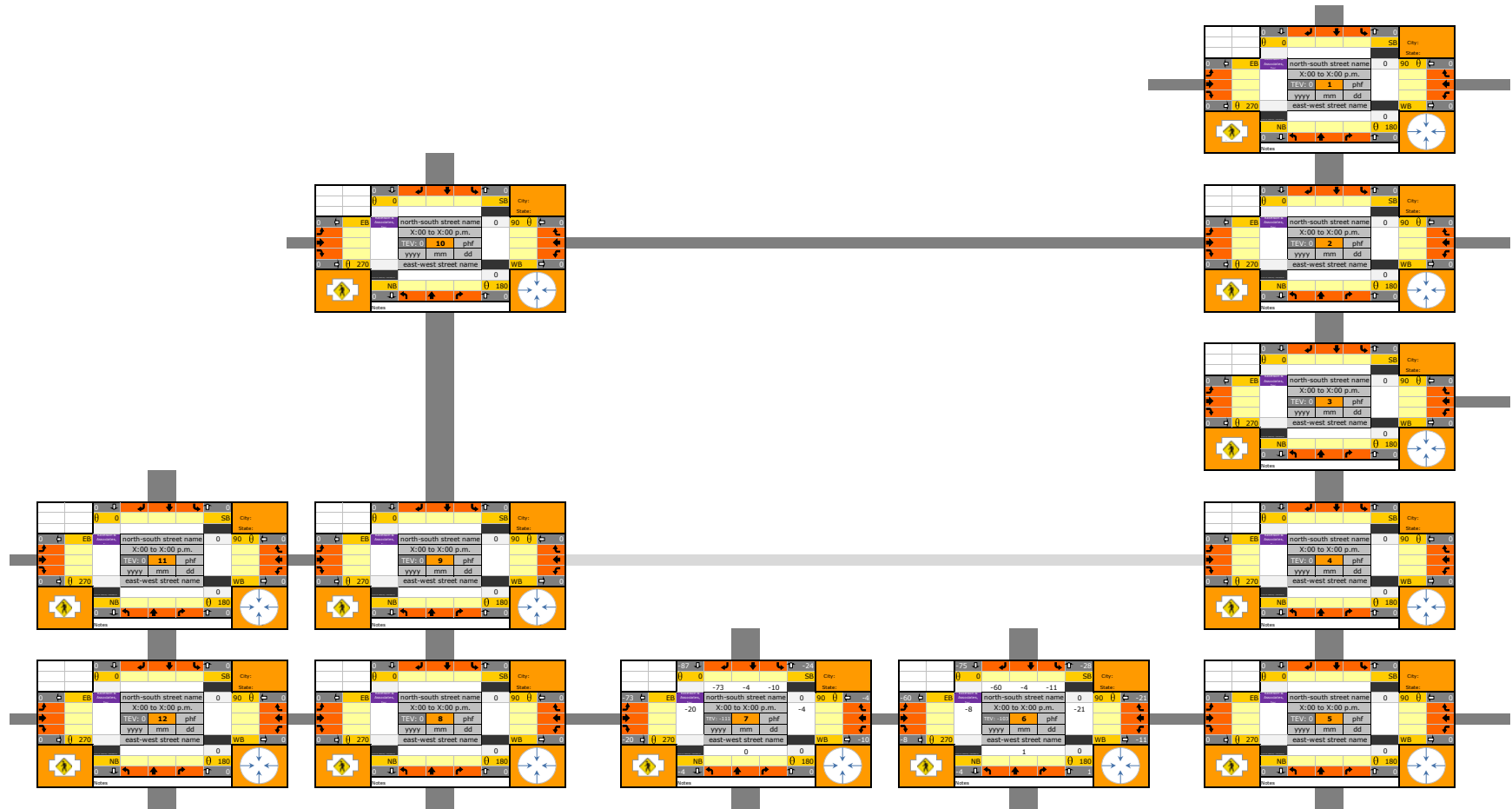
	Traffic Counts	Trip Rate per Thousand Gross Square Feet
AM Peak (7:05 AM - 8:05 AM)		
Entering	261	0.37
Exiting	119	0.17
Total	380	0.53
PM Peak (4:35 PM - 5:35 PM)		
Entering	76	0.11
Exiting	366	0.51
Total	442	0.62

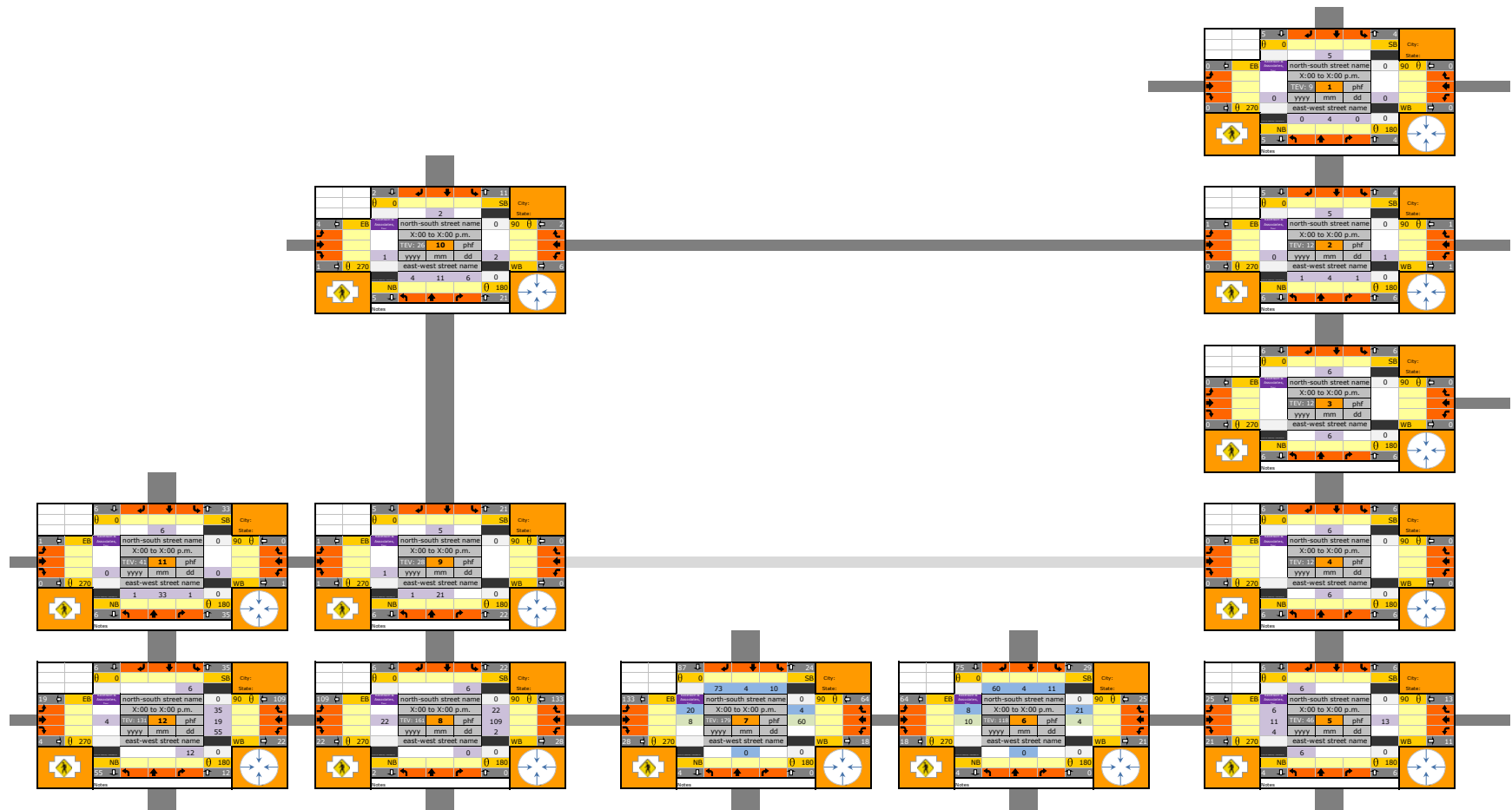
Total for 712,000K
+3,000 K since 1996 count
###

OUT 0.47 IN 0.56 OUT 0.91 0.02 0.07 IN 0.89 0.11	Previous version - use	OUT 0.53 IN 0.44 OUT 0.70 0.04 0.25 IN 0.29 0.71	Latest version - in/out split	OUT 0.46 IN 0.54 OUT 0.62 0.03 0.35 IN 0.31 0.62
TOTAL 76 368		TOTAL 76 368		TOTAL 76 368

2020 Site Driveway Count Distribution - Same Pattern used for Assignment of Historic Trips







Calculated as difference of 2023 count trips and historical (1996) site trips
 Carried through
 Back distributed to system based on 2023 volume ratios (see previous network tool versions for volume ratios)

Appendix E 2038 Baseline Operations
Worksheets & Total In-process
Trip Assignment

Timings
1: SE 192nd & SE 15th St

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	156	45	29	64	158	46	910	89	793
Future Volume (vph)	156	45	29	64	158	46	910	89	793
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	20.0	29.0	20.0	29.0	14.0	15.0	37.0	14.0	36.0
Total Split (%)	20.0%	29.0%	20.0%	29.0%	14.0%	15.0%	37.0%	14.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	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	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effct Green (s)	12.4	18.7	5.9	10.2	22.0	6.7	50.6	8.8	54.7
Actuated g/C Ratio	0.12	0.19	0.06	0.10	0.22	0.07	0.51	0.09	0.55
v/c Ratio	0.80	0.25	0.32	0.38	0.42	0.44	0.59	0.69	0.54
Control Delay	67.8	21.5	53.4	45.3	17.3	59.9	18.2	69.1	20.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	21.5	53.4	45.3	17.3	59.9	18.2	69.1	20.4
LOS	E	C	D	D	B	E	B	E	C
Approach Delay		52.2		28.6			20.1		24.8
Approach LOS		D		C			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 9 (9%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 26.0

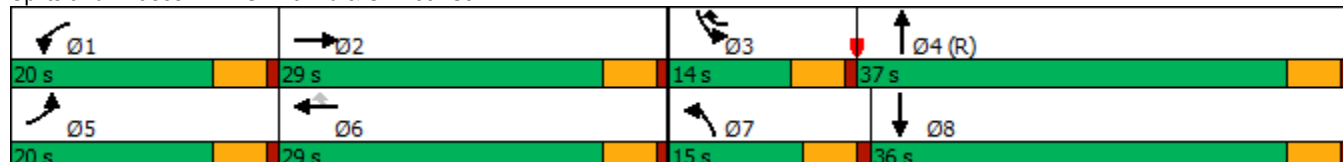
Intersection LOS: C

Intersection Capacity Utilization 58.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Baseline 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	45	34	29	64	158	46	910	16	89	793	87
Future Volume (veh/h)	156	45	34	29	64	158	46	910	16	89	793	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1900	1796	1781	1841	1870	1856	1841	1900	1737	1767	1856
Adj Flow Rate, veh/h	173	50	6	32	71	97	51	1011	17	99	881	90
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
Percent Heavy Veh, %	3	0	7	8	4	2	3	4	0	11	9	3
Cap, veh/h	204	271	32	50	141	239	88	1878	32	122	1715	175
Arrive On Green	0.12	0.16	0.16	0.03	0.08	0.08	0.10	1.00	1.00	0.07	0.56	0.56
Sat Flow, veh/h	1767	1664	200	1697	1841	1585	1767	3518	59	1654	3074	314
Grp Volume(v), veh/h	173	0	56	32	71	97	51	503	525	99	481	490
Grp Sat Flow(s),veh/h/ln	1767	0	1864	1697	1841	1585	1767	1749	1829	1654	1678	1710
Q Serve(g_s), s	9.6	0.0	2.6	1.9	3.7	5.5	2.8	0.0	0.0	5.9	17.8	17.8
Cycle Q Clear(g_c), s	9.6	0.0	2.6	1.9	3.7	5.5	2.8	0.0	0.0	5.9	17.8	17.8
Prop In Lane	1.00		0.11	1.00		1.00	1.00		0.03	1.00		0.18
Lane Grp Cap(c), veh/h	204	0	303	50	141	239	88	934	976	122	936	954
V/C Ratio(X)	0.85	0.00	0.18	0.64	0.50	0.41	0.58	0.54	0.54	0.81	0.51	0.51
Avail Cap(c_a), veh/h	265	0	447	254	442	498	177	934	976	149	936	954
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.84	0.84	0.84	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.4	0.0	36.1	48.0	44.3	38.4	44.0	0.0	0.0	45.6	13.7	13.7
Incr Delay (d2), s/veh	14.7	0.0	0.1	5.0	1.0	0.4	1.9	1.9	1.8	19.5	2.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.5	0.0	2.1	1.5	3.1	3.8	2.1	0.9	0.9	5.4	10.8	10.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	0.0	36.2	53.0	45.3	38.8	45.8	1.9	1.8	65.1	15.7	15.7
LnGrp LOS	E	A	D	D	D	D	D	A	A	E	B	B
Approach Vol, veh/h		229			200			1079			1070	
Approach Delay, s/veh		52.8			43.4			3.9			20.3	
Approach LOS		D			D			A			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.9	21.3	12.4	58.4	16.5	12.7	10.0	60.8				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	24.0	9.0	32.0	15.0	24.0	10.0	31.0				
Max Q Clear Time (g_c+I1), s	3.9	4.6	7.9	2.0	11.6	7.5	4.8	19.8				
Green Ext Time (p_c), s	0.0	0.1	0.0	2.0	0.0	0.2	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay			18.1									
HCM 6th LOS			B									

Timings
2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	166	182	106	165	46	689	59	643
Future Volume (vph)	166	182	106	165	46	689	59	643
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	17.0	29.0	17.0	29.0	15.0	39.0	15.0	39.0
Total Split (%)	17.0%	29.0%	17.0%	29.0%	15.0%	39.0%	15.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effct Green (s)	9.4	18.6	7.6	16.8	7.4	48.0	7.9	46.4
Actuated g/C Ratio	0.09	0.19	0.08	0.17	0.07	0.48	0.08	0.46
v/c Ratio	0.55	0.79	0.42	0.74	0.38	0.52	0.44	0.50
Control Delay	49.5	51.4	48.6	50.4	68.6	8.1	51.7	26.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	51.4	48.6	50.4	68.6	8.1	51.7	26.3
LOS	D	D	D	D	E	A	D	C
Approach Delay		50.6		49.8		11.3		28.2
Approach LOS		D		D		B		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 29.0

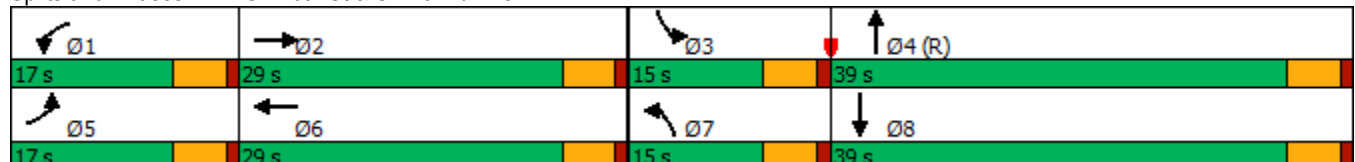
Intersection LOS: C

Intersection Capacity Utilization 62.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: SE 20th St & SE 192nd Ave



HCM 6th Signalized Intersection Summary

2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	166	182	78	106	165	57	46	689	132	59	643	103
Future Volume (veh/h)	166	182	78	106	165	57	46	689	132	59	643	103
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1900	1841	1885	1885	1885	1811	1856	1841	1885	1811	1826
Adj Flow Rate, veh/h	175	192	65	112	174	46	48	725	125	62	677	97
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	0	4	1	1	1	6	3	4	1	6	5
Cap, veh/h	242	222	75	174	206	54	86	1629	281	80	1620	232
Arrive On Green	0.07	0.16	0.16	0.05	0.14	0.14	0.05	0.54	0.54	0.06	0.71	0.71
Sat Flow, veh/h	3428	1358	460	3483	1437	380	1725	3006	518	1795	3021	432
Grp Volume(v), veh/h	175	0	257	112	0	220	48	425	425	62	385	389
Grp Sat Flow(s),veh/h/ln	1714	0	1817	1742	0	1817	1725	1763	1762	1795	1721	1733
Q Serve(g_s), s	5.0	0.0	13.8	3.2	0.0	11.8	2.7	14.6	14.6	3.4	9.1	9.2
Cycle Q Clear(g_c), s	5.0	0.0	13.8	3.2	0.0	11.8	2.7	14.6	14.6	3.4	9.1	9.2
Prop In Lane	1.00		0.25	1.00		0.21	1.00		0.29	1.00		0.25
Lane Grp Cap(c), veh/h	242	0	298	174	0	260	86	955	954	80	923	929
V/C Ratio(X)	0.72	0.00	0.86	0.64	0.00	0.85	0.56	0.45	0.45	0.78	0.42	0.42
Avail Cap(c_a), veh/h	411	0	436	418	0	436	172	955	954	180	923	929
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.83	0.83	0.83
Uniform Delay (d), s/veh	45.5	0.0	40.7	46.6	0.0	41.8	46.4	13.8	13.8	46.5	8.0	8.0
Incr Delay (d2), s/veh	1.5	0.0	8.3	1.5	0.0	3.2	2.1	1.5	1.5	4.9	1.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.8	0.0	10.9	2.5	0.0	9.1	2.1	9.6	9.6	2.8	5.3	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.0	0.0	49.0	48.1	0.0	45.0	48.5	15.3	15.3	51.5	9.1	9.1
LnGrp LOS	D	A	D	D	A	D	D	B	B	D	A	A
Approach Vol, veh/h	432			332			898			836		
Approach Delay, s/veh	48.2			46.0			17.1			12.3		
Approach LOS	D			D			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	21.4	9.5	59.2	12.1	19.3	10.0	58.6				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	24.0	10.0	34.0	12.0	24.0	10.0	34.0				
Max Q Clear Time (g_c+I1), s	5.2	15.8	5.4	16.6	7.0	13.8	4.7	11.2				
Green Ext Time (p_c), s	0.1	0.5	0.0	3.1	0.1	0.5	0.0	2.9				

Intersection Summary

HCM 6th Ctrl Delay 24.7
HCM 6th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	10	789	3	7	801
Future Vol, veh/h	7	10	789	3	7	801
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	230	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	20	4	67	0	7
Mvmt Flow	7	11	831	3	7	843
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1270	418	0	0	835	0
Stage 1	834	-	-	-	-	-
Stage 2	436	-	-	-	-	-
Critical Hdwy	6.8	7.3	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.5	-	-	2.2	-
Pot Cap-1 Maneuver	163	536	-	-	807	-
Stage 1	392	-	-	-	-	-
Stage 2	625	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	161	535	-	-	806	-
Mov Cap-2 Maneuver	161	-	-	-	-	-
Stage 1	392	-	-	-	-	-
Stage 2	619	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	18.7	0	0.1			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 161 535	806	-		
HCM Lane V/C Ratio	-	- 0.046 0.02	0.009	-		
HCM Control Delay (s)	-	- 28.4 11.9	9.5	-		
HCM Lane LOS	-	- D B	A	-		
HCM 95th %tile Q(veh)	-	- 0.1 0.1	0	-		

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	100	148	207	117	67	100	704	349	108	547
Future Volume (vph)	100	148	207	117	67	100	704	349	108	547
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	15.0	36.0	15.0	36.0	36.0	15.0	34.0	15.0	15.0	34.0
Total Split (%)	15.0%	36.0%	15.0%	36.0%	36.0%	15.0%	34.0%	15.0%	15.0%	34.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	25.3	17.2	28.8	19.0	19.0	8.8	43.0	52.8	10.0	44.2
Actuated g/C Ratio	0.25	0.17	0.29	0.19	0.19	0.09	0.43	0.53	0.10	0.44
v/c Ratio	0.33	0.71	0.80	0.36	0.16	0.69	0.54	0.38	0.35	0.53
Control Delay	25.6	46.7	46.5	36.3	0.8	66.1	24.8	2.2	41.1	21.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.6	46.7	46.5	36.3	0.8	66.1	24.8	2.2	41.1	21.1
LOS	C	D	D	D	A	E	C	A	D	C
Approach Delay		39.7		35.6			21.6			23.9
Approach LOS		D		D			C			C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 26.5

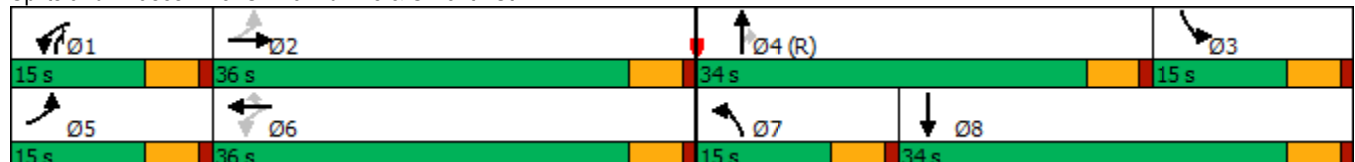
Intersection LOS: C

Intersection Capacity Utilization 67.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	148	55	207	117	67	100	704	349	108	547	116
Future Volume (veh/h)	100	148	55	207	117	67	100	704	349	108	547	116
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1728	1803	1847	1943	2018	1988	2018	1883	1988	1832	1684	1684
Adj Flow Rate, veh/h	111	164	43	230	130	4	111	782	172	120	608	113
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
Percent Heavy Veh, %	8	3	0	5	0	2	0	9	2	1	11	11
Cap, veh/h	338	214	56	308	371	303	141	1037	655	860	1267	235
Arrive On Green	0.07	0.16	0.16	0.10	0.18	0.18	0.07	0.29	0.29	0.25	0.47	0.47
Sat Flow, veh/h	1646	1374	360	1850	2018	1652	1922	3578	1679	3385	2694	500
Grp Volume(v), veh/h	111	0	207	230	130	4	111	782	172	120	361	360
Grp Sat Flow(s),veh/h/ln	1646	0	1734	1850	2018	1652	1922	1789	1679	1693	1600	1593
Q Serve(g_s), s	5.6	0.0	11.4	10.0	5.6	0.1	5.7	19.9	2.4	2.7	15.4	15.5
Cycle Q Clear(g_c), s	5.6	0.0	11.4	10.0	5.6	0.1	5.7	19.9	2.4	2.7	15.4	15.5
Prop In Lane	1.00		0.21	1.00		1.00	1.00		1.00	1.00		0.31
Lane Grp Cap(c), veh/h	338	0	271	308	371	303	141	1037	655	860	753	750
V/C Ratio(X)	0.33	0.00	0.76	0.75	0.35	0.01	0.79	0.75	0.26	0.14	0.48	0.48
Avail Cap(c_a), veh/h	384	0	538	308	626	512	192	1037	655	860	753	750
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.00	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.0	0.0	40.4	33.0	35.6	10.7	45.6	32.3	7.5	28.9	18.1	18.1
Incr Delay (d2), s/veh	0.2	0.0	1.6	8.6	0.2	0.0	9.6	5.1	1.0	0.0	2.2	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.9	0.0	8.3	9.0	4.9	0.1	5.4	13.8	2.1	2.0	9.7	9.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.2	0.0	42.0	41.6	35.8	10.7	55.1	37.3	8.5	28.9	20.3	20.3
LnGrp LOS	C	A	D	D	D	B	E	D	A	C	C	C
Approach Vol, veh/h		318			364			1065			841	
Approach Delay, s/veh		38.6			39.2			34.5			21.5	
Approach LOS		D			D			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	20.6	30.4	34.0	12.2	23.4	12.3	52.1				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	31.0	10.0	29.0	10.0	31.0	10.0	29.0				
Max Q Clear Time (g_c+I1), s	12.0	13.4	4.7	21.9	7.6	7.6	7.7	17.5				
Green Ext Time (p_c), s	0.0	0.3	0.0	1.4	0.0	0.2	0.0	1.2				
Intersection Summary												
HCM 6th Ctrl Delay			31.5									
HCM 6th LOS			C									

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Baseline 2038 AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	36	310	27	255	63	6	11	0	21
Future Volume (vph)	36	310	27	255	63	6	11	0	21
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6		8		4	
Permitted Phases					8		4		4
Detector Phase	5	2	1	6	8	8	4	4	4
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	27.0	10.0	27.0	32.0	32.0	34.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%	26.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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	5.0	5.0	5.0	5.0		5.0	5.0
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 Effect Green (s)	5.5	25.1	5.5	22.9	9.0	9.0		9.0	9.0
Actuated g/C Ratio	0.12	0.56	0.12	0.51	0.20	0.20		0.20	0.20
v/c Ratio	0.20	0.40	0.15	0.41	0.28	0.16		0.05	0.07
Control Delay	26.3	12.8	26.0	13.8	18.0	7.1		15.1	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	26.3	12.8	26.0	13.8	18.0	7.1		15.1	1.5
LOS	C	B	C	B	B	A		B	A
Approach Delay		14.1		14.8		13.4		6.2	
Approach LOS		B		B		B		A	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 44.6

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 14.0

Intersection LOS: B

Intersection Capacity Utilization 44.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

		
10 s	85 s	35 s
		
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	310	24	27	255	46	63	6	41	11	0	21
Future Volume (veh/h)	36	310	24	27	255	46	63	6	41	11	0	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1841	1900	1876	1802	1876	1832	1876	1876	1900	1900	1900
Adj Flow Rate, veh/h	44	383	26	33	315	48	78	7	0	14	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
Percent Heavy Veh, %	0	4	0	0	5	0	3	0	0	0	0	0
Cap, veh/h	90	757	51	70	663	101	332	166	0	327	0	142
Arrive On Green	0.05	0.44	0.44	0.04	0.43	0.43	0.09	0.09	0.00	0.09	0.00	0.00
Sat Flow, veh/h	1810	1704	116	1787	1527	233	1388	1876	0	1376	0	1610
Grp Volume(v), veh/h	44	0	409	33	0	363	78	7	0	14	0	0
Grp Sat Flow(s),veh/h/ln	1810	0	1819	1787	0	1760	1388	1876	0	1376	0	1610
Q Serve(g_s), s	0.8	0.0	5.6	0.6	0.0	5.2	1.3	0.1	0.0	0.3	0.0	0.0
Cycle Q Clear(g_c), s	0.8	0.0	5.6	0.6	0.0	5.2	1.8	0.1	0.0	0.4	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.13	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	90	0	809	70	0	764	332	166	0	327	0	142
V/C Ratio(X)	0.49	0.00	0.51	0.47	0.00	0.48	0.23	0.04	0.00	0.04	0.00	0.00
Avail Cap(c_a), veh/h	258	0	4154	255	0	4017	1399	1607	0	1426	0	1379
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	16.2	0.0	7.0	16.5	0.0	7.1	15.3	14.6	0.0	14.8	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.2	1.8	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.5	0.0	2.0	0.4	0.0	1.8	0.9	0.1	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.7	0.0	7.2	18.3	0.0	7.2	15.5	14.7	0.0	14.8	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	B	A	B	A	A
Approach Vol, veh/h	453				396				85			
Approach Delay, s/veh	8.2				8.2				15.4			
Approach LOS	A				A				B			
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	20.6		8.1	6.7	20.2		8.1				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	2.6	7.6		2.4	2.8	7.2		3.8				
Green Ext Time (p_c), s	0.0	0.8		0.0	0.0	0.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	8.9											
HCM 6th LOS	A											

Intersection												
Int Delay, s/veh	4.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	157	338	11	5	320	14	29	2	17	16	2	70
Future Vol, veh/h	157	338	11	5	320	14	29	2	17	16	2	70
Conflicting Peds, #/hr	3	0	3	3	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	95	-	0	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	3	3	0	0	5	0	0	0	0	0	0	27
Mvmt Flow	185	398	13	6	376	16	34	2	20	19	2	82
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	395	0	0	414	0	0	1216	1185	408	1177	1175	379
Stage 1	-	-	-	-	-	-	778	778	-	391	391	-
Stage 2	-	-	-	-	-	-	438	407	-	786	784	-
Critical Hdwy	4.13	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.47
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.227	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.543
Pot Cap-1 Maneuver	1158	-	-	1156	-	-	159	191	648	169	193	616
Stage 1	-	-	-	-	-	-	392	410	-	637	611	-
Stage 2	-	-	-	-	-	-	601	601	-	388	407	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1155	-	-	1153	-	-	119	159	646	141	160	614
Mov Cap-2 Maneuver	-	-	-	-	-	-	119	159	-	141	160	-
Stage 1	-	-	-	-	-	-	328	343	-	533	606	-
Stage 2	-	-	-	-	-	-	516	596	-	314	341	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.7			0.1			36.4			16.4		
HCM LOS							E			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2			
Capacity (veh/h)	170	1155	-	-	1153	-	-	143	614			
HCM Lane V/C Ratio	0.332	0.16	-	-	0.005	-	-	0.148	0.134			
HCM Control Delay (s)	36.4	8.7	-	-	8.1	-	-	34.5	11.8			
HCM Lane LOS	E	A	-	-	A	-	-	D	B			
HCM 95th %tile Q(veh)	1.4	0.6	-	-	0	-	-	0.5	0.5			

Timings 8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	49	436	3	357	14	5	66	3
Future Volume (vph)	49	436	3	357	14	5	66	3
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	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	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	31.7	34.1	29.6	30.0	9.2	9.2	9.4	9.4
Actuated g/C Ratio	0.68	0.73	0.63	0.64	0.20	0.20	0.20	0.20
v/c Ratio	0.10	0.38	0.01	0.43	0.06	0.04	0.28	0.14
Control Delay	6.3	9.0	6.7	12.5	18.3	14.7	20.5	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	9.0	6.7	12.5	18.3	14.7	20.5	8.3
LOS	A	A	A	B	B	B	C	A
Approach Delay		8.8		12.5		16.8		15.7
Approach LOS		A		B		B		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 46.7

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.43

Intersection Signal Delay: 11.2

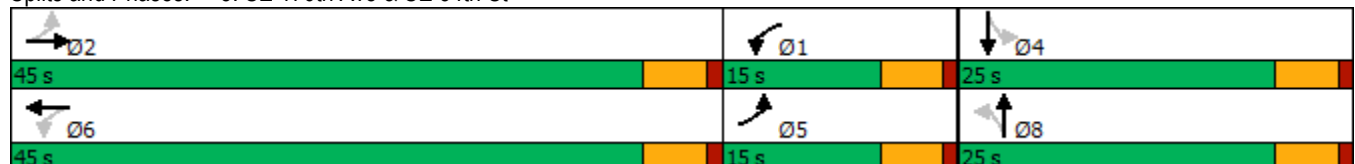
Intersection LOS: B

Intersection Capacity Utilization 50.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	436	2	3	357	59	14	5	4	66	3	39
Future Volume (veh/h)	49	436	2	3	357	59	14	5	4	66	3	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.98		1.00	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1767	1856	1900	1900	1811	1826	1900	1900	1530	1870	1900	1885
Adj Flow Rate, veh/h	58	513	2	4	420	62	16	6	0	78	4	0
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
Percent Heavy Veh, %	9	3	0	0	6	5	0	0	25	2	0	1
Cap, veh/h	470	766	3	483	642	95	348	205	0	345	205	0
Arrive On Green	0.06	0.41	0.41	0.06	0.42	0.42	0.11	0.11	0.00	0.11	0.11	0.00
Sat Flow, veh/h	1682	1847	7	1810	1541	227	1409	1900	0	1384	1900	0
Grp Volume(v), veh/h	58	0	515	4	0	482	16	6	0	78	4	0
Grp Sat Flow(s),veh/h/ln	1682	0	1854	1810	0	1769	1409	1900	0	1384	1900	0
Q Serve(g_s), s	0.0	0.0	8.2	0.0	0.0	7.9	0.4	0.1	0.0	1.9	0.1	0.0
Cycle Q Clear(g_c), s	0.0	0.0	8.2	0.0	0.0	7.9	0.4	0.1	0.0	2.0	0.1	0.0
Prop In Lane	1.00		0.00	1.00		0.13	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	470	0	769	483	0	737	348	205	0	345	205	0
V/C Ratio(X)	0.12	0.00	0.67	0.01	0.00	0.65	0.05	0.03	0.00	0.23	0.02	0.00
Avail Cap(c_a), veh/h	832	0	2047	868	0	1952	974	1049	0	959	1049	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.7	0.0	8.6	10.2	0.0	8.5	14.6	14.5	0.0	15.4	14.4	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.4	0.0	0.0	0.4	0.0	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.5	0.0	3.4	0.0	0.0	3.1	0.2	0.1	0.0	0.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.8	0.0	9.0	10.2	0.0	8.8	14.7	14.5	0.0	15.5	14.5	0.0
LnGrp LOS	B	A	A	B	A	A	B	B	A	B	B	A
Approach Vol, veh/h	573			486			22			82		
Approach Delay, s/veh	9.2			8.8			14.6			15.4		
Approach LOS	A			A			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.3	20.0		8.9	7.2	20.1		8.9				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	10.2		4.0	2.0	9.9		2.4				
Green Ext Time (p_c), s	0.0	2.0		0.1	0.0	1.9		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	9.6											
HCM 6th LOS	A											

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	13	4	124	91	104
Future Vol, veh/h	5	13	4	124	91	104
Conflicting Peds, #/hr	2	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	10	0	2	1	18
Mvmt Flow	6	15	5	146	107	122

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	326	168	229
Stage 1	168	-	-
Stage 2	158	-	-
Critical Hdwy	6.4	6.3	4.1
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.39	2.2
Pot Cap-1 Maneuver	672	856	1351
Stage 1	867	-	-
Stage 2	875	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	669	856	1351
Mov Cap-2 Maneuver	669	-	-
Stage 1	864	-	-
Stage 2	875	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.7	0.2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1351	-	794	-	-
HCM Lane V/C Ratio	0.003	-	0.027	-	-
HCM Control Delay (s)	7.7	-	9.7	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Intersection Delay, s/veh	14.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	272	26	75	314	14	29	67	55	0	60	10
Future Vol, veh/h	12	272	26	75	314	14	29	67	55	0	60	10
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
Heavy Vehicles, %	0	4	10	4	1	9	4	3	0	0	0	0
Mvmt Flow	13	299	29	82	345	15	32	74	60	0	66	11
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	15.2	15.1	11.2	11.2
HCM LOS	C	C	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	55%	0%	91%	0%	96%	86%
Vol Right, %	0%	45%	0%	9%	0%	4%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	29	122	12	298	75	328	70
LT Vol	29	0	12	0	75	0	0
Through Vol	0	67	0	272	0	314	60
RT Vol	0	55	0	26	0	14	10
Lane Flow Rate	32	134	13	327	82	360	77
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.065	0.242	0.024	0.539	0.146	0.578	0.148
Departure Headway (Hd)	7.343	6.496	6.42	5.92	6.357	5.768	6.911
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	487	551	557	609	564	624	517
Service Time	5.107	4.26	4.168	3.667	4.101	3.513	4.985
HCM Lane V/C Ratio	0.066	0.243	0.023	0.537	0.145	0.577	0.149
HCM Control Delay	10.6	11.3	9.3	15.4	10.2	16.2	11.2
HCM Lane LOS	B	B	A	C	B	C	B
HCM 95th-tile Q	0.2	0.9	0.1	3.2	0.5	3.7	0.5

Timings

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center

Baseline 2038 AM Peak Hour Conditions

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	42	7	46	141	16	37	23	1081	16	795
Future Volume (vph)	42	7	46	141	16	37	23	1081	16	795
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA
Protected Phases		2			6		7	4	3	8
Permitted Phases	2		2	6		6				
Detector Phase	2	2	2	6	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	39.0	39.0	39.0	38.0	38.0	38.0	10.0	32.0	10.0	32.0
Total Split (s)	39.0	39.0	39.0	39.0	39.0	39.0	17.0	64.0	17.0	64.0
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	14.2%	53.3%	14.2%	53.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max
Act Effct Green (s)	18.7	18.7	18.7	18.7	18.7	18.7	5.7	86.9	5.4	84.6
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.05	0.72	0.04	0.70
v/c Ratio	0.21	0.02	0.16	0.69	0.07	0.13	0.28	0.31	0.22	0.24
Control Delay	42.7	37.1	6.3	62.4	38.9	3.9	37.5	22.3	61.9	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.7	37.1	6.3	62.4	38.9	3.9	37.5	22.3	61.9	8.2
LOS	D	D	A	E	D	A	D	C	E	A
Approach Delay		24.6			49.2			22.6		9.2
Approach LOS		C			D			C		A

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 85 (71%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 20.0

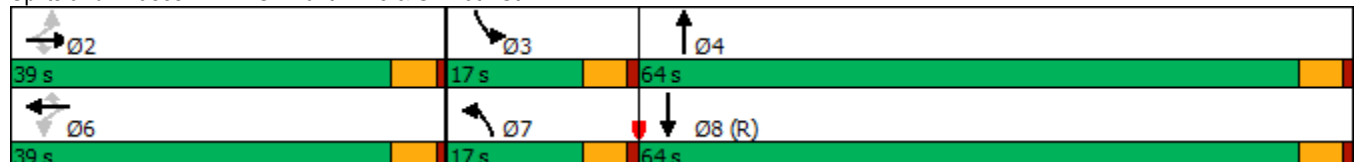
Intersection LOS: B

Intersection Capacity Utilization 51.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	7	46	141	16	37	23	1081	15	16	795	26
Future Volume (veh/h)	42	7	46	141	16	37	23	1081	15	16	795	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1900	1856	1856	1648	1900	1900	1870	1796	1796	1856	1826
Adj Flow Rate, veh/h	44	7	5	148	17	4	24	1138	15	17	837	25
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	0	3	3	17	0	0	2	7	7	3	5
Cap, veh/h	221	239	198	230	207	202	42	2579	34	31	2485	74
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.02	0.50	0.50	0.02	0.49	0.49
Sat Flow, veh/h	1380	1900	1572	1391	1648	1610	1810	5194	68	1711	5055	151
Grp Volume(v), veh/h	44	7	5	148	17	4	24	746	407	17	559	303
Grp Sat Flow(s),veh/h/ln	1380	1900	1572	1391	1648	1610	1810	1702	1858	1711	1689	1828
Q Serve(g_s), s	3.5	0.4	0.3	12.5	1.1	0.3	1.6	16.9	17.0	1.2	12.1	12.1
Cycle Q Clear(g_c), s	4.6	0.4	0.3	12.9	1.1	0.3	1.6	16.9	17.0	1.2	12.1	12.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.04	1.00		0.08
Lane Grp Cap(c), veh/h	221	239	198	230	207	202	42	1690	923	31	1660	899
V/C Ratio(X)	0.20	0.03	0.03	0.64	0.08	0.02	0.58	0.44	0.44	0.55	0.34	0.34
Avail Cap(c_a), veh/h	438	538	446	450	467	456	181	1690	923	171	1660	899
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.78	0.78	0.78	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.4	46.0	46.0	51.7	46.4	46.0	58.0	19.5	19.5	58.4	18.6	18.6
Incr Delay (d2), s/veh	0.2	0.0	0.0	1.1	0.1	0.0	3.6	0.7	1.2	5.6	0.5	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.2	0.3	0.2	7.9	0.8	0.2	1.4	10.3	11.2	1.0	8.2	8.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.5	46.1	46.0	52.8	46.4	46.0	61.7	20.1	20.7	64.0	19.1	19.6
LnGrp LOS	D	D	D	D	D	D	E	C	C	E	B	B
Approach Vol, veh/h	56			169			1177			879		
Approach Delay, s/veh	48.0			52.0			21.2			20.2		
Approach LOS	D			D			C			C		
Timer - Assigned Phs	2			3			4			6		
Phs Duration (G+Y+Rc), s	20.1			7.2			64.6			20.1		
Change Period (Y+Rc), s	5.0			5.0			5.0			5.0		
Max Green Setting (Gmax), s	34.0			12.0			59.0			34.0		
Max Q Clear Time (g_c+I1), s	6.6			3.2			19.0			14.9		
Green Ext Time (p_c), s	0.0			0.0			5.3			0.2		
Intersection Summary												
HCM 6th Ctrl Delay	23.7											
HCM 6th LOS	C											

Timings
12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	28	60	165	294	121	109	111	931	264	158	742
Future Volume (vph)	28	60	165	294	121	109	111	931	264	158	742
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	20.0	33.0	20.0	25.0	38.0	17.0	20.0	45.0	25.0	17.0	42.0
Total Split (%)	16.7%	27.5%	16.7%	20.8%	31.7%	14.2%	16.7%	37.5%	20.8%	14.2%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	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	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	6.4	8.2	23.0	20.0	23.8	47.0	11.8	55.6	80.6	18.2	62.0
Actuated g/C Ratio	0.05	0.07	0.19	0.17	0.20	0.39	0.10	0.46	0.67	0.15	0.52
v/c Ratio	0.39	0.56	0.53	1.11	0.36	0.18	0.72	0.64	0.26	0.66	0.34
Control Delay	68.3	70.9	31.3	130.9	45.0	4.6	74.0	28.4	1.8	52.0	20.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.3	70.9	31.3	130.9	45.0	4.6	74.0	28.4	1.8	52.0	20.8
LOS	E	E	C	F	D	A	E	C	A	D	C
Approach Delay		44.8			84.9			26.9			26.1
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 15 (13%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.11

Intersection Signal Delay: 38.2

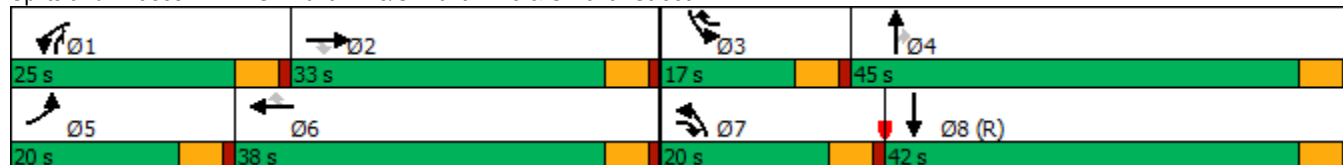
Intersection LOS: D

Intersection Capacity Utilization 70.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave/SE164th Ave & SE 34th Street



HCM 6th Signalized Intersection Summary

12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	60	165	294	121	109	111	931	264	158	742	37
Future Volume (veh/h)	28	60	165	294	121	109	111	931	264	158	742	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1565	1758	1803	1870	1885	1841	1791	1776	1746	1806	1761	1761
Adj Flow Rate, veh/h	31	67	124	327	134	33	123	1034	169	176	824	38
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
Percent Heavy Veh, %	19	6	3	2	1	4	1	2	4	0	3	3
Cap, veh/h	40	159	270	297	434	515	147	1125	740	172	1635	75
Arrive On Green	0.03	0.09	0.09	0.17	0.23	0.23	0.09	0.33	0.33	0.03	0.11	0.11
Sat Flow, veh/h	1491	1758	1528	1781	1885	1560	1706	3375	1480	1720	4711	217
Grp Volume(v), veh/h	31	67	124	327	134	33	123	1034	169	176	560	302
Grp Sat Flow(s),veh/h/ln	1491	1758	1528	1781	1885	1560	1706	1687	1480	1720	1603	1722
Q Serve(g_s), s	2.5	4.3	8.7	20.0	7.1	1.7	8.5	35.3	7.7	12.0	19.7	19.8
Cycle Q Clear(g_c), s	2.5	4.3	8.7	20.0	7.1	1.7	8.5	35.3	7.7	12.0	19.7	19.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	40	159	270	297	434	515	147	1125	740	172	1112	598
V/C Ratio(X)	0.77	0.42	0.46	1.10	0.31	0.06	0.84	0.92	0.23	1.02	0.50	0.51
Avail Cap(c_a), veh/h	186	410	488	297	518	585	213	1125	740	172	1112	598
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	58.0	51.6	44.2	50.0	38.3	27.5	54.0	38.4	16.9	58.0	43.4	43.5
Incr Delay (d2), s/veh	11.1	0.7	0.5	82.2	0.1	0.0	11.8	13.3	0.7	73.5	1.6	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.9	3.4	5.9	23.0	5.8	1.2	7.3	22.7	4.8	14.0	13.4	14.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.2	52.2	44.7	132.2	38.4	27.5	65.8	51.8	17.7	131.5	45.0	46.4
LnGrp LOS	E	D	D	F	D	C	E	D	B	F	D	D
Approach Vol, veh/h	222				494				1326			
Approach Delay, s/veh	50.4				99.8				48.7			
Approach LOS	D				F				D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.0	15.9	17.0	45.0	8.2	32.7	15.4	46.6				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	20.0	28.0	12.0	40.0	15.0	33.0	15.0	37.0				
Max Q Clear Time (g_c+I1), s	22.0	10.7	14.0	37.3	4.5	9.1	10.5	21.8				
Green Ext Time (p_c), s	0.0	0.1	0.0	1.0	0.0	0.2	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay	60.8											
HCM 6th LOS	E											

Timings

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Baseline 2038 PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	116	91	40	82	242	63	1246	115	1424
Future Volume (vph)	116	91	40	82	242	63	1246	115	1424
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	15.0	29.0	15.0	29.0	16.0	14.0	40.0	16.0	42.0
Total Split (%)	15.0%	29.0%	15.0%	29.0%	16.0%	14.0%	40.0%	16.0%	42.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	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	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effct Green (s)	9.0	15.7	6.2	10.9	19.7	7.0	52.3	9.7	57.0
Actuated g/C Ratio	0.09	0.16	0.06	0.11	0.20	0.07	0.52	0.10	0.57
v/c Ratio	0.79	0.58	0.38	0.43	0.68	0.52	0.73	0.69	0.82
Control Delay	78.1	36.7	54.0	45.8	30.8	52.8	23.8	63.7	25.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.1	36.7	54.0	45.8	30.8	52.8	23.8	63.7	25.9
LOS	E	D	D	D	C	D	C	E	C
Approach Delay		53.4		36.7			25.2		28.5
Approach LOS		D		D			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 30.1

Intersection LOS: C

Intersection Capacity Utilization 78.7%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St

			
Ø1	Ø2	Ø3	Ø4 (R)
15 s	29 s	16 s	40 s
			
Ø5	Ø6	Ø7	Ø8
15 s	29 s	14 s	42 s

HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Baseline 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	116	91	80	40	82	242	63	1246	32	115	1424	133
Future Volume (veh/h)	116	91	80	40	82	242	63	1246	32	115	1424	133
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1885	1900	1900	1856	1900	1900	1870	1900	1900	1870	1870
Adj Flow Rate, veh/h	122	96	47	42	86	192	66	1312	33	121	1499	135
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	1	0	0	3	0	0	2	0	0	2	2
Cap, veh/h	150	221	108	62	248	345	100	1762	44	150	1733	155
Arrive On Green	0.09	0.19	0.19	0.03	0.13	0.13	0.11	1.00	1.00	0.08	0.53	0.53
Sat Flow, veh/h	1739	1194	585	1810	1856	1582	1810	3542	89	1810	3298	295
Grp Volume(v), veh/h	122	0	143	42	86	192	66	658	687	121	803	831
Grp Sat Flow(s),veh/h/ln	1739	0	1779	1810	1856	1582	1810	1777	1854	1810	1777	1816
Q Serve(g_s), s	6.9	0.0	7.1	2.3	4.2	10.8	3.5	0.7	0.7	6.6	39.1	40.1
Cycle Q Clear(g_c), s	6.9	0.0	7.1	2.3	4.2	10.8	3.5	0.7	0.7	6.6	39.1	40.1
Prop In Lane	1.00		0.33	1.00		1.00	1.00		0.05	1.00		0.16
Lane Grp Cap(c), veh/h	150	0	329	62	248	345	100	884	923	150	934	954
V/C Ratio(X)	0.82	0.00	0.43	0.67	0.35	0.56	0.66	0.74	0.74	0.81	0.86	0.87
Avail Cap(c_a), veh/h	174	0	427	181	445	513	163	884	923	199	934	954
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.48	0.48	0.48	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.9	0.0	36.1	47.7	39.4	34.9	43.6	0.1	0.1	45.1	20.5	20.8
Incr Delay (d2), s/veh	19.5	0.0	0.3	4.6	0.3	0.5	1.3	2.8	2.7	12.3	10.2	10.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.7	0.0	5.5	2.0	3.5	7.3	2.7	1.3	1.4	6.1	23.8	24.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.4	0.0	36.4	52.4	39.7	35.5	45.0	2.9	2.8	57.3	30.7	31.5
LnGrp LOS	E	A	D	D	D	D	D	A	A	E	C	C
Approach Vol, veh/h	265			320			1411			1755		
Approach Delay, s/veh	49.3			38.8			4.8			32.9		
Approach LOS	D			D			A			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.4	23.5	13.3	54.8	13.6	18.4	10.5	57.5				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	24.0	11.0	35.0	10.0	24.0	9.0	37.0				
Max Q Clear Time (g_c+I1), s	4.3	9.1	8.6	2.7	8.9	12.8	5.5	42.1				
Green Ext Time (p_c), s	0.0	0.2	0.0	2.9	0.0	0.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	24.0											
HCM 6th LOS	C											

Timings
2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	233	183	236	265	138	813	151	1024
Future Volume (vph)	233	183	236	265	138	813	151	1024
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	20.0	27.0	20.0	27.0	14.0	35.0	18.0	39.0
Total Split (%)	20.0%	27.0%	20.0%	27.0%	14.0%	35.0%	18.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effect Green (s)	11.3	24.3	11.4	24.4	9.1	32.6	11.7	35.2
Actuated g/C Ratio	0.11	0.24	0.11	0.24	0.09	0.33	0.12	0.35
v/c Ratio	0.62	0.63	0.62	0.88	0.88	0.86	0.75	1.07
Control Delay	49.0	38.5	48.9	56.7	96.7	22.6	63.9	76.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	38.5	48.9	56.7	96.7	22.6	63.9	76.2
LOS	D	D	D	E	F	C	E	E
Approach Delay		43.3		53.7		32.0		74.9
Approach LOS		D		D		C		E

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 93 (93%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.07

Intersection Signal Delay: 54.0

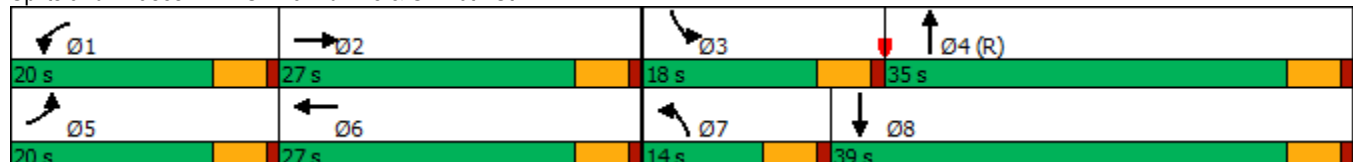
Intersection LOS: D

Intersection Capacity Utilization 88.0%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 2: SE 192nd Ave & SE 20th St



HCM 6th Signalized Intersection Summary

2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	233	183	92	236	265	118	138	813	137	151	1024	237
Future Volume (veh/h)	233	183	92	236	265	118	138	813	137	151	1024	237
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1885	1900	1900	1870	1900	1885	1900	1885	1870	1885
Adj Flow Rate, veh/h	243	191	78	246	276	106	144	847	129	157	1067	227
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	1	0	0	2	0	1	0	1	2	1
Cap, veh/h	316	281	115	319	286	110	163	1198	182	189	1167	247
Arrive On Green	0.09	0.22	0.22	0.09	0.22	0.22	0.09	0.38	0.38	0.14	0.53	0.53
Sat Flow, veh/h	3510	1281	523	3510	1301	500	1810	3115	474	1795	2917	618
Grp Volume(v), veh/h	243	0	269	246	0	382	144	487	489	157	648	646
Grp Sat Flow(s),veh/h/ln	1755	0	1804	1755	0	1801	1810	1791	1799	1795	1777	1758
Q Serve(g_s), s	6.8	0.0	13.7	6.9	0.0	21.0	7.9	23.0	23.0	8.5	33.2	33.6
Cycle Q Clear(g_c), s	6.8	0.0	13.7	6.9	0.0	21.0	7.9	23.0	23.0	8.5	33.2	33.6
Prop In Lane	1.00		0.29	1.00		0.28	1.00		0.26	1.00		0.35
Lane Grp Cap(c), veh/h	316	0	396	319	0	396	163	689	692	189	711	703
V/C Ratio(X)	0.77	0.00	0.68	0.77	0.00	0.96	0.88	0.71	0.71	0.83	0.91	0.92
Avail Cap(c_a), veh/h	527	0	397	527	0	396	163	689	692	233	711	703
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.48	0.48	0.48
Uniform Delay (d), s/veh	44.5	0.0	35.8	44.5	0.0	38.6	45.0	26.0	26.0	42.1	21.8	21.9
Incr Delay (d2), s/veh	1.5	0.0	3.8	1.5	0.0	35.6	38.3	6.0	6.0	7.9	10.1	10.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.3	0.0	10.3	5.3	0.0	18.7	8.9	15.6	15.7	6.2	16.8	17.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.0	0.0	39.7	46.0	0.0	74.2	83.3	32.1	32.0	50.1	31.9	32.6
LnGrp LOS	D	A	D	D	A	E	F	C	C	D	C	C
Approach Vol, veh/h		512			628			1120			1451	
Approach Delay, s/veh		42.7			63.2			38.6			34.2	
Approach LOS		D			E			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.1	26.9	15.6	43.4	14.0	27.0	14.0	45.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	22.0	13.0	30.0	15.0	22.0	9.0	34.0				
Max Q Clear Time (g_c+I1), s	8.9	15.7	10.5	25.0	8.8	23.0	9.9	35.6				
Green Ext Time (p_c), s	0.2	0.5	0.0	1.9	0.2	0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			41.6									
HCM 6th LOS			D									

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	4	1098	3	10	1219
Future Vol, veh/h	3	4	1098	3	10	1219
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	230	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	3	4	1156	3	11	1283
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1824	582	0	0	1161	0
Stage 1	1160	-	-	-	-	-
Stage 2	664	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	70	461	-	-	609	-
Stage 1	265	-	-	-	-	-
Stage 2	479	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	69	460	-	-	608	-
Mov Cap-2 Maneuver	69	-	-	-	-	-
Stage 1	264	-	-	-	-	-
Stage 2	470	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	33	0	0.1			
HCM LOS	D					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 69 460	608	-		
HCM Lane V/C Ratio	-	- 0.046 0.009	0.017	-		
HCM Control Delay (s)	-	- 59.7 12.9	11	-		
HCM Lane LOS	-	- F B	B	-		
HCM 95th %tile Q(veh)	-	- 0.1 0	0.1	-		

Timings 5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	126	204	355	183	120	108	955	204	212	932
Future Volume (vph)	126	204	355	183	120	108	955	204	212	932
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	14.0	32.0	19.0	37.0	37.0	13.0	34.0	19.0	15.0	36.0
Total Split (%)	14.0%	32.0%	19.0%	37.0%	37.0%	13.0%	34.0%	19.0%	15.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	27.5	19.6	38.6	25.7	25.7	9.1	36.4	50.4	10.0	37.3
Actuated g/C Ratio	0.28	0.20	0.39	0.26	0.26	0.09	0.36	0.50	0.10	0.37
v/c Ratio	0.37	0.83	1.08	0.39	0.23	0.69	0.77	0.24	0.65	0.86
Control Delay	22.9	54.8	98.0	32.3	2.0	65.7	34.3	1.9	40.7	29.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.9	54.8	98.0	32.3	2.0	65.7	34.3	1.9	40.7	29.1
LOS	C	D	F	C	A	E	C	A	D	C
Approach Delay		45.0		62.2			31.8			31.0
Approach LOS		D		E			C			C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 36 (36%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.08

Intersection Signal Delay: 38.6

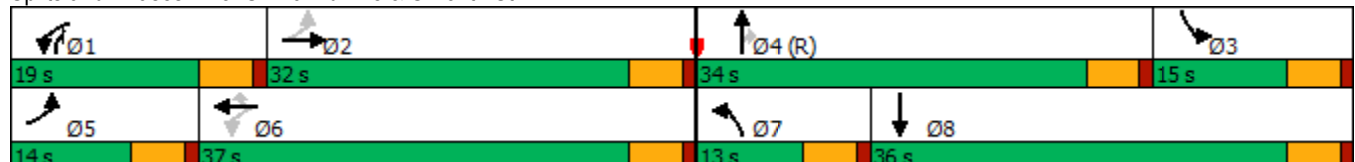
Intersection LOS: D

Intersection Capacity Utilization 88.7%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	126	204	83	355	183	120	108	955	204	212	932	118
Future Volume (veh/h)	126	204	83	355	183	120	108	955	204	212	932	118
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1773	1847	1817	2003	2003	2018	2018	1988	2003	1847	1832	1743
Adj Flow Rate, veh/h	133	215	70	374	193	25	114	1005	98	223	981	115
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	0	2	1	1	0	0	2	1	0	1	7
Cap, veh/h	392	250	81	375	496	422	144	1095	726	621	1244	146
Arrive On Green	0.08	0.19	0.19	0.14	0.25	0.25	0.08	0.29	0.29	0.18	0.40	0.40
Sat Flow, veh/h	1688	1328	432	1908	2003	1704	1922	3777	1683	3413	3132	367
Grp Volume(v), veh/h	133	0	285	374	193	25	114	1005	98	223	545	551
Grp Sat Flow(s),veh/h/ln	1688	0	1760	1908	2003	1704	1922	1889	1683	1706	1741	1759
Q Serve(g_s), s	6.3	0.0	15.7	14.0	8.0	0.7	5.8	25.7	1.5	5.7	27.5	27.5
Cycle Q Clear(g_c), s	6.3	0.0	15.7	14.0	8.0	0.7	5.8	25.7	1.5	5.7	27.5	27.5
Prop In Lane	1.00		0.25	1.00		1.00	1.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	392	0	331	375	496	422	144	1095	726	621	691	698
V/C Ratio(X)	0.34	0.00	0.86	1.00	0.39	0.06	0.79	0.92	0.14	0.36	0.79	0.79
Avail Cap(c_a), veh/h	408	0	475	375	641	545	154	1095	726	621	691	698
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.89	0.00	0.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.1	0.0	39.3	30.0	31.3	11.2	45.5	34.3	5.9	35.8	26.5	26.5
Incr Delay (d2), s/veh	0.2	0.0	7.1	45.4	0.2	0.0	20.3	13.4	0.4	0.1	8.9	8.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.4	0.0	11.3	17.2	6.8	0.8	6.3	19.2	1.2	4.2	18.1	18.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.2	0.0	46.5	75.4	31.5	11.3	65.8	47.8	6.3	35.9	35.4	35.3
LnGrp LOS	C	A	D	E	C	B	E	D	A	D	D	D
Approach Vol, veh/h	418			592			1217			1319		
Approach Delay, s/veh	41.0			58.4			46.1			35.4		
Approach LOS	D			E			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	23.8	23.2	34.0	13.1	29.7	12.5	44.7				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	14.0	27.0	10.0	29.0	9.0	32.0	8.0	31.0				
Max Q Clear Time (g_c+I1), s	16.0	17.7	7.7	27.7	8.3	10.0	7.8	29.5				
Green Ext Time (p_c), s	0.0	0.4	0.0	0.5	0.0	0.3	0.0	0.5				

Intersection Summary

HCM 6th Ctrl Delay	43.6
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Baseline 2038 PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	12	336	37	387	71	1	44	7	118
Future Volume (vph)	12	336	37	387	71	1	44	7	118
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6		8		4	
Permitted Phases					8		4		4
Detector Phase	5	2	1	6	8	8	4	4	4
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	30.0	10.0	30.0	32.0	32.0	34.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%	26.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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	5.0	5.0	5.0	5.0		5.0	5.0
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 Effect Green (s)	5.6	22.8	5.6	24.8	8.4	8.4		8.4	8.4
Actuated g/C Ratio	0.13	0.54	0.13	0.59	0.20	0.20		0.20	0.20
v/c Ratio	0.05	0.45	0.17	0.41	0.29	0.11		0.20	0.30
Control Delay	24.1	12.7	24.5	10.8	17.6	7.2		16.3	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	24.1	12.7	24.5	10.8	17.6	7.2		16.3	5.8
LOS	C	B	C	B	B	A		B	A
Approach Delay		13.1		11.9		14.3		8.9	
Approach LOS		B		B		B		A	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 41.9

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 12.1

Intersection LOS: B

Intersection Capacity Utilization 50.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

		
10 s	85 s	35 s
		
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	336	80	37	387	29	71	1	32	44	7	118
Future Volume (veh/h)	12	336	80	37	387	29	71	1	32	44	7	118
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1870	1841	1832	1847	1876	1817	1876	1832	1841	1900	1900
Adj Flow Rate, veh/h	13	357	75	39	412	29	76	1	4	47	7	14
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	2	4	3	2	0	4	0	3	4	0	0
Cap, veh/h	31	632	133	78	767	54	320	40	160	331	37	196
Arrive On Green	0.02	0.42	0.42	0.04	0.45	0.45	0.12	0.12	0.12	0.12	0.12	0.12
Sat Flow, veh/h	1810	1497	314	1745	1704	120	1346	326	1304	1195	303	1603
Grp Volume(v), veh/h	13	0	432	39	0	441	76	0	5	54	0	14
Grp Sat Flow(s),veh/h/ln	1810	0	1811	1745	0	1824	1346	0	1630	1498	0	1603
Q Serve(g_s), s	0.3	0.0	6.6	0.8	0.0	6.4	2.0	0.0	0.1	0.8	0.0	0.3
Cycle Q Clear(g_c), s	0.3	0.0	6.6	0.8	0.0	6.4	3.1	0.0	0.1	1.1	0.0	0.3
Prop In Lane	1.00		0.17	1.00		0.07	1.00		0.80	0.87		1.00
Lane Grp Cap(c), veh/h	31	0	765	78	0	821	320	0	200	368	0	196
V/C Ratio(X)	0.42	0.00	0.57	0.50	0.00	0.54	0.24	0.00	0.03	0.15	0.00	0.07
Avail Cap(c_a), veh/h	248	0	3966	239	0	3995	1261	0	1339	1395	0	1317
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.8	0.0	8.0	17.0	0.0	7.3	16.0	0.0	14.1	14.5	0.0	14.2
Incr Delay (d2), s/veh	3.4	0.0	0.2	1.8	0.0	0.2	0.1	0.0	0.0	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.2	0.0	2.7	0.5	0.0	2.4	1.0	0.0	0.1	0.6	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.2	0.0	8.3	18.9	0.0	7.5	16.1	0.0	14.1	14.6	0.0	14.2
LnGrp LOS	C	A	A	B	A	A	B	A	B	B	A	B
Approach Vol, veh/h	445			480			81			68		
Approach Delay, s/veh	8.6			8.4			16.0			14.5		
Approach LOS	A			A			B			B		
Timer - Assigned Phs	1	2	4		5	6	8					
Phs Duration (G+Y+Rc), s	6.6	20.4	9.5		5.6	21.4	9.5					
Change Period (Y+Rc), s	5.0	5.0	5.0		5.0	5.0	5.0					
Max Green Setting (Gmax), s	5.0	80.0	30.0		5.0	80.0	30.0					
Max Q Clear Time (g_c+I1), s	2.8	8.6	3.1		2.3	8.4	5.1					
Green Ext Time (p_c), s	0.0	0.4	0.0		0.0	0.4	0.0					
Intersection Summary												
HCM 6th Ctrl Delay	9.5											
HCM 6th LOS	A											

Intersection												
Int Delay, s/veh	4.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	31	407	32	12	560	4	18	0	7	14	4	181
Future Vol, veh/h	31	407	32	12	560	4	18	0	7	14	4	181
Conflicting Peds, #/hr	6	0	0	0	0	6	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	95	-	0	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	2	0	0	2	0	0	0	0	0	0	0
Mvmt Flow	34	447	35	13	615	4	20	0	8	15	4	199
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	625	0	0	482	0	0	1278	1184	466	1185	1197	621
Stage 1	-	-	-	-	-	-	533	533	-	647	647	-
Stage 2	-	-	-	-	-	-	745	651	-	538	550	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	966	-	-	1091	-	-	144	191	601	167	187	491
Stage 1	-	-	-	-	-	-	534	528	-	463	470	-
Stage 2	-	-	-	-	-	-	409	468	-	531	519	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	960	-	-	1091	-	-	81	181	600	158	177	488
Mov Cap-2 Maneuver	-	-	-	-	-	-	81	181	-	158	177	-
Stage 1	-	-	-	-	-	-	515	510	-	444	462	-
Stage 2	-	-	-	-	-	-	237	460	-	505	501	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			0.2			49.9			18.6		
HCM LOS							E			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2			
Capacity (veh/h)	107	960	-	-	1091	-	-	162	488			
HCM Lane V/C Ratio	0.257	0.035	-	-	0.012	-	-	0.122	0.408			
HCM Control Delay (s)	49.9	8.9	-	-	8.3	-	-	30.3	17.4			
HCM Lane LOS	E	A	-	-	A	-	-	D	C			
HCM 95th %tile Q(veh)	0.9	0.1	-	-	0	-	-	0.4	2			

Timings
8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	141	374	11	628	10	6	94	15
Future Volume (vph)	141	374	11	628	10	6	94	15
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	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	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	49.2	49.1	41.1	37.3	11.0	11.0	11.0	11.0
Actuated g/C Ratio	0.71	0.71	0.59	0.54	0.16	0.16	0.16	0.16
v/c Ratio	0.42	0.32	0.02	0.82	0.05	0.03	0.46	0.07
Control Delay	17.6	9.9	7.9	25.0	26.2	23.2	34.6	22.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.6	9.9	7.9	25.0	26.2	23.2	34.6	22.6
LOS	B	A	A	C	C	C	C	C
Approach Delay		11.9		24.7		24.9		32.5
Approach LOS		B		C		C		C

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 69.3

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 20.6

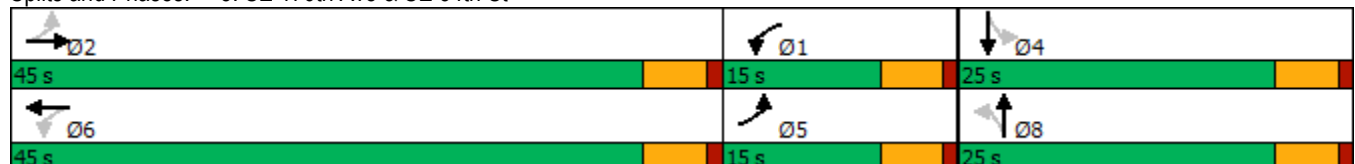
Intersection LOS: C

Intersection Capacity Utilization 72.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	374	13	11	628	120	10	6	2	94	15	5
Future Volume (veh/h)	141	374	13	11	628	120	10	6	2	94	15	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1870	1900	1900	1885	1885	1900	1900	1900	1885	1900	1900
Adj Flow Rate, veh/h	153	407	13	12	683	122	11	7	0	102	16	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
Percent Heavy Veh, %	1	2	0	0	1	1	0	0	0	1	0	0
Cap, veh/h	307	552	18	724	781	139	281	196	0	288	182	11
Arrive On Green	0.09	0.31	0.31	0.28	0.50	0.50	0.10	0.10	0.00	0.10	0.10	0.10
Sat Flow, veh/h	1795	1802	58	1810	1557	278	1412	1900	0	1413	1766	110
Grp Volume(v), veh/h	153	0	420	12	0	805	11	7	0	102	0	17
Grp Sat Flow(s),veh/h/ln	1795	0	1860	1810	0	1835	1412	1900	0	1413	0	1876
Q Serve(g_s), s	0.0	0.0	9.9	0.0	0.0	19.1	0.3	0.2	0.0	3.4	0.0	0.4
Cycle Q Clear(g_c), s	0.0	0.0	9.9	0.0	0.0	19.1	0.7	0.2	0.0	3.6	0.0	0.4
Prop In Lane	1.00		0.03	1.00		0.15	1.00		0.00	1.00		0.06
Lane Grp Cap(c), veh/h	307	0	569	724	0	920	281	196	0	288	0	194
V/C Ratio(X)	0.50	0.00	0.74	0.02	0.00	0.87	0.04	0.04	0.00	0.35	0.00	0.09
Avail Cap(c_a), veh/h	513	0	1519	724	0	1498	712	776	0	719	0	766
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.3	0.0	15.2	10.6	0.0	10.9	20.2	19.8	0.0	21.4	0.0	19.9
Incr Delay (d2), s/veh	0.5	0.0	0.7	0.0	0.0	2.0	0.0	0.0	0.0	0.3	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.6	0.0	6.2	0.1	0.0	9.3	0.2	0.1	0.0	1.9	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.8	0.0	15.9	10.6	0.0	12.8	20.2	19.8	0.0	21.7	0.0	20.0
LnGrp LOS	C	A	B	B	A	B	C	B	A	C	A	B
Approach Vol, veh/h	573			817			18			119		
Approach Delay, s/veh	17.2			12.8			20.1			21.4		
Approach LOS	B			B			C			C		
Timer - Assigned Phs	1	2	4		5	6	8					
Phs Duration (G+Y+Rc), s	18.9	20.0	10.1		9.4	29.6	10.1					
Change Period (Y+Rc), s	5.0	5.0	5.0		5.0	5.0	5.0					
Max Green Setting (Gmax), s	10.0	40.0	20.0		10.0	40.0	20.0					
Max Q Clear Time (g_c+I1), s	2.0	11.9	5.6		2.0	21.1	2.7					
Green Ext Time (p_c), s	0.0	1.5	0.1		0.1	3.5	0.0					

Intersection Summary

HCM 6th Ctrl Delay 15.2
HCM 6th LOS B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	1.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	31	15	259	89	105
Future Vol, veh/h	20	31	15	259	89	105
Conflicting Peds, #/hr	3	0	7	0	0	7
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	7	0	15	0	1	0
Mvmt Flow	22	33	16	278	96	113
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	473	160	216	0	-	0
Stage 1	160	-	-	-	-	-
Stage 2	313	-	-	-	-	-
Critical Hdwy	6.47	6.2	4.25	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.3	2.335	-	-	-
Pot Cap-1 Maneuver	541	890	1280	-	-	-
Stage 1	857	-	-	-	-	-
Stage 2	730	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	526	884	1271	-	-	-
Mov Cap-2 Maneuver	526	-	-	-	-	-
Stage 1	840	-	-	-	-	-
Stage 2	725	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	10.6	0.4		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1271	-	698	-	-	
HCM Lane V/C Ratio	0.013	-	0.079	-	-	
HCM Control Delay (s)	7.9	-	10.6	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.3	-	-	

Intersection	
Intersection Delay, s/veh	79.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	466	58	89	503	18	41	120	73	27	84	28
Future Vol, veh/h	48	466	58	89	503	18	41	120	73	27	84	28
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
Heavy Vehicles, %	3	0	0	1	0	7	0	1	0	4	1	8
Mvmt Flow	52	507	63	97	547	20	45	130	79	29	91	30
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	102.9	95.5	18	18.2
HCM LOS	F	F	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	19%
Vol Thru, %	0%	62%	0%	89%	0%	97%	60%
Vol Right, %	0%	38%	0%	11%	0%	3%	20%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	41	193	48	524	89	521	139
LT Vol	41	0	48	0	89	0	27
Through Vol	0	120	0	466	0	503	84
RT Vol	0	73	0	58	0	18	28
Lane Flow Rate	45	210	52	570	97	566	151
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.11	0.474	0.114	1.139	0.208	1.134	0.373
Departure Headway (Hd)	9.497	8.717	8.213	7.564	8.147	7.588	9.62
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	380	415	439	484	443	481	376
Service Time	7.197	6.417	5.913	5.264	5.847	5.288	7.62
HCM Lane V/C Ratio	0.118	0.506	0.118	1.178	0.219	1.177	0.402
HCM Control Delay	13.4	19	12	111.2	13	109.6	18.2
HCM Lane LOS	B	C	B	F	B	F	C
HCM 95th-tile Q	0.4	2.5	0.4	19	0.8	18.7	1.7

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	89	30	51	117	22	50	42	1434	47	1306
Future Volume (vph)	89	30	51	117	22	50	42	1434	47	1306
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA
Protected Phases		2			6		7	4	3	8
Permitted Phases	2		2	6		6				
Detector Phase	2	2	2	6	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	39.0	39.0	39.0	38.0	38.0	38.0	10.0	32.0	19.5	32.0
Total Split (s)	39.0	39.0	39.0	39.0	39.0	39.0	15.0	66.0	15.0	66.0
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	12.5%	55.0%	12.5%	55.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max
Act Effct Green (s)	16.9	16.9	16.9	16.9	16.9	16.9	6.3	83.5	6.5	83.7
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14	0.14	0.05	0.70	0.05	0.70
v/c Ratio	0.47	0.12	0.19	0.65	0.10	0.19	0.49	0.44	0.51	0.40
Control Delay	53.0	41.8	8.4	63.3	41.2	8.2	51.4	21.4	73.1	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.0	41.8	8.4	63.3	41.2	8.2	51.4	21.4	73.1	9.7
LOS	D	D	A	E	D	A	D	C	E	A
Approach Delay		37.6			46.1			22.2		11.8
Approach LOS		D			D			C		B

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 112 (93%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 20.0

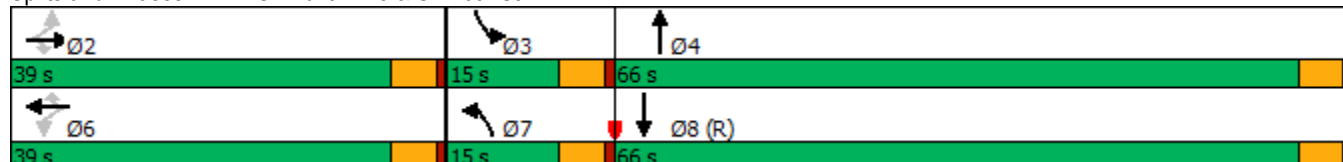
Intersection LOS: B

Intersection Capacity Utilization 59.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	30	51	117	22	50	42	1434	32	47	1306	46
Future Volume (veh/h)	89	30	51	117	22	50	42	1434	32	47	1306	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1826	1633	1856	1826	1870	1752	1870	1885	1900
Adj Flow Rate, veh/h	94	32	6	123	23	5	44	1509	33	49	1375	46
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	5	18	3	5	2	10	2	1	0
Cap, veh/h	227	250	211	216	215	206	56	2614	57	63	2616	88
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.03	0.51	0.51	0.04	0.51	0.51
Sat Flow, veh/h	1398	1900	1603	1332	1633	1565	1739	5142	112	1781	5114	171
Grp Volume(v), veh/h	94	32	6	123	23	5	44	999	543	49	922	499
Grp Sat Flow(s),veh/h/ln	1398	1900	1603	1332	1633	1565	1739	1702	1850	1781	1716	1854
Q Serve(g_s), s	7.6	1.8	0.4	10.8	1.5	0.3	3.0	24.5	24.5	3.3	21.6	21.6
Cycle Q Clear(g_c), s	9.1	1.8	0.4	12.6	1.5	0.3	3.0	24.5	24.5	3.3	21.6	21.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.06	1.00		0.09
Lane Grp Cap(c), veh/h	227	250	211	216	215	206	56	1730	940	63	1755	949
V/C Ratio(X)	0.41	0.13	0.03	0.57	0.11	0.02	0.79	0.58	0.58	0.78	0.53	0.53
Avail Cap(c_a), veh/h	439	538	454	418	463	444	145	1730	940	148	1755	949
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.71	0.71	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.9	46.0	45.4	51.6	45.9	45.4	57.7	20.5	20.5	57.4	19.6	19.6
Incr Delay (d2), s/veh	0.4	0.1	0.0	0.9	0.1	0.0	6.3	1.0	1.8	7.4	1.1	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.9	1.5	0.3	6.6	1.1	0.2	2.5	13.7	15.0	2.8	13.2	14.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.3	46.1	45.4	52.4	46.0	45.4	64.0	21.5	22.4	64.8	20.7	21.7
LnGrp LOS	D	D	D	D	D	D	E	C	C	E	C	C
Approach Vol, veh/h		132			151			1586			1470	
Approach Delay, s/veh		49.1			51.2			23.0			22.5	
Approach LOS		D			D			C			C	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		20.8	9.2	66.0		20.8	8.9	66.4				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		34.0	10.0	61.0		34.0	10.0	61.0				
Max Q Clear Time (g_c+I1), s		11.1	5.3	26.5		14.6	5.0	23.6				
Green Ext Time (p_c), s		0.0	0.0	1.7		0.0	0.0	1.6				
Intersection Summary												
HCM 6th Ctrl Delay			25.1									
HCM 6th LOS			C									

Timings 12: SE 164th Ave & SE 34th Street

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	49	102	194	295	136	247	192	1216	331	164	1249
Future Volume (vph)	49	102	194	295	136	247	192	1216	331	164	1249
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	15.0	33.0	20.0	17.0	35.0	20.0	20.0	50.0	17.0	20.0	50.0
Total Split (%)	12.5%	27.5%	16.7%	14.2%	29.2%	16.7%	16.7%	41.7%	14.2%	16.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	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	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	7.3	10.7	34.0	12.0	17.5	38.0	18.3	61.8	78.8	15.5	59.0
Actuated g/C Ratio	0.06	0.09	0.28	0.10	0.15	0.32	0.15	0.52	0.66	0.13	0.49
v/c Ratio	0.51	0.66	0.41	1.73	0.54	0.46	0.74	0.70	0.30	0.75	0.54
Control Delay	71.7	71.0	24.2	385.6	56.2	21.9	64.4	26.2	3.6	64.7	22.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.7	71.0	24.2	385.6	56.2	21.9	64.4	26.2	3.6	64.7	22.4
LOS	E	E	C	F	E	C	E	C	A	E	C
Approach Delay		44.8			186.9			26.1			27.2
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 40 (33%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.73

Intersection Signal Delay: 53.8

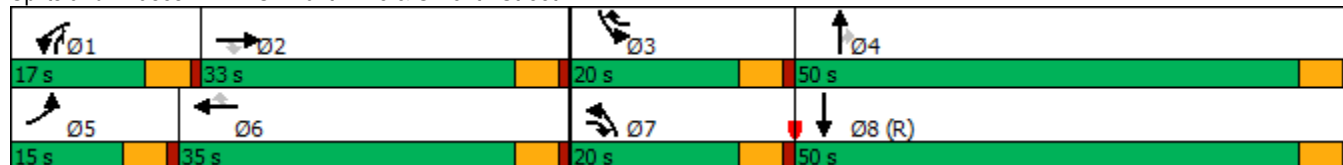
Intersection LOS: D

Intersection Capacity Utilization 81.1%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave & SE 34th Street



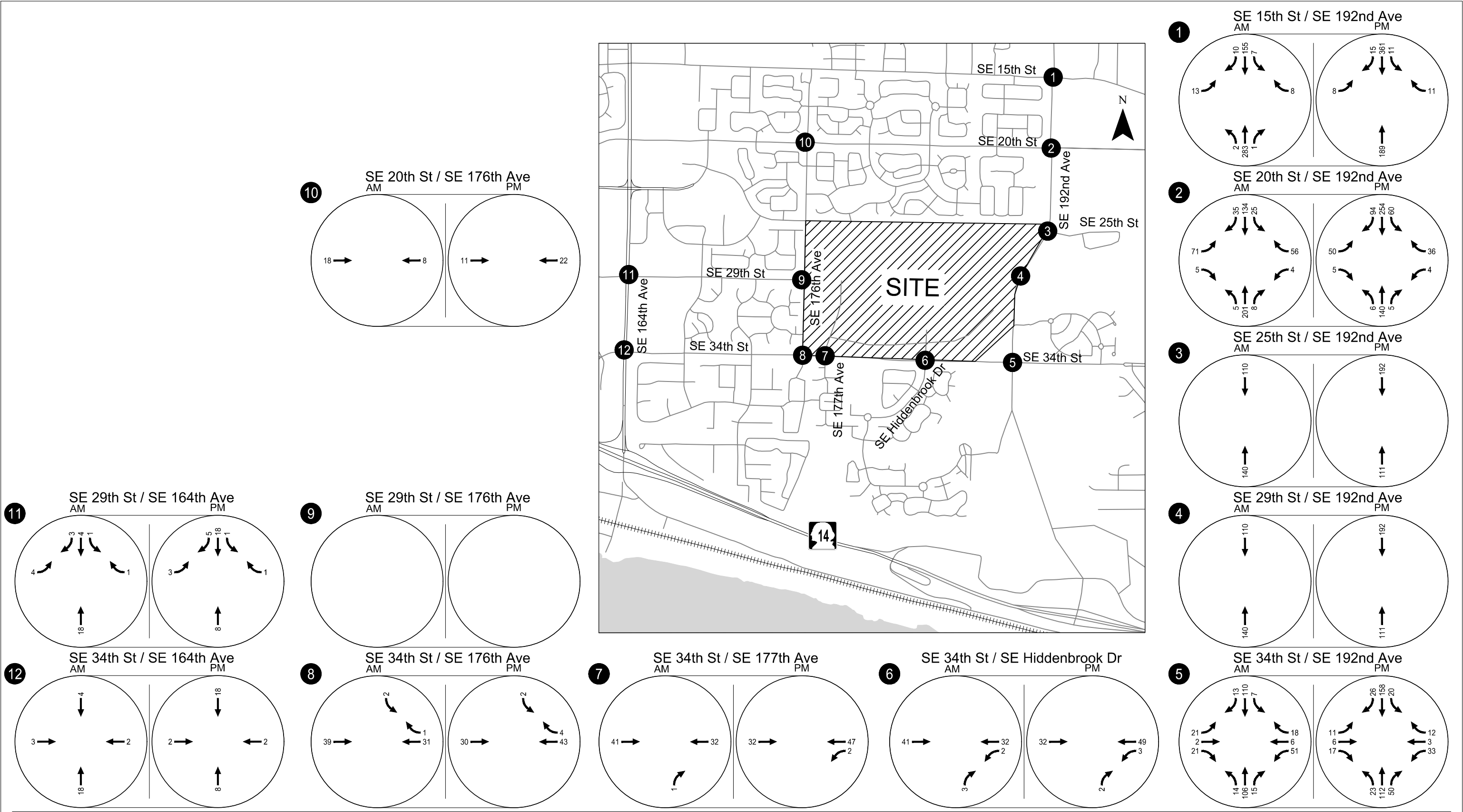
HCM 6th Signalized Intersection Summary

12: SE 164th Ave & SE 34th Street

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	102	194	295	136	247	192	1216	331	164	1249	49
Future Volume (veh/h)	49	102	194	295	136	247	192	1216	331	164	1249	49
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1767	1826	1885	1870	1841	1856	1885	1870	1885	1870	1870	1841
Adj Flow Rate, veh/h	51	106	152	307	142	182	200	1267	237	171	1301	48
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	9	5	1	2	4	3	1	2	1	2	2	4
Cap, veh/h	64	183	359	178	298	430	224	1379	780	199	1895	70
Arrive On Green	0.04	0.10	0.10	0.10	0.16	0.16	0.13	0.39	0.39	0.04	0.12	0.12
Sat Flow, veh/h	1682	1826	1598	1781	1841	1572	1795	3554	1598	1781	5054	186
Grp Volume(v), veh/h	51	106	152	307	142	182	200	1267	237	171	876	473
Grp Sat Flow(s),veh/h/ln	1682	1826	1598	1781	1841	1572	1795	1777	1598	1781	1702	1837
Q Serve(g_s), s	3.6	6.7	9.8	12.0	8.4	11.4	13.2	40.7	10.7	11.5	29.6	29.6
Cycle Q Clear(g_c), s	3.6	6.7	9.8	12.0	8.4	11.4	13.2	40.7	10.7	11.5	29.6	29.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	64	183	359	178	298	430	224	1379	780	199	1277	689
V/C Ratio(X)	0.79	0.58	0.42	1.72	0.48	0.42	0.89	0.92	0.30	0.86	0.69	0.69
Avail Cap(c_a), veh/h	140	426	572	178	460	569	224	1379	780	223	1277	689
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.92	0.92
Uniform Delay (d), s/veh	57.2	51.6	39.8	54.0	45.7	35.8	51.7	34.9	18.5	56.8	45.8	45.8
Incr Delay (d2), s/veh	7.9	1.1	0.3	348.1	0.4	0.2	31.8	11.3	1.0	21.5	2.8	5.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	5.5	6.9	35.7	6.9	7.7	12.4	26.1	7.3	10.7	19.8	21.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.1	52.7	40.1	402.1	46.1	36.0	83.5	46.2	19.5	78.4	48.6	50.9
LnGrp LOS	E	D	D	F	D	D	F	D	B	E	D	D
Approach Vol, veh/h	309			631			1704			1520		
Approach Delay, s/veh	48.6			216.4			46.8			52.7		
Approach LOS	D			F			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	17.0	18.4	51.6	9.6	24.4	20.0	50.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	28.0	15.0	45.0	10.0	30.0	15.0	45.0				
Max Q Clear Time (g_c+I1), s	14.0	11.8	13.5	42.7	5.6	13.4	15.2	31.6				
Green Ext Time (p_c), s	0.0	0.2	0.0	1.1	0.0	0.3	0.0	2.9				
Intersection Summary												
HCM 6th Ctrl Delay	74.8											
HCM 6th LOS	E											

H:\27\27715 - VIC Implementation\005 - Master Plan Update TIA\report\figs\27715-Figures_Fig E-1_in-process Trips Apr 05, 2023 - 2:00pm - ckleynhans Layout Tab: Fig E-1_in-process Trips



In-Process Trip Assignment
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
E-1

Appendix F 2038 With-Project Phase 1
Buildout Operations
Worksheets

Timings 1: SE 192nd & SE 15th St

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	156	45	29	64	158	49	925	89	814
Future Volume (vph)	156	45	29	64	158	49	925	89	814
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	20.0	29.0	20.0	29.0	14.0	15.0	37.0	14.0	36.0
Total Split (%)	20.0%	29.0%	20.0%	29.0%	14.0%	15.0%	37.0%	14.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	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	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effct Green (s)	12.4	18.7	5.9	10.2	22.0	6.8	50.6	8.8	54.5
Actuated g/C Ratio	0.12	0.19	0.06	0.10	0.22	0.07	0.51	0.09	0.54
v/c Ratio	0.80	0.26	0.32	0.38	0.42	0.45	0.60	0.69	0.56
Control Delay	67.8	21.0	53.4	45.3	17.3	60.3	18.0	69.1	20.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	21.0	53.4	45.3	17.3	60.3	18.0	69.1	20.8
LOS	E	C	D	D	B	E	B	E	C
Approach Delay		51.7		28.6			20.1		25.1
Approach LOS		D		C			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 9 (9%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 26.0

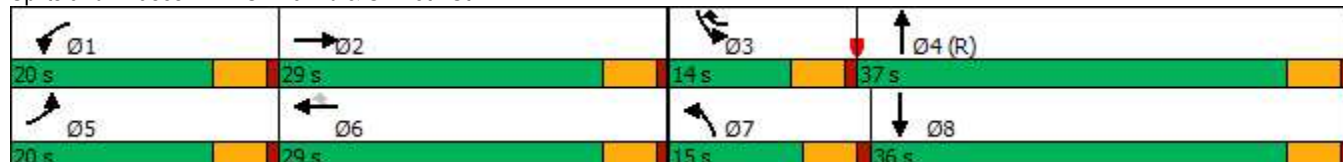
Intersection LOS: C

Intersection Capacity Utilization 58.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	45	37	29	64	158	49	925	16	89	814	87
Future Volume (veh/h)	156	45	37	29	64	158	49	925	16	89	814	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1900	1796	1781	1841	1870	1856	1841	1900	1737	1767	1856
Adj Flow Rate, veh/h	173	50	5	32	71	97	54	1028	17	99	904	90
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
Percent Heavy Veh, %	3	0	7	8	4	2	3	4	0	11	9	3
Cap, veh/h	204	276	28	50	141	239	88	1879	31	122	1720	171
Arrive On Green	0.12	0.16	0.16	0.03	0.08	0.08	0.10	1.00	1.00	0.07	0.56	0.56
Sat Flow, veh/h	1767	1699	170	1697	1841	1585	1767	3519	58	1654	3082	307
Grp Volume(v), veh/h	173	0	55	32	71	97	54	511	534	99	492	502
Grp Sat Flow(s),veh/h/ln	1767	0	1869	1697	1841	1585	1767	1749	1829	1654	1678	1711
Q Serve(g_s), s	9.6	0.0	2.5	1.9	3.7	5.5	2.9	0.0	0.0	5.9	18.3	18.3
Cycle Q Clear(g_c), s	9.6	0.0	2.5	1.9	3.7	5.5	2.9	0.0	0.0	5.9	18.3	18.3
Prop In Lane	1.00		0.09	1.00		1.00	1.00		0.03	1.00		0.18
Lane Grp Cap(c), veh/h	204	0	304	50	141	239	88	934	976	122	936	955
V/C Ratio(X)	0.85	0.00	0.18	0.64	0.50	0.41	0.61	0.55	0.55	0.81	0.53	0.53
Avail Cap(c_a), veh/h	265	0	449	254	442	498	177	934	976	149	936	955
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.82	0.82	0.82	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.4	0.0	36.1	48.0	44.3	38.4	44.1	0.0	0.0	45.6	13.8	13.8
Incr Delay (d2), s/veh	14.7	0.0	0.1	5.0	1.0	0.4	2.1	1.9	1.8	19.5	2.1	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.5	0.0	2.0	1.5	3.1	3.8	2.3	0.9	0.9	5.4	11.1	11.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	0.0	36.2	53.0	45.3	38.8	46.1	1.9	1.8	65.1	15.9	15.9
LnGrp LOS	E	A	D	D	D	D	D	A	A	E	B	B
Approach Vol, veh/h		228			200			1099			1093	
Approach Delay, s/veh		52.8			43.4			4.0			20.4	
Approach LOS		D			D			A			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.9	21.3	12.4	58.4	16.5	12.7	10.0	60.8				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	24.0	9.0	32.0	15.0	24.0	10.0	31.0				
Max Q Clear Time (g_c+I1), s	3.9	4.5	7.9	2.0	11.6	7.5	4.9	20.3				
Green Ext Time (p_c), s	0.0	0.1	0.0	2.1	0.0	0.2	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay			18.1									
HCM 6th LOS			B									

Timings
2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 		 			 		 
Traffic Volume (vph)	166	182	119	165	46	707	59	667
Future Volume (vph)	166	182	119	165	46	707	59	667
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	17.0	29.0	17.0	29.0	15.0	39.0	15.0	39.0
Total Split (%)	17.0%	29.0%	17.0%	29.0%	15.0%	39.0%	15.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effct Green (s)	9.4	18.7	8.0	17.2	7.3	47.6	7.7	46.0
Actuated g/C Ratio	0.09	0.19	0.08	0.17	0.07	0.48	0.08	0.46
v/c Ratio	0.55	0.79	0.45	0.72	0.39	0.54	0.45	0.52
Control Delay	49.5	51.2	48.7	48.4	67.5	8.7	52.3	27.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	51.2	48.7	48.4	67.5	8.7	52.3	27.1
LOS	D	D	D	D	E	A	D	C
Approach Delay		50.5		48.5		11.7		28.9
Approach LOS		D		D		B		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 29.2

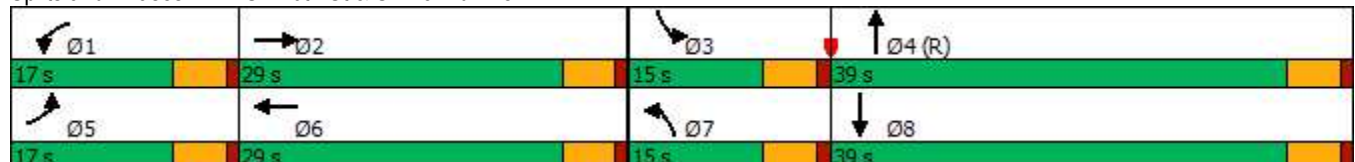
Intersection LOS: C

Intersection Capacity Utilization 63.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: SE 20th St & SE 192nd Ave



HCM 6th Signalized Intersection Summary

2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	166	182	80	119	165	57	46	707	138	59	667	103
Future Volume (veh/h)	166	182	80	119	165	57	46	707	138	59	667	103
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1900	1841	1885	1885	1885	1811	1856	1841	1885	1811	1826
Adj Flow Rate, veh/h	175	192	66	125	174	46	48	744	131	62	702	97
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	0	4	1	1	1	6	3	4	1	6	5
Cap, veh/h	242	222	76	189	212	56	86	1609	283	80	1615	223
Arrive On Green	0.07	0.16	0.16	0.05	0.15	0.15	0.05	0.54	0.54	0.04	0.53	0.53
Sat Flow, veh/h	3428	1352	465	3483	1437	380	1725	2996	527	1795	3036	419
Grp Volume(v), veh/h	175	0	258	125	0	220	48	438	437	62	398	401
Grp Sat Flow(s),veh/h/ln	1714	0	1816	1742	0	1817	1725	1763	1760	1795	1721	1735
Q Serve(g_s), s	5.0	0.0	13.8	3.5	0.0	11.7	2.7	15.3	15.3	3.4	14.1	14.1
Cycle Q Clear(g_c), s	5.0	0.0	13.8	3.5	0.0	11.7	2.7	15.3	15.3	3.4	14.1	14.1
Prop In Lane	1.00		0.26	1.00		0.21	1.00		0.30	1.00		0.24
Lane Grp Cap(c), veh/h	242	0	298	189	0	268	86	947	945	80	915	923
V/C Ratio(X)	0.72	0.00	0.87	0.66	0.00	0.82	0.56	0.46	0.46	0.77	0.43	0.44
Avail Cap(c_a), veh/h	411	0	436	418	0	436	172	947	945	180	915	923
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.81	0.81	0.81
Uniform Delay (d), s/veh	45.5	0.0	40.7	46.4	0.0	41.3	46.4	14.3	14.3	47.3	14.3	14.3
Incr Delay (d2), s/veh	1.5	0.0	8.6	1.5	0.0	2.6	2.1	1.6	1.6	4.8	1.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.8	0.0	10.9	2.7	0.0	9.1	2.1	10.0	10.0	2.9	8.7	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.0	0.0	49.3	47.8	0.0	44.0	48.5	15.9	15.9	52.0	15.5	15.5
LnGrp LOS	D	A	D	D	A	D	D	B	B	D	B	B
Approach Vol, veh/h		433			345			923			861	
Approach Delay, s/veh		48.4			45.4			17.6			18.1	
Approach LOS		D			D			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.4	21.4	9.5	58.7	12.1	19.8	10.0	58.2				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	24.0	10.0	34.0	12.0	24.0	10.0	34.0				
Max Q Clear Time (g_c+I1), s	5.5	15.8	5.4	17.3	7.0	13.7	4.7	16.1				
Green Ext Time (p_c), s	0.1	0.5	0.0	3.1	0.1	0.5	0.0	2.9				

Intersection Summary

HCM 6th Ctrl Delay 26.7
HCM 6th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	10	813	3	7	840
Future Vol, veh/h	7	10	813	3	7	840
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	230	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	20	4	67	0	7
Mvmt Flow	7	11	856	3	7	884
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1315	431	0	0	860	0
Stage 1	859	-	-	-	-	-
Stage 2	456	-	-	-	-	-
Critical Hdwy	6.8	7.3	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.5	-	-	2.2	-
Pot Cap-1 Maneuver	152	525	-	-	790	-
Stage 1	380	-	-	-	-	-
Stage 2	611	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	150	525	-	-	789	-
Mov Cap-2 Maneuver	150	-	-	-	-	-
Stage 1	380	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	19.5	0	0.1			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 150	525	789	-	
HCM Lane V/C Ratio	-	- 0.049	0.02	0.009	-	
HCM Control Delay (s)	-	- 30.2	12	9.6	-	
HCM Lane LOS	-	- D	B	A	-	
HCM 95th %tile Q(veh)	-	- 0.2	0.1	0	-	

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	124	152	207	127	67	118	704	349	108	547
Future Volume (vph)	124	152	207	127	67	118	704	349	108	547
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	15.0	36.0	15.0	36.0	36.0	15.0	34.0	15.0	15.0	34.0
Total Split (%)	15.0%	36.0%	15.0%	36.0%	36.0%	15.0%	34.0%	15.0%	15.0%	34.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	27.0	18.3	29.2	19.4	19.4	9.9	41.9	51.7	10.0	42.1
Actuated g/C Ratio	0.27	0.18	0.29	0.19	0.19	0.10	0.42	0.52	0.10	0.42
v/c Ratio	0.40	0.74	0.82	0.38	0.16	0.73	0.55	0.38	0.35	0.59
Control Delay	26.3	47.2	48.4	36.4	0.8	66.8	25.7	2.3	42.0	23.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.3	47.2	48.4	36.4	0.8	66.8	25.7	2.3	42.0	23.6
LOS	C	D	D	D	A	E	C	A	D	C
Approach Delay		39.8		36.7			22.8			26.1
Approach LOS		D		D			C			C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 28.0

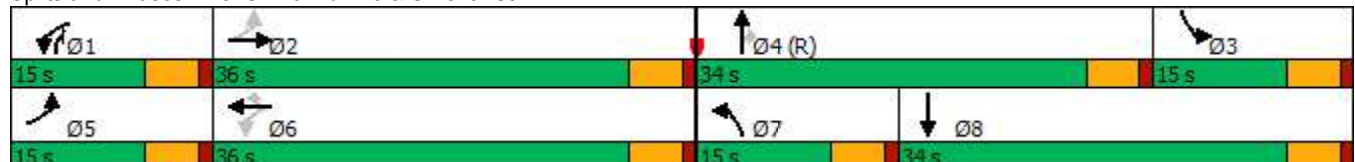
Intersection LOS: C

Intersection Capacity Utilization 69.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	152	74	207	127	67	118	704	349	108	547	155
Future Volume (veh/h)	124	152	74	207	127	67	118	704	349	108	547	155
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1728	1803	1847	1943	2018	1988	2018	1883	1988	1832	1684	1684
Adj Flow Rate, veh/h	138	169	60	230	141	7	131	782	179	120	608	149
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
Percent Heavy Veh, %	8	3	0	5	0	2	0	9	2	1	11	11
Cap, veh/h	352	214	76	305	368	301	163	1037	655	818	1138	278
Arrive On Green	0.09	0.17	0.17	0.10	0.18	0.18	0.08	0.29	0.29	0.24	0.45	0.45
Sat Flow, veh/h	1646	1268	450	1850	2018	1652	1922	3578	1679	3385	2548	623
Grp Volume(v), veh/h	138	0	229	230	141	7	131	782	179	120	381	376
Grp Sat Flow(s),veh/h/ln	1646	0	1718	1850	2018	1652	1922	1789	1679	1693	1600	1571
Q Serve(g_s), s	6.8	0.0	12.8	10.0	6.1	0.2	6.7	19.9	2.6	2.8	17.3	17.4
Cycle Q Clear(g_c), s	6.8	0.0	12.8	10.0	6.1	0.2	6.7	19.9	2.6	2.8	17.3	17.4
Prop In Lane	1.00		0.26	1.00		1.00	1.00		1.00	1.00		0.40
Lane Grp Cap(c), veh/h	352	0	289	305	368	301	163	1037	655	818	715	702
V/C Ratio(X)	0.39	0.00	0.79	0.75	0.38	0.02	0.80	0.75	0.27	0.15	0.53	0.54
Avail Cap(c_a), veh/h	374	0	532	305	626	512	192	1037	655	818	715	702
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.00	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.4	0.0	39.9	32.0	36.0	11.4	44.9	32.3	7.4	29.8	20.1	20.1
Incr Delay (d2), s/veh	0.2	0.0	1.7	9.1	0.2	0.0	15.9	5.1	1.0	0.0	2.8	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.7	0.0	9.0	9.0	5.3	0.2	6.9	13.8	2.2	2.0	10.8	10.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.7	0.0	41.6	41.1	36.2	11.4	60.9	37.3	8.5	29.9	22.9	23.0
LnGrp LOS	C	A	D	D	D	B	E	D	A	C	C	C
Approach Vol, veh/h		367			378			1092			877	
Approach Delay, s/veh		37.5			38.7			35.4			23.9	
Approach LOS		D			D			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	21.8	29.2	34.0	13.6	23.2	13.5	49.7				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	31.0	10.0	29.0	10.0	31.0	10.0	29.0				
Max Q Clear Time (g_c+I1), s	12.0	14.8	4.8	21.9	8.8	8.1	8.7	19.4				
Green Ext Time (p_c), s	0.0	0.4	0.0	1.4	0.0	0.2	0.0	1.2				
Intersection Summary												
HCM 6th Ctrl Delay			32.4									
HCM 6th LOS			C									

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Baseline 2036 AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	36	310	27	255	63	11	58	1	21
Future Volume (vph)	36	310	27	255	63	11	58	1	21
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6		8		4	
Permitted Phases					8		4		4
Detector Phase	5	2	1	6	8	8	4	4	4
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	27.0	10.0	27.0	32.0	32.0	34.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%	26.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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	5.0	5.0	5.0	5.0		5.0	5.0
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 Effect Green (s)	5.6	26.3	5.6	24.1	9.2	9.2		9.2	9.2
Actuated g/C Ratio	0.12	0.57	0.12	0.53	0.20	0.20		0.20	0.20
v/c Ratio	0.20	0.40	0.15	0.50	0.30	0.17		0.28	0.07
Control Delay	27.7	12.3	27.4	14.3	19.5	8.4		19.2	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	27.7	12.3	27.4	14.3	19.5	8.4		19.2	1.5
LOS	C	B	C	B	B	A		B	A
Approach Delay		13.8		15.2		14.4		14.5	
Approach LOS		B		B		B		B	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 45.9

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.50

Intersection Signal Delay: 14.5

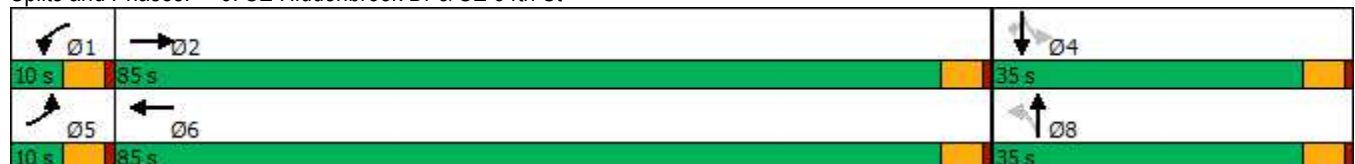
Intersection LOS: B

Intersection Capacity Utilization 47.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St



HCM 6th Signalized Intersection Summary

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	310	24	27	255	113	63	11	41	58	1	21
Future Volume (veh/h)	36	310	24	27	255	113	63	11	41	58	1	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1841	1900	1876	1802	1876	1832	1876	1876	1900	1900	1900
Adj Flow Rate, veh/h	44	383	26	33	315	119	78	14	0	72	1	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
Percent Heavy Veh, %	0	4	0	0	5	0	3	0	0	0	0	0
Cap, veh/h	89	737	50	70	526	199	375	210	0	347	3	181
Arrive On Green	0.05	0.43	0.43	0.04	0.42	0.42	0.11	0.11	0.00	0.11	0.11	0.00
Sat Flow, veh/h	1810	1704	116	1787	1245	470	1387	1876	0	1324	24	1610
Grp Volume(v), veh/h	44	0	409	33	0	434	78	14	0	73	0	0
Grp Sat Flow(s),veh/h/ln	1810	0	1819	1787	0	1716	1387	1876	0	1348	0	1610
Q Serve(g_s), s	0.9	0.0	5.9	0.7	0.0	7.1	0.0	0.2	0.0	1.7	0.0	0.0
Cycle Q Clear(g_c), s	0.9	0.0	5.9	0.7	0.0	7.1	1.5	0.2	0.0	2.0	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.27	1.00		0.00	0.99		1.00
Lane Grp Cap(c), veh/h	89	0	787	70	0	724	375	210	0	350	0	181
V/C Ratio(X)	0.49	0.00	0.52	0.47	0.00	0.60	0.21	0.07	0.00	0.21	0.00	0.00
Avail Cap(c_a), veh/h	251	0	4039	248	0	3809	1374	1562	0	1377	0	1341
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	16.7	0.0	7.5	17.0	0.0	8.1	14.9	14.3	0.0	15.2	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.2	1.8	0.0	0.3	0.1	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.6	0.0	2.3	0.4	0.0	2.7	0.9	0.2	0.0	0.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.2	0.0	7.7	18.8	0.0	8.4	15.0	14.4	0.0	15.3	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	B	A	B	A	A
Approach Vol, veh/h	453				467				92			
Approach Delay, s/veh	8.7				9.1				14.9			
Approach LOS	A				A				B			
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	20.6		9.0	6.8	20.2		9.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	2.7	7.9		4.0	2.9	9.1		3.5				
Green Ext Time (p_c), s	0.0	0.8		0.1	0.0	0.9		0.1				
Intersection Summary												
HCM 6th Ctrl Delay	9.8											
HCM 6th LOS	A											

Intersection												
Int Delay, s/veh	7.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	234	338	11	5	320	14	29	2	17	16	2	125
Future Vol, veh/h	234	338	11	5	320	14	29	2	17	16	2	125
Conflicting Peds, #/hr	3	0	3	3	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	95	-	0	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	3	3	0	0	5	0	0	0	0	0	0	27
Mvmt Flow	275	398	13	6	376	16	34	2	20	19	2	147

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	395	0	0	414	0	0	1429	1365	408	1357	1355	379
Stage 1	-	-	-	-	-	-	958	958	-	391	391	-
Stage 2	-	-	-	-	-	-	471	407	-	966	964	-
Critical Hdwy	4.13	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.47
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.227	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.543
Pot Cap-1 Maneuver	1158	-	-	1156	-	-	114	149	648	127	151	616
Stage 1	-	-	-	-	-	-	312	338	-	637	611	-
Stage 2	-	-	-	-	-	-	577	601	-	309	336	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1155	-	-	1153	-	-	69	112	646	98	114	614
Mov Cap-2 Maneuver	-	-	-	-	-	-	69	112	-	98	114	-
Stage 1	-	-	-	-	-	-	237	257	-	484	606	-
Stage 2	-	-	-	-	-	-	435	596	-	226	255	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	3.6			0.1			76			17.4		
HCM LOS							F			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	103	1155	-	-	1153	-	-	100	614
HCM Lane V/C Ratio	0.548	0.238	-	-	0.005	-	-	0.212	0.24
HCM Control Delay (s)	76	9.1	-	-	8.1	-	-	50.4	12.7
HCM Lane LOS	F	A	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	2.5	0.9	-	-	0	-	-	0.7	0.9

Timings 8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	49	508	3	404	14	5	70	3
Future Volume (vph)	49	508	3	404	14	5	70	3
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	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	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	32.7	32.0	30.7	27.9	9.6	9.6	9.6	9.6
Actuated g/C Ratio	0.66	0.64	0.62	0.56	0.19	0.19	0.19	0.19
v/c Ratio	0.11	0.51	0.01	0.56	0.06	0.04	0.31	0.14
Control Delay	6.4	10.8	6.7	14.4	20.1	15.6	22.8	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.4	10.8	6.7	14.4	20.1	15.6	22.8	9.0
LOS	A	B	A	B	C	B	C	A
Approach Delay		10.4		14.4		18.2		17.6
Approach LOS		B		B		B		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 49.8

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 12.9

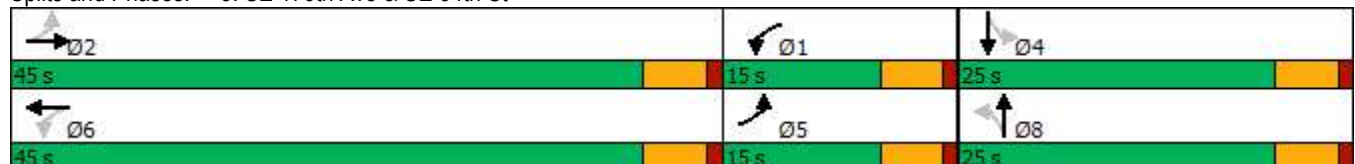
Intersection LOS: B

Intersection Capacity Utilization 54.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	508	2	3	404	67	14	5	5	70	3	39
Future Volume (veh/h)	49	508	2	3	404	67	14	5	5	70	3	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.98		1.00	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1767	1856	1900	1900	1811	1826	1900	1900	1530	1870	1900	1885
Adj Flow Rate, veh/h	58	598	2	4	475	71	16	6	0	82	4	0
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
Percent Heavy Veh, %	9	3	0	0	6	5	0	0	25	2	0	1
Cap, veh/h	425	765	3	423	640	96	351	209	0	347	209	0
Arrive On Green	0.06	0.41	0.41	0.06	0.42	0.42	0.11	0.11	0.00	0.11	0.11	0.00
Sat Flow, veh/h	1682	1848	6	1810	1538	230	1409	1900	0	1385	1900	0
Grp Volume(v), veh/h	58	0	600	4	0	546	16	6	0	82	4	0
Grp Sat Flow(s),veh/h/ln	1682	0	1854	1810	0	1768	1409	1900	0	1385	1900	0
Q Serve(g_s), s	0.0	0.0	10.2	0.0	0.0	9.5	0.4	0.1	0.0	2.0	0.1	0.0
Cycle Q Clear(g_c), s	0.0	0.0	10.2	0.0	0.0	9.5	0.4	0.1	0.0	2.1	0.1	0.0
Prop In Lane	1.00		0.00	1.00		0.13	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	425	0	767	423	0	735	351	209	0	347	209	0
V/C Ratio(X)	0.14	0.00	0.78	0.01	0.00	0.74	0.05	0.03	0.00	0.24	0.02	0.00
Avail Cap(c_a), veh/h	786	0	2043	808	0	1948	972	1047	0	957	1047	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.1	0.0	9.2	11.8	0.0	9.0	14.6	14.4	0.0	15.4	14.4	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.7	0.0	0.0	0.6	0.0	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.5	0.0	4.3	0.0	0.0	3.8	0.2	0.1	0.0	0.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.1	0.0	9.9	11.8	0.0	9.5	14.6	14.4	0.0	15.5	14.4	0.0
LnGrp LOS	B	A	A	B	A	A	B	B	A	B	B	A
Approach Vol, veh/h	658			550			22			86		
Approach Delay, s/veh	10.1			9.5			14.6			15.5		
Approach LOS	B			A			B			B		
Timer - Assigned Phs	1	2	4		5	6	8					
Phs Duration (G+Y+Rc), s	7.3	20.0	9.0		7.2	20.1	9.0					
Change Period (Y+Rc), s	5.0	5.0	5.0		5.0	5.0	5.0					
Max Green Setting (Gmax), s	10.0	40.0	20.0		10.0	40.0	20.0					
Max Q Clear Time (g_c+I1), s	2.0	12.2	4.1		2.0	11.5	2.4					
Green Ext Time (p_c), s	0.0	2.4	0.1		0.0	2.2	0.0					

Intersection Summary

HCM 6th Ctrl Delay 10.3

HCM 6th LOS B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	13	4	132	95	104
Future Vol, veh/h	5	13	4	132	95	104
Conflicting Peds, #/hr	2	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	10	0	2	1	18
Mvmt Flow	6	15	5	155	112	122
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	340	173	234	0	-	0
Stage 1	173	-	-	-	-	-
Stage 2	167	-	-	-	-	-
Critical Hdwy	6.4	6.3	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	2.2	-	-	-
Pot Cap-1 Maneuver	660	850	1345	-	-	-
Stage 1	862	-	-	-	-	-
Stage 2	867	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	657	850	1345	-	-	-
Mov Cap-2 Maneuver	657	-	-	-	-	-
Stage 1	859	-	-	-	-	-
Stage 2	867	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9.7	0.2		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1345	-	786	-	-	
HCM Lane V/C Ratio	0.003	-	0.027	-	-	
HCM Control Delay (s)	7.7	-	9.7	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

Intersection	
Intersection Delay, s/veh	14.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	272	28	75	314	14	33	71	55	0	62	10
Future Vol, veh/h	12	272	28	75	314	14	33	71	55	0	62	10
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
Heavy Vehicles, %	0	4	10	4	1	9	4	3	0	0	0	0
Mvmt Flow	13	299	31	82	345	15	36	78	60	0	68	11
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	15.5	15.3	11.3	11.3
HCM LOS	C	C	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	56%	0%	91%	0%	96%	86%
Vol Right, %	0%	44%	0%	9%	0%	4%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	33	126	12	300	75	328	72
LT Vol	33	0	12	0	75	0	0
Through Vol	0	71	0	272	0	314	62
RT Vol	0	55	0	28	0	14	10
Lane Flow Rate	36	138	13	330	82	360	79
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.074	0.251	0.024	0.546	0.147	0.583	0.153
Departure Headway (Hd)	7.371	6.533	6.47	5.965	6.408	5.819	6.959
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	485	548	552	603	559	620	513
Service Time	5.134	4.297	4.22	3.715	4.154	3.565	5.035
HCM Lane V/C Ratio	0.074	0.252	0.024	0.547	0.147	0.581	0.154
HCM Control Delay	10.7	11.5	9.4	15.7	10.3	16.4	11.3
HCM Lane LOS	B	B	A	C	B	C	B
HCM 95th-tile Q	0.2	1	0.1	3.3	0.5	3.8	0.5

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

														
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT				
Lane Configurations														
Traffic Volume (vph)	42	7	47	141	16	37	27	1106	16	823				
Future Volume (vph)	42	7	47	141	16	37	27	1106	16	823				
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA				
Protected Phases	2				6		7		4		3		8	
Permitted Phases	2		2		6		6							
Detector Phase	2	2	2	6	6	6	7	4	3	8				
Switch Phase														
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	15.0	5.0	15.0				
Minimum Split (s)	39.0	39.0	39.0	38.0	38.0	38.0	10.0	32.0	10.0	32.0				
Total Split (s)	39.0	39.0	39.0	39.0	39.0	39.0	17.0	64.0	17.0	64.0				
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	14.2%	53.3%	14.2%	53.3%				
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0				
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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Lead/Lag							Lead	Lag	Lead	Lag				
Lead-Lag Optimize?							Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max				
Act Effct Green (s)	18.7	18.7	18.7	18.7	18.7	18.7	5.9	86.9	5.4	84.4				
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.05	0.72	0.04	0.70				
v/c Ratio	0.21	0.02	0.16	0.69	0.07	0.13	0.32	0.32	0.22	0.25				
Control Delay	42.7	37.1	6.5	62.4	38.9	3.9	36.9	23.3	61.9	8.3				
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Total Delay	42.7	37.1	6.5	62.4	38.9	3.9	36.9	23.3	61.9	8.3				
LOS	D	D	A	E	D	A	D	C	E	A				
Approach Delay	24.6				49.2			23.6			9.3			
Approach LOS	C				D			C			A			

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 85 (71%), Referenced to phase 8: SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 20.4

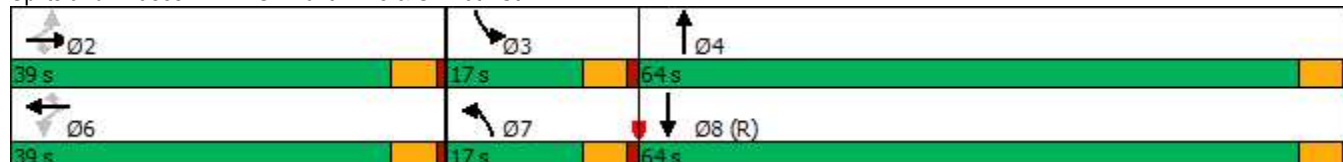
Intersection LOS: C

Intersection Capacity Utilization 51.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	7	47	141	16	37	27	1106	15	16	823	26
Future Volume (veh/h)	42	7	47	141	16	37	27	1106	15	16	823	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1900	1856	1856	1648	1900	1900	1870	1796	1796	1856	1826
Adj Flow Rate, veh/h	44	7	6	148	17	4	28	1164	15	17	866	25
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	0	3	3	17	0	0	2	7	7	3	5
Cap, veh/h	221	239	198	230	207	202	46	2592	33	31	2488	72
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.03	0.50	0.50	0.02	0.49	0.49
Sat Flow, veh/h	1380	1900	1572	1390	1648	1610	1810	5195	67	1711	5060	146
Grp Volume(v), veh/h	44	7	6	148	17	4	28	763	416	17	578	313
Grp Sat Flow(s),veh/h/ln	1380	1900	1572	1390	1648	1610	1810	1702	1858	1711	1689	1829
Q Serve(g_s), s	3.5	0.4	0.4	12.5	1.1	0.3	1.8	17.4	17.4	1.2	12.6	12.6
Cycle Q Clear(g_c), s	4.6	0.4	0.4	12.9	1.1	0.3	1.8	17.4	17.4	1.2	12.6	12.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.04	1.00		0.08
Lane Grp Cap(c), veh/h	221	239	198	230	207	202	46	1698	927	31	1660	899
V/C Ratio(X)	0.20	0.03	0.03	0.64	0.08	0.02	0.61	0.45	0.45	0.55	0.35	0.35
Avail Cap(c_a), veh/h	438	538	446	449	467	456	181	1698	927	171	1660	899
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.73	0.73	0.73	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.4	46.0	46.0	51.7	46.3	46.0	57.9	19.4	19.4	58.4	18.7	18.7
Incr Delay (d2), s/veh	0.2	0.0	0.0	1.1	0.1	0.0	3.6	0.6	1.2	5.6	0.6	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.2	0.3	0.3	7.9	0.8	0.2	1.6	10.3	11.3	1.0	8.5	9.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.5	46.1	46.1	52.8	46.4	46.0	61.5	20.0	20.6	64.0	19.3	19.8
LnGrp LOS	D	D	D	D	D	D	E	C	C	E	B	B
Approach Vol, veh/h	57			169			1207			908		
Approach Delay, s/veh	48.0			52.0			21.2			20.3		
Approach LOS	D			D			C			C		
Timer - Assigned Phs	2			3			4			6		
Phs Duration (G+Y+Rc), s	20.1			7.2			64.9			20.1		
Change Period (Y+Rc), s	5.0			5.0			5.0			5.0		
Max Green Setting (Gmax), s	34.0			12.0			59.0			34.0		
Max Q Clear Time (g_c+I1), s	6.6			3.2			19.4			14.9		
Green Ext Time (p_c), s	0.0			0.0			5.5			0.2		
Intersection Summary												
HCM 6th Ctrl Delay	23.7											
HCM 6th LOS	C											

Timings 12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	28	60	165	312	121	138	111	931	307	187	742
Future Volume (vph)	28	60	165	312	121	138	111	931	307	187	742
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	20.0	33.0	20.0	25.0	38.0	17.0	20.0	45.0	25.0	17.0	42.0
Total Split (%)	16.7%	27.5%	16.7%	20.8%	31.7%	14.2%	16.7%	37.5%	20.8%	14.2%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	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	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	6.4	8.2	23.0	20.0	23.8	52.1	11.8	50.5	75.5	23.3	62.0
Actuated g/C Ratio	0.05	0.07	0.19	0.17	0.20	0.43	0.10	0.42	0.63	0.19	0.52
v/c Ratio	0.39	0.56	0.53	1.18	0.36	0.20	0.72	0.71	0.32	0.61	0.34
Control Delay	68.3	70.9	31.3	152.9	45.0	4.0	74.0	32.9	2.1	45.5	20.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.3	70.9	31.3	152.9	45.0	4.0	74.0	32.9	2.1	45.5	20.5
LOS	E	E	C	F	D	A	E	C	A	D	C
Approach Delay		44.8			94.1			29.3			25.4
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 15 (13%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.18

Intersection Signal Delay: 41.1

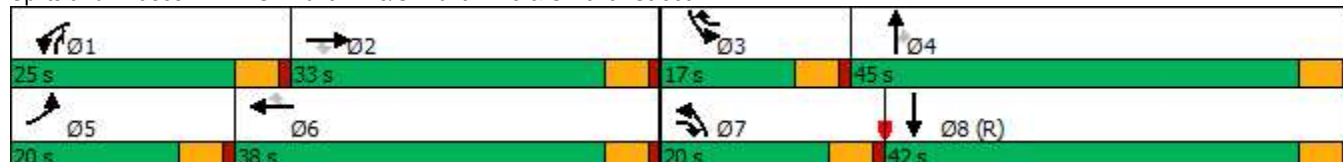
Intersection LOS: D

Intersection Capacity Utilization 72.5%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave/SE164th Ave & SE 34th Street



HCM 6th Signalized Intersection Summary

12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	60	165	312	121	138	111	931	307	187	742	37
Future Volume (veh/h)	28	60	165	312	121	138	111	931	307	187	742	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1565	1758	1803	1870	1885	1841	1791	1776	1746	1806	1761	1761
Adj Flow Rate, veh/h	31	67	124	347	134	50	123	1034	181	208	824	38
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
Percent Heavy Veh, %	19	6	3	2	1	4	1	2	4	0	3	3
Cap, veh/h	40	159	270	297	434	515	147	1125	740	172	1635	75
Arrive On Green	0.03	0.09	0.09	0.17	0.23	0.23	0.09	0.33	0.33	0.03	0.11	0.11
Sat Flow, veh/h	1491	1758	1528	1781	1885	1560	1706	3375	1480	1720	4711	217
Grp Volume(v), veh/h	31	67	124	347	134	50	123	1034	181	208	560	302
Grp Sat Flow(s),veh/h/ln	1491	1758	1528	1781	1885	1560	1706	1687	1480	1720	1603	1722
Q Serve(g_s), s	2.5	4.3	8.7	20.0	7.1	2.7	8.5	35.3	8.4	12.0	19.7	19.8
Cycle Q Clear(g_c), s	2.5	4.3	8.7	20.0	7.1	2.7	8.5	35.3	8.4	12.0	19.7	19.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	40	159	270	297	434	515	147	1125	740	172	1112	598
V/C Ratio(X)	0.77	0.42	0.46	1.17	0.31	0.10	0.84	0.92	0.24	1.21	0.50	0.51
Avail Cap(c_a), veh/h	186	410	488	297	518	585	213	1125	740	172	1112	598
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	58.0	51.6	44.2	50.0	38.3	27.8	54.0	38.4	17.1	58.0	43.4	43.5
Incr Delay (d2), s/veh	11.1	0.7	0.5	106.0	0.1	0.0	11.8	13.3	0.8	134.8	1.6	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.9	3.4	5.9	26.2	5.8	1.8	7.3	22.7	5.2	18.8	13.4	14.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.2	52.2	44.7	156.0	38.4	27.8	65.8	51.8	17.9	192.8	45.0	46.4
LnGrp LOS	E	D	D	F	D	C	E	D	B	F	D	D
Approach Vol, veh/h	222			531			1338			1070		
Approach Delay, s/veh	50.4			114.3			48.5			74.1		
Approach LOS	D			F			D			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.0	15.9	17.0	45.0	8.2	32.7	15.4	46.6				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	20.0	28.0	12.0	40.0	15.0	33.0	15.0	37.0				
Max Q Clear Time (g_c+I1), s	22.0	10.7	14.0	37.3	4.5	9.1	10.5	21.8				
Green Ext Time (p_c), s	0.0	0.1	0.0	1.0	0.0	0.2	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay	68.3											
HCM 6th LOS	E											

Timings

1: SE 192nd & SE 15th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	116	91	40	82	242	66	1268	115	1436
Future Volume (vph)	116	91	40	82	242	66	1268	115	1436
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	15.0	29.0	15.0	29.0	16.0	14.0	40.0	16.0	42.0
Total Split (%)	15.0%	29.0%	15.0%	29.0%	16.0%	14.0%	40.0%	16.0%	42.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	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	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effect Green (s)	9.0	15.7	6.2	10.9	19.7	7.1	52.3	9.7	56.9
Actuated g/C Ratio	0.09	0.16	0.06	0.11	0.20	0.07	0.52	0.10	0.57
v/c Ratio	0.79	0.59	0.38	0.43	0.68	0.54	0.74	0.69	0.83
Control Delay	78.1	36.7	54.0	45.7	30.8	52.8	24.3	63.7	26.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.1	36.7	54.0	45.7	30.8	52.8	24.3	63.7	26.4
LOS	E	D	D	D	C	D	C	E	C
Approach Delay		53.3		36.7			25.7		28.9
Approach LOS		D		D			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 30.4

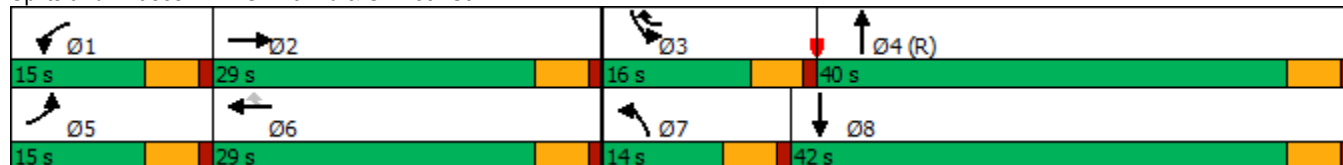
Intersection LOS: C

Intersection Capacity Utilization 79.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	116	91	82	40	82	242	66	1268	32	115	1436	133
Future Volume (veh/h)	116	91	82	40	82	242	66	1268	32	115	1436	133
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1885	1900	1900	1856	1900	1900	1870	1900	1900	1870	1870
Adj Flow Rate, veh/h	122	96	49	42	86	192	69	1335	33	121	1512	135
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	1	0	0	3	0	0	2	0	0	2	2
Cap, veh/h	150	218	111	62	248	345	103	1763	44	150	1729	153
Arrive On Green	0.09	0.19	0.19	0.03	0.13	0.13	0.11	1.00	1.00	0.08	0.52	0.52
Sat Flow, veh/h	1739	1176	600	1810	1856	1582	1810	3544	88	1810	3301	293
Grp Volume(v), veh/h	122	0	145	42	86	192	69	669	699	121	809	838
Grp Sat Flow(s),veh/h/ln	1739	0	1776	1810	1856	1582	1810	1777	1854	1810	1777	1816
Q Serve(g_s), s	6.9	0.0	7.2	2.3	4.2	10.8	3.7	0.7	0.7	6.6	39.8	40.8
Cycle Q Clear(g_c), s	6.9	0.0	7.2	2.3	4.2	10.8	3.7	0.7	0.7	6.6	39.8	40.8
Prop In Lane	1.00		0.34	1.00		1.00	1.00		0.05	1.00		0.16
Lane Grp Cap(c), veh/h	150	0	329	62	248	345	103	884	923	150	931	951
V/C Ratio(X)	0.82	0.00	0.44	0.67	0.35	0.56	0.67	0.76	0.76	0.81	0.87	0.88
Avail Cap(c_a), veh/h	174	0	426	181	445	513	163	884	923	199	931	951
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.43	0.43	0.43	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.9	0.0	36.2	47.7	39.4	34.9	43.4	0.1	0.1	45.1	20.8	21.1
Incr Delay (d2), s/veh	19.5	0.0	0.3	4.6	0.3	0.5	1.2	2.7	2.6	12.3	10.8	11.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.7	0.0	5.5	2.0	3.5	7.3	2.8	1.3	1.3	6.1	24.3	25.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.4	0.0	36.5	52.4	39.7	35.5	44.7	2.8	2.7	57.3	31.6	32.6
LnGrp LOS	E	A	D	D	D	D	D	A	A	E	C	C
Approach Vol, veh/h		267			320			1437			1768	
Approach Delay, s/veh		49.2			38.8			4.7			33.8	
Approach LOS		D			D			A			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.4	23.5	13.3	54.8	13.6	18.4	10.7	57.4				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	24.0	11.0	35.0	10.0	24.0	9.0	37.0				
Max Q Clear Time (g_c+I1), s	4.3	9.2	8.6	2.7	8.9	12.8	5.7	42.8				
Green Ext Time (p_c), s	0.0	0.2	0.0	3.0	0.0	0.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			24.3									
HCM 6th LOS			C									

Timings
2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 		 			 		 
Traffic Volume (vph)	233	183	242	265	140	838	151	1038
Future Volume (vph)	233	183	242	265	140	838	151	1038
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	20.0	27.0	20.0	27.0	15.0	35.0	18.0	38.0
Total Split (%)	20.0%	27.0%	20.0%	27.0%	15.0%	35.0%	18.0%	38.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effect Green (s)	11.3	24.2	11.5	24.4	9.7	32.6	11.7	34.6
Actuated g/C Ratio	0.11	0.24	0.12	0.24	0.10	0.33	0.12	0.35
v/c Ratio	0.62	0.64	0.63	0.88	0.83	0.89	0.75	1.10
Control Delay	49.0	38.8	49.0	56.7	86.6	25.9	63.5	88.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	38.8	49.0	56.7	86.6	25.9	63.5	88.4
LOS	D	D	D	E	F	C	E	F
Approach Delay		43.4		53.7		33.5		85.7
Approach LOS		D		D		C		F

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 93 (93%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 58.5

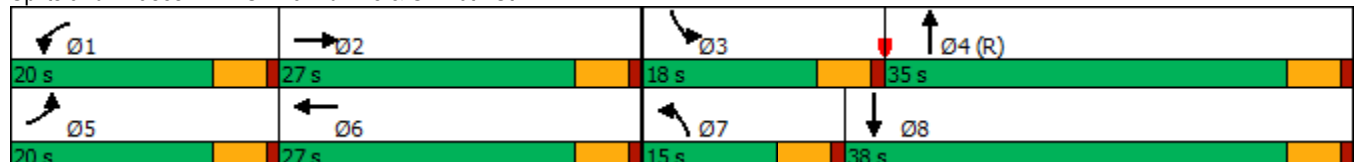
Intersection LOS: E

Intersection Capacity Utilization 88.5%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 2: SE 192nd Ave & SE 20th St



HCM 6th Signalized Intersection Summary

2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	233	183	92	242	265	118	140	838	150	151	1038	237
Future Volume (veh/h)	233	183	92	242	265	118	140	838	150	151	1038	237
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1885	1900	1900	1870	1900	1885	1900	1885	1870	1885
Adj Flow Rate, veh/h	243	191	78	252	276	106	146	873	141	157	1081	227
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	1	0	0	2	0	1	0	1	2	1
Cap, veh/h	316	279	114	325	286	110	179	1185	191	191	1143	239
Arrive On Green	0.09	0.22	0.22	0.09	0.22	0.22	0.10	0.38	0.38	0.11	0.39	0.39
Sat Flow, veh/h	3510	1281	523	3510	1301	500	1810	3087	499	1795	2925	612
Grp Volume(v), veh/h	243	0	269	252	0	382	146	506	508	157	655	653
Grp Sat Flow(s),veh/h/ln	1755	0	1804	1755	0	1801	1810	1791	1795	1795	1777	1759
Q Serve(g_s), s	6.8	0.0	13.7	7.0	0.0	21.0	7.9	24.3	24.3	8.6	35.6	36.0
Cycle Q Clear(g_c), s	6.8	0.0	13.7	7.0	0.0	21.0	7.9	24.3	24.3	8.6	35.6	36.0
Prop In Lane	1.00		0.29	1.00		0.28	1.00		0.28	1.00		0.35
Lane Grp Cap(c), veh/h	316	0	392	325	0	396	179	688	689	191	695	688
V/C Ratio(X)	0.77	0.00	0.69	0.78	0.00	0.96	0.81	0.74	0.74	0.82	0.94	0.95
Avail Cap(c_a), veh/h	527	0	397	527	0	396	181	688	689	233	695	688
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.47	0.47	0.47
Uniform Delay (d), s/veh	44.5	0.0	36.0	44.4	0.0	38.6	44.1	26.5	26.5	43.8	29.4	29.5
Incr Delay (d2), s/veh	1.5	0.0	4.0	1.5	0.0	35.6	22.4	6.9	6.9	7.6	13.3	14.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.3	0.0	10.3	5.5	0.0	18.7	8.1	16.5	16.5	6.4	21.2	21.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.0	0.0	39.9	45.9	0.0	74.2	66.5	33.4	33.4	51.3	42.6	43.7
LnGrp LOS	D	A	D	D	A	E	E	C	C	D	D	D
Approach Vol, veh/h		512			634			1160			1465	
Approach Delay, s/veh		42.8			63.0			37.5			44.1	
Approach LOS		D			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.2	26.8	15.6	43.4	14.0	27.0	14.9	44.1				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	22.0	13.0	30.0	15.0	22.0	10.0	33.0				
Max Q Clear Time (g_c+I1), s	9.0	15.7	10.6	26.3	8.8	23.0	9.9	38.0				
Green Ext Time (p_c), s	0.2	0.5	0.0	1.6	0.2	0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			45.1									
HCM 6th LOS			D									

Intersection							
Int Delay, s/veh	0.2						
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Vol, veh/h	3	4	1138	3	10	1239	
Future Vol, veh/h	3	4	1138	3	10	1239	
Conflicting Peds, #/hr	0	0	0	2	2	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	125	0	-	-	230	-	
Veh in Median Storage, #	0	-	0	-	-	0	
Grade, %	0	-	0	-	-	0	
Peak Hour Factor	95	95	95	95	95	95	
Heavy Vehicles, %	0	0	1	0	0	1	
Mvmt Flow	3	4	1198	3	11	1304	
Major/Minor	Minor1	Major1		Major2			
Conflicting Flow All	1876	603	0	0	1203	0	
Stage 1	1202	-	-	-	-	-	
Stage 2	674	-	-	-	-	-	
Critical Hdwy	6.8	6.9	-	-	4.1	-	
Critical Hdwy Stg 1	5.8	-	-	-	-	-	
Critical Hdwy Stg 2	5.8	-	-	-	-	-	
Follow-up Hdwy	3.5	3.3	-	-	2.2	-	
Pot Cap-1 Maneuver	65	447	-	-	587	-	
Stage 1	251	-	-	-	-	-	
Stage 2	473	-	-	-	-	-	
Platoon blocked, %			-	-		-	
Mov Cap-1 Maneuver	64	446	-	-	586	-	
Mov Cap-2 Maneuver	64	-	-	-	-	-	
Stage 1	250	-	-	-	-	-	
Stage 2	464	-	-	-	-	-	
Approach	WB	NB		SB			
HCM Control Delay, s	35	0		0.1			
HCM LOS	E						
Minor Lane/Major Mvmt		NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)		-	-	64	446	586	-
HCM Lane V/C Ratio		-	-	0.049	0.009	0.018	-
HCM Control Delay (s)		-	-	64.2	13.1	11.3	-
HCM Lane LOS		-	-	F	B	B	-
HCM 95th %tile Q(veh)		-	-	0.2	0	0.1	-

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	166	213	355	187	120	124	955	204	212	932
Future Volume (vph)	166	213	355	187	120	124	955	204	212	932
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	14.0	32.0	19.0	37.0	37.0	13.0	34.0	19.0	15.0	36.0
Total Split (%)	14.0%	32.0%	19.0%	37.0%	37.0%	13.0%	34.0%	19.0%	15.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	29.3	20.8	39.8	26.3	26.3	9.9	35.2	49.2	10.0	35.3
Actuated g/C Ratio	0.29	0.21	0.40	0.26	0.26	0.10	0.35	0.49	0.10	0.35
v/c Ratio	0.46	0.86	1.11	0.39	0.22	0.73	0.80	0.24	0.65	0.92
Control Delay	24.3	56.6	106.9	31.8	1.9	67.9	36.2	2.0	40.5	32.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.3	56.6	106.9	31.8	1.9	67.9	36.2	2.0	40.5	32.9
LOS	C	E	F	C	A	E	D	A	D	C
Approach Delay		45.4		66.7			33.8			34.1
Approach LOS		D		E			C			C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 36 (36%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.11

Intersection Signal Delay: 41.3

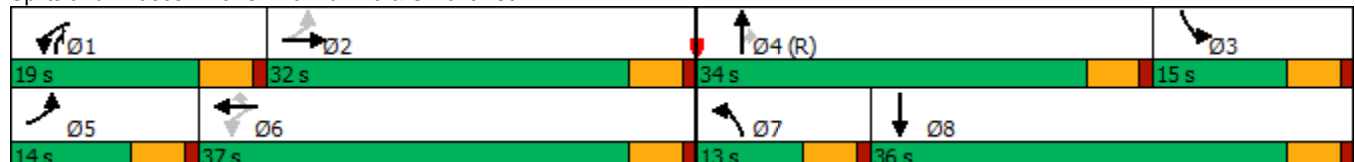
Intersection LOS: D

Intersection Capacity Utilization 91.8%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	166	213	103	355	187	120	124	955	204	212	932	138
Future Volume (veh/h)	166	213	103	355	187	120	124	955	204	212	932	138
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1773	1847	1817	2003	2003	2018	2018	1988	2003	1847	1832	1743
Adj Flow Rate, veh/h	175	224	88	374	197	28	131	1005	100	223	981	133
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	0	2	1	1	0	0	2	1	0	1	7
Cap, veh/h	411	255	100	373	507	431	154	1095	726	570	1159	157
Arrive On Green	0.09	0.20	0.20	0.14	0.25	0.25	0.08	0.29	0.29	0.17	0.38	0.38
Sat Flow, veh/h	1688	1255	493	1908	2003	1704	1922	3777	1683	3413	3073	416
Grp Volume(v), veh/h	175	0	312	374	197	28	131	1005	100	223	555	559
Grp Sat Flow(s),veh/h/ln	1688	0	1748	1908	2003	1704	1922	1889	1683	1706	1741	1749
Q Serve(g_s), s	8.2	0.0	17.3	14.0	8.1	0.8	6.7	25.7	1.6	5.8	29.2	29.2
Cycle Q Clear(g_c), s	8.2	0.0	17.3	14.0	8.1	0.8	6.7	25.7	1.6	5.8	29.2	29.2
Prop In Lane	1.00		0.28	1.00		1.00	1.00		1.00	1.00		0.24
Lane Grp Cap(c), veh/h	411	0	355	373	507	431	154	1095	726	570	656	659
V/C Ratio(X)	0.43	0.00	0.88	1.00	0.39	0.06	0.85	0.92	0.14	0.39	0.85	0.85
Avail Cap(c_a), veh/h	411	0	472	373	641	545	154	1095	726	570	656	659
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.81	0.00	0.81	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.9	0.0	38.7	28.9	30.9	11.7	45.4	34.3	5.9	37.1	28.5	28.5
Incr Delay (d2), s/veh	0.2	0.0	9.6	47.2	0.2	0.0	32.8	13.4	0.4	0.2	12.8	12.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.8	0.0	12.3	17.2	6.9	0.9	8.0	19.2	1.3	4.3	19.8	19.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.2	0.0	48.2	76.1	31.1	11.7	78.3	47.8	6.3	37.3	41.3	41.3
LnGrp LOS	C	A	D	F	C	B	E	D	A	D	D	D
Approach Vol, veh/h		487			599			1236			1337	
Approach Delay, s/veh		41.0			58.3			47.6			40.6	
Approach LOS		D			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	25.3	21.7	34.0	14.0	30.3	13.0	42.7				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	14.0	27.0	10.0	29.0	9.0	32.0	8.0	31.0				
Max Q Clear Time (g_c+I1), s	16.0	19.3	7.8	27.7	10.2	10.1	8.7	31.2				
Green Ext Time (p_c), s	0.0	0.4	0.0	0.5	0.0	0.3	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay 45.9
HCM 6th LOS D

Notes

User approved pedestrian interval to be less than phase max green.

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Phase 1 2038 PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	12	336	37	387	71	2	113	11	118
Future Volume (vph)	12	336	37	387	71	2	113	11	118
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6		8		4	
Permitted Phases					8		4		4
Detector Phase	5	2	1	6	8	8	4	4	4
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	30.0	10.0	30.0	32.0	32.0	34.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%	26.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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	5.0	5.0	5.0	5.0		5.0	5.0
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 Effect Green (s)	5.7	19.1	5.7	21.0	9.9	9.9		9.9	9.9
Actuated g/C Ratio	0.13	0.44	0.13	0.48	0.23	0.23		0.23	0.23
v/c Ratio	0.06	0.55	0.17	0.55	0.27	0.10		0.44	0.27
Control Delay	26.1	14.6	26.4	13.0	17.8	7.6		20.6	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	26.1	14.6	26.4	13.0	17.8	7.6		20.6	5.6
LOS	C	B	C	B	B	A		C	A
Approach Delay		14.9		14.0		14.5		13.3	
Approach LOS		B		B		B		B	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 43.3

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 14.2

Intersection LOS: B

Intersection Capacity Utilization 52.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

		
Ø1	Ø2	Ø4
10 s	85 s	35 s
		
Ø5	Ø6	Ø8
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	336	80	37	387	69	71	2	32	113	11	118
Future Volume (veh/h)	12	336	80	37	387	69	71	2	32	113	11	118
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1870	1841	1832	1847	1876	1817	1876	1832	1841	1900	1900
Adj Flow Rate, veh/h	13	357	74	39	412	66	76	2	5	120	12	21
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	2	4	3	2	0	4	0	3	4	0	0
Cap, veh/h	30	589	122	77	651	104	320	86	216	410	33	293
Arrive On Green	0.02	0.39	0.39	0.04	0.42	0.42	0.18	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	1810	1501	311	1745	1551	249	1333	473	1183	1287	182	1605
Grp Volume(v), veh/h	13	0	431	39	0	478	76	0	7	132	0	21
Grp Sat Flow(s),veh/h/ln	1810	0	1812	1745	0	1800	1333	0	1656	1469	0	1605
Q Serve(g_s), s	0.3	0.0	7.5	0.9	0.0	8.3	2.1	0.0	0.1	2.9	0.0	0.4
Cycle Q Clear(g_c), s	0.3	0.0	7.5	0.9	0.0	8.3	5.3	0.0	0.1	3.1	0.0	0.4
Prop In Lane	1.00		0.17	1.00		0.14	1.00		0.71	0.91		1.00
Lane Grp Cap(c), veh/h	30	0	711	77	0	755	320	0	302	443	0	293
V/C Ratio(X)	0.43	0.00	0.61	0.51	0.00	0.63	0.24	0.00	0.02	0.30	0.00	0.07
Avail Cap(c_a), veh/h	230	0	3680	222	0	3657	1092	0	1262	1286	0	1223
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.2	0.0	9.5	18.4	0.0	9.0	16.8	0.0	13.2	14.4	0.0	13.3
Incr Delay (d2), s/veh	3.5	0.0	0.3	1.9	0.0	0.3	0.1	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.2	0.0	3.5	0.6	0.0	3.7	1.1	0.0	0.1	1.7	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.6	0.0	9.8	20.3	0.0	9.4	16.9	0.0	13.2	14.6	0.0	13.4
LnGrp LOS	C	A	A	C	A	A	B	A	B	B	A	B
Approach Vol, veh/h	444			517			83			153		
Approach Delay, s/veh	10.2			10.2			16.6			14.4		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	20.5		12.2	5.7	21.5		12.2				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	2.9	9.5		5.1	2.3	10.3		7.3				
Green Ext Time (p_c), s	0.0	0.4		0.1	0.0	0.4		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				11.2								
HCM 6th LOS				B								

Intersection												
Int Delay, s/veh	6.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	75	407	32	12	560	4	18	0	7	14	4	258
Future Vol, veh/h	75	407	32	12	560	4	18	0	7	14	4	258
Conflicting Peds, #/hr	6	0	0	0	0	6	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	95	-	0	0	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	2	0	0	2	0	0	0	0	0	0	0
Mvmt Flow	82	447	35	13	615	4	20	0	8	15	4	284
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	625	0	0	482	0	0	1416	1280	466	1281	1293	621
Stage 1	-	-	-	-	-	-	629	629	-	647	647	-
Stage 2	-	-	-	-	-	-	787	651	-	634	646	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	966	-	-	1091	-	-	116	167	601	144	164	491
Stage 1	-	-	-	-	-	-	474	478	-	463	470	-
Stage 2	-	-	-	-	-	-	388	468	-	471	470	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	960	-	-	1091	-	-	44	150	600	131	147	488
Mov Cap-2 Maneuver	-	-	-	-	-	-	44	150	-	131	147	-
Stage 1	-	-	-	-	-	-	434	437	-	421	462	-
Stage 2	-	-	-	-	-	-	159	460	-	425	430	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.3			0.2			84.9			23		
HCM LOS							F			C		
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	44	88	960	-	-	1091	-	-	134	488		
HCM Lane V/C Ratio	0.3	0.162	0.086	-	-	0.012	-	-	0.148	0.581		
HCM Control Delay (s)	118.6	53.7	9.1	-	-	8.3	-	-	36.5	22.1		
HCM Lane LOS	F	F	A	-	-	A	-	-	E	C		
HCM 95th %tile Q(veh)	1	0.5	0.3	-	-	0	-	-	0.5	3.6		

Timings 8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	141	413	12	700	10	6	99	15
Future Volume (vph)	141	413	12	700	10	6	99	15
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	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	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	55.4	54.8	45.4	43.4		11.5	11.6	11.6
Actuated g/C Ratio	0.73	0.72	0.60	0.57		0.15	0.15	0.15
v/c Ratio	0.48	0.35	0.02	0.85		0.08	0.51	0.07
Control Delay	21.9	9.4	8.0	27.2		24.9	37.5	22.4
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	21.9	9.4	8.0	27.2		24.9	37.5	22.4
LOS	C	A	A	C		C	D	C
Approach Delay		12.5		26.9		24.9		35.0
Approach LOS		B		C		C		C

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 76

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 22.2

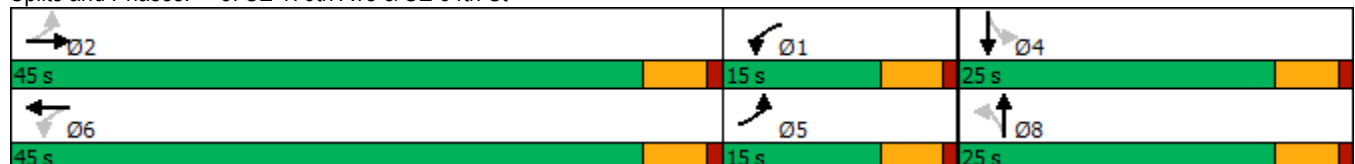
Intersection LOS: C

Intersection Capacity Utilization 73.9%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	413	13	12	700	124	10	6	2	99	15	5
Future Volume (veh/h)	141	413	13	12	700	124	10	6	2	99	15	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1870	1900	1900	1885	1885	1900	1900	1900	1885	1900	1900
Adj Flow Rate, veh/h	153	449	13	13	761	127	11	7	0	108	16	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
Percent Heavy Veh, %	1	2	0	0	1	1	0	0	0	1	0	0
Cap, veh/h	282	542	16	743	846	141	185	91	0	281	181	11
Arrive On Green	0.08	0.30	0.30	0.32	0.54	0.54	0.10	0.10	0.00	0.10	0.10	0.10
Sat Flow, veh/h	1795	1809	52	1810	1575	263	755	884	0	1413	1766	110
Grp Volume(v), veh/h	153	0	462	13	0	888	18	0	0	108	0	17
Grp Sat Flow(s),veh/h/ln	1795	0	1861	1810	0	1838	1639	0	0	1413	0	1876
Q Serve(g_s), s	0.2	0.0	12.5	0.0	0.0	23.4	0.0	0.0	0.0	3.4	0.0	0.4
Cycle Q Clear(g_c), s	0.2	0.0	12.5	0.0	0.0	23.4	0.5	0.0	0.0	3.9	0.0	0.4
Prop In Lane	1.00		0.03	1.00		0.14	0.61		0.00	1.00		0.06
Lane Grp Cap(c), veh/h	282	0	557	743	0	988	275	0	0	281	0	192
V/C Ratio(X)	0.54	0.00	0.83	0.02	0.00	0.90	0.07	0.00	0.00	0.38	0.00	0.09
Avail Cap(c_a), veh/h	464	0	1374	743	0	1357	693	0	0	658	0	693
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.8	0.0	17.7	11.5	0.0	11.2	22.0	0.0	0.0	23.5	0.0	22.0
Incr Delay (d2), s/veh	0.6	0.0	1.2	0.0	0.0	5.3	0.0	0.0	0.0	0.3	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	0.0	8.1	0.2	0.0	12.2	0.4	0.0	0.0	2.3	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.4	0.0	18.9	11.5	0.0	16.5	22.1	0.0	0.0	23.8	0.0	22.1
LnGrp LOS	C	A	B	B	A	B	C	A	A	C	A	C
Approach Vol, veh/h	615			901			18			125		
Approach Delay, s/veh	20.0			16.4			22.1			23.6		
Approach LOS	C			B			C			C		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	22.4	21.2		10.6	9.5	34.1		10.6				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	14.5		5.9	2.2	25.4		2.5				
Green Ext Time (p_c), s	0.0	1.7		0.1	0.1	3.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	18.4											
HCM 6th LOS	B											
Notes												

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	31	15	263	94	105
Future Vol, veh/h	20	31	15	263	94	105
Conflicting Peds, #/hr	3	0	7	0	0	7
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	7	0	15	0	1	0
Mvmt Flow	22	33	16	283	101	113
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	483	165	221	0	-	0
Stage 1	165	-	-	-	-	-
Stage 2	318	-	-	-	-	-
Critical Hdwy	6.47	6.2	4.25	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.3	2.335	-	-	-
Pot Cap-1 Maneuver	534	885	1275	-	-	-
Stage 1	852	-	-	-	-	-
Stage 2	726	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	520	879	1267	-	-	-
Mov Cap-2 Maneuver	520	-	-	-	-	-
Stage 1	835	-	-	-	-	-
Stage 2	721	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	10.7	0.4		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1267	-	692	-	-	
HCM Lane V/C Ratio	0.013	-	0.079	-	-	
HCM Control Delay (s)	7.9	-	10.7	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.3	-	-	

Intersection	
Intersection Delay, s/veh	81.8
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	466	62	89	503	18	43	122	73	27	85	28
Future Vol, veh/h	48	466	62	89	503	18	43	122	73	27	85	28
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
Heavy Vehicles, %	3	0	0	1	0	7	0	1	0	4	1	8
Mvmt Flow	52	507	67	97	547	20	47	133	79	29	92	30
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	107.3	97.1	18.3	18.4
HCM LOS	F	F	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	19%
Vol Thru, %	0%	63%	0%	88%	0%	97%	61%
Vol Right, %	0%	37%	0%	12%	0%	3%	20%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	43	195	48	528	89	521	140
LT Vol	43	0	48	0	89	0	27
Through Vol	0	122	0	466	0	503	85
RT Vol	0	73	0	62	0	18	28
Lane Flow Rate	47	212	52	574	97	566	152
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.116	0.48	0.114	1.152	0.209	1.139	0.377
Departure Headway (Hd)	9.531	8.753	8.25	7.596	8.194	7.635	9.678
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	379	415	437	482	441	481	374
Service Time	7.231	6.453	5.95	5.296	5.894	5.335	7.678
HCM Lane V/C Ratio	0.124	0.511	0.119	1.191	0.22	1.177	0.406
HCM Control Delay	13.5	19.3	12	116	13	111.5	18.4
HCM Lane LOS	B	C	B	F	B	F	C
HCM 95th-tile Q	0.4	2.5	0.4	19.5	0.8	18.9	1.7

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	89	30	55	152	22	50	44	1463	47	1326
Future Volume (vph)	89	30	55	152	22	50	44	1463	47	1326
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA
Protected Phases		2			6		7	4	3	8
Permitted Phases	2		2	6		6				
Detector Phase	2	2	2	6	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	39.0	39.0	39.0	38.0	38.0	38.0	10.0	32.0	19.5	32.0
Total Split (s)	39.0	39.0	39.0	39.0	39.0	39.0	15.0	66.0	15.0	66.0
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	12.5%	55.0%	12.5%	55.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max
Act Effct Green (s)	19.0	19.0	19.0	19.0	19.0	19.0	6.5	81.5	6.5	81.5
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.05	0.68	0.05	0.68
v/c Ratio	0.42	0.11	0.19	0.76	0.09	0.18	0.50	0.46	0.51	0.42
Control Delay	48.9	39.8	8.9	68.9	39.3	7.7	50.5	23.7	73.1	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.9	39.8	8.9	68.9	39.3	7.7	50.5	23.7	73.1	10.8
LOS	D	D	A	E	D	A	D	C	E	B
Approach Delay		34.7			52.3			24.5		12.9
Approach LOS		C			D			C		B

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 112 (93%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 21.9

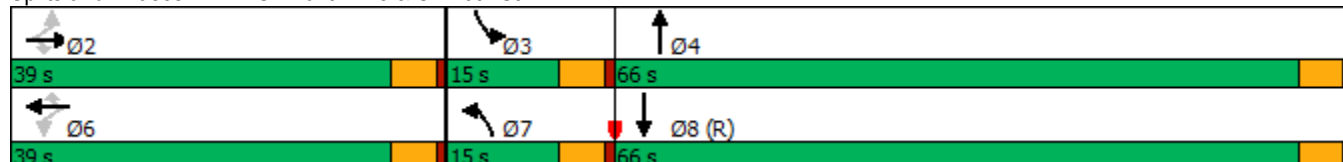
Intersection LOS: C

Intersection Capacity Utilization 61.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	30	55	152	22	50	44	1463	32	47	1326	46
Future Volume (veh/h)	89	30	55	152	22	50	44	1463	32	47	1326	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1826	1633	1856	1826	1870	1752	1870	1885	1900
Adj Flow Rate, veh/h	94	32	5	160	23	5	46	1540	33	49	1396	46
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	5	18	3	5	2	10	2	1	0
Cap, veh/h	262	298	251	250	256	245	59	2615	56	63	2610	86
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.03	0.51	0.51	0.04	0.51	0.51
Sat Flow, veh/h	1399	1900	1604	1334	1633	1566	1739	5144	110	1781	5117	169
Grp Volume(v), veh/h	94	32	5	160	23	5	46	1019	554	49	936	506
Grp Sat Flow(s),veh/h/ln	1399	1900	1604	1334	1633	1566	1739	1702	1850	1781	1716	1855
Q Serve(g_s), s	7.4	1.7	0.3	14.0	1.4	0.3	3.2	25.2	25.2	3.3	22.1	22.1
Cycle Q Clear(g_c), s	8.8	1.7	0.3	15.8	1.4	0.3	3.2	25.2	25.2	3.3	22.1	22.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.06	1.00		0.09
Lane Grp Cap(c), veh/h	262	298	251	250	256	245	59	1730	941	63	1750	946
V/C Ratio(X)	0.36	0.11	0.02	0.64	0.09	0.02	0.79	0.59	0.59	0.78	0.53	0.53
Avail Cap(c_a), veh/h	440	538	454	419	463	444	145	1730	941	148	1750	946
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.68	0.68	0.68	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.1	43.4	42.8	50.2	43.3	42.8	57.5	20.7	20.7	57.4	19.8	19.8
Incr Delay (d2), s/veh	0.3	0.1	0.0	1.0	0.1	0.0	5.8	1.0	1.8	7.4	1.2	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.7	1.5	0.2	8.4	1.1	0.2	2.6	13.9	15.2	2.8	13.5	14.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.4	43.5	42.8	51.2	43.3	42.8	63.3	21.7	22.5	64.8	21.0	22.0
LnGrp LOS	D	D	D	D	D	D	E	C	C	E	C	C
Approach Vol, veh/h	131			188			1619			1491		
Approach Delay, s/veh	46.2			50.0			23.2			22.8		
Approach LOS	D			D			C			C		
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	23.8		9.2	66.0		23.8		9.0	66.2			
Change Period (Y+Rc), s	5.0		5.0	5.0		5.0		5.0	5.0			
Max Green Setting (Gmax), s	34.0		10.0	61.0		34.0		10.0	61.0			
Max Q Clear Time (g_c+l1), s	10.8		5.3	27.2		17.8		5.2	24.1			
Green Ext Time (p_c), s	0.0		0.0	1.8		0.0		0.0	1.6			
Intersection Summary												
HCM 6th Ctrl Delay	25.3											
HCM 6th LOS	C											

Timings
12: SE 164th Ave & SE 34th Street

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	49	102	194	301	136	278	192	1216	346	188	1284
Future Volume (vph)	49	102	194	301	136	278	192	1216	346	188	1284
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	15.0	33.0	20.0	17.0	35.0	20.0	20.0	50.0	17.0	20.0	50.0
Total Split (%)	12.5%	27.5%	16.7%	14.2%	29.2%	16.7%	16.7%	41.7%	14.2%	16.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	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	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	7.3	10.7	34.0	12.0	17.5	40.5	18.3	59.2	76.2	18.0	59.0
Actuated g/C Ratio	0.06	0.09	0.28	0.10	0.15	0.34	0.15	0.49	0.64	0.15	0.49
v/c Ratio	0.51	0.66	0.41	1.77	0.54	0.49	0.74	0.73	0.32	0.74	0.56
Control Delay	71.7	71.0	24.2	402.1	56.2	22.8	64.4	28.5	3.9	58.4	22.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.7	71.0	24.2	402.1	56.2	22.8	64.4	28.5	3.9	58.4	22.9
LOS	E	E	C	F	E	C	E	C	A	E	C
Approach Delay		44.8			188.8			27.6			27.3
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 40 (33%), Referenced to phase 8: SBT, Start of Green

Natural Cycle: 135

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.77

Intersection Signal Delay: 55.5

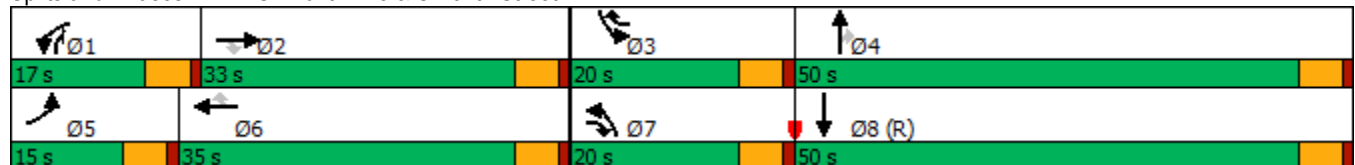
Intersection LOS: E

Intersection Capacity Utilization 82.7%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave & SE 34th Street



HCM 6th Signalized Intersection Summary

12: SE 164th Ave & SE 34th Street

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	102	194	301	136	278	192	1216	346	188	1284	49
Future Volume (veh/h)	49	102	194	301	136	278	192	1216	346	188	1284	49
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1767	1826	1885	1870	1841	1856	1885	1870	1885	1870	1870	1841
Adj Flow Rate, veh/h	51	106	152	314	142	217	200	1267	241	196	1338	48
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	9	5	1	2	4	3	1	2	1	2	2	4
Cap, veh/h	64	183	359	178	298	451	224	1333	759	223	1898	68
Arrive On Green	0.04	0.10	0.10	0.10	0.16	0.16	0.13	0.38	0.38	0.04	0.12	0.12
Sat Flow, veh/h	1682	1826	1598	1781	1841	1572	1795	3554	1598	1781	5060	182
Grp Volume(v), veh/h	51	106	152	314	142	217	200	1267	241	196	900	486
Grp Sat Flow(s),veh/h/ln	1682	1826	1598	1781	1841	1572	1795	1777	1598	1781	1702	1838
Q Serve(g_s), s	3.6	6.7	9.8	12.0	8.4	13.7	13.2	41.6	11.2	13.1	30.5	30.5
Cycle Q Clear(g_c), s	3.6	6.7	9.8	12.0	8.4	13.7	13.2	41.6	11.2	13.1	30.5	30.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	64	183	359	178	298	451	224	1333	759	223	1277	689
V/C Ratio(X)	0.79	0.58	0.42	1.76	0.48	0.48	0.89	0.95	0.32	0.88	0.71	0.71
Avail Cap(c_a), veh/h	140	426	572	178	460	590	224	1333	759	223	1277	689
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	0.90	0.90
Uniform Delay (d), s/veh	57.2	51.6	39.8	54.0	45.7	35.4	51.7	36.4	19.5	56.6	46.2	46.2
Incr Delay (d2), s/veh	7.9	1.1	0.3	365.2	0.4	0.3	31.8	15.4	1.1	27.6	3.0	5.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	5.5	6.9	37.0	6.9	8.9	12.4	27.4	7.6	12.4	20.3	22.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.1	52.7	40.1	419.2	46.1	35.7	83.5	51.8	20.6	84.2	49.2	51.6
LnGrp LOS	E	D	D	F	D	D	F	D	C	F	D	D
Approach Vol, veh/h	309			673			1708			1582		
Approach Delay, s/veh	48.6			216.8			51.1			54.3		
Approach LOS	D			F			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	17.0	20.0	50.0	9.6	24.4	20.0	50.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	28.0	15.0	45.0	10.0	30.0	15.0	45.0				
Max Q Clear Time (g_c+I1), s	14.0	11.8	15.1	43.6	5.6	15.7	15.2	32.5				
Green Ext Time (p_c), s	0.0	0.2	0.0	0.7	0.0	0.3	0.0	2.9				
Intersection Summary												
HCM 6th Ctrl Delay	78.2											
HCM 6th LOS	E											

Appendix G 2038 With-Project Phase 2
Buildout Operations
Worksheets & Re-routed trips

Timings
1: SE 192nd & SE 15th St

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	156	45	29	64	158	58	973	89	848
Future Volume (vph)	156	45	29	64	158	58	973	89	848
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	20.0	29.0	20.0	29.0	14.0	15.0	37.0	14.0	36.0
Total Split (%)	20.0%	29.0%	20.0%	29.0%	14.0%	15.0%	37.0%	14.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	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	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effct Green (s)	12.4	18.7	5.9	10.2	22.0	7.3	50.6	8.8	54.1
Actuated g/C Ratio	0.12	0.19	0.06	0.10	0.22	0.07	0.51	0.09	0.54
v/c Ratio	0.80	0.28	0.32	0.38	0.42	0.50	0.63	0.69	0.58
Control Delay	67.8	20.2	53.4	45.3	17.7	61.3	18.5	69.1	21.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	20.2	53.4	45.3	17.7	61.3	18.5	69.1	21.6
LOS	E	C	D	D	B	E	B	E	C
Approach Delay		50.5		28.8			20.8		25.7
Approach LOS		D		C			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 9 (9%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 26.4

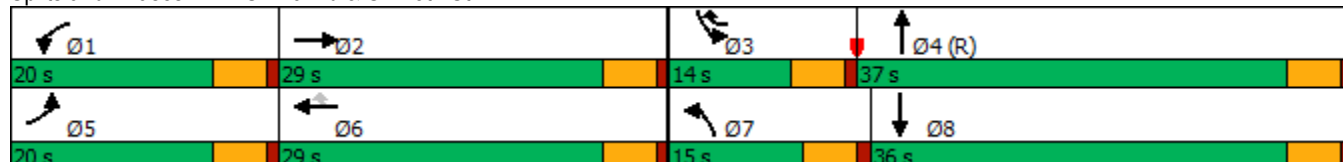
Intersection LOS: C

Intersection Capacity Utilization 60.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Phase 2 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	45	44	29	64	158	58	973	16	89	848	87
Future Volume (veh/h)	156	45	44	29	64	158	58	973	16	89	848	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1900	1796	1781	1841	1870	1856	1841	1900	1737	1767	1856
Adj Flow Rate, veh/h	173	50	8	32	71	103	64	1081	17	99	942	91
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
Percent Heavy Veh, %	3	0	7	8	4	2	3	4	0	11	9	3
Cap, veh/h	204	266	42	50	148	244	97	1869	29	122	1699	164
Arrive On Green	0.12	0.17	0.17	0.03	0.08	0.08	0.11	1.00	1.00	0.07	0.55	0.55
Sat Flow, veh/h	1767	1598	256	1697	1841	1585	1767	3523	55	1654	3092	299
Grp Volume(v), veh/h	173	0	58	32	71	103	64	537	561	99	511	522
Grp Sat Flow(s),veh/h/ln	1767	0	1854	1697	1841	1585	1767	1749	1829	1654	1678	1713
Q Serve(g_s), s	9.6	0.0	2.7	1.9	3.7	5.9	3.5	0.0	0.0	5.9	19.7	19.7
Cycle Q Clear(g_c), s	9.6	0.0	2.7	1.9	3.7	5.9	3.5	0.0	0.0	5.9	19.7	19.7
Prop In Lane	1.00		0.14	1.00		1.00	1.00		0.03	1.00		0.17
Lane Grp Cap(c), veh/h	204	0	308	50	148	244	97	928	970	122	922	941
V/C Ratio(X)	0.85	0.00	0.19	0.64	0.48	0.42	0.66	0.58	0.58	0.81	0.55	0.55
Avail Cap(c_a), veh/h	265	0	445	254	442	498	177	928	970	149	922	941
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.78	0.78	0.78	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.4	0.0	35.9	48.0	44.0	38.3	43.6	0.0	0.0	45.6	14.6	14.6
Incr Delay (d2), s/veh	14.7	0.0	0.1	5.0	0.9	0.4	2.2	2.1	2.0	19.5	2.4	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.5	0.0	2.2	1.5	3.1	4.0	2.7	1.0	1.0	5.4	11.8	12.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	0.0	36.0	53.0	44.9	38.7	45.8	2.1	2.0	65.1	17.0	16.9
LnGrp LOS	E	A	D	D	D	D	D	A	A	E	B	B
Approach Vol, veh/h	231			206			1162			1132		
Approach Delay, s/veh	52.6			43.0			4.4			21.2		
Approach LOS	D			D			A			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.9	21.6	12.4	58.0	16.5	13.0	10.5	60.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	24.0	9.0	32.0	15.0	24.0	10.0	31.0				
Max Q Clear Time (g_c+I1), s	3.9	4.7	7.9	2.0	11.6	7.9	5.5	21.7				
Green Ext Time (p_c), s	0.0	0.1	0.0	2.2	0.0	0.2	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay	18.4											
HCM 6th LOS	B											

Timings
2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 		 			 		 
Traffic Volume (vph)	166	182	140	165	46	764	59	708
Future Volume (vph)	166	182	140	165	46	764	59	708
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	17.0	29.0	17.0	29.0	15.0	39.0	15.0	39.0
Total Split (%)	17.0%	29.0%	17.0%	29.0%	15.0%	39.0%	15.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effect Green (s)	9.4	18.6	8.6	17.8	7.3	47.0	7.7	45.4
Actuated g/C Ratio	0.09	0.19	0.09	0.18	0.07	0.47	0.08	0.45
v/c Ratio	0.55	0.80	0.49	0.70	0.39	0.60	0.45	0.56
Control Delay	49.5	52.2	49.0	46.5	63.3	10.5	52.2	28.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	52.2	49.0	46.5	63.3	10.5	52.2	28.3
LOS	D	D	D	D	E	B	D	C
Approach Delay		51.2		47.4		13.0		30.0
Approach LOS		D		D		B		C

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 29.6
 Intersection Capacity Utilization 65.8%
 Analysis Period (min) 15

Intersection LOS: C

ICU Level of Service C

Splits and Phases: 2: SE 20th St & SE 192nd Ave

 Ø1	 Ø2	 Ø3	 Ø4 (R)
17 s	29 s	15 s	39 s
 Ø5	 Ø6	 Ø7	 Ø8
17 s	29 s	15 s	39 s

HCM 6th Signalized Intersection Summary

2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	166	182	84	140	165	57	46	764	156	59	708	103
Future Volume (veh/h)	166	182	84	140	165	57	46	764	156	59	708	103
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1900	1841	1885	1885	1885	1811	1856	1841	1885	1811	1826
Adj Flow Rate, veh/h	175	192	70	147	174	23	48	804	147	62	745	97
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	0	4	1	1	1	6	3	4	1	6	5
Cap, veh/h	242	221	81	214	256	34	86	1570	287	80	1599	208
Arrive On Green	0.07	0.17	0.17	0.06	0.16	0.16	0.05	0.53	0.53	0.06	0.69	0.69
Sat Flow, veh/h	3428	1328	484	3483	1631	216	1725	2976	544	1795	3061	398
Grp Volume(v), veh/h	175	0	262	147	0	197	48	476	475	62	419	423
Grp Sat Flow(s),veh/h/ln	1714	0	1813	1742	0	1846	1725	1763	1757	1795	1721	1739
Q Serve(g_s), s	5.0	0.0	14.1	4.1	0.0	10.1	2.7	17.5	17.5	3.4	11.0	11.0
Cycle Q Clear(g_c), s	5.0	0.0	14.1	4.1	0.0	10.1	2.7	17.5	17.5	3.4	11.0	11.0
Prop In Lane	1.00		0.27	1.00		0.12	1.00		0.31	1.00		0.23
Lane Grp Cap(c), veh/h	242	0	301	214	0	290	86	930	927	80	899	908
V/C Ratio(X)	0.72	0.00	0.87	0.69	0.00	0.68	0.56	0.51	0.51	0.78	0.47	0.47
Avail Cap(c_a), veh/h	411	0	435	418	0	443	172	930	927	180	899	908
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.79	0.79	0.79
Uniform Delay (d), s/veh	45.5	0.0	40.6	46.0	0.0	39.8	46.4	15.3	15.3	46.5	9.0	9.0
Incr Delay (d2), s/veh	1.5	0.0	9.2	1.5	0.0	1.0	2.1	2.0	2.0	4.7	1.4	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.8	0.0	11.1	3.2	0.0	8.0	2.1	11.2	11.2	2.8	6.2	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.0	0.0	49.8	47.5	0.0	40.8	48.5	17.3	17.3	51.2	10.3	10.3
LnGrp LOS	D	A	D	D	A	D	D	B	B	D	B	B
Approach Vol, veh/h		437			344			999			904	
Approach Delay, s/veh		48.7			43.7			18.8			13.1	
Approach LOS		D			D			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.1	21.6	9.5	57.8	12.1	20.7	10.0	57.2				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	24.0	10.0	34.0	12.0	24.0	10.0	34.0				
Max Q Clear Time (g_c+I1), s	6.1	16.1	5.4	19.5	7.0	12.1	4.7	13.0				
Green Ext Time (p_c), s	0.1	0.5	0.0	3.3	0.1	0.5	0.0	3.2				
Intersection Summary												
HCM 6th Ctrl Delay			24.9									
HCM 6th LOS			C									
Notes												
User approved pedestrian interval to be less than phase max green.												

Intersection							
Int Delay, s/veh	0.3						
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Vol, veh/h	7	10	888	3	7	906	
Future Vol, veh/h	7	10	888	3	7	906	
Conflicting Peds, #/hr	0	0	0	1	1	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	125	0	-	-	230	-	
Veh in Median Storage, #	0	-	0	-	-	0	
Grade, %	0	-	0	-	-	0	
Peak Hour Factor	95	95	95	95	95	95	
Heavy Vehicles, %	0	20	4	67	0	7	
Mvmt Flow	7	11	935	3	7	954	
Major/Minor	Minor1	Major1		Major2			
Conflicting Flow All	1429	470	0	0	939	0	
Stage 1	938	-	-	-	-	-	
Stage 2	491	-	-	-	-	-	
Critical Hdwy	6.8	7.3	-	-	4.1	-	
Critical Hdwy Stg 1	5.8	-	-	-	-	-	
Critical Hdwy Stg 2	5.8	-	-	-	-	-	
Follow-up Hdwy	3.5	3.5	-	-	2.2	-	
Pot Cap-1 Maneuver	128	494	-	-	738	-	
Stage 1	346	-	-	-	-	-	
Stage 2	586	-	-	-	-	-	
Platoon blocked, %			-	-		-	
Mov Cap-1 Maneuver	127	494	-	-	737	-	
Mov Cap-2 Maneuver	127	-	-	-	-	-	
Stage 1	346	-	-	-	-	-	
Stage 2	581	-	-	-	-	-	
Approach	WB	NB		SB			
HCM Control Delay, s	21.7	0		0.1			
HCM LOS	C						
Minor Lane/Major Mvmt		NBT	NBRWBLn1	WBLn2	SBL	SBT	
Capacity (veh/h)		-	-	127	494	737	-
HCM Lane V/C Ratio		-	-	0.058	0.021	0.01	-
HCM Control Delay (s)		-	-	35.1	12.4	9.9	-
HCM Lane LOS		-	-	E	B	A	-
HCM 95th %tile Q(veh)		-	-	0.2	0.1	0	-

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	199	170	207	145	67	153	704	349	108	547
Future Volume (vph)	199	170	207	145	67	153	704	349	108	547
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	15.0	36.0	15.0	36.0	36.0	15.0	34.0	15.0	15.0	34.0
Total Split (%)	15.0%	36.0%	15.0%	36.0%	36.0%	15.0%	34.0%	15.0%	15.0%	34.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	31.5	21.8	31.6	21.8	21.8	12.8	38.5	48.2	10.0	35.7
Actuated g/C Ratio	0.32	0.22	0.32	0.22	0.22	0.13	0.38	0.48	0.10	0.36
v/c Ratio	0.59	0.84	0.89	0.38	0.15	0.73	0.60	0.40	0.35	0.75
Control Delay	29.3	50.7	59.3	34.4	0.7	61.4	28.7	2.4	43.1	30.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	50.7	59.3	34.4	0.7	61.4	28.7	2.4	43.1	30.9
LOS	C	D	E	C	A	E	C	A	D	C
Approach Delay		42.3		41.4			25.3			32.4
Approach LOS		D		D			C			C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 32.4

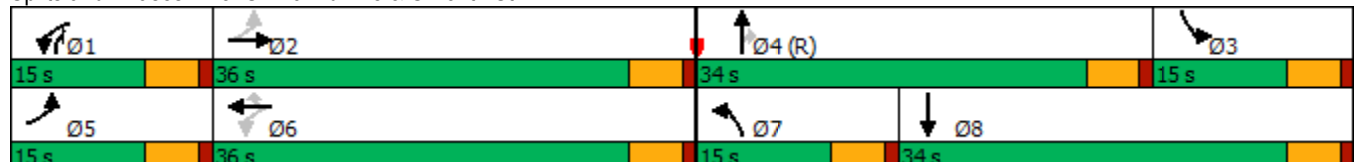
Intersection LOS: C

Intersection Capacity Utilization 77.3%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	199	170	136	207	145	67	153	704	349	108	547	221
Future Volume (veh/h)	199	170	136	207	145	67	153	704	349	108	547	221
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1728	1803	1847	1943	2018	1988	2018	1883	1988	1832	1684	1684
Adj Flow Rate, veh/h	221	189	114	230	161	7	170	782	154	120	608	202
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
Percent Heavy Veh, %	8	3	0	5	0	2	0	9	2	1	11	11
Cap, veh/h	395	221	133	298	424	347	192	1037	655	677	920	305
Arrive On Green	0.10	0.21	0.21	0.10	0.21	0.21	0.10	0.29	0.29	0.20	0.39	0.39
Sat Flow, veh/h	1646	1051	634	1850	2018	1653	1922	3578	1679	3385	2359	782
Grp Volume(v), veh/h	221	0	303	230	161	7	170	782	154	120	412	398
Grp Sat Flow(s),veh/h/ln	1646	0	1684	1850	2018	1653	1922	1789	1679	1693	1600	1542
Q Serve(g_s), s	10.0	0.0	17.3	9.8	6.8	0.2	8.7	19.9	2.6	2.9	21.2	21.2
Cycle Q Clear(g_c), s	10.0	0.0	17.3	9.8	6.8	0.2	8.7	19.9	2.6	2.9	21.2	21.2
Prop In Lane	1.00		0.38	1.00		1.00	1.00		1.00	1.00		0.51
Lane Grp Cap(c), veh/h	395	0	354	298	424	347	192	1037	655	677	624	601
V/C Ratio(X)	0.56	0.00	0.86	0.77	0.38	0.02	0.88	0.75	0.23	0.18	0.66	0.66
Avail Cap(c_a), veh/h	395	0	522	298	626	513	192	1037	655	677	624	601
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.81	0.00	0.81	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.2	0.0	38.1	29.1	33.9	12.1	44.4	32.3	7.2	33.2	25.1	25.1
Incr Delay (d2), s/veh	0.9	0.0	5.2	10.7	0.2	0.0	34.1	5.1	0.8	0.0	5.4	5.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.1	0.0	11.4	8.7	5.9	0.2	9.8	13.8	2.2	2.1	13.3	12.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.1	0.0	43.2	39.8	34.1	12.1	78.5	37.3	8.0	33.2	30.5	30.7
LnGrp LOS	C	A	D	D	C	B	E	D	A	C	C	C
Approach Vol, veh/h		524			398			1106			930	
Approach Delay, s/veh		37.3			37.0			39.6			30.9	
Approach LOS		D			D			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	26.0	25.0	34.0	15.0	26.0	15.0	44.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	31.0	10.0	29.0	10.0	31.0	10.0	29.0				
Max Q Clear Time (g_c+I1), s	11.8	19.3	4.9	21.9	12.0	8.8	10.7	23.2				
Green Ext Time (p_c), s	0.0	0.5	0.0	1.4	0.0	0.2	0.0	1.1				
Intersection Summary												
HCM 6th Ctrl Delay			36.1									
HCM 6th LOS			D									

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Phase 2 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	115	290	27	238	63	19	231	4
Future Volume (vph)	115	290	27	238	63	19	231	4
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases					8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	27.0	10.0	27.0	32.0	32.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%
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	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	5.2	34.2	5.2	29.1	21.7	21.7	21.7	21.7
Actuated g/C Ratio	0.07	0.48	0.07	0.41	0.30	0.30	0.30	0.30
v/c Ratio	1.08	0.45	0.25	0.83	0.20	0.14	0.70	0.11
Control Delay	144.1	16.3	42.8	28.0	22.1	10.2	34.1	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	144.1	16.3	42.8	28.0	22.1	10.2	34.1	7.8
LOS	F	B	D	C	C	B	C	A
Approach Delay		50.5		28.8		16.3		29.4
Approach LOS		D		C		B		C

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 71.7

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.08

Intersection Signal Delay: 34.7

Intersection LOS: C

Intersection Capacity Utilization 66.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

		
Ø1	Ø2	Ø4
10 s	85 s	35 s
		
Ø5	Ø6	Ø8
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	115	290	24	27	238	249	63	19	41	231	4	45
Future Volume (veh/h)	115	290	24	27	238	249	63	19	41	231	4	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1841	1900	1876	1802	1876	1832	1876	1876	1900	1900	1900
Adj Flow Rate, veh/h	142	358	26	33	294	254	78	23	7	285	5	8
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
Percent Heavy Veh, %	0	4	0	0	5	0	3	0	0	0	0	0
Cap, veh/h	172	730	53	65	332	286	469	342	104	466	163	261
Arrive On Green	0.09	0.43	0.43	0.04	0.37	0.37	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1810	1695	123	1787	891	769	1372	1381	420	1401	658	1053
Grp Volume(v), veh/h	142	0	384	33	0	548	78	0	30	285	0	13
Grp Sat Flow(s),veh/h/ln	1810	0	1818	1787	0	1660	1372	0	1801	1401	0	1711
Q Serve(g_s), s	4.1	0.0	8.0	1.0	0.0	16.3	2.4	0.0	0.7	10.3	0.0	0.3
Cycle Q Clear(g_c), s	4.1	0.0	8.0	1.0	0.0	16.3	2.7	0.0	0.7	11.0	0.0	0.3
Prop In Lane	1.00		0.07	1.00		0.46	1.00		0.23	1.00		0.62
Lane Grp Cap(c), veh/h	172	0	783	65	0	618	469	0	446	466	0	424
V/C Ratio(X)	0.83	0.00	0.49	0.51	0.00	0.89	0.17	0.00	0.07	0.61	0.00	0.03
Avail Cap(c_a), veh/h	172	0	2762	170	0	2522	911	0	1026	917	0	975
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.4	0.0	10.8	24.9	0.0	15.5	16.0	0.0	15.1	19.3	0.0	15.0
Incr Delay (d2), s/veh	25.6	0.0	0.2	2.3	0.0	1.8	0.1	0.0	0.0	0.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.9	0.0	4.4	0.7	0.0	8.8	1.3	0.0	0.5	5.6	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.0	0.0	11.0	27.2	0.0	17.2	16.1	0.0	15.2	19.8	0.0	15.0
LnGrp LOS	D	A	B	C	A	B	B	A	B	B	A	B
Approach Vol, veh/h	526			581			108			298		
Approach Delay, s/veh	21.2			17.8			15.8			19.6		
Approach LOS	C			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.9	27.7		18.1	10.0	24.6		18.1				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	3.0	10.0		13.0	6.1	18.3		4.7				
Green Ext Time (p_c), s	0.0	0.7		0.1	0.0	1.2		0.1				
Intersection Summary												
HCM 6th Ctrl Delay	19.2											
HCM 6th LOS	B											

Intersection						
Int Delay, s/veh	1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	413	11	7	339	29	17
Future Vol, veh/h	413	11	7	339	29	17
Conflicting Peds, #/hr	0	3	3	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	95	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	3	0	0	5	0	0
Mvmt Flow	486	13	8	399	34	20
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	502	0	911	496
Stage 1	-	-	-	-	496	-
Stage 2	-	-	-	-	415	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1073	-	307	578
Stage 1	-	-	-	-	616	-
Stage 2	-	-	-	-	671	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1070	-	304	576
Mov Cap-2 Maneuver	-	-	-	-	304	-
Stage 1	-	-	-	-	614	-
Stage 2	-	-	-	-	666	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.2		16.5	
HCM LOS	C					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	368	-	-	1070	-	
HCM Lane V/C Ratio	0.147	-	-	0.008	-	
HCM Control Delay (s)	16.5	-	-	8.4	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.5	-	-	0	-	

Timings
8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	236	352	4	305	14	7	66	4
Future Volume (vph)	236	352	4	305	14	7	66	4
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	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	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	31.5	31.9	25.7	19.3	9.3	9.3	9.3	9.3
Actuated g/C Ratio	0.64	0.65	0.52	0.39	0.19	0.19	0.19	0.19
v/c Ratio	0.48	0.35	0.01	0.62	0.07	0.05	0.30	0.31
Control Delay	12.9	10.5	7.0	18.7	19.3	15.0	22.3	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.9	10.5	7.0	18.7	19.3	15.0	22.3	7.4
LOS	B	B	A	B	B	B	C	A
Approach Delay		11.5		18.6		17.2		13.2
Approach LOS		B		B		B		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 49.4

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 14.1

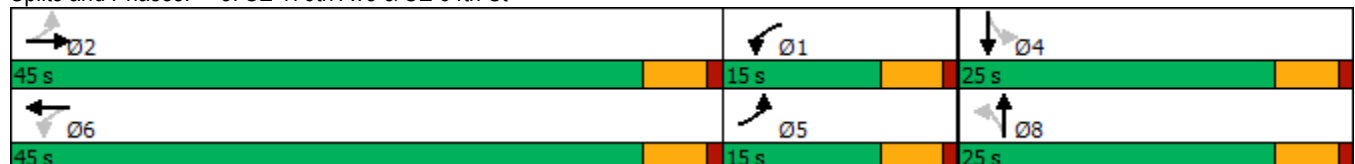
Intersection LOS: B

Intersection Capacity Utilization 55.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	236	352	2	4	305	59	14	7	6	66	4	100
Future Volume (veh/h)	236	352	2	4	305	59	14	7	6	66	4	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.98		1.00	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1767	1856	1900	1900	1811	1826	1900	1900	1530	1870	1900	1885
Adj Flow Rate, veh/h	278	414	2	5	359	57	16	8	0	78	5	0
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
Percent Heavy Veh, %	9	3	0	0	6	5	0	0	25	2	0	1
Cap, veh/h	569	711	3	613	590	94	331	202	0	326	202	0
Arrive On Green	0.12	0.39	0.39	0.12	0.39	0.39	0.11	0.11	0.00	0.11	0.11	0.00
Sat Flow, veh/h	1682	1845	9	1810	1524	242	1407	1900	0	1382	1900	0
Grp Volume(v), veh/h	278	0	416	5	0	416	16	8	0	78	5	0
Grp Sat Flow(s),veh/h/ln	1682	0	1854	1810	0	1766	1407	1900	0	1382	1900	0
Q Serve(g_s), s	0.0	0.0	6.9	0.0	0.0	7.4	0.4	0.1	0.0	2.1	0.1	0.0
Cycle Q Clear(g_c), s	0.0	0.0	6.9	0.0	0.0	7.4	0.5	0.1	0.0	2.2	0.1	0.0
Prop In Lane	1.00		0.00	1.00		0.14	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	569	0	714	613	0	684	331	202	0	326	202	0
V/C Ratio(X)	0.49	0.00	0.58	0.01	0.00	0.61	0.05	0.04	0.00	0.24	0.02	0.00
Avail Cap(c_a), veh/h	795	0	1901	852	0	1810	903	974	0	888	974	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.6	0.0	9.5	8.8	0.0	9.6	15.8	15.6	0.0	16.6	15.6	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	0.0	3.3	0.0	0.0	3.3	0.2	0.1	0.0	1.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.8	0.0	9.8	8.8	0.0	9.9	15.9	15.7	0.0	16.8	15.6	0.0
LnGrp LOS	B	A	A	A	A	A	B	B	A	B	B	A
Approach Vol, veh/h	694			421			24			83		
Approach Delay, s/veh	11.0			9.9			15.8			16.7		
Approach LOS	B			A			B			B		
Timer - Assigned Phs	1	2	4		5	6	8					
Phs Duration (G+Y+Rc), s	9.8	20.0	9.1		9.8	20.1	9.1					
Change Period (Y+Rc), s	5.0	5.0	5.0		5.0	5.0	5.0					
Max Green Setting (Gmax), s	10.0	40.0	20.0		10.0	40.0	20.0					
Max Q Clear Time (g_c+I1), s	2.0	8.9	4.2		2.0	9.4	2.5					
Green Ext Time (p_c), s	0.0	1.5	0.1		0.3	1.6	0.0					

Intersection Summary

HCM 6th Ctrl Delay 11.1
HCM 6th LOS B

Notes

User approved pedestrian interval to be less than phase max green.

MOVEMENT SUMMARY

 **Site: 101 [SE 176 Avenue/ SE 29th Street Phase 2 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Phase 2
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] ft				mph
South: SE 176th Avenue															
3	L2	All MCs	5	0.0	5	0.0	0.315	5.9	LOS A	1.8	44.4	0.37	0.18	0.37	32.8
8	T1	All MCs	144	2.0	144	2.0	0.315	6.0	LOS A	1.8	44.4	0.37	0.18	0.37	33.5
18	R2	All MCs	225	0.0	225	0.0	0.315	5.9	LOS A	1.8	44.4	0.37	0.18	0.37	33.2
Approach			373	0.8	373	0.8	0.315	5.9	LOS A	1.8	44.4	0.37	0.18	0.37	33.3
East: SE 29th Street															
1	L2	All MCs	74	0.0	74	0.0	0.286	5.6	LOS A	1.5	38.6	0.37	0.20	0.37	32.5
6	T1	All MCs	215	0.0	215	0.0	0.286	5.6	LOS A	1.5	38.6	0.37	0.20	0.37	33.1
16	R2	All MCs	46	0.0	46	0.0	0.286	5.6	LOS A	1.5	38.6	0.37	0.20	0.37	32.9
Approach			335	0.0	335	0.0	0.286	5.6	LOS A	1.5	38.6	0.37	0.20	0.37	33.0
North: SE 176th Avenue															
7	L2	All MCs	20	88.0	20	88.0	0.291	16.9	LOS C	1.2	35.0	0.50	0.33	0.50	29.7
4	T1	All MCs	105	1.0	105	1.0	0.291	5.9	LOS A	1.2	35.0	0.50	0.33	0.50	32.8
14	R2	All MCs	122	18.0	122	18.0	0.291	7.5	LOS A	1.2	35.0	0.50	0.33	0.50	32.2
Approach			247	16.5	247	16.5	0.291	7.4	LOS A	1.2	35.0	0.50	0.33	0.50	32.2
West: SE 29th Street															
5	L2	All MCs	6	0.0	6	0.0	0.109	4.1	LOS A	0.5	12.1	0.37	0.22	0.37	33.6
2	T1	All MCs	98	0.0	98	0.0	0.109	4.1	LOS A	0.5	12.1	0.37	0.22	0.37	34.3
12	R2	All MCs	15	10.0	15	10.0	0.109	5.0	LOS A	0.5	12.1	0.37	0.22	0.37	33.8
Approach			119	1.3	119	1.3	0.109	4.2	LOS A	0.5	12.1	0.37	0.22	0.37	34.2
All Vehicles			1074	4.2	1074	4.2	0.315	6.0	LOS A	1.8	44.4	0.40	0.23	0.40	33.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: H:\27\27715 - VIC Implementation\005 - Master Plan Update TIA\Analysis\176th_29th With Project 2038 AM.sip9

Intersection

Intersection Delay, s/veh	15.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	272	33	76	314	14	47	85	56	0	66	10
Future Vol, veh/h	12	272	33	76	314	14	47	85	56	0	66	10
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
Heavy Vehicles, %	0	4	10	4	1	9	4	3	0	0	0	0
Mvmt Flow	13	299	36	84	345	15	52	93	62	0	73	11
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	16.5	16.1	11.9	11.6
HCM LOS	C	C	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	60%	0%	89%	0%	96%	87%
Vol Right, %	0%	40%	0%	11%	0%	4%	13%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	47	141	12	305	76	328	76
LT Vol	47	0	12	0	76	0	0
Through Vol	0	85	0	272	0	314	66
RT Vol	0	56	0	33	0	14	10
Lane Flow Rate	52	155	13	335	84	360	84
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.107	0.286	0.024	0.57	0.152	0.599	0.165
Departure Headway (Hd)	7.446	6.637	6.633	6.117	6.573	5.984	7.119
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	479	539	538	587	544	602	500
Service Time	5.22	4.409	4.399	3.883	4.336	3.746	5.211
HCM Lane V/C Ratio	0.109	0.288	0.024	0.571	0.154	0.598	0.168
HCM Control Delay	11.1	12.1	9.6	16.8	10.5	17.4	11.6
HCM Lane LOS	B	B	A	C	B	C	B
HCM 95th-tile Q	0.4	1.2	0.1	3.6	0.5	4	0.6

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	42	14	46	202	35	140	23	1081	92	795
Future Volume (vph)	42	14	46	202	35	140	23	1081	92	795
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Prot	NA
Protected Phases	5	2		1	6		7	4	3	8
Permitted Phases	2		2	6		6				
Detector Phase	5	2	2	1	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	9.5	39.0	39.0	9.5	38.0	38.0	10.0	32.0	10.0	32.0
Total Split (s)	10.0	25.0	25.0	14.0	29.0	29.0	17.0	44.0	37.0	64.0
Total Split (%)	8.3%	20.8%	20.8%	11.7%	24.2%	24.2%	14.2%	36.7%	30.8%	53.3%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.5	5.0	5.0	4.5	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max
Act Effct Green (s)	15.9	12.0	12.0	23.3	15.2	15.2	5.7	71.8	10.0	80.1
Actuated g/C Ratio	0.13	0.10	0.10	0.19	0.13	0.13	0.05	0.60	0.08	0.67
v/c Ratio	0.22	0.08	0.16	0.85	0.16	0.44	0.28	0.38	0.66	0.26
Control Delay	39.2	47.7	1.2	71.7	46.1	10.8	64.1	7.1	72.8	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.2	47.7	1.2	71.7	46.1	10.8	64.1	7.1	72.8	9.8
LOS	D	D	A	E	D	B	E	A	E	A
Approach Delay		23.3			46.8			8.3		16.2
Approach LOS		C			D			A		B

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 4 (3%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 17.6

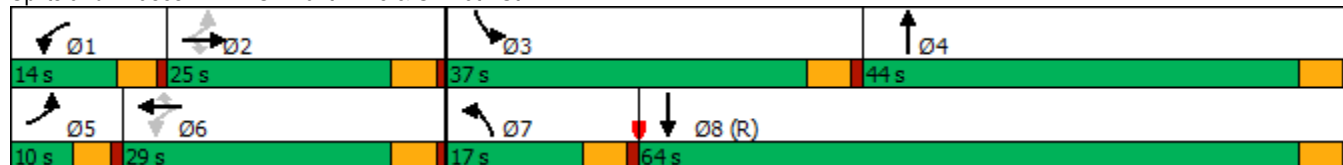
Intersection LOS: B

Intersection Capacity Utilization 58.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	14	46	202	35	140	23	1081	15	92	795	26
Future Volume (veh/h)	42	14	46	202	35	140	23	1081	15	92	795	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1900	1856	1870	1870	1900	1900	1870	1796	1885	1856	1826
Adj Flow Rate, veh/h	44	15	7	213	37	22	24	1138	15	97	837	25
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	0	3	2	2	0	0	2	7	1	3	5
Cap, veh/h	226	156	129	305	242	208	42	2323	31	121	2485	74
Arrive On Green	0.03	0.08	0.08	0.08	0.13	0.13	0.02	0.45	0.45	0.07	0.49	0.49
Sat Flow, veh/h	1767	1900	1572	1781	1870	1610	1810	5194	68	1795	5055	151
Grp Volume(v), veh/h	44	15	7	213	37	22	24	746	407	97	559	303
Grp Sat Flow(s),veh/h/ln	1767	1900	1572	1781	1870	1610	1810	1702	1858	1795	1689	1828
Q Serve(g_s), s	2.7	0.9	0.5	9.5	2.1	1.4	1.6	18.6	18.6	6.4	12.1	12.1
Cycle Q Clear(g_c), s	2.7	0.9	0.5	9.5	2.1	1.4	1.6	18.6	18.6	6.4	12.1	12.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.04	1.00		0.08
Lane Grp Cap(c), veh/h	226	156	129	305	242	208	42	1522	831	121	1660	899
V/C Ratio(X)	0.19	0.10	0.05	0.70	0.15	0.11	0.58	0.49	0.49	0.80	0.34	0.34
Avail Cap(c_a), veh/h	250	317	262	305	374	322	181	1522	831	479	1660	899
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.78	0.78	0.78	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.3	51.0	50.8	47.1	46.4	46.1	58.0	23.5	23.5	55.2	18.6	18.6
Incr Delay (d2), s/veh	0.4	0.1	0.1	6.9	0.1	0.1	3.6	0.9	1.6	4.6	0.5	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.2	0.8	0.3	3.8	1.8	1.0	1.4	11.3	12.4	5.4	8.2	8.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.7	51.1	50.8	53.9	46.5	46.2	61.7	24.4	25.1	59.7	19.1	19.6
LnGrp LOS	D	D	D	D	D	D	E	C	C	E	B	B
Approach Vol, veh/h	66				272				1177			
Approach Delay, s/veh	49.5				52.3				25.4			
Approach LOS	D				D				C			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.0	14.8	13.1	58.7	8.3	20.5	7.8	64.0				
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0				
Max Green Setting (Gmax), s	9.5	20.0	32.0	39.0	5.5	24.0	12.0	59.0				
Max Q Clear Time (g_c+I1), s	11.5	2.9	8.4	20.6	4.7	4.1	3.6	14.1				
Green Ext Time (p_c), s	0.0	0.0	0.0	4.7	0.0	0.1	0.0	3.7				

Intersection Summary

HCM 6th Ctrl Delay	28.2
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Timings
12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	28	60	165	302	121	109	111	931	366	158	803
Future Volume (vph)	28	60	165	302	121	109	111	931	366	158	803
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	20.0	33.0	20.0	25.0	38.0	17.0	20.0	45.0	25.0	17.0	42.0
Total Split (%)	16.7%	27.5%	16.7%	20.8%	31.7%	14.2%	16.7%	37.5%	20.8%	14.2%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	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	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	6.4	8.2	23.0	20.0	23.8	47.0	11.8	55.6	80.6	18.2	62.0
Actuated g/C Ratio	0.05	0.07	0.19	0.17	0.20	0.39	0.10	0.46	0.67	0.15	0.52
v/c Ratio	0.39	0.56	0.53	1.14	0.36	0.18	0.72	0.64	0.35	0.66	0.37
Control Delay	68.3	70.9	31.3	140.5	45.0	4.6	74.0	28.4	1.9	65.2	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.3	70.9	31.3	140.5	45.0	4.6	74.0	28.4	1.9	65.2	14.5
LOS	E	E	C	F	D	A	E	C	A	E	B
Approach Delay		44.8			91.0			25.1			22.6
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 15 (13%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 36.9

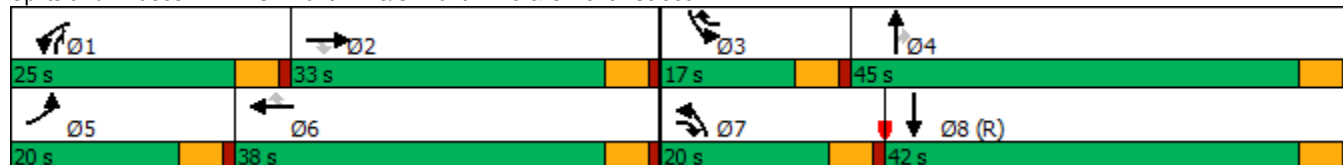
Intersection LOS: D

Intersection Capacity Utilization 70.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave/SE164th Ave & SE 34th Street



HCM 6th Signalized Intersection Summary

12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	60	165	302	121	109	111	931	366	158	803	37
Future Volume (veh/h)	28	60	165	302	121	109	111	931	366	158	803	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1565	1758	1803	1870	1885	1841	1791	1776	1746	1806	1761	1761
Adj Flow Rate, veh/h	31	67	124	336	134	33	123	1034	235	176	892	38
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
Percent Heavy Veh, %	19	6	3	2	1	4	1	2	4	0	3	3
Cap, veh/h	40	159	270	297	434	515	147	1125	740	172	1641	70
Arrive On Green	0.03	0.09	0.09	0.17	0.23	0.23	0.09	0.33	0.33	0.20	0.69	0.69
Sat Flow, veh/h	1491	1758	1528	1781	1885	1560	1706	3375	1480	1720	4730	201
Grp Volume(v), veh/h	31	67	124	336	134	33	123	1034	235	176	604	326
Grp Sat Flow(s),veh/h/ln	1491	1758	1528	1781	1885	1560	1706	1687	1480	1720	1603	1725
Q Serve(g_s), s	2.5	4.3	8.7	20.0	7.1	1.7	8.5	35.3	11.3	12.0	11.1	11.2
Cycle Q Clear(g_c), s	2.5	4.3	8.7	20.0	7.1	1.7	8.5	35.3	11.3	12.0	11.1	11.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.12
Lane Grp Cap(c), veh/h	40	159	270	297	434	515	147	1125	740	172	1112	599
V/C Ratio(X)	0.77	0.42	0.46	1.13	0.31	0.06	0.84	0.92	0.32	1.02	0.54	0.54
Avail Cap(c_a), veh/h	186	410	488	297	518	585	213	1125	740	172	1112	599
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	0.94	0.94
Uniform Delay (d), s/veh	58.0	51.6	44.2	50.0	38.3	27.5	54.0	38.4	17.8	48.0	13.7	13.7
Incr Delay (d2), s/veh	11.1	0.7	0.5	92.6	0.1	0.0	11.8	13.3	1.1	72.8	1.8	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.9	3.4	5.9	24.4	5.8	1.2	7.3	22.7	7.1	12.5	5.6	6.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.2	52.2	44.7	142.6	38.4	27.5	65.8	51.8	19.0	120.8	15.5	17.0
LnGrp LOS	E	D	D	F	D	C	E	D	B	F	B	B
Approach Vol, veh/h	222			503			1392			1106		
Approach Delay, s/veh	50.4			107.3			47.5			32.7		
Approach LOS	D			F			D			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.0	15.9	17.0	45.0	8.2	32.7	15.4	46.6				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	20.0	28.0	12.0	40.0	15.0	33.0	15.0	37.0				
Max Q Clear Time (g_c+I1), s	22.0	10.7	14.0	37.3	4.5	9.1	10.5	13.2				
Green Ext Time (p_c), s	0.0	0.1	0.0	1.0	0.0	0.2	0.0	2.0				
Intersection Summary												
HCM 6th Ctrl Delay	51.9											
HCM 6th LOS	D											

Timings

Mitigation

1: SE 192nd & SE 15th St

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	116	91	40	82	242	78	1310	115	1475
Future Volume (vph)	116	91	40	82	242	78	1310	115	1475
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	15.0	29.0	15.0	29.0	16.0	14.0	40.0	16.0	42.0
Total Split (%)	15.0%	29.0%	15.0%	29.0%	16.0%	14.0%	40.0%	16.0%	42.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	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	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effect Green (s)	9.0	15.8	6.2	11.1	19.8	7.6	52.2	9.7	56.3
Actuated g/C Ratio	0.09	0.16	0.06	0.11	0.20	0.08	0.52	0.10	0.56
v/c Ratio	0.79	0.62	0.38	0.42	0.67	0.60	0.77	0.69	0.86
Control Delay	78.1	36.9	54.0	45.4	30.5	54.0	25.1	63.7	28.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.1	36.9	54.0	45.4	30.5	54.0	25.1	63.7	28.3
LOS	E	D	D	D	C	D	C	E	C
Approach Delay		52.7		36.4			26.7		30.6
Approach LOS		D		D			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 31.5

Intersection LOS: C

Intersection Capacity Utilization 81.1%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St

			
Ø1	Ø2	Ø3	Ø4 (R)
15 s	29 s	16 s	40 s
			
Ø5	Ø6	Ø7	Ø8
15 s	29 s	14 s	42 s

HCM 6th Signalized Intersection Summary

Mitigation

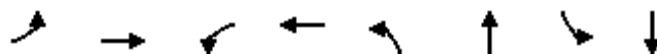
1: SE 192nd & SE 15th St

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	116	91	94	40	82	242	78	1310	32	115	1475	133
Future Volume (veh/h)	116	91	94	40	82	242	78	1310	32	115	1475	133
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1885	1900	1900	1856	1900	1900	1870	1900	1900	1870	1870
Adj Flow Rate, veh/h	122	96	56	42	86	192	82	1379	32	121	1553	135
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	1	0	0	3	0	0	2	0	0	2	2
Cap, veh/h	150	207	121	62	248	344	116	1768	41	149	1708	147
Arrive On Green	0.09	0.19	0.19	0.03	0.13	0.13	0.09	0.66	0.66	0.11	0.69	0.69
Sat Flow, veh/h	1739	1116	651	1810	1856	1582	1810	3550	82	1810	3309	285
Grp Volume(v), veh/h	122	0	152	42	86	192	82	690	721	121	828	860
Grp Sat Flow(s),veh/h/ln	1739	0	1767	1810	1856	1582	1810	1777	1855	1810	1777	1818
Q Serve(g_s), s	6.9	0.0	7.7	2.3	4.2	10.8	4.4	27.1	27.2	6.5	38.4	40.0
Cycle Q Clear(g_c), s	6.9	0.0	7.7	2.3	4.2	10.8	4.4	27.1	27.2	6.5	38.4	40.0
Prop In Lane	1.00		0.37	1.00		1.00	1.00		0.04	1.00		0.16
Lane Grp Cap(c), veh/h	150	0	327	62	248	344	116	885	924	149	917	938
V/C Ratio(X)	0.82	0.00	0.46	0.67	0.35	0.56	0.71	0.78	0.78	0.81	0.90	0.92
Avail Cap(c_a), veh/h	174	0	424	181	445	512	163	885	924	199	917	938
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.30	0.30	0.30	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.9	0.0	36.3	47.7	39.4	35.0	44.8	13.1	13.1	43.8	13.6	13.8
Incr Delay (d2), s/veh	19.5	0.0	0.4	4.6	0.3	0.5	1.0	2.1	2.0	12.5	13.8	15.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.7	0.0	5.8	2.0	3.5	7.3	3.2	10.0	10.4	5.9	18.7	19.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.4	0.0	36.7	52.4	39.7	35.5	45.8	15.2	15.1	56.3	27.4	28.9
LnGrp LOS	E	A	D	D	D	D	D	B	B	E	C	C
Approach Vol, veh/h		274			320			1493			1809	
Approach Delay, s/veh		49.0			38.8			16.8			30.0	
Approach LOS		D			D			B			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.4	23.5	13.2	54.8	13.6	18.4	11.4	56.6				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	24.0	11.0	35.0	10.0	24.0	9.0	37.0				
Max Q Clear Time (g_c+I1), s	4.3	9.7	8.5	29.2	8.9	12.8	6.4	42.0				
Green Ext Time (p_c), s	0.0	0.2	0.0	1.9	0.0	0.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay				27.0								
HCM 6th LOS				C								

Timings

Mitigation

2: SE 192nd Ave & SE 20th St



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰↰	↰	↰↰	↰	↰	↰↰	↰	↰↰
Traffic Volume (vph)	233	183	266	265	144	892	151	1089
Future Volume (vph)	233	183	266	265	144	892	151	1089
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	20.0	27.0	20.0	27.0	14.0	35.0	18.0	39.0
Total Split (%)	20.0%	27.0%	20.0%	27.0%	14.0%	35.0%	18.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effect Green (s)	11.3	23.6	12.1	24.4	9.3	32.6	11.7	35.0
Actuated g/C Ratio	0.11	0.24	0.12	0.24	0.09	0.33	0.12	0.35
v/c Ratio	0.62	0.66	0.66	0.88	0.90	0.97	0.75	1.13
Control Delay	49.0	39.8	49.4	56.7	89.3	35.9	62.2	99.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	39.8	49.4	56.7	89.3	35.9	62.2	99.4
LOS	D	D	D	E	F	D	E	F
Approach Delay		44.0		53.7		42.2		95.6
Approach LOS		D		D		D		F

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 93 (93%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.13

Intersection Signal Delay: 64.8

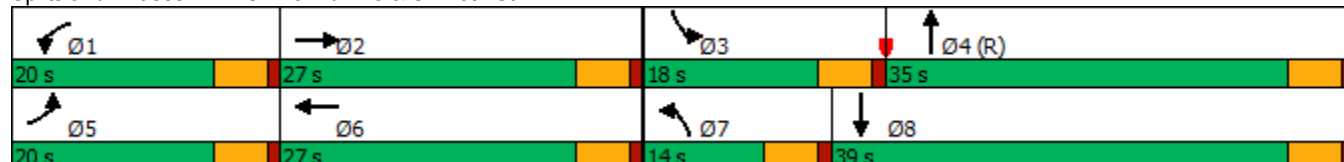
Intersection LOS: E

Intersection Capacity Utilization 90.1%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 2: SE 192nd Ave & SE 20th St



HCM 6th Signalized Intersection Summary 2: SE 192nd Ave & SE 20th St

Mitigation

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	233	183	94	266	265	118	144	892	179	151	1089	237
Future Volume (veh/h)	233	183	94	266	265	118	144	892	179	151	1089	237
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1885	1900	1900	1870	1900	1885	1900	1885	1870	1885
Adj Flow Rate, veh/h	243	191	79	277	276	106	150	929	168	157	1134	227
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	1	0	0	2	0	1	0	1	2	1
Cap, veh/h	316	268	111	350	286	110	163	1165	211	189	1181	235
Arrive On Green	0.09	0.21	0.21	0.10	0.22	0.22	0.09	0.38	0.38	0.14	0.53	0.53
Sat Flow, veh/h	3510	1276	528	3510	1301	500	1810	3029	548	1795	2953	588
Grp Volume(v), veh/h	243	0	270	277	0	382	150	549	548	157	680	681
Grp Sat Flow(s),veh/h/ln	1755	0	1803	1755	0	1801	1810	1791	1786	1795	1777	1764
Q Serve(g_s), s	6.8	0.0	13.9	7.7	0.0	21.0	8.2	27.2	27.2	8.5	36.5	37.2
Cycle Q Clear(g_c), s	6.8	0.0	13.9	7.7	0.0	21.0	8.2	27.2	27.2	8.5	36.5	37.2
Prop In Lane	1.00		0.29	1.00		0.28	1.00		0.31	1.00		0.33
Lane Grp Cap(c), veh/h	316	0	379	350	0	396	163	689	687	189	711	705
V/C Ratio(X)	0.77	0.00	0.71	0.79	0.00	0.96	0.92	0.80	0.80	0.83	0.96	0.97
Avail Cap(c_a), veh/h	527	0	397	527	0	396	163	689	687	233	711	705
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.42	0.42	0.42
Uniform Delay (d), s/veh	44.5	0.0	36.7	44.0	0.0	38.6	45.1	27.3	27.3	42.1	22.6	22.7
Incr Delay (d2), s/veh	1.5	0.0	4.7	2.5	0.0	35.6	47.3	9.3	9.4	7.0	13.8	15.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.3	0.0	10.5	6.1	0.0	18.7	9.6	18.5	18.5	6.0	18.6	19.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.0	0.0	41.3	46.5	0.0	74.2	92.4	36.7	36.7	49.1	36.3	37.9
LnGrp LOS	D	A	D	D	A	E	F	D	D	D	D	D
Approach Vol, veh/h		513			659			1247			1518	
Approach Delay, s/veh		43.5			62.6			43.4			38.4	
Approach LOS		D			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	26.0	15.6	43.4	14.0	27.0	14.0	45.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	22.0	13.0	30.0	15.0	22.0	9.0	34.0				
Max Q Clear Time (g_c+I1), s	9.7	15.9	10.5	29.2	8.8	23.0	10.2	39.2				
Green Ext Time (p_c), s	0.2	0.5	0.0	0.4	0.2	0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			44.7									
HCM 6th LOS			D									

Intersection							
Int Delay, s/veh	0.2						
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Vol, veh/h	3	4	1225	3	10	1316	
Future Vol, veh/h	3	4	1225	3	10	1316	
Conflicting Peds, #/hr	0	0	0	2	2	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	125	0	-	-	230	-	
Veh in Median Storage, #	0	-	0	-	-	0	
Grade, %	0	-	0	-	-	0	
Peak Hour Factor	95	95	95	95	95	95	
Heavy Vehicles, %	0	0	1	0	0	1	
Mvmt Flow	3	4	1289	3	11	1385	
Major/Minor	Minor1	Major1		Major2			
Conflicting Flow All	2008	648	0	0	1294	0	
Stage 1	1293	-	-	-	-	-	
Stage 2	715	-	-	-	-	-	
Critical Hdwy	6.8	6.9	-	-	4.1	-	
Critical Hdwy Stg 1	5.8	-	-	-	-	-	
Critical Hdwy Stg 2	5.8	-	-	-	-	-	
Follow-up Hdwy	3.5	3.3	-	-	2.2	-	
Pot Cap-1 Maneuver	53	418	-	-	542	-	
Stage 1	225	-	-	-	-	-	
Stage 2	451	-	-	-	-	-	
Platoon blocked, %			-	-		-	
Mov Cap-1 Maneuver	52	417	-	-	541	-	
Mov Cap-2 Maneuver	52	-	-	-	-	-	
Stage 1	225	-	-	-	-	-	
Stage 2	442	-	-	-	-	-	
Approach	WB	NB		SB			
HCM Control Delay, s	41.6	0		0.1			
HCM LOS	E						
Minor Lane/Major Mvmt		NBT	NBRWBLn1	WBLn2	SBL	SBT	
Capacity (veh/h)		-	-	52	417	541	-
HCM Lane V/C Ratio		-	-	0.061	0.01	0.019	-
HCM Control Delay (s)		-	-	78.7	13.7	11.8	-
HCM Lane LOS		-	-	F	B	B	-
HCM 95th %tile Q(veh)		-	-	0.2	0	0.1	-

Timings 5: SE 192nd Ave & SE 34th St

Mitigation

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	253	245	355	216	120	177	955	204	212	932
Future Volume (vph)	253	245	355	216	120	177	955	204	212	932
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	14.0	32.0	19.0	37.0	37.0	13.0	34.0	19.0	15.0	36.0
Total Split (%)	14.0%	32.0%	19.0%	37.0%	37.0%	13.0%	34.0%	19.0%	15.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	33.6	24.6	43.6	29.6	29.6	10.4	31.4	45.4	10.0	31.0
Actuated g/C Ratio	0.34	0.25	0.44	0.30	0.30	0.10	0.31	0.45	0.10	0.31
v/c Ratio	0.63	0.92	1.13	0.40	0.21	0.98	0.89	0.25	0.65	1.13
Control Delay	28.3	61.7	117.2	29.9	1.8	109.6	45.1	2.1	40.0	91.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	61.7	117.2	29.9	1.8	109.6	45.1	2.1	40.0	91.7
LOS	C	E	F	C	A	F	D	A	D	F
Approach Delay		48.7		69.9			47.0			83.6
Approach LOS		D		E			D			F

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 36 (36%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.13

Intersection Signal Delay: 63.5

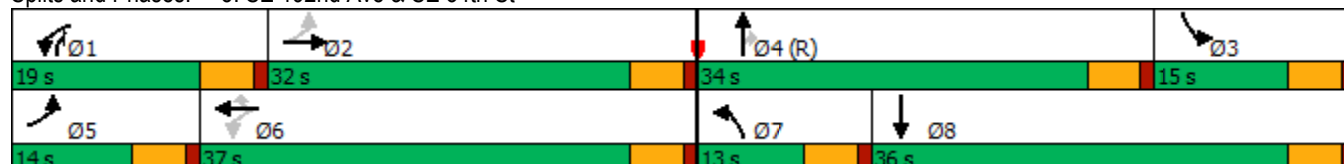
Intersection LOS: E

Intersection Capacity Utilization 101.5%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

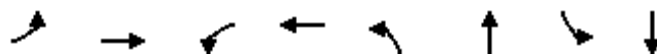
Mitigation

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	253	245	152	355	216	120	177	955	204	212	932	215
Future Volume (veh/h)	253	245	152	355	216	120	177	955	204	212	932	215
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1773	1847	1817	2003	2003	2018	2018	1988	2003	1847	1832	1743
Adj Flow Rate, veh/h	266	258	136	374	227	30	186	1005	87	223	981	205
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	0	2	1	1	0	0	2	1	0	1	7
Cap, veh/h	444	280	147	365	595	507	154	1095	726	419	951	198
Arrive On Green	0.09	0.25	0.25	0.14	0.30	0.30	0.08	0.29	0.29	0.12	0.33	0.33
Sat Flow, veh/h	1688	1131	596	1908	2003	1705	1922	3777	1683	3413	2857	596
Grp Volume(v), veh/h	266	0	394	374	227	30	186	1005	87	223	597	589
Grp Sat Flow(s),veh/h/ln	1688	0	1728	1908	2003	1705	1922	1889	1683	1706	1741	1713
Q Serve(g_s), s	9.0	0.0	22.2	14.0	9.0	0.9	8.0	25.7	1.6	6.1	33.3	33.3
Cycle Q Clear(g_c), s	9.0	0.0	22.2	14.0	9.0	0.9	8.0	25.7	1.6	6.1	33.3	33.3
Prop In Lane	1.00		0.35	1.00		1.00	1.00		1.00	1.00		0.35
Lane Grp Cap(c), veh/h	444	0	427	365	595	507	154	1095	726	419	579	570
V/C Ratio(X)	0.60	0.00	0.92	1.02	0.38	0.06	1.21	0.92	0.12	0.53	1.03	1.03
Avail Cap(c_a), veh/h	444	0	467	365	641	546	154	1095	726	419	579	570
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.78	0.00	0.78	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.4	0.0	36.7	25.3	27.9	11.7	46.0	34.3	6.2	41.2	33.4	33.4
Incr Delay (d2), s/veh	1.2	0.0	18.4	53.4	0.1	0.0	139.9	13.4	0.3	0.7	45.3	46.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.1	0.0	16.0	17.0	7.5	0.9	15.8	19.2	1.4	4.6	28.5	28.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.6	0.0	55.1	78.6	28.0	11.7	185.9	47.8	6.6	41.8	78.7	79.9
LnGrp LOS	C	A	E	F	C	B	F	D	A	D	F	F
Approach Vol, veh/h		660			631			1278			1409	
Approach Delay, s/veh		44.4			57.2			65.1			73.3	
Approach LOS		D			E			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	29.7	17.3	34.0	14.0	34.7	13.0	38.3				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	14.0	27.0	10.0	29.0	9.0	32.0	8.0	31.0				
Max Q Clear Time (g_c+I1), s	16.0	24.2	8.1	27.7	11.0	11.0	10.0	35.3				
Green Ext Time (p_c), s	0.0	0.3	0.0	0.5	0.0	0.4	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			63.3									
HCM 6th LOS			E									
Notes												
User approved pedestrian interval to be less than phase max green.												

Timings

Mitigation

6: SE Hiddenbrook Dr & SE 34th St



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	69	308	37	366	71	15	309	27
Future Volume (vph)	69	308	37	366	71	15	309	27
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases					8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	30.0	10.0	30.0	32.0	32.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%
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	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effect Green (s)	5.1	37.4	5.1	32.9	30.4	30.4	30.4	30.4
Actuated g/C Ratio	0.06	0.45	0.06	0.39	0.36	0.36	0.36	0.36
v/c Ratio	0.67	0.51	0.37	0.93	0.21	0.08	0.69	0.31
Control Delay	72.0	18.7	51.8	42.0	23.7	11.4	34.3	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.0	18.7	51.8	42.0	23.7	11.4	34.3	6.5
LOS	E	B	D	D	C	B	C	A
Approach Delay		26.7		42.6		18.8		23.0
Approach LOS		C		D		B		C

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 83.5

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 31.0

Intersection LOS: C

Intersection Capacity Utilization 78.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

10 s	85 s	35 s
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary 6: SE Hiddenbrook Dr & SE 34th St

Mitigation

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	308	80	37	366	249	71	15	32	309	27	184
Future Volume (veh/h)	69	308	80	37	366	249	71	15	32	309	27	184
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1870	1841	1832	1847	1876	1817	1876	1832	1841	1900	1900
Adj Flow Rate, veh/h	73	328	73	39	389	234	76	16	11	329	29	62
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	2	4	3	2	0	4	0	3	4	0	0
Cap, veh/h	109	607	135	70	420	253	437	297	204	500	154	330
Arrive On Green	0.06	0.41	0.41	0.04	0.39	0.39	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	1810	1479	329	1745	1077	648	1265	1034	711	1357	538	1150
Grp Volume(v), veh/h	73	0	401	39	0	623	76	0	27	329	0	91
Grp Sat Flow(s),veh/h/ln	1810	0	1808	1745	0	1724	1265	0	1746	1357	0	1688
Q Serve(g_s), s	2.3	0.0	9.6	1.3	0.0	19.7	2.8	0.0	0.6	13.2	0.0	2.3
Cycle Q Clear(g_c), s	2.3	0.0	9.6	1.3	0.0	19.7	5.1	0.0	0.6	13.9	0.0	2.3
Prop In Lane	1.00		0.18	1.00		0.38	1.00		0.41	1.00		0.68
Lane Grp Cap(c), veh/h	109	0	742	70	0	673	437	0	501	500	0	484
V/C Ratio(X)	0.67	0.00	0.54	0.55	0.00	0.93	0.17	0.00	0.05	0.66	0.00	0.19
Avail Cap(c_a), veh/h	158	0	2533	153	0	2415	739	0	917	824	0	887
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.3	0.0	12.8	26.9	0.0	16.6	17.3	0.0	14.8	19.8	0.0	15.4
Incr Delay (d2), s/veh	2.7	0.0	0.2	2.5	0.0	2.5	0.1	0.0	0.0	0.6	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.7	0.0	5.6	0.9	0.0	10.9	1.4	0.0	0.4	7.0	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.0	0.0	13.0	29.4	0.0	19.1	17.3	0.0	14.8	20.3	0.0	15.4
LnGrp LOS	C	A	B	C	A	B	B	A	B	C	A	B
Approach Vol, veh/h	474			662			103			420		
Approach Delay, s/veh	15.5			19.7			16.7			19.3		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.3	28.4		21.4	8.4	27.3		21.4				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	3.3	11.6		15.9	4.3	21.7		7.1				
Green Ext Time (p_c), s	0.0	0.3		0.1	0.0	0.6		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	18.2											
HCM 6th LOS	B											

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	450	32	16	606	18	7
Future Vol, veh/h	450	32	16	606	18	7
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	95	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	0	0	2	0	0
Mvmt Flow	495	35	18	666	20	8
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	530	0	1215	514
Stage 1	-	-	-	-	513	-
Stage 2	-	-	-	-	702	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1048	-	202	564
Stage 1	-	-	-	-	605	-
Stage 2	-	-	-	-	495	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1048	-	199	563
Mov Cap-2 Maneuver	-	-	-	-	199	-
Stage 1	-	-	-	-	605	-
Stage 2	-	-	-	-	487	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0.2		21.7		
HCM LOS	C					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	243	-	-	1048	-	
HCM Lane V/C Ratio	0.113	-	-	0.017	-	
HCM Control Delay (s)	21.7	-	-	8.5	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-	

Timings 8: SE 176th Ave & SE 34th St

Mitigation

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	197	383	16	488	10	9	94	19
Future Volume (vph)	197	383	16	488	10	9	94	19
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	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	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effect Green (s)	37.2	35.8	30.0	24.9	10.5	10.5	10.5	10.5
Actuated g/C Ratio	0.62	0.60	0.50	0.42	0.18	0.18	0.18	0.18
v/c Ratio	0.53	0.39	0.03	0.86	0.05	0.05	0.41	0.41
Control Delay	20.5	10.9	8.6	28.7	23.9	19.7	29.4	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5	10.9	8.6	28.7	23.9	19.7	29.4	10.0
LOS	C	B	A	C	C	B	C	B
Approach Delay		14.1		28.2		21.5		17.4
Approach LOS		B		C		C		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 59.7

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 20.6

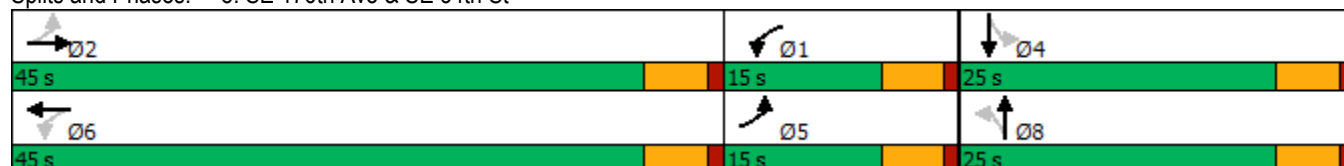
Intersection LOS: C

Intersection Capacity Utilization 68.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary 8: SE 176th Ave & SE 34th St

Mitigation

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	197	383	13	16	488	120	10	9	5	94	19	135
Future Volume (veh/h)	197	383	13	16	488	120	10	9	5	94	19	135
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1870	1900	1900	1885	1885	1900	1900	1900	1885	1900	1900
Adj Flow Rate, veh/h	214	416	13	17	530	117	11	10	1	102	21	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
Percent Heavy Veh, %	1	2	0	0	1	1	0	0	0	1	0	0
Cap, veh/h	396	639	20	652	637	141	301	189	19	320	121	75
Arrive On Green	0.11	0.35	0.35	0.18	0.43	0.43	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1795	1804	56	1810	1496	330	1391	1699	170	1409	1085	672
Grp Volume(v), veh/h	214	0	429	17	0	647	11	0	11	102	0	34
Grp Sat Flow(s),veh/h/ln	1795	0	1860	1810	0	1826	1391	0	1869	1409	0	1757
Q Serve(g_s), s	0.0	0.0	8.2	0.0	0.0	13.3	0.3	0.0	0.2	3.0	0.0	0.7
Cycle Q Clear(g_c), s	0.0	0.0	8.2	0.0	0.0	13.3	1.0	0.0	0.2	3.2	0.0	0.7
Prop In Lane	1.00		0.03	1.00		0.18	1.00		0.09	1.00		0.38
Lane Grp Cap(c), veh/h	396	0	659	652	0	777	301	0	208	320	0	196
V/C Ratio(X)	0.54	0.00	0.65	0.03	0.00	0.83	0.04	0.00	0.05	0.32	0.00	0.17
Avail Cap(c_a), veh/h	625	0	1757	753	0	1724	802	0	882	828	0	830
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.7	0.0	11.5	9.4	0.0	10.8	17.5	0.0	16.8	18.2	0.0	17.0
Incr Delay (d2), s/veh	0.4	0.0	0.4	0.0	0.0	0.9	0.0	0.0	0.0	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.8	0.0	4.4	0.1	0.0	6.5	0.2	0.0	0.2	1.6	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.1	0.0	11.9	9.4	0.0	11.7	17.5	0.0	16.9	18.4	0.0	17.2
LnGrp LOS	B	A	B	A	A	B	B	A	B	B	A	B
Approach Vol, veh/h	643		664			22			136			
Approach Delay, s/veh	13.6		11.7			17.2			18.1			
Approach LOS	B		B			B			B			
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.6	20.0		9.7	9.6	23.0		9.7				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	10.2		5.2	2.0	15.3		3.0				
Green Ext Time (p_c), s	0.0	1.6		0.2	0.2	2.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	13.2											
HCM 6th LOS	B											
Notes												

MOVEMENT SUMMARY

 Site: 101 [SE 176 Avenue/ SE 29th Street Phase 2 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Phase 2
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]	ft			mph
South: SE 176th Avenue															
3	L2	All MCs	16	15.0	16	15.0	0.314	7.4	LOS A	1.7	43.3	0.41	0.22	0.41	32.3
8	T1	All MCs	268	0.0	268	0.0	0.314	6.0	LOS A	1.7	43.3	0.41	0.22	0.41	33.4
18	R2	All MCs	74	0.0	74	0.0	0.314	6.0	LOS A	1.7	43.3	0.41	0.22	0.41	33.1
Approach			358	0.7	358	0.7	0.314	6.1	LOS A	1.7	43.3	0.41	0.22	0.41	33.3
East: SE 29th Street															
1	L2	All MCs	152	0.0	152	0.0	0.438	8.4	LOS A	2.6	64.2	0.59	0.40	0.59	31.0
6	T1	All MCs	247	0.0	247	0.0	0.438	8.4	LOS A	2.6	64.2	0.59	0.40	0.59	31.6
16	R2	All MCs	41	0.0	41	0.0	0.438	8.4	LOS A	2.6	64.2	0.59	0.40	0.59	31.3
Approach			440	0.0	440	0.0	0.438	8.4	LOS A	2.6	64.2	0.59	0.40	0.59	31.3
North: SE 176th Avenue															
7	L2	All MCs	44	0.0	44	0.0	0.249	6.5	LOS A	1.2	29.2	0.55	0.41	0.55	32.1
4	T1	All MCs	67	1.0	67	1.0	0.249	6.6	LOS A	1.2	29.2	0.55	0.41	0.55	32.7
14	R2	All MCs	113	0.0	113	0.0	0.249	6.5	LOS A	1.2	29.2	0.55	0.41	0.55	32.4
Approach			224	0.3	224	0.3	0.249	6.6	LOS A	1.2	29.2	0.55	0.41	0.55	32.4
West: SE 29th Street															
5	L2	All MCs	22	7.0	22	7.0	0.159	5.4	LOS A	0.7	18.1	0.42	0.27	0.42	32.9
2	T1	All MCs	111	0.0	111	0.0	0.159	4.8	LOS A	0.7	18.1	0.42	0.27	0.42	33.8
12	R2	All MCs	33	0.0	33	0.0	0.159	4.8	LOS A	0.7	18.1	0.42	0.27	0.42	33.5
Approach			166	0.9	166	0.9	0.159	4.9	LOS A	0.7	18.1	0.42	0.27	0.42	33.6
All Vehicles			1187	0.4	1187	0.4	0.438	6.9	LOS A	2.6	64.2	0.50	0.33	0.50	32.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: H:\27\27715 - VIC Implementation\005 - Master Plan Update TIA\Analysis\176th_29th With Project 2038 PM.sip9

Intersection	
Intersection Delay, s/veh	90.7
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	466	71	93	503	18	49	132	76	27	95	28
Future Vol, veh/h	48	466	71	93	503	18	49	132	76	27	95	28
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
Heavy Vehicles, %	3	0	0	1	0	7	0	1	0	4	1	8
Mvmt Flow	52	507	77	101	547	20	53	143	83	29	103	30
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	124.1	106.1	19.5	19.6
HCM LOS	F	F	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	18%
Vol Thru, %	0%	63%	0%	87%	0%	97%	63%
Vol Right, %	0%	37%	0%	13%	0%	3%	19%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	49	208	48	537	93	521	150
LT Vol	49	0	48	0	93	0	27
Through Vol	0	132	0	466	0	503	95
RT Vol	0	76	0	71	0	18	28
Lane Flow Rate	53	226	52	584	101	566	163
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.133	0.517	0.117	1.199	0.223	1.167	0.409
Departure Headway (Hd)	9.705	8.932	8.467	7.801	8.438	7.877	9.937
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	372	407	426	473	429	464	365
Service Time	7.405	6.632	6.167	5.501	6.138	5.577	7.937
HCM Lane V/C Ratio	0.142	0.555	0.122	1.235	0.235	1.22	0.447
HCM Control Delay	13.9	20.8	12.3	134.1	13.5	122.6	19.6
HCM Lane LOS	B	C	B	F	B	F	C
HCM 95th-tile Q	0.5	2.9	0.4	21.2	0.8	19.7	1.9

Timings

Mitigation

11: SE 164th Ave & SE 29th St

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	89	49	51	240	36	143	42	1434	131	1306
Future Volume (vph)	89	49	51	240	36	143	42	1434	131	1306
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Prot	NA
Protected Phases	5	2		1	6		7	4	3	8
Permitted Phases	2		2	6		6				
Detector Phase	5	2	2	1	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	9.5	39.0	39.0	9.5	38.0	38.0	10.0	32.0	19.5	32.0
Total Split (s)	15.0	20.0	20.0	19.0	24.0	24.0	15.0	59.0	22.0	66.0
Total Split (%)	12.5%	16.7%	16.7%	15.8%	20.0%	20.0%	12.5%	49.2%	18.3%	55.0%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.5	5.0	5.0	4.5	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max
Act Effct Green (s)	18.9	11.0	11.0	28.7	14.5	14.5	6.3	64.6	11.8	72.1
Actuated g/C Ratio	0.16	0.09	0.09	0.24	0.12	0.12	0.05	0.54	0.10	0.60
v/c Ratio	0.37	0.30	0.19	0.76	0.17	0.47	0.49	0.57	0.78	0.46
Control Delay	40.7	55.0	1.5	55.9	47.9	12.2	51.3	34.3	80.8	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.7	55.0	1.5	55.9	47.9	12.2	51.3	34.3	80.8	14.9
LOS	D	D	A	E	D	B	D	C	F	B
Approach Delay		33.8			40.3			34.8		20.8
Approach LOS		C			D			C		C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 112 (93%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 29.6

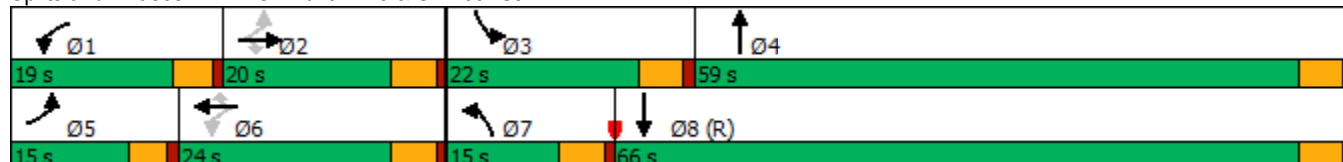
Intersection LOS: C

Intersection Capacity Utilization 68.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Mitigation

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	49	51	240	36	143	42	1434	32	131	1306	46
Future Volume (veh/h)	89	49	51	240	36	143	42	1434	32	131	1306	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1870	1870	1870	1826	1870	1752	1885	1885	1900
Adj Flow Rate, veh/h	94	52	10	253	38	26	44	1509	32	138	1375	46
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	2	2	2	5	2	10	1	1	0
Cap, veh/h	287	163	138	356	273	230	56	2315	49	164	2605	87
Arrive On Green	0.06	0.09	0.09	0.12	0.15	0.15	0.03	0.45	0.45	0.09	0.51	0.51
Sat Flow, veh/h	1810	1900	1599	1781	1870	1579	1739	5146	109	1795	5114	171
Grp Volume(v), veh/h	94	52	10	253	38	26	44	998	543	138	922	499
Grp Sat Flow(s), veh/h/ln	1810	1900	1599	1781	1870	1579	1739	1702	1851	1795	1716	1854
Q Serve(g_s), s	5.6	3.1	0.7	14.5	2.1	1.7	3.0	27.4	27.4	9.1	21.7	21.7
Cycle Q Clear(g_c), s	5.6	3.1	0.7	14.5	2.1	1.7	3.0	27.4	27.4	9.1	21.7	21.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.06	1.00		0.09
Lane Grp Cap(c), veh/h	287	163	138	356	273	230	56	1532	833	164	1748	944
V/C Ratio(X)	0.33	0.32	0.07	0.71	0.14	0.11	0.79	0.65	0.65	0.84	0.53	0.53
Avail Cap(c_a), veh/h	334	238	200	356	296	250	145	1532	833	254	1748	944
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.71	0.71	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.0	51.5	50.4	42.6	44.7	44.5	57.7	25.7	25.7	53.6	19.8	19.8
Incr Delay (d2), s/veh	0.7	0.4	0.1	6.5	0.1	0.1	6.3	1.5	2.8	8.2	1.1	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.7	2.7	0.5	12.0	1.8	1.2	2.5	15.5	17.0	7.8	13.3	14.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.7	51.9	50.5	49.1	44.8	44.6	64.0	27.2	28.5	61.8	20.9	21.9
LnGrp LOS	D	D	D	D	D	D	E	C	C	E	C	C
Approach Vol, veh/h		156			317			1585			1559	
Approach Delay, s/veh		48.7			48.2			28.7			24.8	
Approach LOS		D			D			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	15.3	16.0	59.0	11.8	22.5	8.9	66.1				
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0				
Max Green Setting (Gmax), s	14.5	15.0	17.0	54.0	10.5	19.0	10.0	61.0				
Max Q Clear Time (g_c+I1), s	16.5	5.1	11.1	29.4	7.6	4.1	5.0	23.7				
Green Ext Time (p_c), s	0.0	0.0	0.0	1.7	0.0	0.0	0.0	1.6				
Intersection Summary												
HCM 6th Ctrl Delay				29.6								
HCM 6th LOS				C								
Notes												
User approved pedestrian interval to be less than phase max green.												

Timings

Mitigation

12: SE 164th Ave & SE 34th St

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	49	102	194	279	136	247	192	1216	390	164	1372
Future Volume (vph)	49	102	194	279	136	247	192	1216	390	164	1372
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	15.0	33.0	20.0	17.0	35.0	20.0	20.0	50.0	17.0	20.0	50.0
Total Split (%)	12.5%	27.5%	16.7%	14.2%	29.2%	16.7%	16.7%	41.7%	14.2%	16.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	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	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	7.3	10.7	34.0	12.0	17.5	38.0	18.3	61.8	78.8	15.5	59.0
Actuated g/C Ratio	0.06	0.09	0.28	0.10	0.15	0.32	0.15	0.52	0.66	0.13	0.49
v/c Ratio	0.51	0.66	0.41	1.64	0.54	0.46	0.74	0.70	0.35	0.75	0.59
Control Delay	71.7	71.0	24.2	348.1	56.2	21.9	64.4	26.2	3.7	67.2	22.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.7	71.0	24.2	348.1	56.2	21.9	64.4	26.2	3.7	67.2	22.3
LOS	E	E	C	F	E	C	E	C	A	E	C
Approach Delay		44.8			166.5			25.4			26.9
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 40 (33%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.64

Intersection Signal Delay: 48.8

Intersection LOS: D

Intersection Capacity Utilization 80.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave & SE 34th St

			
17 s	33 s	20 s	50 s
			
15 s	35 s	20 s	50 s (R)

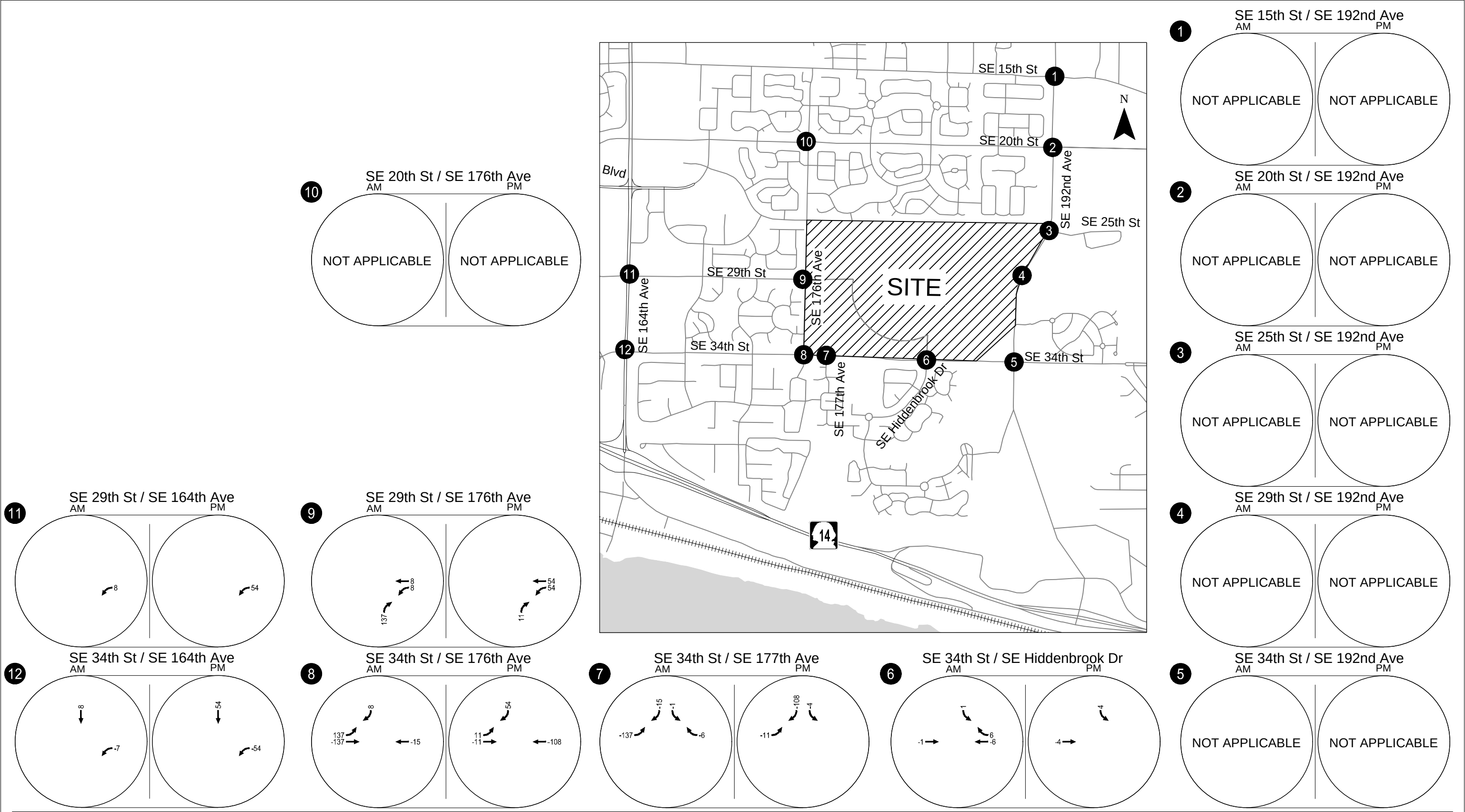
HCM 6th Signalized Intersection Summary

12: SE 164th Ave & SE 34th St

Mitigation

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	102	194	279	136	247	192	1216	390	164	1372	49
Future Volume (veh/h)	49	102	194	279	136	247	192	1216	390	164	1372	49
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1767	1826	1885	1870	1841	1856	1885	1870	1885	1870	1870	1841
Adj Flow Rate, veh/h	51	106	152	291	142	182	200	1267	279	171	1429	48
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	9	5	1	2	4	3	1	2	1	2	2	4
Cap, veh/h	64	183	359	178	298	430	224	1379	780	199	1902	64
Arrive On Green	0.04	0.10	0.10	0.10	0.16	0.16	0.13	0.39	0.39	0.04	0.12	0.12
Sat Flow, veh/h	1682	1826	1598	1781	1841	1572	1795	3554	1598	1781	5073	170
Grp Volume(v), veh/h	51	106	152	291	142	182	200	1267	279	171	959	518
Grp Sat Flow(s),veh/h/ln	1682	1826	1598	1781	1841	1572	1795	1777	1598	1781	1702	1840
Q Serve(g_s), s	3.6	6.7	9.8	12.0	8.4	11.4	13.2	40.7	13.0	11.5	32.7	32.7
Cycle Q Clear(g_c), s	3.6	6.7	9.8	12.0	8.4	11.4	13.2	40.7	13.0	11.5	32.7	32.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.09
Lane Grp Cap(c), veh/h	64	183	359	178	298	430	224	1379	780	199	1277	690
V/C Ratio(X)	0.79	0.58	0.42	1.63	0.48	0.42	0.89	0.92	0.36	0.86	0.75	0.75
Avail Cap(c_a), veh/h	140	426	572	178	460	569	224	1379	780	223	1277	690
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Uniform Delay (d), s/veh	57.2	51.6	39.8	54.0	45.7	35.8	51.7	34.9	19.0	56.8	47.2	47.2
Incr Delay (d2), s/veh	7.9	1.1	0.3	309.2	0.4	0.2	31.8	11.3	1.3	20.4	3.5	6.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	5.5	6.9	32.7	6.9	7.7	12.4	26.1	8.5	10.5	21.4	23.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.1	52.7	40.1	363.2	46.1	36.0	83.5	46.2	20.3	77.2	50.7	53.6
LnGrp LOS	E	D	D	F	D	D	F	D	C	E	D	D
Approach Vol, veh/h	309			615			1746			1648		
Approach Delay, s/veh	48.6			193.2			46.3			54.4		
Approach LOS	D			F			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	17.0	18.4	51.6	9.6	24.4	20.0	50.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	28.0	15.0	45.0	10.0	30.0	15.0	45.0				
Max Q Clear Time (g_c+I1), s	14.0	11.8	13.5	42.7	5.6	13.4	15.2	34.7				
Green Ext Time (p_c), s	0.0	0.2	0.0	1.1	0.0	0.3	0.0	2.9				
Intersection Summary												
HCM 6th Ctrl Delay	70.5											
HCM 6th LOS	E											

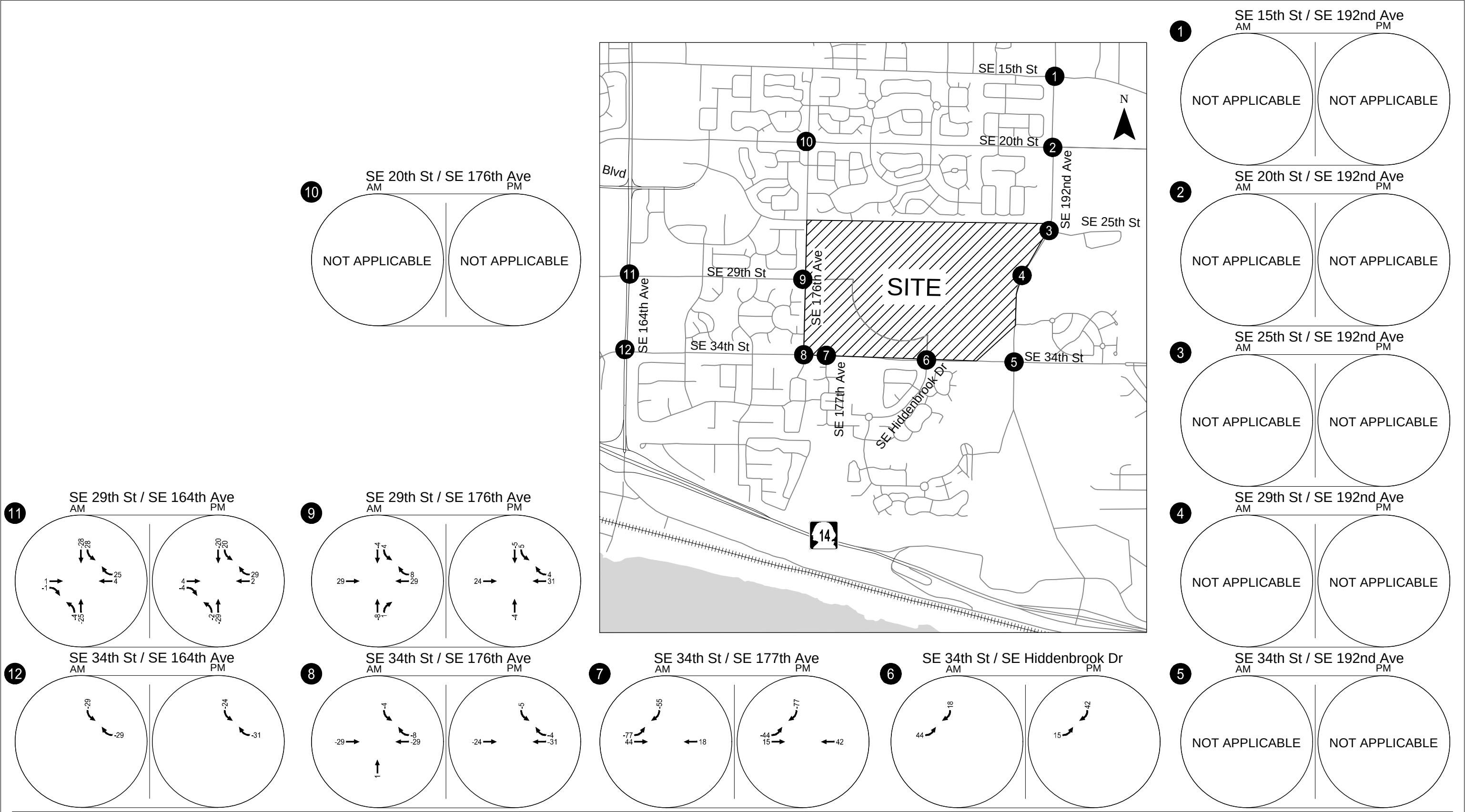
H:\2715 - VIC Implementation\005 - Master Plan Update TIA\report\figs\2715-Figures_Fig G-1-Redistributed 29th (west) Apr 05, 2023 - 3:31pm - ckleyhans Layout Tab: Fig G-1_Redistributed 29th (west)



Redistributed Baseline Traffic Volumes - SE 29th St Western Connection
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
G-1

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Redistributed Phase 1 Trips - SE 29th St Western Connection
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
G-2

Appendix H 2038 With-Project Phase 3
Buildout Operations
Worksheets & Re-routed trips

Timings

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Phase 3 2038 AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	156	45	29	64	158	61	986	89	888
Future Volume (vph)	156	45	29	64	158	61	986	89	888
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	20.0	29.0	20.0	29.0	14.0	15.0	37.0	14.0	36.0
Total Split (%)	20.0%	29.0%	20.0%	29.0%	14.0%	15.0%	37.0%	14.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	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	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effct Green (s)	12.4	18.7	5.9	10.2	22.0	7.4	50.6	8.8	54.0
Actuated g/C Ratio	0.12	0.19	0.06	0.10	0.22	0.07	0.51	0.09	0.54
v/c Ratio	0.80	0.30	0.32	0.38	0.43	0.53	0.64	0.69	0.61
Control Delay	67.8	19.2	53.4	45.3	17.8	58.9	23.7	69.1	22.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	19.2	53.4	45.3	17.8	58.9	23.7	69.1	22.2
LOS	E	B	D	D	B	E	C	E	C
Approach Delay		49.3		28.9			25.7		26.1
Approach LOS		D		C			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 9 (9%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 28.4

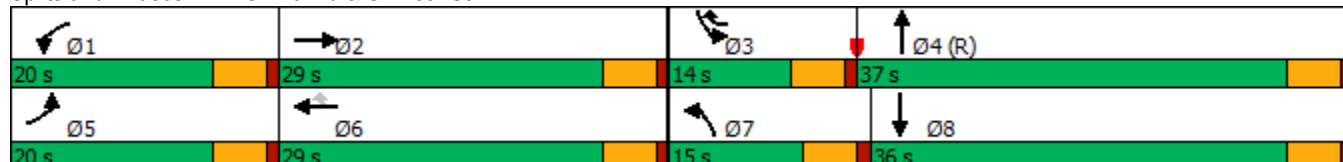
Intersection LOS: C

Intersection Capacity Utilization 60.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Phase 3 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	45	50	29	64	158	61	986	16	89	888	87
Future Volume (veh/h)	156	45	50	29	64	158	61	986	16	89	888	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1900	1796	1781	1841	1870	1856	1841	1900	1737	1767	1856
Adj Flow Rate, veh/h	173	50	8	32	71	99	68	1096	17	99	987	91
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
Percent Heavy Veh, %	3	0	7	8	4	2	3	4	0	11	9	3
Cap, veh/h	204	262	42	50	144	241	101	1877	29	122	1708	157
Arrive On Green	0.12	0.16	0.16	0.03	0.08	0.08	0.11	1.00	1.00	0.07	0.55	0.55
Sat Flow, veh/h	1767	1598	256	1697	1841	1585	1767	3523	55	1654	3107	286
Grp Volume(v), veh/h	173	0	58	32	71	99	68	544	569	99	533	545
Grp Sat Flow(s),veh/h/ln	1767	0	1854	1697	1841	1585	1767	1749	1829	1654	1678	1715
Q Serve(g_s), s	9.6	0.0	2.7	1.9	3.7	5.6	3.7	0.0	0.0	5.9	21.0	21.0
Cycle Q Clear(g_c), s	9.6	0.0	2.7	1.9	3.7	5.6	3.7	0.0	0.0	5.9	21.0	21.0
Prop In Lane	1.00		0.14	1.00		1.00	1.00		0.03	1.00		0.17
Lane Grp Cap(c), veh/h	204	0	304	50	144	241	101	932	975	122	923	943
V/C Ratio(X)	0.85	0.00	0.19	0.64	0.49	0.41	0.68	0.58	0.58	0.81	0.58	0.58
Avail Cap(c_a), veh/h	265	0	445	254	442	498	177	932	975	149	923	943
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.76	0.76	0.76	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.4	0.0	36.1	48.0	44.2	38.4	43.4	0.0	0.0	45.6	14.9	14.9
Incr Delay (d2), s/veh	14.7	0.0	0.1	5.0	1.0	0.4	2.2	2.0	1.9	19.5	2.6	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.5	0.0	2.2	1.5	3.1	3.9	2.8	0.9	0.9	5.4	12.4	12.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	0.0	36.2	53.0	45.2	38.8	45.6	2.0	1.9	65.1	17.5	17.4
LnGrp LOS	E	A	D	D	D	D	D	A	A	E	B	B
Approach Vol, veh/h		231			202			1181			1177	
Approach Delay, s/veh		52.6			43.3			4.5			21.5	
Approach LOS		D			D			A			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.9	21.4	12.4	58.3	16.5	12.8	10.7	60.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	24.0	9.0	32.0	15.0	24.0	10.0	31.0				
Max Q Clear Time (g_c+I1), s	3.9	4.7	7.9	2.0	11.6	7.6	5.7	23.0				
Green Ext Time (p_c), s	0.0	0.1	0.0	2.2	0.0	0.2	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay			18.4									
HCM 6th LOS			B									

Timings
2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	166	182	166	165	47	780	59	754
Future Volume (vph)	166	182	166	165	47	780	59	754
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	17.0	29.0	17.0	29.0	15.0	39.0	15.0	39.0
Total Split (%)	17.0%	29.0%	17.0%	29.0%	15.0%	39.0%	15.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effct Green (s)	9.4	18.7	9.3	18.7	7.4	46.2	7.7	44.6
Actuated g/C Ratio	0.09	0.19	0.09	0.19	0.07	0.46	0.08	0.45
v/c Ratio	0.55	0.81	0.54	0.67	0.39	0.62	0.45	0.60
Control Delay	49.5	53.3	49.3	44.1	64.6	14.2	52.2	29.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	53.3	49.3	44.1	64.6	14.2	52.2	29.7
LOS	D	D	D	D	E	B	D	C
Approach Delay		51.9		46.3		16.6		31.2
Approach LOS		D		D		B		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 31.4

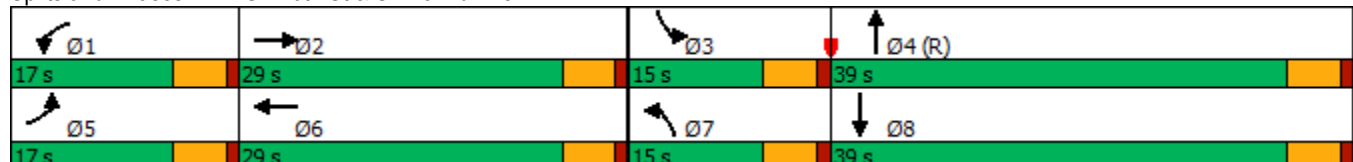
Intersection LOS: C

Intersection Capacity Utilization 67.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: SE 20th St & SE 192nd Ave



HCM 6th Signalized Intersection Summary

2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	166	182	89	166	165	57	47	780	161	59	754	103
Future Volume (veh/h)	166	182	89	166	165	57	47	780	161	59	754	103
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1900	1841	1885	1885	1885	1811	1856	1841	1885	1811	1826
Adj Flow Rate, veh/h	175	192	74	175	174	46	49	821	154	62	794	99
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	0	4	1	1	1	6	3	4	1	6	5
Cap, veh/h	242	220	85	244	241	64	86	1531	287	80	1574	196
Arrive On Green	0.07	0.17	0.17	0.07	0.17	0.17	0.05	0.52	0.52	0.06	0.68	0.68
Sat Flow, veh/h	3428	1306	503	3483	1437	380	1725	2962	556	1795	3078	384
Grp Volume(v), veh/h	175	0	266	175	0	220	49	489	486	62	444	449
Grp Sat Flow(s),veh/h/ln	1714	0	1809	1742	0	1817	1725	1763	1755	1795	1721	1742
Q Serve(g_s), s	5.0	0.0	14.3	4.9	0.0	11.5	2.8	18.5	18.5	3.4	12.6	12.6
Cycle Q Clear(g_c), s	5.0	0.0	14.3	4.9	0.0	11.5	2.8	18.5	18.5	3.4	12.6	12.6
Prop In Lane	1.00		0.28	1.00		0.21	1.00		0.32	1.00		0.22
Lane Grp Cap(c), veh/h	242	0	305	244	0	305	86	911	907	80	880	891
V/C Ratio(X)	0.72	0.00	0.87	0.72	0.00	0.72	0.57	0.54	0.54	0.78	0.50	0.50
Avail Cap(c_a), veh/h	411	0	434	418	0	436	172	911	907	180	880	891
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.77	0.77	0.77
Uniform Delay (d), s/veh	45.5	0.0	40.5	45.5	0.0	39.4	46.4	16.2	16.2	46.5	9.8	9.8
Incr Delay (d2), s/veh	1.5	0.0	9.8	1.5	0.0	1.3	2.2	2.3	2.3	4.6	1.6	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.8	0.0	11.3	3.8	0.0	8.8	2.2	11.8	11.8	2.8	6.8	6.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.0	0.0	50.3	47.0	0.0	40.7	48.6	18.4	18.4	51.1	11.4	11.4
LnGrp LOS	D	A	D	D	A	D	D	B	B	D	B	B
Approach Vol, veh/h		441			395			1024			955	
Approach Delay, s/veh		49.0			43.5			19.9			14.0	
Approach LOS		D			D			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.0	21.9	9.5	56.7	12.1	21.8	10.0	56.1				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	24.0	10.0	34.0	12.0	24.0	10.0	34.0				
Max Q Clear Time (g_c+I1), s	6.9	16.3	5.4	20.5	7.0	13.5	4.8	14.6				
Green Ext Time (p_c), s	0.1	0.5	0.0	3.3	0.1	0.5	0.0	3.3				

Intersection Summary

HCM 6th Ctrl Delay 25.8
HCM 6th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection							
Int Delay, s/veh	0.3						
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Vol, veh/h	7	10	910	3	7	983	
Future Vol, veh/h	7	10	910	3	7	983	
Conflicting Peds, #/hr	0	0	0	1	1	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	125	0	-	-	230	-	
Veh in Median Storage, #	0	-	0	-	-	0	
Grade, %	0	-	0	-	-	0	
Peak Hour Factor	95	95	95	95	95	95	
Heavy Vehicles, %	0	20	4	67	0	7	
Mvmt Flow	7	11	958	3	7	1035	
Major/Minor	Minor1	Major1		Major2			
Conflicting Flow All	1493	482	0	0	962	0	
Stage 1	961	-	-	-	-	-	
Stage 2	532	-	-	-	-	-	
Critical Hdwy	6.8	7.3	-	-	4.1	-	
Critical Hdwy Stg 1	5.8	-	-	-	-	-	
Critical Hdwy Stg 2	5.8	-	-	-	-	-	
Follow-up Hdwy	3.5	3.5	-	-	2.2	-	
Pot Cap-1 Maneuver	116	485	-	-	724	-	
Stage 1	337	-	-	-	-	-	
Stage 2	559	-	-	-	-	-	
Platoon blocked, %			-	-		-	
Mov Cap-1 Maneuver	115	485	-	-	723	-	
Mov Cap-2 Maneuver	115	-	-	-	-	-	
Stage 1	337	-	-	-	-	-	
Stage 2	553	-	-	-	-	-	
Approach	WB	NB		SB			
HCM Control Delay, s	23.2	0		0.1			
HCM LOS	C						
Minor Lane/Major Mvmt		NBT	NBRWBLn1	WBLn2	SBL	SBT	
Capacity (veh/h)		-	-	115	485	723	-
HCM Lane V/C Ratio		-	-	0.064	0.022	0.01	-
HCM Control Delay (s)		-	-	38.4	12.6	10	-
HCM Lane LOS		-	-	E	B	B	-
HCM 95th %tile Q(veh)		-	-	0.2	0.1	0	-

Timings

4: SE 192nd Ave & SE 29th St

Vancouver Innovation Center

Phase 3 2038 AM Peak Hour Conditions

					
Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	147	70	91	766	781
Future Volume (vph)	147	70	91	766	781
Turn Type	Prot	pt+ov	Prot	NA	NA
Protected Phases	2	2 7	7	4	8
Permitted Phases					
Detector Phase	2	2 7	7	4	8
Switch Phase					
Minimum Initial (s)	5.0		5.0	5.0	5.0
Minimum Split (s)	27.0		10.0	26.0	26.0
Total Split (s)	35.0		15.0	65.0	50.0
Total Split (%)	35.0%		15.0%	65.0%	50.0%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	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
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None		None	C-Max	Max
Act Effct Green (s)	14.8	30.7	10.8	75.2	59.3
Actuated g/C Ratio	0.15	0.31	0.11	0.75	0.59
v/c Ratio	0.62	0.14	0.52	0.31	0.53
Control Delay	49.6	5.3	28.6	11.4	23.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	49.6	5.3	28.6	11.4	23.0
LOS	D	A	C	B	C
Approach Delay	35.3			13.2	23.0
Approach LOS	D			B	C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 85 (85%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 20.3

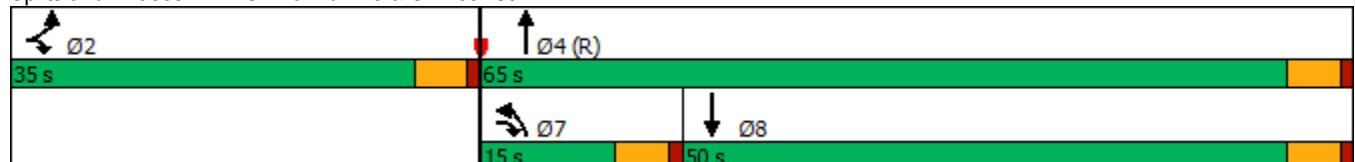
Intersection LOS: C

Intersection Capacity Utilization 53.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: SE 192nd Ave & SE 29th St



HCM 6th Signalized Intersection Summary

4: SE 192nd Ave & SE 29th St

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (veh/h)	147	70	91	766	781	209
Future Volume (veh/h)	147	70	91	766	781	209
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1811	1826	1826	1826	1811	1767
Adj Flow Rate, veh/h	155	20	96	806	822	201
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	6	5	5	5	6	9
Cap, veh/h	192	279	120	2736	1836	449
Arrive On Green	0.11	0.11	0.14	1.00	0.67	0.67
Sat Flow, veh/h	1725	1547	1739	3561	2831	670
Grp Volume(v), veh/h	155	20	96	806	516	507
Grp Sat Flow(s),veh/h/ln	1725	1547	1739	1735	1721	1690
Q Serve(g_s), s	8.8	1.1	5.4	0.0	14.1	14.1
Cycle Q Clear(g_c), s	8.8	1.1	5.4	0.0	14.1	14.1
Prop In Lane	1.00	1.00	1.00			0.40
Lane Grp Cap(c), veh/h	192	279	120	2736	1153	1132
V/C Ratio(X)	0.81	0.07	0.80	0.29	0.45	0.45
Avail Cap(c_a), veh/h	517	571	174	2736	1153	1132
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.81	0.81	1.00	1.00
Uniform Delay (d), s/veh	43.4	34.0	42.5	0.0	7.8	7.8
Incr Delay (d2), s/veh	7.8	0.1	12.9	0.2	1.3	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.4	1.8	4.6	0.2	8.3	8.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	51.2	34.2	55.3	0.2	9.0	9.1
LnGrp LOS	D	C	E	A	A	A
Approach Vol, veh/h	175			902	1023	
Approach Delay, s/veh	49.2			6.1	9.1	
Approach LOS	D			A	A	
Timer - Assigned Phs	2		4		7	8
Phs Duration (G+Y+Rc), s	16.1		83.9		11.9	72.0
Change Period (Y+Rc), s	5.0		5.0		5.0	5.0
Max Green Setting (Gmax), s	30.0		60.0		10.0	45.0
Max Q Clear Time (g_c+I1), s	10.8		2.0		7.4	16.1
Green Ext Time (p_c), s	0.4		6.3		0.0	7.3
Intersection Summary						
HCM 6th Ctrl Delay			11.1			
HCM 6th LOS			B			

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	74	164	207	146	87	111	775	349	121	604
Future Volume (vph)	74	164	207	146	87	111	775	349	121	604
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	15.0	36.0	15.0	36.0	36.0	15.0	34.0	15.0	15.0	34.0
Total Split (%)	15.0%	36.0%	15.0%	36.0%	36.0%	15.0%	34.0%	15.0%	15.0%	34.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effect Green (s)	26.5	19.8	32.8	24.8	24.8	9.4	40.5	50.2	10.0	41.0
Actuated g/C Ratio	0.26	0.20	0.33	0.25	0.25	0.09	0.40	0.50	0.10	0.41
v/c Ratio	0.23	0.79	0.84	0.34	0.18	0.72	0.63	0.39	0.39	0.59
Control Delay	22.1	48.8	50.4	32.4	0.7	66.6	28.3	2.3	44.6	25.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.1	48.8	50.4	32.4	0.7	66.6	28.3	2.3	44.6	25.5
LOS	C	D	D	C	A	E	C	A	D	C
Approach Delay		42.9		34.6			24.4			28.3
Approach LOS		D		C			C			C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 29.3

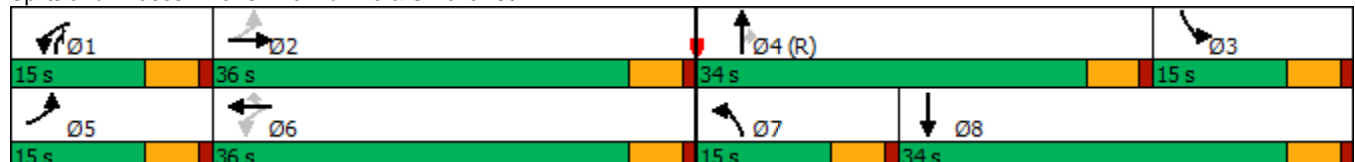
Intersection LOS: C

Intersection Capacity Utilization 70.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

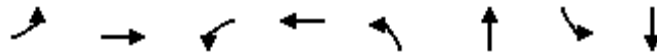
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	164	96	207	146	87	111	775	349	121	604	89
Future Volume (veh/h)	74	164	96	207	146	87	111	775	349	121	604	89
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1817	1803	1847	1943	2018	1988	2018	1883	1988	1832	1684	1817
Adj Flow Rate, veh/h	82	182	79	230	162	16	123	861	169	134	671	88
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
Percent Heavy Veh, %	2	3	0	5	0	2	0	9	2	1	11	2
Cap, veh/h	357	221	96	302	472	387	154	1037	655	758	1233	162
Arrive On Green	0.05	0.19	0.19	0.10	0.23	0.23	0.08	0.29	0.29	0.22	0.43	0.43
Sat Flow, veh/h	1731	1189	516	1850	2018	1654	1922	3578	1679	3385	2844	373
Grp Volume(v), veh/h	82	0	261	230	162	16	123	861	169	134	377	382
Grp Sat Flow(s),veh/h/ln	1731	0	1706	1850	2018	1654	1922	1789	1679	1693	1600	1616
Q Serve(g_s), s	3.8	0.0	14.7	9.9	6.7	0.4	6.3	22.5	2.6	3.2	17.5	17.5
Cycle Q Clear(g_c), s	3.8	0.0	14.7	9.9	6.7	0.4	6.3	22.5	2.6	3.2	17.5	17.5
Prop In Lane	1.00		0.30	1.00		1.00	1.00		1.00	1.00		0.23
Lane Grp Cap(c), veh/h	357	0	317	302	472	387	154	1037	655	758	694	701
V/C Ratio(X)	0.23	0.00	0.82	0.76	0.34	0.04	0.80	0.83	0.26	0.18	0.54	0.54
Avail Cap(c_a), veh/h	440	0	529	302	626	513	192	1037	655	758	694	701
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.00	0.96	1.00	1.00	1.00	1.00	1.00	1.00	0.85	0.85	0.85
Uniform Delay (d), s/veh	30.5	0.0	39.1	29.4	31.9	9.9	45.2	33.2	7.3	31.4	21.0	21.0
Incr Delay (d2), s/veh	0.1	0.0	2.0	9.7	0.2	0.0	13.5	7.7	1.0	0.0	2.6	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.8	0.0	10.1	8.7	5.7	0.5	6.3	15.7	2.2	2.3	10.5	10.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.6	0.0	41.1	39.1	32.1	9.9	58.7	40.9	8.2	31.4	23.6	23.6
LnGrp LOS	C	A	D	D	C	A	E	D	A	C	C	C
Approach Vol, veh/h		343			408			1153			893	
Approach Delay, s/veh		38.6			35.2			38.0			24.7	
Approach LOS		D			D			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	23.6	27.4	34.0	10.2	28.4	13.0	48.4				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	31.0	10.0	29.0	10.0	31.0	10.0	29.0				
Max Q Clear Time (g_c+I1), s	11.9	16.7	5.2	24.5	5.8	8.7	8.3	19.5				
Green Ext Time (p_c), s	0.0	0.4	0.0	1.2	0.0	0.2	0.0	1.2				
Intersection Summary												
HCM 6th Ctrl Delay			33.4									
HCM 6th LOS			C									

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Phase 3 2038 AM Peak Hour Conditions



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	153	289	27	212	63	29	61	4
Future Volume (vph)	153	289	27	212	63	29	61	4
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases					8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	27.0	10.0	27.0	32.0	32.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%
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	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effect Green (s)	5.4	28.1	5.4	17.1	8.9	8.9	8.9	8.9
Actuated g/C Ratio	0.12	0.63	0.12	0.38	0.20	0.20	0.20	0.20
v/c Ratio	0.78	0.30	0.14	0.52	0.27	0.21	0.26	0.14
Control Delay	52.7	10.2	25.1	15.6	17.6	9.3	17.4	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	10.2	25.1	15.6	17.6	9.3	17.4	6.6
LOS	D	B	C	B	B	A	B	A
Approach Delay		24.2		16.3		13.2		12.8
Approach LOS		C		B		B		B

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 44.6

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 19.1

Intersection LOS: B

Intersection Capacity Utilization 48.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

10 s	85 s	35 s
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	153	289	24	27	212	102	63	29	41	61	4	42
Future Volume (veh/h)	153	289	24	27	212	102	63	29	41	61	4	42
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1841	1900	1876	1802	1876	1832	1876	1876	1900	1900	1900
Adj Flow Rate, veh/h	170	321	24	30	236	92	70	32	3	68	4	3
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
Percent Heavy Veh, %	0	4	0	0	5	0	3	0	0	0	0	0
Cap, veh/h	217	799	60	64	479	187	330	185	17	312	110	83
Arrive On Green	0.12	0.47	0.47	0.04	0.39	0.39	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1810	1691	126	1787	1233	481	1380	1690	158	1395	1008	756
Grp Volume(v), veh/h	170	0	345	30	0	328	70	0	35	68	0	7
Grp Sat Flow(s),veh/h/ln	1810	0	1817	1787	0	1714	1380	0	1848	1395	0	1764
Q Serve(g_s), s	3.6	0.0	4.8	0.6	0.0	5.7	1.9	0.0	0.7	1.8	0.0	0.1
Cycle Q Clear(g_c), s	3.6	0.0	4.8	0.6	0.0	5.7	2.0	0.0	0.7	2.5	0.0	0.1
Prop In Lane	1.00		0.07	1.00		0.28	1.00		0.09	1.00		0.43
Lane Grp Cap(c), veh/h	217	0	859	64	0	665	330	0	202	312	0	193
V/C Ratio(X)	0.78	0.00	0.40	0.47	0.00	0.49	0.21	0.00	0.17	0.22	0.00	0.04
Avail Cap(c_a), veh/h	231	0	3706	228	0	3494	1234	0	1413	1226	0	1349
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.8	0.0	6.7	18.6	0.0	9.1	16.5	0.0	15.9	17.0	0.0	15.6
Incr Delay (d2), s/veh	13.6	0.0	0.1	2.0	0.0	0.2	0.1	0.0	0.1	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.6	0.0	1.9	0.5	0.0	2.5	1.0	0.0	0.5	1.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.4	0.0	6.8	20.6	0.0	9.3	16.6	0.0	16.0	17.1	0.0	15.6
LnGrp LOS	C	A	A	C	A	A	B	A	B	B	A	B
Approach Vol, veh/h	515			358			105			75		
Approach Delay, s/veh	14.6			10.2			16.4			17.0		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	23.5		9.3	9.7	20.2		9.3				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	2.6	6.8		4.5	5.6	7.7		4.0				
Green Ext Time (p_c), s	0.0	0.6		0.0	0.0	0.6		0.1				
Intersection Summary												
HCM 6th Ctrl Delay	13.5											
HCM 6th LOS	B											

Intersection						
Int Delay, s/veh	1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	450	11	7	310	29	17
Future Vol, veh/h	450	11	7	310	29	17
Conflicting Peds, #/hr	0	3	3	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	95	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	3	0	0	5	0	0
Mvmt Flow	529	13	8	365	34	20
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	545	0	920	539
Stage 1	-	-	-	-	539	-
Stage 2	-	-	-	-	381	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1034	-	303	546
Stage 1	-	-	-	-	589	-
Stage 2	-	-	-	-	695	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1031	-	300	544
Mov Cap-2 Maneuver	-	-	-	-	300	-
Stage 1	-	-	-	-	587	-
Stage 2	-	-	-	-	689	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.2		16.8	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	360	-	-	1031	-	
HCM Lane V/C Ratio	0.15	-	-	0.008	-	
HCM Control Delay (s)	16.8	-	-	8.5	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.5	-	-	0	-	

Timings 8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	280	388	4	276	14	9	65	4
Future Volume (vph)	280	388	4	276	14	9	65	4
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	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	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	31.4	31.8	24.6	18.7	9.3	9.3	9.3	9.3
Actuated g/C Ratio	0.64	0.65	0.50	0.38	0.19	0.19	0.19	0.19
v/c Ratio	0.54	0.38	0.01	0.58	0.07	0.07	0.29	0.32
Control Delay	13.6	10.2	7.5	18.3	18.7	14.5	21.7	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	10.2	7.5	18.3	18.7	14.5	21.7	7.2
LOS	B	B	A	B	B	B	C	A
Approach Delay		11.7		18.2		16.4		12.4
Approach LOS		B		B		B		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 48.9

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.58

Intersection Signal Delay: 13.7

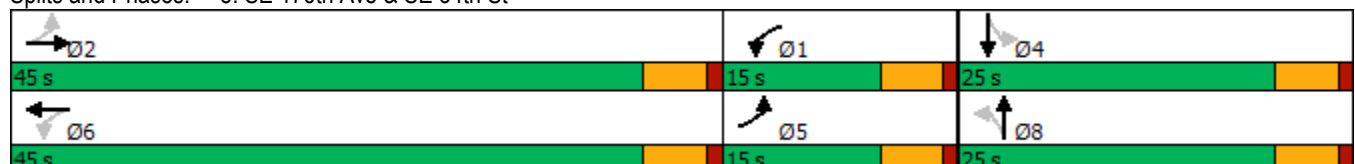
Intersection LOS: B

Intersection Capacity Utilization 56.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	388	2	4	276	59	14	9	8	65	4	109
Future Volume (veh/h)	280	388	2	4	276	59	14	9	8	65	4	109
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.98		1.00	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1767	1856	1900	1900	1811	1826	1900	1900	1530	1870	1900	1885
Adj Flow Rate, veh/h	329	456	2	5	325	56	16	11	0	76	5	0
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
Percent Heavy Veh, %	9	3	0	0	6	5	0	0	25	2	0	1
Cap, veh/h	595	709	3	584	580	100	331	203	0	324	203	0
Arrive On Green	0.12	0.38	0.38	0.13	0.39	0.39	0.11	0.11	0.00	0.11	0.11	0.00
Sat Flow, veh/h	1682	1846	8	1810	1503	259	1407	1900	0	1378	1900	0
Grp Volume(v), veh/h	329	0	458	5	0	381	16	11	0	76	5	0
Grp Sat Flow(s),veh/h/ln	1682	0	1854	1810	0	1762	1407	1900	0	1378	1900	0
Q Serve(g_s), s	0.0	0.0	7.9	0.0	0.0	6.6	0.4	0.2	0.0	2.1	0.1	0.0
Cycle Q Clear(g_c), s	0.0	0.0	7.9	0.0	0.0	6.6	0.5	0.2	0.0	2.3	0.1	0.0
Prop In Lane	1.00		0.00	1.00		0.15	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	595	0	712	584	0	680	331	203	0	324	203	0
V/C Ratio(X)	0.55	0.00	0.64	0.01	0.00	0.56	0.05	0.05	0.00	0.23	0.02	0.00
Avail Cap(c_a), veh/h	816	0	1895	818	0	1801	900	971	0	881	971	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.4	0.0	9.9	9.4	0.0	9.4	15.9	15.7	0.0	16.7	15.7	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.4	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.6	0.0	3.8	0.0	0.0	3.0	0.2	0.1	0.0	1.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.7	0.0	10.2	9.4	0.0	9.7	15.9	15.8	0.0	16.9	15.7	0.0
LnGrp LOS	B	A	B	A	A	A	B	B	A	B	B	A
Approach Vol, veh/h	787			386			27			81		
Approach Delay, s/veh	11.3			9.7			15.8			16.8		
Approach LOS	B			A			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.9	20.0		9.2	9.9	20.1		9.2				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	9.9		4.3	2.0	8.6		2.5				
Green Ext Time (p_c), s	0.0	1.7		0.1	0.3	1.4		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	11.2											
HCM 6th LOS	B											

MOVEMENT SUMMARY

 **Site: 101 [SE 176 Avenue/ SE 29th Street Phase 3 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Phase 3

Site Category: (None)

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]		[Total HV]					[Veh. veh	Dist]				
			veh/h	%	veh/h	%	v/c	sec			ft				mph
South: SE 176th Avenue															
3	L2	All MCs	5	0.0	5	0.0	0.392	7.2	LOS A	2.3	57.6	0.49	0.29	0.49	32.2
8	T1	All MCs	144	2.0	144	2.0	0.392	7.4	LOS A	2.3	57.6	0.49	0.29	0.49	32.8
18	R2	All MCs	279	0.0	279	0.0	0.392	7.2	LOS A	2.3	57.6	0.49	0.29	0.49	32.6
Approach			427	0.7	427	0.7	0.392	7.3	LOS A	2.3	57.6	0.49	0.29	0.49	32.6
East: SE 29th Street															
1	L2	All MCs	85	0.0	85	0.0	0.338	6.2	LOS A	1.9	48.5	0.40	0.21	0.40	32.2
6	T1	All MCs	259	0.0	259	0.0	0.338	6.2	LOS A	1.9	48.5	0.40	0.21	0.40	32.9
16	R2	All MCs	53	0.0	53	0.0	0.338	6.2	LOS A	1.9	48.5	0.40	0.21	0.40	32.6
Approach			396	0.0	396	0.0	0.338	6.2	LOS A	1.9	48.5	0.40	0.21	0.40	32.7
North: SE 176th Avenue															
7	L2	All MCs	26	88.0	26	88.0	0.322	18.6	LOS C	1.3	38.3	0.55	0.39	0.55	29.3
4	T1	All MCs	104	1.0	104	1.0	0.322	6.5	LOS A	1.3	38.3	0.55	0.39	0.55	32.3
14	R2	All MCs	122	18.0	122	18.0	0.322	8.3	LOS A	1.3	38.3	0.55	0.39	0.55	31.7
Approach			252	18.2	252	18.2	0.322	8.3	LOS A	1.3	38.3	0.55	0.39	0.55	31.7
West: SE 29th Street															
5	L2	All MCs	6	0.0	6	0.0	0.176	4.9	LOS A	0.8	20.5	0.41	0.25	0.41	33.3
2	T1	All MCs	167	0.0	167	0.0	0.176	4.9	LOS A	0.8	20.5	0.41	0.25	0.41	34.0
12	R2	All MCs	15	10.0	15	10.0	0.176	5.8	LOS A	0.8	20.5	0.41	0.25	0.41	33.5
Approach			188	0.8	188	0.8	0.176	4.9	LOS A	0.8	20.5	0.41	0.25	0.41	34.0
All Vehicles			1264	4.0	1264	4.0	0.392	6.9	LOS A	2.3	57.6	0.46	0.28	0.46	32.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Sieglach M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: H:\27\27715 - VIC Implementation\005 - Master Plan Update TIA\Analysis\176th_29th With Project 2038 AM.sip9

Intersection	
Intersection Delay, s/veh	15.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	272	34	76	314	14	50	88	56	0	69	10
Future Vol, veh/h	12	272	34	76	314	14	50	88	56	0	69	10
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
Heavy Vehicles, %	0	4	10	4	1	9	4	3	0	0	0	0
Mvmt Flow	13	299	37	84	345	15	55	97	62	0	76	11
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	16.7	16.4	11.9	11.8
HCM LOS	C	C	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	61%	0%	89%	0%	96%	87%
Vol Right, %	0%	39%	0%	11%	0%	4%	13%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	50	144	12	306	76	328	79
LT Vol	50	0	12	0	76	0	0
Through Vol	0	88	0	272	0	314	69
RT Vol	0	56	0	34	0	14	10
Lane Flow Rate	55	158	13	336	84	360	87
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.114	0.293	0.024	0.575	0.154	0.604	0.173
Departure Headway (Hd)	7.47	6.666	6.679	6.161	6.62	6.03	7.157
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	477	536	534	582	540	595	497
Service Time	5.249	4.445	4.45	3.931	4.386	3.795	5.253
HCM Lane V/C Ratio	0.115	0.295	0.024	0.577	0.156	0.605	0.175
HCM Control Delay	11.2	12.2	9.6	17	10.6	17.7	11.8
HCM Lane LOS	B	B	A	C	B	C	B
HCM 95th-tile Q	0.4	1.2	0.1	3.6	0.5	4	0.6

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	42	15	46	214	38	162	23	1081	145	792
Future Volume (vph)	42	15	46	214	38	162	23	1081	145	792
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Prot	NA
Protected Phases	5	2		1	6		7	4	3	8
Permitted Phases	2		2	6		6				
Detector Phase	5	2	2	1	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	9.5	39.0	39.0	9.5	38.0	38.0	10.0	32.0	10.0	32.0
Total Split (s)	10.0	25.0	25.0	14.0	29.0	29.0	17.0	44.0	37.0	64.0
Total Split (%)	8.3%	20.8%	20.8%	11.7%	24.2%	24.2%	14.2%	36.7%	30.8%	53.3%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.5	5.0	5.0	4.5	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max
Act Effct Green (s)	15.9	12.0	12.0	23.3	15.2	15.2	5.7	68.0	13.8	80.1
Actuated g/C Ratio	0.13	0.10	0.10	0.19	0.13	0.13	0.05	0.57	0.12	0.67
v/c Ratio	0.22	0.08	0.16	0.90	0.17	0.48	0.28	0.40	0.75	0.26
Control Delay	39.2	47.9	1.2	79.3	46.3	11.2	64.3	7.8	72.3	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.2	47.9	1.2	79.3	46.3	11.2	64.3	7.8	72.3	9.8
LOS	D	D	A	E	D	B	E	A	E	A
Approach Delay		23.6			49.6			8.9		19.2
Approach LOS		C			D			A		B

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 4 (3%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 19.8

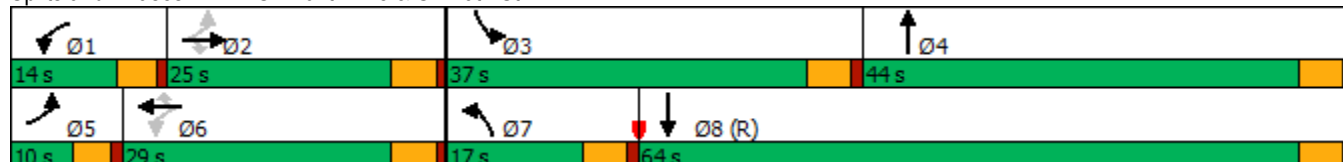
Intersection LOS: B

Intersection Capacity Utilization 61.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	15	46	214	38	162	23	1081	20	145	792	26
Future Volume (veh/h)	42	15	46	214	38	162	23	1081	20	145	792	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1900	1856	1870	1870	1900	1900	1870	1796	1885	1856	1826
Adj Flow Rate, veh/h	44	16	2	225	40	14	24	1138	20	153	834	25
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	0	3	2	2	0	0	2	7	1	3	5
Cap, veh/h	226	155	128	304	241	207	42	2141	38	180	2485	74
Arrive On Green	0.03	0.08	0.08	0.08	0.13	0.13	0.02	0.41	0.41	0.10	0.49	0.49
Sat Flow, veh/h	1767	1900	1572	1781	1870	1610	1810	5167	91	1795	5054	151
Grp Volume(v), veh/h	44	16	2	225	40	14	24	750	408	153	557	302
Grp Sat Flow(s),veh/h/ln	1767	1900	1572	1781	1870	1610	1810	1702	1854	1795	1689	1828
Q Serve(g_s), s	2.7	0.9	0.1	9.5	2.3	0.9	1.6	19.8	19.9	10.1	12.0	12.1
Cycle Q Clear(g_c), s	2.7	0.9	0.1	9.5	2.3	0.9	1.6	19.8	19.9	10.1	12.0	12.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.05	1.00		0.08
Lane Grp Cap(c), veh/h	226	155	128	304	241	207	42	1410	768	180	1660	899
V/C Ratio(X)	0.19	0.10	0.02	0.74	0.17	0.07	0.58	0.53	0.53	0.85	0.34	0.34
Avail Cap(c_a), veh/h	250	317	262	304	374	322	181	1410	768	479	1660	899
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.78	0.78	0.78	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.3	51.0	50.7	47.7	46.5	45.9	58.0	26.4	26.4	53.1	18.6	18.6
Incr Delay (d2), s/veh	0.4	0.1	0.0	9.3	0.1	0.1	3.6	1.1	2.1	4.3	0.5	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.2	0.8	0.1	4.9	2.0	0.7	1.4	12.1	13.2	8.2	8.2	8.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.8	51.1	50.7	57.0	46.7	46.0	61.7	27.5	28.5	57.3	19.1	19.6
LnGrp LOS	D	D	D	E	D	D	E	C	C	E	B	B
Approach Vol, veh/h	62			279			1182			1012		
Approach Delay, s/veh	49.4			54.9			28.5			25.0		
Approach LOS	D			D			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.0	14.8	17.0	54.7	8.3	20.4	7.8	64.0				
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0				
Max Green Setting (Gmax), s	9.5	20.0	32.0	39.0	5.5	24.0	12.0	59.0				
Max Q Clear Time (g_c+I1), s	11.5	2.9	12.1	21.9	4.7	4.3	3.6	14.1				
Green Ext Time (p_c), s	0.0	0.0	0.1	4.6	0.0	0.1	0.0	3.7				
Intersection Summary												
HCM 6th Ctrl Delay	30.6											
HCM 6th LOS	C											

Timings
12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	28	60	165	293	121	99	111	936	449	155	813
Future Volume (vph)	28	60	165	293	121	99	111	936	449	155	813
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	20.0	33.0	20.0	25.0	38.0	17.0	20.0	45.0	25.0	17.0	42.0
Total Split (%)	16.7%	27.5%	16.7%	20.8%	31.7%	14.2%	16.7%	37.5%	20.8%	14.2%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	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	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	6.4	8.2	23.0	20.0	23.8	46.4	11.8	56.2	81.2	17.6	62.0
Actuated g/C Ratio	0.05	0.07	0.19	0.17	0.20	0.39	0.10	0.47	0.68	0.15	0.52
v/c Ratio	0.39	0.56	0.53	1.11	0.36	0.16	0.72	0.64	0.42	0.66	0.53
Control Delay	68.3	70.9	31.3	129.9	45.0	4.8	74.0	28.0	2.1	66.0	16.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.3	70.9	31.3	129.9	45.0	4.8	74.0	28.0	2.1	66.0	16.8
LOS	E	E	C	F	D	A	E	C	A	E	B
Approach Delay		44.8			85.8			23.7			24.4
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 15 (13%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.11

Intersection Signal Delay: 35.3

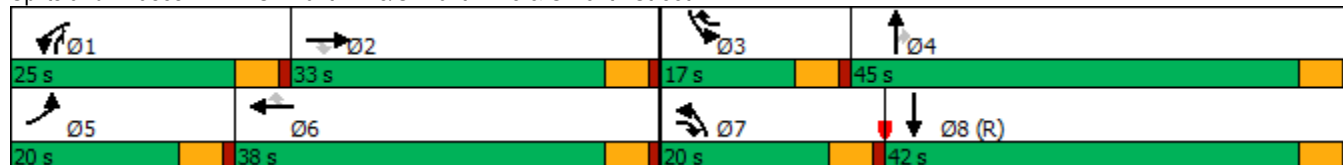
Intersection LOS: D

Intersection Capacity Utilization 70.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave/SE164th Ave & SE 34th Street



HCM 6th Signalized Intersection Summary

12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	60	165	293	121	99	111	936	449	155	813	37
Future Volume (veh/h)	28	60	165	293	121	99	111	936	449	155	813	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1565	1758	1803	1870	1885	1841	1791	1776	1746	1806	1761	1761
Adj Flow Rate, veh/h	31	67	124	326	134	30	123	1040	291	172	903	39
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
Percent Heavy Veh, %	19	6	3	2	1	4	1	2	4	0	3	3
Cap, veh/h	40	159	270	297	434	515	147	1125	740	172	1326	57
Arrive On Green	0.03	0.09	0.09	0.17	0.23	0.23	0.09	0.33	0.33	0.10	0.35	0.35
Sat Flow, veh/h	1491	1758	1528	1781	1885	1560	1706	3375	1480	1720	3821	165
Grp Volume(v), veh/h	31	67	124	326	134	30	123	1040	291	172	532	410
Grp Sat Flow(s),veh/h/ln	1491	1758	1528	1781	1885	1560	1706	1687	1480	1720	1127	1732
Q Serve(g_s), s	2.5	4.3	8.7	20.0	7.1	1.6	8.5	35.6	14.7	12.0	24.2	24.3
Cycle Q Clear(g_c), s	2.5	4.3	8.7	20.0	7.1	1.6	8.5	35.6	14.7	12.0	24.2	24.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	40	159	270	297	434	515	147	1125	740	172	782	601
V/C Ratio(X)	0.77	0.42	0.46	1.10	0.31	0.06	0.84	0.92	0.39	1.00	0.68	0.68
Avail Cap(c_a), veh/h	186	410	488	297	518	585	213	1125	740	172	782	601
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.93	0.93	0.93
Uniform Delay (d), s/veh	58.0	51.6	44.2	50.0	38.3	27.4	54.0	38.5	18.7	54.0	33.5	33.5
Incr Delay (d2), s/veh	11.1	0.7	0.5	81.1	0.1	0.0	11.8	13.9	1.6	66.2	4.4	5.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.9	3.4	5.9	22.8	5.8	1.0	7.3	23.0	8.9	12.8	11.1	16.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.2	52.2	44.7	131.1	38.4	27.4	65.8	52.5	20.2	120.2	37.9	39.3
LnGrp LOS	E	D	D	F	D	C	E	D	C	F	D	D
Approach Vol, veh/h		222			490			1454			1114	
Approach Delay, s/veh		50.4			99.4			47.1			51.1	
Approach LOS		D			F			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.0	15.9	17.0	45.0	8.2	32.7	15.4	46.6				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	20.0	28.0	12.0	40.0	15.0	33.0	15.0	37.0				
Max Q Clear Time (g_c+I1), s	22.0	10.7	14.0	37.6	4.5	9.1	10.5	26.3				
Green Ext Time (p_c), s	0.0	0.1	0.0	0.9	0.0	0.2	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay			56.5									
HCM 6th LOS			E									

Timings

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Phase 3 2038 PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	116	91	40	82	242	84	1345	115	1486
Future Volume (vph)	116	91	40	82	242	84	1345	115	1486
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	15.0	29.0	15.0	29.0	16.0	14.0	40.0	16.0	42.0
Total Split (%)	15.0%	29.0%	15.0%	29.0%	16.0%	14.0%	40.0%	16.0%	42.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	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	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effct Green (s)	9.0	15.9	6.2	11.1	19.8	7.8	52.2	9.7	56.1
Actuated g/C Ratio	0.09	0.16	0.06	0.11	0.20	0.08	0.52	0.10	0.56
v/c Ratio	0.79	0.62	0.38	0.42	0.67	0.63	0.79	0.69	0.87
Control Delay	78.1	37.0	54.0	45.3	30.4	53.9	25.4	63.7	28.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.1	37.0	54.0	45.3	30.4	53.9	25.4	63.7	28.9
LOS	E	D	D	D	C	D	C	E	C
Approach Delay		52.7		36.4			27.0		31.2
Approach LOS		D		D			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 31.8

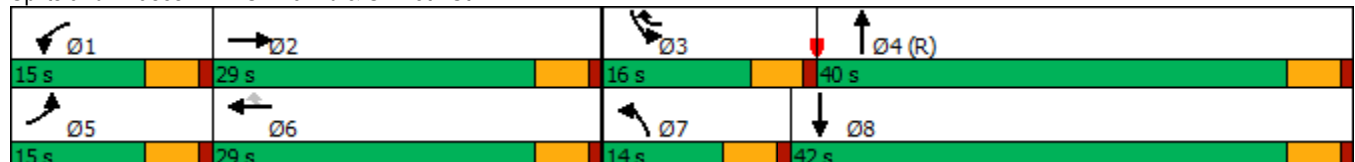
Intersection LOS: C

Intersection Capacity Utilization 81.9%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Phase 3 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	116	91	97	40	82	242	84	1345	32	115	1486	133
Future Volume (veh/h)	116	91	97	40	82	242	84	1345	32	115	1486	133
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1885	1900	1900	1856	1900	1900	1870	1900	1900	1870	1870
Adj Flow Rate, veh/h	122	96	58	42	86	192	88	1416	32	121	1564	135
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	1	0	0	3	0	0	2	0	0	2	2
Cap, veh/h	150	204	123	62	248	344	122	1769	40	149	1699	145
Arrive On Green	0.09	0.19	0.19	0.03	0.13	0.13	0.09	0.66	0.66	0.11	0.68	0.68
Sat Flow, veh/h	1739	1100	664	1810	1856	1582	1810	3552	80	1810	3311	283
Grp Volume(v), veh/h	122	0	154	42	86	192	88	708	740	121	833	866
Grp Sat Flow(s),veh/h/ln	1739	0	1764	1810	1856	1582	1810	1777	1856	1810	1777	1818
Q Serve(g_s), s	6.9	0.0	7.8	2.3	4.2	10.8	4.7	28.6	28.7	6.5	39.6	41.3
Cycle Q Clear(g_c), s	6.9	0.0	7.8	2.3	4.2	10.8	4.7	28.6	28.7	6.5	39.6	41.3
Prop In Lane	1.00		0.38	1.00		1.00	1.00		0.04	1.00		0.16
Lane Grp Cap(c), veh/h	150	0	327	62	248	344	122	885	924	149	912	933
V/C Ratio(X)	0.82	0.00	0.47	0.67	0.35	0.56	0.72	0.80	0.80	0.81	0.91	0.93
Avail Cap(c_a), veh/h	174	0	423	181	445	512	163	885	924	199	912	933
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.19	0.19	0.19	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.9	0.0	36.4	47.7	39.4	35.0	44.6	13.3	13.3	43.8	14.0	14.3
Incr Delay (d2), s/veh	19.5	0.0	0.4	4.6	0.3	0.5	1.1	1.5	1.5	12.5	15.1	16.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.7	0.0	5.9	2.0	3.5	7.3	3.1	9.8	10.2	5.9	19.5	20.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.4	0.0	36.8	52.4	39.7	35.5	45.7	14.8	14.8	56.3	29.1	30.8
LnGrp LOS	E	A	D	D	D	D	D	B	B	E	C	C
Approach Vol, veh/h	276			320			1536			1820		
Approach Delay, s/veh	49.0			38.8			16.6			31.7		
Approach LOS	D			D			B			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.4	23.5	13.2	54.8	13.6	18.4	11.7	56.3				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	24.0	11.0	35.0	10.0	24.0	9.0	37.0				
Max Q Clear Time (g_c+I1), s	4.3	9.8	8.5	30.7	8.9	12.8	6.7	43.3				
Green Ext Time (p_c), s	0.0	0.2	0.0	1.6	0.0	0.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	27.6											
HCM 6th LOS	C											

Timings
2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	233	183	272	265	148	933	151	1103
Future Volume (vph)	233	183	272	265	148	933	151	1103
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	20.0	27.0	20.0	27.0	14.0	35.0	18.0	39.0
Total Split (%)	20.0%	27.0%	20.0%	27.0%	14.0%	35.0%	18.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effct Green (s)	11.3	23.5	12.2	24.4	9.5	32.6	11.7	34.8
Actuated g/C Ratio	0.11	0.24	0.12	0.24	0.10	0.33	0.12	0.35
v/c Ratio	0.62	0.66	0.66	0.88	0.91	1.03	0.75	1.15
Control Delay	49.0	40.2	49.5	56.7	105.2	54.2	61.7	106.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	40.2	49.5	56.7	105.2	54.2	61.7	106.8
LOS	D	D	D	E	F	D	E	F
Approach Delay		44.2		53.7		60.1		102.3
Approach LOS		D		D		E		F

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 93 (93%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.15

Intersection Signal Delay: 72.9

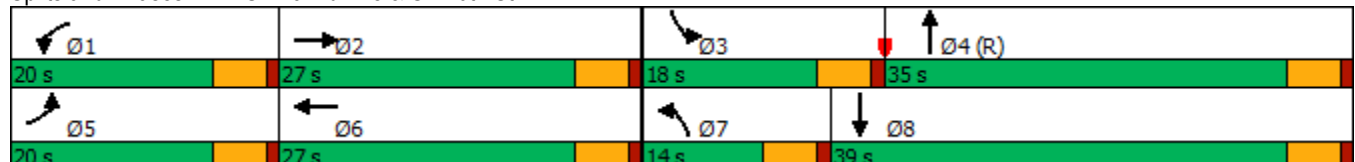
Intersection LOS: E

Intersection Capacity Utilization 90.7%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 2: SE 192nd Ave & SE 20th St



HCM 6th Signalized Intersection Summary

2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	233	183	95	272	265	118	148	933	203	151	1103	237
Future Volume (veh/h)	233	183	95	272	265	118	148	933	203	151	1103	237
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1885	1900	1900	1870	1900	1885	1900	1885	1870	1885
Adj Flow Rate, veh/h	243	191	80	283	276	106	154	972	192	157	1149	228
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	1	0	0	2	0	1	0	1	2	1
Cap, veh/h	316	265	111	355	286	110	163	1146	226	189	1183	233
Arrive On Green	0.09	0.21	0.21	0.10	0.22	0.22	0.09	0.38	0.38	0.14	0.53	0.53
Sat Flow, veh/h	3510	1270	532	3510	1301	500	1810	2981	588	1795	2958	583
Grp Volume(v), veh/h	243	0	271	283	0	382	154	583	581	157	688	689
Grp Sat Flow(s),veh/h/ln	1755	0	1802	1755	0	1801	1810	1791	1778	1795	1777	1764
Q Serve(g_s), s	6.8	0.0	14.0	7.9	0.0	21.0	8.5	29.7	29.8	8.5	37.3	38.1
Cycle Q Clear(g_c), s	6.8	0.0	14.0	7.9	0.0	21.0	8.5	29.7	29.8	8.5	37.3	38.1
Prop In Lane	1.00		0.30	1.00		0.28	1.00		0.33	1.00		0.33
Lane Grp Cap(c), veh/h	316	0	376	355	0	396	163	689	684	189	711	706
V/C Ratio(X)	0.77	0.00	0.72	0.80	0.00	0.96	0.95	0.85	0.85	0.83	0.97	0.98
Avail Cap(c_a), veh/h	527	0	397	527	0	396	163	689	684	233	711	706
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.40	0.40	0.40
Uniform Delay (d), s/veh	44.5	0.0	36.8	43.9	0.0	38.6	45.3	28.1	28.1	42.1	22.8	22.9
Incr Delay (d2), s/veh	1.5	0.0	5.0	2.9	0.0	35.6	54.0	12.3	12.5	6.7	14.9	16.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.3	0.0	10.6	6.2	0.0	18.7	10.2	20.5	20.4	5.9	19.1	19.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.0	0.0	41.8	46.8	0.0	74.2	99.2	40.4	40.6	48.8	37.7	39.6
LnGrp LOS	D	A	D	D	A	E	F	D	D	D	D	D
Approach Vol, veh/h		514			665			1318			1534	
Approach Delay, s/veh		43.8			62.6			47.4			39.7	
Approach LOS		D			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.1	25.9	15.6	43.4	14.0	27.0	14.0	45.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	22.0	13.0	30.0	15.0	22.0	9.0	34.0				
Max Q Clear Time (g_c+I1), s	9.9	16.0	10.5	31.8	8.8	23.0	10.5	40.1				
Green Ext Time (p_c), s	0.3	0.5	0.0	0.0	0.2	0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			46.5									
HCM 6th LOS			D									

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	4	1294	3	10	1337
Future Vol, veh/h	3	4	1294	3	10	1337
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	230	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	3	4	1362	3	11	1407
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	2092	685	0	0	1367	0
Stage 1	1366	-	-	-	-	-
Stage 2	726	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	46	395	-	-	509	-
Stage 1	206	-	-	-	-	-
Stage 2	445	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	45	394	-	-	508	-
Mov Cap-2 Maneuver	45	-	-	-	-	-
Stage 1	206	-	-	-	-	-
Stage 2	435	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	47.1	0		0.1		
HCM LOS	E					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	45	394	508	-
HCM Lane V/C Ratio	-	-	0.07	0.011	0.021	-
HCM Control Delay (s)	-	-	91	14.2	12.2	-
HCM Lane LOS	-	-	F	B	B	-
HCM 95th %tile Q(veh)	-	-	0.2	0	0.1	-

Timings

4: SE 192nd Ave & SE 29th St

Vancouver Innovation Center

Phase 3 2038 PM Peak Hour Conditions

					
Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	131	45	55	1166	1239
Future Volume (vph)	131	45	55	1166	1239
Turn Type	Prot	pm+ov	Prot	NA	NA
Protected Phases	2	7	7	4	8
Permitted Phases		2			
Detector Phase	2	7	7	4	8
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	27.0	10.0	10.0	26.0	26.0
Total Split (s)	30.0	16.0	16.0	68.0	54.0
Total Split (%)	30.0%	16.0%	16.0%	68.0%	54.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0
Lead/Lag		Lead	Lead		Lag
Lead-Lag Optimize?		Yes	Yes		Yes
Recall Mode	Max	None	None	C-Max	None
Act Effect Green (s)	25.0	38.5	8.5	65.0	53.6
Actuated g/C Ratio	0.25	0.38	0.08	0.65	0.54
v/c Ratio	0.32	0.08	0.40	0.53	0.75
Control Delay	33.0	9.9	68.8	4.6	23.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	33.0	9.9	68.8	4.6	23.2
LOS	C	A	E	A	C
Approach Delay	27.1			7.5	23.2
Approach LOS	C			A	C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 45 (45%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 16.4

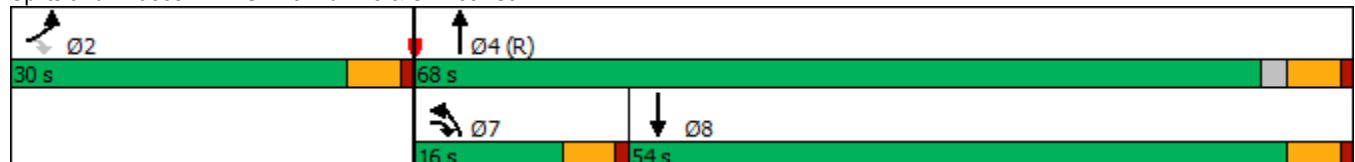
Intersection LOS: B

Intersection Capacity Utilization 61.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 4: SE 192nd Ave & SE 29th St



HCM 6th Signalized Intersection Summary

4: SE 192nd Ave & SE 29th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (veh/h)	131	45	55	1166	1239	101
Future Volume (veh/h)	131	45	55	1166	1239	101
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1826	1826	1885	1885	1826
Adj Flow Rate, veh/h	138	47	58	1227	1304	100
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	5	5	1	1	5
Cap, veh/h	442	453	74	2328	1880	144
Arrive On Green	0.25	0.25	0.08	1.00	0.56	0.56
Sat Flow, veh/h	1767	1547	1739	3676	3466	258
Grp Volume(v), veh/h	138	47	58	1227	691	713
Grp Sat Flow(s),veh/h/ln	1767	1547	1739	1791	1791	1839
Q Serve(g_s), s	6.4	2.2	3.3	0.0	27.8	28.0
Cycle Q Clear(g_c), s	6.4	2.2	3.3	0.0	27.8	28.0
Prop In Lane	1.00	1.00	1.00			0.14
Lane Grp Cap(c), veh/h	442	453	74	2328	998	1025
V/C Ratio(X)	0.31	0.10	0.78	0.53	0.69	0.70
Avail Cap(c_a), veh/h	442	453	191	2328	998	1025
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.49	0.49	1.00	1.00
Uniform Delay (d), s/veh	30.5	25.8	45.3	0.0	15.9	16.0
Incr Delay (d2), s/veh	1.8	0.5	8.6	0.4	2.1	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.2	4.1	2.7	0.2	16.0	16.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	32.3	26.3	53.9	0.4	18.0	18.1
LnGrp LOS	C	C	D	A	B	B
Approach Vol, veh/h	185			1285	1404	
Approach Delay, s/veh	30.8			2.8	18.0	
Approach LOS	C			A	B	
Timer - Assigned Phs	2		4		7	8
Phs Duration (G+Y+Rc), s	30.0		70.0		9.2	60.8
Change Period (Y+Rc), s	5.0		5.0		5.0	5.0
Max Green Setting (Gmax), s	25.0		63.0		11.0	49.0
Max Q Clear Time (g_c+I1), s	8.4		2.0		5.3	30.0
Green Ext Time (p_c), s	0.5		11.8		0.0	9.2
Intersection Summary						
HCM 6th Ctrl Delay			12.1			
HCM 6th LOS			B			

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	191	254	355	220	124	139	1006	204	221	968
Future Volume (vph)	191	254	355	220	124	139	1006	204	221	968
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	14.0	32.0	19.0	37.0	37.0	13.0	34.0	19.0	15.0	36.0
Total Split (%)	14.0%	32.0%	19.0%	37.0%	37.0%	13.0%	34.0%	19.0%	15.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	33.3	24.8	43.8	30.2	30.2	9.3	31.2	45.2	10.0	32.0
Actuated g/C Ratio	0.33	0.25	0.44	0.30	0.30	0.09	0.31	0.45	0.10	0.32
v/c Ratio	0.47	0.93	1.14	0.40	0.21	0.86	0.94	0.26	0.68	1.05
Control Delay	22.4	62.2	118.0	29.7	2.0	88.2	51.5	2.1	73.0	87.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	62.2	118.0	29.7	2.0	88.2	51.5	2.1	73.0	87.9
LOS	C	E	F	C	A	F	D	A	E	F
Approach Delay		49.4		69.6			47.8			85.4
Approach LOS		D		E			D			F

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 36 (36%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 64.4

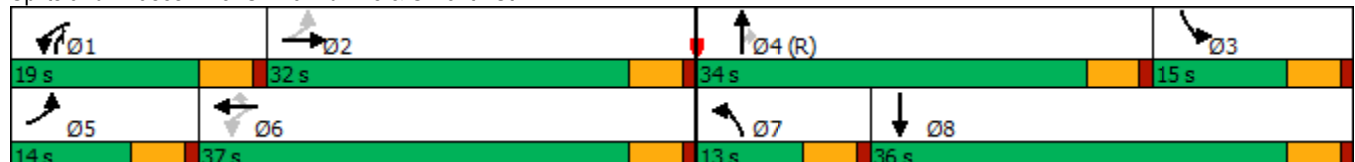
Intersection LOS: E

Intersection Capacity Utilization 97.8%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	191	254	145	355	220	124	139	1006	204	221	968	135
Future Volume (veh/h)	191	254	145	355	220	124	139	1006	204	221	968	135
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1817	1847	1817	2003	2003	2018	2018	1988	2003	1847	1832	1817
Adj Flow Rate, veh/h	201	267	131	374	232	32	146	1059	90	233	1019	130
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	0	2	1	1	0	0	2	1	0	1	2
Cap, veh/h	451	289	142	365	598	509	154	1095	726	415	1027	131
Arrive On Green	0.09	0.25	0.25	0.14	0.30	0.30	0.08	0.29	0.29	0.12	0.33	0.33
Sat Flow, veh/h	1731	1163	570	1908	2003	1705	1922	3777	1683	3413	3099	395
Grp Volume(v), veh/h	201	0	398	374	232	32	146	1059	90	233	572	577
Grp Sat Flow(s),veh/h/ln	1731	0	1733	1908	2003	1705	1922	1889	1683	1706	1741	1753
Q Serve(g_s), s	8.7	0.0	22.4	14.0	9.2	0.9	7.6	27.7	1.7	6.4	32.7	32.8
Cycle Q Clear(g_c), s	8.7	0.0	22.4	14.0	9.2	0.9	7.6	27.7	1.7	6.4	32.7	32.8
Prop In Lane	1.00		0.33	1.00		1.00	1.00		1.00	1.00		0.23
Lane Grp Cap(c), veh/h	451	0	431	365	598	509	154	1095	726	415	577	581
V/C Ratio(X)	0.45	0.00	0.92	1.02	0.39	0.06	0.95	0.97	0.12	0.56	0.99	0.99
Avail Cap(c_a), veh/h	451	0	468	365	641	546	154	1095	726	415	577	581
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.79	0.00	0.79	1.00	1.00	1.00	1.00	1.00	1.00	0.62	0.62	0.62
Uniform Delay (d), s/veh	24.9	0.0	36.7	25.2	27.8	11.7	45.8	35.0	6.3	41.4	33.3	33.3
Incr Delay (d2), s/veh	0.2	0.0	18.8	53.7	0.2	0.0	57.0	20.3	0.4	0.7	27.5	27.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.1	0.0	16.2	17.1	7.7	0.9	9.9	21.5	1.4	4.8	22.8	23.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.1	0.0	55.5	78.8	28.0	11.8	102.8	55.3	6.6	42.1	60.8	61.0
LnGrp LOS	C	A	E	F	C	B	F	E	A	D	E	E
Approach Vol, veh/h	599			638			1295			1382		
Approach Delay, s/veh	45.3			57.0			57.3			57.7		
Approach LOS	D			E			E			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	29.8	17.2	34.0	14.0	34.8	13.0	38.2				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	14.0	27.0	10.0	29.0	9.0	32.0	8.0	31.0				
Max Q Clear Time (g_c+I1), s	16.0	24.4	8.4	29.7	10.7	11.2	9.6	34.8				
Green Ext Time (p_c), s	0.0	0.3	0.0	0.0	0.0	0.4	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay 55.6

HCM 6th LOS E

Notes

User approved pedestrian interval to be less than phase max green.

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Phase 3 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	74	307	37	334	71	17	250	37
Future Volume (vph)	74	307	37	334	71	17	250	37
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases					8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	30.0	10.0	30.0	32.0	32.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%
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	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	5.2	29.0	5.2	24.0	17.8	17.8	17.8	17.8
Actuated g/C Ratio	0.08	0.46	0.08	0.38	0.28	0.28	0.28	0.28
v/c Ratio	0.53	0.49	0.27	0.77	0.26	0.11	0.71	0.38
Control Delay	47.8	15.9	37.5	24.9	21.5	10.3	32.9	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.8	15.9	37.5	24.9	21.5	10.3	32.9	8.1
LOS	D	B	D	C	C	B	C	A
Approach Delay		21.0		25.7		16.9		21.6
Approach LOS		C		C		B		C

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 62.6

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 22.5

Intersection LOS: C

Intersection Capacity Utilization 68.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

		
10 s	85 s	35 s
		
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	307	80	37	334	167	71	17	32	250	37	173
Future Volume (veh/h)	74	307	80	37	334	167	71	17	32	250	37	173
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1870	1841	1832	1847	1876	1817	1876	1832	1841	1900	1900
Adj Flow Rate, veh/h	79	327	74	39	355	156	76	18	7	266	39	53
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	2	4	3	2	0	4	0	3	4	0	0
Cap, veh/h	126	548	124	75	419	184	424	323	126	487	183	249
Arrive On Green	0.07	0.37	0.37	0.04	0.35	0.35	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1810	1474	333	1745	1213	533	1263	1285	500	1359	728	989
Grp Volume(v), veh/h	79	0	401	39	0	511	76	0	25	266	0	92
Grp Sat Flow(s),veh/h/ln	1810	0	1807	1745	0	1745	1263	0	1784	1359	0	1717
Q Serve(g_s), s	1.9	0.0	8.0	1.0	0.0	12.2	2.3	0.0	0.5	8.3	0.0	1.9
Cycle Q Clear(g_c), s	1.9	0.0	8.0	1.0	0.0	12.2	4.2	0.0	0.5	8.8	0.0	1.9
Prop In Lane	1.00		0.18	1.00		0.31	1.00		0.28	1.00		0.58
Lane Grp Cap(c), veh/h	126	0	672	75	0	603	424	0	448	487	0	432
V/C Ratio(X)	0.63	0.00	0.60	0.52	0.00	0.85	0.18	0.00	0.06	0.55	0.00	0.21
Avail Cap(c_a), veh/h	201	0	3217	194	0	3107	950	0	1191	1053	0	1146
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.3	0.0	11.4	21.1	0.0	13.6	15.0	0.0	12.8	16.1	0.0	13.3
Incr Delay (d2), s/veh	1.9	0.0	0.3	2.1	0.0	1.3	0.1	0.0	0.0	0.4	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.3	0.0	4.3	0.7	0.0	6.7	1.1	0.0	0.3	4.1	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.2	0.0	11.7	23.1	0.0	14.9	15.0	0.0	12.8	16.5	0.0	13.4
LnGrp LOS	C	A	B	C	A	B	B	A	B	B	A	B
Approach Vol, veh/h	480			550			101			358		
Approach Delay, s/veh	13.4			15.5			14.5			15.7		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.9	21.7		16.3	8.1	20.5		16.3				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	3.0	10.0		10.8	3.9	14.2		6.2				
Green Ext Time (p_c), s	0.0	0.3		0.1	0.0	0.5		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	14.8											
HCM 6th LOS	B											

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	454	32	16	563	18	7
Future Vol, veh/h	454	32	16	563	18	7
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	95	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	0	0	2	0	0
Mvmt Flow	499	35	18	619	20	8
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	534	0	1172	518
Stage 1	-	-	-	-	517	-
Stage 2	-	-	-	-	655	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1044	-	215	562
Stage 1	-	-	-	-	603	-
Stage 2	-	-	-	-	521	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1044	-	211	561
Mov Cap-2 Maneuver	-	-	-	-	211	-
Stage 1	-	-	-	-	603	-
Stage 2	-	-	-	-	512	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.2		20.7	
HCM LOS	C					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	256	-	-	1044	-	
HCM Lane V/C Ratio	0.107	-	-	0.017	-	
HCM Control Delay (s)	20.7	-	-	8.5	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-	

Timings 8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	207	387	18	443	10	10	93	21
Future Volume (vph)	207	387	18	443	10	10	93	21
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	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	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	35.3	34.1	29.8	23.4	10.2	10.2	10.2	10.2
Actuated g/C Ratio	0.61	0.59	0.52	0.41	0.18	0.18	0.18	0.18
v/c Ratio	0.52	0.40	0.04	0.81	0.06	0.06	0.41	0.48
Control Delay	18.1	11.0	7.5	25.4	23.4	18.4	28.2	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.1	11.0	7.5	25.4	23.4	18.4	28.2	9.7
LOS	B	B	A	C	C	B	C	A
Approach Delay		13.4		24.9		20.3		15.7
Approach LOS		B		C		C		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 57.6

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 18.4

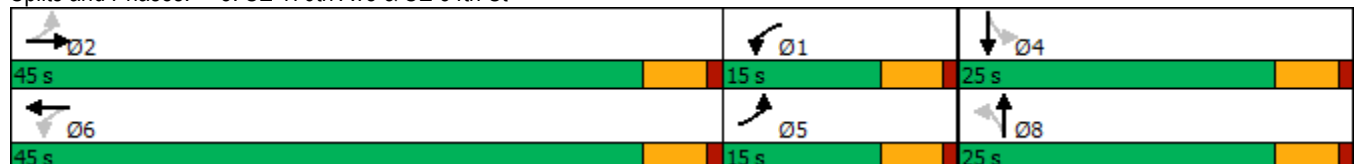
Intersection LOS: B

Intersection Capacity Utilization 66.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	207	387	13	18	443	120	10	10	6	93	21	174
Future Volume (veh/h)	207	387	13	18	443	120	10	10	6	93	21	174
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1870	1900	1900	1885	1885	1900	1900	1900	1885	1900	1900
Adj Flow Rate, veh/h	225	421	13	20	482	115	11	11	0	101	23	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
Percent Heavy Veh, %	1	2	0	0	1	1	0	0	0	1	0	0
Cap, veh/h	449	671	21	614	591	141	305	215	0	330	110	86
Arrive On Green	0.11	0.37	0.37	0.14	0.40	0.40	0.11	0.11	0.00	0.11	0.11	0.11
Sat Flow, veh/h	1795	1805	56	1810	1471	351	1382	1900	0	1409	975	763
Grp Volume(v), veh/h	225	0	434	20	0	597	11	11	0	101	0	41
Grp Sat Flow(s),veh/h/ln	1795	0	1860	1810	0	1822	1382	1900	0	1409	0	1738
Q Serve(g_s), s	0.0	0.0	7.7	0.0	0.0	11.8	0.3	0.2	0.0	2.8	0.0	0.9
Cycle Q Clear(g_c), s	0.0	0.0	7.7	0.0	0.0	11.8	1.2	0.2	0.0	3.0	0.0	0.9
Prop In Lane	1.00		0.03	1.00		0.19	1.00		0.00	1.00		0.44
Lane Grp Cap(c), veh/h	449	0	691	614	0	732	305	215	0	330	0	196
V/C Ratio(X)	0.50	0.00	0.63	0.03	0.00	0.82	0.04	0.05	0.00	0.31	0.00	0.21
Avail Cap(c_a), veh/h	689	0	1843	802	0	1806	834	941	0	869	0	861
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.4	0.0	10.4	9.4	0.0	10.8	16.8	16.0	0.0	17.3	0.0	16.3
Incr Delay (d2), s/veh	0.3	0.0	0.4	0.0	0.0	0.9	0.0	0.0	0.0	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.7	0.0	3.9	0.2	0.0	5.7	0.2	0.1	0.0	1.5	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	0.0	10.7	9.4	0.0	11.6	16.8	16.0	0.0	17.5	0.0	16.5
LnGrp LOS	B	A	B	A	A	B	B	B	A	B	A	B
Approach Vol, veh/h	659			617			22			142		
Approach Delay, s/veh	12.4			11.5			16.4			17.2		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.8	20.0		9.6	9.6	21.2		9.6				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	9.7		5.0	2.0	13.8		3.2				
Green Ext Time (p_c), s	0.0	1.6		0.2	0.2	2.4		0.0				

Intersection Summary

HCM 6th Ctrl Delay 12.6
HCM 6th LOS B

Notes

User approved pedestrian interval to be less than phase max green.

MOVEMENT SUMMARY

 **Site: 101 [SE 176 Avenue/ SE 29th Street Phase 3 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Phase 3
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				mph
South: SE 176th Avenue															
3	L2	All MCs	16	15.0	16	15.0	0.336	7.9	LOS A	1.9	46.6	0.45	0.27	0.45	32.1
8	T1	All MCs	267	0.0	267	0.0	0.336	6.5	LOS A	1.9	46.6	0.45	0.27	0.45	33.2
18	R2	All MCs	87	0.0	87	0.0	0.336	6.5	LOS A	1.9	46.6	0.45	0.27	0.45	32.9
Approach			370	0.7	370	0.7	0.336	6.5	LOS A	1.9	46.6	0.45	0.27	0.45	33.1
East: SE 29th Street															
1	L2	All MCs	197	0.0	197	0.0	0.594	11.4	LOS B	6.0	151.1	0.71	0.58	0.94	29.8
6	T1	All MCs	354	0.0	354	0.0	0.594	11.4	LOS B	6.0	151.1	0.71	0.58	0.94	30.3
16	R2	All MCs	47	0.0	47	0.0	0.594	11.4	LOS B	6.0	151.1	0.71	0.58	0.94	30.1
Approach			598	0.0	598	0.0	0.594	11.4	LOS B	6.0	151.1	0.71	0.58	0.94	30.1
North: SE 176th Avenue															
7	L2	All MCs	51	0.0	51	0.0	0.325	8.5	LOS A	1.5	38.0	0.65	0.54	0.65	31.2
4	T1	All MCs	86	1.0	86	1.0	0.325	8.6	LOS A	1.5	38.0	0.65	0.54	0.65	31.8
14	R2	All MCs	113	0.0	113	0.0	0.325	8.5	LOS A	1.5	38.0	0.65	0.54	0.65	31.6
Approach			249	0.3	249	0.3	0.325	8.5	LOS A	1.5	38.0	0.65	0.54	0.65	31.6
West: SE 29th Street															
5	L2	All MCs	22	7.0	22	7.0	0.199	6.3	LOS A	0.9	23.1	0.48	0.34	0.48	32.6
2	T1	All MCs	139	0.0	139	0.0	0.199	5.5	LOS A	0.9	23.1	0.48	0.34	0.48	33.5
12	R2	All MCs	33	0.0	33	0.0	0.199	5.5	LOS A	0.9	23.1	0.48	0.34	0.48	33.2
Approach			194	0.8	194	0.8	0.199	5.6	LOS A	0.9	23.1	0.48	0.34	0.48	33.3
All Vehicles			1411	0.3	1411	0.3	0.594	8.8	LOS A	6.0	151.1	0.60	0.46	0.70	31.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Sieglach M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: H:\27\27715 - VIC Implementation\005 - Master Plan Update TIA\Analysis\176th_29th With Project 2038 PM.sip9

Intersection	
Intersection Delay, s/veh	92.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	466	73	93	503	18	50	135	76	27	96	28
Future Vol, veh/h	48	466	73	93	503	18	50	135	76	27	96	28
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
Heavy Vehicles, %	3	0	0	1	0	7	0	1	0	4	1	8
Mvmt Flow	52	507	79	101	547	20	54	147	83	29	104	30
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	127.4	107.5	19.7	19.8
HCM LOS	F	F	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	18%
Vol Thru, %	0%	64%	0%	86%	0%	97%	64%
Vol Right, %	0%	36%	0%	14%	0%	3%	19%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	50	211	48	539	93	521	151
LT Vol	50	0	48	0	93	0	27
Through Vol	0	135	0	466	0	503	96
RT Vol	0	76	0	73	0	18	28
Lane Flow Rate	54	229	52	586	101	566	164
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.136	0.525	0.117	1.208	0.224	1.171	0.413
Departure Headway (Hd)	9.732	8.962	8.503	7.834	8.481	7.92	9.988
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	371	406	424	469	426	464	363
Service Time	7.432	6.662	6.203	5.534	6.181	5.62	7.988
HCM Lane V/C Ratio	0.146	0.564	0.123	1.249	0.237	1.22	0.452
HCM Control Delay	14	21.1	12.3	137.6	13.6	124.3	19.8
HCM Lane LOS	B	C	B	F	B	F	C
HCM 95th-tile Q	0.5	3	0.4	21.6	0.8	19.8	2

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	89	51	51	287	38	193	42	1419	151	1304
Future Volume (vph)	89	51	51	287	38	193	42	1419	151	1304
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Prot	NA
Protected Phases	5	2		1	6		7	4	3	8
Permitted Phases	2		2	6		6				
Detector Phase	5	2	2	1	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	9.5	39.0	39.0	9.5	38.0	38.0	10.0	32.0	19.5	32.0
Total Split (s)	15.0	20.0	20.0	19.0	24.0	24.0	15.0	59.0	22.0	66.0
Total Split (%)	12.5%	16.7%	16.7%	15.8%	20.0%	20.0%	12.5%	49.2%	18.3%	55.0%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.5	5.0	5.0	4.5	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max
Act Effct Green (s)	18.9	11.0	11.0	28.7	14.5	14.5	6.3	63.6	12.9	72.1
Actuated g/C Ratio	0.16	0.09	0.09	0.24	0.12	0.12	0.05	0.53	0.11	0.60
v/c Ratio	0.37	0.31	0.19	0.91	0.18	0.55	0.49	0.57	0.83	0.94
Control Delay	40.8	55.3	1.5	74.3	48.1	12.4	51.0	35.3	84.5	36.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	55.3	1.5	74.3	48.1	12.4	51.0	35.3	84.5	36.2
LOS	D	E	A	E	D	B	D	D	F	D
Approach Delay		34.1			49.3			35.7		41.1
Approach LOS		C			D			D		D

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 112 (93%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 39.7

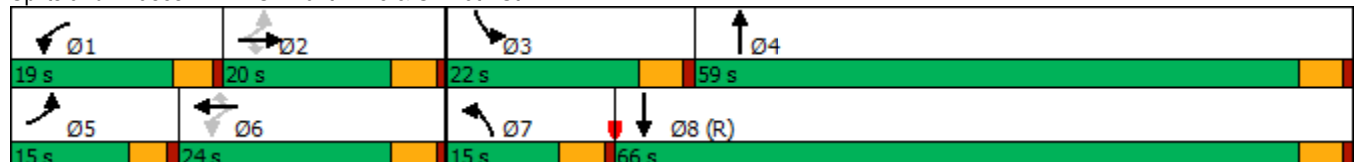
Intersection LOS: D

Intersection Capacity Utilization 72.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	51	51	287	38	193	42	1419	36	151	1304	46
Future Volume (veh/h)	89	51	51	287	38	193	42	1419	36	151	1304	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1870	1870	1870	1826	1870	1752	1885	1885	1900
Adj Flow Rate, veh/h	94	54	1	302	40	17	44	1494	36	159	1373	47
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	2	2	2	5	2	10	1	1	0
Cap, veh/h	287	163	137	355	273	230	56	2308	56	186	1794	61
Arrive On Green	0.06	0.09	0.09	0.12	0.15	0.15	0.03	0.45	0.45	0.10	0.52	0.52
Sat Flow, veh/h	1810	1900	1599	1781	1870	1579	1739	5128	124	1795	3443	118
Grp Volume(v), veh/h	94	54	1	302	40	17	44	992	538	159	677	743
Grp Sat Flow(s), veh/h/ln	1810	1900	1599	1781	1870	1579	1739	1702	1848	1795	848	1864
Q Serve(g_s), s	5.6	3.2	0.1	14.5	2.2	1.1	3.0	27.1	27.1	10.5	38.1	38.1
Cycle Q Clear(g_c), s	5.6	3.2	0.1	14.5	2.2	1.1	3.0	27.1	27.1	10.5	38.1	38.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		0.06
Lane Grp Cap(c), veh/h	287	163	137	355	273	230	56	1532	832	186	884	972
V/C Ratio(X)	0.33	0.33	0.01	0.85	0.15	0.07	0.79	0.65	0.65	0.86	0.77	0.77
Avail Cap(c_a), veh/h	335	238	200	355	296	250	145	1532	832	254	884	972
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.71	0.71	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.0	51.6	50.2	45.1	44.7	44.3	57.7	25.6	25.6	52.9	22.9	22.9
Incr Delay (d2), s/veh	0.7	0.4	0.0	17.6	0.1	0.0	6.3	1.5	2.8	14.6	6.3	5.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.7	2.8	0.0	6.6	1.9	0.8	2.5	15.3	16.8	9.2	12.5	23.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.7	52.0	50.2	62.7	44.8	44.3	64.0	27.1	28.4	67.5	29.1	28.6
LnGrp LOS	D	D	D	E	D	D	E	C	C	E	C	C
Approach Vol, veh/h		149			359			1574			1579	
Approach Delay, s/veh		48.7			59.9			28.6			32.8	
Approach LOS		D			E			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	15.3	17.4	59.0	11.8	22.5	8.9	67.5				
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0				
Max Green Setting (Gmax), s	14.5	15.0	17.0	54.0	10.5	19.0	10.0	61.0				
Max Q Clear Time (g_c+I1), s	16.5	5.2	12.5	29.1	7.6	4.2	5.0	40.1				
Green Ext Time (p_c), s	0.0	0.0	0.0	1.7	0.0	0.0	0.0	1.5				

Intersection Summary

HCM 6th Ctrl Delay	34.3
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Timings
12: SE 164th Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	49	102	194	287	136	232	192	1220	405	162	1419
Future Volume (vph)	49	102	194	287	136	232	192	1220	405	162	1419
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	15.0	33.0	20.0	17.0	35.0	20.0	20.0	50.0	17.0	20.0	50.0
Total Split (%)	12.5%	27.5%	16.7%	14.2%	29.2%	16.7%	16.7%	41.7%	14.2%	16.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	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	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	7.3	10.7	34.0	12.0	17.5	37.8	18.3	62.0	79.0	15.3	59.0
Actuated g/C Ratio	0.06	0.09	0.28	0.10	0.15	0.32	0.15	0.52	0.66	0.13	0.49
v/c Ratio	0.51	0.66	0.41	1.69	0.54	0.43	0.74	0.70	0.36	0.75	0.86
Control Delay	71.7	71.0	24.2	366.8	56.2	20.7	64.4	26.0	3.7	67.8	25.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.7	71.0	24.2	366.8	56.2	20.7	64.4	26.0	3.7	67.8	25.4
LOS	E	E	C	F	E	C	E	C	A	E	C
Approach Delay		44.8			179.6			25.1			29.6
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 40 (33%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.69

Intersection Signal Delay: 51.1

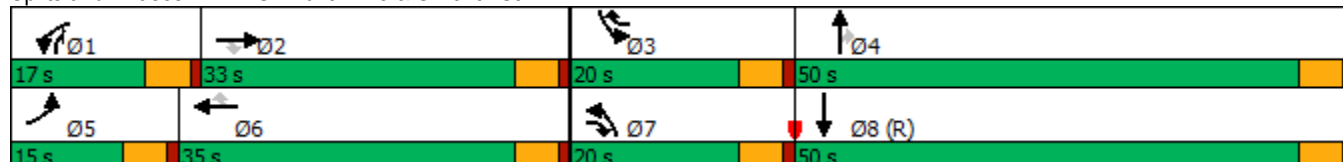
Intersection LOS: D

Intersection Capacity Utilization 80.6%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave & SE 34th St



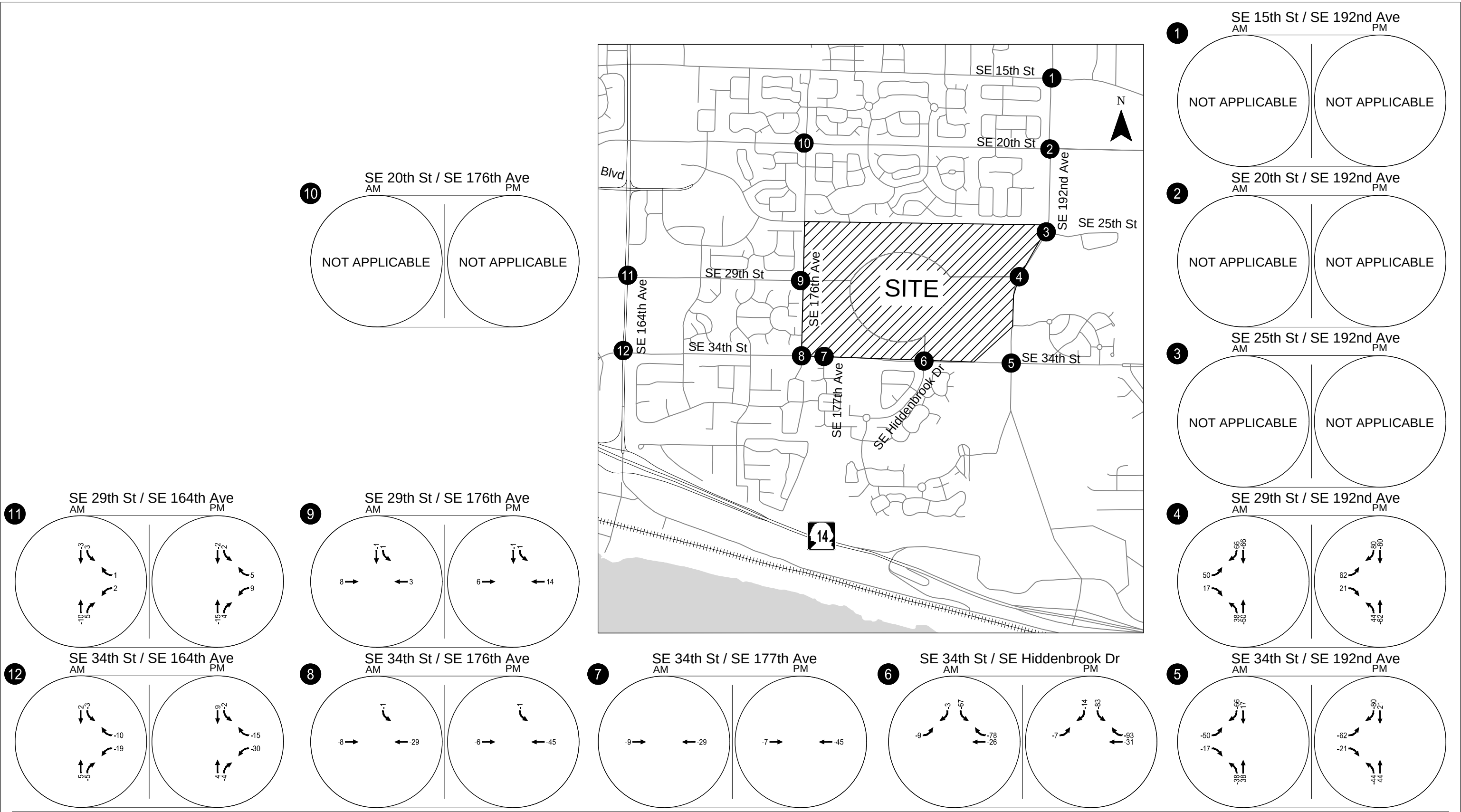
HCM 6th Signalized Intersection Summary

12: SE 164th Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	102	194	287	136	232	192	1220	405	162	1419	49
Future Volume (veh/h)	49	102	194	287	136	232	192	1220	405	162	1419	49
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1826	1885	1870	1841	1856	1885	1870	1885	1870	1870	1841
Adj Flow Rate, veh/h	51	106	152	299	142	167	200	1271	291	169	1478	49
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	9	5	1	2	4	3	1	2	1	2	2	4
Cap, veh/h	64	183	359	178	298	427	224	1387	783	195	1552	51
Arrive On Green	0.04	0.10	0.10	0.10	0.16	0.16	0.13	0.39	0.39	0.11	0.38	0.38
Sat Flow, veh/h	1682	1826	1598	1781	1841	1572	1795	3554	1598	1781	4140	137
Grp Volume(v), veh/h	51	106	152	299	142	167	200	1271	291	169	868	659
Grp Sat Flow(s),veh/h/ln	1682	1826	1598	1781	1841	1572	1795	1777	1598	1781	1216	1846
Q Serve(g_s), s	3.6	6.7	9.8	12.0	8.4	10.4	13.2	40.7	13.6	11.2	41.6	41.6
Cycle Q Clear(g_c), s	3.6	6.7	9.8	12.0	8.4	10.4	13.2	40.7	13.6	11.2	41.6	41.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	64	183	359	178	298	427	224	1387	783	195	912	692
V/C Ratio(X)	0.79	0.58	0.42	1.68	0.48	0.39	0.89	0.92	0.37	0.86	0.95	0.95
Avail Cap(c_a), veh/h	140	426	572	178	460	566	224	1387	783	223	912	692
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.30	0.30	0.30
Uniform Delay (d), s/veh	57.2	51.6	39.8	54.0	45.7	35.6	51.7	34.7	19.1	52.5	36.5	36.5
Incr Delay (d2), s/veh	7.9	1.1	0.3	328.6	0.4	0.2	31.8	11.0	1.4	8.6	8.4	10.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	5.5	6.9	34.2	6.9	7.1	12.4	26.0	8.9	7.5	16.1	23.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.1	52.7	40.1	382.6	46.1	35.8	83.5	45.7	20.4	61.2	44.9	46.9
LnGrp LOS	E	D	D	F	D	D	F	D	C	E	D	D
Approach Vol, veh/h		309			608			1762			1696	
Approach Delay, s/veh		48.6			208.8			45.8			47.3	
Approach LOS		D			F			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	17.0	18.2	51.8	9.6	24.4	20.0	50.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	28.0	15.0	45.0	10.0	30.0	15.0	45.0				
Max Q Clear Time (g_c+I1), s	14.0	11.8	13.2	42.7	5.6	12.4	15.2	43.6				
Green Ext Time (p_c), s	0.0	0.2	0.0	1.1	0.0	0.3	0.0	0.7				
Intersection Summary												
HCM 6th Ctrl Delay				69.2								
HCM 6th LOS				E								

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Redistributed Baseline Traffic Volumes - SE 29th St Eastern Connection
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
H-1

Appendix I 2038 With-Project Phase 4
Buildout Operations
Worksheets

Timings

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Phase 4 2038 AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	156	45	29	64	158	69	1025	89	920
Future Volume (vph)	156	45	29	64	158	69	1025	89	920
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	20.0	29.0	20.0	29.0	14.0	15.0	37.0	14.0	36.0
Total Split (%)	20.0%	29.0%	20.0%	29.0%	14.0%	15.0%	37.0%	14.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	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	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effct Green (s)	12.4	18.7	5.9	10.2	22.0	7.7	50.6	8.8	53.7
Actuated g/C Ratio	0.12	0.19	0.06	0.10	0.22	0.08	0.51	0.09	0.54
v/c Ratio	0.80	0.31	0.32	0.38	0.43	0.57	0.66	0.69	0.63
Control Delay	67.8	18.5	53.4	45.3	18.0	60.6	24.5	69.1	22.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	18.5	53.4	45.3	18.0	60.6	24.5	69.1	22.9
LOS	E	B	D	D	B	E	C	E	C
Approach Delay		48.3		29.0			26.8		26.7
Approach LOS		D		C			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 9 (9%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 29.0

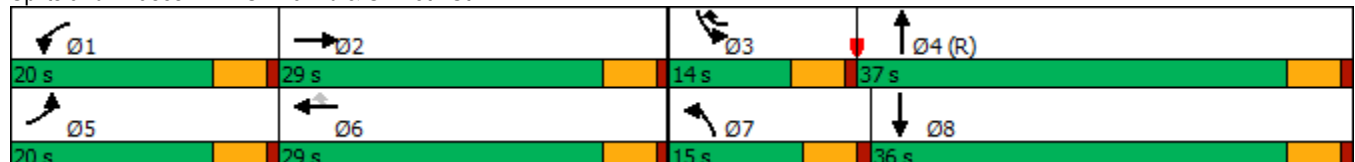
Intersection LOS: C

Intersection Capacity Utilization 61.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Phase 4 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	45	57	29	64	158	69	1025	16	89	920	87
Future Volume (veh/h)	156	45	57	29	64	158	69	1025	16	89	920	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1900	1796	1781	1841	1870	1856	1841	1900	1737	1767	1856
Adj Flow Rate, veh/h	173	50	9	32	71	100	77	1139	17	99	1022	91
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
Percent Heavy Veh, %	3	0	7	8	4	2	3	4	0	11	9	3
Cap, veh/h	204	258	46	50	145	242	109	1877	28	122	1697	151
Arrive On Green	0.12	0.16	0.16	0.03	0.08	0.08	0.12	1.00	1.00	0.07	0.54	0.54
Sat Flow, veh/h	1767	1567	282	1697	1841	1585	1767	3526	53	1654	3117	277
Grp Volume(v), veh/h	173	0	59	32	71	100	77	565	591	99	550	563
Grp Sat Flow(s),veh/h/ln	1767	0	1849	1697	1841	1585	1767	1749	1830	1654	1678	1716
Q Serve(g_s), s	9.6	0.0	2.8	1.9	3.7	5.7	4.2	0.0	0.0	5.9	22.2	22.2
Cycle Q Clear(g_c), s	9.6	0.0	2.8	1.9	3.7	5.7	4.2	0.0	0.0	5.9	22.2	22.2
Prop In Lane	1.00		0.15	1.00		1.00	1.00		0.03	1.00		0.16
Lane Grp Cap(c), veh/h	204	0	304	50	145	242	109	931	974	122	913	934
V/C Ratio(X)	0.85	0.00	0.19	0.64	0.49	0.41	0.70	0.61	0.61	0.81	0.60	0.60
Avail Cap(c_a), veh/h	265	0	444	254	442	498	177	931	974	149	913	934
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.71	0.71	0.71	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.4	0.0	36.1	48.0	44.2	38.3	42.9	0.0	0.0	45.6	15.4	15.5
Incr Delay (d2), s/veh	14.7	0.0	0.1	5.0	1.0	0.4	2.2	2.1	2.0	19.5	2.9	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.5	0.0	2.2	1.5	3.1	3.9	3.2	1.0	1.0	5.4	13.1	13.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	0.0	36.2	53.0	45.1	38.8	45.1	2.1	2.0	65.1	18.4	18.3
LnGrp LOS	E	A	D	D	D	D	D	A	A	E	B	B
Approach Vol, veh/h		232			203			1233			1212	
Approach Delay, s/veh		52.5			43.2			4.7			22.2	
Approach LOS		D			D			A			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.9	21.4	12.4	58.2	16.5	12.9	11.2	59.4				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	24.0	9.0	32.0	15.0	24.0	10.0	31.0				
Max Q Clear Time (g_c+I1), s	3.9	4.8	7.9	2.0	11.6	7.7	6.2	24.2				
Green Ext Time (p_c), s	0.0	0.1	0.0	2.3	0.0	0.2	0.0	1.6				
Intersection Summary												
HCM 6th Ctrl Delay			18.6									
HCM 6th LOS			B									

Timings
2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 		 			 		 
Traffic Volume (vph)	166	182	182	165	50	827	59	793
Future Volume (vph)	166	182	182	165	50	827	59	793
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	17.0	29.0	17.0	29.0	15.0	39.0	15.0	39.0
Total Split (%)	17.0%	29.0%	17.0%	29.0%	15.0%	39.0%	15.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effect Green (s)	9.4	18.8	9.7	19.1	7.5	45.8	7.7	44.0
Actuated g/C Ratio	0.09	0.19	0.10	0.19	0.08	0.46	0.08	0.44
v/c Ratio	0.55	0.82	0.57	0.65	0.42	0.67	0.45	0.64
Control Delay	49.5	53.5	49.7	43.0	64.3	19.0	51.9	31.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	53.5	49.7	43.0	64.3	19.0	51.9	31.1
LOS	D	D	D	D	E	B	D	C
Approach Delay		52.0		46.0		21.2		32.4
Approach LOS		D		D		C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 33.2

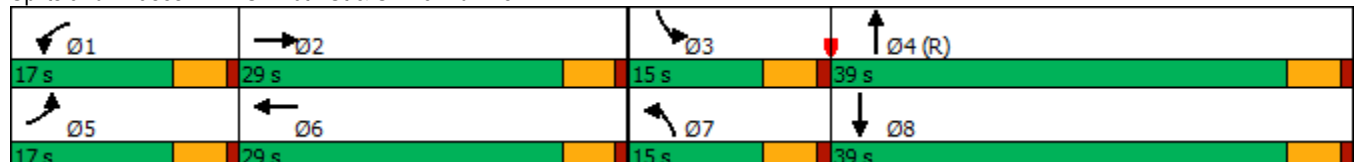
Intersection LOS: C

Intersection Capacity Utilization 69.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: SE 20th St & SE 192nd Ave



HCM 6th Signalized Intersection Summary

2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	166	182	92	182	165	57	50	827	179	59	793	103
Future Volume (veh/h)	166	182	92	182	165	57	50	827	179	59	793	103
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1900	1841	1885	1885	1885	1811	1856	1841	1885	1811	1826
Adj Flow Rate, veh/h	175	192	77	192	174	46	53	871	172	62	835	100
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	0	4	1	1	1	6	3	4	1	6	5
Cap, veh/h	242	220	88	261	251	66	87	1496	295	80	1560	187
Arrive On Green	0.07	0.17	0.17	0.07	0.17	0.17	0.05	0.51	0.51	0.06	0.67	0.67
Sat Flow, veh/h	3428	1290	517	3483	1437	380	1725	2934	579	1795	3094	371
Grp Volume(v), veh/h	175	0	269	192	0	220	53	523	520	62	464	471
Grp Sat Flow(s),veh/h/ln	1714	0	1807	1742	0	1817	1725	1763	1751	1795	1721	1744
Q Serve(g_s), s	5.0	0.0	14.5	5.4	0.0	11.4	3.0	20.7	20.7	3.4	13.9	13.9
Cycle Q Clear(g_c), s	5.0	0.0	14.5	5.4	0.0	11.4	3.0	20.7	20.7	3.4	13.9	13.9
Prop In Lane	1.00		0.29	1.00		0.21	1.00		0.33	1.00		0.21
Lane Grp Cap(c), veh/h	242	0	308	261	0	318	87	899	893	80	868	879
V/C Ratio(X)	0.72	0.00	0.87	0.74	0.00	0.69	0.61	0.58	0.58	0.78	0.54	0.54
Avail Cap(c_a), veh/h	411	0	434	418	0	436	172	899	893	180	868	879
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.74	0.74	0.74
Uniform Delay (d), s/veh	45.5	0.0	40.4	45.3	0.0	38.7	46.5	17.1	17.1	46.5	10.4	10.4
Incr Delay (d2), s/veh	1.5	0.0	10.3	1.5	0.0	1.1	2.6	2.7	2.8	4.4	1.8	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.8	0.0	11.5	4.2	0.0	8.7	2.4	13.1	13.0	2.8	7.3	7.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.0	0.0	50.7	46.8	0.0	39.9	49.1	19.8	19.8	51.0	12.2	12.2
LnGrp LOS	D	A	D	D	A	D	D	B	B	D	B	B
Approach Vol, veh/h	444			412			1096			997		
Approach Delay, s/veh	49.2			43.1			21.3			14.6		
Approach LOS	D			D			C			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.5	22.1	9.5	56.0	12.1	22.5	10.0	55.4				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	24.0	10.0	34.0	12.0	24.0	10.0	34.0				
Max Q Clear Time (g_c+I1), s	7.4	16.5	5.4	22.7	7.0	13.4	5.0	15.9				
Green Ext Time (p_c), s	0.1	0.5	0.0	3.4	0.1	0.5	0.0	3.5				

Intersection Summary

HCM 6th Ctrl Delay 26.3
HCM 6th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	10	978	3	7	1041
Future Vol, veh/h	7	10	978	3	7	1041
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	230	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	20	4	67	0	7
Mvmt Flow	7	11	1029	3	7	1096
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1594	517	0	0	1033	0
Stage 1	1032	-	-	-	-	-
Stage 2	562	-	-	-	-	-
Critical Hdwy	6.8	7.3	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.5	-	-	2.2	-
Pot Cap-1 Maneuver	100	459	-	-	681	-
Stage 1	309	-	-	-	-	-
Stage 2	540	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	99	459	-	-	680	-
Mov Cap-2 Maneuver	99	-	-	-	-	-
Stage 1	309	-	-	-	-	-
Stage 2	535	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	25.9	0	0.1			
HCM LOS	D					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 99 459	680	-		
HCM Lane V/C Ratio	-	- 0.074 0.023	0.011	-		
HCM Control Delay (s)	-	- 44.3 13	10.4	-		
HCM Lane LOS	-	- E B	B	-		
HCM 95th %tile Q(veh)	-	- 0.2 0.1	0	-		

Timings
4: SE 192nd Ave & SE 29th St

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

					
Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	215	100	109	766	781
Future Volume (vph)	215	100	109	766	781
Turn Type	Prot	pt+ov	Prot	NA	NA
Protected Phases	2	2 7	7	4	8
Permitted Phases					
Detector Phase	2	2 7	7	4	8
Switch Phase					
Minimum Initial (s)	5.0		5.0	5.0	5.0
Minimum Split (s)	27.0		10.0	26.0	26.0
Total Split (s)	35.0		15.0	65.0	50.0
Total Split (%)	35.0%		15.0%	65.0%	50.0%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	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	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None		None	C-Max	Max
Act Effct Green (s)	18.6	35.4	11.9	71.4	54.6
Actuated g/C Ratio	0.19	0.35	0.12	0.71	0.55
v/c Ratio	0.72	0.17	0.57	0.33	0.61
Control Delay	50.5	5.0	28.9	14.1	27.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	50.5	5.0	28.9	14.1	27.0
LOS	D	A	C	B	C
Approach Delay	36.1			15.9	27.0
Approach LOS	D			B	C

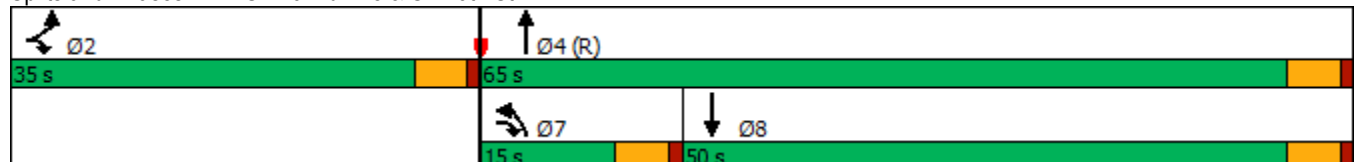
Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 85 (85%), Referenced to phase 4:NBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 23.9
 Intersection Capacity Utilization 60.6%
 Analysis Period (min) 15

Intersection LOS: C

ICU Level of Service B

Splits and Phases: 4: SE 192nd Ave & SE 29th St



HCM 6th Signalized Intersection Summary

4: SE 192nd Ave & SE 29th St

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	215	100	109	766	781	267
Future Volume (veh/h)	215	100	109	766	781	267
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1811	1826	1826	1826	1811	1767
Adj Flow Rate, veh/h	226	39	115	806	822	252
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	6	5	5	5	6	9
Cap, veh/h	266	364	141	2587	1595	489
Arrive On Green	0.15	0.15	0.16	1.00	0.61	0.61
Sat Flow, veh/h	1725	1547	1739	3561	2684	795
Grp Volume(v), veh/h	226	39	115	806	545	529
Grp Sat Flow(s),veh/h/ln	1725	1547	1739	1735	1721	1668
Q Serve(g_s), s	12.8	2.0	6.4	0.0	17.9	17.9
Cycle Q Clear(g_c), s	12.8	2.0	6.4	0.0	17.9	17.9
Prop In Lane	1.00	1.00	1.00			0.48
Lane Grp Cap(c), veh/h	266	364	141	2587	1058	1026
V/C Ratio(X)	0.85	0.11	0.82	0.31	0.52	0.52
Avail Cap(c_a), veh/h	517	589	174	2587	1058	1026
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.79	0.79	1.00	1.00
Uniform Delay (d), s/veh	41.2	30.0	41.2	0.0	10.8	10.9
Incr Delay (d2), s/veh	7.4	0.1	17.6	0.2	1.8	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.9	3.5	5.7	0.2	10.6	10.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	48.6	30.1	58.8	0.2	12.6	12.7
LnGrp LOS	D	C	E	A	B	B
Approach Vol, veh/h	265			921	1074	
Approach Delay, s/veh	45.9			7.6	12.7	
Approach LOS	D			A	B	
Timer - Assigned Phs	2		4		7	8
Phs Duration (G+Y+Rc), s	20.4		79.6		13.1	66.5
Change Period (Y+Rc), s	5.0		5.0		5.0	5.0
Max Green Setting (Gmax), s	30.0		60.0		10.0	45.0
Max Q Clear Time (g_c+l1), s	14.8		2.0		8.4	19.9
Green Ext Time (p_c), s	0.7		6.3		0.0	7.5
Intersection Summary						
HCM 6th Ctrl Delay			14.5			
HCM 6th LOS			B			

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	74	173	207	154	95	121	785	349	131	624
Future Volume (vph)	74	173	207	154	95	121	785	349	131	624
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	15.0	36.0	15.0	36.0	36.0	15.0	34.0	15.0	15.0	34.0
Total Split (%)	15.0%	36.0%	15.0%	36.0%	36.0%	15.0%	34.0%	15.0%	15.0%	34.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	27.6	20.9	34.0	26.0	26.0	10.0	39.3	49.1	10.0	39.3
Actuated g/C Ratio	0.28	0.21	0.34	0.26	0.26	0.10	0.39	0.49	0.10	0.39
v/c Ratio	0.22	0.82	0.85	0.34	0.19	0.73	0.66	0.40	0.43	0.63
Control Delay	21.3	49.9	52.2	31.6	0.8	66.8	29.6	2.4	41.6	24.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.3	49.9	52.2	31.6	0.8	66.8	29.6	2.4	41.6	24.3
LOS	C	D	D	C	A	E	C	A	D	C
Approach Delay		44.0		34.5			25.6			27.0
Approach LOS		D		C			C			C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 29.7

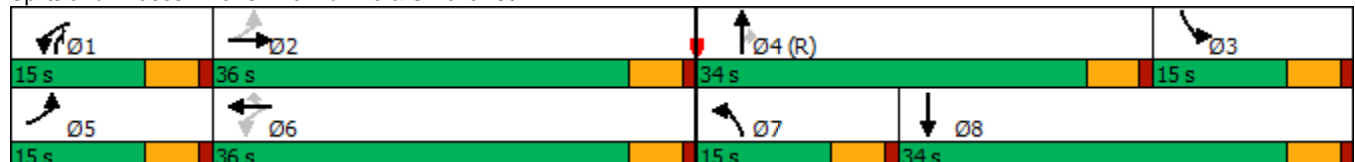
Intersection LOS: C

Intersection Capacity Utilization 72.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	173	112	207	154	95	121	785	349	131	624	89
Future Volume (veh/h)	74	173	112	207	154	95	121	785	349	131	624	89
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1817	1803	1847	1943	2018	1988	2018	1883	1988	1832	1684	1817
Adj Flow Rate, veh/h	82	192	94	230	171	19	134	872	165	146	693	88
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
Percent Heavy Veh, %	2	3	0	5	0	2	0	9	2	1	11	2
Cap, veh/h	367	228	111	300	501	411	166	1037	655	712	1182	150
Arrive On Green	0.05	0.20	0.20	0.10	0.25	0.25	0.09	0.29	0.29	0.21	0.41	0.41
Sat Flow, veh/h	1731	1140	558	1850	2018	1655	1922	3578	1679	3385	2856	362
Grp Volume(v), veh/h	82	0	286	230	171	19	134	872	165	146	388	393
Grp Sat Flow(s),veh/h/ln	1731	0	1698	1850	2018	1655	1922	1789	1679	1693	1600	1618
Q Serve(g_s), s	3.7	0.0	16.2	9.7	7.0	0.5	6.8	22.9	2.7	3.6	18.8	18.8
Cycle Q Clear(g_c), s	3.7	0.0	16.2	9.7	7.0	0.5	6.8	22.9	2.7	3.6	18.8	18.8
Prop In Lane	1.00		0.33	1.00		1.00	1.00		1.00	1.00		0.22
Lane Grp Cap(c), veh/h	367	0	339	300	501	411	166	1037	655	712	662	670
V/C Ratio(X)	0.22	0.00	0.84	0.77	0.34	0.05	0.81	0.84	0.25	0.21	0.59	0.59
Avail Cap(c_a), veh/h	451	0	526	300	626	513	192	1037	655	712	662	670
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.00	0.96	1.00	1.00	1.00	1.00	1.00	1.00	0.79	0.79	0.79
Uniform Delay (d), s/veh	29.5	0.0	38.5	28.6	30.9	9.9	44.9	33.3	7.2	32.6	22.7	22.7
Incr Delay (d2), s/veh	0.1	0.0	4.1	10.3	0.1	0.0	16.8	8.2	0.9	0.0	3.0	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.7	0.0	11.1	8.6	5.9	0.6	7.1	16.0	2.3	2.6	11.1	11.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.6	0.0	42.6	38.9	31.0	9.9	61.7	41.5	8.1	32.6	25.7	25.7
LnGrp LOS	C	A	D	D	C	A	E	D	A	C	C	C
Approach Vol, veh/h		368			420			1171			927	
Approach Delay, s/veh		39.7			34.4			39.1			26.8	
Approach LOS		D			C			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	25.0	26.0	34.0	10.1	29.8	13.6	46.4				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	31.0	10.0	29.0	10.0	31.0	10.0	29.0				
Max Q Clear Time (g_c+I1), s	11.7	18.2	5.6	24.9	5.7	9.0	8.8	20.8				
Green Ext Time (p_c), s	0.0	0.4	0.0	1.1	0.0	0.3	0.0	1.2				
Intersection Summary												
HCM 6th Ctrl Delay			34.5									
HCM 6th LOS			C									

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Phase 4 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	169	288	27	212	63	57	86	29
Future Volume (vph)	169	288	27	212	63	57	86	29
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases					8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	27.0	10.0	27.0	32.0	32.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%
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	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	5.4	28.3	5.4	17.3	9.6	9.6	9.6	9.6
Actuated g/C Ratio	0.12	0.62	0.12	0.38	0.21	0.21	0.21	0.21
v/c Ratio	0.88	0.31	0.14	0.55	0.26	0.28	0.35	0.20
Control Delay	67.2	10.4	25.7	16.2	17.4	13.8	19.0	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.2	10.4	25.7	16.2	17.4	13.8	19.0	9.0
LOS	E	B	C	B	B	B	B	A
Approach Delay		30.4		16.9		15.2		14.5
Approach LOS		C		B		B		B

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 45.5

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 21.9

Intersection LOS: C

Intersection Capacity Utilization 51.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

		
10 s	85 s	35 s
		
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	169	288	24	27	212	120	63	57	41	86	29	42
Future Volume (veh/h)	169	288	24	27	212	120	63	57	41	86	29	42
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1841	1900	1876	1802	1876	1832	1876	1876	1900	1900	1900
Adj Flow Rate, veh/h	188	320	24	30	236	107	70	63	22	96	32	4
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
Percent Heavy Veh, %	0	4	0	0	5	0	3	0	0	0	0	0
Cap, veh/h	217	761	57	63	428	194	359	207	72	324	257	32
Arrive On Green	0.12	0.45	0.45	0.04	0.37	0.37	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1810	1691	127	1787	1172	532	1344	1329	464	1333	1656	207
Grp Volume(v), veh/h	188	0	344	30	0	343	70	0	85	96	0	36
Grp Sat Flow(s),veh/h/ln	1810	0	1817	1787	0	1704	1344	0	1793	1333	0	1863
Q Serve(g_s), s	4.3	0.0	5.4	0.7	0.0	6.7	2.0	0.0	1.8	2.9	0.0	0.7
Cycle Q Clear(g_c), s	4.3	0.0	5.4	0.7	0.0	6.7	2.7	0.0	1.8	4.6	0.0	0.7
Prop In Lane	1.00		0.07	1.00		0.31	1.00		0.26	1.00		0.11
Lane Grp Cap(c), veh/h	217	0	818	63	0	623	359	0	279	324	0	289
V/C Ratio(X)	0.87	0.00	0.42	0.48	0.00	0.55	0.19	0.00	0.31	0.30	0.00	0.12
Avail Cap(c_a), veh/h	217	0	3484	214	0	3267	1116	0	1289	1075	0	1339
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.0	0.0	7.8	19.8	0.0	10.5	16.3	0.0	15.6	17.7	0.0	15.2
Incr Delay (d2), s/veh	27.9	0.0	0.1	2.1	0.0	0.3	0.1	0.0	0.2	0.2	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.6	0.0	2.4	0.5	0.0	3.2	1.0	0.0	1.2	1.4	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.9	0.0	7.9	21.8	0.0	10.8	16.4	0.0	15.9	17.9	0.0	15.2
LnGrp LOS	D	A	A	C	A	B	B	A	B	B	A	B
Approach Vol, veh/h	532			373			155			132		
Approach Delay, s/veh	21.4			11.7			16.1			17.1		
Approach LOS	C			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.5	23.8		11.5	10.0	20.2		11.5				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	2.7	7.4		6.6	6.3	8.7		4.7				
Green Ext Time (p_c), s	0.0	0.6		0.1	0.0	0.7		0.2				
Intersection Summary												
HCM 6th Ctrl Delay	17.2											
HCM 6th LOS	B											

Intersection						
Int Delay, s/veh	1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	465	11	7	310	29	17
Future Vol, veh/h	465	11	7	310	29	17
Conflicting Peds, #/hr	0	3	3	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	95	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	3	0	0	5	0	0
Mvmt Flow	547	13	8	365	34	20
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	563	0	938	557
Stage 1	-	-	-	-	557	-
Stage 2	-	-	-	-	381	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1019	-	296	534
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	695	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1016	-	293	532
Mov Cap-2 Maneuver	-	-	-	-	293	-
Stage 1	-	-	-	-	576	-
Stage 2	-	-	-	-	689	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.2		17.1	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	351	-	-	1016	-	
HCM Lane V/C Ratio	0.154	-	-	0.008	-	
HCM Control Delay (s)	17.1	-	-	8.6	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.5	-	-	0	-	

Timings 8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	295	403	4	276	14	9	65	4
Future Volume (vph)	295	403	4	276	14	9	65	4
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	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	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	31.7	32.1	24.5	18.7	9.3	9.3	9.3	9.3
Actuated g/C Ratio	0.65	0.65	0.50	0.38	0.19	0.19	0.19	0.19
v/c Ratio	0.56	0.40	0.01	0.59	0.07	0.07	0.29	0.39
Control Delay	14.5	10.2	7.5	18.4	18.9	14.5	21.7	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	10.2	7.5	18.4	18.9	14.5	21.7	7.1
LOS	B	B	A	B	B	B	C	A
Approach Delay		12.0		18.3		16.4		11.6
Approach LOS		B		B		B		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 49.1

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 13.7

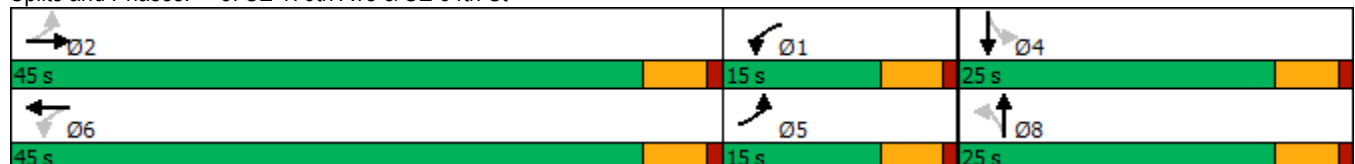
Intersection LOS: B

Intersection Capacity Utilization 59.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	295	403	2	4	276	59	14	9	8	65	4	141
Future Volume (veh/h)	295	403	2	4	276	59	14	9	8	65	4	141
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.98		1.00	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1856	1900	1900	1811	1826	1900	1900	1530	1870	1900	1885
Adj Flow Rate, veh/h	347	474	2	5	325	56	16	11	0	76	5	0
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
Percent Heavy Veh, %	9	3	0	0	6	5	0	0	25	2	0	1
Cap, veh/h	596	708	3	572	580	100	330	202	0	324	202	0
Arrive On Green	0.12	0.38	0.38	0.13	0.39	0.39	0.11	0.11	0.00	0.11	0.11	0.00
Sat Flow, veh/h	1682	1846	8	1810	1503	259	1407	1900	0	1378	1900	0
Grp Volume(v), veh/h	347	0	476	5	0	381	16	11	0	76	5	0
Grp Sat Flow(s),veh/h/ln	1682	0	1854	1810	0	1762	1407	1900	0	1378	1900	0
Q Serve(g_s), s	0.0	0.0	8.3	0.0	0.0	6.6	0.4	0.2	0.0	2.1	0.1	0.0
Cycle Q Clear(g_c), s	0.0	0.0	8.3	0.0	0.0	6.6	0.5	0.2	0.0	2.3	0.1	0.0
Prop In Lane	1.00		0.00	1.00		0.15	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	596	0	711	572	0	680	330	202	0	324	202	0
V/C Ratio(X)	0.58	0.00	0.67	0.01	0.00	0.56	0.05	0.05	0.00	0.23	0.02	0.00
Avail Cap(c_a), veh/h	816	0	1893	805	0	1800	899	970	0	880	970	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.6	0.0	10.0	9.7	0.0	9.4	15.9	15.7	0.0	16.7	15.7	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.4	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.9	0.0	4.0	0.0	0.0	3.0	0.2	0.1	0.0	1.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.9	0.0	10.4	9.7	0.0	9.7	15.9	15.8	0.0	16.9	15.7	0.0
LnGrp LOS	B	A	B	A	A	A	B	B	A	B	B	A
Approach Vol, veh/h		823			386			27			81	
Approach Delay, s/veh		11.5			9.7			15.9			16.8	
Approach LOS		B			A			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	20.0		9.2	9.9	20.1		9.2				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	10.3		4.3	2.0	8.6		2.5				
Green Ext Time (p_c), s	0.0	1.8		0.1	0.4	1.4		0.0				

Intersection Summary

HCM 6th Ctrl Delay	11.4
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

MOVEMENT SUMMARY

 **Site: 101 [SE 176 Avenue/ SE 29th Street Phase 4 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Phase 4

Site Category: (None)

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]		[Total HV]					[Veh. veh	Dist]				mph
			veh/h	%	veh/h	%	v/c	sec			ft				
South: SE 176th Avenue															
3	L2	All MCs	5	0.0	5	0.0	0.515	10.9	LOS B	3.9	97.6	0.71	0.64	0.94	30.6
8	T1	All MCs	144	2.0	144	2.0	0.515	11.2	LOS B	3.9	97.6	0.71	0.64	0.94	31.1
18	R2	All MCs	296	0.0	296	0.0	0.515	10.9	LOS B	3.9	97.6	0.71	0.64	0.94	30.9
Approach			445	0.6	445	0.6	0.515	11.0	LOS B	3.9	97.6	0.71	0.64	0.94	31.0
East: SE 29th Street															
1	L2	All MCs	122	0.0	122	0.0	0.527	8.9	LOS A	3.9	97.9	0.51	0.27	0.51	31.1
6	T1	All MCs	418	0.0	418	0.0	0.527	8.9	LOS A	3.9	97.9	0.51	0.27	0.51	31.7
16	R2	All MCs	79	0.0	79	0.0	0.527	8.9	LOS A	3.9	97.9	0.51	0.27	0.51	31.5
Approach			619	0.0	619	0.0	0.527	8.9	LOS A	3.9	97.9	0.51	0.27	0.51	31.6
North: SE 176th Avenue															
7	L2	All MCs	69	88.0	69	88.0	0.536	28.9	LOS D	2.9	90.3	0.75	0.78	1.15	26.5
4	T1	All MCs	104	1.0	104	1.0	0.536	12.3	LOS B	2.9	90.3	0.75	0.78	1.15	28.9
14	R2	All MCs	122	18.0	122	18.0	0.536	14.7	LOS B	2.9	90.3	0.75	0.78	1.15	28.4
Approach			295	28.5	295	28.5	0.536	16.4	LOS C	2.9	90.3	0.75	0.78	1.15	28.1
West: SE 29th Street															
5	L2	All MCs	6	0.0	6	0.0	0.351	7.5	LOS A	1.8	46.0	0.57	0.40	0.57	32.2
2	T1	All MCs	313	0.0	313	0.0	0.351	7.5	LOS A	1.8	46.0	0.57	0.40	0.57	32.8
12	R2	All MCs	15	10.0	15	10.0	0.351	8.7	LOS A	1.8	46.0	0.57	0.40	0.57	32.3
Approach			334	0.5	334	0.5	0.351	7.5	LOS A	1.8	46.0	0.57	0.40	0.57	32.8
All Vehicles			1693	5.2	1693	5.2	0.536	10.6	LOS B	3.9	97.9	0.62	0.48	0.75	31.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: H:\27\27715 - VIC Implementation\005 - Master Plan Update TIA\Analysis\176th_29th With Project 2038 AM.sip9

Intersection	
Intersection Delay, s/veh	16.6
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	272	36	87	314	14	55	94	66	0	93	10
Future Vol, veh/h	12	272	36	87	314	14	55	94	66	0	93	10
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
Heavy Vehicles, %	0	4	10	4	1	9	4	3	0	0	0	0
Mvmt Flow	13	299	40	96	345	15	60	103	73	0	102	11
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	18.8	17.9	12.8	12.8
HCM LOS	C	C	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	59%	0%	88%	0%	96%	90%
Vol Right, %	0%	41%	0%	12%	0%	4%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	55	160	12	308	87	328	103
LT Vol	55	0	12	0	87	0	0
Through Vol	0	94	0	272	0	314	93
RT Vol	0	66	0	36	0	14	10
Lane Flow Rate	60	176	13	338	96	360	113
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.13	0.338	0.026	0.614	0.185	0.638	0.235
Departure Headway (Hd)	7.746	6.923	7.051	6.526	6.969	6.377	7.466
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	463	519	510	555	517	569	481
Service Time	5.489	4.665	4.763	4.238	4.681	4.089	5.517
HCM Lane V/C Ratio	0.13	0.339	0.025	0.609	0.186	0.633	0.235
HCM Control Delay	11.6	13.2	10	19.1	11.3	19.7	12.8
HCM Lane LOS	B	B	A	C	B	C	B
HCM 95th-tile Q	0.4	1.5	0.1	4.1	0.7	4.5	0.9

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	42	30	46	234	56	259	23	1081	237	792
Future Volume (vph)	42	30	46	234	56	259	23	1081	237	792
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Prot	NA
Protected Phases	5	2		1	6		7	4	3	8
Permitted Phases	2		2	6		6				
Detector Phase	5	2	2	1	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	9.5	39.0	39.0	9.5	38.0	38.0	10.0	32.0	10.0	32.0
Total Split (s)	10.0	25.0	25.0	14.0	29.0	29.0	17.0	44.0	37.0	64.0
Total Split (%)	8.3%	20.8%	20.8%	11.7%	24.2%	24.2%	14.2%	36.7%	30.8%	53.3%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.5	5.0	5.0	4.5	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max
Act Effct Green (s)	15.9	12.0	12.0	23.3	15.2	15.2	5.7	61.5	20.3	80.1
Actuated g/C Ratio	0.13	0.10	0.10	0.19	0.13	0.13	0.05	0.51	0.17	0.67
v/c Ratio	0.23	0.17	0.16	0.98	0.25	0.62	0.28	0.45	0.82	0.26
Control Delay	39.2	49.8	1.2	98.6	48.1	11.6	64.3	9.3	69.2	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.2	49.8	1.2	98.6	48.1	11.6	64.3	9.3	69.2	9.8
LOS	D	D	A	F	D	B	E	A	E	A
Approach Delay		27.3			52.4			10.4		23.1
Approach LOS		C			D			B		C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 4 (3%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 23.8

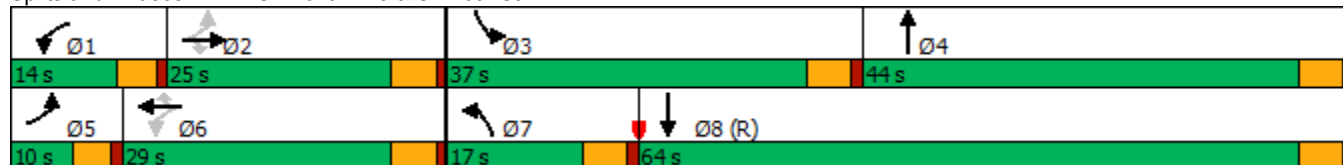
Intersection LOS: C

Intersection Capacity Utilization 67.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	30	46	234	56	259	23	1081	37	237	792	26
Future Volume (veh/h)	42	30	46	234	56	259	23	1081	37	237	792	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1900	1856	1870	1870	1900	1900	1870	1796	1885	1856	1826
Adj Flow Rate, veh/h	44	32	2	246	59	22	24	1138	37	249	834	25
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	0	3	2	2	0	0	2	7	1	3	5
Cap, veh/h	225	158	130	293	243	209	42	1834	60	276	2485	74
Arrive On Green	0.03	0.08	0.08	0.08	0.13	0.13	0.02	0.36	0.36	0.15	0.49	0.49
Sat Flow, veh/h	1767	1900	1572	1781	1870	1610	1810	5079	165	1795	5054	151
Grp Volume(v), veh/h	44	32	2	246	59	22	24	763	412	249	557	302
Grp Sat Flow(s),veh/h/ln	1767	1900	1572	1781	1870	1610	1810	1702	1840	1795	1689	1828
Q Serve(g_s), s	2.7	1.9	0.1	9.5	3.4	1.4	1.6	22.1	22.2	16.4	12.0	12.1
Cycle Q Clear(g_c), s	2.7	1.9	0.1	9.5	3.4	1.4	1.6	22.1	22.2	16.4	12.0	12.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.09	1.00		0.08
Lane Grp Cap(c), veh/h	225	158	130	293	243	209	42	1229	664	276	1660	899
V/C Ratio(X)	0.20	0.20	0.02	0.84	0.24	0.11	0.58	0.62	0.62	0.90	0.34	0.34
Avail Cap(c_a), veh/h	249	317	262	293	374	322	181	1229	664	479	1660	899
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.77	0.77	0.77	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.2	51.3	50.5	48.9	46.9	46.0	58.0	31.6	31.6	49.9	18.6	18.6
Incr Delay (d2), s/veh	0.4	0.2	0.0	18.9	0.2	0.1	3.6	1.8	3.4	6.2	0.5	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.2	1.7	0.1	7.7	2.9	1.0	1.4	13.5	14.8	12.2	8.2	8.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.6	51.6	50.5	67.8	47.1	46.1	61.6	33.4	34.9	56.1	19.1	19.6
LnGrp LOS	D	D	D	E	D	D	E	C	C	E	B	B
Approach Vol, veh/h	78			327			1199			1108		
Approach Delay, s/veh	49.9			62.6			34.5			27.6		
Approach LOS	D			E			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.0	15.0	23.4	48.3	8.3	20.6	7.8	64.0				
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0				
Max Green Setting (Gmax), s	9.5	20.0	32.0	39.0	5.5	24.0	12.0	59.0				
Max Q Clear Time (g_c+I1), s	11.5	3.9	18.4	24.2	4.7	5.4	3.6	14.1				
Green Ext Time (p_c), s	0.0	0.0	0.1	4.4	0.0	0.1	0.0	3.7				

Intersection Summary

HCM 6th Ctrl Delay	35.5
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Timings
12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	28	60	165	312	121	99	111	953	465	155	833
Future Volume (vph)	28	60	165	312	121	99	111	953	465	155	833
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	20.0	33.0	20.0	25.0	38.0	17.0	20.0	45.0	25.0	17.0	42.0
Total Split (%)	16.7%	27.5%	16.7%	20.8%	31.7%	14.2%	16.7%	37.5%	20.8%	14.2%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	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	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	6.4	8.2	23.0	20.0	23.8	46.4	11.8	56.2	81.2	17.6	62.0
Actuated g/C Ratio	0.05	0.07	0.19	0.17	0.20	0.39	0.10	0.47	0.68	0.15	0.52
v/c Ratio	0.39	0.56	0.53	1.18	0.36	0.16	0.72	0.65	0.43	0.66	0.54
Control Delay	68.3	70.9	31.3	152.9	45.0	4.8	74.0	28.4	2.3	65.1	17.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.3	70.9	31.3	152.9	45.0	4.8	74.0	28.4	2.3	65.1	17.1
LOS	E	E	C	F	D	A	E	C	A	E	B
Approach Delay		44.8			100.8			23.7			24.4
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 15 (13%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.18

Intersection Signal Delay: 37.8

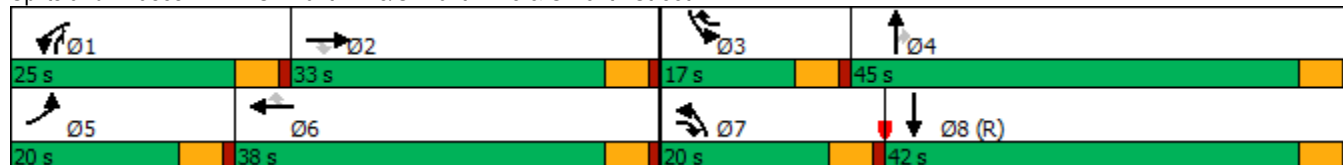
Intersection LOS: D

Intersection Capacity Utilization 71.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave/SE164th Ave & SE 34th Street



HCM 6th Signalized Intersection Summary

12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	60	165	312	121	99	111	953	465	155	833	37
Future Volume (veh/h)	28	60	165	312	121	99	111	953	465	155	833	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1565	1758	1803	1870	1885	1841	1791	1776	1746	1806	1761	1761
Adj Flow Rate, veh/h	31	67	124	347	134	30	123	1059	306	172	926	39
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
Percent Heavy Veh, %	19	6	3	2	1	4	1	2	4	0	3	3
Cap, veh/h	40	159	270	297	434	515	147	1125	740	172	1327	56
Arrive On Green	0.03	0.09	0.09	0.17	0.23	0.23	0.09	0.33	0.33	0.10	0.35	0.35
Sat Flow, veh/h	1491	1758	1528	1781	1885	1560	1706	3375	1480	1720	3826	161
Grp Volume(v), veh/h	31	67	124	347	134	30	123	1059	306	172	545	420
Grp Sat Flow(s),veh/h/ln	1491	1758	1528	1781	1885	1560	1706	1687	1480	1720	1127	1732
Q Serve(g_s), s	2.5	4.3	8.7	20.0	7.1	1.6	8.5	36.6	15.6	12.0	25.0	25.1
Cycle Q Clear(g_c), s	2.5	4.3	8.7	20.0	7.1	1.6	8.5	36.6	15.6	12.0	25.0	25.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.09
Lane Grp Cap(c), veh/h	40	159	270	297	434	515	147	1125	740	172	782	601
V/C Ratio(X)	0.77	0.42	0.46	1.17	0.31	0.06	0.84	0.94	0.41	1.00	0.70	0.70
Avail Cap(c_a), veh/h	186	410	488	297	518	585	213	1125	740	172	782	601
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.92	0.92
Uniform Delay (d), s/veh	58.0	51.6	44.2	50.0	38.3	27.4	54.0	38.9	18.9	54.0	33.7	33.8
Incr Delay (d2), s/veh	11.1	0.7	0.5	106.0	0.1	0.0	11.8	16.0	1.7	65.9	4.7	6.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.9	3.4	5.9	26.2	5.8	1.0	7.3	23.8	9.3	12.7	11.3	16.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.2	52.2	44.7	156.0	38.4	27.4	65.8	54.9	20.6	119.9	38.5	39.9
LnGrp LOS	E	D	D	F	D	C	E	D	C	F	D	D
Approach Vol, veh/h	222			511			1488			1137		
Approach Delay, s/veh	50.4			117.6			48.7			51.3		
Approach LOS	D			F			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.0	15.9	17.0	45.0	8.2	32.7	15.4	46.6				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	20.0	28.0	12.0	40.0	15.0	33.0	15.0	37.0				
Max Q Clear Time (g_c+I1), s	22.0	10.7	14.0	38.6	4.5	9.1	10.5	27.1				
Green Ext Time (p_c), s	0.0	0.1	0.0	0.6	0.0	0.2	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay	60.2											
HCM 6th LOS	E											

Timings
1: SE 192nd & SE 15th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	116	91	40	82	242	87	1360	115	1505
Future Volume (vph)	116	91	40	82	242	87	1360	115	1505
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	15.0	29.0	15.0	29.0	16.0	14.0	40.0	16.0	42.0
Total Split (%)	15.0%	29.0%	15.0%	29.0%	16.0%	14.0%	40.0%	16.0%	42.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	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	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effct Green (s)	9.0	15.9	6.2	11.1	19.9	7.9	52.1	9.7	55.9
Actuated g/C Ratio	0.09	0.16	0.06	0.11	0.20	0.08	0.52	0.10	0.56
v/c Ratio	0.79	0.63	0.38	0.42	0.67	0.64	0.80	0.69	0.88
Control Delay	78.1	37.1	54.0	45.1	30.3	53.9	25.6	63.7	30.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.1	37.1	54.0	45.1	30.3	53.9	25.6	63.7	30.0
LOS	E	D	D	D	C	D	C	E	C
Approach Delay		52.5		36.2			27.2		32.3
Approach LOS		D		D			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 32.3

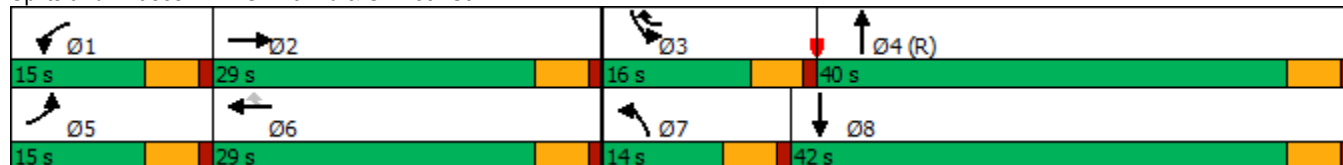
Intersection LOS: C

Intersection Capacity Utilization 82.8%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	116	91	101	40	82	242	87	1360	32	115	1505	133
Future Volume (veh/h)	116	91	101	40	82	242	87	1360	32	115	1505	133
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1885	1900	1900	1856	1900	1900	1870	1900	1900	1870	1870
Adj Flow Rate, veh/h	122	96	60	42	86	192	92	1432	33	121	1584	135
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	1	0	0	3	0	0	2	0	0	2	2
Cap, veh/h	150	201	125	62	248	344	126	1768	41	149	1694	143
Arrive On Green	0.09	0.19	0.19	0.03	0.13	0.13	0.09	0.66	0.66	0.11	0.68	0.68
Sat Flow, veh/h	1739	1084	678	1810	1856	1582	1810	3550	82	1810	3315	280
Grp Volume(v), veh/h	122	0	156	42	86	192	92	716	749	121	842	877
Grp Sat Flow(s),veh/h/ln	1739	0	1762	1810	1856	1582	1810	1777	1855	1810	1777	1819
Q Serve(g_s), s	6.9	0.0	7.9	2.3	4.2	10.8	4.9	29.3	29.5	6.5	41.1	43.0
Cycle Q Clear(g_c), s	6.9	0.0	7.9	2.3	4.2	10.8	4.9	29.3	29.5	6.5	41.1	43.0
Prop In Lane	1.00		0.38	1.00		1.00	1.00		0.04	1.00		0.15
Lane Grp Cap(c), veh/h	150	0	326	62	248	344	126	885	924	149	908	929
V/C Ratio(X)	0.82	0.00	0.48	0.67	0.35	0.56	0.73	0.81	0.81	0.81	0.93	0.94
Avail Cap(c_a), veh/h	174	0	423	181	445	512	163	885	924	199	908	929
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.14	0.14	0.14	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.9	0.0	36.4	47.7	39.4	35.0	44.5	13.4	13.5	43.8	14.4	14.7
Incr Delay (d2), s/veh	19.5	0.0	0.4	4.6	0.3	0.5	1.1	1.2	1.2	12.5	16.8	18.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.7	0.0	6.0	2.0	3.5	7.3	3.1	9.7	10.1	5.9	20.7	22.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.4	0.0	36.8	52.4	39.7	35.5	45.5	14.6	14.6	56.3	31.3	33.4
LnGrp LOS	E	A	D	D	D	D	D	B	B	E	C	C
Approach Vol, veh/h		278			320			1557			1840	
Approach Delay, s/veh		48.9			38.8			16.4			33.9	
Approach LOS		D			D			B			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.4	23.5	13.2	54.8	13.6	18.4	12.0	56.1				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	24.0	11.0	35.0	10.0	24.0	9.0	37.0				
Max Q Clear Time (g_c+I1), s	4.3	9.9	8.5	31.5	8.9	12.8	6.9	45.0				
Green Ext Time (p_c), s	0.0	0.2	0.0	1.5	0.0	0.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			28.5									
HCM 6th LOS			C									

Timings
2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	233	183	280	265	149	951	151	1126
Future Volume (vph)	233	183	280	265	149	951	151	1126
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	20.0	27.0	20.0	27.0	14.0	35.0	18.0	39.0
Total Split (%)	20.0%	27.0%	20.0%	27.0%	14.0%	35.0%	18.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effct Green (s)	11.3	23.3	12.4	24.4	9.5	32.6	11.7	34.8
Actuated g/C Ratio	0.11	0.23	0.12	0.24	0.10	0.33	0.12	0.35
v/c Ratio	0.62	0.67	0.67	0.88	0.91	1.05	0.75	1.17
Control Delay	49.0	40.5	49.7	56.7	104.0	62.1	61.1	115.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	40.5	49.7	56.7	104.0	62.1	61.1	115.4
LOS	D	D	D	E	F	E	E	F
Approach Delay		44.4		53.7		66.8		110.0
Approach LOS		D		D		E		F

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 93 (93%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.17

Intersection Signal Delay: 78.1

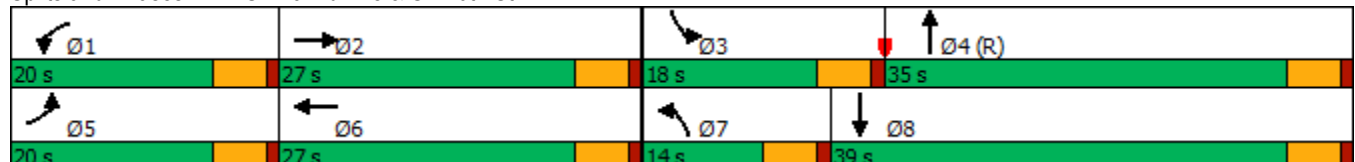
Intersection LOS: E

Intersection Capacity Utilization 91.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 2: SE 192nd Ave & SE 20th St



HCM 6th Signalized Intersection Summary

2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	233	183	95	280	265	118	149	951	210	151	1126	237
Future Volume (veh/h)	233	183	95	280	265	118	149	951	210	151	1126	237
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1885	1900	1900	1870	1900	1885	1900	1885	1870	1885
Adj Flow Rate, veh/h	243	191	80	292	276	106	155	991	200	157	1173	228
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	1	0	0	2	0	1	0	1	2	1
Cap, veh/h	316	262	110	364	286	110	163	1142	230	189	1188	229
Arrive On Green	0.09	0.21	0.21	0.10	0.22	0.22	0.09	0.38	0.38	0.14	0.53	0.53
Sat Flow, veh/h	3510	1270	532	3510	1301	500	1810	2969	598	1795	2970	573
Grp Volume(v), veh/h	243	0	271	292	0	382	155	597	594	157	699	702
Grp Sat Flow(s),veh/h/ln	1755	0	1802	1755	0	1801	1810	1791	1777	1795	1777	1766
Q Serve(g_s), s	6.8	0.0	14.0	8.1	0.0	21.0	8.5	30.8	30.9	8.5	38.6	39.5
Cycle Q Clear(g_c), s	6.8	0.0	14.0	8.1	0.0	21.0	8.5	30.8	30.9	8.5	38.6	39.5
Prop In Lane	1.00		0.30	1.00		0.28	1.00		0.34	1.00		0.32
Lane Grp Cap(c), veh/h	316	0	372	364	0	396	163	689	683	189	711	707
V/C Ratio(X)	0.77	0.00	0.73	0.80	0.00	0.96	0.95	0.87	0.87	0.83	0.98	0.99
Avail Cap(c_a), veh/h	527	0	397	527	0	396	163	689	683	233	711	707
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.37	0.37	0.37
Uniform Delay (d), s/veh	44.5	0.0	37.1	43.8	0.0	38.6	45.3	28.4	28.5	42.1	23.1	23.3
Incr Delay (d2), s/veh	1.5	0.0	5.2	3.5	0.0	35.6	55.7	13.8	14.2	6.3	16.9	19.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.3	0.0	10.7	6.5	0.0	18.7	10.3	21.3	21.3	5.8	19.8	20.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.0	0.0	42.3	47.3	0.0	74.2	101.0	42.3	42.6	48.4	40.0	42.5
LnGrp LOS	D	A	D	D	A	E	F	D	D	D	D	D
Approach Vol, veh/h		514			674			1346			1558	
Approach Delay, s/veh		44.0			62.6			49.2			42.0	
Approach LOS		D			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.4	25.6	15.6	43.4	14.0	27.0	14.0	45.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	22.0	13.0	30.0	15.0	22.0	9.0	34.0				
Max Q Clear Time (g_c+I1), s	10.1	16.0	10.5	32.9	8.8	23.0	10.5	41.5				
Green Ext Time (p_c), s	0.3	0.5	0.0	0.0	0.2	0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			48.0									
HCM 6th LOS			D									

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	4	1320	3	10	1368
Future Vol, veh/h	3	4	1320	3	10	1368
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	230	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	3	4	1389	3	11	1440
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	2135	698	0	0	1394	0
Stage 1	1393	-	-	-	-	-
Stage 2	742	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	43	388	-	-	497	-
Stage 1	199	-	-	-	-	-
Stage 2	437	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	42	387	-	-	496	-
Mov Cap-2 Maneuver	42	-	-	-	-	-
Stage 1	199	-	-	-	-	-
Stage 2	427	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	50.1	0		0.1		
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	42	387	496	-
HCM Lane V/C Ratio	-	-	0.075	0.011	0.021	-
HCM Control Delay (s)	-	-	97.6	14.4	12.4	-
HCM Lane LOS	-	-	F	B	B	-
HCM 95th %tile Q(veh)	-	-	0.2	0	0.1	-

Timings
4: SE 192nd Ave & SE 29th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

						
Lane Group	EBL	EBR	NBL	NBT	SBT	
Lane Configurations						
Traffic Volume (vph)	157	57	70	1166	1239	
Future Volume (vph)	157	57	70	1166	1239	
Turn Type	Prot	pm+ov	Prot	NA	NA	
Protected Phases	2	7	7	4	8	
Permitted Phases		2				
Detector Phase	2	7	7	4	8	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	27.0	10.0	10.0	26.0	26.0	
Total Split (s)	30.0	16.0	16.0	68.0	54.0	
Total Split (%)	30.0%	16.0%	16.0%	68.0%	54.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	Max	None	None	C-Max	None	
Act Effect Green (s)	25.0	34.1	9.1	65.0	53.1	
Actuated g/C Ratio	0.25	0.34	0.09	0.65	0.53	
v/c Ratio	0.38	0.11	0.47	0.53	0.77	
Control Delay	34.1	11.5	70.0	4.6	24.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	34.1	11.5	70.0	4.6	24.0	
LOS	C	B	E	A	C	
Approach Delay	28.1			8.3	24.0	
Approach LOS	C			A	C	

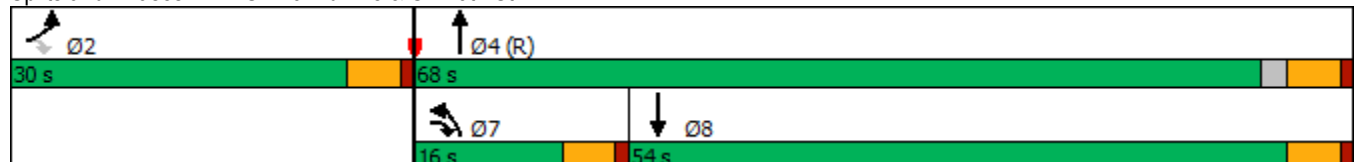
Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 45 (45%), Referenced to phase 4:NBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 17.5
 Intersection Capacity Utilization 73.5%
 Analysis Period (min) 15

Intersection LOS: B

ICU Level of Service D

Splits and Phases: 4: SE 192nd Ave & SE 29th St



HCM 6th Signalized Intersection Summary

4: SE 192nd Ave & SE 29th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	157	57	70	1166	1239	132
Future Volume (veh/h)	157	57	70	1166	1239	132
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1826	1826	1885	1885	1826
Adj Flow Rate, veh/h	165	39	74	1227	1304	131
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	5	5	1	1	5
Cap, veh/h	442	470	94	2328	1795	180
Arrive On Green	0.25	0.25	0.11	1.00	0.55	0.55
Sat Flow, veh/h	1767	1547	1739	3676	3382	329
Grp Volume(v), veh/h	165	39	74	1227	708	727
Grp Sat Flow(s),veh/h/ln	1767	1547	1739	1791	1791	1826
Q Serve(g_s), s	7.7	1.8	4.1	0.0	29.7	30.0
Cycle Q Clear(g_c), s	7.7	1.8	4.1	0.0	29.7	30.0
Prop In Lane	1.00	1.00	1.00			0.18
Lane Grp Cap(c), veh/h	442	470	94	2328	978	997
V/C Ratio(X)	0.37	0.08	0.79	0.53	0.72	0.73
Avail Cap(c_a), veh/h	442	470	191	2328	978	997
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.46	0.46	1.00	1.00
Uniform Delay (d), s/veh	31.0	24.8	44.0	0.0	17.0	17.1
Incr Delay (d2), s/veh	2.4	0.3	6.6	0.4	2.7	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.4	3.4	3.3	0.2	17.2	17.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	33.4	25.2	50.6	0.4	19.7	19.9
LnGrp LOS	C	C	D	A	B	B
Approach Vol, veh/h	204			1301	1435	
Approach Delay, s/veh	31.9			3.3	19.8	
Approach LOS	C			A	B	
Timer - Assigned Phs	2		4		7	8
Phs Duration (G+Y+Rc), s	30.0		70.0		10.4	59.6
Change Period (Y+Rc), s	5.0		5.0		5.0	5.0
Max Green Setting (Gmax), s	25.0		63.0		11.0	49.0
Max Q Clear Time (g_c+I1), s	9.7		2.0		6.1	32.0
Green Ext Time (p_c), s	0.5		11.8		0.0	8.9
Intersection Summary						
HCM 6th Ctrl Delay			13.3			
HCM 6th LOS			B			

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	191	258	355	224	129	148	1016	204	225	976
Future Volume (vph)	191	258	355	224	129	148	1016	204	225	976
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	14.0	32.0	19.0	37.0	37.0	13.0	34.0	19.0	15.0	36.0
Total Split (%)	14.0%	32.0%	19.0%	37.0%	37.0%	13.0%	34.0%	19.0%	15.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	33.8	25.2	44.2	30.7	30.7	9.6	30.8	44.8	10.0	31.2
Actuated g/C Ratio	0.34	0.25	0.44	0.31	0.31	0.10	0.31	0.45	0.10	0.31
v/c Ratio	0.47	0.94	1.13	0.40	0.22	0.89	0.97	0.26	0.69	1.08
Control Delay	22.2	64.1	117.8	29.5	2.2	92.2	55.9	2.1	72.0	97.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.2	64.1	117.8	29.5	2.2	92.2	55.9	2.1	72.0	97.2
LOS	C	E	F	C	A	F	E	A	E	F
Approach Delay		50.8		68.8			51.8			92.9
Approach LOS		D		E			D			F

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 36 (36%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.13

Intersection Signal Delay: 68.3

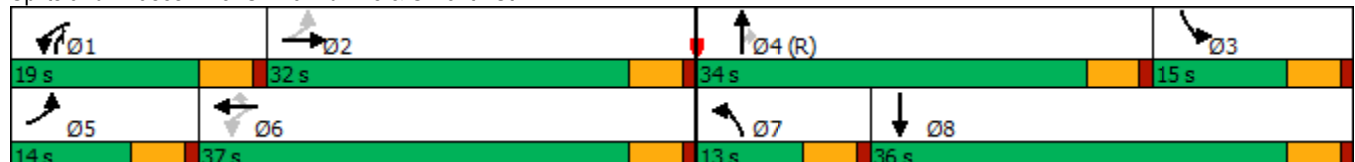
Intersection LOS: E

Intersection Capacity Utilization 99.2%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	191	258	153	355	224	129	148	1016	204	225	976	135
Future Volume (veh/h)	191	258	153	355	224	129	148	1016	204	225	976	135
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1817	1847	1817	2003	2003	2018	2018	1988	2003	1847	1832	1817
Adj Flow Rate, veh/h	201	272	138	374	236	35	156	1069	91	237	1027	130
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	0	2	1	1	0	0	2	1	0	1	2
Cap, veh/h	455	292	148	363	610	520	154	1095	726	393	1009	128
Arrive On Green	0.09	0.25	0.25	0.14	0.30	0.30	0.08	0.29	0.29	0.12	0.33	0.33
Sat Flow, veh/h	1731	1148	583	1908	2003	1705	1922	3777	1683	3413	3102	392
Grp Volume(v), veh/h	201	0	410	374	236	35	156	1069	91	237	576	581
Grp Sat Flow(s),veh/h/ln	1731	0	1731	1908	2003	1705	1922	1889	1683	1706	1741	1753
Q Serve(g_s), s	8.6	0.0	23.1	14.0	9.3	1.0	8.0	28.0	1.7	6.6	32.5	32.5
Cycle Q Clear(g_c), s	8.6	0.0	23.1	14.0	9.3	1.0	8.0	28.0	1.7	6.6	32.5	32.5
Prop In Lane	1.00		0.34	1.00		1.00	1.00		1.00	1.00		0.22
Lane Grp Cap(c), veh/h	455	0	441	363	610	520	154	1095	726	393	566	570
V/C Ratio(X)	0.44	0.00	0.93	1.03	0.39	0.07	1.01	0.98	0.13	0.60	1.02	1.02
Avail Cap(c_a), veh/h	455	0	467	363	641	546	154	1095	726	393	566	570
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.79	0.00	0.79	1.00	1.00	1.00	1.00	1.00	1.00	0.59	0.59	0.59
Uniform Delay (d), s/veh	24.4	0.0	36.4	25.5	27.4	11.8	46.0	35.2	6.4	42.1	33.7	33.7
Incr Delay (d2), s/veh	0.2	0.0	20.2	54.8	0.1	0.0	76.5	22.0	0.4	1.1	33.4	33.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.1	0.0	16.8	17.2	7.7	1.0	11.4	22.0	1.5	4.9	23.8	24.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.6	0.0	56.6	80.4	27.5	11.8	122.5	57.1	6.7	43.2	67.2	67.5
LnGrp LOS	C	A	E	F	C	B	F	E	A	D	F	F
Approach Vol, veh/h	611			645			1316			1394		
Approach Delay, s/veh	46.1			57.3			61.4			63.2		
Approach LOS	D			E			E			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	30.5	16.5	34.0	14.0	35.5	13.0	37.5				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	14.0	27.0	10.0	29.0	9.0	32.0	8.0	31.0				
Max Q Clear Time (g_c+I1), s	16.0	25.1	8.6	30.0	10.6	11.3	10.0	34.5				
Green Ext Time (p_c), s	0.0	0.2	0.0	0.0	0.0	0.4	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay 59.0

HCM 6th LOS E

Notes

User approved pedestrian interval to be less than phase max green.

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Phase 4 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	86	306	37	333	71	26	263	46
Future Volume (vph)	86	306	37	333	71	26	263	46
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases					8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	30.0	10.0	30.0	32.0	32.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%
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	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	5.2	29.9	5.2	24.9	19.0	19.0	19.0	19.0
Actuated g/C Ratio	0.08	0.46	0.08	0.38	0.29	0.29	0.29	0.29
v/c Ratio	0.63	0.49	0.28	0.79	0.26	0.12	0.71	0.40
Control Delay	55.8	16.1	38.9	26.1	21.8	11.3	32.7	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.8	16.1	38.9	26.1	21.8	11.3	32.7	11.1
LOS	E	B	D	C	C	B	C	B
Approach Delay		23.3		27.0		17.1		22.8
Approach LOS		C		C		B		C

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 64.7

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 23.9

Intersection LOS: C

Intersection Capacity Utilization 70.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

		
Ø1	Ø2	Ø4
10 s	85 s	35 s
		
Ø5	Ø6	Ø8
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary 6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	306	80	37	333	181	71	26	32	263	46	174
Future Volume (veh/h)	86	306	80	37	333	181	71	26	32	263	46	174
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1870	1841	1832	1847	1876	1817	1876	1832	1885	1900	1900
Adj Flow Rate, veh/h	91	326	74	39	354	167	76	28	8	280	49	82
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	2	4	3	2	0	4	0	3	1	0	0
Cap, veh/h	134	553	125	74	407	192	398	367	105	494	167	279
Arrive On Green	0.07	0.38	0.38	0.04	0.34	0.34	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1810	1473	334	1745	1183	558	1220	1402	401	1378	637	1066
Grp Volume(v), veh/h	91	0	400	39	0	521	76	0	36	280	0	131
Grp Sat Flow(s),veh/h/ln	1810	0	1807	1745	0	1741	1220	0	1803	1378	0	1703
Q Serve(g_s), s	2.3	0.0	8.3	1.0	0.0	13.1	2.5	0.0	0.7	9.0	0.0	2.9
Cycle Q Clear(g_c), s	2.3	0.0	8.3	1.0	0.0	13.1	5.4	0.0	0.7	9.7	0.0	2.9
Prop In Lane	1.00		0.19	1.00		0.32	1.00		0.22	1.00		0.63
Lane Grp Cap(c), veh/h	134	0	678	74	0	598	398	0	472	494	0	446
V/C Ratio(X)	0.68	0.00	0.59	0.53	0.00	0.87	0.19	0.00	0.08	0.57	0.00	0.29
Avail Cap(c_a), veh/h	193	0	3088	186	0	2975	860	0	1155	1016	0	1092
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.1	0.0	11.7	21.9	0.0	14.4	16.0	0.0	13.0	16.7	0.0	13.8
Incr Delay (d2), s/veh	2.2	0.0	0.3	2.1	0.0	1.6	0.1	0.0	0.0	0.4	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.6	0.0	4.5	0.7	0.0	7.4	1.1	0.0	0.5	4.6	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.4	0.0	12.0	24.1	0.0	16.0	16.1	0.0	13.0	17.1	0.0	14.0
LnGrp LOS	C	A	B	C	A	B	B	A	B	B	A	B
Approach Vol, veh/h	491			560			112			411		
Approach Delay, s/veh	14.1			16.5			15.1			16.1		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.0	22.6		17.2	8.5	21.1		17.2				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	3.0	10.3		11.7	4.3	15.1		7.4				
Green Ext Time (p_c), s	0.0	0.3		0.1	0.0	0.5		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	15.6											
HCM 6th LOS	B											

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	465	32	16	563	18	7
Future Vol, veh/h	465	32	16	563	18	7
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	95	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	0	0	2	0	0
Mvmt Flow	511	35	18	619	20	8
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	546	0	1184	530
Stage 1	-	-	-	-	529	-
Stage 2	-	-	-	-	655	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1033	-	211	553
Stage 1	-	-	-	-	595	-
Stage 2	-	-	-	-	521	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1033	-	207	552
Mov Cap-2 Maneuver	-	-	-	-	207	-
Stage 1	-	-	-	-	595	-
Stage 2	-	-	-	-	512	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.2		21.1	
HCM LOS	C					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	251	-	-	1033	-	
HCM Lane V/C Ratio	0.109	-	-	0.017	-	
HCM Control Delay (s)	21.1	-	-	8.5	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-	

Timings 8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	219	398	18	443	10	10	93	21
Future Volume (vph)	219	398	18	443	10	10	93	21
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	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	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	35.9	34.6	29.8	23.5	10.3	10.3	10.3	10.3
Actuated g/C Ratio	0.62	0.60	0.51	0.40	0.18	0.18	0.18	0.18
v/c Ratio	0.55	0.40	0.04	0.82	0.07	0.06	0.41	0.50
Control Delay	19.1	10.9	7.6	25.7	23.8	18.5	28.5	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.1	10.9	7.6	25.7	23.8	18.5	28.5	9.7
LOS	B	B	A	C	C	B	C	A
Approach Delay		13.7		25.2		20.5		15.5
Approach LOS		B		C		C		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 58.1

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 18.5

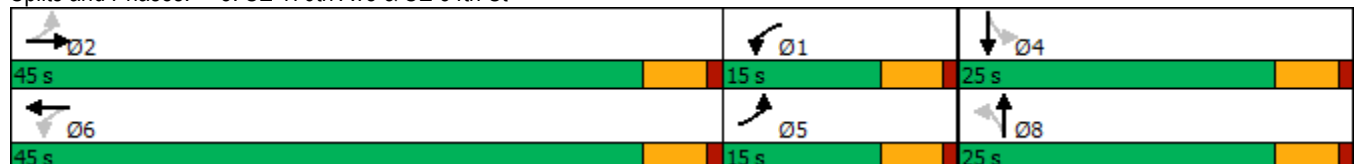
Intersection LOS: B

Intersection Capacity Utilization 68.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	219	398	13	18	443	120	10	10	6	93	21	186
Future Volume (veh/h)	219	398	13	18	443	120	10	10	6	93	21	186
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1870	1900	1900	1885	1885	1900	1900	1900	1885	1900	1900
Adj Flow Rate, veh/h	238	433	13	20	482	115	11	11	0	101	23	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
Percent Heavy Veh, %	1	2	0	0	1	1	0	0	0	1	0	0
Cap, veh/h	450	670	20	607	590	141	304	215	0	330	110	86
Arrive On Green	0.12	0.37	0.37	0.15	0.40	0.40	0.11	0.11	0.00	0.11	0.11	0.11
Sat Flow, veh/h	1795	1806	54	1810	1471	351	1382	1900	0	1409	975	763
Grp Volume(v), veh/h	238	0	446	20	0	597	11	11	0	101	0	41
Grp Sat Flow(s),veh/h/ln	1795	0	1861	1810	0	1822	1382	1900	0	1409	0	1738
Q Serve(g_s), s	0.0	0.0	8.0	0.0	0.0	11.8	0.3	0.2	0.0	2.8	0.0	0.9
Cycle Q Clear(g_c), s	0.0	0.0	8.0	0.0	0.0	11.8	1.2	0.2	0.0	3.0	0.0	0.9
Prop In Lane	1.00		0.03	1.00		0.19	1.00		0.00	1.00		0.44
Lane Grp Cap(c), veh/h	450	0	690	607	0	731	304	215	0	330	0	196
V/C Ratio(X)	0.53	0.00	0.65	0.03	0.00	0.82	0.04	0.05	0.00	0.31	0.00	0.21
Avail Cap(c_a), veh/h	687	0	1839	790	0	1801	832	939	0	867	0	859
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.4	0.0	10.5	9.6	0.0	10.8	16.8	16.0	0.0	17.4	0.0	16.3
Incr Delay (d2), s/veh	0.4	0.0	0.4	0.0	0.0	0.9	0.0	0.0	0.0	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.9	0.0	4.1	0.2	0.0	5.7	0.2	0.1	0.0	1.5	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.8	0.0	10.9	9.6	0.0	11.7	16.9	16.1	0.0	17.5	0.0	16.5
LnGrp LOS	B	A	B	A	A	B	B	B	A	B	A	B
Approach Vol, veh/h	684			617			22			142		
Approach Delay, s/veh	12.6			11.6			16.5			17.2		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.9	20.0		9.6	9.7	21.2		9.6				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	10.0		5.0	2.0	13.8		3.2				
Green Ext Time (p_c), s	0.0	1.6		0.2	0.2	2.4		0.0				

Intersection Summary

HCM 6th Ctrl Delay 12.7
HCM 6th LOS B

Notes

User approved pedestrian interval to be less than phase max green.

MOVEMENT SUMMARY

 **Site: 101 [SE 176 Avenue/ SE 29th Street Phase 4 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Phase 4
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]		[Total HV]					[Veh. veh	Dist]				mph
			veh/h	%	veh/h	%	v/c	sec			ft				
South: SE 176th Avenue															
3	L2	All MCs	16	15.0	16	15.0	0.373	9.0	LOS A	2.1	51.9	0.53	0.35	0.53	31.7
8	T1	All MCs	267	0.0	267	0.0	0.373	7.3	LOS A	2.1	51.9	0.53	0.35	0.53	32.8
18	R2	All MCs	100	0.0	100	0.0	0.373	7.3	LOS A	2.1	51.9	0.53	0.35	0.53	32.5
Approach			383	0.6	383	0.6	0.373	7.4	LOS A	2.1	51.9	0.53	0.35	0.53	32.7
East: SE 29th Street															
1	L2	All MCs	210	0.0	210	0.0	0.673	13.7	LOS B	9.1	227.6	0.79	0.71	1.20	29.0
6	T1	All MCs	408	0.0	408	0.0	0.673	13.7	LOS B	9.1	227.6	0.79	0.71	1.20	29.5
16	R2	All MCs	60	0.0	60	0.0	0.673	13.7	LOS B	9.1	227.6	0.79	0.71	1.20	29.3
Approach			677	0.0	677	0.0	0.673	13.7	LOS B	9.1	227.6	0.79	0.71	1.20	29.3
North: SE 176th Avenue															
7	L2	All MCs	66	0.0	66	0.0	0.369	9.7	LOS A	1.8	46.4	0.68	0.62	0.76	30.6
4	T1	All MCs	86	1.0	86	1.0	0.369	9.9	LOS A	1.8	46.4	0.68	0.62	0.76	31.2
14	R2	All MCs	113	0.0	113	0.0	0.369	9.7	LOS A	1.8	46.4	0.68	0.62	0.76	30.9
Approach			265	0.3	265	0.3	0.369	9.7	LOS A	1.8	46.4	0.68	0.62	0.76	30.9
West: SE 29th Street															
5	L2	All MCs	22	7.0	22	7.0	0.263	7.2	LOS A	1.3	31.7	0.53	0.38	0.53	32.3
2	T1	All MCs	194	0.0	194	0.0	0.263	6.4	LOS A	1.3	31.7	0.53	0.38	0.53	33.1
12	R2	All MCs	33	0.0	33	0.0	0.263	6.4	LOS A	1.3	31.7	0.53	0.38	0.53	32.9
Approach			248	0.6	248	0.6	0.263	6.4	LOS A	1.3	31.7	0.53	0.38	0.53	33.0
All Vehicles			1573	0.3	1573	0.3	0.673	10.3	LOS B	9.1	227.6	0.67	0.56	0.86	30.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: H:\27\27715 - VIC Implementation\005 - Master Plan Update TIA\Analysis\176th_29th With Project 2038 PM.sip9

Intersection	
Intersection Delay, s/veh	97.9
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	466	76	96	503	18	52	142	79	27	104	28
Future Vol, veh/h	48	466	76	96	503	18	52	142	79	27	104	28
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
Heavy Vehicles, %	3	0	0	1	0	7	0	1	0	4	1	8
Mvmt Flow	52	507	83	104	547	20	57	154	86	29	113	30
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	137.5	114	20.9	20.8
HCM LOS	F	F	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	17%
Vol Thru, %	0%	64%	0%	86%	0%	97%	65%
Vol Right, %	0%	36%	0%	14%	0%	3%	18%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	52	221	48	542	96	521	159
LT Vol	52	0	48	0	96	0	27
Through Vol	0	142	0	466	0	503	104
RT Vol	0	79	0	76	0	18	28
Lane Flow Rate	57	240	52	589	104	566	173
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.142	0.554	0.119	1.235	0.235	1.191	0.438
Departure Headway (Hd)	9.852	9.084	8.658	7.985	8.65	8.088	10.159
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	366	399	416	460	417	453	358
Service Time	7.552	6.784	6.358	5.685	6.35	5.788	8.159
HCM Lane V/C Ratio	0.156	0.602	0.125	1.28	0.249	1.249	0.483
HCM Control Delay	14.2	22.5	12.5	148.6	14	132.4	20.8
HCM Lane LOS	B	C	B	F	B	F	C
HCM 95th-tile Q	0.5	3.2	0.4	22.5	0.9	20.4	2.2

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	89	59	51	295	44	229	42	1419	194	1304
Future Volume (vph)	89	59	51	295	44	229	42	1419	194	1304
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Prot	NA
Protected Phases	5	2		1	6		7	4	3	8
Permitted Phases	2		2	6		6				
Detector Phase	5	2	2	1	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	9.5	39.0	39.0	9.5	38.0	38.0	10.0	32.0	19.5	32.0
Total Split (s)	15.0	20.0	20.0	19.0	24.0	24.0	15.0	59.0	22.0	66.0
Total Split (%)	12.5%	16.7%	16.7%	15.8%	20.0%	20.0%	12.5%	49.2%	18.3%	55.0%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.5	5.0	5.0	4.5	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max
Act Effct Green (s)	18.9	11.0	11.0	28.7	14.5	14.5	6.3	60.6	15.9	72.1
Actuated g/C Ratio	0.16	0.09	0.09	0.24	0.12	0.12	0.05	0.50	0.13	0.60
v/c Ratio	0.38	0.36	0.19	0.94	0.20	0.60	0.49	0.60	0.86	0.94
Control Delay	40.8	56.6	1.5	79.8	48.6	12.5	51.0	37.6	82.8	36.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	56.6	1.5	79.8	48.6	12.5	51.0	37.6	82.8	36.2
LOS	D	E	A	E	D	B	D	D	F	D
Approach Delay		35.3			50.3			38.0		42.1
Approach LOS		D			D			D		D

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 112 (93%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 41.3

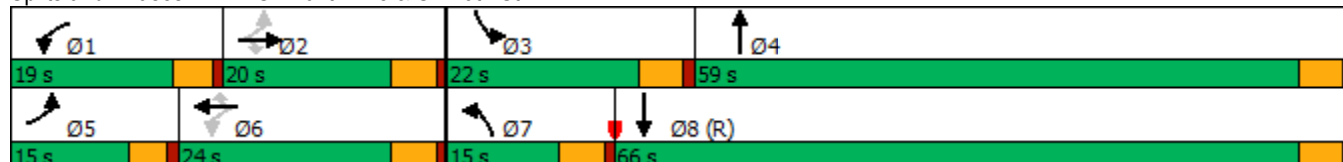
Intersection LOS: D

Intersection Capacity Utilization 74.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	59	51	295	44	229	42	1419	36	194	1304	46
Future Volume (veh/h)	89	59	51	295	44	229	42	1419	36	194	1304	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1870	1870	1870	1826	1870	1752	1885	1885	1900
Adj Flow Rate, veh/h	94	62	12	311	46	107	44	1494	36	204	1373	45
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	2	2	2	5	2	10	1	1	0
Cap, veh/h	278	164	138	348	273	230	56	2308	56	230	1883	62
Arrive On Green	0.06	0.09	0.09	0.12	0.15	0.15	0.03	0.45	0.45	0.13	0.55	0.55
Sat Flow, veh/h	1810	1900	1599	1781	1870	1579	1739	5128	124	1795	3448	113
Grp Volume(v), veh/h	94	62	12	311	46	107	44	992	538	204	676	742
Grp Sat Flow(s), veh/h/ln	1810	1900	1599	1781	1870	1579	1739	1702	1848	1795	848	1865
Q Serve(g_s), s	5.6	3.7	0.8	14.5	2.6	7.5	3.0	27.1	27.1	13.4	36.0	36.0
Cycle Q Clear(g_c), s	5.6	3.7	0.8	14.5	2.6	7.5	3.0	27.1	27.1	13.4	36.0	36.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		0.06
Lane Grp Cap(c), veh/h	278	164	138	348	273	230	56	1532	832	230	927	1018
V/C Ratio(X)	0.34	0.38	0.09	0.89	0.17	0.46	0.79	0.65	0.65	0.89	0.73	0.73
Avail Cap(c_a), veh/h	326	238	200	348	296	250	145	1532	832	254	927	1018
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.71	0.71	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.0	51.8	50.5	45.7	44.9	47.0	57.7	25.6	25.6	51.4	20.5	20.5
Incr Delay (d2), s/veh	0.7	0.5	0.1	24.0	0.1	0.5	6.3	1.5	2.8	25.6	5.0	4.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.7	3.2	0.6	8.2	2.2	5.3	2.5	15.3	16.8	12.1	11.7	22.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.8	52.3	50.6	69.7	45.0	47.5	64.0	27.1	28.4	77.0	25.6	25.1
LnGrp LOS	D	D	D	E	D	D	E	C	C	E	C	C
Approach Vol, veh/h		168			464			1574			1622	
Approach Delay, s/veh		49.1			62.1			28.6			31.8	
Approach LOS		D			E			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	15.3	20.4	59.0	11.8	22.5	8.9	70.5				
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0				
Max Green Setting (Gmax), s	14.5	15.0	17.0	54.0	10.5	19.0	10.0	61.0				
Max Q Clear Time (g_c+I1), s	16.5	5.7	15.4	29.1	7.6	9.5	5.0	38.0				
Green Ext Time (p_c), s	0.0	0.0	0.0	1.7	0.0	0.0	0.0	1.5				

Intersection Summary

HCM 6th Ctrl Delay	34.9
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Timings
12: SE 164th Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	49	102	194	295	136	232	192	1220	426	162	1427
Future Volume (vph)	49	102	194	295	136	232	192	1220	426	162	1427
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	15.0	33.0	20.0	17.0	35.0	20.0	20.0	50.0	17.0	20.0	50.0
Total Split (%)	12.5%	27.5%	16.7%	14.2%	29.2%	16.7%	16.7%	41.7%	14.2%	16.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	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	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	7.3	10.7	34.0	12.0	17.5	37.8	18.3	62.0	79.0	15.3	59.0
Actuated g/C Ratio	0.06	0.09	0.28	0.10	0.15	0.32	0.15	0.52	0.66	0.13	0.49
v/c Ratio	0.51	0.66	0.41	1.73	0.54	0.43	0.74	0.70	0.38	0.75	0.86
Control Delay	71.7	71.0	24.2	385.6	56.2	20.7	64.4	26.0	3.8	67.6	25.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.7	71.0	24.2	385.6	56.2	20.7	64.4	26.0	3.8	67.6	25.7
LOS	E	E	C	F	E	C	E	C	A	E	C
Approach Delay		44.8			190.1			24.9			29.9
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 40 (33%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.73

Intersection Signal Delay: 52.7

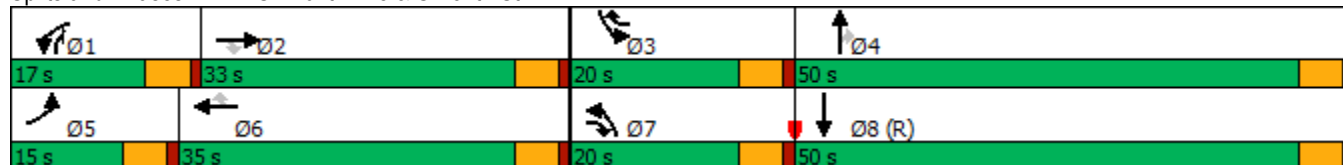
Intersection LOS: D

Intersection Capacity Utilization 81.1%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

12: SE 164th Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	102	194	295	136	232	192	1220	426	162	1427	49
Future Volume (veh/h)	49	102	194	295	136	232	192	1220	426	162	1427	49
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1826	1885	1870	1841	1856	1885	1870	1885	1870	1870	1841
Adj Flow Rate, veh/h	51	106	152	307	142	167	200	1271	305	169	1486	48
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	9	5	1	2	4	3	1	2	1	2	2	4
Cap, veh/h	64	183	359	178	298	427	224	1387	783	195	1554	50
Arrive On Green	0.04	0.10	0.10	0.10	0.16	0.16	0.13	0.39	0.39	0.11	0.38	0.38
Sat Flow, veh/h	1682	1826	1598	1781	1841	1572	1795	3554	1598	1781	4144	134
Grp Volume(v), veh/h	51	106	152	307	142	167	200	1271	305	169	872	662
Grp Sat Flow(s), veh/h/ln	1682	1826	1598	1781	1841	1572	1795	1777	1598	1781	1216	1846
Q Serve(g_s), s	3.6	6.7	9.8	12.0	8.4	10.4	13.2	40.7	14.4	11.2	41.9	41.9
Cycle Q Clear(g_c), s	3.6	6.7	9.8	12.0	8.4	10.4	13.2	40.7	14.4	11.2	41.9	41.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	64	183	359	178	298	427	224	1387	783	195	912	692
V/C Ratio(X)	0.79	0.58	0.42	1.72	0.48	0.39	0.89	0.92	0.39	0.86	0.96	0.96
Avail Cap(c_a), veh/h	140	426	572	178	460	566	224	1387	783	223	912	692
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.28	0.28	0.28
Uniform Delay (d), s/veh	57.2	51.6	39.8	54.0	45.7	35.6	51.7	34.7	19.3	52.5	36.5	36.5
Incr Delay (d2), s/veh	7.9	1.1	0.3	348.1	0.4	0.2	31.8	11.0	1.5	8.1	8.5	10.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	5.5	6.9	35.7	6.9	7.1	12.4	26.0	9.3	7.4	16.1	23.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.1	52.7	40.1	402.1	46.1	35.8	83.5	45.7	20.7	60.6	45.0	47.0
LnGrp LOS	E	D	D	F	D	D	F	D	C	E	D	D
Approach Vol, veh/h		309			616			1776			1703	
Approach Delay, s/veh		48.6			220.7			45.7			47.3	
Approach LOS		D			F			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	17.0	18.2	51.8	9.6	24.4	20.0	50.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	28.0	15.0	45.0	10.0	30.0	15.0	45.0				
Max Q Clear Time (g_c+I1), s	14.0	11.8	13.2	42.7	5.6	12.4	15.2	43.9				
Green Ext Time (p_c), s	0.0	0.2	0.0	1.1	0.0	0.3	0.0	0.6				
Intersection Summary												
HCM 6th Ctrl Delay				71.0								
HCM 6th LOS				E								

VIC Sustainability Plan

The following outlines the Sustainability Plan for VIC Masterplan 2.0 and the various commitments the Developer has submitted to date.

Sustainability Improvements done to date at the existing 715,000 SF industrial buildings:

- **Energy Efficiency Improvements:** Developer has worked with Clark PUD and Energy Trust of Oregon to improve energy efficiency at the existing industrial buildings as follows:
 - Installed new, more efficient chillers.
 - Replaced pumps and installed new VFDs in central plant.
 - Installed new building HVAC control systems.
 - Converting point controls from pneumatic to digital.
 - Installed exterior LED lighting.
 - Replacing all common area and house lighting with state-of-the-art LED and lighting control system.

The total estimated annual savings from the above installed improvements is estimated to be 6,300,000 KWh and 345,000 Therms.

- Additional energy efficiency upgrades and sustainability initiatives to date include:
 - Upgraded bathrooms with waterless and reduced flow systems to achieve **indoor water use reduction**.
 - Replaced water fountains with bottle filling stations.
 - Installed new electrical sub-metering system for better monitoring of electrical and water usage.
 - Participant in Clark PUD's Community Solar Program.
- All new tenants are required to install LED lighting and controls within their space.
- Installed showers and bicycle storage space to promote biking to work.
 - Creating long term program to replace a portion of current landscaping with native plants species.
- **Adaptive Reuse, Access to Recreation Facilities:**
 - The existing 715,000 SF of buildings is at the heart of this campus and substantial sustainability investments have been made as noted above. The Developer also renovated underutilized former corporate cafeteria into an activated community space with an upscale café and coffee bar, living room/lounge space, conference rooms, expanded fitness center with fully renovated locker rooms, a yoga and meditation studio, etc.

Sustainability Plan for the New Development under Masterplan 2.0

Overall Campus & Vision:

- **Walkable Streets, Compact Development, Mixed-Use Neighborhoods, Smart Location, Access to Recreation Facilities:** The campus is designed as a 20-minute, walkable, mixed-use

neighborhood providing convenient, safe pedestrian-oriented access to places and services that residents, employees, and neighbors need every day – including work, transit, shopping, quality food, school, parks, open space, and social activities.

- **Neighborhood Schools:** The campus includes a 20-acre parcel that is owned by the Evergreen School District and will be home to a future middle school.
- **Site Design for Habitat Conservation:** A 13.7-acre Forested Tract that has a restrictive covenant to remain as open space. The Developer intends to sell this Forested Tract to the City of Vancouver.
- **Housing Types and Affordability, Housing and Jobs Proximity:** Developer commits to participating in the MFTE program whereby 20% of the 1,800 units (i.e. 360 units) will be available at 80% AMI. All residential units are within walking distance of all employment opportunities on campus.
- **Connected and Open Community, Access to Civic and Public Space, Access to Recreation Facilities, Local Food Production:** Developer will provide a perimeter trail and neighborhood park open to the general public. The trail will be connected to the Forested Tract. The trail will also link together all of the developments within the campus. Community gardens will be available to residents and tenants. The Town Plaza is an optimal location for a local farmers market to operate on the campus.
- **Community Outreach and Involvement:** Masterplan 2.0 was developed in concert with community and municipal input through feedback from the Masterplan 1.0 approval process, community engagement sessions on the proposed Masterplan 2.0, and ongoing conversations with City staff.

Building Design:

- **Optimize Building Energy Performance:** Developer will achieve GHG emissions reduction targets stated in the City's Climate Action Framework as outlined in Appendix I of the application (Appendix I is part of Developer's Sustainability Plan).
- **Optimize Building Energy Performance:** All new buildings will include the following:
 - All electric heating, cooling and domestic hot water.
 - Efficient heat pump selections for space heating and domestic hot water
 - for all new residential buildings, all electric appliances
- **Solar Orientation:** All new buildings will be solar ready per code.
- **Rainwater Management:** For new buildings, Developer will be infiltrating all runoff on site.
- **Electric Vehicles:** Developer will comply with City code for EV infrastructure requirements with each project's site plan approval.

Transportation and Mobility:

- **Compact Development, Walkable Streets, Mixed-Use Neighborhoods, Connected and Open Community, Transportation Demand Management, Housing and Jobs Proximity, Smart Location:** Masterplan 2.0 allows for greater integration of uses than Masterplan 1.0. The entire

campus will be walkable/bikeable with ample opportunities to live and work on campus. Small retail and commercial services will be within a 5-minute walk of any residential neighborhood or commercial/industrial tenant. The reconfiguration of Masterplan 2.0 also achieves added density with the same amount of vested trips in Masterplan 1.0. Masterplan 2.0 also creates a more efficient street network that allows for separation of industrial related truck traffic from residential and mixed-use traffic.

- **Walkable Streets, Transit Facilities, Bike Facilities, Smart Location:** Road networks will be designed and coordinated with City transportation staff to ensure safe, comfortable and complete connections for various modes of transportation (vehicular, pedestrian, bicycles, etc.)
 - Once ESD develops the school, Developer will have bikeable/walkable laneways for students to be able to walk or bike to school safely.
- **Bicycle Facilities, Smart Location:** Developer will include infrastructure to support bike parking and will have bike sharing programs. Developer renovated locker rooms, showers and changing facilities at the existing buildings to help encourage habitual biking for its tenants. The perimeter trail and bike paths throughout the campus will encourage recreational physical activity.
- **Transportation Demand Management, Smart Location:** Developer will deploy shared parking strategies where applicable. The campus design encourages multimodal travel. Developer is eliminating an entrance on 34th Street to reduce traffic congestion at 176th Avenue and 34th Street. Campus entrances/exits at 34th Street are being coordinated with the City's efforts along that corridor to ensure offsite improvements result in a smooth and safe pedestrian experience.
- **Access to Quality Transit and Transit Facilities, Smart Location:** Developer will work with CTran, ESD and City staff to coordinate safe and efficient placement of bus stops within the campus. The VIC campus already has a bus stop along 34th Street and the campus will have pedestrian laneways to provide safe access to the existing bus stop.

Open Space, Natural Systems & Water Resources:

- **Site Design for Habitat Conservation and Long-Term Conservation Management of Habitat, Connected and Open Community, Access to Recreation Facilities:** Preservation of 13.7 acre Forested Tract
 - Developer worked with a local arborist to adjust the boundary line of the Forested Tract to create a better edge condition for the trees allowing for a more resilient tree canopy and preservation of native and climate resilient species.
- **Connected and Open Community, Access to Civic and Public Space, Access to Recreation Facilities, Connected and Open Community, Access to Recreation Facilities:** Masterplan 2.0 increases the amount of open space/parks/trails by 26% from 19 acres of open space to 24 acres.
- **Tree Lined and Shaded Streetscapes and Heat Island Reduction:** Canopy coverage per Restated DA which is above and beyond the code minimum for all use types. Developer also commits to achieving Tree CAP certification for all projects (minimum Silver Leaf Achievement). Both canopy coverage & Tree Cap Silver will reduce the heat island effects within the campus.

- **Outdoor Water Use Reduction:** Developer will favor nature scaping in lieu of high maintenance turf for streetscapes.
- **Rainwater Management:** For new buildings, Developer will be infiltrating all runoff on site.

APPENDIX F

REVISED DESIGN GUIDELINES



EXHIBIT E DESIGN GUIDELINES

Vancouver Innovation Center Master Plan

Updated April 2023

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Appendix A

Single Family Residential Design Reference Guide

Appendix B

Placemaking Goals

PURPOSE

These design guidelines are intended to ensure that development within the Vancouver Innovation Center is cohesive in both form and function and is consistent with the brand pillars of the VIC. These brand pillars form the foundation of the design principles that will guide project implementation. These brand pillars and the associated VIC design principles are described further below:



Natural

Connected to nature in all that we do

Design Principle

Provide a network of both passive and active open space areas that utilize existing trees and natural resources for recreation and relaxation.



Balanced

physical, mental, and spiritual

Design Principle

Provide a balance of community gathering spaces and areas for personal escape.



Authentic

Urban style and refinement, built with taste, personalization and ease in mind

Design Principle

Create a compact urban form composed of well-articulated buildings and ample pedestrian areas to encourage multi-modal travel throughout the site between the various on-site uses and open space areas.



Blended

Contemporary convenience, modern collaboration

Design Principle

Design buildings to encourage pedestrian access, ground floor visibility and community spaces for socialization and collaboration.



Community

Inclusivity and shared knowledge, energy and passion

Design Principle

Design with an eye towards the future. Incorporate sustainability and energy efficiency measures including things such as vehicle charging stations, solar panels, and low impact development (LID) stormwater management approaches. Continuously evaluate project performance related to parking and space efficiency, vehicular trips and sustainability with the goal of design refinements and improvements throughout project buildout, with the goal of the project becoming a “living laboratory.” Provide a network of well defined and accessible pedestrian corridors to encourage access through the site for all individuals.

APPLICABILITY

These guidelines will apply to new development and remodels of existing development within the Residential, Light Industrial, Mixed-Use, and Open Space LUAs within the VIC masterplan. Demonstration of project adherence to these guidelines will be required with land use permit submittals for new development on the site.



DESIGN GUIDELINES



Mobility

All new developments will demonstrate:

- a. Support for a 20-Minute Neighborhood by providing means to reduce need for vehicle trips;
- b. Functional connections to the site-wide bicycle and walking path network outlined in the Masterplan;
- c. Compliance with Washington State electric vehicle charging standards in effect at the time of land use application;
- d. Curbside ride share drop off or pull-out areas shall be incorporated at major entry points to all new buildings in the IL LUA; and
- e. Shared parking strategies.
- f. Compliance with the City of Vancouver Complete Street Policy, including infrastructure designed to be safe for all users, ages and abilities regardless of their mode of travel.



Energy

Developer is installing HVAC and lighting upgrades for the Existing Building. All new developments will demonstrate:

- a. Compliance with the 2018 Washington State Energy Code, at a minimum;
- b. Compliance with environmental standards in effect at the time of building permit application (i.e. environmental development standards do not vest on the Restated DA Effective Date;
- c. That every new building is designed to accommodate ready access for installation of solar panels that would occupy at least 10% of the building footprint. This includes the necessary structural and electrical infrastructure to accommodate the solar panels; and
- d. Infrastructure for electric vehicle charging stations.
- e. Advancement of "District Energy Conditions" as identified in Appendix A – Vancouver Innovation Center Master Plan Sustainability Framework.

Water

The VIC will prioritize use reductions, efficiency strategies, and surface water quality in its design. All new development applications will include:

- a. Water-saving plumbing fixtures in all new buildings;
- b. Native and adaptive plant selections that do not require excessive irrigation; and
- c. A surface stormwater strategy synopsis describing anticipated collection, treatment, and discharge strategies including any Low Impact Development (LID) BMPs planned for the project.
- d. An evaluation of means to reduce potable water use consistent with Appendix A – Vancouver Innovation Center Master Plan Sustainability Framework.





Building Design

a. Blank Walls

- i. At least 75% of the width of any new first-story building wall facing a street shall be devoted to interest-creating features, pedestrian entrances, transparent show or display windows, or windows affording views into retail, office or lobby space.
- ii. In all areas other than the IL LUA, building surfaces over 2,000 sf shall be broken up with window openings and/or changes in material.
- iii. Blank walls longer than 20 feet without windows or an unbroken series of garage doors are not permitted on any street frontage.
- iv. Any face of a building that is over 50' wide shall have varied horizontal plane and/or vertical façade shifts to break up the building's mass.

b. Corner Buildings

- i. New IL LUA buildings on a corner will have an entrance within 75 feet of the corner.

c. Ground Floor

- i. Buildings should engage with the “sidewalk zone” to bring visual interest, variation, and intimacy to the streetscape, while maintaining the pedestrian through-routes that link the land use areas on the site.
- ii. Pedestrian access to primary building entrances should be close to and visible from circulation facilities that include a pedestrian component such as a sidewalk, trail, or pedestrian plaza. Primary building entrances may not be from non-pedestrian oriented areas. Each primary building entrance should be attractive and have weather protection and highlight the presence of the entrance to pedestrians through the use of architectural treatments such as changes in the street-facing wall and lighting. Entrances from primary pedestrian corridors should be visually more prominent than
- iii. The design of buildings, above and below should be pedestrian scaled, intimate, and inviting.

d. Roofs

- i. Roof materials shall screen roof top mechanical equipment from ground-level views
- ii. Buildings shall have primarily flat roofs - architectural detailing and rooftop decks shall be allowed.



Exterior Building Finishes

To create a unique identity for the VIC, material selection and application is required to adhere to exterior finish standards.

- a. Major color themes are to predominantly be earth tones of grey, brown, and tan.
- b. Materials exhibiting patina are encouraged – including weathered wood, rusted steel, singed wood.
- c. Material changes shall be offset by a minimum 3 ½" horizontal or vertical relief.
- d. Materials that expose their natural state are encouraged such as exposed wood and concrete.
- e. First floor window framing shall be either wood or aluminum (does not apply to Residential LUAs)
- f. Opportunity for more industrial and technological materials, such as steel, aluminum, and heavy timber.

Maximum Building Heights

See Development Standards applicable to each LUA under Exhibit D of the Restated DA.

Single Family Residential

Single family residential attached designs should incorporate the material and pedestrian orientation provisions of these guidelines. See Appendix B – Single Family Residential Design Reference Guide.

Signage

- a. Monument signs will have a uniform color and typeface throughout the property.





Tree canopy

Every development application must demonstrate how it complies with the Tree Canopy Plan (Section 6.10 of the Restated DA) and provide an tree canopy assessment for its site and a 5-, 10-, 15-, and 20-year forecast for the tree canopy on the entire Property.

Open Space

All site plans will demonstrate adherence to the Masterplan and Appendix C - Placemaking Goals.

- a. Open spaces shall be directly accessible from all buildings in the development (building occupants should not have to walk around the building to get outside)
- b. Avoid inconvenient or circuitous ped access to amenities.
- c. Both greenscaping and useable accessible hardscaping elements shall count as open space
- d. Hardscape open spaces shall be designed for four season use and durable for urban intensity.
- e. Neighborhood open spaces
 - i. Refer to Circulation and Open Public Space Plan for targeted locations.
 - ii. Neighborhood open spaces shall be a minimum of 2,000 sf.
 - iii. Neighborhood open spaces shall incorporate interactive amenities such as pavilions, picnic facilities, and play structures.

Street Cross Sections

See DA for street section implementation options for the Vancouver Innovation Center.

APPENDIX A

Single Family Residential Design Reference Guide

Vancouver Innovation Center Master Plan

Updated April 2023



SINGLE FAMILY ATTACHED

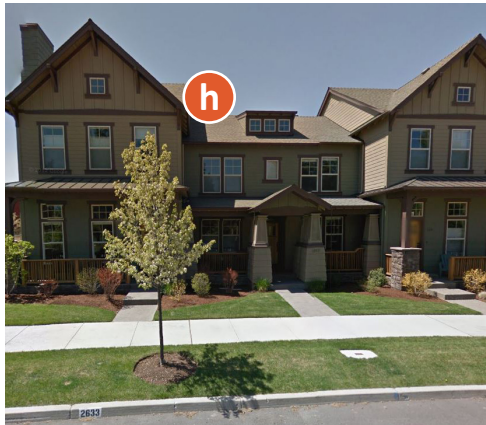


- a. Find opportunities to alley-load attached single family residential units to minimize driveway and garage exposure.
- b. Orient residential buildings to the “sidewalk zone” through the use of front porch features.
- c. Incorporate a range of natural color tones, architectural styles and horizontal and vertical relief.
- d. Seek opportunities to orient units to courtyards and open spaces.
- e. Create visual interest through horizontal and vertical relief and variation of architectural styles of adjoining attached units.
- f. Encourage reduced setbacks for residential units to engage entrances with the sidewalk.



SINGLE FAMILY ATTACHED – CONTINUED

- g.** Allow front-loaded attached units when accessed from a local street and when the garage exposure is minimized by site and building design features.
- h.** Allow for a mix of scale and size of attached product including larger duplexes.
- i.** Natural material elements including wood and stone should be prioritized for use.
- j.** Provide substantial window and trim relief on units to break up the potential for monolithic appearances on taller units.
- k.** For continuous banks of attached units, provide vertical, horizontal and roof relief variation to minimize the scale of the structures.



APPENDIX B

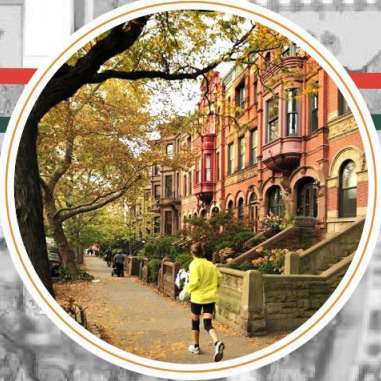
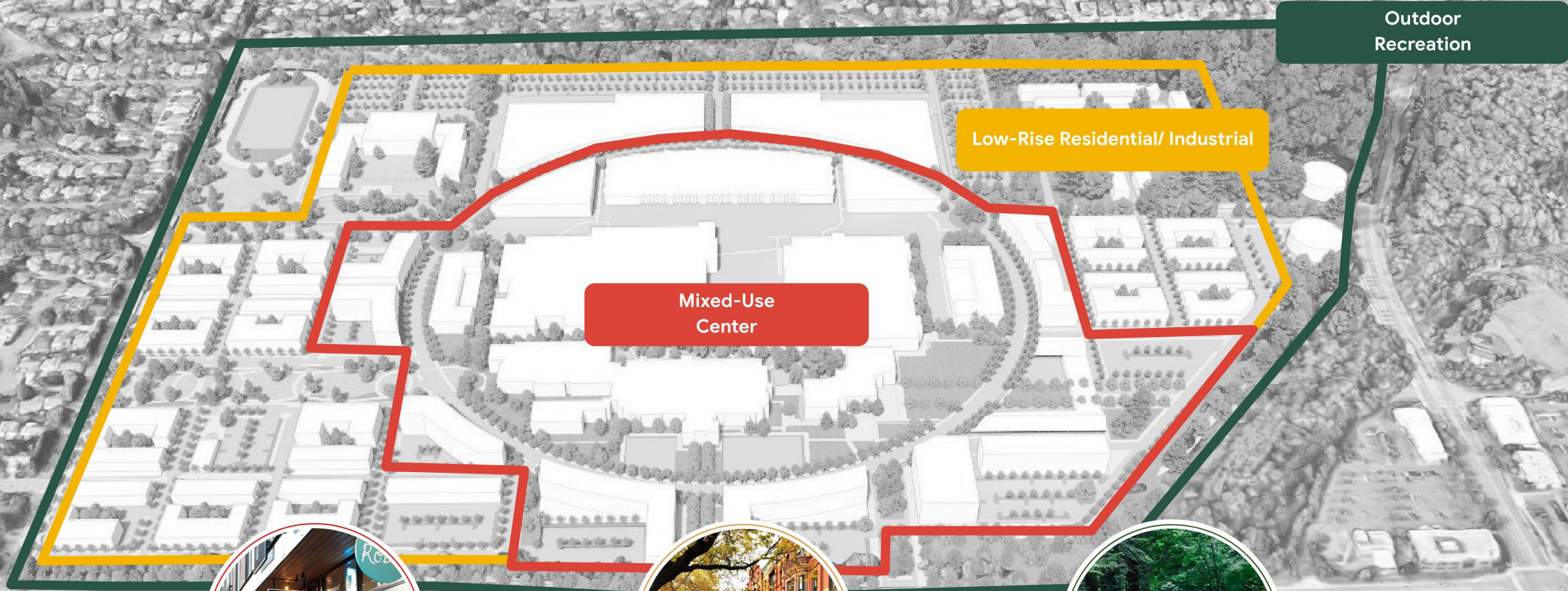
Placemaking Goals

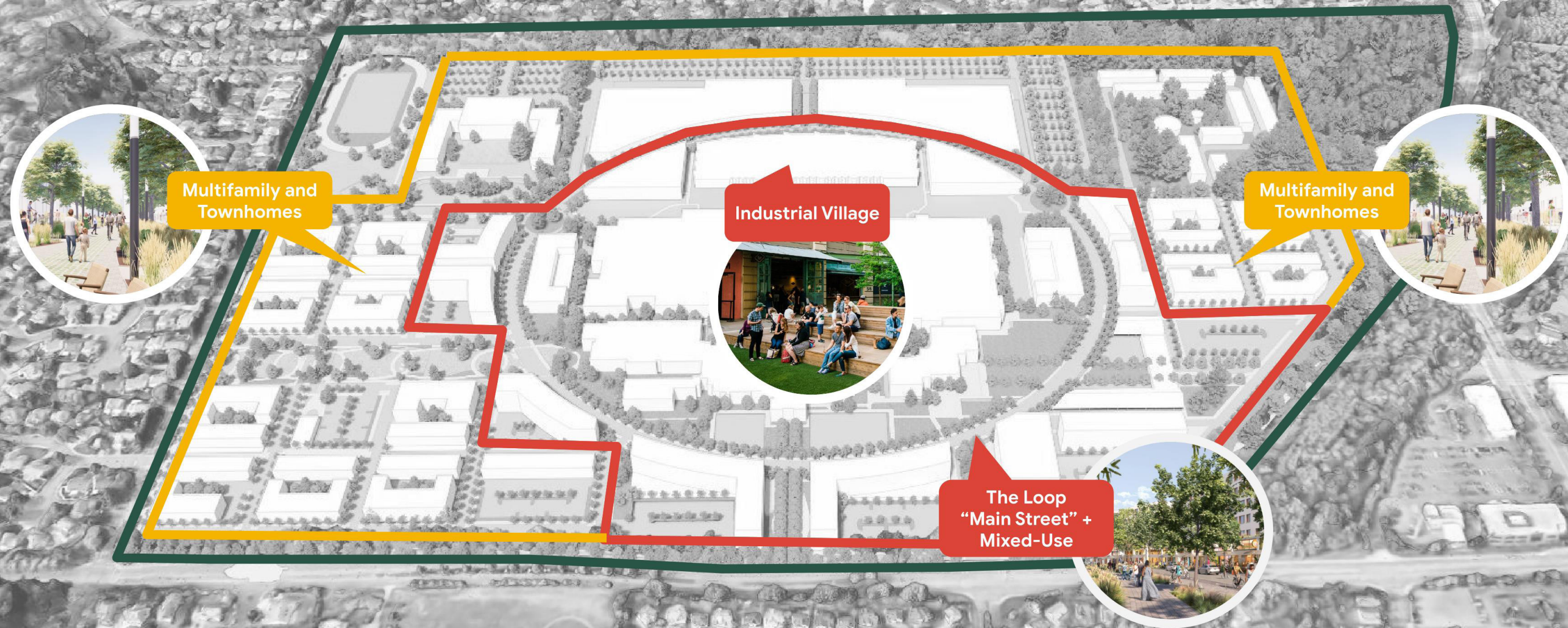
Vancouver Innovation Center Master Plan

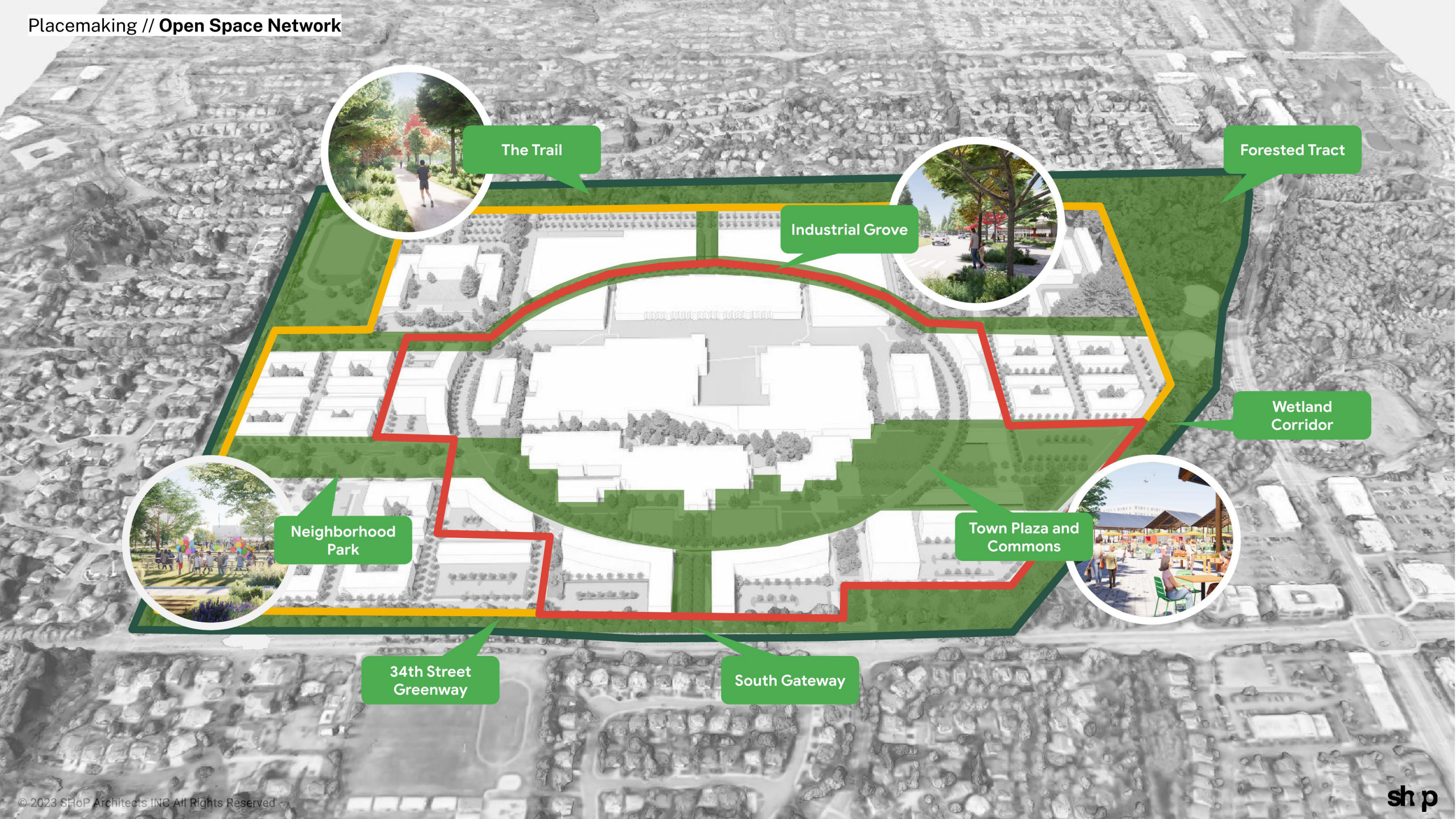
Updated April 2023











The Trail

Forested Tract

Industrial Grove

Wetland
Corridor

Neighborhood
Park

Town Plaza and
Commons

34th Street
Greenway

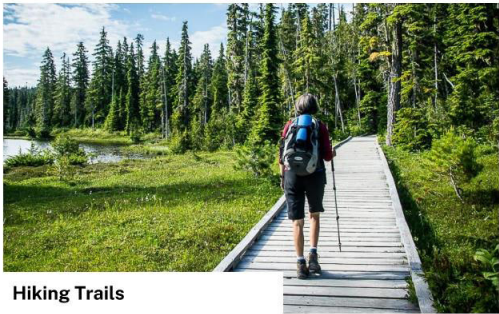
South Gateway



Multi-Use Public Trail



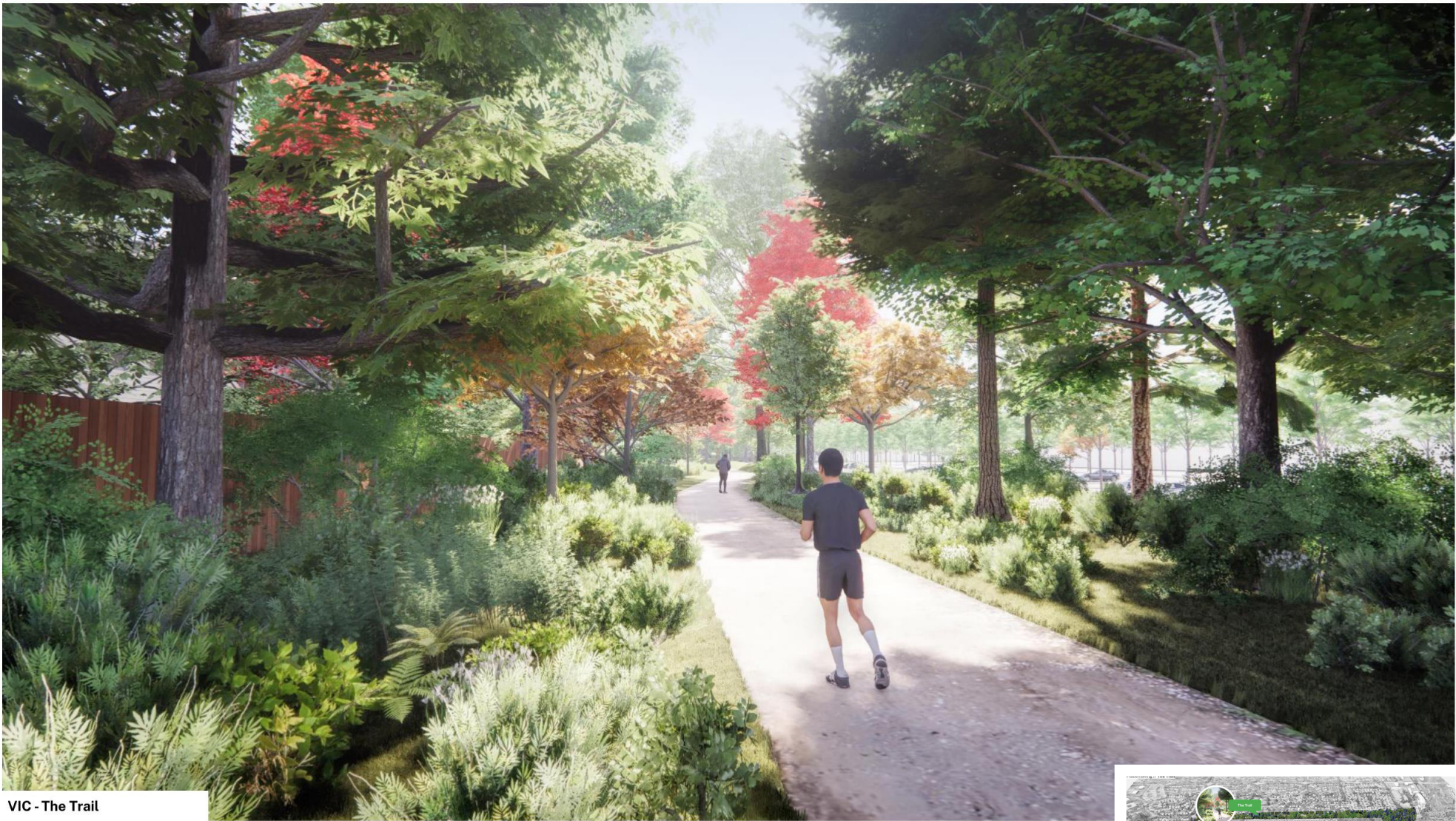
Existing Landscape



Hiking Trails

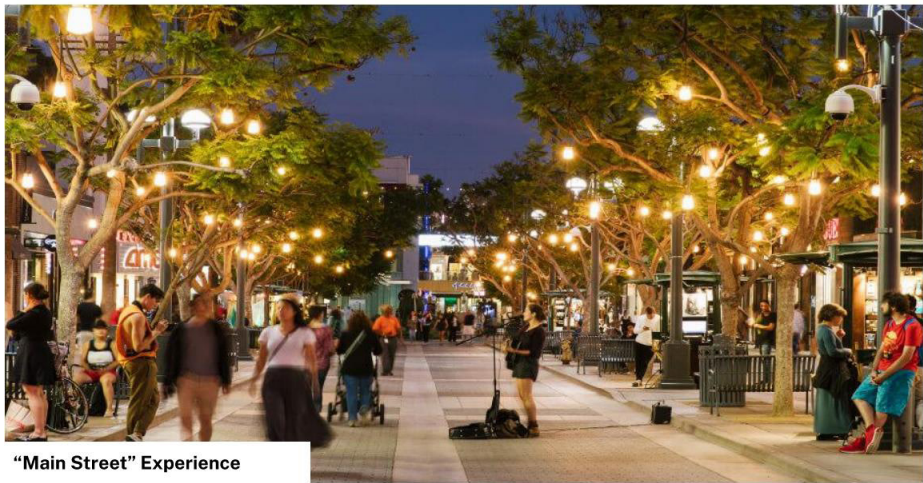


Connection to Forest Park



VIC - The Trail

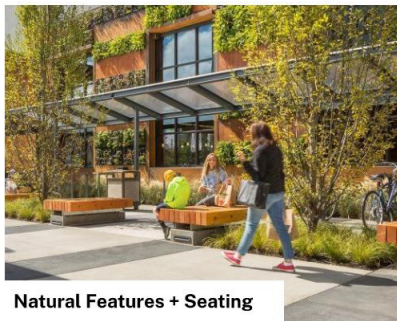




“Main Street” Experience



Destination Retail and F&B



Natural Features + Seating



Community Amenities



VIC - The Loop



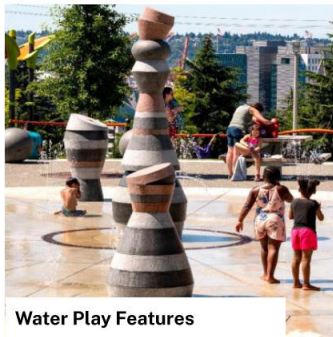
Placemaking // Town Plaza and VIC Commons



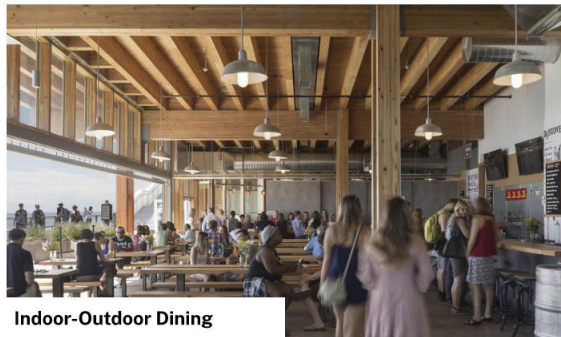
Community Events



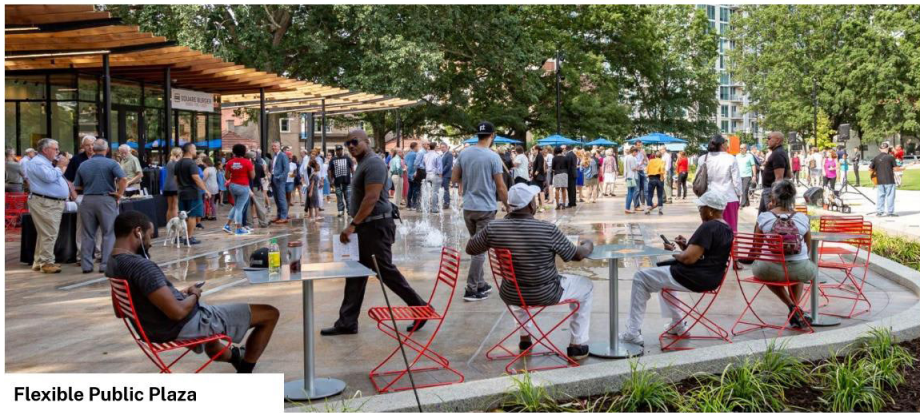
Outdoor Fitness



Water Play Features



Indoor-Outdoor Dining



Flexible Public Plaza



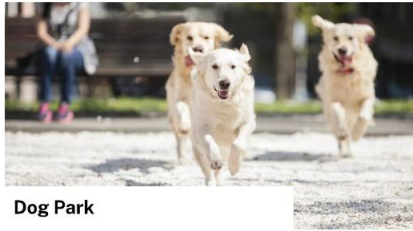
VIC - Town Plaza



Placemaking // Multi-family and Townhomes - Neighborhood Park



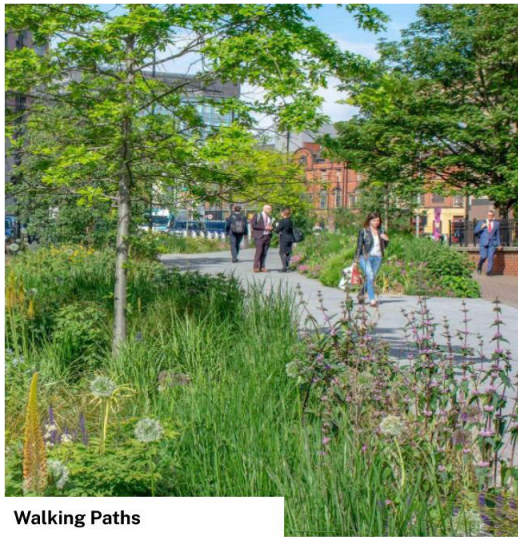
Seating + Picnic Areas



Dog Park



Playscapes



Walking Paths



Community Garden



VIC - Neighborhood Park



Placemaking // Multi-family and Townhomes - Pedestrian Laneways



Variety of Residential Types



Bioretention Landscape



Porches + Stoops



Pedestrian + Bike Laneway



VIC - Pedestrian Laneway



Placemaking // Industrial Grove



Light Industrial + Manufacturing



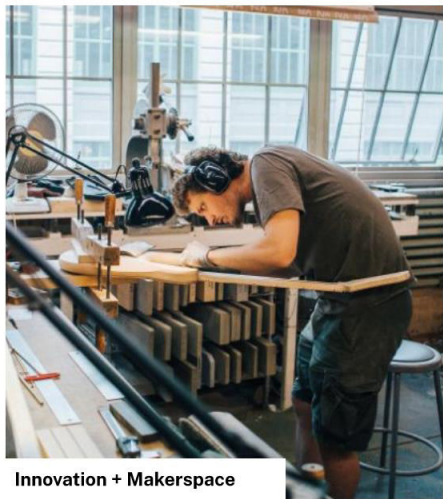
29th St. Parkway



Pedestrian Pathways



Parking Area



Innovation + Makerspace



VIC - Industrial Grove



APPENDIX I

SUSTAINABILITY GOALS FOR CITY OF VANCOUVER CAF ALIGNMENT

Memo

Date: March 27, 2023
Project: VIC Sustainability Master Planning
Project Number: 22-1362
To: Pedro Polanco, Jennifer Rabina, Marc Esrig
From: Forest Tanier-Gesner, Ned Greene
Subject: Sustainability Goals for City of Vancouver CAF Alignment

The Vancouver Innovation Center (VIC) development is determining sustainability goals for site infrastructure and future phase developments and is working to align to the Vancouver Climate Action Framework (CAF) that has recently been released by the City of Vancouver.

GOALS OF THE CLIMATE ACTION FRAMEWORK

One of the primary goals of the City of Vancouver's Climate Action Framework is aggressive reductions in the Greenhouse Gas (GHG) emissions associated with the City and Community operations:

- By 2025 – Achieve 80% Reduction in GHG emissions associated with municipal operations.
- By 2030 – Achieve 80% Reduction in GHG emissions associated with community operations.
- By 2040 – Achieve 100% Reduction in GHG emissions (Carbon Neutrality) associated with municipal and community operations.

PAE understands that the VIC development team is in favor of these performance-based standards over arbitrary certification programs that do not guarantee the City's desired outcome for emission reduction as set forth in the CAF.

To that end, PAE has developed life-cycle emissions and life-cycle cost assessments of several heating, cooling, and domestic hot water (DHW) system options and cooking appliance options for the VIC campus. PAE's recommended baseline design option was then benchmarked against the City of Vancouver's CAF. Based on this analysis it is estimated that the non-industrial process loads¹ on the VIC campus could be within 2% of the CAF reduction targets by 2030 and within 1% of the total CAF target by 2040.

PAE identified additional potential measures to address the minor gap in the emissions reductions estimates versus the CAF targets. These measures serve as a menu of options and can be implemented incrementally and discretely during the course of the VIC development. The quantifiable impacts of these options are also summarized in the following table.

¹ It is understood that the campus currently houses industrial processes that rely on natural gas fuel. These operations are currently outside of the scope of the systems options analysis and emissions reduction estimates. Alternate fuel sources should be considered by the Development Team as these become more readily available for the types of industrial processes.



	Reference Year	2024	2030	2040
BENCHMARK:				
Existing Building Stock and Forecasting Future buildings per today's Standards				
	MT CO2e/year	20,743	20,743	20,743
BASELINE DESIGN for new buildings:				
All Electric heating, cooling, and domestic hot water for all asset types.				
All Electric appliance requirements for all residential buildings (all-electric cooking and laundry)				
Efficient heat pump selections for space heating and domestic hot water (DHW) in all new buildings				
	MT CO2e/year	7,075	4,530	289
	(% reduction from benchmark)	66%	78%	99%
UPGRADES BY 2030 - OPTIONS TO CONSIDER				
Increase campus Photovoltaic (Solar) installations as needed to reach emission reduction goal. Consider exceeding code minimum if needed.			A	
Material selections and construction practices could further reduce the emissions associated with the campus development, through reductions in the embodied emissions for the buildings and site infrastructure. Design teams could help address marginal reductions needed to achieve goal by 2030			B	
Consider committing to provide more EV charging for residential parking and/or more residential spaces provisioned as EV ready if market demand supports that investment			C	
A+B+C = 390 MT CO2e/year	MT CO2e/year	7,075	4,140	289
	(% reduction from benchmark)	66%	80.0%	99%
UPGRADES BY 2040				
Phase out use of non-industrial gas use from the VIC Campus - enforce all electric cooking in commercial buildings, upgrade existing buildings, phase out other gas uses by 2040 if required by code.				-289
	MT CO2e/year	7,075	4,140	0
	(% reduction from benchmark)	66%	80%	100%

Table 1: Emissions Reduction Estimates for VIC Campus



VIC SUSTAINABILITY GOALS

As shown in Table 1, site emissions estimates for the recommended baseline design approach closely aligns with the City's CAF emissions reductions targets. Below is a summary of PAE's recommended baseline design for the campus:

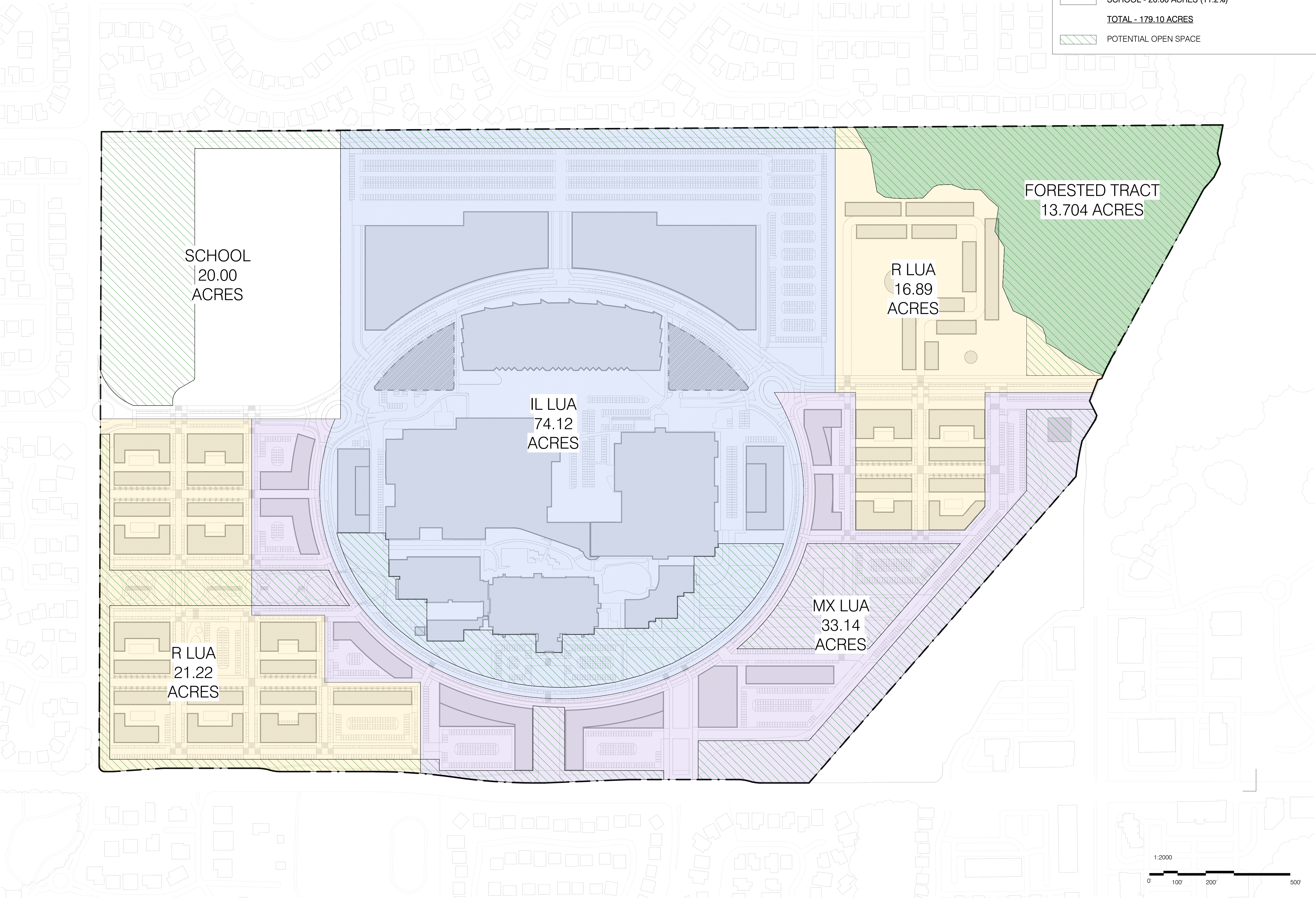
- BOD - "Building by Building Heating and Cooling – All Electric" systems approach for all new construction.
 - Efficient heat pump selections for space heating and domestic hot water (DHW) in all new buildings
 - Electrification phase in plan for all existing buildings heating and DHW heating systems by 2040, if required under City CAF.
 - Central heating update requires consideration of low temp heating coils for end-of-life upgrades with current heat pump technology.
 - All Electric appliance requirements for all residential buildings (all-electric cooking and laundry)

To close the minor gap between the baseline design approach and the CAF targets, PAE recommends the following possible options to be evaluated at the time of each new development project:

- Recommend to future commercial tenants to strive for All Electric appliance requirements for all commercial buildings (i.e. all-electric commercial cooking by 2040 if required by code). It is understood that restaurants and some industrial tenants who have commercial grade kitchens within their premises, may not be willing to comply with this requirement today given current industry standards.
- Increase onsite Photovoltaic (solar) installations as needed to reach emission reduction goal. This may require exceeding code minimum to achieve the desired target.
- Material selections and construction practices could further reduce the emissions associated with the campus development, through reductions in the embodied emissions for the buildings and site infrastructure. Design teams could help address marginal reductions needed to achieve goal by 2030.
- Evaluate demand for Increasing percentage of Electrical Vehicle charging stations for residential neighborhoods. Exceeding existing code if demand warranted that could help meet the CAF targets.

GENERAL NOTES:

1. BUILDING FOOTPRINTS ARE ILLUSTRATIVE AND SUBJECT TO CHANGE.
2. OPEN SPACE BOUNDARIES ARE CONCEPTUAL. THE LOCATIONS AND SIZE OF EACH OPEN SPACE AREA WILL BE REFINED AT THE SITE DEVELOPMENT STAGE.

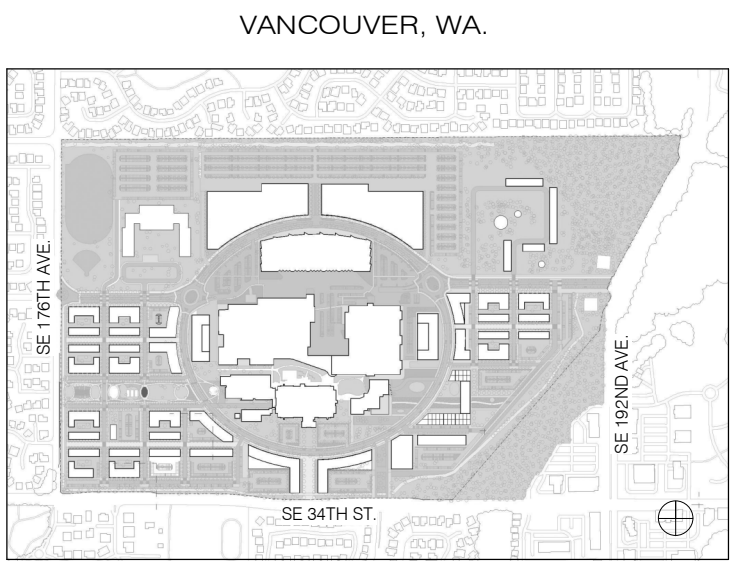


LAND USE LEGEND	
	LIGHT INDUSTRIAL (IL) - 74.13 ACRES (41.4%)
	RESIDENTIAL (R) - 38.12 ACRES (21.3%)
	MIXED-USE (MX) - 33.15 ACRES (18.5%)
	FORESTED TRACT - 13.704 ACRES (7.6%)
	SCHOOL - 20.00 ACRES (11.2%)
TOTAL - 179.10 ACRES	
	POTENTIAL OPEN SPACE

sh p	
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URBAN DESIGN + MASTERPLAN ARCHITECT ShoP ARCHITECTS 233 BROADWAY 11TH FLOOR NEW YORK, NY 10029 Tel 212.889.9005	MASTERPLAN LOCAL ARCHITECT EL DORADO ARCHITECTS 1623 NW MARSHAL STREET PORTLAND, OR 97209 Tel 971.266.8665
LANDSCAPE ARCHITECT SITEWORKSHOP 3800 WOODLAND PARK AVE. N, SUITE 200 SEATTLE, WA 98103 Tel 206.285.3026	CIVIL ENGINEER KPF 111 SW 5TH AVENUE #2600 PORTLAND, OR 97204 Tel 503.227.3251
TRAFFIC ENGINEER KITTELSON & ASSOCIATES 651 SW 6TH AVE., SUITE 600 PORTLAND, OR 97204 Tel 800.878.6290	LAND USE CONSULTANT DOWL 720 SW WASHINGTON ST., SUITE 750 PORTLAND, OR 97205 Tel 971.280.8641
ENERGY & WATER USE DISTRICT PLANNING PAE ENGINEERS 151 SW 1ST AVENUE PORTLAND, OR 97204 Tel 503.226.2921	SUSTAINABILITY PAE ENGINEERS 151 SW 1ST AVENUE PORTLAND, OR 97204 Tel 503.226.2921

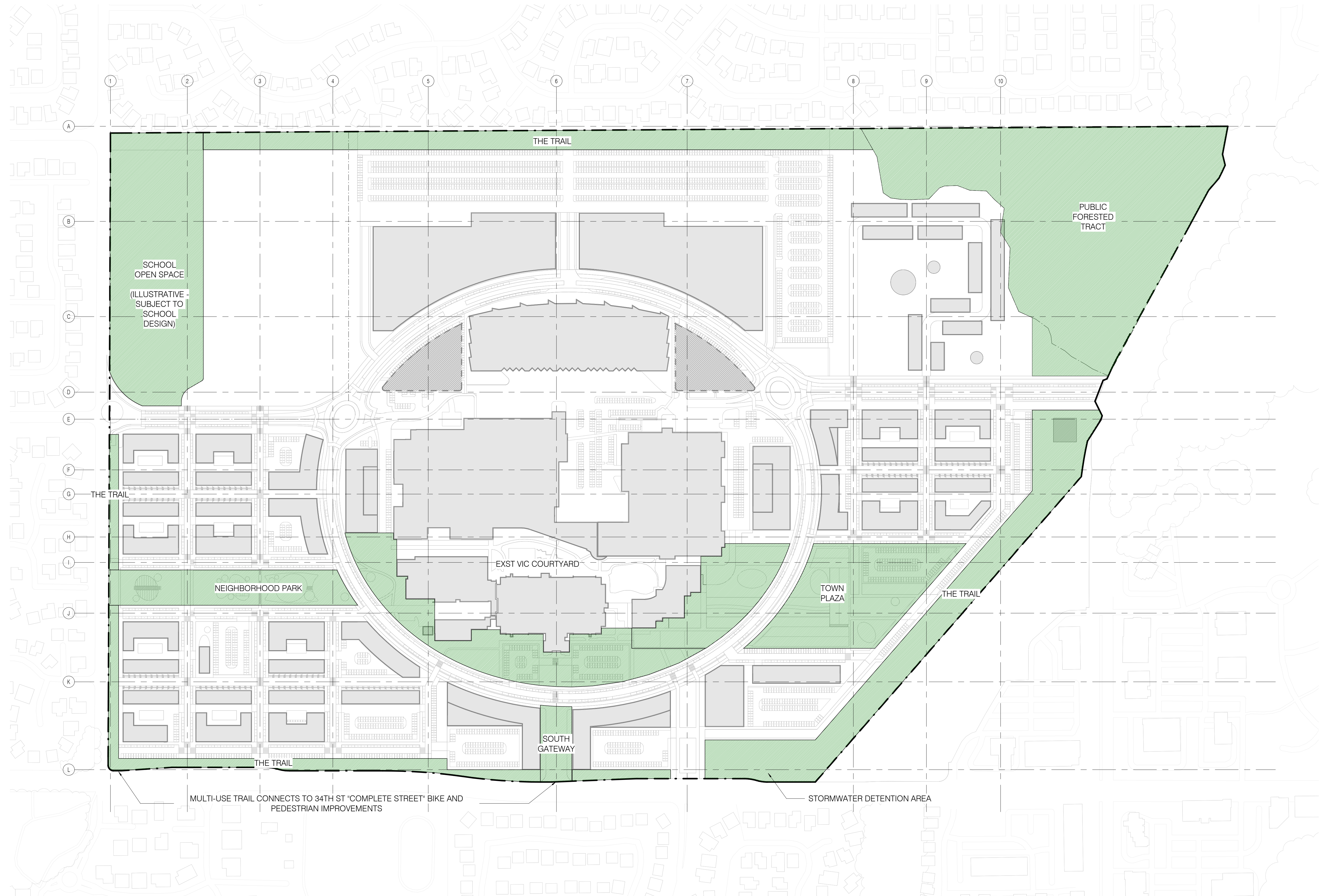
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SHEET INFORMATION: ARCH D 24"x36"		
DRAWING TITLE		
MASTER PLAN - PROPOSED LAND-USE		
SEAL & SIGNATURE	DATE	
	PROJECT NO.	210917
	DRAWN BY	Author
	CHECKED BY	Checker
DRAWING NUMBER		

1. BUILDING FOOTPRINTS ARE ILLUSTRATIVE AND SUBJECT TO CHANGE.
2. OPEN SPACE BOUNDARIES ARE CONCEPTUAL. THE LOCATIONS AND SIZE OF EACH OPEN SPACE AREA WILL BE REFINED AT THE SITE DEVELOPMENT STAGE.



– STORMWATER DETENTION AREA

1	004
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DRAWING TITLE		
SITE PLAN - POTENTIAL OPEN SPACE		
SEAL & SIGNATURE	DATE	
	PROJECT NO.	210917
	DRAWN BY	Author
	CHECKED BY	Checker
	DRAWING NUMBER	

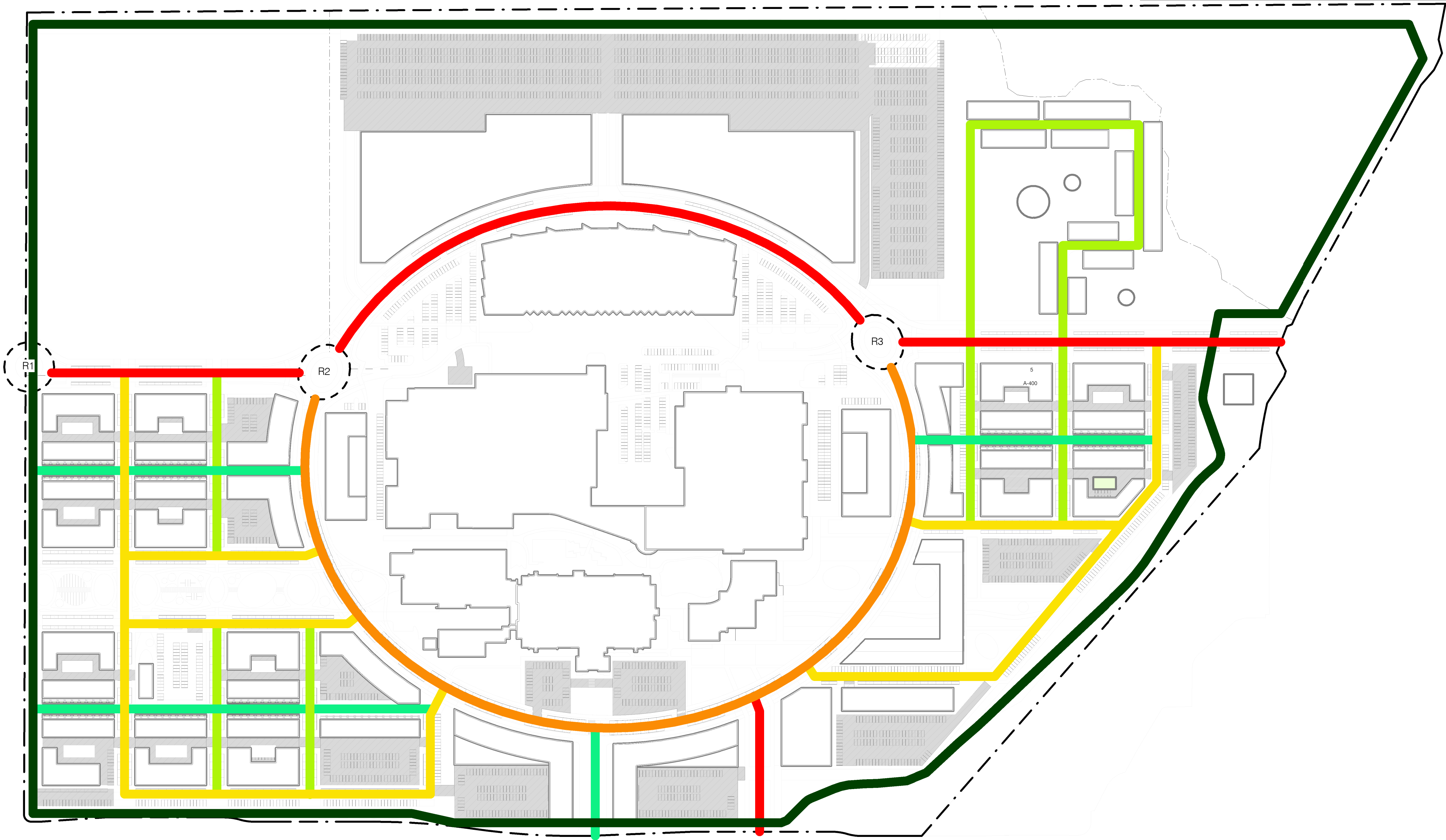
004

GENERAL NOTES:

1.
- LOCATION OF STREET TYPES 04 LOCAL ACCESS CONNECTIONS AND 05 PEDESTRIAN LANEWAYS ARE ILLUSTRATIVE AND SUBJECT TO CHANGE.
2.
- BUILDING FOOTPRINTS ARE ILLUSTRATIVE AND SUBJECT TO CHANGE.
3.
- LOCATION OF TRAIL IS ILLUSTRATIVE AND SUBJECT TO CHANGE. TRAIL LOCATION IN SCHOOL PARCEL AND FORESTED TRACT ARE SUBJECT TO COORDINATION WITH EVERGREEN SCHOOL DISTRICT AND CITY OF VANCOUVER.
4.
- REFER TO SHEET 007 FOR CORRESPONDING STREET SECTIONS.

MOBILITY LEGEND

- STREET TYPE 01 - MAIN STREET ALONG LOOP
- STREET TYPE 02 - SLOW STREET ALONG LOOP
- STREET TYPE 03 - LOCAL STREET/NEIGHBORHOOD LOOP
- STREET TYPE 04 - LOCAL ACCESS CONNECTIONS
- STREET TYPE 05 - PEDESTRIAN LANEWAYS
- ROUNDBABOUT
- SURFACE PARKING LOT
- TRAIL - REFER TO SHEET 008

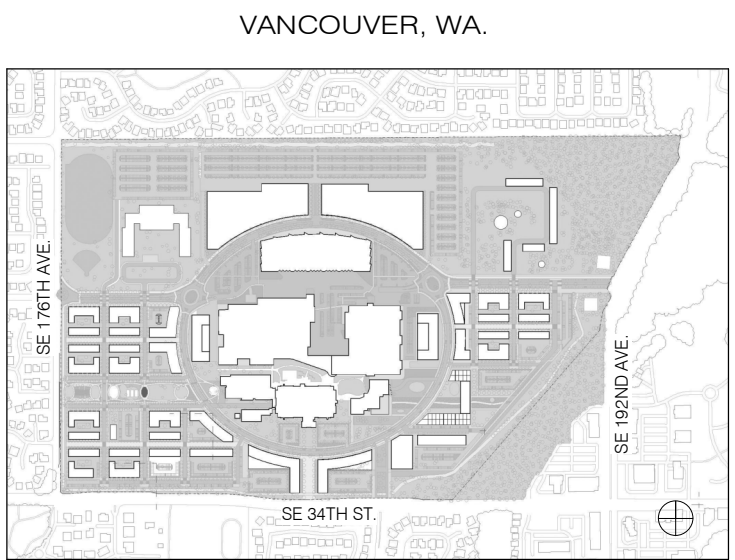


sh p

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DRAWING TITLE
SITE PLAN - MOBILITY PLAN

SEAL & SIGNATURE	DATE
PROJECT NO.	210917
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MOBILITY PLAN

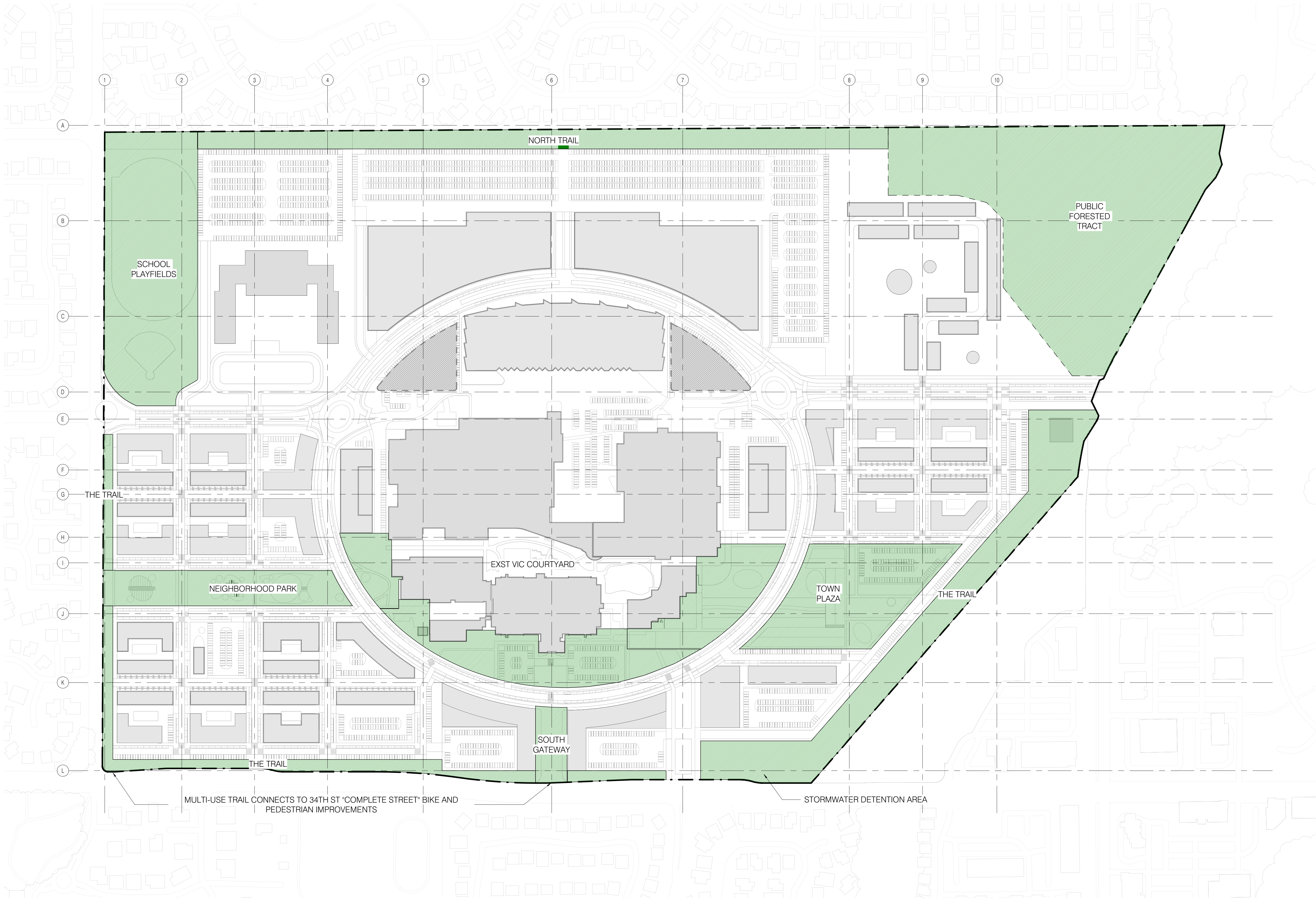
1 : 2000

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005

005

GENERAL NOTES:

1. BUILDING FOOTPRINTS ARE ILLUSTRATIVE AND SUBJECT TO CHANGE.
2. OPEN SPACE BOUNDARIES ARE CONCEPTUAL. THE LOCATIONS AND SIZE OF EACH OPEN SPACE AREA WILL BE REFINED AT THE SITE DEVELOPMENT STAGE.



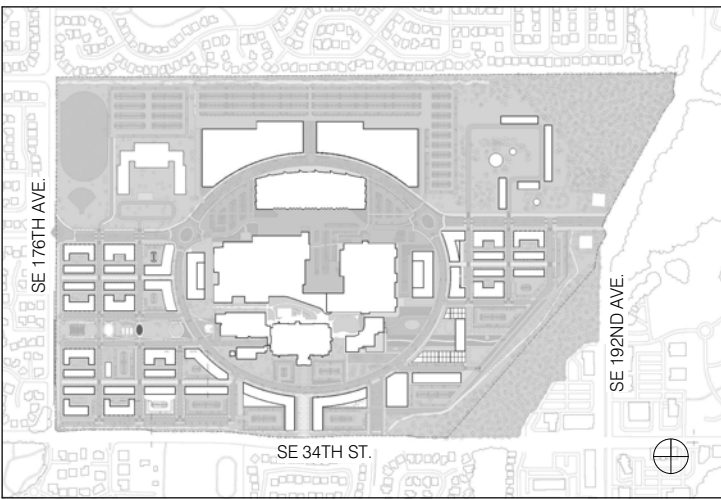
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TRAFFIC ENGINEER	LAND USE CONSULTANT
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ENERGY & WATER USE DISTRICT PLANNING	SUSTAINABILITY
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NO.	DATE	REVISION
3	8/25/2022	PRE-APPLICATION DESIGN PACKAGE

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SITE PLAN - POTENTIAL OPEN SPACE

SEAL & SIGNATURE	DATE	08/11/2022
	PROJECT NO.	210917
	DRAWN BY	Author
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006

ILLUSTRATIVE OPEN SPACE PLAN

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006



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STREET SECTION LEGEND

- | | |
|---|---|
|  | TRAVEL LANE |
|  | ON-STREET PARKING / FLEX LANE
MAY CONTAIN BULB-OUTS AT INTERSECTIONS |
|  | SIDEWALK |
|  | SHARED VEHICULAR/BICYCLE/PEDESTRIAN ACCESS |
|  | MEDIAN/TURN POCKET |
|  | LANDSCAPE ZONE |
|  | CYCLE TRACK |
|  | OUT OF STREET SCOPE, SEE PLAN |

From: [Jean M. Avery](#)
To: [Planning Commission](#)
Cc: [City Council](#); [Eiken, Chad](#); [Ray, Charles](#); [Small, Rebecca](#)
Subject: Comment to Planning Commission, 12/12, re Vancouver Innovation Center
Date: Sunday, December 10, 2023 6:22:41 PM

CAUTION: This email originated from outside of the City of Vancouver. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello,

I wish to share concerns about the VIC development --- specifically because this development includes removal of mature trees in a forested tract.

- In Vancouver's Tree Canopy Achievement Program, the process section states: *"Protect mature trees. Mature trees are irreplaceable assets to our community and help define our neighborhoods."*
- Per VMC Title 20.770, trees on private property may not be removed unless permitted, citing the importance of canopy coverage provided by trees.

In reviewing the slides for the VIC presentation, I am concerned by these statements:

- "Open space boundaries [on the design document] are conceptual.....Open space area will be refined at the site development phase." There already has been vagueness and lack of transparency regarding the exact acreage of the forested tract.
- "Trees required to be replaced due to the parking development [adjacent to the Forested Area] will be replaced on campus." Replacement trees would not be mature trees.

I urge the Planning Commission to preserve the full forested tract before we lose a valuable and rare stand of mature trees in East Vancouver.

Jean Avery
Vancouver resident

From: [Bob Ortblad](#)
To: [Planning Commission](#)
Subject: Public Comment
Date: Monday, December 11, 2023 5:08:42 PM
Attachments: [Vancouver Planning Commission.pdf](#)

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Vancouver Planning Commission

Please accept the attached Public Comment for the Dec. 12, 2023 meeting.

Respectfully
Bob Ortblad

Vancouver Planning Commission

Will the “Strategic Plan” address the devastating impacts of the Interstate Bridge Replacement Program’s massive freeway expansion in the heart of Vancouver?

Bob Ortblad MSCE, MBA
Seattle, WA



What does the Vancouver City Council want on their waterfront for the next 100 years? IBR's massive concrete interchange or a Waterfront Park over an Immersed Tunnel.



Portland

100 years



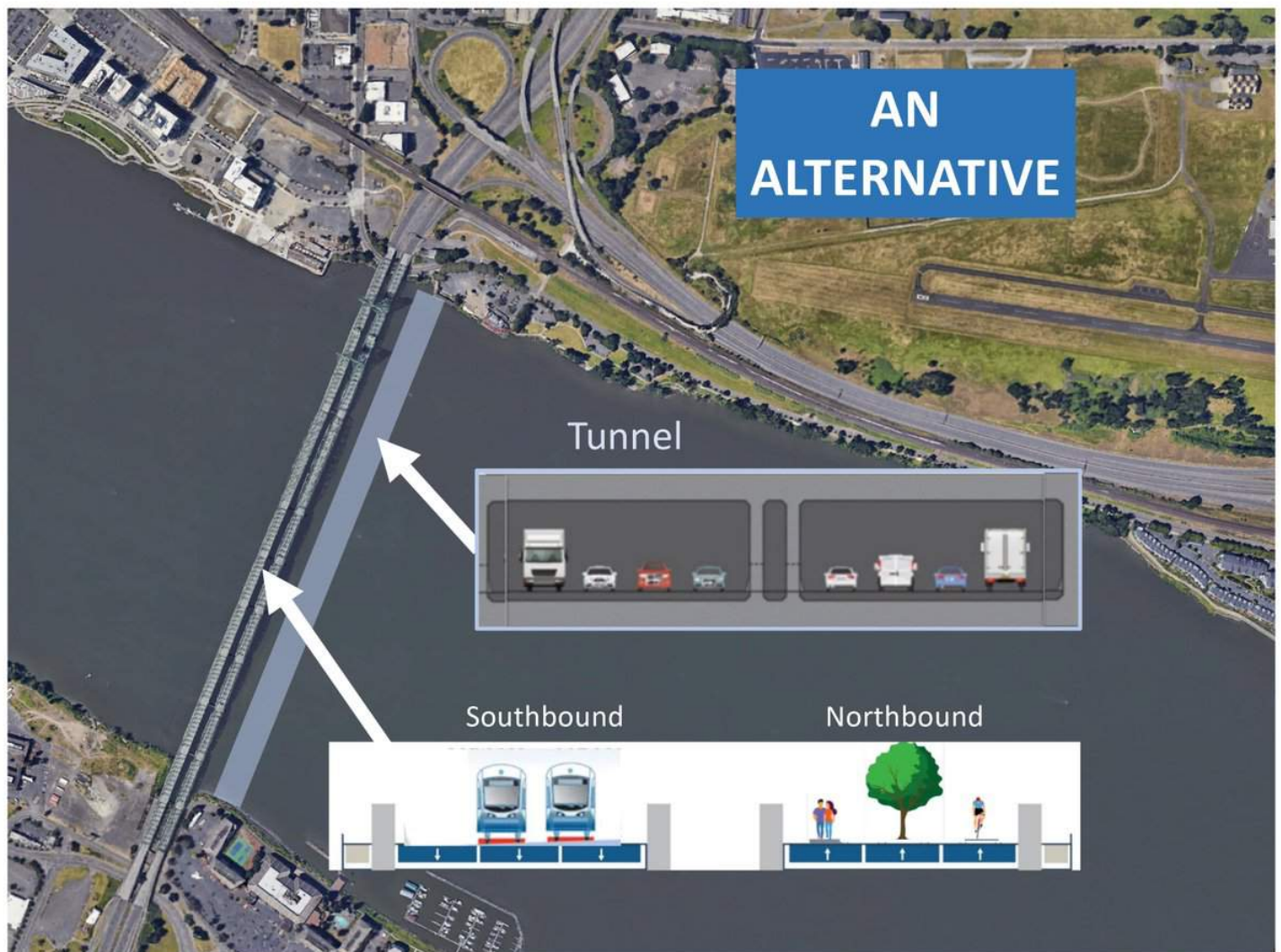
Salem

Alternative not considered by IBR.

No rebuild of 7 interchanges, saving billions.

Northbound bridge repurposed to shared path (like NYC High Line) connecting Hayden Island & Vancouver waterfront parks.

Southbound bridge repurposed for light rail, less costly ground level stations.



From: [Teresa Hardy](#)
To: [Planning Commission](#)
Subject: Fwd: Survey forested tract -VIC
Date: Monday, December 11, 2023 11:25:51 PM

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Information and emails previously submitted regarding the Forested Tract and the discrepancy.

Begin forwarded message:

From: Teresa Hardy <teshardy31@gmail.com>
Subject: Survey forested tract -VIC
Date: October 29, 2021 at 12:27:49 AM PDT
To: "McEnerny-Ogle, Anne" <anne.mcenerny-ogle@cityofvancouver.us>, linda.glover@cityofvancouver.us, sarah.fox@cityofvancouver.us, bart.hansen@cityofvancouver.us, erik.paulsen@cityofvancouver.us, ty.stober@cityofvancouver.us, laurie.lebowsky@cityofvancouver.us
Cc: planningcommission@cityofvancouver.us

Jean Avery reached out to Mr. Hornstein (8/9/2021) after his verbal commitment to keep the forested area.. a forested area. After Ms. Avery's second request about the total acres Mr Hornstein responded (10/26/21). See below.

Questions by citizens concerned with Vancouver Neighborhood and Community Park deficits and retention of Mature Tree canopy,

- Mr. Hornstein's response is confusing.
- Is Mr. Hornstein not sure the total acres and thinks it is 14 acres?
- Is Mr. Hornstein confused that the SEPA states it is 35 acres and Mr. Charles Ray, Urban Forester confirmed approximately 35 acres using GIS Mapping?
- After a rezone approval, why is it being surveyed by "we" assuming "we" means for his clients New Blueprint Partners and MacKay Sposito?
- In the Third Amended and Restated Development Agreement that was submitted to Chair Ledell and Planning Commission on 5/4/21 by Mr. Snodgrass - p.40 there are what appear to be surveys.
- Were there not valid surveys submitted for the rezone and now the forested tract has to be re-surveyed by the owner and developer to determine the total acres?
- Does this mean the DA agreement that stated 13.6 acres would be retained, prior to Mr. Hornstein's commitment to retain all of the forested tract, ...mean that only about .4 (4/10) of an acre would be removed?

Jean M. Avery
Vancouver resident

On Tue, Oct 26, 2021, 2:34 PM Steve Horenstein
<Steve@horensteinlawgroup.com> wrote:

Hi Jean,

I apparently missed your first reach out. My apologies.
The forested area is about 14 acres. We are having it surveyed.
We have recorded a covenant against it to keep it in its natural
state and not develop it. Our arborist, working with the City
may want a few unhealthy trees cut but that will be decided on
a technical basis. Forwarded message -----

From: **Jean M. Avery** <jeanmavery@gmail.com>
Date: Tue, Aug 17, 2021, 3:53 PM
Subject: Ltr to Horenstein

Re: VIC Development, forested section

Dear Mr. Horenstein,

At the August 9, 2021 meeting of the Vancouver City Council, I
was pleased to hear you say that the forested section of the VIC
property would be retained in its current, natural state (except for
the removal of a few unhealthy trees). Would you please clarify
whether there is indeed a "Covenant" on the forested section of
the property, and what that entails?

Thank you for your reply, I basis and will be very minimal. We
are working on an agreement with the city to turn this area into
a City park with appropriate improvements for a forested area.
There will be community engagement as the City always does
with a new park as to its design and such.
Let me know if you have further questions.

Sent from my iPhone

From: "Jean M. Avery" <jeanmavery@gmail.com>
Subject: Re: Park at VIC
Date: October 27, 2021 at 7:24:33 AM PDT
To: Steve Horenstein <Steve@horensteinlawgroup.com>

Mr. Horenstein,

Thank you for this response. I am joined by other Vancouver residents who value trees in our communities.

I am taking the liberty of sharing your response with them.

Regards,

Jean (Avery)

From: [Teresa Hardy](#)
To: [Planning Commission](#)
Subject: Fwd: VIC - Mr. Hornstein's statement
Date: Monday, December 11, 2023 11:49:20 PM

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Email previously sent regarding the discrepancy of the Forested Track.

Begin forwarded message:

From: Teresa Hardy <teshardy31@gmail.com>
Subject: VIC - Mr. Hornstein's statement
Date: October 12, 2021 at 2:10:20 PM PDT
To: jason.rush@comcast.net, abhishek.kandar@gmail.com,
northwestuser2@gmail.com, stevenhaygood@mac.com,
akullick@comcast.net
Cc: Brian and Kathleen Mathieson <bkmathieson@gmail.com>, Kate
Fernald <kate.fernal@gmail.com>, cathryn Chudy
<chudyca@gmail.com>, "Williams, Holly"
<Holly.Williams@cityofvancouver.us>, "Perlick, David"
<David.Perlick@cityofvancouver.us>, charles.ray@cityofvancouver.us

Neighborhood Association's Leadership

For those of who may not have been able to attend the 8/9 City Council meeting and are interested, if you go to CVTV (18 min 48 sec. to 20 min. 45 sec.) you will be able to listen to Mr. Hornstein's statement about retaining the forested area.



From: [Teresa Hardy](#)
To: [Planning Commission](#)
Subject: Fwd: Land Use- VIC Forested Tract/ Parks
Date: Tuesday, December 12, 2023 12:19:17 AM
Attachments: [VIC DA Open Space Areas Diagram \(Exhibit B-5\).pdf](#)
[VIC DA Tree Canopy Diagram \(Exhibit B-7\).pdf](#)

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Information previously sent in regards to the Forest Tract

10/10/21

Cathryn Chudy, Jean Avery, Monica Zazueta, and myself, as members of the Loowit Chapter of the Sierra Club, have been following the retention of the VIC Forested tract for a Forested Park, emailing Mr. Hornstein, the Mayor, and City Council and speaking up at Planning Commission and City Council Meetings to ask the City to retain more than 13.6 acres. We encouraged the City to retain the forested tract as an interim step in addressing the City Climate Action Plan Strategy. After Mr. Hornstein spoke to the City Council, in an attempt to find written documentation of the total acres, I reread the documentation and what was presented to the Planning Commission and City Council at workshops, meetings and hearings. The documentation presented to the public kept saying 13.6 (70%) acres out of 19.1 acres. However, 19.1 acres is the total of the Urban Plaza, promenade, linear parkway, and forested track to be retained and not the 35 acres of 50 year old Douglas Fir trees. .

With the 1200 projected units at VIC and 2,103 multifamily (high density) units with a minimum of 2 people in each unit that is 6,600 more residents off 192nd. Having a 35 acre forested park on the East side would be a major benefit to the entire City of Vancouver.

The loss of 21.4 acres of trees to New Blueprint Partners. a New York firm, is questionable and disheartening.

A written follow-up to the
Public Comment at the 9/27
City Council Community
Forum.

There still seems to be
misunderstanding,
discrepancy, and
inconsistency in the
information around the VIC
Forested tract.

- Recognizing the SEPA

Environmental Checklist:
(WAC 197-11-960) p. 9 of
18 that says there is
approximately **35 acres** of
healthy trees in the NE
corner of the VIC, which
was confirmed by Mr.
Charles Ray, City Urban
Forester, after using GIS
mapping.

- The Development
Agreement which
says **13.6** acres will be
retained of the Forested
area.

- The Columbian printed an
article on 8-17, after Mr.
Hornstein spoke to the City
Council on 8/9. “ The plan
calls for the heavily
forested **14 acre** northeast
corner of the site to be
preserved and used as a
public park through a
covenant with New
Blueprint Partners. “

-The SEPA Environmental
Checklist: (WAC 197-11-
9600) p. 4 of 18, goes on to
say.. “ Approximately 19
acres of open space through
the retention of
approximately **70%** of the
forested area in the northeast
portion of the site, a linear
greenway extending from
the forested area, and a

separate urban plaza in the purple mixed use area.“
70% of the **35** acres is **24.5** acres, which is more than the **13.6** in the Development Agreement, leaving **10.5** acres to be used by the Developer for MX high density housing.

- At the 8/9 City Council Mr. Hornstein, speaking in behalf of Vancouver Innovation Center and his client New Blue print partners said,

“those that are concerned about the trees in the forested area need not be. We have agreed to place a covenant on that property within 30 days of execution of the Development Agreement that will preclude us from doing anything on that property other than leave it in its natural state. The reason we will put the covenant on is the City doesn’t have funds yet to purchase that property for park purposes. We have assured the Parks Department and Planning, we are committed to leaving that forest area a forest area.”

The City is currently engaged in Climate Round Tables, which involve action

development for
Vancouver's Climate Plan...
actions to reduce GHG
emission and climate
resiliency actions.
Resiliency includes
maintaining mature trees
(VIC forested stand -50 year
old Douglas Fir) versus
replanting with new young
trees which under drought
condition take 3 years to get
established and requires 10-
15 gallons of water a week
in summer months. (City
Urban Forestry Summer
Tree Care)... "Our trees
provide natural canopies and
shade for our
neighborhoods, clean our air
and water, and enhance the
quality of life for all of us"

During the Park
Presentation, Essential
Spaces 9/27 City Council
Meeting reiterated the
shortage of parks on the
East Side.... especially with
high density approval ie.
VIC and others.
As a matter of preserving
credibility with the citizens
of Vancouver and to clear
up the various reports,
especially Mr. Hornstein's
commitment representing
the Developer, the Public
looks forward to
clarification from the City
for the VIC Forested tract.

EXHIBIT B-5 – Open Space Plan

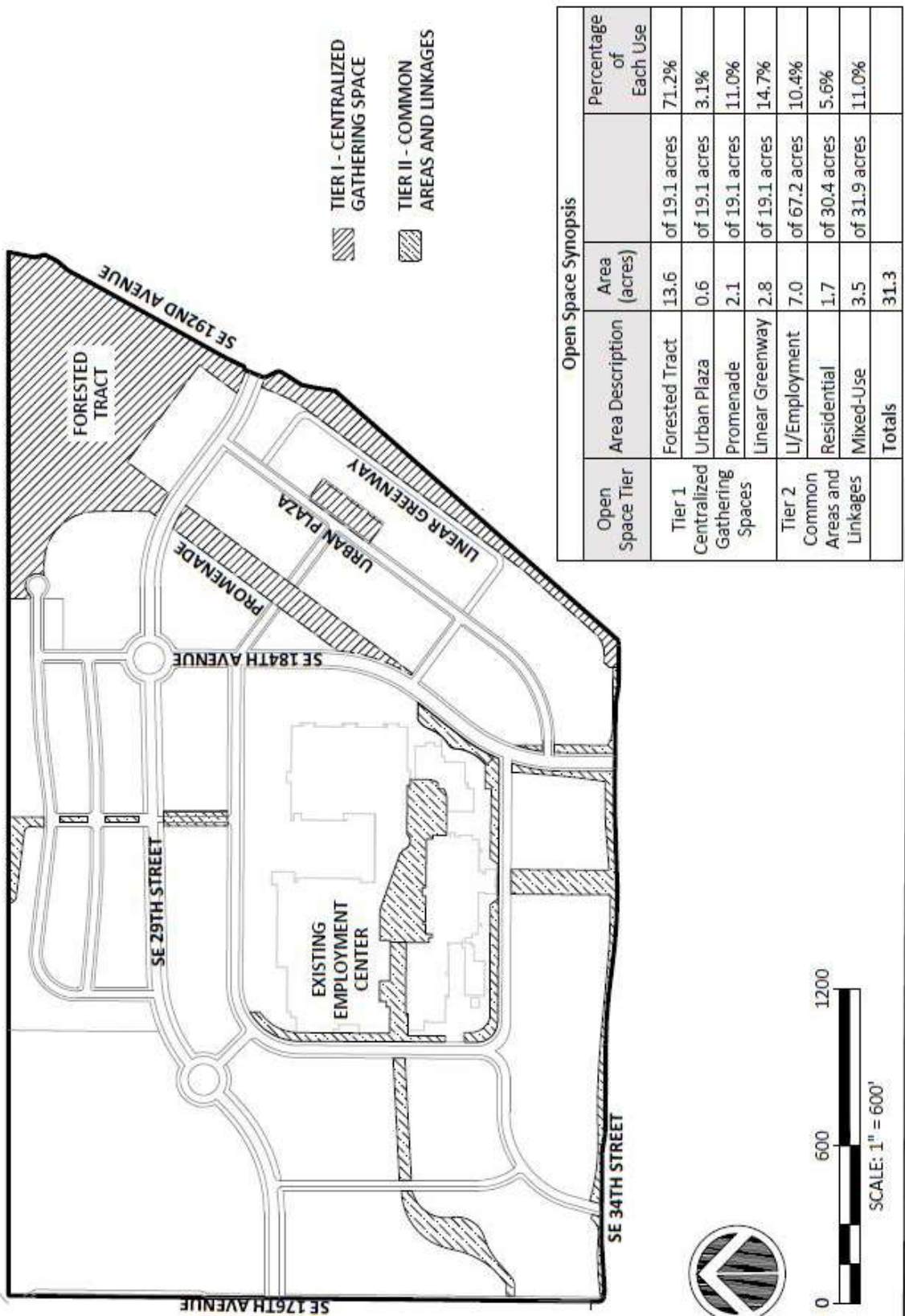
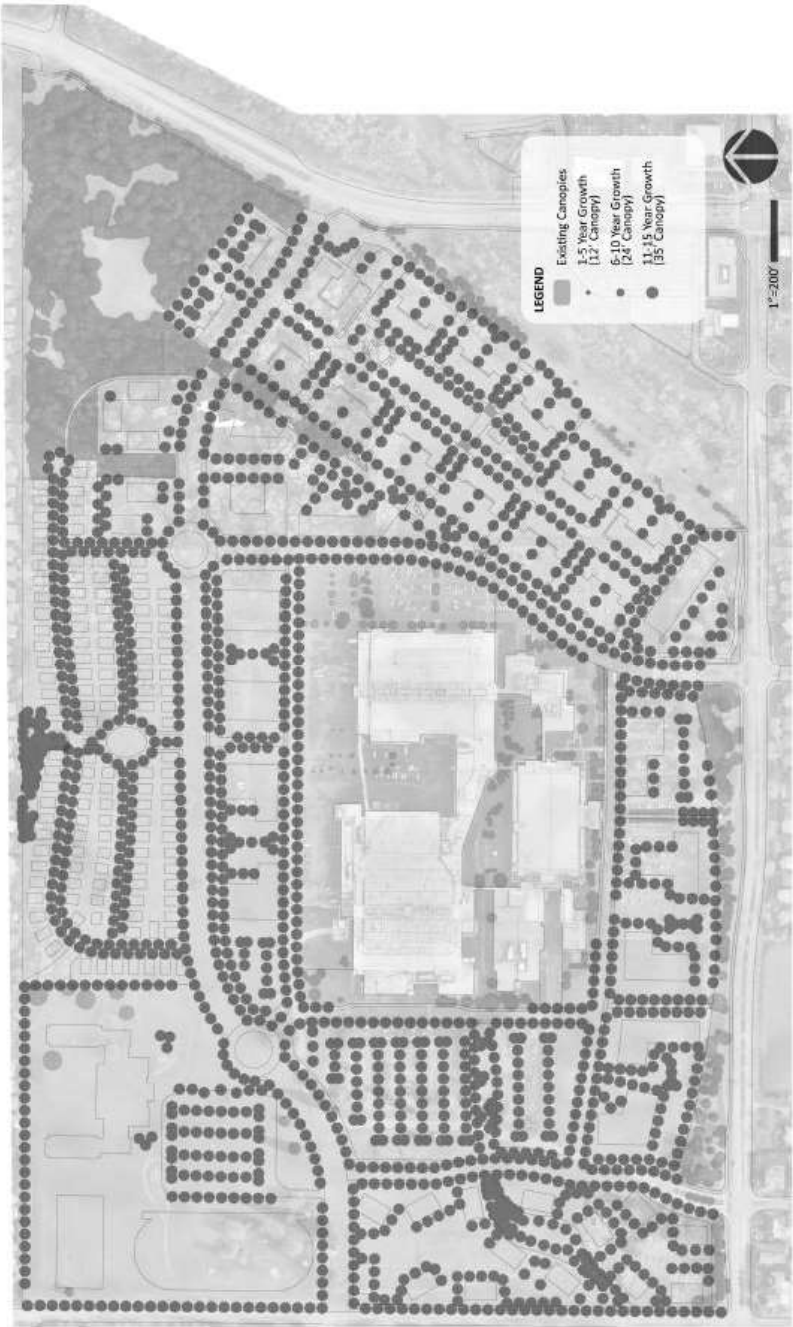


EXHIBIT B-7 – Tree Canopy Plan



Canopy at Full Growth- 55 acres - 31% of total acreage, (179)

Vancouver Innovation Center - Proposed Tree Canopy / 16-20 Years

MARCH 2021

Vancouver Innovation Center Project – Analysis of Parks and Open Space Needs: Discussion Draft

- Park Impact Fee District C located east of 205 to the City limits is significantly underserved in terms of park acreage.
- Based upon current population projects which are likely lower than actuals, there is a 186 acre Community Park deficit with an additional 44-acres needed for Neighborhood Parks. For the 10-year planning period to 2030 we anticipate a 209-acre Community Park deficit, and 59-acre Neighborhood Park deficit. The district has a surplus of Urban Natural Area of 22.8 acres (2020) and 14.9 acres (2030) respectively.
- There are only a few consolidated areas within District C that provide opportunities of viable buildable lands that to meet the community needs of parks and open space.

- The preliminary project proposes between 125 to 190 single family units, and 980 to 1150 multifamily residential units. Based upon adopted park standards identified the Comprehensive Parks, Recreation and Natural Areas Plan the project would add an additional demand of 14.38 to 17.55 acres of additional parks (11.98 – 14.63 acres) and open space (2.4 – 2.92 acres) that would add to the district deficit.

WAC 197-11-960: SEPA ENVIRONMENTAL CHECKLIST

- ☐ Orchards, vineyards or other permanent crops.
- ☐ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
- ☐ water plants: water lily, eelgrass, milfoil, other
- ☐ other types of vegetation

- b.  What kind and amount of vegetation will be removed or altered? *There is an approximately 35 acre healthy tree stand in the northeast corner of the site consisting primarily of Douglas Fir, which has been visited by the City Urban Forester, as well as scattered trees throughout the site. Approximately 19 acres of the forested area is envisioned for park space and linear open areas, where most trees will be retained with some thinning. Approximately 30% of the stand is anticipated to be removed for development, but replanted throughout the site will be required by the City of Vancouver trees standards under VMC 20.770, Tree, Vegetation and Soil standards.*
- c. List threatened and endangered species known to be on or near the site. None known
- d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any: *Future development will be required to meet landscaping requirements of VMC 20.925, in addition to the tree standards of VMC 20.770*
- e. List all noxious weeds and invasive species known to be on or near the site. None known

WAC 197-11-960: SEPA ENVIRONMENTAL CHECKLIST

The applicant envisions that future buildout of the site over approximately 15 years will accommodate approximately 5,000 jobs and 1200 residential units, with specifics as follows:

- In the blue light industrial (IL) area at the center of the site in the Land Use Allocation Plan, the existing approximately 715,000 square foot light industrial building complex is currently half occupied with approximately 1500 employees. The applicant is in the process of leasing out the remaining spaces and has begun some tenant improvements. Approximately 11 separate new industrial buildings encompassing 215,000 square feet are planned to be built in the IL area, and will likely constitute the first phase of development on the overall site. The western portion of the blue IL area will contain a large parking area.
- In the tan multi-family residential area on the west side of the site, approximately 24 buildings encompassing a total of 180 apartment and 100 townhome units are anticipated, in the second phase of development.
- In the tan single-family residential area on the north side of the site, approximately 110 detached and 100 attached single-family homes are planned in the third phase of developments
- In the purple mixed use area on the eastern side of the site, approximately 20 mixed use or commercial buildings are envisioned, encompassing approximately 750,000 square feet. These are anticipated to accommodate up to 610 multi-family housing units. The dashed area comprising most of this area is referred to as the Town Center, where the most intensive development of the overall site is envisioned in an urban setting surrounding a central plaza, and with a linear greenway connecting to the forested park area in the northeast corner of the overall site. A separate master plan will be required to be submitted for the Town Center, within three years of approval the full site master plan.
-  Approximately 19 acres of open space are proposed, through the retention of approximately 70% of the forested area in the northeast portion of the site, a linear greenway extending from the forested area, and a separate urban plaza in the purple mixed use area.
- The approximately 20-acre green area at the northwest corner of the site is planned for a future middle school campus. No timetable has been set for development, as the Evergreen School District has not yet acquired the property and has indicated the school will be needed for future rather than current demand.
- Two major public roadways are planned to serve the site, SE 29th Avenue running east-west, and Road A running north-south.

From: ssilvey643@aol.com
To: [Planning Commission](#)
Subject: meetign comment 12 dec
Date: Tuesday, December 12, 2023 6:43:59 AM

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Sirs,

Why it appears there have been meetings to discuss, in overlooking things (a lot of information) it appears no community visits to compare what has been approved and the actual product, and then the people whom have used said product.

While I get this is a concept.... when one buys a car they do not buy concept they bur the actual car as built. I get it that in plan review, the folks bring forth concept sketches and illustration, but they also mark them as concept, yet no one to my knowledge actually looks at what was proposed, approved and compares it to a finished product which appears to be the wink wink attitude.

It is somewhat like housing affordability... a big issue, yet the demands on builders, to support things via increased builder's fees, which were discussed at a town hall, by those needing monies, as it was becoming less, and the solution of raising fees one had to laugh at lack of comprehension of these folks. Or the fact that a recent resolution to be green, neutral to ban natural gas... so now equipment and demand for electricity which in our area is not green by way of a vote, must be used which cost individuals more in use and shall only go up when the smart meters regulate rates during the day.

It brings to mind a comment I made too many years ago after they improved a section of 4th Plain by Andresen the west side. It was why not mark side walk in two colors for use of walkers and bicyclist, and why were power poles and trees planted where they impeded walk/ride ability. The answer was we are aware of this concept but doesn't matter. Same with engineering studies that have been shown to be flawed, the engineer in front of judge stated it doesn't matter.

It may be that all is nice and appeals to the few, but why not go out after hours and view what has been created, and how is it working, functioning, and do actual test and see what the issues are. But then again from past practices....

Steven Silvey

From: [Bob Ortblad](#)
To: [Planning Commission](#)
Subject: Public Comment
Date: Tuesday, December 12, 2023 12:28:13 PM
Attachments: [Parking & Ride.pdf](#)

You don't often get email from r.ortblad@comcast.net. [Learn why this is important](#)

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Vancouver Planning Commission

Please accept the attached Public Comment for the Dec. 12, 2023 meeting.

IBR's plan for parking conflicts with Vancouver's Strategic Plan.

Respectfully
Bob Ortblad

Bob Ortblad @BOrtblad · Oct 16

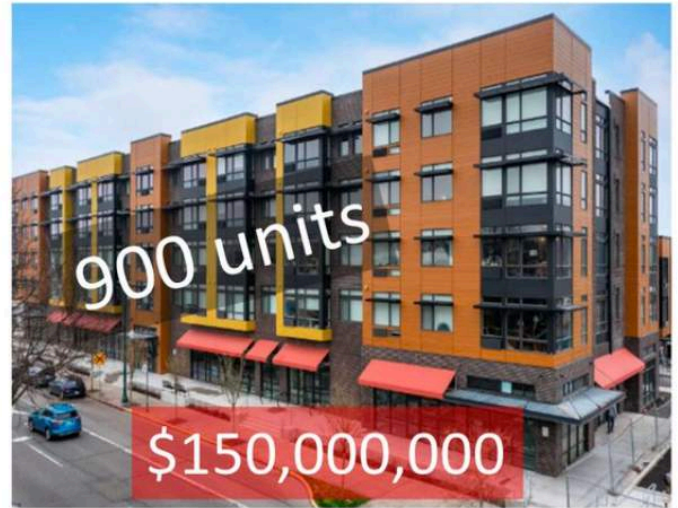
...

FTA want to fund affordable housing near transit stations.

IBR plans to build 1,270 parking spaces costing \$116,000,000.

These 6 acres better used for 900 apartments.

IBR's 1960's freeway & parking not attractive to Federal funding.



Bob Ortblad @BOrtblad · Nov 16

Outrage over destruction of the Seattle Hotel to build a parking garage saved historic Pioneer Square.

IBR's Parking Rides will add traffic & blight to downtown Vancouver. Land near transit is more valuable for commercial & residential development.

[@FTA_DOT](#) [@USDOTFHWA](#) [@trimet](#)



1,270 Parking Spaces: \$116 million plus land



Bob Ortblad @BOrtblad · Oct 23

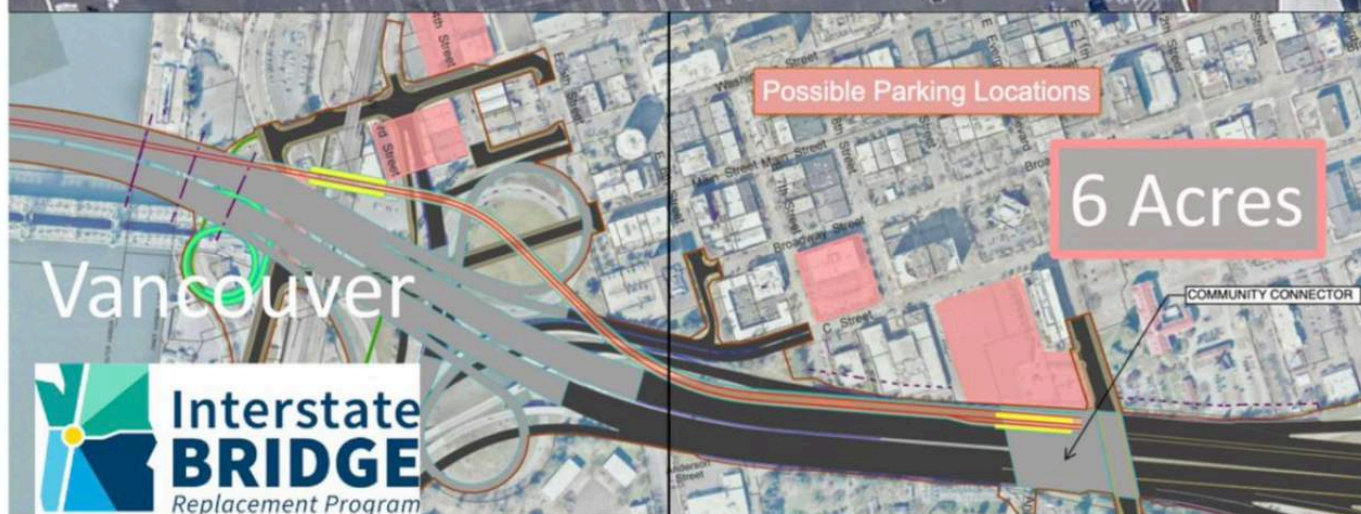
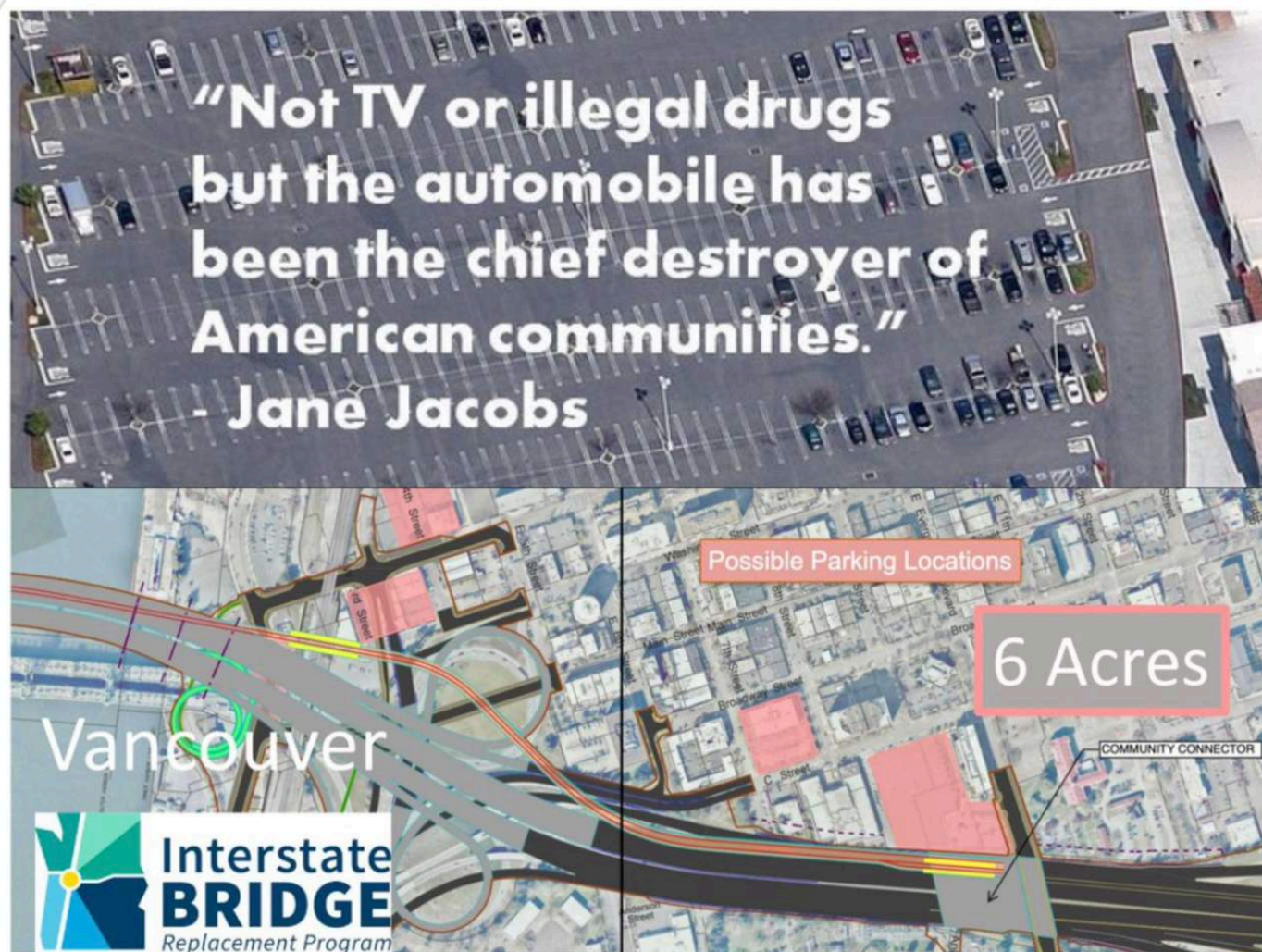
...

Vancouver should build a downtown for people, not cars.

IBR plans to build 1,270 parking spaces costing \$116,000,000.

These 6 acres better used for 900 apartments.

IBR's 1960's freeway & parking not attractive to Federal funding.



Bob Ortblad @BOrtblad · Sep 11

...

IBR's just submitted a USDOT Mega grant application.
Planned Vancouver parking lots are almost dumber than a high bridge with a -4% grade on an often-icy S-curve.

Immersed Tunnel, innovative, safe, with environmental benefits and more attractive for Federal funding.



*“Yes, the planet got destroyed.
But the IBR built
lots of car parking”*

1,270 Parking Spaces: \$116 million plus land

