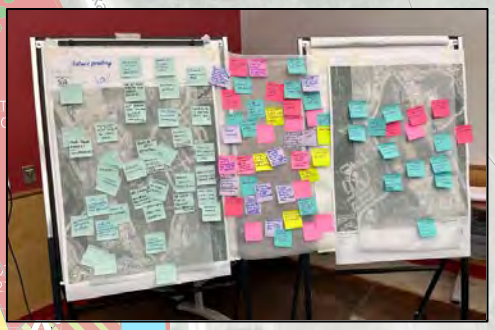
Valleyview South Master Plan

Final Report

May 2024









Prepared by:

GROUNDSWELL PLANNING

In partnership with:

MODUS

ECOLOGICAL LOGISTICS & RESEARCH LTD

GREENWOOD ENGINEERING SOLUTIONS

MORRISON HERSHFIELD

INUKSHUK PLANNING & DEVELOPMENT LTD

URBAN SYSTEMS

Executive Summary

The City of Whitehorse is focused on ensuring all residents have access to a safe place to call home. To meet this demand, the City is looking at a number of ways it can increase the amount of housing in the community. The "Valleyview South" area, located between the Valleyview, McIntyre, and Hillcrest neighbourhoods, has long been envisioned by the City for residential development. To ensure the area is developed in a logical, integrated manner, the City undertook a land use Master Plan for this new residential neighbourhood.

The Plan sets out a vision, objectives, and associated policies to guide decisions and articulate clear direction on land use and development in the Plan area. The Plan content was informed by: a review of relevant City plans, policies and bylaws; supporting studies and technical reviews; landowner, community, stakeholder, and government consultation; and a thorough understanding of the Plan area. To arrive at a preferred land use concept and report for the Plan area, the City's consultant went through multiple iterations of information gathering, conceptualization, and engagement.

The Plan envisions the development of a mix and range of housing and public spaces in Valleyview South, as well as a mixed-use Urban Centre situated across Hamilton Boulevard from the Canada Games Centre. To fulfill the Official Community Plan's density requirements for the Urban Core, a diverse mix of low, medium, and high-density housing is proposed, with a minimum of 1,700 units anticipated within the planning area. The Plan envisions key transportation enhancements, including a new highway access at Range Road and accompanying transformation of the eastern portion of Sumanik Drive into a multi-use trail, and improvements to intersections along Hamilton Boulevard. The Plan also envisions a robust network of multi-use pathways throughout the new neighbourhood to connect residents with the City's existing active transportation network. These changes aim to enhance both vehicular and active transportation modes, fostering improved accessibility and connectivity for the community.

To develop this new neighbourhood, significant site preparation will be required. The Plan recommends significant grading, including gravel removal, to establish a gradual slope averaging 2-3% from the Alaska Highway to Hamilton Boulevard. Grading is needed to provide highway access, maximize the developable area, and facilitate efficient water, sanitary, and stormwater infrastructure; however, the City recognizes the potential negative impacts to existing residents of the area from prolonged gravel extraction activity. As such, the Plan includes a strategy in which site preparation and development progress will be coupled in discrete phases and linked to the development approval process.

This Master Plan will serve as the guiding document for the City and the Valleyview South development partners as they proceed to implementation in the years ahead. Its land use strategies, transportation and servicing prescriptions, mitigation measures, and implementation strategies will be the means through which the vision of a well-integrated, vibrant, and sustainable Valleyview South neighbourhood is ultimately realized.

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1.0 Introduction

The City of Whitehorse ("City") Planning and Sustainability Services Department led the development of a master plan for the area located between the Valleyview, McIntyre, and Hillcrest neighbourhoods, referred to as "Valleyview South". The Valleyview South contains a mix of private, government, and First Nation land parcels. It has long been envisioned by the City for residential development. Refer to Figure 1.



Figure 1. Geographic context of Valleyview South planning area in Whitehorse

The Valleyview South Master Plan (VSMP) is intended to:

- Help accommodate the growth of Whitehorse's population and needs of future residents;
- Ensure the new development will fit in with existing neighbourhoods;
- Integrate the area with existing infrastructure, such as roads and water/sanitary systems;
- Identify and protect key environmental features;
- Provide direction on what types of land uses will occur, and where;
- Identify major future roads and active transportation corridors;
- Identify open space, parks, and trail connections; and
- Provide recommendations on other relevant aspects of future development.

1.1 Master Planning Process

A multi-disciplinary team led by Groundswell Planning was retained by the City in September 2022 to undertake the Master Plan. From the outset, Groundswell established a process that considered each major landowner/future developer as “partners” and sought their input and agreement at each milestone along the way. All partner discussions were grounded in the team’s technical advice and input from the public. While the development partners (i.e., landowners with a desire to develop in the future) were the key contributors to the Master Plan, other landowners who have no development plans were included and kept aware of progress to ensure the existing and planned land uses on their parcels were factored in.

The planning process took 17 months and was organized into four phases, as shown in Figure 2 below.



Figure 2. Valleyview South Master Plan process

1.1.1 Phase 4 – Master Planning

The final phase (Phase 4) of the process included most project milestones and decision-making, starting with a January 2023 design charrette and ending with the adoption of the Plan by Council in May 2024. Refer to Figure 3 for an overview of timelines and milestones. Refer to Section Phase 4 – Master Planning1.1.1 for more information on public engagement.



Figure 3. Valleyview South Master Plan Phase 4 milestones and timelines

- *January 2023 Design Charrette*

A three-day design charrette was held from January 25-27, 2023 at the City's Public Safety Building. The charrette involved all the VSMP development partners, technical experts from various City departments, urban design consultants, and residents of Hillcrest and Valleyview. The agenda is shown in Table 1 below.

Table 1. Design charrette agenda

Day 1 am	• Introductions & orientation • Setting current context, visioning, and strategies ("Now, Wow, How" exercise)
Day 1 pm	• Design team working session
Day 2 am	• Design team working session
Day 2 pm	• Mid-course pin-up – participant review of team's work
Day 3 am	• Design team working session
Day 3 pm	• Final pin-up – participant review of second round of team's work

The charrette resulted in two concepts which the City and development partners evaluated against a range of success criteria they had established jointly. The final round of participant feedback provided the "jumping off" point for the team's continued work.







Images above: Scenes from the January 2023 design charrette with VSMP partners and representatives of Hillcrest and Valleyview neighbourhood associations

- *Concept Options*

The planning team continued to elaborate on the two concepts, reconvening City staff and development partners in April 2023 to work through specific design issues.

The team created a Scenario Brief that provided an overview of the two concept options and compared their approaches to land use, transportation, servicing, parks/greenspace, grading, and other design and implementation elements. The draft brief and concept options were reviewed by the City staff and development partners in early June, prior to the start of the second round of public engagement.

- *Final Concept*

City staff and development partners reconvened in late July 2023 to review the outcomes of the June engagement on the two concept options. The group

discussed potential design responses to key public input and provided direction to the team on the elements of a single preferred concept. The draft final concept and Master Plan report were distributed for a final round of review and feedback from City staff and the development partners in December 2023. The resulting final Master Plan was shared with City Council, which held a public input session in April, and was approved in May 2024.

1.2 Master Plan Application

This Master Plan establishes the framework for this future neighbourhood by articulating:

- The location, configuration, and area for different land uses and the associated recommended zoning;
- The types, density, and resulting population for residential development;
- Direction for parks and open space;
- The pattern and alignment of a multi-modal transportation network;
- Desired neighbourhood character;
- A conceptual scheme for servicing the development with water, sanitary, stormwater, power, and grading;
- Implementation considerations; and
- Other items pertinent to development.

The completion of the Master Plan marks a key milestone in the history of the Valleyview South development area and the first shared achievement of the multiple landowners involved. The Plan will be the framework for the individual VSMP partners to proceed with in a coherent and coordinated manner. The anticipated next steps for the Plan's implementation include:

- Follow-up environmental and heritage investigations;
- Preliminary and detailed grading and engineering design;
- Regulatory approvals and associated assessments under the *Yukon Environmental and Socioeconomic Assessment Act*;
- Rezoning; and
- Continued process and coordination discussions between the landowners/partners.

It should be noted that the Master Plan report focuses more on the desired future state of the Valleyview South area, not the current state. Readers are encouraged to refer to the Valleyview South Master Plan Background Report for a comprehensive overview of the study area and its development context.

Note: The policies set out in this Master Plan are intended for implementation by the City; however, they also guide Valleyview South landowners in orienting their development plans for success and approval by the City.

2.0 Neighbourhood Context

Note: The following section is an abridged version of the Valleyview South Master Plan Background Report.

2.1 Parcel Legal Descriptions and Size

The planning area consists of 14 surveyed land parcels, two unsurveyed parcels, three surveyed roads, and numerous easements totaling approximately 114 hectares (ha). Refer to Table 2, the Ownership Map in Appendix A1, and Figure 4. Note that rights-of-way and easements are not included in the table.

Table 2. Valleyview South parcel legal descriptions and size

Parcel	Legal Description	Size (ha)
Lot 66	LOT 66 Valleyview Subdivision 76832 CLSR YT Plan 95-12 LTO YT	3.60
Unsurveyed area	None	2.67
C-117B	LOT 1225 QUAD 105D/11 96822 CLSR YT Plan 2010-0048 LTO YT	5.23
C-141B	LOT 1228 QUAD 105D/11 96822 CLSR YT Plan 2010-0048 LTO YT	5.01
Lot 12	LOT 12 Valleyview Subdivision 76359 CLSR YT Plan 94-64 LTO YT	4.12
Lot 431	LOT 431 GROUP 804 51614 CLSR YT Plan 26170 LTO YT	2.93
Lot 262-2	LOT 262-2 GROUP 804 51139 CLSR YT Plan 25056 LTO YT	3.34
C-30B	LOT 1190 QUAD 105D/11 88070 CLSR YT Plan 2003-0223 LTO YT	12.32
Lot 427-1	LOT 427-1 GROUP 804 57304 CLSR YT Plan 35408 LTO YT	1.58
Lot 427	LOT 427 GROUP 804 51614 CLSR YT Plan 26170 LTO YT	0.36
Lot 438	LOT 438 GROUP 804 51614 CLSR YT Plan 26170 LTO YT	0.51
Lot 2	LOT 2 QUAD 105D/11 64319 CLSR YT Plan 52219 LTO YT	0.58
Lot 426	LOT 426 GROUP 804 51614 CLSR YT Plan 26170 LTO YT	2.80
Unsurveyed area	None	19.91
Lot 429	LOT 429 GROUP 804 51614 CLSR YT Plan 26170 LTO YT	18.56*
Lot 430	LOT 430 GROUP 804 51614 CLSR YT Plan 26170 LTO YT	29.90
Road (#8034222)	51139 CLSR YT Plan 25056 LTO YT	0.06
Road (#8006307)	51614 CLSR YT Plan 26170 LTO YT	0.07
Road (#8006308)	51614 CLSR YT Plan 26170 LTO YT	0.08
	TOTAL	113.63

*Does not include a 7.3 ha portion that is being planned and developed separately.



Figure 4. Aerial view of Valleyview South planning area and approximate parcel locations (Credit: Alistair Maitland)

2.2 Site Conditions and Values

2.2.1 Site History

- *First Nation History and Occupation*

The Valleyview South Master Plan study area is located within the traditional territories of the Ta'an Kwäch'än Council (TKC) and Kwanlin Dün First Nation (KDFN). These first people refer to the Whitehorse section of the Yukon River as Chu Nįį Kwan, which translates to "water, face, moonlight". Local Southern Tutchone oral history confirms inhabitation of the Ta'an Kwäch'än in the immediate section of Chu Nii Kwan/Yukon River to Täa'an Màn/Lake Laberge including the river valley and the surrounding mountains Thè Mbay (Grey Mountain) to the east, Thay T'aw (Haeckel Hill) to the northwest, and T'si Ma (Golden Horn Mountain) to the south.

Southern Tutchone oral history, archaeological, and geological research all indicate that the ancestors of modern-day First Nation citizens arrived in the Yukon River valley shortly after it became deglaciated, around 10,000 years ago. New plant and animal species made the post-glacial landscape a suitable environment for human occupants, and salmon drew people to the river to fish, gather, and visit. Generations of Coastal and Inland Tlingit, Kaska, Han, Gwich'in, Northern Tutchone, and other First Nations came to trade, feast, fish and gather with the Tagish Kwan[1] and Southern Tutchone in the Whitehorse area.

[1] There are various spellings of this word. The 2040 City of Whitehorse Official Community Plan uses "Ch'an".

These millennia-long patterns of occupation and use of the Yukon River valley in Whitehorse by first peoples largely continued after the arrival of non-Indigenous people in the Yukon in the 1860s. The Gold Rush, establishment of post-Gold Rush rail and river-based transportation networks, and the 1942 construction of the Alaska Highway were key milestones in a broader geographic, economic, political, and cultural marginalization of First Nation people that saw them displaced from traditional use areas. Continued growth and urban expansion forced First Nations to move and relocate several times as new neighbourhoods took the place of hunting and gathering areas along the Alaska Highway, including the planning area.

In 1987, the Ta'an Kwäch'än re-established themselves as a distinct First Nation, formally separating from KDFN in 1998. In 2002, TKC signed its final and self-government agreements and assumed ownership and authority over 796 square kilometres (km2) of Settlement Land – including parcel C-30B, located adjacent to the Alaska Highway in the eastern portion of the study area. KDFN signed its land claims agreements in 2005, assuming authority for over 1036 km2 of Settlement Land, including C-117B and C-141B, located within the study area to the north and south of Sumanik Drive.

- *Whitehorse Upper Tank Farm*

The Canol (short for "Canadian Oil") refinery opened in 1944 in the Marwell area of Whitehorse. The intent of a related pipeline between Skagway and Whitehorse (part of Canol No. 2) was to deliver gasoline barged to the Alaskan port to the Yukon.

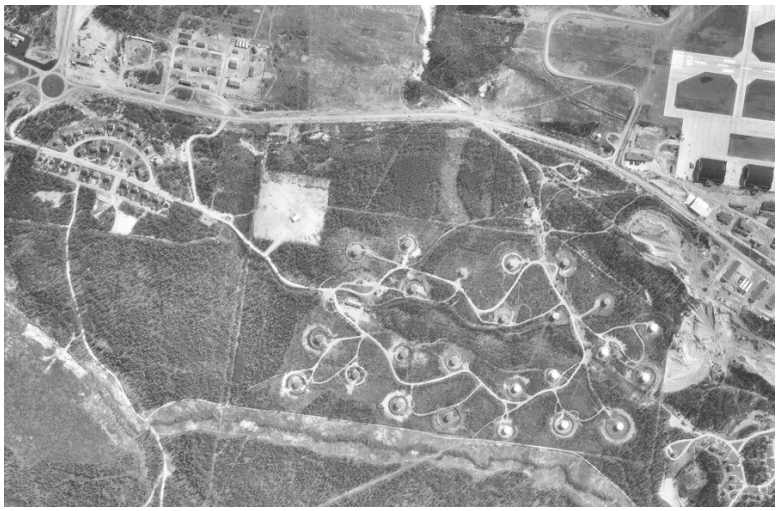


Figure 5. 1963 air photo of WUTF and Valleyview South area

The Whitehorse Upper Tank Farm (WUTF) was established west of the newly expanded Whitehorse airfield, with several pipelines (from Skagway and to the refinery) connecting to it and the 24 large tanks used for the storage of gasoline, furnace oil and arctic stove oil (EBA, 1999). The end of World War II and withdrawal of U.S. military interests saw a complicated chain of Canol No. 1 and 2 asset purchases and transfers involving the Canadian and U.S. governments and White Pass and Yukon Route Company. In 1958, the Canadian government accepted transfer of the portion of the Skagway pipeline located within Canada and leased a portion of the tank farm to White Pass (Midnight Arts, 1999). Figure 5 shows the general footprint of the WUTF and surrounding neighbourhoods after this time.

In 1958, Yukon Pipeline Limited purchased the tank farm and operated it as a light petroleum storage facility for the Yukon until 1995, when it applied to the National Energy Board (NEB) to abandon the facility because it was no longer economically feasible to operate (Golder Associates, 2013). Yukon Pipeline Limited was granted an order to abandon, subject to a plan of remediation, in 1996. Dismantling of the storage tanks and the pipeline that serviced the site was completed in 1997, and a Plan of Restoration was submitted to the NEB in 1999. The property was acquired by private owners in the late 1990s (Whitehorse Star, 2012) and released by the NEB in 2009 as meeting the Plan of Restoration for current usage. Environment Yukon formally designated the WUTF site as a contaminated site in 2011 to have greater oversight of remediation. That remediation has now progressed to the point that only a portion of the tank farm site remains designated.

2.2.2 Geology, Hydrology, and Topography

The Valleyview South study area is largely comprised of a broad, gently rolling terrace on the west side of the Yukon River valley. The terrace is at about elevation 722 metres above sea level and is bounded to the east side where the land slopes down about 25 metres to the Erik Nielsen Whitehorse International Airport terrace level.

The development area is generally flat to gently rolling but is punctuated by a north-south trending line of closed depressions, or post-glacial “kettles”. The central depressions and eastern edge of the study area are steeper, with slopes of 5 to 15% or more. Locally there may be steep slopes (>15%) from gravel excavation activities, including on the southeast corner of Lot 429 and a residual gravel excavation depression on Lot 430 on the western edge of the property near Hamilton Boulevard.

The largest of the (typically) six-to-eight-metre-deep kettles is located just north of the Hillcrest subdivision. This depression is about 20 metres deep and hosts a small environmentally sensitive intermittent pond/wetland area that receives the local drainage. This is the only surface water feature in the study area.

Groundwater is relatively deep, ranging from 20 to 30 metres below ground surface (Golder, 2020). It flows from west to east through the highly permeable sands and gravels underlying the study area, emerging as a series of springs in Baxter’s Gulch (located east of the Alaska Highway) that forms the headwaters of a small creek that flows to the downtown and ultimately, Yukon River. To some degree, groundwater and run-off will also flow south from the Valleyview South area towards the Hillcrest subdivision and surface water may pool within the former Whitehorse Upper Tank Farm (Golder Associates, 2013).

Extensive drilling of the site over the past 45 years shows the site is underlain by a thick sequence of sand and gravel, with increasing sand at depth. This surficial geology creates a well-drained surface with no surfacewater features (other than the kettle pond). Along the east side of the area, silt is encountered at depth.
Overall, the geological conditions are favourable to development, with well drained soils and natural features.



Eastward panorama of topography of upper terrace (Lots 429 and 430)

2.2.3 Ecology

Some portions of the study area have been previously cleared of vegetation, especially the WUTF area. For remaining areas, the vegetation is typical of low elevations of the Yukon Southern Lakes Ecoregion and largely consists of Lodgepole Pine with Trembling Aspen, White Spruce and some Paper Birch, with various understories such as feathermoss, lichen-grass, Labrador Tea, and willow (Golder Associates, 2013). The forested sections include a myriad of informal recreational paths and trails, particularly in the southwestern corner adjacent to Hillcrest and Granger.

Anthropogenic disturbances such as noise, vehicle and people movements mean most larger animals stay away from the area although the occasional occurrence of these species should never be ruled out. Wildlife such as Red Fox, Coyote, Red Squirrel, Pine Marten and Least Chipmunk can likely be found, along with a variety of small mammals such as voles and mice.



Wetland near Hillcrest

No Wildlife Key Areas or species of conservation concern overlap the study area (GeoYukon, 2022). The area with the highest wildlife habitat value is likely the small wetland located immediately north of Hillcrest in the unsurveyed Government of Yukon parcel. Another feature of note is the north-south forested gulley that straddles Lots 429 and 430 for an approximate distance of 600 metres. Areas designated Greenspace in the Official Community Plan are not known or observed to have particular sensitivity or ecological values.

2.2.4 Aspect and Views

Northerly aspects are the most dominant and are distributed throughout the planning area. Southerly and westerly aspects are also found throughout but are generally more prevalent in the southwestern corner, centre, and western areas. Easterly aspects are more concentrated along the lower elevation areas adjacent to the Alaska Highway.

The most significant and expansive view is found along the southern boundary of the planning area between Lots 429 and 430, where the access road intersects the forested gulley feature and there is a view of Grey Mountain. Lot 262-6 also offers views towards Lake Laberge and the mountains to the east of it.



View of Grey Mountain from Lots 429/430

2.2.5 Trails

Informal trails within the Valleyview South area are predominantly old roads and doubletrack (i.e., all-terrain vehicle width), with limited amounts of singletrack (i.e., hiking width). The highest concentration of trails is in the greenspace areas adjacent to Hillcrest/Granger and Valleyview. There is a significant network of City singletrack trails located in and around the "Mount Mac" trail network; during the winter months, the Whitehorse Cross Country Ski Club holds a license of occupation to the cross-country ski trails and only the City's singletrack trails are available for public use free-of-charge.



Trails northwest of Hillcrest

2.2.6 Contamination

- *Whitehorse Upper Tank Farm (Lots 429 and 430)*

The Whitehorse Upper Tank Farm (WUTF) operation consisted of 24 above ground storage tanks on raised sand pads in unlined earthen berms and used for the storage of regular gasoline, furnace oil, and arctic stove oil (EBA, 1999). The local geology was highly conducive to vertical migration of spilled and leaked hydrocarbon products from WUTF operation. The first of many investigations to delineate the resulting contamination occurred in 1996, and groundwater monitoring continues to this day. From the outset, the intent was to remediate the property to meet numerical standards under the Contaminated Sites Regulation. However, it was also recognized that the area around the eastern property line of Lot 429 may require a risk-based approach to remediation, versus a numerical one.

The 2013 Plan of Remediation was accepted and implemented, resulting in the first Certificate of Compliance for the northwestern corner of the former WUTF in 2015. The second certificate was issued in 2020 for most of the central, western, and southern portions of the WUTF site. Both certificates were issued with a disclaimer that multiple locations located within the lands covered by them have hydrocarbon concentrations above Contaminated Sites Regulation residential land use standards at depths greater than three metres below current ground surface, as follows:

"This Certificate of Compliance will no longer be valid if the elevation of ground surface changes such that the depths of these exceedances are no longer greater than three metres below the surface of the land, as the site will be considered contaminated."

These disclaimers effectively mean that future site grading needs to consider the locations noted in the certificates and, ideally, avoid bringing the new grades to within three metres of the elevations at which subsurface contamination is still present. These nine locations, or Areas of Environmental Concern, for Lots 429/430 are shown in Table 3 and on the Environmental and Special Places Map in Appendix A2.

In practice, the grading issue does not pose a significant constraint to development. Government of Yukon (YG) staff advised that should the site grading plan result in a "trigger" of the 3m buffer,

Area of Environmental Concern	Depth of Contamination (metres)
C	5.0
CC	9.0
D	12.0
G	20.0
K	4.5-12.0
L	5.0
N	6.0
Q	6.0
R	4.0

Table 3. Areas of Environmental Concern (AECs) on Lots 429/430 (Source: Golder Associates, 2020)

targeted excavation and confirmatory sampling could be carried out in those specific locations with the objective of further remediating to meet the residential standard (Schilder, pers. comm).

The status of remediation, nor timelines for completion, of the remaining eastern portion of Lot 429 (mentioned above) under Ministerial designation is not well understood at present. Groundwater monitoring wells continue to show contamination above applicable standards with various hydrocarbon parameters (Schilder, pers. comm).

- *Other Properties*

While Lots 429 and 430 were the focal point of WUTF activities, associated pipelines were or are still believed to be present on neighbouring properties. Areas of interest include a right-of-way straddling the City's Lot 427 that crosses Lot 426, and another that crosses Lot 12 and C-141B before terminating at the Lot 430 parcel boundary (while the latter is not specified as a pipeline right-of-way in GeoYukon, partially uncovered pipe is visible around Lot 430/C-141B and this is almost certainly a section of historic pipeline). Pipeline-related contamination was encountered on Lot 426 in 2021 (Idrees, pers. comm); in 2005, approximately 30 - 40 aged, rusty barrels were found on the lot filled with asphalt or roof tar.

A Phase 1 Environmental Site Assessment was undertaken for Lot 262-2 in 2005 that noted a 40-year old underground storage tank and recommended follow-up investigation. YG staff commented that 17 years is a long interval and recommended that this assessment be updated to reflect current conditions and conform with industry standards (Schilder, June 30). Further, the property has been used for snow storage since that time, which could potentially add new sources of contamination.

Residual pipelines and/or WUTF infrastructure are only one potential concern for adjoining properties; the other is off-site migration of contamination in soils and groundwater across property boundaries. Based on the local geology of the site, off-site migration of contamination that has reached the groundwater table is understood to be the more likely issue of concern (note that groundwater flows west to east, with discharge emerging as a series of springs in Baxter's Gulch). YG Environment staff identified C-30B and Lot 262-2 as being potentially vulnerable.

2.2.7 Heritage Resources and Values

- *Archaeological Resources*

In preparation for remediation activities, an archaeological overview assessment was conducted in 2013 by Golder Associates on the former Whitehorse Upper Tank Farm (WUTF), as well as the C-30B parcel. The overview confirmed the presence of one previously registered archaeological site, JeUs-30, just outside of the southwest corner of the tank farm property and external to the planning area boundaries. The report deemed the potential for undocumented, subsurface archaeological sites and culturally modified trees within the former WUTF to be low; however, it identified the eastern boundary of the property, as well as C-30B, to have high potential for undocumented heritage resources given their relative proximity to the Yukon River, Baxter's Gulch, and JeUs-30.

Based on their review of the Golder report, Kwanlin Dün First Nation and Ta'an Kwäch'än Council staff have indicated that, from their perspectives, it has gaps and limitations that need to be understood before it is used as a reliable source of recommendations for development. Discussions with the City will need to continue to ensure that broader heritage values for the area have been duly considered as development proceeds.

- *Historic Resources*

Two known historic sites in the study area have been documented by Government of Yukon (YG) Archaeology Branch staff. The first is a cinderblock bunker located on Lot 426 and is registered in the Yukon Historic Sites Inventory and is believed to have served as a storage function for the WUTF (Ibid). Potential alterations to this lot would likely trigger a Historic Resources Impact Assessment to provide more information on the extent of impacts and appropriate mitigation measures.



Concrete bunker on Lot 426

The second site is a wood structure located on Lot 2 that is believed to form part of one of several World War II era sand bunkers found in the area (Golder, 2013). Because this resource is located on private property, YG is unlikely to include it in the inventory unless the owner provides access and permission to document it.

2.3 Land Designation, Zoning, and Uses

The 2023 City of Whitehorse Official Community Plan (OCP) designates the planning area as primarily Residential – Urban (refer to Figure 6). Section 15.18 of the OCP establishes the purpose of Residential – Urban lands to "accommodate a wide range of residential housing forms and compatible uses, located primarily within the Urban Containment Boundary."

Under the City's current Zoning Bylaw, most of the area is designated Future Planning (or First Nation – Future Planning), and the unsurveyed piece is zoned PG – Greenspace. Refer to Figure 7.

The planning area hosts a limited but diverse range of land uses currently. The northwest and southwest portions serve as well-used neighbourhood greenspace for adjacent residents (including the Valleyview neighbourhood park), while other undeveloped and unoccupied parcels receive relatively little visitation. Land use in the former Whitehorse Upper Tank Farm (WUTF), or Lots 429 and 430, has been limited to contaminated remediation activities (and unauthorized trail use) in recent years. Parcels in the southeast portion of the planning area provides a place of worship and telecommunication services.

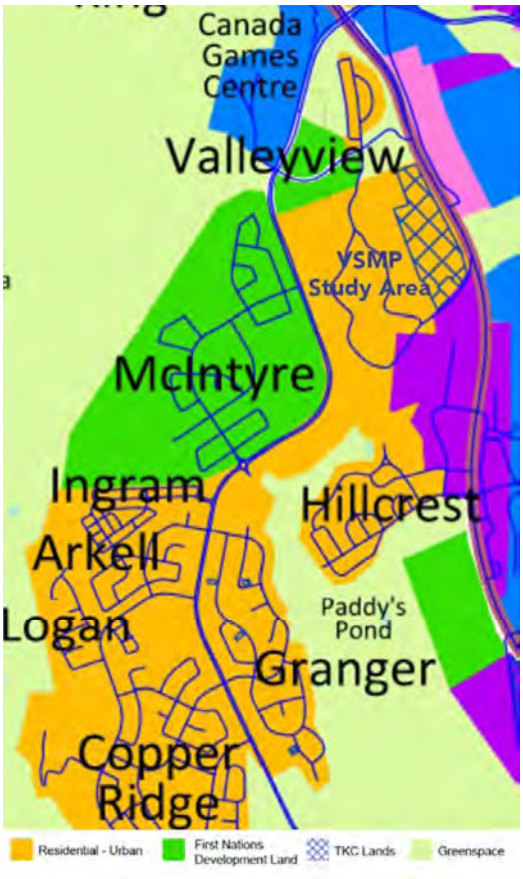


Figure 6. Valleyview South area 2040 OCP designations (Source: City of Whitehorse, November 2022)

2.4 Relevant Policies, Plans, and Studies

2.4.1 City of Whitehorse

- *2040 Official Community Plan*

The City's Official Community Plan (OCP) outlines the community's vision for growth and sustainability to 2040. It serves as a guiding document for City administration and Council in making development decisions in the city. The OCP directs half of all new housing development to the Urban Core, which includes the Downtown, Riverdale, Marwell, Takhini, and the Valleyview South area.

The OCP contains numerous policies that directed the development of this plan, noted in parentheses. Firstly, master plans must adhere to the OCP (13.23) which seeks to promote the redevelopment of brownfield sites to enhance efficiency, remediate the environment, and reduce urban sprawl (8.3).
Within the Valleyview South area, the OCP conceptually locates an Urban Centre (8.16), which integrates diverse and higher-density land uses (8.17, 8.21) and a mix of community amenities (8.5), while also ensuring a sensitive transition to nearby residential uses (8.18). Refer to Figure 8.

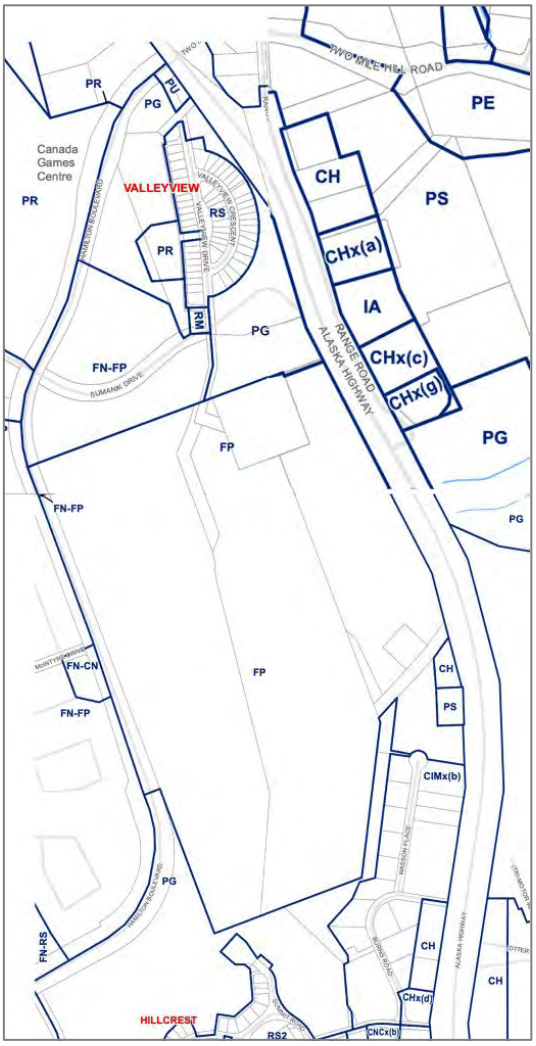


Figure 7. Valleyview South area zoning (Source: City of Whitehorse, 2020)

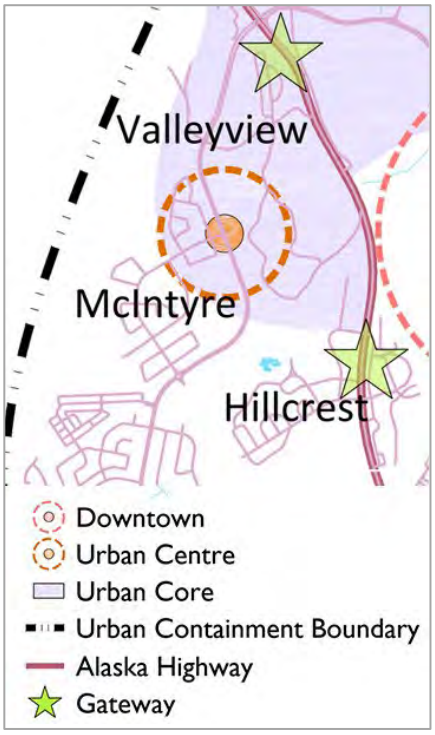


Figure 8. Conceptual Urban Centre location for Valleyview South in 2040 OCP

The OCP also established a minimum gross density of 20 dwelling units per hectare, considering the collective area that includes roadways, utilities, reserves, and public spaces (8.38). To achieve this target, compact developments are prioritized to optimize public services, minimize transportation impacts, preserve wilderness areas, and enhance walkability (8.1). The transportation network further seeks to prioritize active and shared travel modes over personal vehicles (11.2). Additionally, neighbourhood designs must also consider long-term municipal responsibilities (12.19). This Master Plan provides further direction on how the OCP policies should be implemented within the Valleyview South Master Plan area.

- *Trail, Parks, and Recreation Plans*

The City aims to improve connectivity and livability. In Valleyview South, the 2020 Trail Plan and 2018 Bicycle Network Plan focuses on creating an East-West path to connect Hamilton Boulevard multi-use path to the Airport trail (Action 13). To enhance cost-effectiveness and connectivity, the Bicycle Network Plan also recommends integrating the AAA pathway with collector roads and improving intersections, especially at Sumanik Drive.

The 2018 Parks and Recreation Plan emphasizes integrating parks and recreation considerations into city planning and development initiatives (Action 12). The goal is to create quality trails for a well-connected, vibrant northern community.

- *2018 Transit Plan*

The 2018 Transit Plan promotes integrating public transit and cycling to improve active transportation. It recommends a walking distance of 400 metres to transit stops and proposes spacing stops at 400-metre intervals along roadways for better neighbourhood connectivity. These initiatives aim to create an integrated, accessible, and sustainable transportation network in the community.

- *Subdivision Control Bylaw 2012-16*

The City requires 10% of land to be dedicated to the City for public use or payment in lieu at the time of subdivision. This allocation is in addition to any required buffers, streets, or lanes. Applications on First Nation Settlement Land collaborate with the City to designate public use areas instead of dedicating land to the City.

2.4.2 Kwanlin Dün First Nation

The Traditional Territory Land Vision (2017) sets out four land-based goals - Community Development, Wildlife, Heritage, and Revenue Generation - for the Traditional Territory and Settlement Lands. The Land Vision recommends that KDFN revenue generation goals be focused primarily on Settlement Lands within Whitehorse. It also directs that revenue generation be balanced with the need for some Settlement Lands to be reserved for community development (KDFN residential use). Opportunities to protect, manage and/or interpret wildlife and heritage values also should be considered.

KDFN's Community Lands Plan (2020) associates C-117B and C-141B with the goals of Community (i.e., residential) Development and Revenue Generation. The Plan also includes a set of policies directly relevant to C-117B/C-141B, including the use of design and construction best practices, consideration of future generations, integration of planning with the City to ensure efficient land use, use of archaeological potential mapping, and pursuit of highest and best use (including leaving lands of ecological or heritage importance in their natural state).

C-117B and C-141B are Type 2 Settlement Land parcels designated for Residential and Commercial use under the KDFN Self Government Agreement Appendix B Part II. This provision allows KDFN to enact laws pertaining to planning, zoning, and land development on them. KDFN is also undertaking a McIntyre neighbourhood planning exercise, the outcomes of which may influence how it ultimately develops its parcels in the Valleyview South area.

2.5 Adjacent Land Uses

2.5.1 Erik Nielsen Whitehorse International Airport

Both federal airport and municipal zoning regulations define the nature of permitted land uses in the vicinity of the airport. Transport Canada is the delegated agency responsible for ensuring administrative compliance with the Whitehorse Airport Zoning Regulations. There are typically three major considerations to future development: electronic zoning, obstacle clearances and noise exposure levels. Electronic zoning is not a concern at the master plan level and can be addressed at a later stage in the development when specific proposals are being reviewed.

The airport reference elevation is 693.8 metres above sea level and the ground rises significantly on the west side of the Alaska Highway to the former Whitehorse Upper Tank Farm terrace elevation, encroaching into the 14R-32L main runway obstacle limitation approach path and west side transitional approach slope. Existing trees and one residence at the corner of Valleyview and Sumanik Drives were found to penetrate these limits in the 2020 Whitehorse Airport Development Plan. Based on that previous assessment, it is possible that – if left at current grades - future development on Valleyview South parcels in the vicinity of the intersection of Sumanik and Valleyview Drives (Lots 12, 262-2, 431 and C-30B) could be affected by the transitional obstacle limitation slopes. Until the updates to the obstacle clearance study, it is not possible to say with certainty whether noise and building height restrictions may be necessary as development occurs within the study area.

Exposure to aircraft noise near airports is a key planning consideration. The Noise Exposure Forecast (NEF) system provides a measurement of the actual and forecasted noise near airport, factoring in the subjective reactions of the human ear to specific aircraft noise stimulus and expressing these as numerical contours (Transport Canada, N.D.) In the most recent 1985 airport noise study, the central and eastern portions of the VSMP area were located within Noise Exposure Forecast contours ranging from 25 to 33 (Transport Canada predicts “sporadic to repeated individual complaints” between 30-35, while a NEF below 30 predicts “sporadic complaints”). The consultants who prepared the 2020 Airport Development Plan concluded that current aircraft noise levels were not significant enough to require preparation of a noise abatement plan.

2.5.2 Wasson Place and Burns Road

The Wasson Place and Burns Road area is a mixed-use commercial industrial subdivision occupied by a range of business and government activities. Wasson Place is the more recent development and its cul-de-sac bulb borderson Lots 426 and 429 to the north. In 2020, Sidhu Trucking applied for and received an OCP amendment to redesignate about 7.3 hectares of Lot 429 from Residential Urban to Mixed-Use Industrial-Commercial to develop serviced lots Refer to Figure 9.



Figure 9. Proposed commercial-industrial development in the southeast corner of Lot 429 off Wasson Place)
(Source: 3 Pikas, 2020)

2.5.3 Adjacent Neighbourhoods

The Valleyview South area is surrounded on three sides by existing neighbourhoods: Valleyview to the north, McIntyre to the west, and Hillcrest (and portion of Granger) to the south and southwest. The current character, form and amenities associated with these neighbourhoods helped inform potential gaps and/or synergies for this plan

to address and respond to. These neighbourhood are predominantly low-density residential areas, consisting of single-detached and semi-detached houses, as well as some townhouses and low-rise apartments.

2.6 Existing Infrastructure and Services

2.6.1 Transportation

- *Road Network*

The Valleyview South planning area is bounded by the Alaska Highway to the east and Hamilton Boulevard to the west and northwest. The four-lane Alaska Highway is a designated freeway with a posted speed of 60 km/hr through this section. Hamilton Boulevard is designated a major arterial road with a posted speed of 60 km/hr. Sumanik Drive bisects the northern portion of the study area and is designated a collector road with a posted speed of 50 km/hr.

In addition to the above noted transportation corridors, access into the study area includes:

- A surveyed road extending south from the intersection of Valleyview Drive and Sumanik Drive and into Lots 262-2, 429 and 430 (gated at the boundary line of Lots 429/30);
- A right-in, right-out (RIRO) access to Lot 430 across from McIntyre Drive; and
- An unsurveyed road extending from the cul-de-sac bulb of Wasson Place to Lot 2.

- *Active Travel Modes*

The planning area is located approximately 3.2 kilometres from the downtown core[2] and there are several major destinations within a 25-minute walk and 20-minute bike ride. This suggests there is moderate to high potential for future residents to use active transportation. The City's 2018 Bicycle Network Plan envisioned a future connection through the Valleyview South area, specifically an All Ages and Abilities (AAA) multi-use pathway to connect from the Hamilton Boulevard MMUP to the Alaska Highway. Refer to Figure 10.

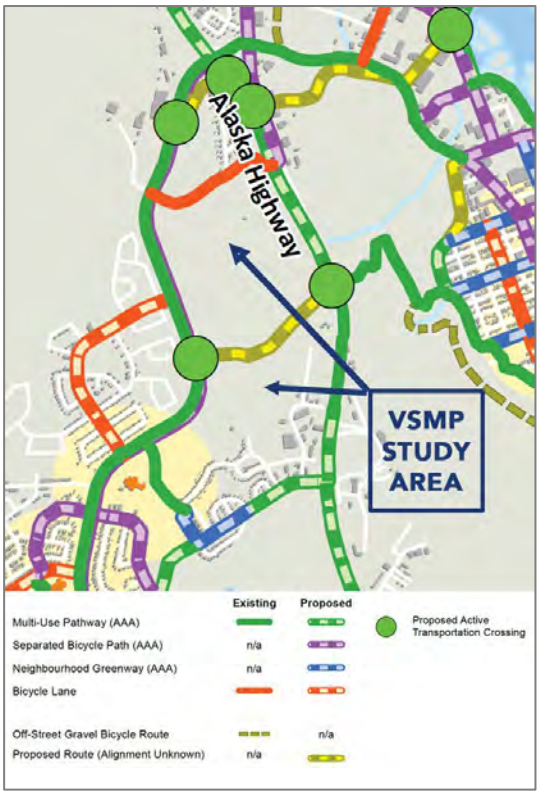


Figure 10. Proposed Valleyview South active transportation connector (Source: City of Whitehorse, 2018)

[2] Measured from the approximate centre of the planning area to Main Street and Second Avenue.

- *Transit*

Transit service currently extends to the periphery of the planning area in all directions. Routes #2, #3, and #6 run along Hamilton Boulevard to downtown, with Route #3 also running through Hillcrest and along the Alaska Highway and Range Road. The closest bus stops are located at McIntyre Drive, by the Canada Games Centre, at the Range Road/Alaska Highway intersection, along Sunset Drive North in Hillcrest, and Burns Road. Refer to Figure 11.

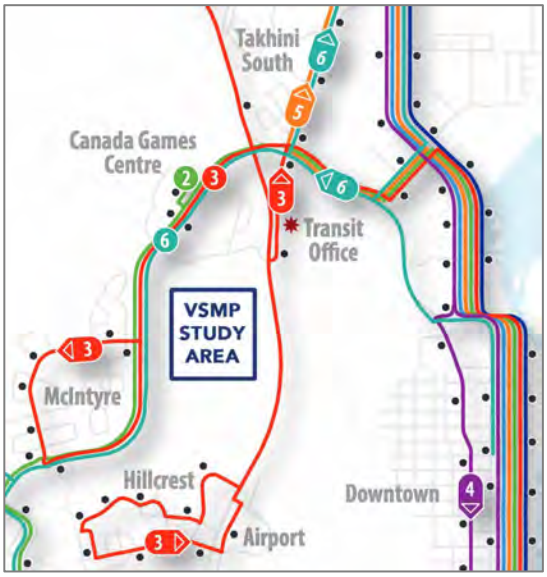


Figure 11. Current transit routes around planning area (Source: City of Whitehorse)

2.6.2 Water

Water supply for the Valleyview South development area will be provided by the Valleyview Reservoir, located immediately west and upslope of the Mount McIntyre Recreation Centre. This large reservoir is a very important component of the City's water system, providing the water supply and pressure to Takhini, Range Point, and Hillcrest subdivisions, and the airport area. The reservoir also feeds water, to booster and pressure control valve stations that services Copper Ridge, Porter Creek, Whistle Bend, Kulan, and Crestview neighbourhoods.

Based on the proximity of the development to the Valleyview Reservoir, there is a significant amount of available water supply to meet the fire protection needs of the new development without requiring a booster station. To benefit from the water supply from the Valleyview reservoir, the Valleyview South water system will need to connect to the water trunkmain west of Valleyview and the trunkmain that parallels the highway and supplies the airport. A looped (versus dead end) watermain system with connections to the watermains west of Valleyview, Hamilton Boulevard and/or Alaska Highway will be required to optimize system reliability, achieve the necessary fire flows, maintain flow in the watermains for freeze protection, and to limit stagnant water that can result in quality issues.

Staff with the City's Water and Waste Services indicated that the Two Mile Booster Station is at or near capacity during peak use times. The results of the City's Water and Sewer Master Plan Update, that was underwayat the time of drafting this report, also inform any potential offsite upgrades that may be required and how (or if) these might impact the Valleyview South area.

2.6.3 Wastewater

The sanitary sewer trunkmain on the west side of Hamilton Boulevard was sized to convey the flows from Copper Ridge, Ingram, Granger, Logan, McIntyre, Valleyview, and Canada Games Centre (CGC). At the time of sewer trunkmain planning and construction, the proposed "Tank Farm" subdivision was also included in the catchment area and designed capacity. The Hamilton Boulevard sewer trunkmain is part of the catchment area for the Marwell Lift Station, which pumps wastewater from the majority of the City's sanitary collection system up to the Livingstone Trail Environmental Control Facility for treatment. The City recently completed maintenance on the Marwell Lift Station and continues to invest in the station and the associated forcemain to meet the needs of the community.

The Valleyview South planning area has no sanitary infrastructure at present. Typical sanitary sewer servicing design for a new development seeks to convey flow using a conventional gravity sewer to minimize pumping requirements. As such, elevations across the planning area have a major impact on the viability of different options to connect future development to the surrounding sanitary infrastructure. Sanitary infrastructure alignments logically follow roadways, given the significant expense and disturbance involved with deep utility construction – not to mention the inability to construct buildings over top. Furthermore, locating utilities in road rights-of-way improves access for maintenance and repairs.

2.6.4 Stormwater

Currently there is no channelized flow from the site and given the granular and free draining nature of the soils found throughout much of the planning area, all the stormwater is currently managed through infiltration into the ground. The new development will alter the surface drainage regime via introduction of impervious surfaces, grading, and direct drainage routes. Best practice dictates that stormwater should match pre-development discharge conditions (i.e., flow rates, water quality, and discharge locations) to receiving environments and waterbodies.

2.6.5 Power and Communications

Major power infrastructure in the planning area consists of the ATCO Electric Yukon distribution lines (4x12 kV lines and 5x25 kV lines) traversing portions of Lots 12, Lot 431, and the entire southern and western boundary of C-141B. To the east of Lot 12, the ATCO distribution lines connect to the distribution and longer transmission network on the east side of the Alaska Highway. These poles are equipped with 3x 25 kV and 5x34 kV lines. From the northwestern corner of C-141B, the powerline goes both west and north. To the west, the powerline transitions to underground and provides power into the McIntyre subdivision (it appears that there is a conduit stub near the intersection of McIntyre Drive and Hamilton Boulevard, presumably to allow for future development). To the north, it transitions to underground and provides power to the Mount McIntyre Recreation Centre, intersection lights at Sumanik Drive and CGC, and streetlights on Hamilton Boulevard north of the intersection.

Based on ATCO's initial analysis, the Arkell Substation, which feeds the Hamilton Boulevard neighbourhoods, can accommodate 3,350kVa of additional load, representing approximately half of the current load in Whistle Bend (March 2022 population of 2500), which amounts to substantially less than the estimated population of Valleyview South. To bridge the gap, ATCO believes that power from the Logan and Arkell substations will be required and both will need to be upgraded with larger transformers to accommodate the demand of the full build-out population. There is potential that new development in the Valleyview South area could be serviced from the Valleyview Drive and Sumanik Drive intersection (for the main electrical feed) and Alaska Highway (for the secondary feed). Supplementary service could be provided from Hamilton Boulevard if required.

The current overhead distribution lines poses numerous development challenges, most particularly on C-141B, where the natural depression occupying the eastern half will require fill to develop. At a minimum, this will necessitate raising power poles; alternately, the lines could go underground.

3.0 Citizen and Resident Perspectives

3.1 Pre-Master Plan Input

In addition to the City's broad engagement around the future of the former Whitehorse Upper Tank Farm and surrounding area, which dates to the early 1980s, there were three public and/or stakeholder engagements involving development in the Valleyview South area in the past decade or so. These are described briefly in the following sections.

- *Sidhu Trucking's Community Workshop Series (2012)*

These sessions were led by Golder Associates on behalf of Sidhu Trucking for Lots 429 and 430 in 2012. Input from about 50 stakeholder representatives and the public led to six draft principles to shape future development, as follows:

1) *"Clean up the property so it is safe for human habitation (to numerical standards);*
2) *Create a walkable and transit-oriented neighbourhood;*
3) *Provide a range of housing options to help address affordable housing needs in the community;*
4) *Create an interconnected and accessible network of trails and open space as part of a community-wide pedestrian system;*
5) *Infiltrate rainwater onsite and retain tree canopy and habitat where possible; and*
6) *Work together with neighbours to ensure a collaborative and integrated process."*

A range of other ideas and input were heard during this initiative, including a desire for a mixed use commercial area that could accommodate daily needs (e.g., grocery store, clinics, café, etc.), a community gathering place, preservation of views, variety of housing "looks", and many others.

- *Kwanlin Dün First Nation Community Lands Plan (2018-19)*

During consultation for the Kwanlin Dün First Nation (KDFN) Community Lands Plan, citizens did not identify wildlife and heritage values on C-117B and C-141B. Instead, these parcels were deemed most appropriate for Community (i.e., residential) Development and Revenue Generation.

- *Ta'an Kwäch'än Council Administration Building Planning (2019)*

In 2019, Da Daghay Development Corporation (DDDC), the arms-length economic development arm of Ta'an Kwäch'än Council (TKC), consulted with TKC citizens around the location and key programming elements for a new administration building/gathering place. Over a series of months and numerous workshops, citizens informed a vision for the development and provided input on preferred locations. C-30B was added to the list of potential locations in the latter phases of the consultation and ultimately was selected as the preferred site (Da Daghay, 2019).

3.2 Fall 2022 - Visioning

- *Overview*

The City, KDFN, and TKC undertook a three-week engagement campaign in November and December 2022 consisting of an online survey and in-person/virtual meetings with community associations of the adjacent neighbourhoods. A core survey was developed for all audiences and additional questions were posed to TKC and KDFN citizens/beneficiaries and/or residents of the adjacent neighbourhoods. The survey was promoted by the City, TKC and KDFN. KDFN mailed out hard copy surveys as well. The City received a total of 685 responses to the online survey.

- *Results*

The key themes arising from engagement included the following:

- Safe, well-connected active transportation and transit is a high priority;
- The public wants natural greenspaces and trails to be maximized and connected;
- There are diverse opinions about the appropriate level of density, but housing variety and good urban design are broadly supported;
- A commercial/mixed use area is important for neighbourhood vitality and reducing vehicle trips;
- A mix of small and medium park spaces is preferred; and
- Off-site and on-site traffic circulation is a major issue and opportunity.

Survey participants were given the opportunity to articulate their vision for a successful future neighbourhood in Valleyview South. The responses were reviewed, and key themes recorded and tabulated to create a semi-quantitative picture of the sentiments expressed. Density, trails, active transportation, and greenspace were the dominant topics that survey participants touched on in their responses. Refer to Figure 12.

3.3 January 2023 – Design Charrette

Representatives of the Hillcrest, Granger, and Valleyview community associations were invited to participate in a three-day design charrette in late January 2023 (note that Kwanlin Dün First Nation staff represented the McIntyre neighbourhood). Residents of Hillcrest and Valleyview were able to attend, providing valuable input on their neighbourhood interests and responding to the planning team's draft concepts. Refer to Section 1.1.1 for more information on the charrette process.

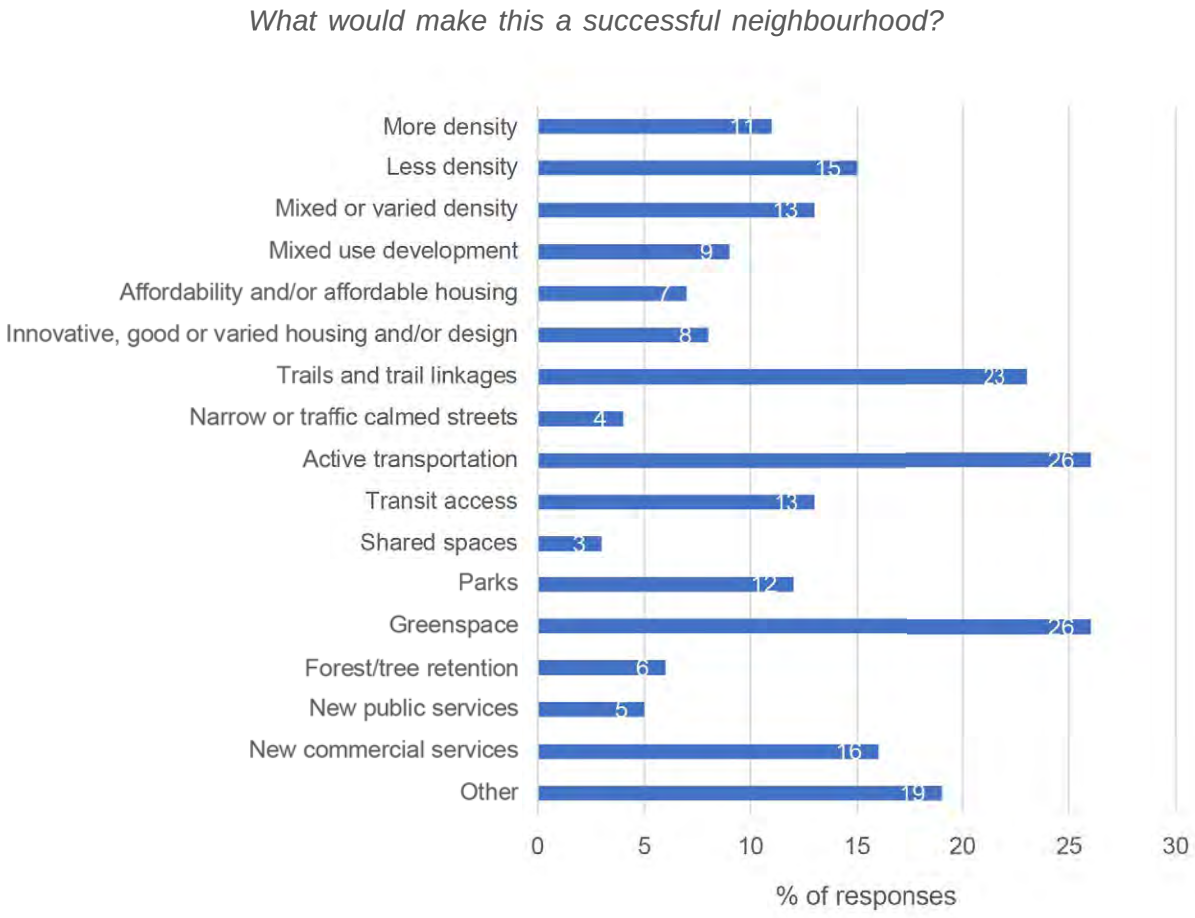


Figure 12. Results from the open-ended question in the November 2022 engagement for VSMP

3.4 Summer 2023 – Land Use Scenarios

- *Overview*

Incorporating the insights gained from the initial engagement in Fall 2022, the January design charrette, and technical analysis, the City and the development partners worked with the planning team to develop two land use concepts and presented these to the public for comment in June 2023. Refer to Figure 13.

The engagement program consisted of an online survey and two days of in-person open houses which included a session dedicated to residents of the adjacent neighbourhoods. The survey was developed for all audiences and additional questions were posed to “above the airport” neighbourhood residents (regarding traffic). A total of 63 responses to the online survey were received, along with letters from one member of the public and the Valleyview Community Association. 68% of the responses were received from Valleyview residents.

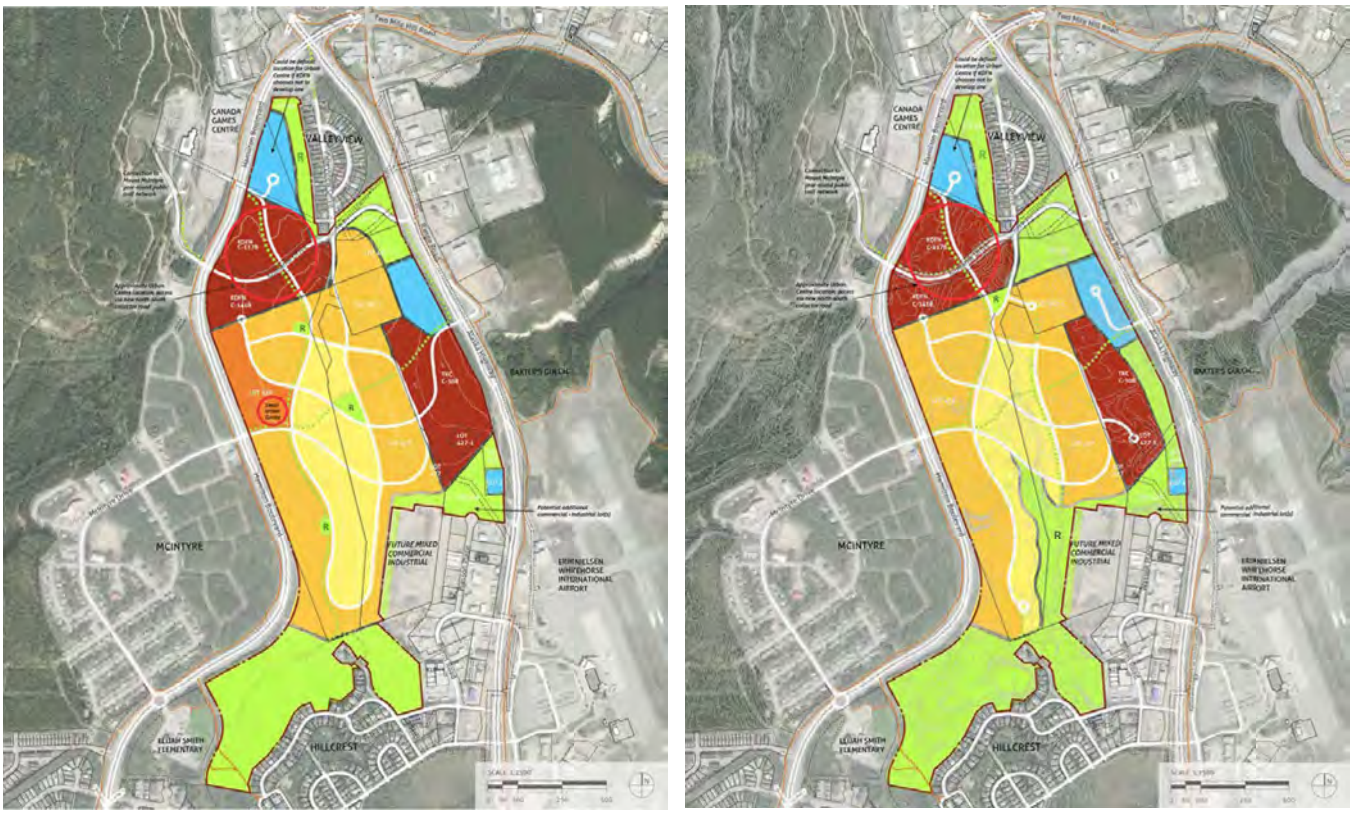


Figure 13. VSMP draft neighbourhood concepts 1 (left) and 2 (right) presented to the public in June 2023

- *Results*

Key results arising from the second round of engagement included the following:

- Concept 2 emerged as the favoured option, drawing approximately 50% agreement from respondents. This support seemed to stem from the retention and provision of larger greenspaces and maintaining the existing elevations. However, key aspects of Concept 1 were broadly supported, including its commercial areas, density, new highway access at Range Road, and lesser peripheral traffic impacts;
- Valleyview and Hillcrest residents expressed concerns around the active transportation connections and housing variety, as well as locating a public/institutional use east of the Canada Games Centre;
- The responses were in some cases contradictory, particularly where housing density and mix and highway access and grading were concerned (i.e., wanting one while opposing the other even though they are interdependent);
- The location of different housing densities around the planning area received mixed and inconclusive responses;
- Concept 2's parks and greenspace elements were generally preferred by all respondent groups; however, Valleyview and Hillcrest residents expressed concern about the usability of greenspaces due to the terrain; and
- When asked to suggest mitigation for the loss of greenspace to the west of Valleyview for a public/institutional use, Valleyview residents emphasized the area's importance and generally requested it be left in place.

The feedback portrayed the complexity and diversity of perspectives among the survey participants. Despite the lack of clear and consistent direction, it was concluded that a concept that strategically incorporates elements from both concepts was preferred. Recurring themes were the preference for roundabouts over traffic lights, the careful balancing of greenspace and density, and the potential impacts on existing residents. “Other” comments and responses to open-ended questions echoed this desire for increased greenspace, well-connected transportation networks, and thoughtful high-density housing integration.

While the Summer 2023 direction was incorporated into the final Master Plan, the relatively low response rate and localized origin of respondents meant that the first Visioning survey from Fall 2022, with over 10 times the response rate, continued to play a key role in identifying broad community desires for the new neighbourhood.

4.0 Neighbourhood Vision



The Master Plan articulates its vision and achieves the objectives below through a variety of design, planning, and policy elements, shown in the Land Use Plan contained in Appendix B1. These objectives and elements include:

Objective #1. Integrate the area with the surrounding neighbourhoods, adding this long missing and strategic piece to the "puzzle" of Whitehorse's urban footprint.

a. A road and active transportation network that connects residents to surrounding arterial roadways, pathways such as the Airport and Hamilton Boulevard trails, and destinations such as Downtown and the Canada Games Centre;
b. Sensitive transitions to adjacent neighbourhoods of Valleyview and Hillcrest; and
c. Introduction of new commercial services, employment nodes, and recreational opportunities to benefit residents of the existing "above the airport" neighbourhoods.

Objective #2. Facilitate coordinated, complementary, and flexible development of land parcels with different ownership contexts.

a. A blueprint for integrated site preparation and infrastructure development that respects the independence of each landowner while simultaneously recognizing interdependencies;
b. Flexibility for First Nation governments to pursue development within their unique legal and political contexts and according to their own priorities;

c. A fair and equitable cost attribution for shared infrastructure; and
d. Phasing approach that recognizes landowners' different stages of readiness to develop.

Objective #3. Offer a diversity of housing choices that cater to residents with different life stages, incomes, and lifestyles.

a. A mix of housing choices ranging from single and semi-detached homes to townhomes and apartments; and
b. Mixed-use development that will allow residents to live, work, and gather in the same place.

Objective #4. Promote quality of life with convenient access to parks, trails, and greenspace.

a. A system of diverse small to medium-sized parks connected to one another with multi-use paved pathways forwalking and cycling;
b. Multi-use pathways sited to take advantage of views of the Whitehorse valley and Grey Mountain;
c. Convenient connections to large natural areas and trail networks in nearby Paddy's Pond/Ice Lake and McIntyre Creek conceptual regional parks; and
d. Proximity to premier recreational facilities such as the Canada Games Centre, Mt McIntyre Recreation Centre, and Whitehorse Cross Country Ski Club.

Objective #5. Create a compact, walkable neighbourhood and strong connections for all modes of transportation.

a. An easily navigable collector road pattern that creates short, walkable distances between key neighbourhood destinations and beyond;
b. Thoughtful design that seeks to avoid non-resident vehicles short-cutting through the neighbourhood;
c. A comprehensive and strategic active transportation network that minimizes commuting distances to/from Downtown and provides convenient access to nearby destinations, such as the Canada Games Centre;
d. Closure of a portion of Sumanik Drive to create a more coherent road network and improve active transportation connections; and
e. A road network that provides access to surrounding arterial roadways, including the Alaska Highway, Hamilton Boulevard, and Sumanik Drive.

Objective #6. Establish vibrant commercial and public services that meet the day-to-day needs of nearby residents and broader needs of a growing city.

a. One or two small to medium commercial village areas that will provide a range of services and employment opportunities for residents; and
b. Inclusion of medium to large public facilities that can meet the needs of Ta'an Kwäch'an Council and its citizens, public governments, and the broader Whitehorse public.

5.0 Land Use Designations

5.1 Land Use Summary

The Master Plan for the Valleyview South development area consists of nine different land uses. The predominant uses are residential, which accounts for 50% of the planning area, and parks and greenspace, which accounts for 27%. Mixed-use residential/commercial accounts for 19%, while mixed-use commercial/ industrial accounts for less than 1%. Public and institutional uses comprise 3.5%.

In terms of residential uses, medium density housing occupies the most area at 14%, followed by low density residential 1 (13%, low density residential 2 (12% and high density (11 %. A detailed summary is presented in Table 4 below and illustrated in the Land Use Plan on the following page and in Appendix B1. If an area is hatched with two different land uses, the area could develop as either land use based on more detailed planning.

Table 4. Valleyview South Land use summary

Land Use	Gross Area (ha)	% of total area*	
Low Density Residential 1 (larger lots)	14.6	12.8	49.7
Low Density Residential 2 (smaller lots)	13.4	11.8	
Medium Density Residential	16.0	14.0	
High Density Residential	12.6	11.1	
Mixed-Use – Residential/Commercial[3]	21.9	19.2	19.2
Mixed-Use – Industrial/Commercial[4]	0.62	0.5	0.5
Public/Institutional	4.0	3.5	3.5
Parks and Greenspace[5◊]	28.9	25.4	27.1
Environmental Protection	1.9	1.7	
TOTAL	114.0	100.0	100.0

*Note that totals may not exactly correspond due to rounding

◊Not including 10% public land dedications for residential, mixed-use, and public/institutional

5.2 Residential Land Use

5.2.1 Overview

- *Housing Units and Density*

The Valleyview South development area will create about 1700 new housing units, ranging from lower density forms such as single detached and duplex to medium and higher density forms such as townhomes and apartment buildings. The intent of the proposed mix and distribution of housing types to foster a diverse community that can accommodate a variety of income groups, household configurations, and age groups, while generally promoting more compact and affordable housing forms. The projected minimum population for Valleyview South at full build-out is about 4200 people. Refer to Table 5.

3 Assumes 50% of hatched area in Land Use Plan is designated for mixed-use residential/commercial

4 Assumes 50% of hatched area in Land Use Plan is designated for mixed-use commercial/industrial

5 Assumes 50% of hatched area in Land Use Plan is designated for parks and greenspace.

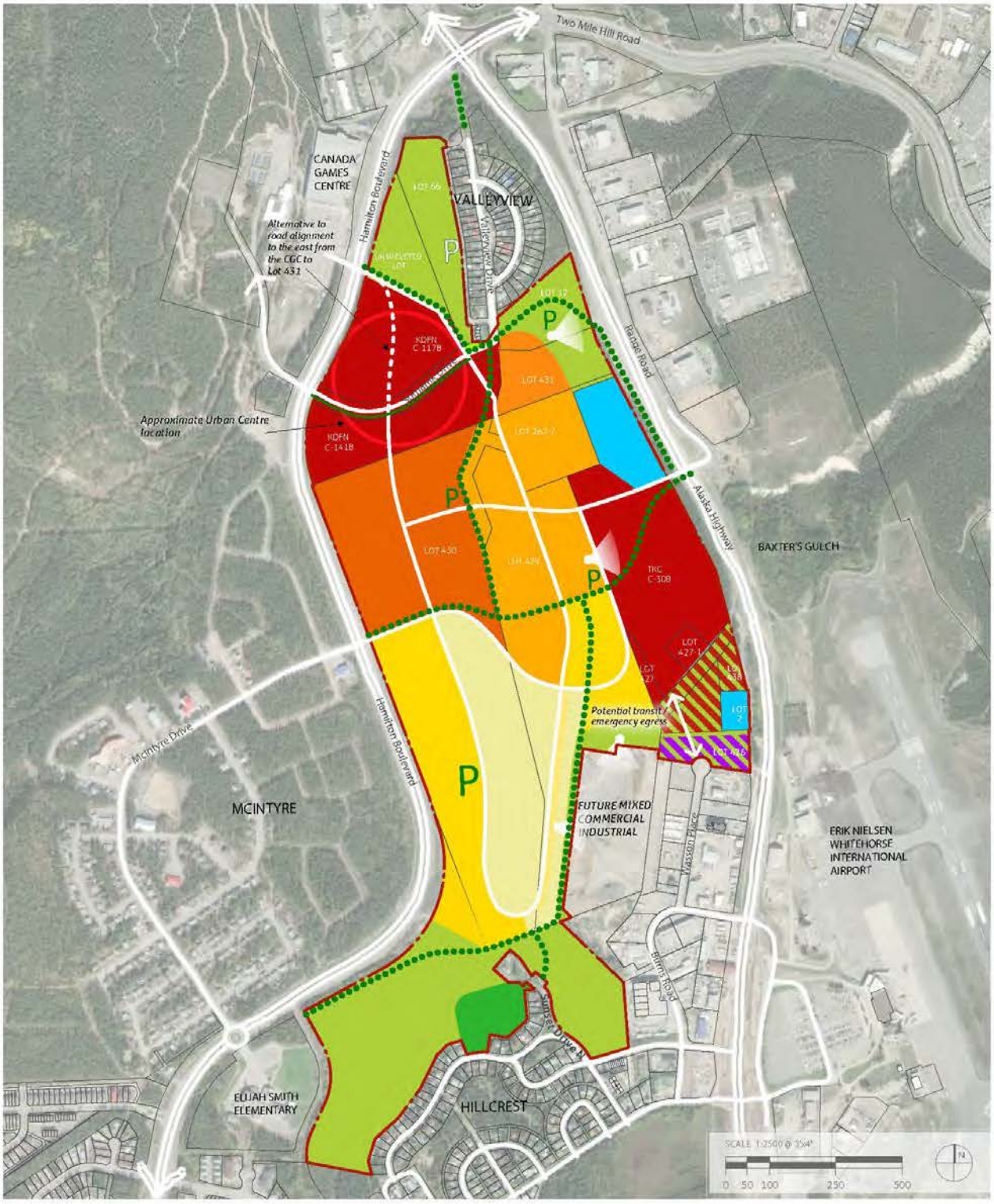

Two Mile Hill Road
CANADA GAMES CENTRE
Hamilton Boulevard
VALLEYVIEW
Valleyview Drive
Alternative to road alignment to the east from the CGC to Lot 431
Approximate Urban Centre location
KDFN C-117B
KDFN C-141B
Ranae Road
Alaska Highway
BAXTER'S GULCH
TKC C-50B
Potential transit / emergency egress
MCINTYRE
Mcintyre Drive
FUTURE MIXED COMMERCIAL INDUSTRIAL
Massson Place
ERIK NIELSEN WHITEHORSE INTERNATIONAL AIRPORT
Sunset Drive
ELIJAH SMITH ELEMENTARY
HILLCREST
SCALE 1:2500 @ 3'x4'
0 50 100 250 500
Study Area Boundary
Land Parcels
Road
Mixed-Use Industrial Commercial
Mixed-Use Residential Commercial
Public / Institutional
Parks / Green Space
Environmental Protection
Potential Park Location
Existing Park Location
Multi-Use Pathway / Corridor
Residential (gross)
High Density (55 units/ha)
Medium Density (20 units/ha)
Low Density - Small Lots (10 units
Low Density - Large Lots (8 units/
Potential Viewpoint
GROUNDSWELL PLANNING
MODUS

Table 5. Valleyview South minimum density, housing units, and population projections

Residential Land Use Designation	Gross Area (ha)	Minimum Density Target (units/gross ha)	Estimated Net Density (units/net ha)	Minimum # of units	Minimum Population[6]
Official Community Plan Minimum Density Target					
Valleyview South developable area	85.3	20	31	1706	4198
Projected Valleyview South Density					
Low Density Residential 1	14.6	8	12	117	287
Low Density Residential 2	13.4	10	15.5	134	330
Medium Density Residential	16.0	20	31	320	787
High Density Residential	12.6	55	85	693	1705
Mixed-Use	22.5	20	31	450	1108
Public/Institutional	4.0	0	0	0	0
Park/Greenspace*	2.2	0	0	0	0
TOTALS	85.3	-	-	1714	4217
MINIMUM # OF UNITS/GROSS HECTARE = 20.1					

* This Parks/Greenspace land has only been included for the purposes of calculating OCP density requirements and does not include greenspace with physical or environmental constraints.

The 2040 OCP mandates a minimum residential density standard of 20 units/ gross hectare for new development within the Whitehorse Urban Core. Applied to the relevant land use types, the projected density for the Valleyview South area is 20.1 hectares. Refer to Table 5.

- *Housing Types and Zoning*

The intended range of housing choices for the Valleyview South area is best facilitated by flexible zoning that broadly prescribes permitted housing forms along with specific development details such as minimum lot sizes, setbacks, and maximum heights. Each Valleyview South development partner will apply for rezoning that best fits their individual development plans; the role of the Master Plan is to provide guidance on the zoning options that are compatible with the various residential land use designations.

Refer to Table 6 for the planning team's recommendations for appropriate zoning to fulfill the residential land use designations in the VSMP. Note that the team based its recommendations on the 2012 Zoning Bylaw, which is currently being rewritten to conform to the newly adopted OCP. In addition to the permitted uses in Table 6, additional housing forms may be permitted as a conditional use, if approved by City Council. Examples of conditional uses may be mobile homes and supportive housing, depending on the zone. To provide a transition area, lands that border different land designations could include zoning from the adjacent area, subject to the land designation achieving the minimum density target (as outlined in Table 5).

[6] Based on 2016 census data of 2.46 persons per household in non-downtown areas of Whitehorse

Table 6. Recommended zoning for residential land use designations

Land Designation	Recommended Zones	Permitted Housing						
		Apt	3/4 plex	Town house	2 plex	Single	Care home	Suite
Low density 1	Comprehensive Residential Single Family (RCS)				x	x	x	x
	Comprehensive Residential Single Family 2 (RCS2)				x	x	x	x
	Comprehensive Residential Single Family 3 (RCS3)				x	x	x	x
Low density 2	Comprehensive Residential Single Family (RCS)				x	x	x	x
	Comprehensive Residential Single Family 2 (RCS2)				x	x	x	x
	Comprehensive Residential Single Family 3 (RCS3)				x	x	x	x
	Cottage Cluster Homes (RCM3)		x		x	x	x	x
	Residential Single Detached (RS)		x		x	x	x	x
	Residential Single Detached 2 (RS2)		x				x	
Medium density	Comprehensive Residential Multiple Family (RCM)	x	x	x			x	
	Comprehensive Residential Multiple Family 2 (RCM2)	x						
	Comprehensive Residential Townhouses (RCT)			x			x	
	Comprehensive Residential Multiple Family (RCT2)			x			x	
	Cottage Cluster Homes (RCM3)		x		x	x	x	
	Residential Multiple Housing (RM)	x	x	x			x	
High density	Comprehensive Residential Multiple Family 2 (RCM2)	x					x	
	Residential Multiple Housing (RM)	x	x	x			x	

5.2.2 Policies

General

1. Promote a variety of housing forms and lot sizes to provide more affordable housing choices.
2. Promote housing that accommodates a range of lifestyles and life stages.
3. Support a variety of housing tenures, from fee simple to leasehold title.
4. Encourage the adoption of green building practices for all new construction.
5. Minimum density targets are averaged over the entire land use type. Development proposals for smaller geographic areas (e.g., lots, blocks) could be above or below the target, provided the overall target is met.
    a. To ensure the overall target is met, development that is above the minimum density target should be developed prior to approving developments below the target.
6. Encourage sound attenuation measures in the design of residential buildings adjacent to Hamilton Boulevard and the Alaska Highway.
7. Encourage the design of housing to be adaptive and accessible for persons at different stages of life and with varying mobility.

Medium and Higher Density

8. The minimum density for High Density areas is 55 units per gross hectare (approximately 85 units per net hectare).
9. The minimum density for Medium Density areas is 20 units per gross hectare (approximately 31 units per net hectare).
10. Ensure that areas designated high and medium density creates an effective transition, in terms of building massing and height, to lower density areas.
11. Where buildings over three storeys are proposed, encourage the use of multiple stepped masses to avoid monolithic building forms and create sensitive transitions to outdoor spaces, adjacent buildings, and/or natural features/landscape.

12. Encourage the siting of some of the semi-private amenity space to be contiguous to multi-use pathways.
13. Consider the impact of slopes and building heights of mid-rise apartment buildings on the privacy and views of any adjacent lower-density residential areas.

Low Density

14. The minimum density for Low Density 1 areas is 8 units per gross hectare (approximately 12 units per net hectare).
15. The minimum density for Low Density 2 areas is 10 units per gross hectare (approximately 15.5 units per net hectare).
16. Ensure that areas designated low density create an effective transition, in terms of building massing and height, to higher density areas.

Refer to Appendix C for neighbourhood character examples to guide implementation of this section.

5.3 Mixed Use – Residential/Commercial

5.3.1 Overview

The purpose of the Mixed-Use Residential/Commercial land use designation is to facilitate the co-development of commercial and compatible residential uses, including a vibrant Urban Centre where nearby residents can obtain day-to-day goods and services. This designation applies to: three First Nation land parcels (C-117B, C-141B, and C-30B); one private parcel (Lot 427-1); and potentially up to four City and Government of Yukon (YG) owned parcels (Lot 427, Lot 426, Road #8006308, and Lot 438). These are described below.

- *C-117B and C-141B*

Both C-117B and C-141B are Type 2 Settlement Land parcels designated for Residential and Commercial use under KDFN's Self Government Agreement (SGA). The western half of each parcel is designated Commercial, while the eastern half (adjoining Valleyview) is designated Residential, with a specification that the residential use is limited to "single family dwelling units of a permanent nature only". KDFN's endorsement of the Master Plan represents its commitment to coordinate with neighbouring landowners where there is mutual benefit and vary the land use designation in its SGA to allow for flexible mixed-use development that includes a broader range of housing options. Refer to Figure 14 for a rendering of one potential development approach.

- *C-30B*

Preliminary site planning and citizen consultation for the northern portion of its C-30B parcel have been ongoing since 2019 as part of the TKC's plans for a new administration building/community gathering place. The remainder of C-30B has not been planned by the First Nation, nor is its intended land use set out in TKC's SGA. TKC's endorsement of the Master Plan represents its commitment to coordinate with neighbouring landowners where there is mutual benefit, including the installation of shared sanitary infrastructure and stormwater management.

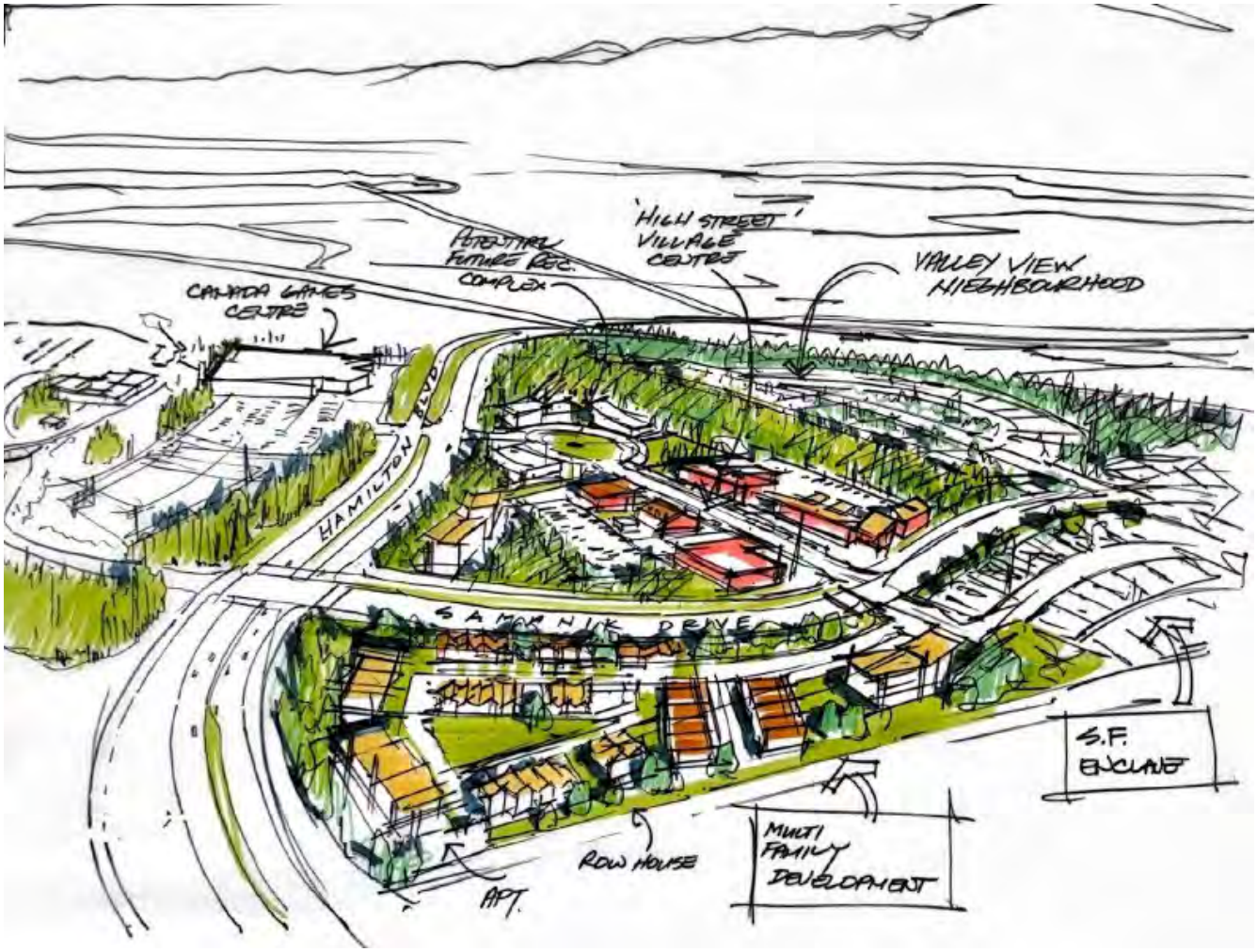


Figure 14. Rendering of a commercial village on C-117B and residential uses on C-141B from the January 2023 design charrette (Note: this is just one of many development scenarios KDFN could pursue in the future).

- *Lots 426, 427, 427-1, 438 and City Right-of-Way*

Lots 427 and 427-1 are envisioned as being integrated into adjoining Mixed-Use Residential/Commercial development. The Land Use Plan indicates the parcels to the south, namely the upland portion of Lot 426, Lot 438, and City's right-of-way (ROW #8006308), being developed for mixed-use or being retained as parks and greenspace.

- *Recommended Zoning*

The envisioned development diversity and flexibility for Mixed-Use Residential/Commercial areas in the Valleyview South area is best achieved with a range of zoning. Refer to Table 7 for the planning team's recommendations for appropriate zoning through which to fulfill the Mixed-Use Residential/Commercial land use designation. Note that the team based its recommendations on the 2012 Zoning Bylaw, which is currently being rewritten to conform to the newly adopted OCP.

Table 7. Recommended zoning for Mixed-Use Residential/Commercial land use designation

Land Parcel	Recommended Residential Zones	Recommended Commercial Zones
C-117B C-141B	See recommended residential land zones in Section 5.2.1	Neighbourhood Commercial (CN) Comprehensive Neighbourhood Commercial (CNC) Comprehensive Neighbourhood Commercial 2 (CNC2)
C-30B Lot 426 (upland) Lot 427 Lot 427-1 Lot 438 City ROW (#8006308)	See recommended residential land zones in Section 5.2.1	Neighbourhood Commercial (CN) Comprehensive Neighbourhood Commercial (CNC) Comprehensive Neighbourhood Commercial 2 (CNC2) Highway Commercial (CH) Service Commercial (CS)

5.3.2 Policies

Urban Centre

1. Multi-storey mixed-use buildings are encouraged and standalone commercial uses are discouraged.
2. Promote a transition in building height from taller to shorter buildings both within and across different uses.
3. Commercial uses in the Urban Centre will be on the ground floor with residential uses above.
4. Promote a built form that encourages the establishment of commercial and retail services that address day-to-day needs and facilitate neighbourhood gathering.
5. Support a diversity of compatible commercial activity within the Urban Centre to create a vibrant employment hub.
6. Encourage the design of buildings within the Urban Centre to frame and activate streets and other open spaces to support walking and cycling, pedestrian comfort, and social interaction.
7. Encourage the orientation of primary building facades and entries to the fronting street or open space to create street edge definition and activity.
8. Prioritize informal gathering through public spaces that encourage pedestrian accessibility and circulation.
9. Encourage businesses to animate sidewalks and streetscapes through outdoor programming and amenities, such as, but not limited to, patios and street art.
10. Where possible, support breaking up contiguous areas of parking into smaller lots and use of landscaping to soften visual impacts.
11. Support the siting of parking behind buildings or screen through landscape design to promote a pedestrian friendly environment and minimize views from residential uses.
12. Improve safety by ensuring that public spaces are animated with a diversity of users, programming, and adjacent active transportation routes.
13. Ensure that commercial units have convenient access along the active transportation network.

Other Areas

14. Encourage landowners to consider opportunities to complement preceding development on adjacent lots.
15. Support KDFN in amending the land use designations in their Self-Government Agreement to allow for more flexible development.
16. Encourage the siting of stand-alone and/or single storey commercial uses adjacent to the highway where practicable.
17. In areas bordering Medium Density and Low Density, encourage complementary and/or similar housing forms and density.

18. Ensure that the privacy and integrity of the existing public/institutional use on Lot 2 is not negatively affected by development.
19. Should development potential of Lots 426 and 438 and the City's ROW (#8006308) prove limited, YG and the City should retain these parcels for use as Parks/Greenspace.

Refer to Appendix C for neighbourhood character examples to guide implementation of this section.

5.4 Commercial/Industrial

5.4.1 Overview

The southeast portion of the Valleyview South area consists of a mix of YG and City lands, with YG's Lot 426 being the largest and most consequential parcel. Lot 426 has a roughly 12 metre elevation gain between its southern boundary (bordering on Wasson Place) and the central and northern portions that occupy the same terrace as the City's ROW (#8006308) and YG's Lot 438. Development here is complicated both by the terrain and nearby uses.

Due to development constraints in this area, the Master Plan flexibility for Mixed-Use Commercial/Industrial development, Parks/Greenspace, or a combination of both, as the desired land use in the southern portion of Lot 426.

5.4.2 Policies

1. Ensure convenient access to the active transportation and transit networks from all commercial/industrial development.
2. Ensure that sufficient land is set aside on Lot 426 to accommodate a road extension from Wasson Place to Lot 429's commercial/industrial, which is outside of the study area for this Master Plan.
3. Ensure that development of the southern portion of Lot 426 aligns with adjacent existing uses, the grading needs of adjacent landowners (outside of the Valleyview South area), Wasson Place road extension, and the potential need for a transit and emergency egress route (see Appendix B2: Transportation Concept).
4. Require appropriate buffers between Mixed-Use Commercial/Industrial and Mixed-Use Residential/ Commercial.
5. Ensure that the privacy and integrity of the existing Public/Institutional use on Lot 2 is not negatively affected by development.
6. Should development and/or access potential prove limited, this area should remain as Parks/Greenspace.
7. If feasible, Lot 426 should connect the planning area to the Hilllcrest Industrial area with a transit and emergency only access route to provide a secondary egress point to the highway and improve transit routing in this area.

5.5 Public/Institutional

5.5.1 Overview

There are two areas designated for Public/Institutional use in the Land Use Plan. The northern portion of TKC's strategically located Settlement Land parcel C-30B is designated Public/Institutional. Potential uses include an administration building, community gathering facility, cultural centre, or other public/ institutional use that serves the needs of TKC citizens. The second area is an existing place of worship that this plan anticipates no major change to.

5.5.2 Policies

General

1. Uses that may be suitable for inclusion in the Public/Institutional area may include, but are not limited to, an administrative building, cultural centre, place of worship, school, transit hub, recreational facility, and/or other uses as defined in the OCP or zoning.
2. Ensure convenient access to the active transportation and transit networks from all public/institutional development.
3. Encourage the use of active transportation and transit by employees, visitors, and patrons by providing secure bicycle parking and transit stops.

5.6 Parks, Open Space, and Trails

5.6.1 Overview

- *Active Park Spaces*

The Land Use Plan indicates a system of built park spaces dispersed throughout the Valleyview South neighbourhood offering a variety of structured leisure opportunities. This system acts as a complement to connections to larger natural greenspaces both within and outside of the planning area, such as nearby McIntyre Creek/Chasàn Chuà and Paddy's Pond/Ice Lake regional parks.

During the November 2022 engagement for VSMP, survey respondents in adjacent neighbourhoods selected their "Top 3" parks and open space features for the new neighbourhood. Residents of Valleyview, Hillcrest and Granger showed a strong preference for natural greenspace/forest and trail connections, with a playground ranking third. McIntyre residents favoured (in order of preference): a community garden, playground, and public BBQ/firepit and trail connections (tied for third).

Active park spaces will be created through the 10% public land dedication under the Subdivision Control Bylaw. This dedication should result in approximately 8 hectares (not including passive and protected areas).

- *Passive Parks/Greenspace*

The Land Use Plan indicates several greenspaces that are intended for passive leisure opportunities and urban forested. Passive parks and green can provide informal recreational space, trails, and stormwater management. These are located north of Hillcrest, southeast of Valleyview, and west/northwest of Valleyview.

- *Protected Area*

The Land Use Plan includes an environmental protection designation for the small kettle pond situated between Lots 429/430 and Hillcrest. The designation recognizes the importance of retaining this locally unique feature as a natural place as well as its role in the local hydrological regime.

5.6.2 Policies

General

1. The Land Use Plan provides the broad conceptual location of parks. Landowners may exercise flexibility in where parks are sited on their parcels, subject to a relatively even distribution throughout the broader neighbourhood and access to the active transportation network.
2. Promote walking by encouraging parks and/or trails to be situated within 200 metres of each home.
3. Prioritize proximity of park spaces to the active transportation network.

Active Park Spaces

4. Suitable uses may include, but are not limited to, open space, community garden, dog park, skating rink, gathering space, a toboggan hill and other uses as defined in the OCP or zoning.
5. To ensure adequate park space for future residents, cash-in-lieu should not be accepted in fulfillment of the Subdivision Control Bylaw.
6. Balance the park, recreation, and culture experiences in the neighbourhood with those provided in adjacent neighbourhoods.
7. Develop spaces that foster health, social connections, and appreciation for the natural environment.
8. Design a variety of facilities and amenities in parks that function for a diversity of ages and abilities.
9. Support local food systems through considering using park space for community gardens, greenhouses, etc.
10. Where appropriate, consider opportunities to incorporate First Nation history, heritage, language, legend, stories, and place names into interpretive signage, park names, and placemaking features.
11. Promote year-round use of parks through seasonally appropriate amenities and design.
12. Consider the development of a toboggan hill and/or other recreational amenity to utilize the slope between Sumanik Drive and Alaska Highway in conjunction with the conversion of this section of roadway into an active transportation corridor.
13. Prioritize high quality, durable, natural materials (such as wood, metal, and stone), and nature-inspired elements in the design of park amenities.
14. Incorporate maintenance considerations into park design, such as providing water connections to central park space for irrigation.
15. Ensure that easements and natural surface trails (not identified on the Transportation Map in Appendix B2) are located to provide convenient pedestrian access to greenspace from the road network.
16. Design parks and trail corridors utilizing Winter City principles to maximize their functionality and use throughout the year.
17. Design parks and trail corridors utilizing Crime Prevention Through Environmental Design principles, including the use of lighting to increase the safety of parks and trails.

Landscaping and buffers

18. Ensure that neighbourhood character is reinforced through the planting and/or replacement of street trees that help preserve/ restore the tree canopy.
19. Plant trees and other vegetation along streets, in parking areas and in other paved open spaces to store carbon, reduce water run-off, buffer windstorms, and provide shade.
20. Utilize native low grass and wildflower mix (unmowed) for areas that require low maintenance such as open greenspace in parks, landscaped boulevards, and around stormwater management facilities.
21. Apply the entirety of Lot 429's public land dedication requirement within the Valleyview South Master Plan Area portion of the lot. This dedicated greenspace could be used to increase the required buffer between the residential uses in the Valleyview South area and the mixed-use commercial/industrial area off of Wasson Place or as park space elsewhere within the portion of Lot 429 within the Valleyview South area.

Refer to Appendix C for neighbourhood character examples to guide implementation of this section.

6.0 Infrastructure and Servicing

The provision of infrastructure at the level of urban servicing is essential to meet the needs of future development in the Valleyview South area. Infrastructure will aim to be cost effective, respect the environment, and conserve water and energy resources. While identified conceptually in the Master Plan, specific infrastructure requirements for each landowner's parcels will be determined during detailed engineering design and through the negotiation of development agreements with the City.

Note: The transportation and servicing concepts described in the following sections are predicated on a significant clearing and regrading effort that will involve the removal of an estimated 4-5 million cubic metres of gravel from the former tank farm and adjoining parcels. The gravel extraction is described in Section 6.6.

6.1 Transportation Network

6.1.1 Overview

- *Road Network*

The Transportation Concept in Appendix B2 envisions a new road network that integrates the Valleyview South area with surrounding major transportation corridors, distributes vehicle traffic efficiently through the area, and facilitates an efficient and intuitive driving experience for future residents.

- *Traffic Impacts and Improvements*

The Traffic Impact Analysis (TIA) included in Appendix D predicts that about 13,800 total daily vehicle trips will be created by the new development at full build-out, with accompanying percentage increases in vehicular demand on the existing road network. The TIA was based on an approximate 250 increase in dwelling units over the minimum requirements set in Section 5.2.1. Refer to Table 8.

Table 8. Projected traffic generation and impacts from Valleyview South development

Traffic Parameter	
Total Number of Vehicle Trips Generated at Full Build-out	
Weekday AM peak hours	1,202
Weekday PM peak hours	1,232
Daily	13,818
Potential Percentage Increase in Vehicular Demand on Surrounding Road Network – AM (PM)	
Hamilton Boulevard (between McIntyre Drive and Alaska Highway)	20% (20%)
Two Mile Hill Road (east of Range Road intersection)	20% (20%)
Alaska Highway (between Range Road and Hamilton Boulevard/Two Mile Hill Road intersections)	50% (55%)
Range Road (between Two Mile Hill and Alaska Highway intersection)	10% (10%)

According to the TIA, the intersections of the Alaska Highway/Hamilton Boulevard and Two Mile Hill Road/Range Road will face operational challenges in 2040 under background traffic conditions. At full build-out, Valleyview South's internal intersections should maintain satisfactory operating conditions, as should most of the external intersections. However, the new neighbourhood's traffic would undermine the recommended background condition improvements to the Alaska Highway/Hamilton Boulevard and Two Mile Hill Road/Range Road intersections (assuming these are implemented).

At the time this plan was drafted, the City was undertaking a study of improvements for both of these intersections.

- *Active Travel Modes*

The 4.9-kilometre Active Transportation (AT) network depicted in the Transportation Concept in Appendix B2 features connections to several of the City's existing multi-use pathways (MUPs), including:

  - The Hamilton Boulevard MUP at McIntyre Drive, the Canada Games Centre signalized intersection, and near Elijah Smith Elementary School;
  - The Airport Trail MUP at the Alaska Highway & Range Road intersection; and,
  - The MUP serving Hillcrest and Granger neighbourhoods (east of Elijah Smith Elementary).

- *Transit*

The Transportation Concept depicts a new series of internal transit stops that meets the City's 2018 Transit Master Plan goal of situating transit stops within 400 metres of residences and businesses within the Urban Core. In addition, it highlights the possible incorporation of a transit egress lane that would connect the central (or upland) portion of the planning area with Wasson Place to the south. This lane could also serve as an additional emergency egress to the Alaska Highway for the neighbourhood in the event of a wildfire or other disaster. An estimated 340 transit users could be served.[7]

- *Recreational Motor Vehicles*

The Transportation Concept does not direct further expansion of the City's motorized trail network. The area is already well served by the Hamilton Boulevard motorized MUP and the new neighbourhood's MUP can offer an alternative experience for non-motorized users. All-Terrain Vehicles (ATV) are allowed to use City streets for the purposes of connecting to the nearest motorized multi-use trail and/or permitted open space, subject to other requirements of the ATV Bylaw. Snowmobiles are generally allowed on trails, subject to the Snowmobile Bylaw.

6.1.2 Policies

1. The Transportation Concept provides the broad conceptual location for roadways, transit stops, and AT infrastructure. Each landowner may exercise flexibility in where these elements are located on their properties, subject to the achievement of an equivalent degree of connectivity for all modes of travel.

2. Until further assessment is completed by the City, consider the Valleyview South's TIA's recommendations to manage the 2040 background traffic condition for Valleyview South's external road network:

[7] Based on 2016 data, approximately 8% of Takhini and Riverdale residents use transit as their main mode to commute. Applied to VSMP 4,217 people = 337 transit users.

a. For the Two Mile Hill & Range Road intersection:
    i. Revise the southbound approach by converting the existing configuration of one through and left turn lane, plus one dedicated right turn lane, into one dedicated left turn lane and one lane accommodating both through and right turns;
    ii. Add a through lane to the eastbound approach;
    iii. Introduce a protected left turn phase for the westbound approach, converting it into a protected plus permissive left turn; and,
    iv. Update the signal timing plan for both the AM and PM peak hours.
b. For the Alaska Highway & Hamilton Boulevard intersection:
    i. Implement an additional dedicated left turn lane for westbound and southbound approaches, creating a double left turn configuration;
    ii. Convert the northbound right turn, previously regulated by a yield, into a free-flowing movement;
    iii. Provide an overpass for pedestrian and cyclist movements; and,
    iv. Update the signal timing plans for both the AM and PM peak hours.

3. Until further assessment is completed by the City, consider the Valleyview South's recommendations to manage the 2040 total traffic condition for Valleyview South's external road network:
    a. For the Two Mile Hill & Range Road intersection:
        i. Update the signal timing plan for both the AM and PM peak hours.
    b. For the Alaska Highway & Hamilton Boulevard intersection:
        i. Introduce an extra through lane for the eastbound approach to accommodate the growing volume of through traffic; and,
        ii. Update the signal timing plan for both the AM and PM peak hours.

4. Provide a connected internal road network by developing:
    a. A curving east-west/north-south collector road that connects the central portion of the Valleyview South area to Hamilton Boulevard at McIntyre Drive;
    b. An intersecting north-south collector road that connects the Mixed-Use Residential/Commercial area near Sumanik Drive and High Density Residential area with the entrance opposite McIntyre Drive;
    c. A connection between the central portion of the Valleyview South area to the Alaska Highway at Range Road;
    d. The expansion and realignment of the existing access to Lot 262-2 and Lot 429 to a straighter north- south collector road intersecting with the Alaska Highway connecting road;
    e. Intersection upgrades (3 to 4 way) at Canada Games Centre & Hamilton Boulevard and Alaska Highway & Range Road;
    f. Closure of Sumanik Drive east of Valleyview Drive to vehicular traffic, after alternative highway access is provided at Range Road;
    g. A new major (two lane) roundabout at McIntyre Drive & Hamilton Boulevard and a new minor (one lane) roundabout at Sumanik Drive and the north-south collector road; and,
    h. Use of two-way stops at most internal intersections to facilitate emergency response and better traffic flow.

5. If the recommended road alignment that extends from the CGC into the Valleyview South area is determined to be unfeasible, an alternative road alignment that bisect C-117B and C-141B could be considered.

6. Promote active transportation by developing:
    a. East-west MUP connection from Hamilton Boulevard & McIntyre Drive to the Alaska Highway & Range Road;
    b. East-west MUP connection from the CGC to the Alaska Highway & Range Road, via Sumanik Drive east of Valleyview Drive;

c. North-south MUP connection from Elijah Smith Elementary School to the CGC, generally through the middle of the planning area
d. After a fully functioning Alaska Highway connection is established at Range Road, convert the eastern road segment of Sumanik Drive (east of Valleyview Drive) into a wide AT pathway with designated lanes for pedestrian and cyclist traffic; and,
e. Pedestrian improvements and the demarcation of a dedicated cycling lane along the western segment of Sumanik Drive (west of Valleyview Drive).

7. Promote a pedestrian-friendly neighbourhood by:
   a. Considering traffic calming measures, such as curb extensions and raised crosswalks;
   b. Creating well-lit road corridors;
   c. Requiring sidewalks separated from the roadway on both sides of all major and minor collector roads;
   d. Requiring sidewalks on both sides of roadways in medium and high density areas;
   e. Considering reducing the internal road speed limit to 30 km/hr in strategic locations to encourage safety and comfort for pedestrians and cyclists; and,
   f. Providing winter maintenance of all MUPs within the new neighbourhood, where feasible.

8. Transit stops will be constructed or improved to City standards.

9. Transit stops are conceptually located on the Transportation Map and should be located at key intersections and destinations.

10. Provide bicycle parking at all neighbourhood parks.

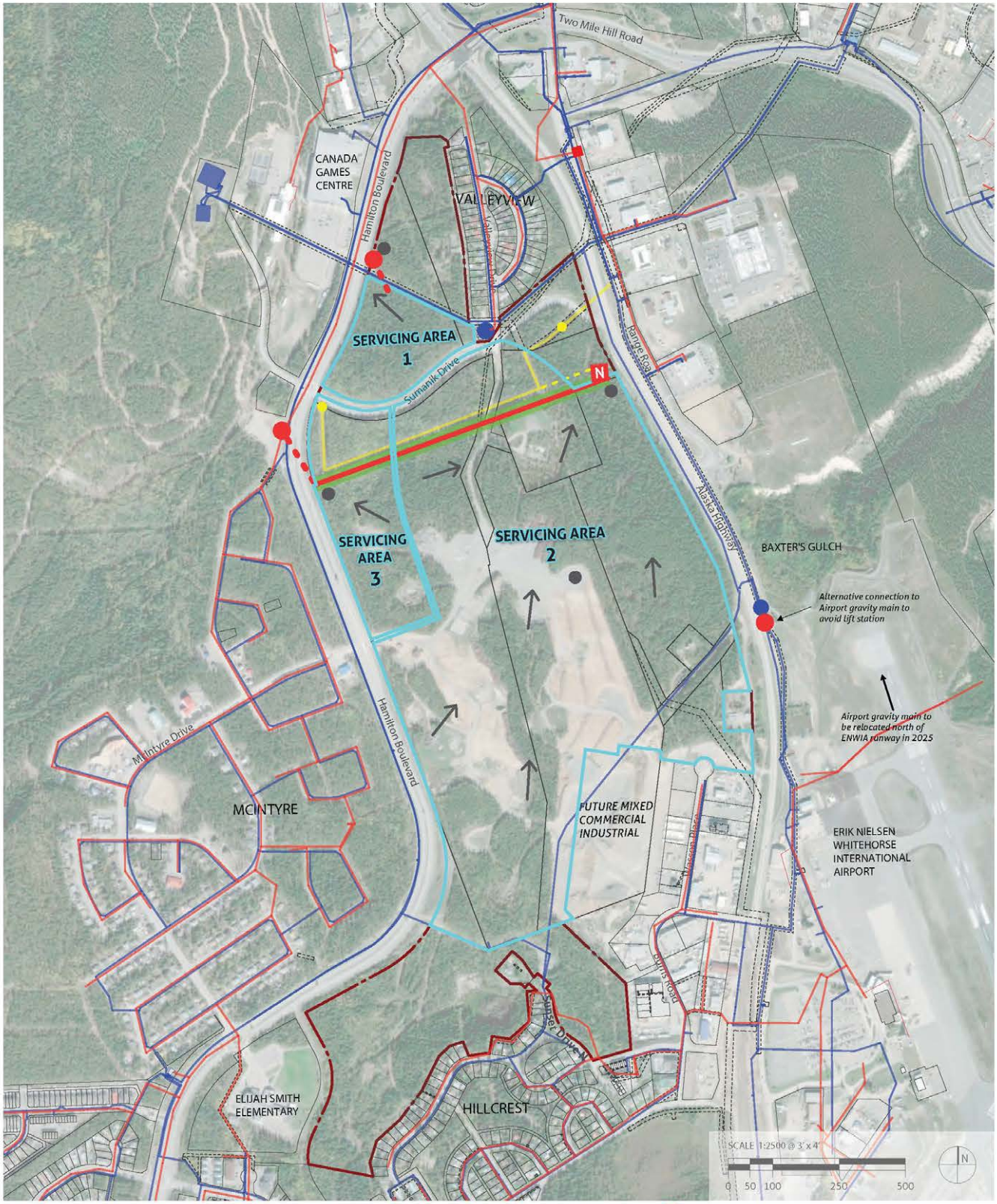
11. Require the provision of adequate bicycle parking for commercial and public/institutional uses.

12. Encourage use of active transportation by employees and visitors to commercial and public facilities by requiring Class 1 bicycle parking.

6.2 Water Servicing

6.2.1 Overview

The Servicing Concept presented in Appendix B3 anticipates that multiple connections will be made to multiple watermains surrounding the planning area to achieve the desired looping system configuration. Conceptual connection points are indicated, but their exact placement will be negotiated with the City through the detailed design process. In addition, the City's Water and Sewer Master Plan will identify, at a very preliminary level, potential offsite improvements triggered by this development. These too will be further confirmed, quantified, and costed during detailed design, including the percentage allocation to benefitting areas. The study area is divided into 3 Service Areas, based on water, sanitary, and stormwater infrastructure and the intended final grade (See the Servicing Plan illustrated on the following page and in Appendix B3).


Two Mile Hill Road
CANADA GAMES CENTRE
Hamilton Boulevard
VALLEYVIEW
Falcon Crescent
SERVICING AREA 1
Sumanik Drive
N
Range Road
SERVICING AREA 3
SERVICING AREA 2
Alaska Highway
BAXTER'S GULCH
Alternative connection to Airport gravity main to avoid lift station
Airport gravity main to be relocated north of ENWIA runway in 2025
McIntyre Drive
Hamilton Boulevard
MCINTYRE
FUTURE MIXED COMMERCIAL INDUSTRIAL
Norman Place
ERIK NIELSEN WHITEHORSE INTERNATIONAL AIRPORT
Burns Road
Sunset Drive
ELIJAH SMITH ELEMENTARY
HILLCREST
SCALE 1:2500 @ 3' x 4'
0 50 100 250 500
N
Study Area Boundary
Parcel
Easement
Power Distribution Line
Approximate Start/End of Power Pole Reinstallation
Potential Poweline Reroute
Water Main / Reservoir
Sanitary Main / Lift Station
Potential Water Main Tie-in
Potential Sanitary Main Tie-in
N New Lift Station and Sanitary Force
New Sanitary Gravity Main
Grading Direction
Potential Stormwater Management Facility
Potential Utility Corridor
GROUNDSWELL PLANNING
MODUS

- *Servicing Area 1 - North of Sumanik Drive*

The future mixed-use residential commercial development on C-117B can connect to the water trunkmain west of Valleyview. A maximum of two connections (one northward and one southward) is envisioned.

- *Servicing Areas 2 & 3*

Servicing Area 2 (Lots 262-2, 429, 430, 431, C-30B, C-141B, and smaller parcels in the southeast) can likely connect to the Valleyview and Hamilton Boulevard trunkmains to facilitate a looping water system. The higher density development in Servicing Area 3 will require a larger diameter watermain that connects to the trunkmain west of Valleyview or the Alaska Highway to achieve the higher fire flows required by the City. Note that the southeast portions of Servicing Area 2 may or may not be integrated into this scheme, depending on whether greenspace or mixed-use development is the final land use.

6.2.2 Policies

1. Encourage the consideration of the most cost effective and low maintenance watermain alignment toservice higher density development with the necessary fire flows.
2. Encourage the consideration of an east-west utility corridor connecting the Alaska Highway with Hamilton Boulevard that could accommodate water, sanitary, and power infrastructure.
    a. Alternative corridor alignments utilizing the right-of-way in the to-be-decommissioned portion of Sumanik Drive and water trunkmain easement west of Valleyview should be considered.

6.3 Sanitary Servicing

6.3.1 Overview

The Servicing Concept in Appendix B3 depicts an approach to connect the Valleyview South area to the surrounding City sanitary system, accounting for the challenges posed by the varying elevations across the area and objective of minimizing the long-term operations and maintenance burden on the City. The concept generally directs sanitary servicing for the central, southern, and eastern areas (Servicing Area 2) to a shared lift station and forcemain, while allowing the remaining areas (Servicing Areas 1 and 3) to connect to existing infrastructure via gravity. The sanitary servicing options are described below by servicing area.

It should be noted that the City's Water and Sewer Master Plan will identify, at a very preliminary level, potential offsite improvements triggered by this development. These will be further confirmed, quantified, and costed during detailed design, including the percentage allocation to benefitting areas.

- *Servicing Area 1*

Development in Servicing Area 1, consisting of C-117B, will be facilitated via a new gravity main that will connect to the Hamilton Boulevard sewer trunkmain near the Canada Games Centre intersection. The alignment of the gravity main will be determined through detailed design.

- *Servicing Area 2*

Servicing Area 2 – consisting of Lots 262-2, 429, 430, 431, C-141B (east), C-30B, and the smaller parcels in the southeast - will be graded down from the southwest to northeast to facilitate gravity conveyance of sanitary flows to a new shared lift station. A sanitary forcemain will be installed to convey pumped flows up to Hamilton Boulevard. This sanitary servicing approach will require the removal of significant amounts of gravel from the area (see Section 6.6). Note that the southeast portions of Servicing Area 2 may or may not be integrated into this scheme, depending on whether greenspace or mixed-use development is the final land use.

The new sanitary lift station is anticipated to be sited in the southeastern corner of Lot 431, adjacent to the Alaska Highway. A generator, pumps, and control systems will be located inside the building, while the wet well will be located outside. Ideally, pumps run for longer periods and fewer on/off cycles to extend their operating life and to avoid operational issues (i.e., wastewater going septic creating odour and corrosive issues, solids settling in lift station, etc.) that are associated with extended non-operating periods; this will need to be factored into the sizing of pumps as the neighbourhood builds out.

- *Servicing Area 3*

Servicing Area 3 is higher than Hamilton Boulevard and will be graded to connect via gravity to the sewermain just north of the McIntyre subdivision. The western half of C-141B, which is lower, could be integrated with the Servicing Area 2 sanitary system.

6.3.2 Policies

1. The design of the lift station should consider the phasing and timing of the connecting developments and be capable to upgrade with additional pumps to increase the pumping capacity as the area expands and approaches full build-out.

2. The forcemain design should be based on the lift station design and the appropriate diameter to service the full build out of the development. Design should consider the installation of a second smaller diameter forcemain for the short term to avoid issues with long residence times in the forcemain.

3. The forcemain alignment should consider opportunities to avoid the administrative complications of siting on Settlement Land.

4. The gravity main should be sized in anticipation of the additional flows from the connecting forcemain and associated development.

5. Lands that accommodate lift stations should be zoned Public Utility.

6. Lift station should be fenced and gated.

7. Encourage the consideration of an east-west utility corridor connecting the Alaska Highway with Hamilton Boulevard that could accommodate water, sanitary, and power infrastructure.
    a. Alternative corridor alignment utilizing the right-of-way in Sumanik Drive, including the to-be-decommissioned portion, should be considered.

8. Require landowner to develop strategies to minimize clearing and disruption of the greenspace in the design and construction of the gravity main to service Servicing Area 1.

9. Minimize negative aesthetic impacts from the lift station to C-30B and the Alaska Highway corridor, where feasible.

Refer to Appendix C for neighbourhood character examples to guide implementation of this section.

6.4 Stormwater

6.4.1 Overview

The Servicing Concept in Appendix B3 depicts a highly conceptual approach to managing stormwater in the Valleyview South area through the construction of several stormwater management facilities (SWMFs). The broad objective of stormwater management is to ensure that post-development discharges (i.e., flow rates and water quality) match pre-development discharge conditions to receiving environments and waterbodies.

Stormwater mains will generally follow the gravity sewer network and discharge into the SWMFs for onsite management. Features will be situated at depressions/low spots and be designed to avoid conflicts with adjacent land uses. Stormwater routing will be further delineated in conjunction with a coordinated grading plan (see Section 6.6); however, the anticipated broad approach is described below.

- *Servicing Area 1*

A small SWMF could be sited downgradient from and within the KDFN development. To maximize the development potential of C-117B, the SWMF could be locted in the Park/Greenspace to the north, subject to detailed design.

- *Servicing Area 2*

Stormwater from Servicing Area 2 could be managed with two small SWMFs. The central area SWMF could be sited near the eastern boundary of Lot 429 to capture drainage from most of Lots 429/430. Another one could be sited around the north end of C-30B to receive stormwater from C-30B (and adjoining parcels to the south), Lot 262-6, Lot 431, and the eastern half of C-141B. Note that the southeast portions of Servicing Area 2 may or may not be integrated into this scheme, depending on whether greenspace or mixed-use development is the final land use.

- *Servicing Area 3*

The northwest portion of Lot 430 and western part of C-141B will be graded towards Hamilton Boulevard. A review of the existing drainage ditch and infrastructure should be conducted as part of detailed design. As required, an additional SWMF could be sited in the area.

6.4.2 Policies

1. The Servicing Concept provides the broad conceptual location for SWMFs. Each landowner may exercise flexibility in where stormwater management components are located on their properties, subject to the achievement of stormwater management objectives.

2. All SWMFs should control and retain stormwater runoff and release it to receiving waterbodies at pre-development rates and volumes.

3. Detailed design of SWMFs should consider the use of stormwater management pond(s) as well as smaller low impact source controls such as bioswales, rock pits, and rain gardens.

4. SWMFs should be in low lying areas and integrated into the landscape design for the greenspaces.

5. Stormwater system design should consider the use of overflow structures to ensure the stormwater system can manage a peak event, including spring freshet when the ground may still be frozen.

6. Stormwater system design should consider operational requirements, including managing potential freezing issues affecting the performance of the stormwater infrastructure.

7. Ensure that adequate maintenance of the SWMFs is integrated into the City's operations plans.

8. Review the major storm outlets during detailed design to determine if any erosion protection is required.

Refer to Appendix C for neighbourhood character examples to guide implementation of this section.

6.5 Power and Communications

6.5.1 Overview

The onsite and offsite power needs associated with the Valleyview South area will be delineated during detailed engineering design. While power servicing is anticipated to be straightforward within the development footprint,the routing of the distribution line through Lots 12 and 431 and its treatment through C-141B will require careful consideration. Communications lines will likely be installed in the same duct bank as power within the road right-of-way.

First, the lift station (in addition to public and commercial land uses located to the west) will require three-phase power, instead of the current two-phase on site. Second, the powerline's alignment compromises the grading concept and subsequent development of portions of Lots 12 and 431 for medium density residential. Third, the grades on C-141B will need to be raised to maximize the buildable area and ensure adequate conditions for lot grading, servicing, and road access. Lastly, underground power is preferred as compared to overhead to improve neighbourhood aesthetics and increase developable areas (since overhead lines require more clearances and need to follow straighter alignments to avoid multiple guy wires).

6.5.2 Policies

1. Encourage the consideration of an east-west utility corridor connecting the Alaska Highway with Hamilton Boulevard that could accommodate water, sanitary, and power infrastructure.
    a. Alternative corridor alignments utilizing the right-of-way in the to-be-decommissioned portion of Sumanik Drive and water trunkmain easement west of Valleyview should be considered.

2. Work closely with ATCO Electric Yukon to ensure that negative impacts of gravel extraction and grading activities in proximity to the transmission line are minimized.

6.6 Site Grading/Gravel Extraction

6.6.1 Overview

The transportation and servicing concepts, combined with the desire to maximize development of the steeper areas adjoining the Alaska Highway, necessitate the regrading of most of the Valleyview South development area. Re-grading effectively means the excavation and removal of significant volumes of subsurface gravels from the area.

Servicing Area 2 will be graded to slope towards the proposed lift station adjacent to the Alaska Highway, resulting in a relatively gradual, consistent slope averaging about 2-3% between Hamilton Boulevard and the Alaska Highway. The preliminary estimate for the amount of extracted gravel needed to achieve that average slope is approximately 4.5 million cubic metres. Note that the southeast portions of Servicing Area 2 may or may not be integrated into this scheme, depending on whether greenspace or mixed-use development is determined to be the final land use.

The removal of this significant quantity of gravel could be achieved in as few as five years; however this timeframe may not be achievable or realistic. The estimated annual quantity of Valleyview South aggregates likely exceeds the annual gravel demand in the region, assuming the Valleyview South area became the sole supplier (which is unlikely given competition from other gravel operations). This supply-demand mismatch necessitates that a suitable storage area is located, and preferably nearby to minimize hauling costs. Lastly, it may not be feasible to dedicate so many resources to the extractioneffort.

It is critical to apply lessons from the past in approaching this future gravel removal. During this planning process and previous ones involving the tank farm area, Valleyview and Hillcrest residents have expressed concerns about a lack of development progress and the perceived operation of an urban gravel pit in proximity to their homes. Moving forward, a balance must be struck between gravel removal and tangible progress on the development front. This balance seeks to avoid a scenario in which the clearing and regrading of the entire tank farm and surrounding area occurs years before any housing is built.

The Master Plan envisions an incremental approach in which site preparation (i.e., clearing, gravel removal, and rough grading) generally proceed only so far as is required to facilitate infrastructure installation and final grading for a defined area, or phase, of development. In this way, the removal of gravel and tangible development progress are coupled in the development approval process. The phases, and their inter-relationships, are depicted in the Phasing Concept in Appendix B4 and further described in Section 7.3. The policies below deal specifically with the gravel extraction activity.

6.6.2 Policies

1. The Phasing Concept in Appendix B4 presents a high-level spatial framework to achieve the City's objective of ensuring site preparation in the Valleyview South area does not advance too far ahead of development. Landowners may exercise flexibility around their regrading activities so long as their plans generally achieve the Phasing Concept's objectives.

2. Prior to the initiation of regrading and/or gravel extraction activities by any owner of a parcel located within Phase C of the Phasing Concept, a coordinating grading plan is required. The plan should include the following information:
    a. Existing and final conceptual grades for Phases D-F (as well as B should C precede it);
    b. An updated phasing plan showing how the extraction will be phased and aligned with the first

phases of subdivision construction;
    c. Estimated aggregate needs for the phase(s) of development the proposed gravel extraction precedes;
    d. An operations plan showing proposed haul routes, processing areas, and stockpile locations; and,
    e. Letters of consent from adjacent landowners within the plan area.

3. Encourage the redistribution of aggregate within the planning area to minimize the amount of aggregate needed to be hauled off site.

4. Direct all regrading activity towards the Alaska Highway and/or Wasson Place, including establishing access to the highway and/or Wasson Plan and prohibiting the use of Sumanik Drive, where feasible.
    a. Access to the Alaska Highway and/or Wasson Place should be established prior to the removal of gravels from any portion of the development area south of Sumanik Drive.
    b. Hamilton Boulevard or Sumanik Drive should only be used for hauling if access to the Alaska Highway is blocked for an extended period.

5. Landowners are required to obtain a Temporary Use Permit from the City to proceed with grading and removal of aggregate material from the planning area. Permits may also allow for processing activities on site.

6. Establish mechanisms for information sharing and problem-solving between the Valleyview South development partners engaged in gravel extraction, the City, and adjacent neighbourhoods. Such mechanisms may include:
    a. Meetings to discuss operating plans.
    b. Mandatory advisories when significant changes to the operating plan are proposed.
    c. Ongoing email communications.

7. To mitigate adverse impacts from gravel removal and processing activities, such as noise, dust, and public safety, consider the use of the following measures in any Temporary Use Permit:
    a. Limiting hours of operation for any and/or all proposed activities.
    b. Restricting the type of material processing that may occur
    c. Restricting areas where material processing may occur
    d. Obtaining security deposits.
    e. Limiting regrading activities to one or two-year periods.
    f. Other timeframe limits tied to specific phases (or portions of phases) and extraction volumes.
    g. Requiring remediation if regrading exposes contaminated soils.

8. Provide support, as needed, to explore options for the short and medium-term storage of extracted aggregates.

9. Where regrading has the potential to expose any contamination, require landowners to liaise with the Government of Yukon and remediate any area where contamination is exposed, providing proof to the City that the activities uphold the requirements of any affected Certificate of Compliance or other applicable regulations.

10. Encourage landowners to work closely with ATCO Electric Yukon to ensure that negative impacts of aggregate extraction and grading activities in proximity to the transmission line are minimized.

7.0 Implementation

As the Valleyview South Master Plan (VSMP) transitions to implementation, flexibility, and innovation will be required from the development partners and City of Whitehorse. The following section touches on the key tasks and strategic considerations that must be navigated to successfully implement the Plan.

7.1 Subdivisions

7.1.1 Overview

The unique challenge that the multi-owner nature of the Valleyview South development area posed during the planning stage will carry over to implementation, with numerous subdivisions and land dispositions requiring attention. Table 9 outlines some of the key challenges and possible approaches to resolving them.

7.1.2 Policies

1. Consider the recommendations summarized in Table 9 during the more detailed planning and/or subdivision approval stage, as appropriate.

Table 9. Overview of subdivision and disposition challenges and potential solutions

Land Parcel(s) See Landowner map in Appendix A1	Development Challenge	Potential Solutions
Lot 66 and adjacent unsurveyed YG land	No development proposed.	
City road right-of-ways (ROWs)	Only a portion of one ROW (#8034222) is envisioned as part of the road network. Development on the southern ROW (#8006308) is complicated by its unusual configuration and adjacency to C-30B.	• Land sale or swap to adjacent landowners • Incorporation into road network (where possible) • Use as greenspace
Lot 427	This small parcel is oddly shaped situated and is between Lot 429 and C-30B.	• Incorporation into road network • Land sale or swap to adjacent landowners
Lot 427-1	This lot currently houses two satellite receiversthat the VSMP proposes for decommissioning.	• Work with landowner to relocate satellite receivers
	This lot is surrounded by Settlement Land, a City road ROW (#8006308) and future Mixed-Use Residential/Commercial development.	• Ensure adjacent subdivisions consider this lot in the parcel fabric and access
Unsurveyed YG land (southwest corner)	A portion of this parcel is proposed for low density – small lot residential development but is shaped and situated in a manner that will make creating discrete lots within this area difficult.	• Land sale or swap to adjacent landowners • Creation of a single lot that can accommodate numerous single family dwellings under different zoning (i.e., Cottage Cluster)

7.2 Regulatory Processes

7.2.1 Overview

- *Airport Regulations*

As briefly discussed in Section 2.5.1, development in the Valleyview South area has the potential to conflict with obstacle clearance and noise zoning, assuming current grades are maintained. As the development partners advance their planning, particularly the coordinated grading, airport zoning impacts will be meaningfully assessed, and mitigation measures (if any) developed.

- *Yukon Environmental and Socioeconomic Assessment Act*

Section 47(2) (b) of the Yukon Environmental and Socioeconomic Assessment Act (YESAA) requires an assessment for various activities that will be carried out to develop the Valleyview South area. In general, the development is expected to trigger numerous activities listed under Schedule 1 of the Act, including:

  - "Construction, modification, or decommissioning of a public road, including a public road used only in winter (Part 6.10);
  - Quarry, crushing, or screening of minerals (Part 11.1);
  - On Crown land or settlement land, moving earth or clearing land using a self-propelled power driven machine (Part 13.12);
  - On Crown land or settlement land, leveling, grading, clearing, cutting or snow ploughing of the right-of-way of a power line, pipeline, railways line or road (Part 13.13b);
  - On Crown land or settlement land, the extraction of sand, gravel, stone, marl, loam, clay or volcanic ash (Part 13.15); and
  - Operation, decommissioning, abandonment or expansion of a gravel or sand pit or stone quarry (Part 13.16)."

Since public roads are expected to be constructed on nearly every lot (with the potential exception of Lot 262-2 and/or development occurring on crown or settlement lands, a YESAA assessment will be required for most, if not all, of the Vallleyview South area.

The required YESAA assessment is anticipated to be a Designated Office level screening.

- *Contaminated Sites Regulation*

Under the *Environment Act*, parties responsible for contamination have a duty to clean it up. Under the *Contaminated Sites Regulation* of the Act, any site designated contaminated may not be altered and/or otherwise developed without permission from the Government of Yukon. While the regulatory expectations are relatively black and white, there is a vast grey area to navigate when it comes to potential contamination liability. Development in the Valleyview South area intersects with both clear regulatory requirements and the realms of best practice and due diligence.

The matter of the former Whitehorse Upper Tank Farm (WUTF) is the most clearcut: the site is a known historic contaminated site that has been under some level of government oversight over the past three decades. Development of the two areas that have received Certificates of Compliance and the one which remains designated will require attention (for the former) and continued liaison with YG Environment (for the latter). Refer

to the map in Appendix A2 for an overview of Environmental and Special Places. However, Lots 429 and 430 are not the only known contamination issues in the Valleyview South area; contamination has also historically (and more recently) been encountered on Lot 426. Refer to Table 10 for an overview of contamination-related development issues and the Master Plan's accompanying recommendations.

Other properties in the Valleyview South area pose issues of potential liability, due either to the potential (but unconfirmed) deposit of contaminants or the migration of contaminants from adjacent parcels. Lot 262-2 and C-30B are potentially contaminated due to their proximity to the WUTF area and previous/existing uses, however, the presence and extent of any potential contamination needs to be studied. Conducting an Environmental Site Assessment (ESA) to confirm and/or rule out the presence of contamination is a best practice before land with potential for contamination issues is transferred or sold and will be required prior to rezoning and subsequent development. Refer to Table 10 for an overview of recommendations.

Table 10. Recommendations for known and potential contamination issues

Property	Status & Anticipated Development Impacts	Recommendations
Parcels with Known Contamination Issues		
Lots 429/430 – portion with Certificate of Compliance	These areas are proposed for residential use. The envisioned gravel extraction for site preparation has a high likelihood of bringing post-grading elevations to within 3m of known depth of contamination for numerous areas of environmental concern (AECs). There is a potential that at depth horizontal movement of contamination has occurred. A preliminary grading plan would confirm which AECs are impacted.	A comprehensive sampling plan should be organized with AECs staked out prior to the onset of earthmoving. Sampling should also occur around the AECs to confirm if horizontal movement of contaminants has occurred or not. Depressions could be backfilled with clean material or soils could remain in place if not contaminated. Either scenario would require confirmatory sampling and close liaison with YG Department of Environment.

Property	Status & Anticipated Development Impacts	Recommendations
Parcels with Known Contamination Issues (continued)		
Lots 429/430 – Ministerial Designation portion	This area is also proposed for residential use. Its continued designated status means that any earthmoving activities are subject to oversight byYG Department of Environment. Contamination isrelated to groundwater and gravel extraction forsite grading and preparation would not be expected to impact the groundwater Nonetheless, the Certificate of Compliance would be issued only if YG is satisfied that the area poses little to no risk. This could occur in two ways: 1. Sampling could confirm that contamination has naturally attenuated to below numerical standards (which may be possible dependingon the development timeline); or 2. A risk assessment confirms that there is no risk to human health.	The owner of Lots 429/430 should initiate dialogue with YG Department of Environment about the pre-conditions to receiving a Certificate of Compliance for the still designated area. The Certificate would likely detail the conditions within which human health risks are deemed non-existent and/or minimal. The administrative mechanism for transferring the Certificate (and accompanying conditions) to subsequent subdivided and privately owned parcels will need to be determined by YG.
426	The future use of this lot could be Parks/Greenspace, Mixed-Use Commercial/ Industrial, and/or Mixed-Use Residential/ Commercial. Lot 426 will also be the route if a transit/emergency egress is built to Wasson Place. Contamination was encountered during construction activity in 2022 and a Phase 1 ESA was reportedly completed.	Based on the results of the Phase 1 ESA,a Phase 2 ESA is recommended.
Parcels with Potential Contamination Issues		
Lot 262-2	This lot is proposed for residential use. The ESA isout of date and doesn't reflect the past decade or so of winter snow storage use.	A new Phase 1 ESA is recommended.
C-30B	This parcel is proposed for Public/Institutional and Mixed-Use Residential/Commercial uses. No ESA has been completed to date. Groundwater contamination is possible due to its downgradient location from WUTF.	A Phase 1 ESA is recommended. If groundwater contamination is confirmedbut soil contamination is considered unlikely, a risk assessment could be undertaken to confirm that there are minimal risks to human health from the proposed development.
Lot 427-1	This lot currently houses two satellite receivers but is proposed for decommissioning, sale, andfuture Mixed-Use Residential Commercial development.	A Phase 1 ESA is recommended after the satellite receivers have been decommissioned and removed from the site and prior to sale and/or transfer of this parcel for development.

Property	Status & Anticipated Development Impacts	Recommendations
Parcels with Potential Contamination Issues (continued)		
City road right-of-ways (ROWs)	Two City road ROWs intersect with and/or borderformer WUTF pipeline infrastructure. The Land Use Plan proposes ROW #8006308 for development as Mixed-Use Residential/ Commercial and ROW #8034222 as Medium Density Residential.	A Phase 1 ESA is recommended prior to any site preparation and/or land disposition.
Pipeline easements	Situated within proposed Mixed-Use Residential/Commercial (C-141B and C-30B) and Medium Density Residential uses.	A Phase 1 ESA is recommended prior to any site preparation and/or land disposition.
C-141B	This parcel is proposed for Mixed-Use Residential/ Commercial development. The eastern portion intersects with the (assumed) former pipeline right-of-way.	A Phase 1 ESA is recommended prior toany site preparation and/or land disposition.

- *City of Whitehorse Approvals*

The adoption of the Master Plan by Council is the first step in a long sequence of approvals that the Valleyview South development partners will require from the City of Whitehorse. These include re-designations of parcels under the Official Community Plan (OCP), rezoning, temporary use permitting, and development approvals.

To fulfill the VSMP's Land Use Plan, several land holdings will need to be redesignated under the OCP, including:

- Portions of Lots 12 and 431 – from Greenspace to Residential – Urban; and
- A portion of the unsurveyed YG area in the south – from Residential – Urban to Greenspace.

The OCP allows for temporary gravel extraction for the purposes of site preparation. The process for temporary extraction is still under development, but the current understanding is that the adoption of the Master Plan will allow City administration to issue development permits for the relevant VSMP partners to pursue temporary extraction, subject to terms and conditions.

Once extraction of part or all the area is completed to the City's satisfaction, a development agreement will be negotiated and signed between each Valleyview South development partner and the City as a condition of subdivision and eventual transfer of roads, utilities, and public space to the City. The draft plan of subdivision will be reviewed for compliance with this Master Plan and the *Subdivision Control Bylaw* (i.e., 10% public land dedication) and the approved draft plan will allow detailed engineering to proceed. Due to KDFN and TKC's inability to transfer ownership of Settlement Lands, an alternate arrangement will also need to be captured in the agreement between the two governments for public land dedication, per the *Subdivision Control Bylaw*.

Detailed engineering design will be reviewed by the City for assurance that it meets the Servicing Standards Manual. A construction completion certificate will be issued once the infrastructure is developed, followed by a warranty period and final acceptance certificate, which triggers the transfer of the new land and infrastructure by the City.

In addition to the development agreement, the City and First Nations will likely negotiate a service agreement setting out roles and responsibilities with respect to infrastructure and municipal service provision on Settlement Land parcels. This agreement will need to respect the principles set out within the Self Government Agreements. There is already precedent for this with the McIntyre subdivision, and the City's negotiations with Chu Níi Kwän Development Corporation around the pending Copper Ridge subdivision should provide further guidance.

7.2.2 Policies

1. A favourable YESAA assessment decision must be obtained prior to applying for rezoning. A confirmation letter from the Yukon Environmental and Socioeconomic Assessment Board will be required where a landowner claims that an assessment is not required.
    a. This Master Plan may be used in support of any YESAA application.

2. Ensure airport zoning regulations conform with rezoning and/or development proposals, including proposed building heights.

3. Consider the need for noise mitigation strategies at the time of rezoning.

4. Require an Environmental Site Assessment ruling out the presence of contamination prior to rezoning for any parcels deemed to have contamination potential, as set out in Table 10 above.

5. Prior to rezoning areas subject to designation under the Yukon Contaminated Sites Registry, require a Certificates of Compliance from YG Environment confirming adherence to any advice or requirements under the Yukon Contaminated Sites Regulation to allow for the proposed development to proceed.

6. For any areas subject to a Certificates of Compliance, require documentation from YG Environment at the cessation of gravel extraction and/or regrading confirming that:
    a. The landowner has undertaken contaminant testing for any areas identified in the Certificate as being of potential concern and provided these results to YG Environment for review;
    b. Grading activities have not exposed new areas of potential concern;
    c. Minimum standards are maintained between any contamination and where a person could be exposed, including building foundations and trenches for buried infrastructure; and,
    d. The relevant Certificate/s of Compliance is/are still valid.

7. If required by the post-grading status of areas subject to a Certificate of Compliance, consider imposing restrictions on built form to ensure the required minimum vertical separation between any contamination at depth and the intended land use is achieved.

8. Consider other recommendations summarized in Table 10 during the more detailed planning, rezoning and/or subdivision approval stage, as appropriate.

9. Ensure that other regulatory requirements are met during the rezoning, and subdivision approval stage, as appropriate.

7.3 Development Coordination and Phasing

7.3.1 Overview

The Phasing Concept in Appendix B4 spatially organizes the Valleyview South area into development areas, or phases, in which site preparation (i.e., clearing, gravel extraction, and regrading) and infrastructure installation can be jointly achieved. The concept distinguishes development areas that can proceed independently from those that are dependent on grading and infrastructure installation from another phase. These phases are highly conceptual and will be adjusted as the development partners undertake coordinated grading plans that provide finer-grained insight. Refer to Table 11 for further details.

Table 11. Proposed Valleyview South development phases

Phase	Land Parcels	Description	Pre-Requisite Phase
A	C-117B	• Minor grading/gravel extraction • Mixed-Use Commercial/Residential Urban Centre • Hamilton Boulevard connection (at the Canada Games Centre) • Sumanik Drive roundabout • Small stormwater management facility • Internal roads and active transportation infrastructure	• None
B	Lot 430 C-141B (west)	• High Density Residential, Mixed-Use Commercial/Residential, and Parks/Greenspace • Gravity sanitary connection to Hamilton Boulevard • Roundabout at McIntyre Drive, internal roads, and active transportation infrastructure • Small stormwater management feature (if required)	• None
C	Lot 12 Lot 262-2 Lot 429 Lot 430 Lot 431 C-30B (north)	• Major grading/gravel extraction • Medium Density Residential, Public/Institutional, and Parks/Greenspace • Lift station and forcemain • Small stormwater management facility • Powerline realignment and/or reconfiguration • Alaska Highway road connection (and subsequent closure of Sumanik Drive east of Valleyview Drive) • Internal roads and active transportation infrastructure	• None
D	C-141B (east)Lot 429 Lot 430	• Major grading/gravel extraction • Medium/High Density Residential, Mixed-Use Commercial/Residential, and Parks/Greenspace • Small stormwater management facility Internal roads and active transportation infrastructure	• Phase C
E	C-30B (south) Lot 426 Lot 427 Lot 427-1 Lot 438	• Major grading/gravel extraction (C-30B) • Mixed-use commercial/residential (C-30B) • Mixed-use development and/or greenspace (YG/City) • Satellite dish relocation (Lot 427-1) • Internal roads and active transportation infrastructure	• Phase C
F	Lot 429 Lot 430 YG land	• Major grading/gravel extraction • Low density residential and parks • Internal roads and active transportation infrastructure	• Phase D

7.3.2 Policies

1. The Phasing Concept in Appendix B4 presents a high-level spatial framework to achieve the City's objective of ensuring site preparation in the Valleyview South area does not advance too far ahead of development. Landowners may exercise flexibility around how they phase development so long as their plans generally achieve the Phasing Concept's objectives.

2. Development of portions of an indicated phase may proceed in isolation of the remaining portions,

particularly in the case where multiple landowners' parcels are included in the same phase.
    a. The exception is where one landowner's development plans are dependent on shared infrastructure that must be installed in advance on neighbouring land parcels.

3. Multiple phases may be undertaken concurrently, but only where any pre-requisite phases are sufficiently advanced.
    a. Consider, where practicable, requiring subdivision approval on a pre-requisite phase (or phase portion) prior to permitting the initiation of site preparation for another phase (or phase portion); and,
    b. Where 7.3.2.3a is not practical or creates undue hardship for landowners, require the completion of rough grading and major infrastructure installation prior to the initiation of clearing, gravel removal, and regrading for another phase (or phase portion).

4. The Phasing Concept in Appendix B4 outlines a general approach to achieve the City's objective of allowing gravel extraction and regrading to proceed while ensuring these activities do not outpace development itself. Landowners may exercise some flexibility around how they organize or phase development so long as their plans generally align with the Phasing Concept's objectives.

5. Development phases may overlap, provided that:
    a. Site preparation (i.e., clearing, gravel extraction, and rough grading) are complete for one phase prior to the initiation of site preparation for subsequent the next phase; or
    b. All necessary infrastructure are complete for one phase prior to the initiation of installing infrastructure on the subsequent phase

6. Consider opportunities to coordinate phasing between different landowners to maximize development efficiencies and minimize unnecessary infrastructure development costs.

7. Ensure that the servicing needs of future development on adjoining and/or interdependent parcels is considered during the engineering review of near-term development.

8. Explore opportunities to minimize infrastructure redundancies between land parcels and development phases.

9. Facilitate the future development of Lot 427-1 by working with the landowner to identify a suitable alternative site for the satellite dishes and assisting with the post-decommissioning land disposition.

7.4 Development Financing

7.4.1 Overview

The VSMP development partners have engaged in preliminary discussions around how to navigate the dual challenge of different development timeframes and cost sharing for shared infrastructure. The final arrangement may be precedent setting and require the bridging of a policy gaps.

Financing agreements will need to address cost sharing for the considerable project administration and consulting work that is yet to come, including detailed engineering design. One of the most challenging issues to navigate in this respect is the fair attribution of capital costs to each VSMP development partner.

7.4.2 Policies

1. Prioritize the development of policy and/or other mechanisms to address how “latecomer” landowners/developers will contribute to the costs of shared infrastructure installed in earlier development phases.

2. While developing cost sharing mechanisms in 7.4.2.1, consider issues of financial capacity and equity as well as the role of public governments in providing a mechanism for financial transactions between themselves, First Nation, and/or private landowners.

3. Develop a framework to allocate shared infrastructure costs among landowners in an equitable manner.

7.5 Next Steps

7.5.1 Overview

The implementation of this Master Plan is anticipated to occur over the next 15-20 years, which started with the document’s approval by City Council in May 2024 and ending with the final release of lots to the marketplace. Due to the significant complexity posed by multiple landowners with different development plans, let alone changing political priorities and market conditions, the Master Plan does not attempt to set out next steps on a medium or long-term basis. Instead, it focuses on the near-term actions that will be critical to maintaining the momentum and spirit of cooperation that the planning process has generated and the order phasing of development without proscribing development timelines.

7.5.2 Policies

1. Consider the establishment of a forum for continued City and Valleyview South development partner discussions to help ensure effective Plan implementation.

2. Continue to work with partner First Nations to:
    a. Address outstanding issues around heritage resource protection in Valleyview South; and
    b. Explore the potential for and/or identify a suitable First Nation inspired neighbourhood name.

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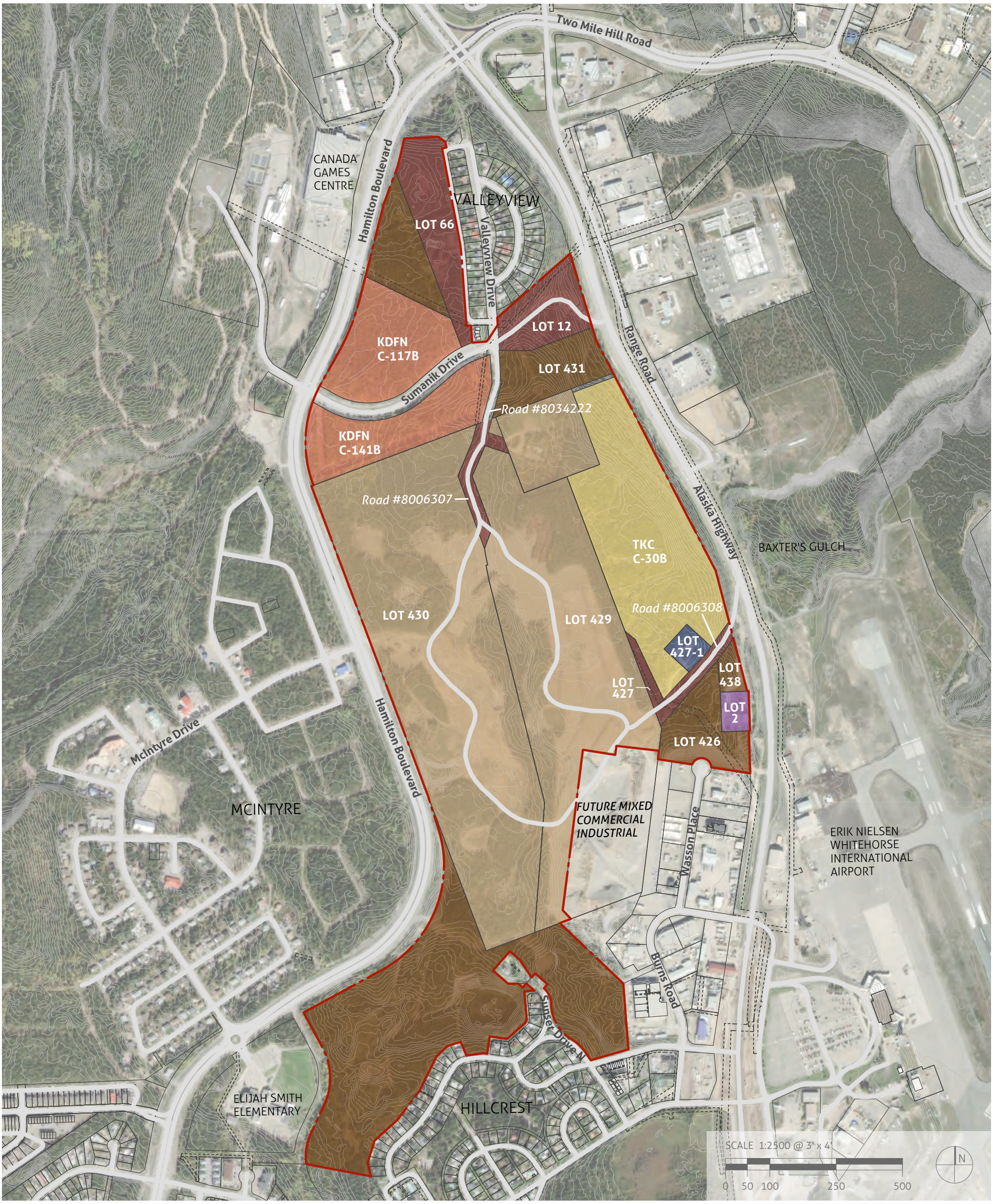
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APPENDIX A

Site Context Maps

Valleyview South Master Plan

A1. Site Ownership



- 1 m Contours
- Study Area Boundary
- Parcel
- Easement
- Road
- Utility
- City of Whitehorse
- Government of Yukon
- Private Ownership
- Kwanlin Dün First Nation
- Ta'an Kwäch'än Council
- Institutional

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Valleyview South Master Plan

A2. Environmental & Special Places



- Study Area Boundary
- Parcel
- Easement
- Road
- Viewpoint
- Environmentally Sensitive Areas
- Informal Trails
- Designated Contaminated Area
- Sub-surface Contamination of Potential Concern*
- Archaeological/Historical Resource

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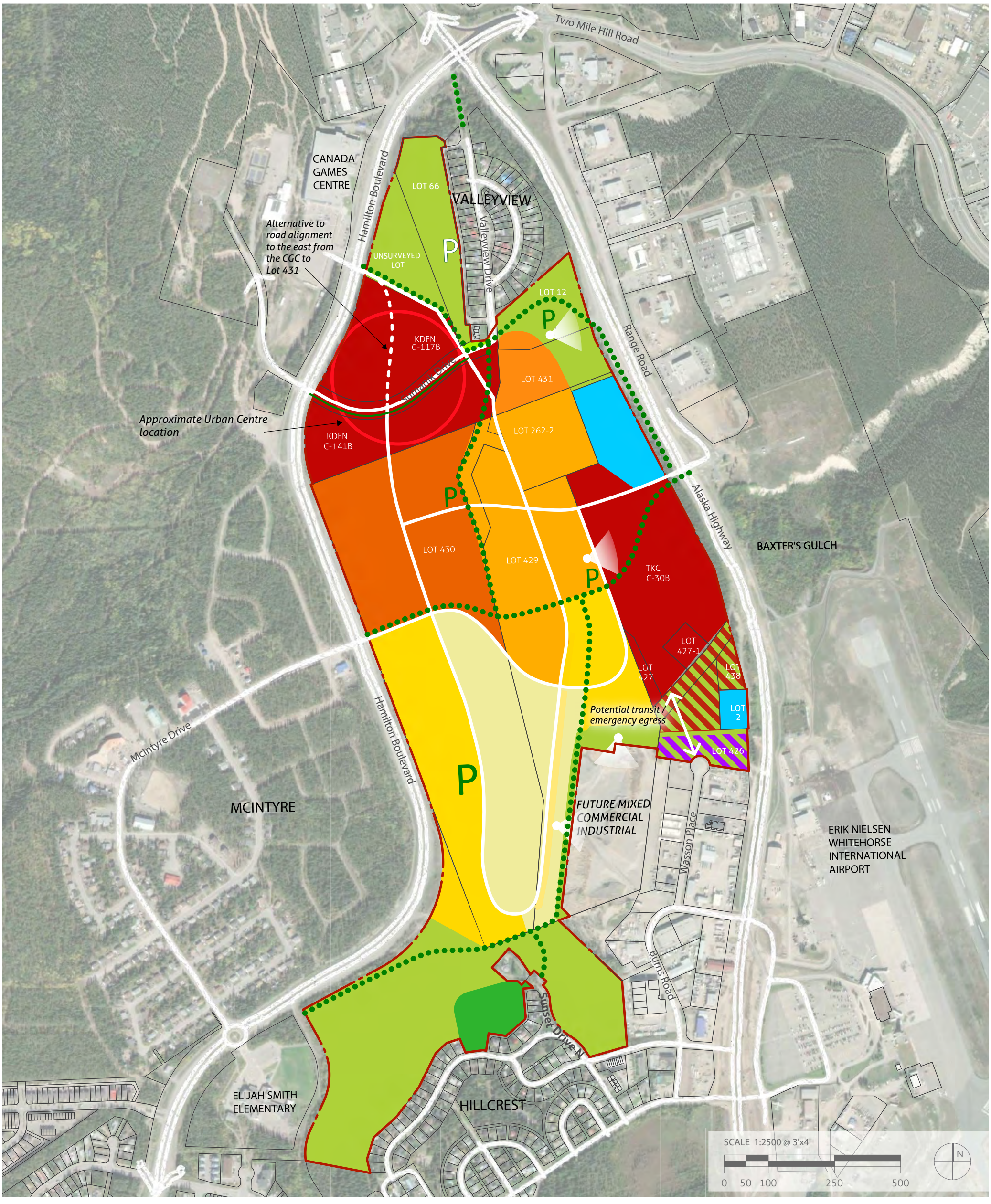
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APPENDIX B

Master Plan Concepts

Valleyview South Master Plan

B1. Land Use Plan



- Study Area Boundary
- Land Parcels
- Road
- Mixed-Use Industrial Commercial
- Mixed-Use Residential Commercial
- Public / Institutional
- Parks / Green Space
- Environmental Protection
- P Potential Park Location
- P Existing Park Location
- Multi-Use Pathway / Corridor

Residential (gross)

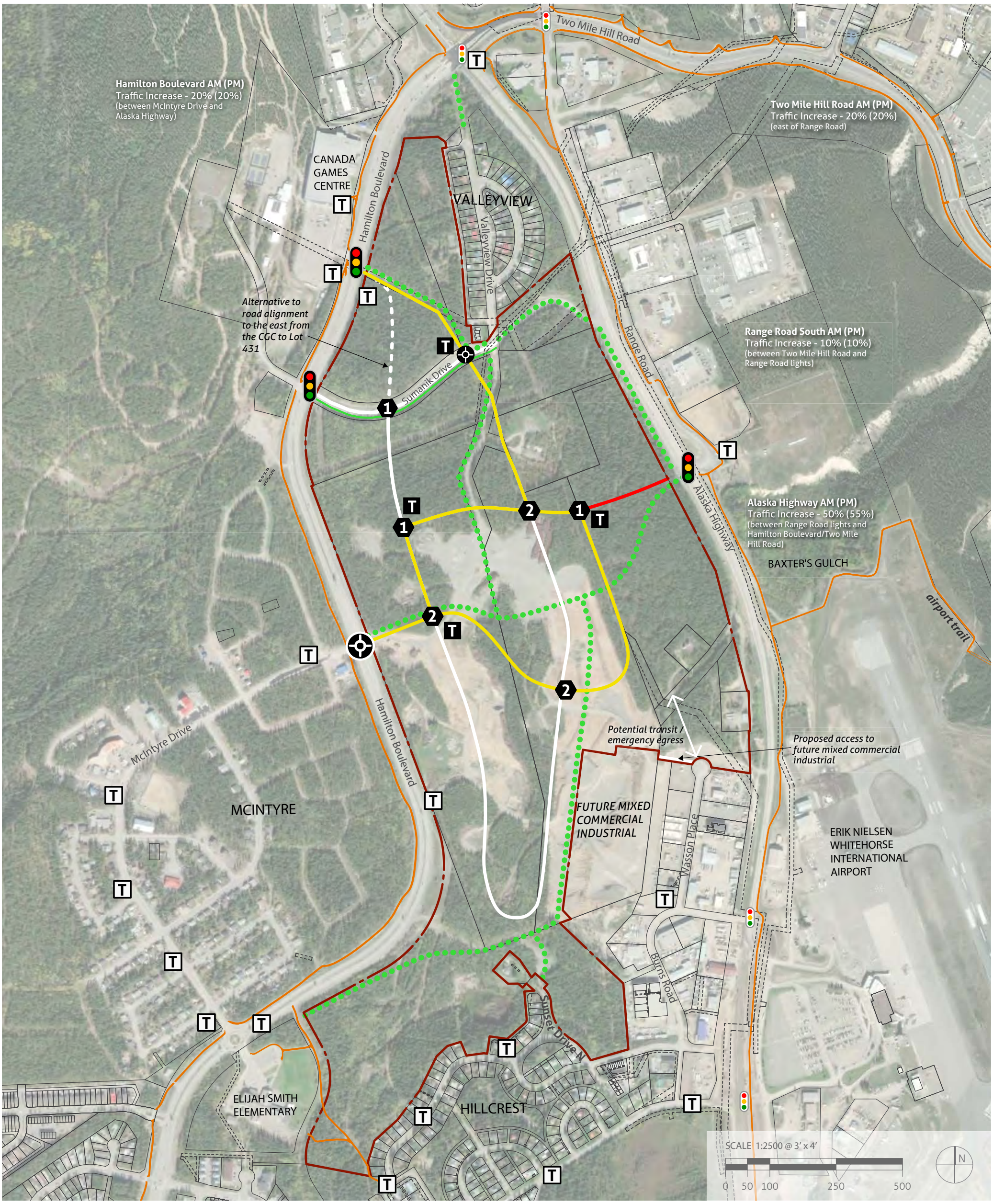
- High Density (55 units/ha)
- Medium Density (20 units/ha)
- Low Density - Small Lots (10 units/
- Low Density - Large Lots (8 units/h
- Potential Viewpoint

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Valleyview South Master Plan

B2. Transportation



- Study Area Boundary
- Parcel
- Easement
- Local Road
- Minor Urban Collector (22.5m)
- Major Urban Collector
- Signalized Intersection
- Signalized Intersection Upgrade
- Multi-Use Paved Pathway (Existing)
- Multi-Use Paved Pathway (New)
- Pedestrian Improvements
- Multi-Way Stop
- Major Roundabout
- Minor Roundabout
- Potential Transit Stop Location
- Existing Transit Stop

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Valleyview South Master Plan

B3. Servicing



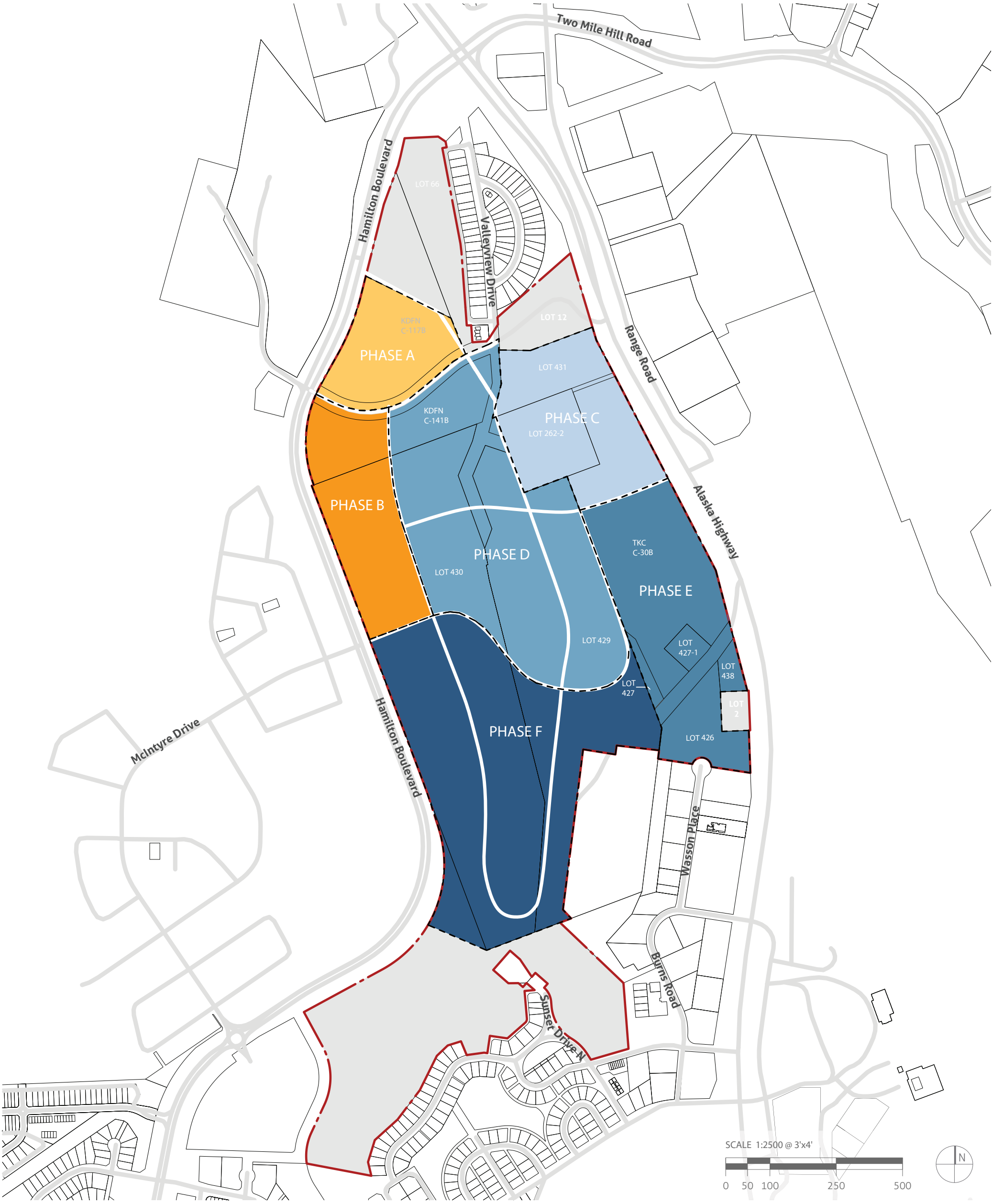
- Study Area Boundary
- Parcel
- Easement
- Power Distribution Line
- Approximate Start/End of Power Pole Reinstallation
- Potential Poweline Reroute
- Water Main / Reservoir
- Sanitary Main / Lift Station
- Potential Water Main Tie-in
- Potential Sanitary Main Tie-in
- N New Lift Station and Sanitary Force
- New Sanitary Gravity Main
- Grading Direction
- Potential Stormwater Management Facility
- Potential Utility Corridor

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Valleyview South Master Plan

B4. Phasing Concept



Study Area Boundary
Parcel
Roads
Phase Boundary
No Significant Change

Can Proceed Independently
Phase A
Phase B
Phase C

Dependent on Previous Phases
Phase D (Phase C required)
Phase E (Phase C required)
Phase F (Phase D required)

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APPENDIX C

Neighbourhood Character Examples

Figure 1. Neighbourhood character examples – residential





















Figure 2. Neighbourhood character examples – mixed-use commercial/residential and Urban Centres













Figure 3. Neighbourhood character examples – parks, open space, and trails
















COMMONS







Figure 4. Neighbourhood character examples – utilities



Proposed City of Calgary lift station design using wood and natural design elements (above and below)





Landscaped bioswale feature (middle right) and wet stormwater pond (bottom right)



APPENDIX D

Transportation Impact Assessment

Draft Report V2

Valleyview South Master Plan
Transportation Impact Assessment Study

November 22, 2023

MH# 2203772.00

Presented to:

GROUNDSWELL PLANNING
Jane Koepke
Principal
19 Donjek Road
Whitehorse, Yukon, Y1A3P8
T: 867 335 3346
E: janek@northwestel.net

Presented by:

MORRISON HERSHFIELD
Stanley Li, M.Sc., P.Eng., PTOE
Transportation Engineer
Morrison Hershfield Limited
205 Black Street, Suite 210
Whitehorse, Yukon, Y1A 2M8
T: 867 456 4747
E: sli@morrisonhershfield.com



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APPENDIX E – SYNCHRO REPORTS – INTERSECTION IMPROVEMENTS (2040 TOTAL CONDITION)
APPENDIX F – SYNCHRO REPORTS – CLOSURE OF SUMANIK DRIVE BETWEEN VALLEYVIEW DRIVE AND ALASKA HIGHWAY
APPENDIX G – VSMP LAND USE PLAN
APPENDIX H – VSMP TRANSPORTATION CONCEPT PLAN

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Project Team:

Groundswell Planning
Jane Koepke
Project Manager

Morrison Hershfield
Stanley Li, M.Sc., P.Eng., PTOE
Traffic Lead
Andres Baez, M.U.P., P.Eng.
Senior Transportation Planner
Chao Qi, M.Sc., M.Eng., EIT
Transportation Planner

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Revision History

Rev.	Issue Date	Description
R0	October 13, 2023	Transportation Impact Assessment Draft Report
R1	November 22, 2023	Transportation Impact Assessment Draft Report V1

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1.0 Introduction

Morrison Hershfield Limited was retained by Groundswell Planning to conduct a Traffic Impact Assessment (TIA) study for the proposed new development envisioned as part of the Valleyview South Master Plan (VSMP) being led by the City of Whitehorse on behalf of the multiple private, government and First Nation landowners involved.

1.1 Study Scope & Methodology

The traffic impact assessment study was developed following the guidelines and standards from best practices. The main purpose of the traffic impact study is to determine what the impacts may be from the proposed development and to determine what measures may be required to mitigate adverse impacts (if any) and to allow the roadway network to provide a satisfactory Level of Service (LOS). The following scenarios were evaluated in the study:

- 2023 Existing Scenario
- 2040 Full Build Out Scenario
- 2040 Full Build Out Scenario with Sumanik Drive Closure between Valleyview Drive and Alaska Highway

Traffic analyses were conducted using the methods and procedures of the Highway Capacity Manual (HCM) and Trafficware's Synchro 11 software suite for intersections. Typical measures of effectiveness are delay, volume-to-capacity ratio (v/c ratio) and LOS.

The v/c ratio is a ratio of the factored volume to the calculated capacity. It is generally accepted that movements experiencing v/c ratios higher than 0.90 are indicative of improvements needed.

The LOS is determined as a function of the average delay per vehicle. The criteria upon which LOS is determined differs for signalized intersections versus unsignalized intersections. Table 1 shows the relationships between LOS and average delay per vehicle for signalized and unsignalized intersections. Movements experiencing LOS of E or F will require improvements.

TABLE 1. LEVEL OF SERVICE CRITERIA OF SIGNALIZED AND UNSIGNALIZED INTERSECTIONS

Level of Service (LOS)	Average Delay for UNSIGNALIZED Intersection Movements	Average Delay for SIGNALIZED Intersection Movements
A	0 – 10 sec. per vehicle	0 – 10 sec. per vehicle
B	> 10 – 15 sec. per vehicle	> 10 – 20 sec. per vehicle
C	> 15 – 25 sec. per vehicle	> 20 – 35 sec. per vehicle
D	> 25 – 35 sec. per vehicle	> 35 – 55 sec. per vehicle
E	> 35 – 50 sec. per vehicle	> 55 – 80 sec. per vehicle
F	> 50 sec. per vehicle	> 80 sec. per vehicle

In addition to delay, LOS and v/c ratio measures, queues for critical movements (if any) are also evaluated to ensure that the 95th percentile queue does not exceed the existing storage length or impact upstream intersections.

1.2 Study Area Description

The study area is situated south of the Valleyview neighbourhood, northwest of the downtown core of Whitehorse, YT, as shown in Figure 1. The planning area is to the northwest of Whitehorse downtown and is bounded by the Alaska Highway to the east and Hamilton Boulevard to the west.

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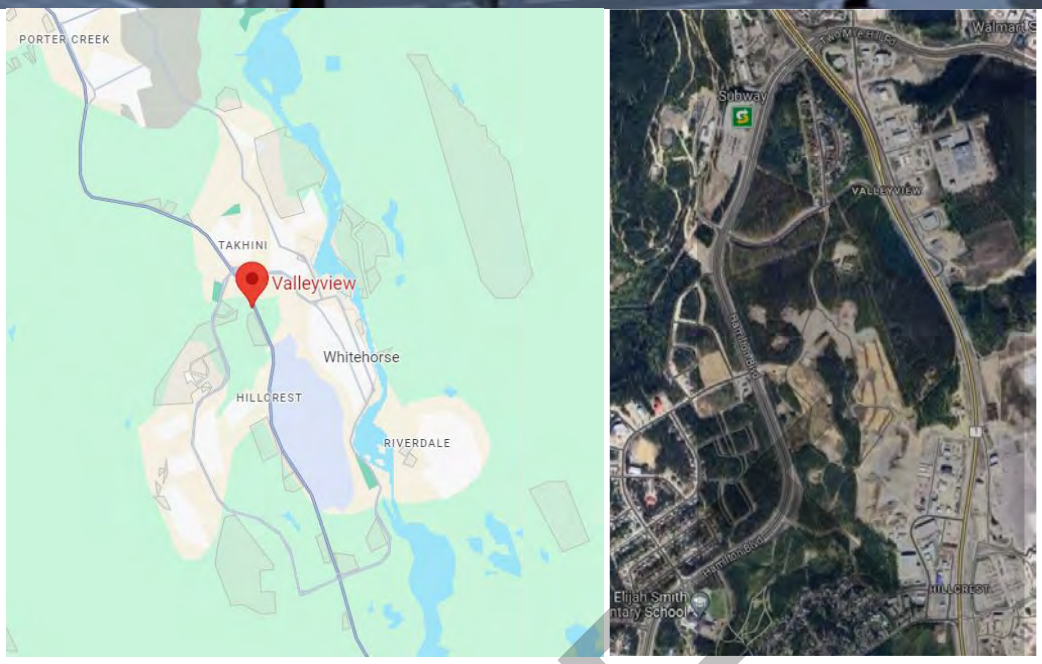


FIGURE 1. LOCATION OF THE PROPOSED DEVELOPMENT SITE

1.3 Existing Road Network Description

The four-lane Alaska Highway is a designated freeway with a posted speed of 60 km/h running north-south to the east of the planning area.

Hamilton Boulevard / Two Mile Hill Road is a four-lane major arterial road with a posted speed of 60 km/h to the west and north of the site.

Sumanik Drive bisects the northern portion of the planning area and is a two-lane collector road running east-west with a posted speed of 50 km/h.

McIntyre Drive is a two-lane collector road intersecting with Hamilton Boulevard to the west of the site.

Range Road is a two-lane collector road intersecting with the Alaska Highway to the east of the site.

In addition, several internal roads within the site will be provided serving as collector roads connecting various land parcels and the external road network described above.

Table 2 below summarizes the information of the above-mentioned roadways surrounding the study site.

TABLE 2. ROADWAYS SURROUNDING THE PROPOSED DEVELOPMENT SITE

#	Name	Classification	Configuration	Speed Limit
1	Alaska Highway	Freeway	Multi-lane divided	60 kph
2	Hamilton Boulevard / Two Mile Hill Road	Arterial	Multi-lane divided	60 kph
3	Sumanik Drive	Collector	Two-lane undivided	50 kph
4	McIntyre Drive	Collector	Two-lane undivided	50 kph
5	Range Road	Collector	Two-lane undivided	50 kph
6	Internal Collectors	Collector	Two-lane undivided	50 kph

The typical intersections of interest of this TIA include:

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- #1 McIntyre Drive & Hamilton Boulevard (unsignalized T-intersection, four-way roundabout in the future).
- #2-5 Internal Intersections within the site (unsignalized intersection / roundabout).
- #6 Hamilton Boulevard & Canada Games Centre (CGC) Access (signalized T-intersection, four-way signalized intersection in the future).
- #7 Hamilton Boulevard & Sumanik Drive (four-way signalized intersection).
- #8 Alaska Highway & Hamilton Boulevard (four-way signalized intersection).
- #9 Alaska Highway & Range Road (signalized T-intersection, four-way signalized intersection in the future).
- #10 Two Mile Hill Road & Range Road (four-way signalized intersection).
- #11 Alaska Highway & Sumanik Drive (unsignalized T-intersection limited to right-in/right-out).

The following figure (Figure 2) illustrates the layout of the road network surrounding the VSMP area.



FIGURE 2. ROAD NETWORK SURROUNDING THE PROPOSED SITE

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2.0 Baseline Conditions (2023 Existing)

2.1 Traffic Volumes

The turning movement counts of the existing intersections are obtained from the City of Whitehorse for the traffic analysis. The provided traffic volume has been adjusted to the current year (2023) volume conditions with an annual growth rate of 1.3%. The estimation process of the background traffic growth rate can be seen in the following Table 3.

TABLE 3. BACKGROUD TRAFFIC GROWTH RATE ESTIMATION

Whitehorse 2021 Population	28201 (Statistics Canada)	
Whitehorse 2040 Population	41084 (estimated 2% annual growth)	
Estimated City-wide population growth	12883 (2040 minus 2021's population)	
Valleyview area population grov	4459 (proposed by the development)	Prorated to an annual 0.7% growth rate
Population growth of other neighbourhoods	8424 (citywide growth minus Valleyview growth)	Prorated to an annual 1.3% growth rate

In sum, the 2023 existing AM and PM peak hour traffic volumes are illustrated in the following Figure 3.

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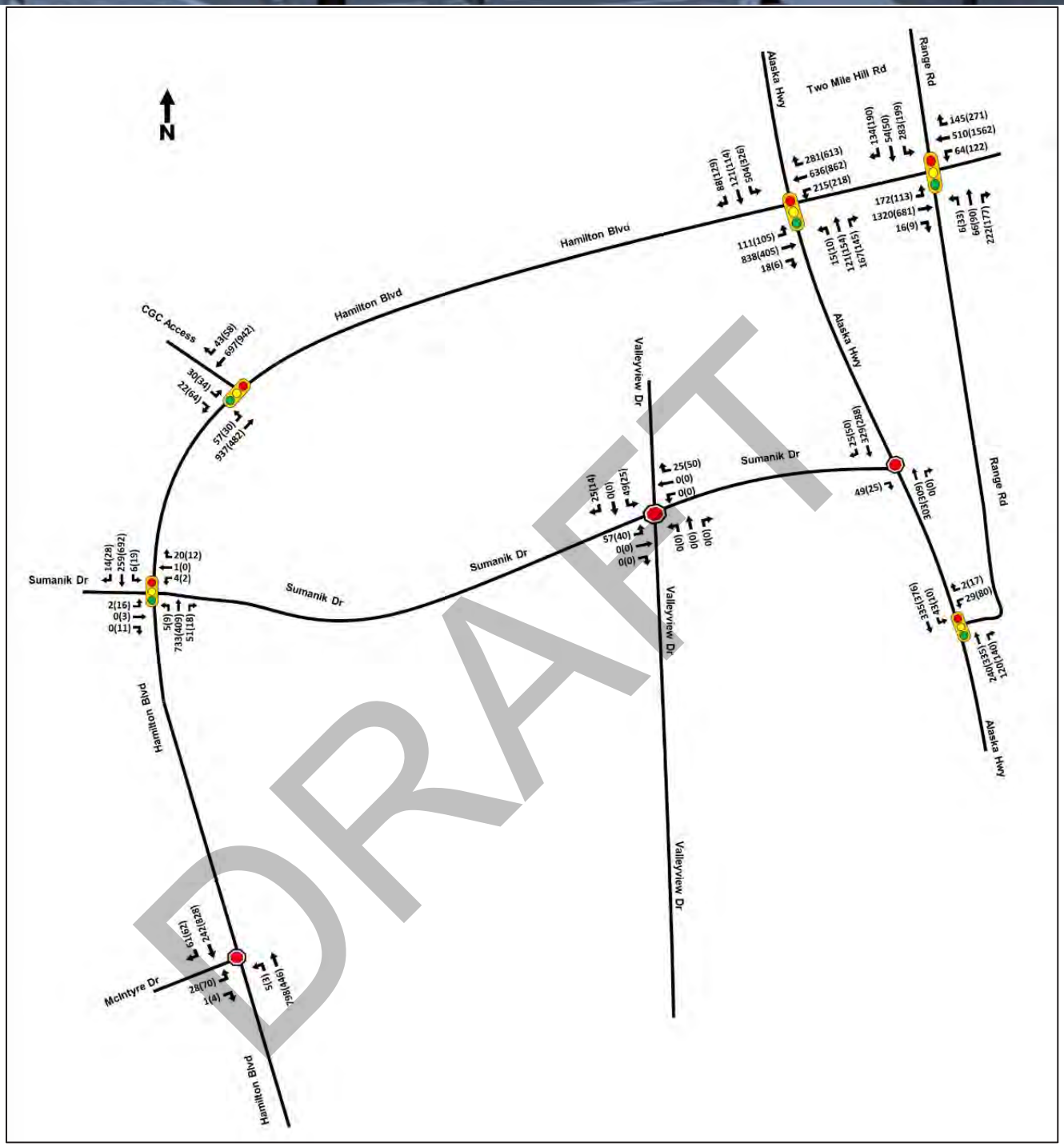


FIGURE 3. 2023 EXISTING TRAFFIC VOLUME – WEEKDAY AM PEAK (PM PEAK)

2.2 Capacity Analysis

Synchro/SimTraffic software version 11 is used to conduct the capacity analysis for the study intersections under 2023 existing condition. The intersections are generally performing satisfactorily with acceptable LOS and v/c ratios. The intersections of Alaska Highway & Hamilton Boulevard and Two Mile Hill Road & Range Road are relatively busier than the other intersections with a lower LOS of C and higher delays and v/c ratios for both the AM and PM peak hours.



Additionally, the westbound left turn movement at Two Mile Hill Road & Range Road intersection is experiencing a LOS E with a relatively high delay of 71.2 s in the AM peak hour. Detailed Synchro reports are included in Appendix A.

TABLE 4. 2023 EXISTING CONDITION INTERSECTION PERFORMANCE (WEEKDAY AM AND PM PEAKS)

Intersections			AM Peak Hour				PM Peak Hour			
			LOS	Delay (s)	Max v/c	95th Queue (m)	LOS	Delay (s)	Max v/c	95th Queue (m)
#1 McIntyre Drive & Hamilton Boulevard	Intersection Overall		A	0.7	0.50	-	C	23.2	0.86	-
#6 Hamilton Boulevard & CGC Access	Intersection Overall		A	8.1	0.38	-	A	9.2	0.44	-
#7 Hamilton Boulevard & Sumanik Drive	Intersection Overall		A	2.0	0.26	-	A	3.5	0.27	-
#8 Alaska Highway & Hamilton Boulevard	Intersection Overall		C	34.2	0.85	-	C	25.0	0.69	-
#9 Alaska Highway & Range Road	Intersection Overall		A	4.0	0.18	-	A	6.7	0.31	-
#10 Two Mile Hill Road & Range Road	Intersection Overall		C	22.0	0.79	-	C	22.6	0.84	-
	Critical Movements	WBL	E	71.2	0.73	34.7	-	-	-	-
#11 Alaska Highway & Sumanik Drive	Intersection Overall		A	0.7	0.14	-	A	0.4	0.12	-

Note: Internal intersections (ID #2-5) within the site are not included the 2023 existing condition analysis.

3.0 Proposed Development

3.1 Proposed Development

As per the VSMP final land use plan (Appendix G), the development consists of multiple land parcels primarily designated for residential uses. Additionally, certain land parcels incorporate mixed-use developments with residential and commercial purposes, along with institutional land uses. Table 5 and Table 6 provide summaries of the land uses for each land parcel.

TABLE 5. PROPOSED LAND USES OF VSMP DEVELOPMENT

Parcel/property	Gross Parcel Size (ha)	residential areas (net)				areas - mixed use			# of net hectares for institutional uses
		low density (ha)	low-med density (ha)	medium density (ha)	high density (ha)	total hectares	max buildable area	GFA for commercial (m2)	
Tank Farm (Lots 429/430)	50.6	8.7	8.5	6.9	8.2				
Lot 262-2	3.34								
KDFN C-117B - mixed use	5.23					3.40	3.40	5348	
KDFN C-141B - mixed use	5.01					3.26	3.26	5123	
Lot 431 (regraded portion)	1.5			0.975					
YG/City land (north of C-117B)	3.2								1.12
TKC C-30B - mixed use	9.32					6.06	6.06	9530	
TKC C-30B - public/institutional	3								1.05
Total						**12.71**		**20000**	

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Note that, for the purposes of the TIA, the portions of First Nation Settlement Land not allocated for public/institutional use were assumed to be mixed use residential-commercial, with ground floor commercial and one to two stories of residential above. In reality, the future of these mixed-use areas is not well defined at present.

TABLE 6. PROPOSED UNIT & POPULATION COUNTS OF VSMP DEVELOPMENT

	High density units	Pop'n (high density)	Medium density units	Pop'n (med density)	Low-med density units	Pop'n (low-med density)	Low density units	Pop'n (low density)	Totals	Units per gross ha	Population subtotals
Tank Farm (Lots 429/430)	615	1439	193.2	452	127.5	298	87	204	1022.7	20.21	2393.12
Lot 262-2	116	271	104	243					220	65.87	514.80
KDFN C-117B - mixed use			170	398					170	32.5	397.74
KDFN C-141B - mixed use			163	381					163	32.5	381.01
Lot 431 (regraded portion)			27.3	64					27.3	28.0	63.88
TKC C-30B (residential portion of mixed use)			303	709					303	32.5	708.79
Total units by housing type	731		960.2		127.5		87		**1905.7**		
Population by housing type		1711		2247		298		204	**4459**		

3.2 Trip Generation (Weekday AM and PM Peak Hours)

The ITE Trip Generation Manual 11th Edition is used to estimate the trips generated by the proposed development. Table 7 summarizes the estimated trip generation for each land parcel resulting from the development. The ITE trip generations used for the study include:

- Land Use: 210 - Single-Family Detached Housing. A single-family detached housing site includes any single-family detached home on an individual lot.
- Land Use: 220 - Multifamily Housing (Low-Rise): Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors (levels).
- Land Use: 221 - Multifamily Housing (Mid-Rise): Mid-rise multifamily housing includes apartments and condominiums located in a building that has between four and 10 floors of living space.
- Land Use: 230 Low-Rise Residential with Ground-Floor Commercial: Low-rise residential with ground-floor commercial is a mixed-use multifamily housing building with two or three floors of residential living space and commercial space open to the public on the ground level.

The traffic volumes of each land parcel are calculated based on the number of units of each land use type within the parcel and the associated ITE trip generation formulas. For example, the traffic volumes generated from the Tank Farm (Lots 429/430) parcel are estimated using the following three land use types within the parcel:

- 215 (127.5 + 87) low and low-medium density units (ITE Land Use 210) and associated ITE trip generation formulas
- 193 medium density units (ITE Land Use 220) and associated ITE trip generation formulas
- 615 high-density units (ITE Land Use 221) and associated ITE trip generation formulas

Then, the traffic volumes generated from this particular land parcel are calculated by adding the estimated volumes of all land use types together for each volume category. These volume categories include daily traffic volumes, a.m. peak hour traffic volumes (total, entering the site, and exiting the site), p.m. peak hour traffic volumes (total, entering the site, and exiting the site). The results can now be distributed to the road network based on the methodology discussed in Section 3.3.

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TABLE 7. DEVELOPMENT TRIP GENERATION - WEEKDAY AM AND PM PEAK HOURS

Proposed Land Uses	Units	ITE Vehicle Trip Generation Rates (peak hours are for peak hour of adjacent street traffic unless highlighted)										Site Plan Provided Units	Total Generated Trips			Total Distribution of Generated Trips					
Former Tank Farm (Lots 429/430)		ITE comparable Land Use	ITE units	On a	Daily	AM	PM	AM In	AM Out	PM In	PM Out		Daily	AM Hour	PM Hour	AM In	AM Out	Pass-By	PM In	PM Out	Pass-By
Proposed Development Area																					
Low and Low-Med Density Units (Single-Detached Houses)	Dwelling Units	Single-Family Detached Housing (210)	Dwelling Units	weekday	Ln(T)=0.92Ln(X)+2.71	T=0.71(X)+4.8	Ln(T)=0.96Ln(X)+0.20	25%	75%	63%	37%	215 (128 'low-med density' + 87 'low density')	2,103	157	212	39	118	0	134	78	0
Medium Density Units (Townhouses)	Dwelling Units	Multifamily Housing Low-Rise (220)	Dwelling Units	weekday	T=6.41(X)+75.31	T=0.31(X)+22.85	T=0.43(X)+20.55	24%	76%	63%	37%	193	1,312	83	104	20	63	0	66	38	0
High Density Units (Multi-Storey Apartments)	Dwelling Units	Multifamily Housing Mid-Rise (221)	Dwelling Units	weekday	T=4.77(X)-46.46	T=0.44(X)-11.61	T=0.39(X)+0.34	23%	77%	61%	39%	615	2,887	259	240	60	199	0	146	94	0
												Total	6,302	499	556	119	380	0	346	210	0

Proposed Land Uses	Units	ITE Vehicle Trip Generation Rates (peak hours are for peak hour of adjacent street traffic unless highlighted)										Site Plan Provided Units	Total Generated Trips			Total Distribution of Generated Trips					
Lot 262-2		ITE comparable Land Use	ITE units	On a	Daily	AM	PM	AM In	AM Out	PM In	PM Out		Daily	AM Hour	PM Hour	AM In	AM Out	Pass-By	PM In	PM Out	Pass-By
Proposed Development Area																					
Medium Density Units (Townhouses)	Dwelling Units	Multifamily Housing Low-Rise (220)	Dwelling Units	weekday	T=6.41(X)+75.31	T=0.31(X)+22.85	T=0.43(X)+20.55	24%	76%	63%	37%	104	742	55	65	13	42	0	41	24	0
High Density Units (Multi-Storey Apartments)	Dwelling Units	Multifamily Housing Mid-Rise (221)	Dwelling Units	weekday	T=4.77(X)-46.46	T=0.44(X)-11.61	T=0.39(X)+0.34	23%	77%	61%	39%	116	507	39	46	9	30	0	28	18	0
												Total	1,249	94	111	22	72	0	69	42	0

Proposed Land Uses	Units	ITE Vehicle Trip Generation Rates (peak hours are for peak hour of adjacent street traffic unless highlighted)										Site Plan Provided Units	Total Generated Trips			Total Distribution of Generated Trips					
KDFN C-117B and Adjacent Public Land		ITE comparable Land Use	ITE units	On a	Daily	AM	PM	AM In	AM Out	PM In	PM Out		Daily	AM Hour	PM Hour	AM In	AM Out	Pass-By	PM In	PM Out	Pass-By
Proposed Development Area																					
Medium Density Units with Commercial	Dwelling Units	Low-Rise Residential with Ground-Floor Commercial - GFA (25-65k) (230	Dwelling Units	weekday	Not Provided**	0.57	0.46	23%	77%	65%	35%	170	1,213	97	78	22	75	0	51	27	0
YG/City land (north of C-117B)*													1,030	95	115	55	40	0	50	65	0
												Total	2,243	192	193	77	115	0	101	92	0

Proposed Land Uses	Units	ITE Vehicle Trip Generation Rates (peak hours are for peak hour of adjacent street traffic unless highlighted)										Site Plan Provided Units	Total Generated Trips			Total Distribution of Generated Trips					
KDFN C-141B		ITE comparable Land Use	ITE units	On a	Daily	AM	PM	AM In	AM Out	PM In	PM Out		Daily	AM Hour	PM Hour	AM In	AM Out	Pass-By	PM In	PM Out	Pass-By
Proposed Development Area																					
Medium Density Units with Commercial	Dwelling Units	Low-Rise Residential with Ground-Floor Commercial - GFA (25-65k) (230	Dwelling Units	weekday	Not Provided**	0.57	0.46	23%	77%	65%	35%	163	1,163	93	75	21	72	0	49	26	0
												Total	1,163	93	75	21	72	0	49	26	0

Proposed Land Uses	Units	ITE Vehicle Trip Generation Rates (peak hours are for peak hour of adjacent street traffic unless highlighted)										Site Plan Provided Units	Total Generated Trips			Total Distribution of Generated Trips					
Lot 431		ITE comparable Land Use	ITE units	On a	Daily	AM	PM	AM In	AM Out	PM In	PM Out		Daily	AM Hour	PM Hour	AM In	AM Out	Pass-By	PM In	PM Out	Pass-By
Proposed Development Area																					
Medium Density Units (Townhouses)	Dwelling Units	Multifamily Housing Low-Rise (220)	Dwelling Units	weekday	T=6.41(X)+75.31	T=0.31(X)+22.85	T=0.43(X)+20.55	24%	76%	63%	37%	27	248	31	32	7	24	0	20	12	0
												Total	248	31	32	7	24	0	20	12	0

Proposed Land Uses	Units	ITE Vehicle Trip Generation Rates (peak hours are for peak hour of adjacent street traffic unless highlighted)										Site Plan Provided Units	Total Generated Trips			Total Distribution of Generated Trips					
TKC C-30B		ITE comparable Land Use	ITE units	On a	Daily	AM	PM	AM In	AM Out	PM In	PM Out		Daily	AM Hour	PM Hour	AM In	AM Out	Pass-By	PM In	PM Out	Pass-By
Proposed Development Area																					
Medium Density Units with Commercial	Dwelling Units	Low-Rise Residential with Ground-Floor Commercial - GFA (25-65k) (230	Dwelling Units	weekday	Not Provided**	0.57	0.46	23%	77%	65%	35%	303	2,163	173	139	40	133	0	90	49	0
TKC C-30B - public/institutional*													450	120	126	110	10	0	13	113	0
												Total	2,613	293	265	150	143	0	103	162	0

*According to the provided site plan, the YG/City land north of C-117B will be used for public facility with 15 employees and average daily visitation of 500, and the institutional/public land of TKC C-30B will be used for administration building and multi-use facility with 100 employees and 125 average daily visitation. It is assumed that the AM Peak Hour Traffic equals to the number of employees (In) plus 8% of the daily visitation (In and Out); the PM Peak Hour Traffic equals to the number of employees (Out) plus 10% of the daily visitation (In and Out); the Daily Traffic equals to the sum of employee and daily visitation times 2.

** Some daily trip generation rates are not provided by ITE, in these cases, daily traffic is estimated using the above-mentioned AM peak hour to daily traffic ratio, which is 8%.

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3.3 Trip Distribution

Trip distribution is used to ascertain the directional percentages of vehicles entering and leaving the proposed site. To estimate trip distribution rate patterns, the city's employment projections for 2040 horizon year are considered, as detailed in Table 8, in accordance with the nature of the proposed development.

TABLE 8. TRIP DISTRIBUTION ASSUMPTIONS

Surrounding Road Network	Neighbourhoods	2040 Employment Projections	Proposed Trip Distribution from Subject Development
Alaska Highway North	Porter Creek, Kulan, Taylor, Crestview, Whistle Bend (half), Whistle Bend Bench (half), Hidden Valley, McPherson, Wilderness Area	2,697	9.75%
Alaska Highway South	Riverdale, Airport, Yukon Energy hydroelectric and battery storage facilities, Hillcrest Industrial, Hillcrest, West of Airport, South of Robert Service Way, Copper, Fox Haven, Pineridge, Spruce Hill, Wolf Creek, Mary Lake, Cowley Creek	6,125	22.13%
Two Mile Hill Road East	Downtown, Marwell	14,970	54.09%
Hamilton Boulevard South	McIntyre, Ingram, Arkell, Logan, Granger, Copper Ridge, South Residential Growth Area	1,550	5.6%
Range Road North	Range Rd & Two Mile Hill area, Takhini, Whistle Bend (half), Whistle Bend Bench (half)	1,973	7.13%
Canada Games Centre (CGC)	CGC	180	0.65%
Internal	Valleyview, Valleyview South	180	0.65%
	Total	27,675	100%

The traffic volume distribution of the VSMP development site when fully built-out is illustrated in Figure 4. It is essential to note that the Whitehorse Transportation Master Plan (TMP) proposes Hamilton Boulevard / Two Mile Hill Road to be an important transit corridor with transit signal priorities and more frequent transit services. According to the plan's projections, it is expected that public transit will accommodate approximately 15% of the overall traffic through the corridor, which includes both background and development-generated traffic, rather than private vehicles.

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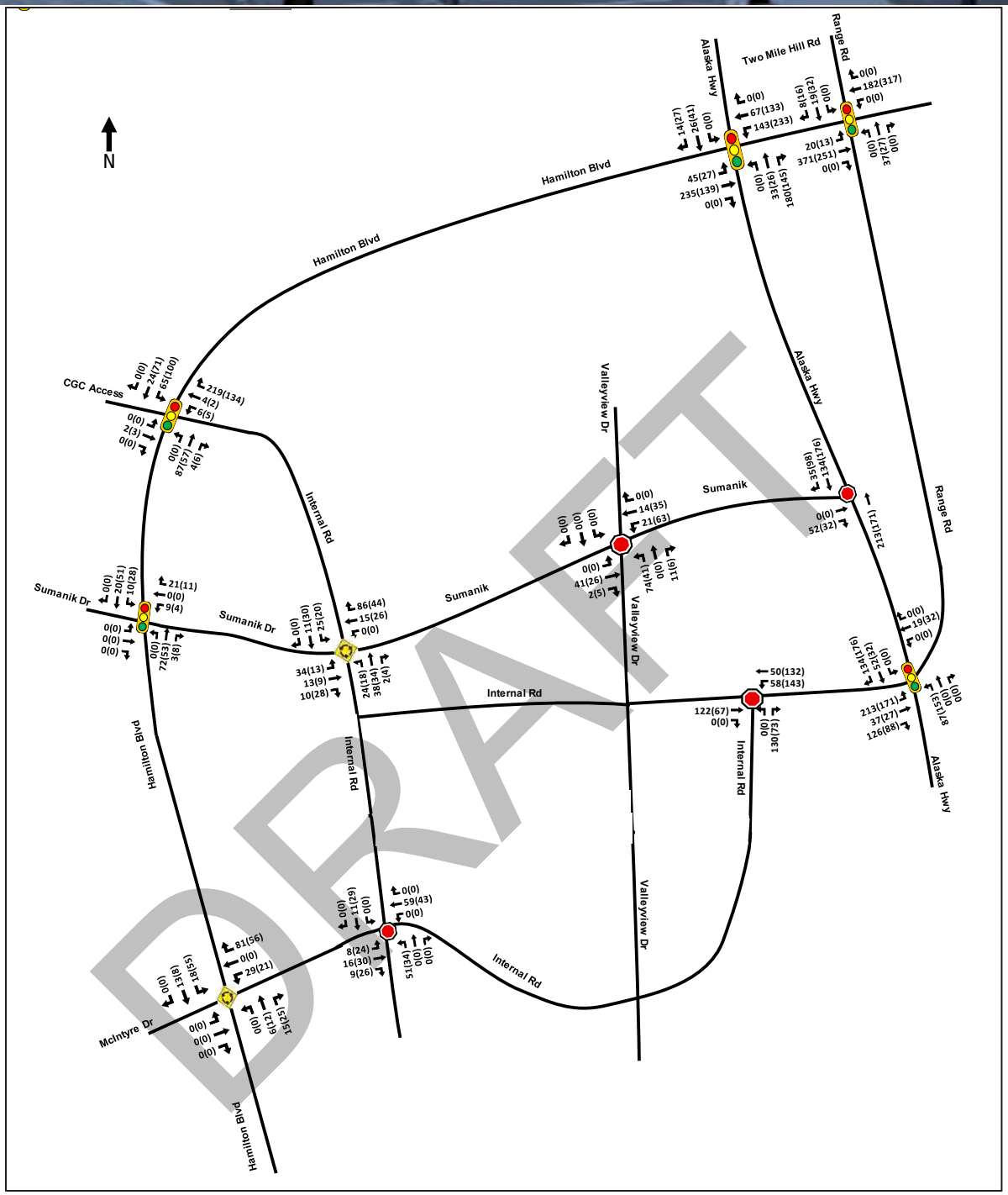


FIGURE 4. SITE GENERATED VEHICULAR TRIPS – 2040 WEEKDAY AM PEAK (PM PEAK)

4.0 2040 Weekday Peak Hours - Background Traffic Condition

4.1 2040 Weekday Peak Hours - Background Condition Traffic Volumes

Background traffic volumes represents the growth in traffic over time that is unrelated to the proposed development. For the 2040 horizon year, background traffic volumes are projected using a 1.3% annual growth rate from 2023 traffic levels. Figure 5 illustrates the estimated background traffic volumes for the 2040 horizon year.

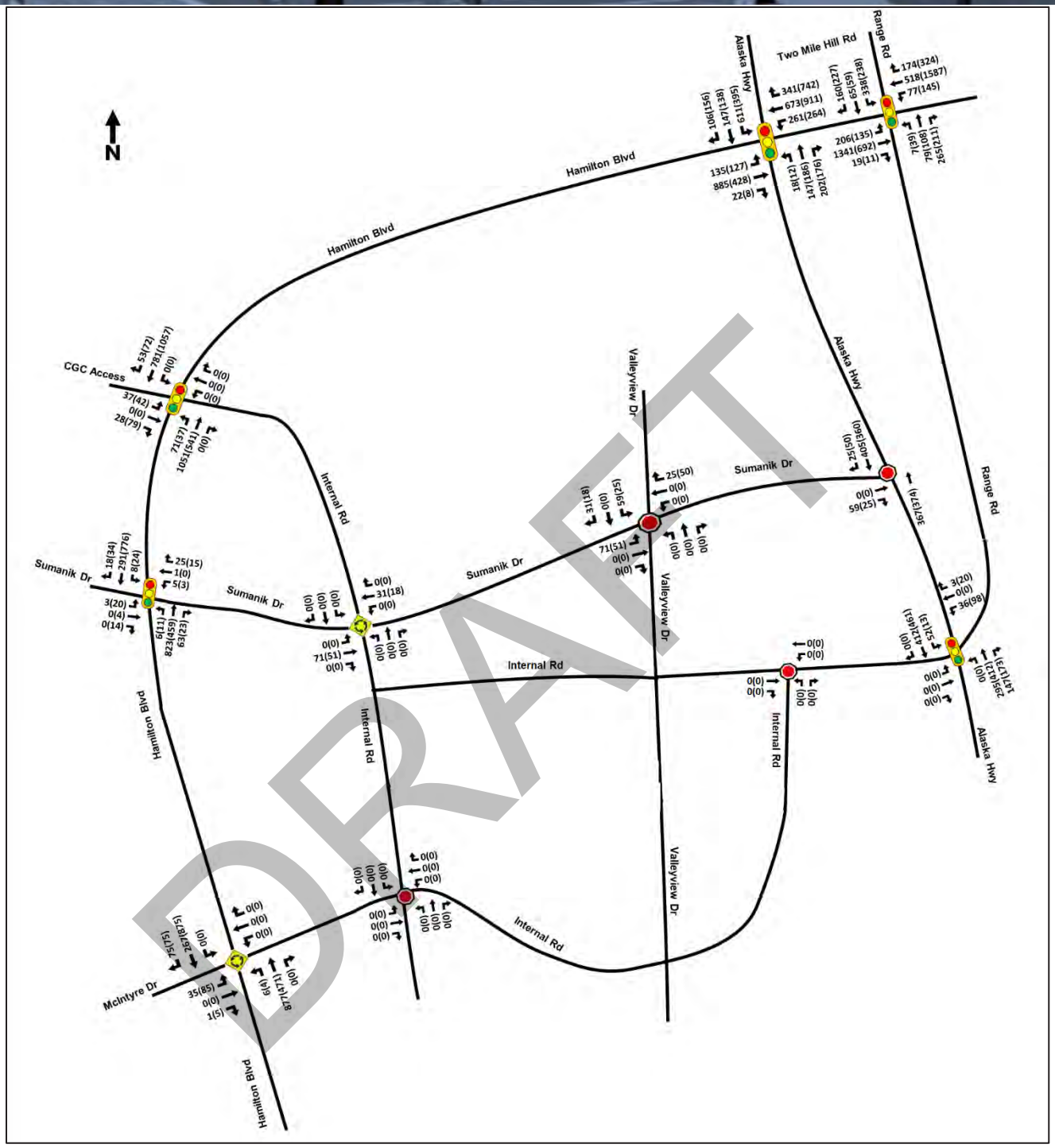


FIGURE 5. 2040 BACKGROUND TRAFFIC VOLUME DIAGRAM – WEEKDAY AM PEAK (PM PEAK)

4.2 2040 Weekday Peak Hours - Background Condition Capacity Analysis

Background traffic conditions indicate the performance of existing road networks in future years, assuming the proposed development is not in place. The background traffic capacity analysis was conducted for both AM and PM peak hours on a typical weekday. Summaries of intersection capacity analysis of the 2040 horizon are included in Table 9. Detailed Synchro results of background traffic capacity analyses are included in Appendix B.



As indicated by the capacity analysis results, it is projected that the intersections of Alaska Highway & Hamilton Boulevard and Two Mile Hill Road & Range Road will face operational challenges when subjected to the 2040 background traffic conditions. To provide more specific details, during the AM peak hour, the westbound left and southbound left turn movements at Alaska Highway & Hamilton Boulevard are anticipated to experience a Level of Service (LOS) rating of F, characterized by high delays, traffic volume exceeding capacity, and long queues. Similarly, the westbound left turn movement at Two Mile Hill Road & Range Road is expected to be over capacity during the AM peak hour. In contrast, the remaining intersections are expected to maintain acceptable LOS and v/c ratios under the 2040 background traffic conditions.

TABLE 9. 2040 BACKGROUND INTERSECTION PERFORMANCE (WEEKDAY AM AND PM PEAK HOURS)

Intersections			AM Peak Hour				PM Peak Hour			
			LOS	Delay (s)	Max v/c	95th Queue (m)	LOS	Delay (s)	Max v/c	95th Queue (m)
#1 McIntyre Drive & Hamilton Boulevard*	Intersection Overall		B	-	0.71	-	B	-	0.75	-
#6 Hamilton Boulevard & CGC Access**	Intersection Overall		A	8.7	0.43	-	B	10.1	0.50	-
#7 Hamilton Boulevard & Sumanik Drive	Intersection Overall		A	3.3	0.32	-	A	3.7	0.30	-
#8 Alaska Highway & Hamilton Boulevard	Intersection Overall		D	49.3	1.12	-	C	28.5	0.81	-
	Critical Movements	WBL	F	122.0	1.12	148.1	-	-	-	-
		SBL	F	97.3	1.10	287.2	-	-	-	-
#9 Alaska Highway & Range Road***	Intersection Overall		A	5.0	0.22	-	A	6.6	0.31	-
#10 Two Mile Hill Road & Range Road	Intersection Overall		C	29.0	0.98	-	C	31.8	0.97	-
	Critical Movements	WBL	F	127.7	0.98	43.5	-	-	-	-
#11 Alaska Highway & Sumanik Drive	Intersection Overall		A	0.7	0.17	-	A	0.3	0.15	-

Note: Internal intersections (ID #2-5) within the site are not included in the 2040 background condition analysis.
* The intersection of McIntyre Drive & Hamilton Boulevard will be upgraded from a 3-way stop-controlled intersection to a four-way roundabout by 2040.
** The intersection of Hamilton Boulevard & CGC Access will be upgraded from a 3-way signalized intersection to a four-way signalized intersection by 2040.
*** The intersection of Alaska Highway & Range Road will be upgraded from a 3-way signalized intersection to a four-way signalized intersection by 2040.

4.3 2040 Weekday Peak Hours – Recommended Intersection Improvements for the Background Condition

The operational issues of the intersections of Alaska Highway & Hamilton Boulevard and Two Mile Hill Road & Range Road under 2040 background condition need to be addressed. Recommended improvements are outlined in Table 10, and the updated lane configurations are illustrated in Figure 6.

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TABLE 10. 2040 BACKGROUND CONDITION RECOMMENDED IMPROVEMENTS

Intersection	Improvement Types	Recommended Improvements (compared with the existing condition)
Two Mile Hill Road & Range Road	Intersection Configurations	• Revise the southbound approach by converting the existing configuration of one through & left turn lane, plus one dedicated right turn lane, into one dedicated left turn lane and one lane accommodating both through and right turns. • Add a through lane to the eastbound approach and a dedicated right turn lane to the westbound approach to accommodate the through traffic.
	Signal Timing / Phasing	• Introduce a protected left turn phase for the westbound approach, converting it into a protected + permissive left turn. • Update the signal timing plan for both the AM and PM peak hours.
Alaska Highway & Hamilton Boulevard	Intersection Configurations	• Implement an additional dedicated left turn lane for westbound and southbound approaches, creating a double left turn configuration. • It is recommended to convert the northbound right turn, previously regulated by a yield, into a free-flowing movement. • Provide overpass to pedestrian and cyclist movements.
	Signal Timing / Phasing	• Update the signal timing plan for both the AM and PM peak hours.

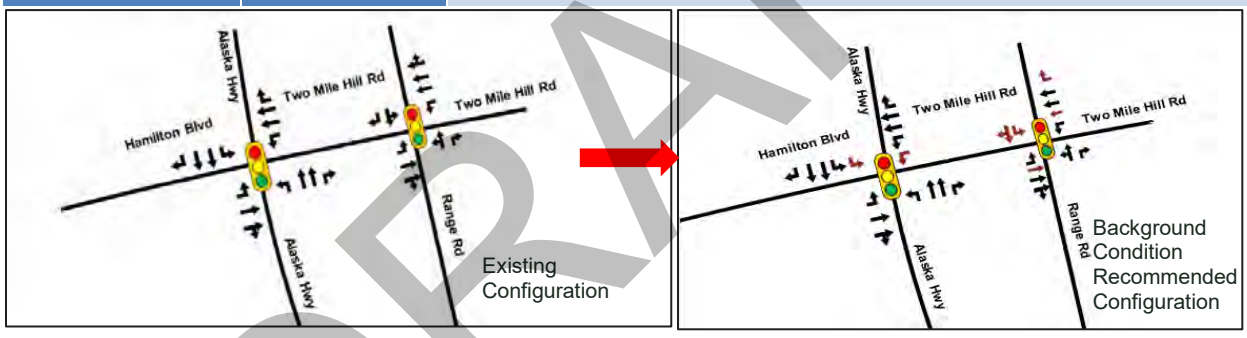


FIGURE 6. LANE CONFIGURATION UPGRADE FOR THE IMPROVEMENT OF FAILED INTERSECTIONS (BACKGROUND CONDITION)

With the aforementioned enhancements, we anticipate that the operational challenges at the two intersections in question will be successfully resolved, thereby ensuring satisfactory performance for all traffic movements for the 2040 background traffic condition. The improved intersection performance is detailed in Table 11. Detailed Synchro reports are included in Appendix C.

TABLE 11. 2040 BACKGOURND TRAFFIC INTERSECTION PERFORMANCE (IMPROVED)

Intersections			AM Peak Hour				PM Peak Hour			
			LOS	Delay (s)	Max v/c	95th Queue (m)	LOS	Delay (s)	Max v/c	95th Queue (m)
Alaska Highway & Hamilton Boulevard	Intersection Overall		D	37.8	0.85	-	C	22.2	0.77	-
	Critical Movements	None	-	-	-	-	-	-	-	-
Two Mile Hill Road & Range Road	Intersection Overall		C	29.6	0.73	-	C	22.1	0.87	
	Critical Movements	None	-	-	-	-	-	-	-	-

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5.0 2040 Weekday Peak Hours – Total Traffic Condition

5.1 2040 Weekday Peak Hours - Total Traffic Condition Traffic Volumes

The 2040 horizon year total traffic volumes are the sum of the development traffic volumes (Figure 4) and the 2040 background traffic volumes (Figure 5), as illustrated in Figure 7.

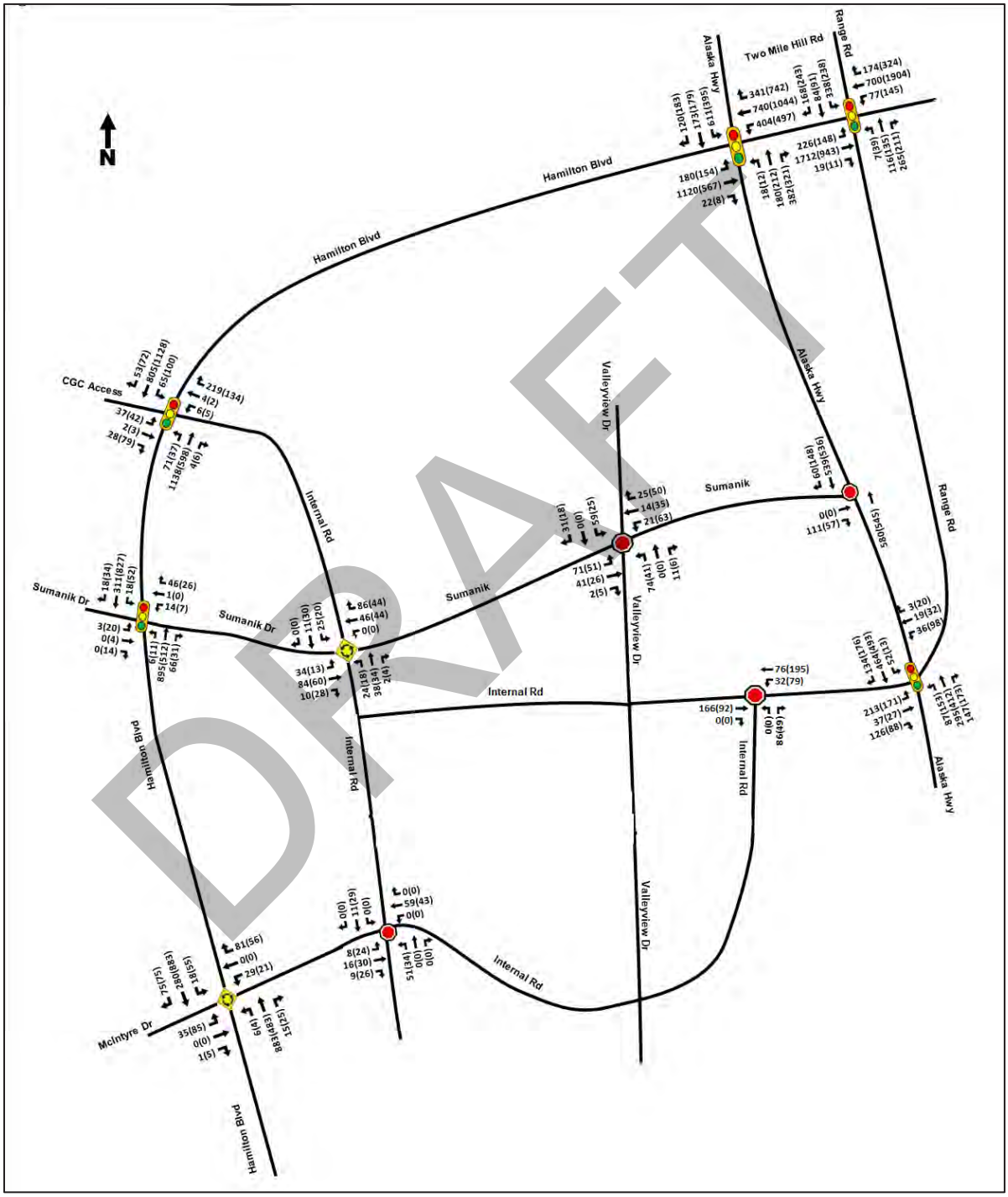


FIGURE 7. 2040 TOTAL TRAFFIC VOLUME DIAGRAM – WEEKDAY AM PEAK (PM PEAK)



5.2 2040 Weekday Peak Hours - Total Traffic Condition Capacity Analysis

The 2040 horizon year total traffic capacity was evaluated for both AM and PM peak hours on a typical weekday. Summaries of intersection capacity analysis are included in Table 12. The 2040 total traffic condition analysis is based on the 2040 total traffic volume under the improved background road network.

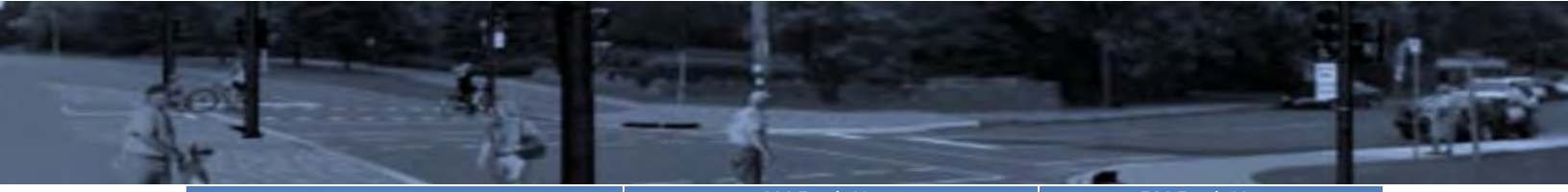
All internal intersections within the site are projected to maintain satisfactory operational conditions in the year 2040. The external intersections of McIntyre Drive & Hamilton Boulevard, Hamilton Boulevard & CGC Access, Hamilton Boulevard & Sumanik Drive, Alaska Highway & Range Road, and Alaska Highway & Sumanik Drive are expected to experience increased traffic due to the addition of site-generated traffic; nevertheless, they are expected to continue operating under appropriate conditions.

Conversely, the performance of the intersections at Alaska Highway & Hamilton Boulevard and Two Mile Hill Road & Range Road is forecasted to further deteriorate under the 2040 total traffic conditions. These two intersections are anticipated to have several turning movements operating with the LOS of E during either the AM or PM Peak hour. Detailed Synchro results of the 2040 total traffic capacity analyses are included in Appendix D.

TABLE 12. 2040 TOTAL TRAFFIC CONDITION INTERSECTIONS PERFORMANCE (WEEKDAY AM PEAK AND PM PEAK HOUR)

Intersections			AM Peak Hour				PM Peak Hour			
			LOS	Delay (s)	Max v/c	95th Queue (m)	LOS	Delay (s)	Max v/c	95th Queue (m)
#1 McIntyre Drive & Hamilton Boulevard	Intersection Overall		B	-	0.74	-	C	-	0.81	-
#2 Internal Intersection 1	Intersection Overall		A	7.5	0.07	-	A	7.5	0.10	-
#3 Internal Intersection 2	Intersection Overall		A	3.0	0.11	-	A	2.7	0.06	-
#4 Internal Intersection (Sumanik Drive & Valleyview Drive)	Intersection Overall		A	8.1	0.16	-	A	8.0	0.18	-
#5 Internal Intersection 3	Intersection Overall		A	-	0.11	-	A	-		0.08
#6 Hamilton Boulevard & CGC Access	Intersection Overall		B	14.3	0.61	-	B	12.3	0.71	-
#7 Hamilton Boulevard & Sumanik Drive	Intersection Overall		A	5.1	0.39	-	A	3.8	0.32	-
#8 Alaska Highway & Hamilton Boulevard	Intersection Overall		D	47.7	0.99	-	C	34.2	0.77	-
	Critical Movements	EBT	E	68.8	0.99	369.4	-	-	-	-
		WBL	E	59.5	0.67	97.7	-	-	-	-
		NBT	E	65.1	0.54	42.7	E	58.1	0.58	50.1
		SBL	E	71.8	0.91	194.5	E	61.9	0.77	102.8
#9 Alaska Highway & Range Road	Intersection Overall		B	17.8	0.77	-	B	14.2	0.69	-
#10 Two Mile Hill Road & Range Road	Intersection Overall		C	30.4	0.97	-	D	36.3	1.04	-
	Critical Movements	WBT	-	-	-	-	E	59.3	1.04	191.3

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Intersections		AM Peak Hour				PM Peak Hour			
		LOS	Delay (s)	Max v/c	95th Queue (m)	LOS	Delay (s)	Max v/c	95th Queue (m)
#11 Alaska Highway & Sumanik Drive	Intersection Overall	A	1.0	0.23	-	A	0.5	0.23	-

Note: According to the provided transportation concept, Internal Intersection 3 is planned to be constructed as a traffic circle in 2040, while other internal intersections, including Internal Intersection 1, Internal Intersection 2, and Sumanik Drive & Valleyview Drive, are designated as stop-controlled intersections.

5.3 2040 Weekday Peak Hours – Recommended Intersection Improvements for the Total Condition

The operational issues of the intersections of Alaska Highway & Hamilton Boulevard and Two Mile Hill Road & Range Road under the 2040 total condition need to be addressed. Recommended improvements are outlined in Table 13, and the updated lane configurations are illustrated in Figure 8.

TABLE 13. 2040 TOTAL CONDITION RECOMMENDED IMPROVEMENTS

Intersection	Improvement Types	Recommended Improvements (compared with the background improved condition)
Two Mile Hill Road & Range Road	Intersection Configurations	-
	Signal Timing / Phasing	• Update the signal timing plan for both the AM and PM peak hours.
Alaska Highway & Hamilton Boulevard	Intersection Configurations	• Introduce an extra through lane for the eastbound approach to accommodate the growing volume of through traffic.
	Signal Timing / Phasing	• Update the signal timing plan for both the AM and PM peak hours.

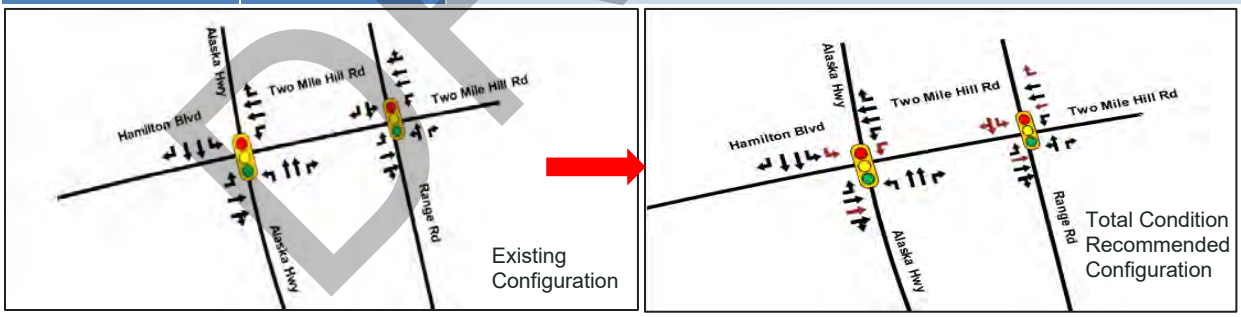


FIGURE 8. LANE CONFIGURATION UPGRADE FOR THE IMPROVEMENT OF FAILED INTERSECTIONS (TOTAL CONDITION)

With the recommended improvements outlined above, it is expected that the operational issues at the two subject intersections will be effectively addressed, ensuring acceptable performance for all traffic movements. The following Table 14 shows the improved intersection performance. The performance of both intersections has shown improvement, with the overall intersection LOS reaching C or D and minimum expected critical movements. Detailed Synchro reports are included in Appendix E.

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TABLE 14. 2040 TOTAL CONDITION INTERSECTION PERFORMANCE (IMPROVED)

Intersections			AM Peak Hour				PM Peak Hour			
			LOS	Delay (s)	Max v/c	95th Queue (m)	LOS	Delay (s)	Max v/c	95th Queue (m)
Alaska Highway & Hamilton Boulevard	Intersection Overall		D	37.3	0.81	-	C	26.3	0.88	-
	Critical Movements	NBT	E	53.4	0.63	96.6	E	67.0	0.72	50.5
Two Mile Hill Road & Range Road	Intersection Overall		C	32.6	0.76	-	C	25.6	0.88	-
	Critical Movements	None	-	-	-	-	-	-	-	-

It is worth noting that the northbound through traffic at Alaska Highway & Hamilton Boulevard may experience a relatively low LOS of E. However, given that the delay, v/c ratio, and queue length for this movement are expected to remain within acceptable limits, it is unlikely that significant issues will be encountered.

It is important to highlight that the City of Whitehorse and Government of Yukon have commenced the design process for improving the two subject intersections in the short to medium term. Their proposed improvements may not be the same as the improvements proposed in this TIA, but it is expected that the improvements will reach similar LOS for both intersections at a minimum. These enhancements are essential to ensure that, upon completion, both intersections will operate with acceptable LOS ratings and v/c ratios. Ongoing, close monitoring of the updated intersections should be undertaken, given their critical location and high traffic volume.

6.0 Scenario of Sumanik Drive Closure between Valleyview Dr and the Alaska Highway

An additional scenario involving the closure of Sumanik Drive between Valleyview Drive and the Alaska Highway is also investigated to assess the traffic implications resulting from alterations to the internal network. The concept of this scenario is shown in the following Figure 9.



FIGURE 9. CLOSURE OF THE EAST SECTION OF SUMANIK DRIVE

The closure of the aforementioned road segment will lead to the closure of the intersection at Alaska Highway & Sumanik Drive. The current configuration of this intersection operates exclusively as a right-in/right-out (RIRO) access point. Incoming traffic into the VSMP area is directed through a right turn movement from southbound Alaska

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Highway, while outbound traffic exiting the VSMP area relies on a right turn movement from eastbound Sumanik Drive onto the southbound Alaska Highway. It is reasonable to anticipate that these two traffic movements will be shifted to the nearby intersection southward at Alaska Highway & Range Road with the Sumanik Drive closure. Consequently, in this scenario, the nearby intersection at Alaska Highway & Range Road will experience an increased traffic load. Simultaneously, this modification to the network will also impact some internal intersections, namely Sumanik Drive & Valleyview Drive and Internal Intersection 2. The impacts involve the changes of road network and distribution of traffic volume, as depicted in Figure 10 below.

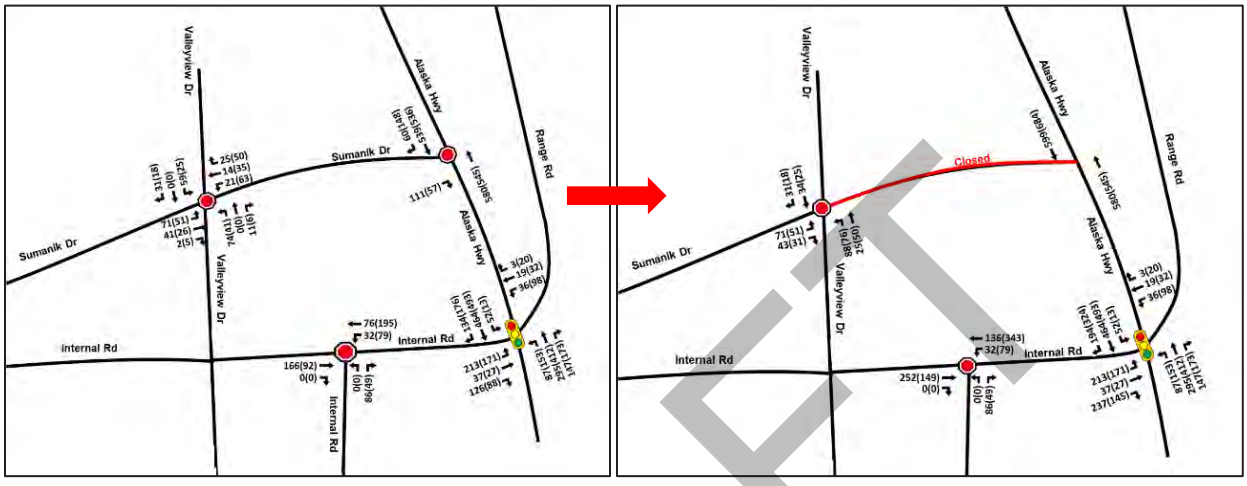


FIGURE 10. IMPACTED INTERSECTIONS AND TRAFFIC DISTRIBUTION BEFORE AND AFTER THE CLOSURE OF SUMANIK DRIVE EAST (2040 TOTAL TRAFFIC CONDITIONS)

Synchro analysis have been conducted for the outlined scenario for the total traffic conditions for the year 2040. The goal is to evaluate the operational conditions of the affected intersections, with a particular focus on the Alaska Highway & Range Road intersection, both before and after the closure of Sumanik Drive. The comparative findings are presented in Table 15 below.

TABLE 15. COMPARISON OF THE OPERATION CONDITIONS OF THE AFFECTED INTERSECTIONS BEFORE AND AFTER THE CLOSURE OF SUMANIK DRIVE (2040)

Intersections			AM Peak Hour				PM Peak Hour			
			LOS	Delay (s)	Max v/c	95th Queue (m)	LOS	Delay (s)	Max v/c	95th Queue (m)
Alaska Highway & Range Road After (Before)	Intersection Overall		C (B)	20.5 (17.8)	0.85 (0.77)	-	B (B)	15.1 (14.2)	0.75 (0.69)	-
	Critical Movements	None (None)	-	-	-	-	-	-	-	-
Sumanik Drive & Valleyview Drive After (Before)	Intersection Overall		A (A)	8.0 (8.1)	0.15 (0.16)	-	A (A)	7.9 (8.0)	0.16 (0.18)	-
	Critical Movements	None (None)	-	-	-	-	-	-	-	-
Internal Intersection 2 After (Before)	Intersection Overall		A (A)	2.3 (3.0)	0.16 (0.11)	-	A (A)	2.0 (2.7)	0.10 (0.06)	-
	Critical Movements	None (None)	-	-	-	-	-	-	-	-

The closure of Sumanik Drive between Valleyview Drive and the Alaska Highway is expected to introduce additional traffic demands at the nearby Alaska Highway & Range Road intersection. However, the impact appears to be relatively minimal, with slight adjustments in delays and v/c ratios, and no critical traffic movements observed as the affected traffic integrates into the intersection. Consequently, it can be inferred that the Alaska Highway & Range Road intersection can maintain acceptable operating conditions after the closure of Sumanik Drive. Additionally, we anticipate that the closure will not significantly affect the operation of the internal intersections, namely Sumanik Drive

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& Valleyview Drive and Internal Intersection 2 within the site. For a more detailed Synchro analysis result of this scenario, please refer to Appendix F.

7.0 Other Key Considerations

7.1 Access Intersection Control Treatments

The VSMP transportation concept plan can be found in Appendix H. The signalized intersections of Hamilton Boulevard & CGC Access and Alaska Highway & Range Road will need to be upgraded from 3-way to 4-way. It is also assumed that the signalized intersection of Hamilton Boulevard & Sumanik Drive will remain unchanged, although some intersection improvements should be explored to address safety concerns for Valleyview residents taking westbound right turns from Sumanik Drive. The intersection of Hamilton Boulevard & McIntyre Drive is proposed to be upgraded to a roundabout with all turning movements allowed.

7.2 Internal Intersection Control Treatments

Based on the anticipated traffic volumes within the internal roadway network, either stop control or small roundabout (traffic circle) is needed at intersections where collector roads intersect. Specifically, Internal Intersection 1, Internal Intersection 2, and the intersection of Sumanik Drive & Valleyview Drive should be converted to stop-controlled intersections. Specifically, Internal Intersection 1 and Sumanik Drive & Valleyview Drive will be converted to all-way stop-controlled intersections, and Internal Intersection 2 will be converted to a one-way stop-controlled T-intersection. Internal Intersection 3, located near Hamilton Boulevard & Sumanik Drive, is to be configured as a traffic circle. Additionally, two-way stop control is recommended for intersections where a local road intersects with a collector road.

7.3 Official Community Plan Guidance

Section 11.0 - Transportation and Mobility in the City's recently adopted Official Community Plan contains several policies relevant to the transportation aspects of VSMP, with a focus on active and public transportation. Noteworthy policies include:

- 11.2 - Active transportation modes (i.e., pedestrians and cyclists) are prioritized over shared and personal modes.
- 11.7 - The City will encourage a shift towards increased use of active and shared transportation modes.
- 11.11 - A Complete Streets approach will be applied to roadway reconstruction, upgrades, and new construction.
- 11.12 - The design of the transportation network will support surrounding land use, consider the needs of all users, incorporate multi-modal movements, and include opportunities for decorative street furniture or public art, where appropriate.
- 11.17 - The City will ensure that new developments are designed and connected to the active transportation network in a way that supports the hierarchy of transportation modes included (in 11.2).
- 11.18 - Initiatives that remove physical barriers, address safety concerns, close route gaps, improve winter maintenance, and improve lighting for active transportation modes throughout the community will be supported, where feasible.
- 11.20 - The City will ensure that the active transportation network is designed with connections to support year-round multi-modal movements.
- 11.21 - The City will work with community partners to enhance the overall active transportation network connectivity to destinations such as schools, hospital, and major workplaces.

It is worth noting that the final Master Plan will provide additional guidance. Given the preliminary design stage of the project, there are opportunities to ensure the City's OCP policies are reflected in this development. It is advisable for the development to prioritize the promotion and advancement of active transportation and public transportation usage.

7.4 Internal Road Classification

To determine the suitable road classifications for the internal roads on the site, we conducted an estimation of the Average Annual Daily Traffic (AADT) as depicted in Figure 12. Our analysis revealed that the majority of the internal roads exhibit AADT values falling within the range of 1,500 to 3,000, suggesting that designating them as minor collector roads would be

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sufficient. However, it is worth noting that the easternmost road segment, which connects the intersection of Alaska Highway and Range Road, stands out with a notably higher AADT of 7,500. Consequently, it is advisable to classify this specific road segment as a major collector road, given its higher traffic volume.

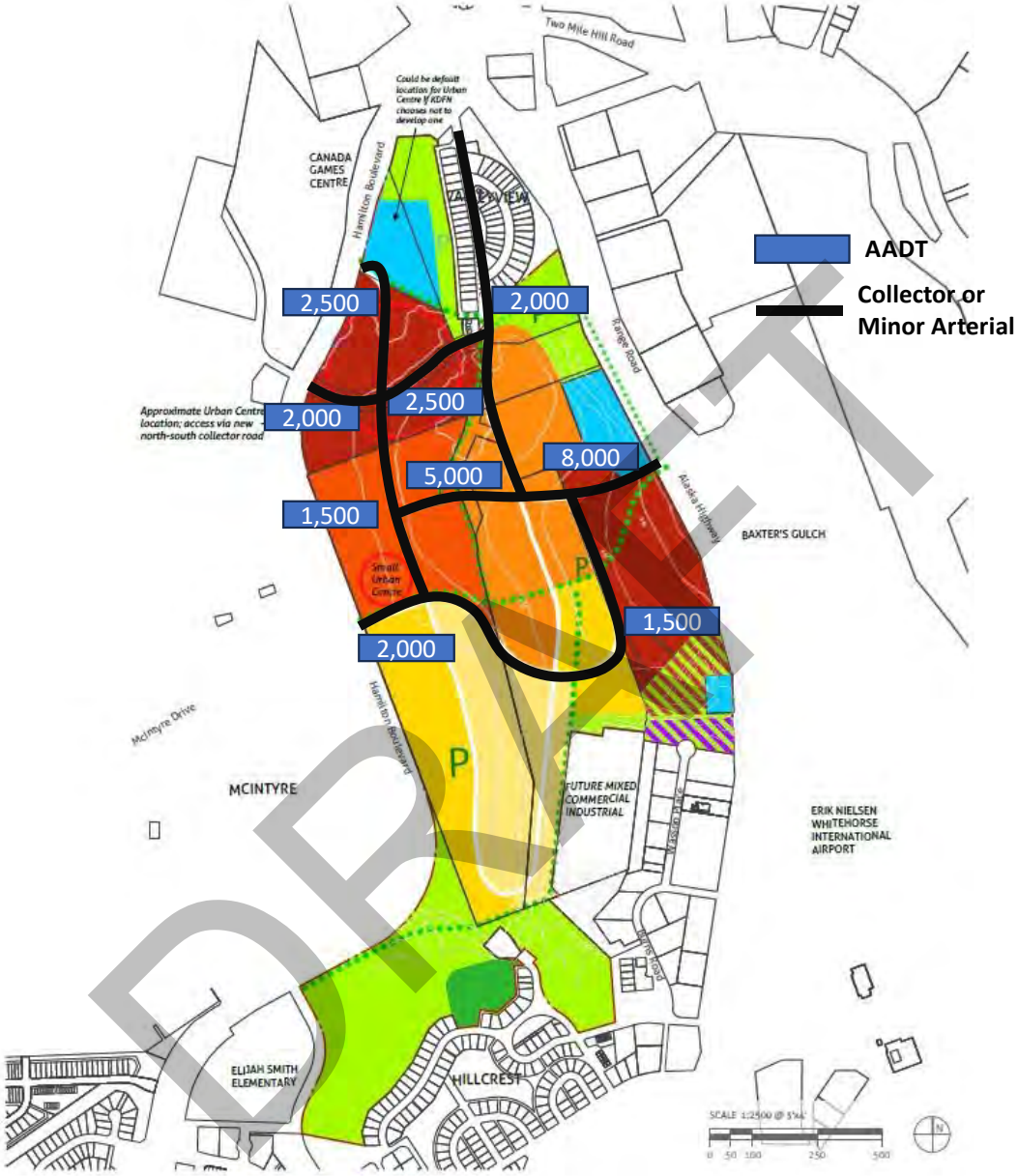


FIGURE 11. **PROJECTED AADT OF THE SITE'S INTERNAL ROADS**

7.5 Active Transportation Connections

To ensure the integration to the existing and proposed city-wide active transportation network, the VSMP concept plan includes an extensive AAAAA (Always Available for All Ages and Abilities) multi-use pathway (MUP) network. Figure 12 presents a conceptual analysis of key desire lines within the VSMP area, reflecting the following travel patterns:

- Anticipated major east-west movement through the VSMP area to the Alaska Highway for VSMP residents as well as McIntyre and other "above the airport" neighbourhood residents using the Hamilton Boulevard MUP.
- Existing and anticipated north-south movement between the VSMP area, Hillcrest, Granger and Canada Games Centre/Mount McIntyre Recreation Centre area.

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- Existing movement between Valleyview and the Airport Trail, Canada Games Centre/Mount McIntyre Recreation Centre, and the Mount Mac public trail network.
- Existing and anticipated north-south movement between Hillcrest and Granger neighbourhoods and the VSMP area and destinations beyond (north and east).
- Anticipated northwest movement between the VSMP neighbourhood and the Mount Mac public trail network.



FIGURE 12. DESIRE ACTIVE TRANSPORTATION LINES WITHIN THE VSMP AREA

The east-west MUP reflects the general concept proposed in the City's Bicycle Network Plan (2019), shown in Figure 13. The internal N-S active transportation facilities will be able to provide additional N-S active transportation connections (besides Alaska Highway and Hamilton Boulevard) within the neighbourhood, which will improve connectivity and safety for active transportation modes. The concept also addresses deficiencies in the active transportation network for Valleyview and its lack of logical (and convenient) connection to the public trails at Mount McIntyre, which will become more important if and when the adjacent greenspace to the west is developed.

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FIGURE 13. PROPOSED CITY-WIDE ACTIVE TRANSPORTATION NETWORK

The Cycling Association of Yukon, in partnership with Hillcrest Community Association, is exploring the potential for a highway underpass at the crossing location indicated in Figure 13. Should this location prove viable, and funding is secured to proceed, the east-west routing could be altered. For the time being, the team assumes that the Airport Trail connection point is at the Alaska Highway & Range Road intersection. Additionally, there is an existing buffered bike lane along Sumanik Drive between Hamilton Boulevard and Alaska Highway that should be maintained. The Master Plan allows for the future consideration of closing the easternmost segment of Sumanik Drive to vehicles entirely and converting it to a wide multi-use pathway and park area.

7.6 Transit Routes

Transit routing changes frequently, but our analysis suggests that the VSMP neighbourhood could be easily integrated into the current City transit system. The concept plan includes a series of bus stops located along the collector road loop. New stops along Hamilton Boulevard and the Alaska Highway would be required to keep all proposed transit stops located within the recommended 400-metre walking distance from residences.

As shown in Figure 14, Route #3 currently services the McIntyre, Hillcrest and Valleyview neighbourhoods. The proposed Alaska Highway transit stop could be incorporated into the southbound run to Hillcrest, whereas the proposed Hamilton Boulevard and internal VSMP neighbourhood transit stops could be incorporated into the northbound return leg from McIntyre.

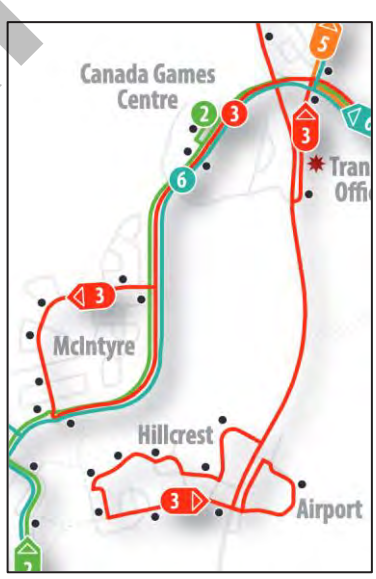


FIGURE 14. CURRENT CITY TRANSIT ROUTING AROUND THE STUDY AREA

7.7 Short-Cutting Concerns

The connection to the Alaska Highway could potentially invite residents of other “above the airport” neighbourhoods to use it as a shortcut to the downtown area, avoiding the busy Alaska Highway & Hamilton Boulevard intersection. However, we do not anticipate this being an issue given that Alaska Highway & Hamilton Boulevard intersection still has sufficient residual capacity for E-W directions (provided that our intersection improvement suggestions are implemented appropriately). We predict that the majority of the traffic will still stay on Hamilton Boulevard instead of shortcutting through the subject development.

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It is also worth noting that the Yukon Government is currently upgrading the intersections of Alaska Highway & Hamilton Boulevard and Two Mile Hill Road & Range Road. We anticipate that additional capacity will be provided to the two intersections as the subject neighbourhood is being developed, further motivating vehicles to remain on Hamilton Boulevard. In addition, the concept plan features intersecting collector roads to access the Alaska Highway from the future McIntyre Drive entrance. This design element could discourage short cutting by posing additional delays compared to a continuous collector road alignment. It should be noted that, if the eastern segment of Sumanik Drive near the Alaska Highway were to be closed in the future, the shortcut traffic problem would be further addressed.

8.0 Conclusions & Recommendations

The conclusions and recommendations of the VSMP TIA are summarized as follows:

The majority of intersections in and around the development site are not expected to encounter operational issues.

- The external intersections including McIntyre Drive & Hamilton Boulevard, Hamilton Boulevard & CGC Access, Hamilton Boulevard & Sumanik Drive, Alaska Highway & Range Road, and Alaska Highway & Sumanik Drive, are anticipated to operate with acceptable conditions under all 2023 and 2040 scenarios.
- The studied internal intersections are expected to operate satisfactorily upon the completion of the VSMP development in 2040.
- The closure of the easternmost segment of Sumanik Drive will exert a negligible influence on the adjacent intersection, namely Alaska Highway & Range Road. Similarly, the closure is not expected to cause significant impacts on the internal intersections of the study area.

However, two significant external intersections to the north of the development, namely Alaska Highway & Hamilton Boulevard and Two Mile Hill Road & Range Road, are experiencing higher traffic volumes compared to the other intersections and are projected to experience operational issues by the time the VSMP development is finalized in 2040. The study has put forth recommendations for improvements (Table 10 and Table 13) to address these operational challenges, which involve updating intersection configurations and refining signal timing and phasing plans. Implementing these recommendations should rectify the operational problems at these two intersections, allowing them to operate under acceptable conditions in 2040.

In addition to the traffic analysis, the study has examined the following elements based on the provided VSMP land use and transportation concept plans:

- The signalized intersections of Hamilton Boulevard & CGC and Alaska Highway & Range Road will need to be upgraded from 3-way to 4-way configurations. The intersection of Hamilton Boulevard & McIntyre Drive is proposed to be upgraded to a roundabout allowing all turning movements.
- Internal Intersection 1, Internal Intersection 2, and Sumanik Drive & Valleyview Drive should be converted into stop-controlled intersections. Internal Intersection 3, located near Hamilton Boulevard & Sumanik Drive, is planned to be configured as a traffic circle.
- The key internal roads should be designated as either minor collector or major collector road classifications.
- The recently adopted Whitehorse 2040 Official Community Plan includes several policies related to the transportation aspects of the VSMP, with a particular emphasis on promoting active and public transportation. In line with these policies, the concept plan has incorporated an extensive network of multi-use paths aligning with the primary desire lines within the VSMP area. Additionally, the plan has introduced several new transit stops, both within the site and along Alaska Highway and Hamilton Boulevard, ensuring a convenient access within a 400-meter walking distance from residential areas.
- Regarding the issue of existing “above the airport” neighbourhood traffic attempting to bypass the busy Alaska Highway & Hamilton Boulevard intersection, it is anticipated that most of the traffic will continue to use Hamilton Boulevard rather than attempting to “short cut” through the new development. This expectation is mainly based on the planned capacity improvements for Alaska Highway & Hamilton Boulevard, which are likely to encourage traffic to remain on the main routes, as well as a non-facilitative VSMP internal road network design.

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Should you have any questions or comments concerning the contents of this report, please do not hesitate to contact the undersigned.

Sincerely,
MORRISON HERSHFIELD LTD.

Stanley J. Li, M.Sc., P.Eng., PTOE

Principal, Transportation Engineer

Tel: 867 456 4747

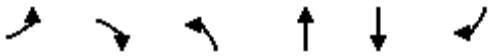
Email: sli@morrisonhershfield.com

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APPENDIX A – SYNCHRO REPORTS – 2023 EXISTING CONDITION

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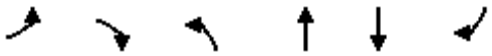


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	28	1	5	787	239	61
Future Volume (Veh/h)	28	1	5	787	239	61
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	30	1	5	855	260	66
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					391	
pX, platoon unblocked						
vC, conflicting volume	1158	163	326			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1158	163	326			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	84	100	100			
cM capacity (veh/h)	189	853	1230			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	31	5	855	173	153
Volume Left	30	5	0	0	0
Volume Right	1	0	0	0	66
cSH	193	1230	1700	1700	1700
Volume to Capacity	0.16	0.00	0.50	0.10	0.09
Queue Length 95th (m)	4.2	0.1	0.0	0.0	0.0
Control Delay (s)	27.1	7.9	0.0	0.0	0.0
Lane LOS	D	A			
Approach Delay (s)	27.1	0.0		0.0	
Approach LOS	D				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		

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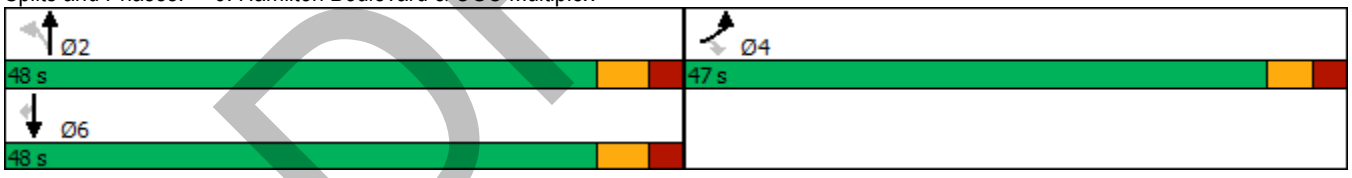
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	29	22	57	931	692	43
Future Volume (vph)	29	22	57	931	692	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	100.0			80.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1789	1601	1789	3579	3579	1601
Flt Permitted	0.950		0.366			
Satd. Flow (perm)	1789	1601	689	3579	3579	1601
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		24				47
Link Speed (k/h)	50			60	60	
Link Distance (m)	310.3			321.6	541.6	
Travel Time (s)	22.3			19.3	32.5	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	32	24	62	1012	752	47
Shared Lane Traffic (%)						
Lane Group Flow (vph)	32	24	62	1012	752	47
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	10.0	10.0	10.0	10.0
Minimum Split (s)	46.8	46.8	36.2	36.2	36.2	36.2
Total Split (s)	47.0	47.0	48.0	48.0	48.0	48.0
Total Split (%)	49.5%	49.5%	50.5%	50.5%	50.5%	50.5%
Yellow Time (s)	3.3	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
Act Effct Green (s)	12.1	12.1	41.8	41.8	41.8	41.8

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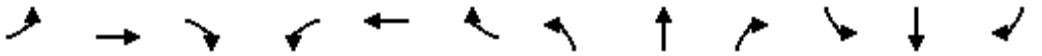
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Actuated g/C Ratio	0.22	0.22	0.75	0.75	0.75	0.75
v/c Ratio	0.08	0.07	0.12	0.38	0.28	0.04
Control Delay	19.6	8.5	9.7	8.3	7.5	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.6	8.5	9.7	8.3	7.5	3.9
LOS	B	A	A	A	A	A
Approach Delay	14.8			8.4	7.3	
Approach LOS	B			A	A	
Queue Length 50th (m)	3.0	0.0	1.9	20.4	13.7	0.0
Queue Length 95th (m)	8.7	4.5	15.5	94.2	65.1	5.9
Internal Link Dist (m)	286.3			297.6	517.6	
Turn Bay Length (m)			100.0			80.0
Base Capacity (vph)	1395	1254	543	2823	2823	1272
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.02	0.11	0.36	0.27	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 55.5			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 8.1		Intersection LOS: A	
Intersection Capacity Utilization 48.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Hamilton Boulevard & CGC Multiplex



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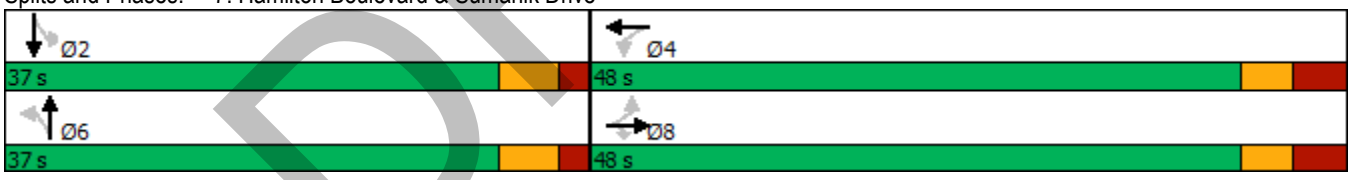
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	0	0	4	1	20	5	728	51	6	257	14
Future Volume (vph)	2	0	0	4	1	20	5	728	51	6	257	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	50.0		20.0	0.0		0.0	90.0		0.0	80.0		50.0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt					0.890			0.990			0.992	
Flt Protected	0.950	0.950			0.993		0.950			0.950		
Satd. Flow (prot)	1700	1700	1883	0	1665	0	1789	3543	0	1789	3550	0
Flt Permitted							0.572			0.334		
Satd. Flow (perm)	1789	1789	1883	0	1676	0	1077	3543	0	629	3550	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					22			9			7	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		630.9			507.6			391.2			321.6	
Travel Time (s)		45.4			36.5			23.5			19.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	2	0	0	4	1	22	5	791	55	7	279	15
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	1	1	0	0	27	0	5	846	0	7	294	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8		8	4			6			2		
Detector Phase	8	8	8	4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	47.8	47.8	47.8	47.8	47.8		35.7	35.7		35.7	35.7	
Total Split (s)	48.0	48.0	48.0	48.0	48.0		37.0	37.0		37.0	37.0	
Total Split (%)	56.5%	56.5%	56.5%	56.5%	56.5%		43.5%	43.5%		43.5%	43.5%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.5	3.5	3.5	3.5	3.5		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.8		6.8		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Act Effct Green (s)	7.4	7.4			7.4		34.4	34.4		34.4	34.4	

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.20	0.20			0.20		0.92	0.92		0.92	0.92	
v/c Ratio	0.00	0.00			0.08		0.01	0.26		0.01	0.09	
Control Delay	16.0	16.0			10.3		2.4	1.8		2.3	1.5	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	16.0	16.0			10.3		2.4	1.8		2.3	1.5	
LOS	B	B			B		A	A		A	A	
Approach Delay		16.0			10.3			1.8			1.6	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	0.1	0.1			0.3		0.0	0.0		0.0	0.0	
Queue Length 95th (m)	1.1	1.1			5.6		1.0	26.1		1.3	8.7	
Internal Link Dist (m)		606.9			483.6			367.2			297.6	
Turn Bay Length (m)	50.0						90.0			80.0		
Base Capacity (vph)	1707	1707			1600		943	3103		550	3108	
Starvation Cap Reductn	0	0			0		0	0		0	0	
Spillback Cap Reductn	0	0			0		0	0		0	0	
Storage Cap Reductn	0	0			0		0	0		0	0	
Reduced v/c Ratio	0.00	0.00			0.02		0.01	0.27		0.01	0.09	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 37.3			
Natural Cycle: 85			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.26			
Intersection Signal Delay: 2.0		Intersection LOS: A	
Intersection Capacity Utilization 38.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Hamilton Boulevard & Sumanik Drive



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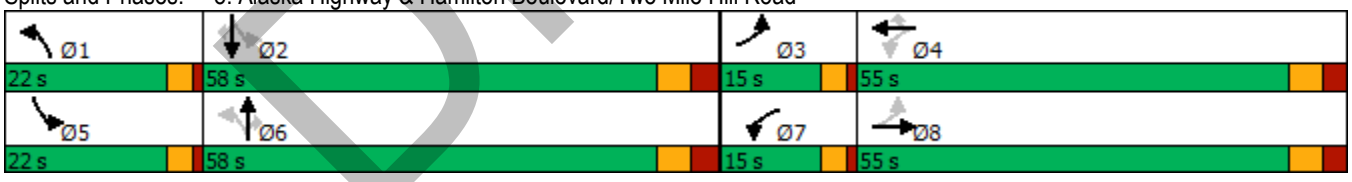
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	108	815	18	210	619	274	15	118	162	491	118	85
Future Volume (vph)	108	815	18	210	619	274	15	118	162	491	118	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	120.0		0.0	0.0		110.0	125.0		110.0	260.0		110.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												
Frt		0.997				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3568	0	1789	3579	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.269			0.112			0.671			0.596		
Satd. Flow (perm)	507	3568	0	211	3579	1601	1264	3579	1601	1123	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				298			176			92
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		541.6			225.0			695.8			804.3	
Travel Time (s)		32.5			13.5			41.7			48.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	117	886	20	228	673	298	16	128	176	534	128	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	117	906	0	228	673	298	16	128	176	534	128	92
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4	6		6	2		2
Detector Phase	3	8		7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	25.0		5.0	25.0	25.0	5.0	25.0	25.0	5.0	25.0	25.0
Minimum Split (s)	9.0	54.7		9.0	54.7	54.7	9.0	57.2	57.2	9.0	57.2	57.2
Total Split (s)	15.0	55.0		15.0	55.0	55.0	22.0	58.0	58.0	22.0	58.0	58.0
Total Split (%)	10.0%	36.7%		10.0%	36.7%	36.7%	14.7%	38.7%	38.7%	14.7%	38.7%	38.7%
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0		1.0	3.0	3.0	1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		-1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.7		2.5	6.7	6.7	4.0	7.2	7.2	4.0	7.2	7.2
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min		None	Min	Min	None	Min	Min	None	Min	Min
Act Effct Green (s)	47.8	35.7		54.2	37.6	37.6	38.9	29.4	29.4	55.0	47.8	47.8

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.41	0.31		0.46	0.32	0.32	0.33	0.25	0.25	0.47	0.41	0.41
v/c Ratio	0.38	0.83		0.85	0.59	0.42	0.04	0.14	0.33	0.84	0.09	0.13
Control Delay	23.1	45.6		52.8	36.2	5.5	19.1	34.8	6.7	39.5	23.6	5.7
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	23.1	45.6		52.8	36.2	5.5	19.1	34.8	6.7	39.5	23.6	5.7
LOS	C	D		D	D	A	B	C	A	D	C	A
Approach Delay		43.0			31.7			18.6			32.7	
Approach LOS		D			C			B			C	
Queue Length 50th (m)	13.8	94.1		30.2	63.0	0.0	1.9	11.7	0.0	88.1	8.5	0.0
Queue Length 95th (m)	33.4	153.2		#101.8	107.7	20.3	6.3	21.5	16.4	#147.5	19.1	11.0
Internal Link Dist (m)		517.6			201.0			671.8			780.3	
Turn Bay Length (m)	120.0					110.0	125.0		110.0	260.0		110.0
Base Capacity (vph)	338	1501		269	1505	845	633	1582	806	632	1630	779
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.60		0.85	0.45	0.35	0.03	0.08	0.22	0.84	0.08	0.12

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 116.9			
Natural Cycle: 130			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 34.2		Intersection LOS: C	
Intersection Capacity Utilization 86.1%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 8: Alaska Highway & Hamilton Boulevard/Two Mile Hill Road



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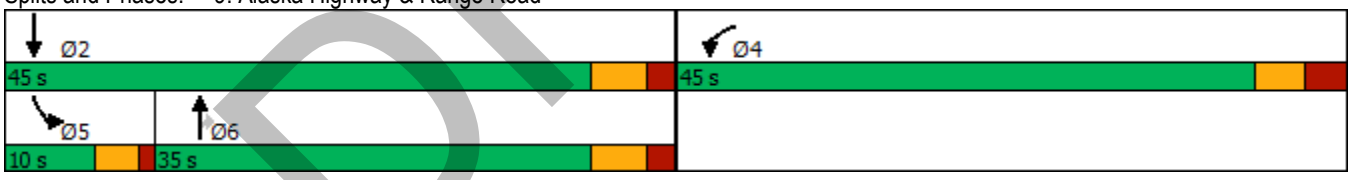
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	29	2	237	118	42	330
Future Volume (vph)	29	2	237	118	42	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)	0%		0%			0%
Storage Length (m)	0.0	0.0		175.0	130.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Ped Bike Factor						
Frt	0.992			0.850		
Flt Protected	0.955				0.950	
Satd. Flow (prot)	1784	0	3579	1601	1789	3579
Flt Permitted	0.955				0.950	
Satd. Flow (perm)	1784	0	3579	1601	1789	3579
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	2			128		
Link Speed (k/h)	50		70			70
Link Distance (m)	1141.1		889.8			404.2
Travel Time (s)	82.2		45.8			20.8
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	32	2	258	128	46	359
Shared Lane Traffic (%)						
Lane Group Flow (vph)	34	0	258	128	46	359
Turn Type	Prot		NA	Perm	Prot	NA
Protected Phases	4		6		5	2
Permitted Phases				6		
Detector Phase	4		6	6	5	2
Switch Phase						
Minimum Initial (s)	7.0		20.0	20.0	5.0	20.0
Minimum Split (s)	44.3		27.7	27.7	9.0	25.7
Total Split (s)	45.0		35.0	35.0	10.0	45.0
Total Split (%)	50.0%		38.9%	38.9%	11.1%	50.0%
Yellow Time (s)	3.3		3.7	3.7	3.0	3.7
All-Red Time (s)	3.0		2.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3		5.7	5.7	4.0	5.7
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
Act Effct Green (s)	7.2		32.7	32.7	6.0	37.9

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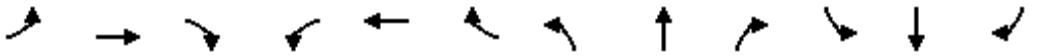
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Actuated g/C Ratio	0.18		0.80	0.80	0.15	0.92
v/c Ratio	0.11		0.09	0.10	0.18	0.11
Control Delay	15.9		4.3	2.2	18.5	1.5
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	15.9		4.3	2.2	18.5	1.5
LOS	B		A	A	B	A
Approach Delay	15.9		3.6			3.4
Approach LOS	B		A			A
Queue Length 50th (m)	1.6		0.0	0.0	2.4	0.0
Queue Length 95th (m)	8.6		12.8	6.9	11.3	10.0
Internal Link Dist (m)	1117.1		865.8			380.2
Turn Bay Length (m)				175.0	130.0	
Base Capacity (vph)	1660		3141	1421	266	3359
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.02		0.08	0.09	0.17	0.11

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 41			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.18			
Intersection Signal Delay: 4.0		Intersection LOS: A	
Intersection Capacity Utilization 40.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Alaska Highway & Range Road



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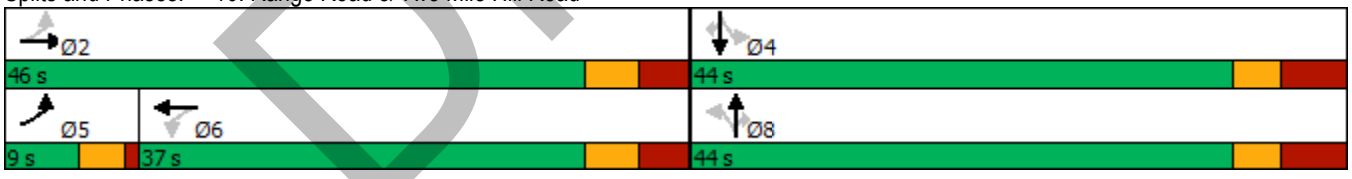
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	1266	15	62	490	139	5	64	213	271	52	129
Future Volume (vph)	165	1266	15	62	490	139	5	64	213	271	52	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	140.0		0.0	75.0		175.0	0.0		30.0	0.0		50.0
Storage Lanes	1		0	1		1	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.967				0.850			0.850
Flt Protected	0.950			0.950				0.997			0.960	
Satd. Flow (prot)	1789	3571	0	1789	4972	0	0	1878	1601	0	1808	1601
Flt Permitted	0.324			0.133				0.970			0.709	
Satd. Flow (perm)	610	3571	0	250	4972	0	0	1827	1601	0	1335	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			85				99			140
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		225.0			1098.9			1141.1			1649.4	
Travel Time (s)		13.5			65.9			82.2			118.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	179	1376	16	67	533	151	5	70	232	295	57	140
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	1392	0	67	684	0	0	75	232	0	352	140
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		6	6		8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	9.0	31.2		31.2	31.2		14.8	14.8	14.8	43.8	43.8	43.8
Total Split (s)	9.0	46.0		37.0	37.0		44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	10.0%	51.1%		41.1%	41.1%		48.9%	48.9%	48.9%	48.9%	48.9%	48.9%
Yellow Time (s)	3.0	3.7		3.7	3.7		3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	3.5		3.5	3.5		4.5	4.5	4.5	4.5	4.5	4.5
Lost Time Adjust (s)	0.0	-1.0		0.0	0.0			0.0	0.0		-1.3	0.0
Total Lost Time (s)	4.0	6.2		7.2	7.2			7.8	7.8		6.5	7.8
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Recall Mode	None	Max		Max	Max		Min	Min	Min	Min	Min	Min
Act Effct Green (s)	42.3	40.1		30.0	30.0			26.8	26.8		28.1	26.8

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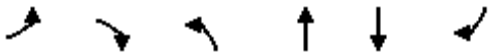
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.52	0.50		0.37	0.37			0.33	0.33		0.35	0.33
v/c Ratio	0.46	0.79		0.73	0.36			0.12	0.39		0.76	0.23
Control Delay	16.7	22.6		71.2	17.8			18.4	13.0		34.7	4.2
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	16.7	22.6		71.2	17.8			18.4	13.0		34.7	4.2
LOS	B	C		E	B			B	B		C	A
Approach Delay		21.9			22.5			14.3			26.0	
Approach LOS		C			C			B			C	
Queue Length 50th (m)	14.0	90.1		8.8	24.1			7.9	14.7		46.9	0.0
Queue Length 95th (m)	30.2	#146.6		#34.7	38.8			16.4	31.0		76.5	10.4
Internal Link Dist (m)		201.0			1074.9			1117.1			1625.4	
Turn Bay Length (m)	140.0			75.0					30.0			50.0
Base Capacity (vph)	392	1770		92	1897			823	775		623	798
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.46	0.79		0.73	0.36			0.09	0.30		0.57	0.18

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 81			
Natural Cycle: 85			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 22.0		Intersection LOS: C	
Intersection Capacity Utilization 84.8%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 10: Range Road & Two Mile Hill Road



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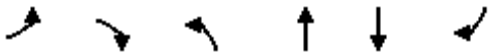


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	51	0	295	321	25
Future Volume (Veh/h)	0	51	0	295	321	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	55	0	321	349	27
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	523	188	376			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	523	188	376			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	93	100			
cM capacity (veh/h)	484	822	1179			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	55	160	160	233	143
Volume Left	0	0	0	0	0
Volume Right	55	0	0	0	27
cSH	822	1700	1700	1700	1700
Volume to Capacity	0.07	0.09	0.09	0.14	0.08
Queue Length 95th (m)	1.6	0.0	0.0	0.0	0.0
Control Delay (s)	9.7	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	9.7	0.0		0.0	
Approach LOS	A				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	19.7%	ICU Level of Service	A
Analysis Period (min)	15		

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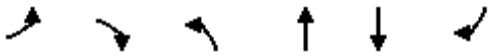


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	68	4	3	434	806	60
Future Volume (vph)	68	4	3	434	806	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	74	4	3	472	876	65

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	78	3	472	584	357
Volume Left (vph)	74	3	0	0	0
Volume Right (vph)	4	0	0	0	65
Hadj (s)	0.19	0.53	0.03	0.03	-0.09
Departure Headway (s)	6.8	6.4	5.9	5.3	5.2
Degree Utilization, x	0.15	0.01	0.77	0.86	0.51
Capacity (veh/h)	499	543	599	669	685
Control Delay (s)	11.0	8.2	24.4	30.8	12.3
Approach Delay (s)	11.0	24.3		23.7	
Approach LOS	B	C		C	

Intersection Summary			
Delay	23.2		
Level of Service	C		
Intersection Capacity Utilization	34.9%	ICU Level of Service	A
Analysis Period (min)	15		

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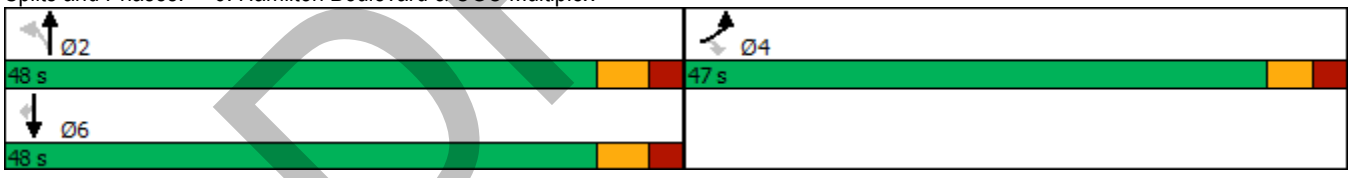
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	33	64	29	479	936	58
Future Volume (vph)	33	64	29	479	936	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	100.0			80.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1789	1601	1789	3579	3579	1601
Flt Permitted	0.950		0.257			
Satd. Flow (perm)	1789	1601	484	3579	3579	1601
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		49				63
Link Speed (k/h)	50			60	60	
Link Distance (m)	310.3			321.6	541.6	
Travel Time (s)	22.3			19.3	32.5	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	36	70	32	521	1017	63
Shared Lane Traffic (%)						
Lane Group Flow (vph)	36	70	32	521	1017	63
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	10.0	10.0	10.0	10.0
Minimum Split (s)	46.8	46.8	36.2	36.2	36.2	36.2
Total Split (s)	47.0	47.0	48.0	48.0	48.0	48.0
Total Split (%)	49.5%	49.5%	50.5%	50.5%	50.5%	50.5%
Yellow Time (s)	3.3	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
Act Effct Green (s)	11.8	11.8	35.6	35.6	35.6	35.6

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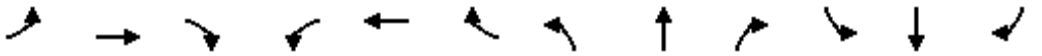
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Actuated g/C Ratio	0.22	0.22	0.65	0.65	0.65	0.65
v/c Ratio	0.09	0.18	0.10	0.22	0.44	0.06
Control Delay	17.1	8.9	10.9	8.2	9.8	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.1	8.9	10.9	8.2	9.8	3.7
LOS	B	A	B	A	A	A
Approach Delay	11.7			8.3	9.4	
Approach LOS	B			A	A	
Queue Length 50th (m)	2.7	1.6	0.9	8.8	20.6	0.0
Queue Length 95th (m)	9.2	9.7	9.5	43.5	95.0	6.8
Internal Link Dist (m)	286.3			297.6	517.6	
Turn Bay Length (m)			100.0			80.0
Base Capacity (vph)	1428	1288	390	2889	2889	1304
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.05	0.08	0.18	0.35	0.05

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 54.7			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.44			
Intersection Signal Delay: 9.2		Intersection LOS: A	
Intersection Capacity Utilization 41.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Hamilton Boulevard & CGC Multiplex



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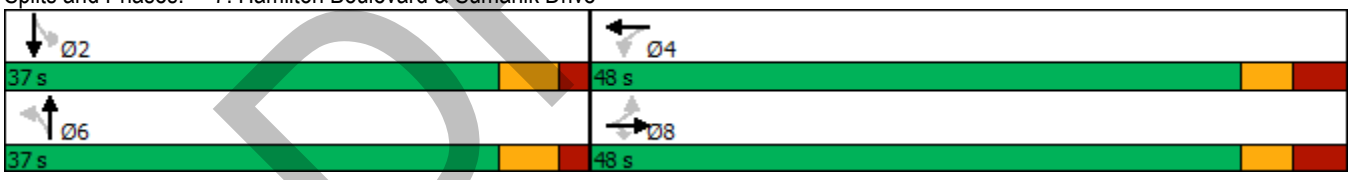
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	3	8	2	0	12	9	406	18	19	687	27
Future Volume (vph)	16	3	8	2	0	12	9	406	18	19	687	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	50.0		20.0	0.0		0.0	90.0		0.0	80.0		50.0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.850		0.883			0.993			0.994	
Flt Protected	0.950	0.966			0.993		0.950			0.950		
Satd. Flow (prot)	1700	1728	1601	0	1651	0	1789	3553	0	1789	3557	0
Flt Permitted					0.950		0.358			0.487		
Satd. Flow (perm)	1789	1789	1601	0	1580	0	674	3553	0	917	3557	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			35		35			6			5	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		630.9			507.6			391.2			321.6	
Travel Time (s)		45.4			36.5			23.5			19.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	17	3	9	2	0	13	10	441	20	21	747	29
Shared Lane Traffic (%)	42%											
Lane Group Flow (vph)	10	10	9	0	15	0	10	461	0	21	776	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8		8	4			6			2		
Detector Phase	8	8	8	4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	47.8	47.8	47.8	47.8	47.8		35.7	35.7		35.7	35.7	
Total Split (s)	48.0	48.0	48.0	48.0	48.0		37.0	37.0		37.0	37.0	
Total Split (%)	56.5%	56.5%	56.5%	56.5%	56.5%		43.5%	43.5%		43.5%	43.5%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.5	3.5	3.5	3.5	3.5		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.8		6.8		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Act Effct Green (s)	7.4	7.4	7.4		7.4		30.5	30.5		30.5	30.5	

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.20	0.20	0.20		0.20		0.82	0.82		0.82	0.82	
v/c Ratio	0.03	0.03	0.03		0.04		0.02	0.16		0.03	0.27	
Control Delay	15.1	15.1	1.9		3.7		4.3	3.1		4.2	3.5	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	15.1	15.1	1.9		3.7		4.3	3.1		4.2	3.5	
LOS	B	B	A		A		A	A		A	A	
Approach Delay		11.0			3.7			3.2			3.5	
Approach LOS		B			A			A			A	
Queue Length 50th (m)	0.4	0.4	0.0		0.0		0.0	0.0		0.0	0.0	
Queue Length 95th (m)	3.4	3.4	0.9		2.0		1.7	13.8		2.7	24.2	
Internal Link Dist (m)		606.9			483.6			367.2			297.6	
Turn Bay Length (m)	50.0		20.0				90.0			80.0		
Base Capacity (vph)	1726	1726	1546		1525		585	3087		796	3090	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	0.01	0.01	0.01		0.01		0.02	0.15		0.03	0.25	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 37.1			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.27			
Intersection Signal Delay: 3.5		Intersection LOS: A	
Intersection Capacity Utilization 47.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Hamilton Boulevard & Sumanik Drive



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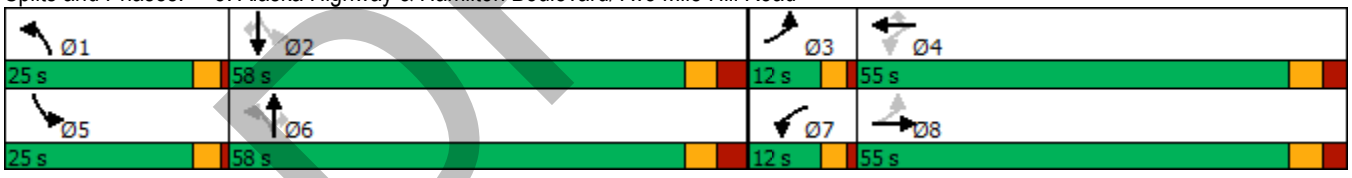
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	394	6	212	838	596	9	150	141	317	111	125
Future Volume (vph)	102	394	6	212	838	596	9	150	141	317	111	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	120.0		0.0	0.0		110.0	125.0		110.0	260.0		110.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3571	0	1789	3579	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.156			0.441			0.675			0.578		
Satd. Flow (perm)	294	3571	0	831	3579	1601	1271	3579	1601	1089	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				648			153			136
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		541.6			225.0			695.8			804.3	
Travel Time (s)		32.5			13.5			41.7			48.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	111	428	7	230	911	648	10	163	153	345	121	136
Shared Lane Traffic (%)												
Lane Group Flow (vph)	111	435	0	230	911	648	10	163	153	345	121	136
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4	6		6	2		2
Detector Phase	3	8		7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	25.0		5.0	25.0	25.0	5.0	25.0	25.0	5.0	25.0	25.0
Minimum Split (s)	9.0	54.7		9.0	54.7	54.7	9.0	57.2	57.2	9.0	57.2	57.2
Total Split (s)	12.0	55.0		12.0	55.0	55.0	25.0	58.0	58.0	25.0	58.0	58.0
Total Split (%)	8.0%	36.7%		8.0%	36.7%	36.7%	16.7%	38.7%	38.7%	16.7%	38.7%	38.7%
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0		1.0	3.0	3.0	1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		-1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.7		2.5	6.7	6.7	4.0	7.2	7.2	4.0	7.2	7.2
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min		None	Min	Min	None	Min	Min	None	Min	Min
Act Effct Green (s)	57.2	46.6		60.6	46.8	46.8	38.6	29.5	29.5	57.3	52.3	52.3

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.45	0.37		0.48	0.37	0.37	0.30	0.23	0.23	0.45	0.41	0.41
v/c Ratio	0.50	0.33		0.49	0.69	0.65	0.02	0.20	0.31	0.57	0.08	0.18
Control Delay	28.1	30.7		24.9	38.2	5.9	20.2	39.6	7.2	27.7	23.6	4.4
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	28.1	30.7		24.9	38.2	5.9	20.2	39.6	7.2	27.7	23.6	4.4
LOS	C	C		C	D	A	C	D	A	C	C	A
Approach Delay		30.2			24.8			23.8			21.6	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	13.8	38.4		29.9	95.0	0.0	1.4	17.6	0.0	58.7	9.4	0.0
Queue Length 95th (m)	33.1	67.4		64.3	154.6	30.9	4.5	26.5	15.5	81.6	17.5	12.4
Internal Link Dist (m)		517.6			201.0			671.8			780.3	
Turn Bay Length (m)	120.0					110.0	125.0		110.0	260.0		110.0
Base Capacity (vph)	227	1372		469	1374	1014	626	1445	738	609	1510	754
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.32		0.49	0.66	0.64	0.02	0.11	0.21	0.57	0.08	0.18

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 126.8			
Natural Cycle: 130			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 25.0		Intersection LOS: C	
Intersection Capacity Utilization 89.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 8: Alaska Highway & Hamilton Boulevard/Two Mile Hill Road



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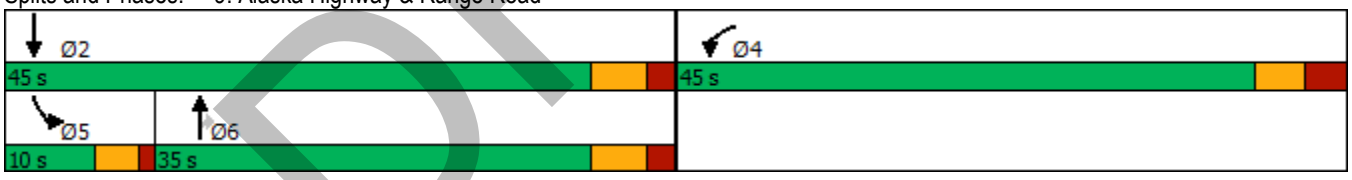
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	79	16	330	139	10	370
Future Volume (vph)	79	16	330	139	10	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)	0%		0%			0%
Storage Length (m)	0.0	0.0		175.0	130.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Ped Bike Factor						
Frt	0.978			0.850		
Flt Protected	0.960				0.950	
Satd. Flow (prot)	1768	0	3579	1601	1789	3579
Flt Permitted	0.960				0.950	
Satd. Flow (perm)	1768	0	3579	1601	1789	3579
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	14			151		
Link Speed (k/h)	50		70			70
Link Distance (m)	1141.1		889.8			404.2
Travel Time (s)	82.2		45.8			20.8
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	86	17	359	151	11	402
Shared Lane Traffic (%)						
Lane Group Flow (vph)	103	0	359	151	11	402
Turn Type	Prot		NA	Perm	Prot	NA
Protected Phases	4		6		5	2
Permitted Phases				6		
Detector Phase	4		6	6	5	2
Switch Phase						
Minimum Initial (s)	7.0		20.0	20.0	5.0	20.0
Minimum Split (s)	44.3		27.7	27.7	9.0	25.7
Total Split (s)	45.0		35.0	35.0	10.0	45.0
Total Split (%)	50.0%		38.9%	38.9%	11.1%	50.0%
Yellow Time (s)	3.3		3.7	3.7	3.0	3.7
All-Red Time (s)	3.0		2.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3		5.7	5.7	4.0	5.7
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
Act Effct Green (s)	8.0		26.9	26.9	5.8	28.6

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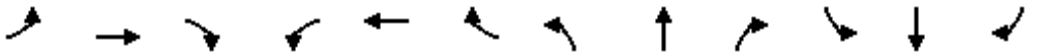
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Actuated g/C Ratio	0.18		0.60	0.60	0.13	0.64
v/c Ratio	0.31		0.17	0.15	0.05	0.18
Control Delay	17.5		6.9	2.6	19.1	5.1
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	17.5		6.9	2.6	19.1	5.1
LOS	B		A	A	B	A
Approach Delay	17.5		5.6			5.5
Approach LOS	B		A			A
Queue Length 50th (m)	5.2		5.9	0.0	0.7	6.7
Queue Length 95th (m)	18.2		19.2	8.1	4.6	13.3
Internal Link Dist (m)	1117.1		865.8			380.2
Turn Bay Length (m)				175.0	130.0	
Base Capacity (vph)	1561		2591	1201	244	3207
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.07		0.14	0.13	0.05	0.13

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 44.6			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.31			
Intersection Signal Delay: 6.7		Intersection LOS: A	
Intersection Capacity Utilization 32.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Alaska Highway & Range Road



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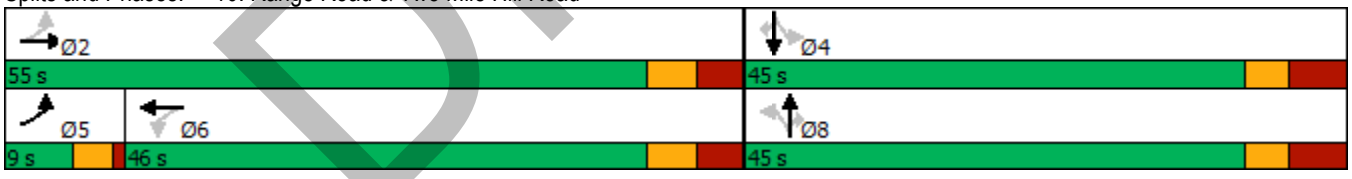
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	108	654	9	117	1499	260	31	86	170	191	48	183
Future Volume (vph)	108	654	9	117	1499	260	31	86	170	191	48	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	140.0		0.0	75.0		175.0	0.0		30.0	0.0		50.0
Storage Lanes	1		0	1		1	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.978				0.850			0.850
Flt Protected	0.950			0.950				0.987			0.962	
Satd. Flow (prot)	1789	3571	0	1789	5029	0	0	1859	1601	0	1812	1601
Flt Permitted	0.093			0.378				0.832			0.685	
Satd. Flow (perm)	175	3571	0	712	5029	0	0	1567	1601	0	1290	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			40				161			127
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		225.0			1098.9			1141.1			1649.4	
Travel Time (s)		13.5			65.9			82.2			118.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	117	711	10	127	1629	283	34	93	185	208	52	199
Shared Lane Traffic (%)												
Lane Group Flow (vph)	117	721	0	127	1912	0	0	127	185	0	260	199
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		6	6		8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	9.0	31.2		31.2	31.2		14.8	14.8	14.8	43.8	43.8	43.8
Total Split (s)	9.0	55.0		46.0	46.0		45.0	45.0	45.0	45.0	45.0	45.0
Total Split (%)	9.0%	55.0%		46.0%	46.0%		45.0%	45.0%	45.0%	45.0%	45.0%	45.0%
Yellow Time (s)	3.0	3.7		3.7	3.7		3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	3.5		3.5	3.5		4.5	4.5	4.5	4.5	4.5	4.5
Lost Time Adjust (s)	0.0	-1.0		0.0	0.0			0.0	0.0		-1.3	0.0
Total Lost Time (s)	4.0	6.2		7.2	7.2			7.8	7.8		6.5	7.8
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Recall Mode	None	Max		Max	Max		Min	Min	Min	Min	Min	Min
Act Effct Green (s)	51.4	49.2		39.1	39.1			24.2	24.2		25.5	24.2

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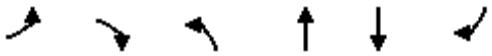
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.59	0.56		0.45	0.45			0.28	0.28		0.29	0.28
v/c Ratio	0.60	0.36		0.40	0.84			0.29	0.33		0.69	0.37
Control Delay	25.3	12.3		23.8	26.8			25.8	7.0		37.3	11.3
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	25.3	12.3		23.8	26.8			25.8	7.0		37.3	11.3
LOS	C	B		C	C			C	A		D	B
Approach Delay		14.1			26.6			14.6			26.0	
Approach LOS		B			C			B			C	
Queue Length 50th (m)	7.8	31.9		13.7	97.5			16.6	2.9		38.2	9.1
Queue Length 95th (m)	#30.7	58.9		35.6	#164.9			29.8	16.4		62.5	24.2
Internal Link Dist (m)		201.0			1074.9			1117.1			1625.4	
Turn Bay Length (m)	140.0			75.0					30.0			50.0
Base Capacity (vph)	196	2009		318	2271			671	778		572	759
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.60	0.36		0.40	0.84			0.19	0.24		0.45	0.26

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 87.5			
Natural Cycle: 95			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 22.6		Intersection LOS: C	
Intersection Capacity Utilization 75.3%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 10: Range Road & Two Mile Hill Road



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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	25	0	300	279	50
Future Volume (Veh/h)	0	25	0	300	279	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	27	0	326	303	54
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	493	178	357			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	493	178	357			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	100			
cM capacity (veh/h)	505	834	1198			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	27	163	163	202	155
Volume Left	0	0	0	0	0
Volume Right	27	0	0	0	54
cSH	834	1700	1700	1700	1700
Volume to Capacity	0.03	0.10	0.10	0.12	0.09
Queue Length 95th (m)	0.8	0.0	0.0	0.0	0.0
Control Delay (s)	9.5	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	9.5	0.0		0.0	
Approach LOS	A				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	19.3%	ICU Level of Service	A
Analysis Period (min)	15		

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APPENDIX B – SYNCHRO REPORTS – 2040 BACKGROUND CONDITION

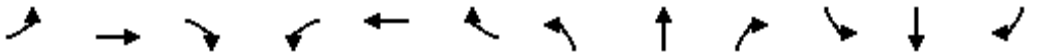
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Intersection	
Intersection Delay, s/veh	10.1
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	1	1	2	2
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	39	0	960	372
Demand Flow Rate, veh/h	40	0	979	380
Vehicles Circulating, veh/h	296	1018	39	7
Vehicles Exiting, veh/h	91	0	297	1011
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.0	0.0	12.4	4.9
Approach LOS	A	-	B	A

Lane	Left	Left	Left	Right	Left	Right
Designated Moves	LTR	LTR	L	TR	L	TR
Assumed Moves	LTR	LTR	L	TR	L	TR
RT Channelized						
Lane Util	1.000	1.000	0.007	0.993	0.000	1.000
Follow-Up Headway, s	2.609	2.609	2.535	2.535	2.535	2.535
Critical Headway, s	4.976	4.976	4.544	4.544	4.544	4.544
Entry Flow, veh/h	40	0	7	972	0	380
Cap Entry Lane, veh/h	1020	489	1371	1371	1411	1411
Entry HV Adj Factor	0.975	1.000	1.000	0.980	1.000	0.979
Flow Entry, veh/h	39	0	7	953	0	372
Cap Entry, veh/h	995	489	1371	1344	1411	1382
V/C Ratio	0.039	0.000	0.005	0.709	0.000	0.269
Control Delay, s/veh	4.0	7.4	2.7	12.5	2.6	4.9
LOS	A	A	A	B	A	A
95th %tile Queue, veh	0	0	0	6	0	1

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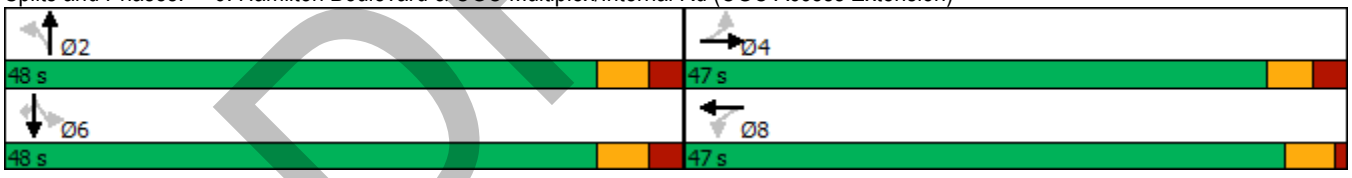
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	0	28	0	0	0	71	1051	0	0	781	53
Future Volume (vph)	37	0	28	0	0	0	71	1051	0	0	781	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	100.0		0.0	0.0		80.0
Storage Lanes	1		0	0		0	2		0	0		2
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00
Ped Bike Factor												
Frt		0.850										0.850
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1789	1601	0	0	1883	0	1789	3579	0	0	3579	1601
Flt Permitted	0.757						0.330					
Satd. Flow (perm)	1426	1601	0	0	1883	0	622	3579	0	0	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		84										58
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		310.3			283.9			321.6			541.6	
Travel Time (s)		22.3			20.4			19.3			32.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	40	0	30	0	0	0	77	1142	0	0	849	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	30	0	0	0	0	77	1142	0	0	849	58
Turn Type	Perm	NA					Perm	NA			NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	5.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	46.8	46.8		22.5	22.5		36.2	36.2		36.2	36.2	36.2
Total Split (s)	47.0	47.0		47.0	47.0		48.0	48.0		48.0	48.0	48.0
Total Split (%)	49.5%	49.5%		49.5%	49.5%		50.5%	50.5%		50.5%	50.5%	50.5%
Yellow Time (s)	3.3	3.3		3.5	3.5		3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	2.5	2.5		1.0	1.0		2.5	2.5		2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	5.8	5.8			4.5		6.2	6.2			6.2	6.2
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Act Effct Green (s)	12.3	12.3					40.0	40.0			40.0	40.0

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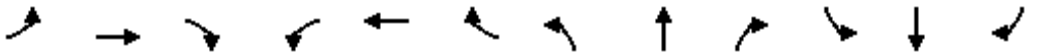
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.23	0.23					0.74	0.74			0.74	0.74
v/c Ratio	0.12	0.07					0.17	0.43			0.32	0.05
Control Delay	18.8	0.3					10.7	9.2			8.1	3.8
Queue Delay	0.0	0.0					0.0	0.0			0.0	0.0
Total Delay	18.8	0.3					10.7	9.2			8.1	3.8
LOS	B	A					B	A			A	A
Approach Delay		10.9						9.3			7.8	
Approach LOS		B						A			A	
Queue Length 50th (m)	3.7	0.0					2.5	25.0			16.6	0.0
Queue Length 95th (m)	10.2	0.0					19.4	111.6			75.5	6.6
Internal Link Dist (m)		286.3			259.9			297.6			517.6	
Turn Bay Length (m)							100.0					80.0
Base Capacity (vph)	1133	1289					498	2865			2865	1293
Starvation Cap Reductn	0	0					0	0			0	0
Spillback Cap Reductn	0	0					0	0			0	0
Storage Cap Reductn	0	0					0	0			0	0
Reduced v/c Ratio	0.04	0.02					0.15	0.40			0.30	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 54.1			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.43			
Intersection Signal Delay: 8.7		Intersection LOS: A	
Intersection Capacity Utilization 71.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 6: Hamilton Boulevard & CGC Multiplex/Internal Rd (CGC Access Extension)



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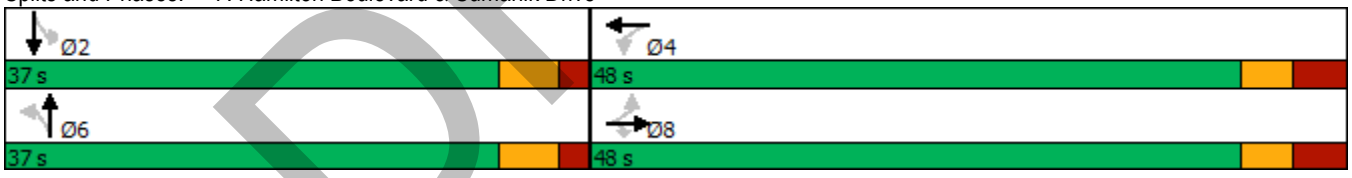
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	0	5	1	25	6	823	63	8	291	18
Future Volume (vph)	3	0	0	5	1	25	6	823	63	8	291	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	50.0		20.0	0.0		0.0	90.0		0.0	80.0		50.0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt					0.890			0.989			0.991	
Flt Protected	0.950	0.950			0.992		0.950			0.950		
Satd. Flow (prot)	1700	1700	1883	0	1663	0	1789	3539	0	1789	3546	0
Flt Permitted					0.960		0.549			0.296		
Satd. Flow (perm)	1789	1789	1883	0	1609	0	1034	3539	0	557	3546	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					27			10			9	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		630.9			204.4			391.2			321.6	
Travel Time (s)		45.4			14.7			23.5			19.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	3	0	0	5	1	27	7	895	68	9	316	20
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	1	2	0	0	33	0	7	963	0	9	336	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8		8	4			6			2		
Detector Phase	8	8	8	4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	47.8	47.8	47.8	47.8	47.8		35.7	35.7		35.7	35.7	
Total Split (s)	48.0	48.0	48.0	48.0	48.0		37.0	37.0		37.0	37.0	
Total Split (%)	56.5%	56.5%	56.5%	56.5%	56.5%		43.5%	43.5%		43.5%	43.5%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.5	3.5	3.5	3.5	3.5		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.8		6.8		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Act Effct Green (s)	7.6	7.6			7.6		35.4	35.4		35.4	35.4	

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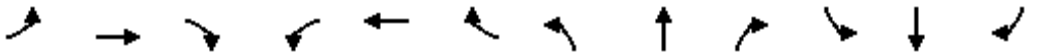
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.18	0.18			0.18		0.85	0.85		0.85	0.85	
v/c Ratio	0.00	0.01			0.11		0.01	0.32		0.02	0.11	
Control Delay	19.0	19.0			11.4		3.5	3.2		3.6	2.6	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	19.0	19.0			11.4		3.5	3.2		3.6	2.6	
LOS	B	B			B		A	A		A	A	
Approach Delay		19.0			11.4			3.2			2.6	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	0.1	0.1			0.3		0.0	0.0		0.0	0.0	
Queue Length 95th (m)	1.1	1.6			6.4		1.2	30.8		1.5	9.8	
Internal Link Dist (m)		606.9			180.4			367.2			297.6	
Turn Bay Length (m)	50.0						90.0			80.0		
Base Capacity (vph)	1628	1628			1467		828	2835		446	2840	
Starvation Cap Reductn	0	0			0		0	0		0	0	
Spillback Cap Reductn	0	0			0		0	0		0	0	
Storage Cap Reductn	0	0			0		0	0		0	0	
Reduced v/c Ratio	0.00	0.00			0.02		0.01	0.34		0.02	0.12	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 41.7			
Natural Cycle: 85			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.32			
Intersection Signal Delay: 3.3		Intersection LOS: A	
Intersection Capacity Utilization 41.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Hamilton Boulevard & Sumanik Drive



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	885	22	261	673	341	18	147	202	611	147	106
Future Volume (vph)	135	885	22	261	673	341	18	147	202	611	147	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	120.0		0.0	0.0		110.0	125.0		110.0	260.0		110.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												
Frt		0.996				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3564	0	1789	3579	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.235			0.095			0.651			0.578		
Satd. Flow (perm)	443	3564	0	179	3579	1601	1226	3579	1601	1089	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				371			186			115
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		541.6			225.0			695.8			804.3	
Travel Time (s)		32.5			13.5			41.7			48.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	147	962	24	284	732	371	20	160	220	664	160	115
Shared Lane Traffic (%)												
Lane Group Flow (vph)	147	986	0	284	732	371	20	160	220	664	160	115
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4	6		6	2		2
Detector Phase	3	8		7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	25.0		5.0	25.0	25.0	5.0	25.0	25.0	5.0	25.0	25.0
Minimum Split (s)	9.0	54.7		9.0	54.7	54.7	9.0	57.2	57.2	9.0	57.2	57.2
Total Split (s)	15.0	55.0		15.0	55.0	55.0	22.0	58.0	58.0	22.0	58.0	58.0
Total Split (%)	10.0%	36.7%		10.0%	36.7%	36.7%	14.7%	38.7%	38.7%	14.7%	38.7%	38.7%
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0		1.0	3.0	3.0	1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		-1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.7		2.5	6.7	6.7	4.0	7.2	7.2	4.0	7.2	7.2
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min		None	Min	Min	None	Min	Min	None	Min	Min
Act Effct Green (s)	52.1	39.3		57.2	40.4	40.4	39.0	29.4	29.4	54.9	47.7	47.7

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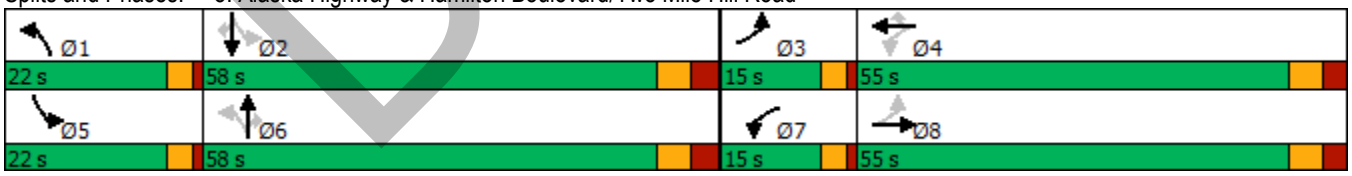
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.43	0.33		0.48	0.34	0.34	0.32	0.24	0.24	0.46	0.40	0.40
v/c Ratio	0.48	0.85		1.12	0.61	0.47	0.05	0.18	0.41	1.10	0.11	0.16
Control Delay	24.9	45.9		122.0	36.6	5.3	20.3	36.8	10.6	97.3	25.2	5.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.9	45.9		122.0	36.6	5.3	20.3	36.8	10.6	97.3	25.2	5.5
LOS	C	D		F	D	A	C	D	B	F	C	A
Approach Delay		43.2			45.7			21.6			73.8	
Approach LOS		D			D			C			E	
Queue Length 50th (m)	17.7	105.6		~55.3	71.2	0.0	2.5	15.5	6.2	~158.0	11.4	0.0
Queue Length 95th (m)	41.1	171.1		#148.1	118.6	22.7	7.4	26.2	26.3	#287.2	23.2	12.2
Internal Link Dist (m)		517.6			201.0			671.8			780.3	
Turn Bay Length (m)	120.0					110.0	125.0		110.0	260.0		110.0
Base Capacity (vph)	320	1452		254	1456	871	603	1532	791	603	1578	770
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.68		1.12	0.50	0.43	0.03	0.10	0.28	1.10	0.10	0.15

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 120.3			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.12			
Intersection Signal Delay: 49.3		Intersection LOS: D	
Intersection Capacity Utilization 112.6%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Alaska Highway & Hamilton Boulevard/Two Mile Hill Road



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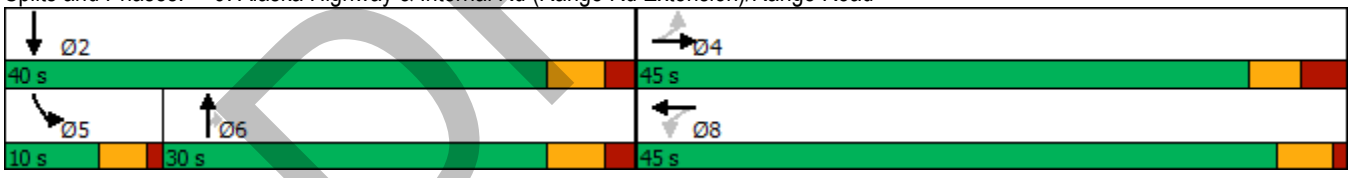
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	36	0	3	0	295	147	52	412	0
Future Volume (vph)	0	0	0	36	0	3	0	295	147	52	412	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		175.0	130.0		0.0
Storage Lanes	0		0	1		0	0		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												
Frt					0.850				0.850			
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	1883	0	1789	1601	0	0	3579	1601	1789	3579	0
Flt Permitted				0.952						0.950		
Satd. Flow (perm)	0	1883	0	1793	1601	0	0	3579	1601	1789	3579	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					419				160			
Link Speed (k/h)		48			50			70			70	
Link Distance (m)		122.4			1141.1			889.8			404.2	
Travel Time (s)		9.2			82.2			45.8			20.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	0	0	39	0	3	0	321	160	57	448	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	39	3	0	0	321	160	57	448	0
Turn Type				Perm	NA			NA	Perm	Prot	NA	
Protected Phases		4			8			6		5	2	
Permitted Phases	4			8					6			
Detector Phase	4	4		8	8			6	6	5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	5.0			20.0	20.0	5.0	20.0	
Minimum Split (s)	44.3	44.3		22.5	22.5			27.7	27.7	9.0	25.7	
Total Split (s)	45.0	45.0		45.0	45.0			30.0	30.0	10.0	40.0	
Total Split (%)	52.9%	52.9%		52.9%	52.9%			35.3%	35.3%	11.8%	47.1%	
Yellow Time (s)	3.3	3.3		3.5	3.5			3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		1.0	1.0			2.0	2.0	1.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.3		4.5	4.5			5.7	5.7	4.0	5.7	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?								Yes	Yes	Yes		
Recall Mode	None	None		None	None			Min	Min	None	Min	
Act Effct Green (s)				7.1	7.1			32.6	32.6	6.1	36.0	

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio				0.17	0.17			0.77	0.77	0.14	0.85	
v/c Ratio				0.13	0.00			0.12	0.13	0.22	0.15	
Control Delay				17.3	0.0			5.7	2.4	20.4	2.5	
Queue Delay				0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay				17.3	0.0			5.7	2.4	20.4	2.5	
LOS				B	A			A	A	C	A	
Approach Delay					16.1			4.6			4.5	
Approach LOS					B			A			A	
Queue Length 50th (m)				1.5	0.0			0.0	0.0	2.3	0.0	
Queue Length 95th (m)				9.2	0.0			15.2	7.6	13.0	11.8	
Internal Link Dist (m)		98.4			1117.1			865.8			380.2	
Turn Bay Length (m)									175.0	130.0		
Base Capacity (vph)				1653	1509			2843	1305	262	3130	
Starvation Cap Reductn				0	0			0	0	0	0	
Spillback Cap Reductn				0	0			0	0	0	0	
Storage Cap Reductn				0	0			0	0	0	0	
Reduced v/c Ratio				0.02	0.00			0.11	0.12	0.22	0.14	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 42.4			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.22			
Intersection Signal Delay: 5.0		Intersection LOS: A	
Intersection Capacity Utilization 36.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Alaska Highway & Internal Rd (Range Rd Extension)/Range Road



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	206	1341	19	77	518	174	7	79	265	338	65	160
Future Volume (vph)	206	1341	19	77	518	174	7	79	265	338	65	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	140.0		0.0	75.0		175.0	0.0		30.0	0.0		50.0
Storage Lanes	1		0	1		1	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.962				0.850			0.850
Flt Protected	0.950			0.950				0.996			0.960	
Satd. Flow (prot)	1789	3571	0	1789	4946	0	0	1876	1601	0	1808	1601
Flt Permitted	0.282			0.133				0.955			0.696	
Satd. Flow (perm)	531	3571	0	250	4946	0	0	1799	1601	0	1311	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			101				99			174
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		225.0			1098.9			1141.1			1649.4	
Travel Time (s)		13.5			65.9			82.2			118.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	224	1458	21	84	563	189	8	86	288	367	71	174
Shared Lane Traffic (%)												
Lane Group Flow (vph)	224	1479	0	84	752	0	0	94	288	0	438	174
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		6	6		8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	9.0	31.2		31.2	31.2		14.8	14.8	14.8	43.8	43.8	43.8
Total Split (s)	9.0	46.0		37.0	37.0		44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	10.0%	51.1%		41.1%	41.1%		48.9%	48.9%	48.9%	48.9%	48.9%	48.9%
Yellow Time (s)	3.0	3.7		3.7	3.7		3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	3.5		3.5	3.5		4.5	4.5	4.5	4.5	4.5	4.5
Lost Time Adjust (s)	0.0	-1.0		0.0	0.0			0.0	0.0		-1.3	0.0
Total Lost Time (s)	4.0	6.2		7.2	7.2			7.8	7.8		6.5	7.8
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Recall Mode	None	Max		Max	Max		Min	Min	Min	Min	Min	Min
Act Effct Green (s)	42.2	40.0		29.9	29.9			32.2	32.2		33.5	32.2

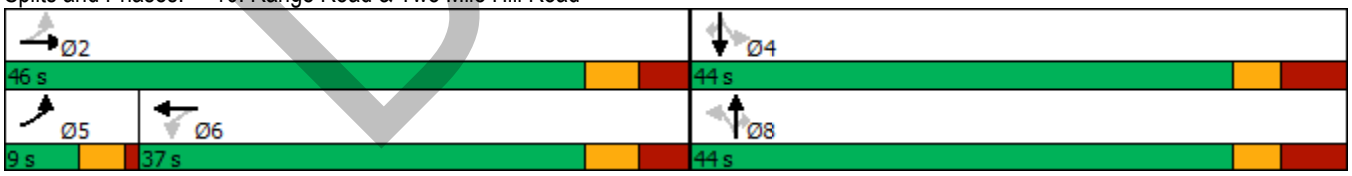
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.49	0.46		0.35	0.35			0.37	0.37		0.39	0.37
v/c Ratio	0.67	0.89		0.98	0.42			0.14	0.44		0.86	0.25
Control Delay	27.5	30.7		127.7	19.9			17.9	14.8		42.4	3.8
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	27.5	30.7		127.7	19.9			17.9	14.8		42.4	3.8
LOS	C	C		F	B			B	B		D	A
Approach Delay		30.3			30.7			15.6			31.4	
Approach LOS		C			C			B			C	
Queue Length 50th (m)	22.7	123.8		~14.8	31.6			10.0	21.8		64.6	0.0
Queue Length 95th (m)	#42.5	#172.6		#43.5	42.3			19.7	42.1		#115.1	11.5
Internal Link Dist (m)		201.0			1074.9			1117.1			1625.4	
Turn Bay Length (m)	140.0			75.0					30.0			50.0
Base Capacity (vph)	333	1657		86	1783			758	732		573	775
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.67	0.89		0.98	0.42			0.12	0.39		0.76	0.22

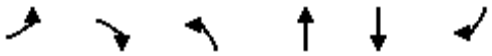
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 86.2			
Natural Cycle: 95			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 29.0		Intersection LOS: C	
Intersection Capacity Utilization 93.3%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Range Road & Two Mile Hill Road



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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	59	0	367	405	25
Future Volume (Veh/h)	0	59	0	367	405	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	64	0	399	440	27
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	653	234	467			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	653	234	467			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	92	100			
cM capacity (veh/h)	400	768	1091			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	64	200	200	293	174
Volume Left	0	0	0	0	0
Volume Right	64	0	0	0	27
cSH	768	1700	1700	1700	1700
Volume to Capacity	0.08	0.12	0.12	0.17	0.10
Queue Length 95th (m)	2.1	0.0	0.0	0.0	0.0
Control Delay (s)	10.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.1	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	22.3%	ICU Level of Service	A
Analysis Period (min)	15		

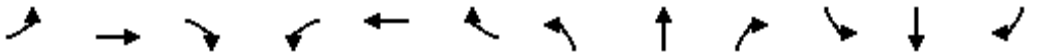
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Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	1	1	2	2
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	97	0	516	1033
Demand Flow Rate, veh/h	99	0	526	1054
Vehicles Circulating, veh/h	970	620	94	4
Vehicles Exiting, veh/h	88	0	975	616
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.8	0.0	6.7	13.5
Approach LOS	A	-	A	B

Lane	Left	Left	Left	Right	Left	Right
Designated Moves	LTR	LTR	L	TR	L	TR
Assumed Moves	LTR	LTR	L	TR	L	TR
RT Channelized						
Lane Util	1.000	1.000	0.008	0.992	0.000	1.000
Follow-Up Headway, s	2.609	2.609	2.535	2.535	2.535	2.535
Critical Headway, s	4.976	4.976	4.544	4.544	4.544	4.544
Entry Flow, veh/h	99	0	4	522	0	1054
Cap Entry Lane, veh/h	513	733	1304	1304	1415	1415
Entry HV Adj Factor	0.980	1.000	1.000	0.980	1.000	0.980
Flow Entry, veh/h	97	0	4	512	0	1033
Cap Entry, veh/h	503	733	1304	1278	1415	1387
V/C Ratio	0.193	0.000	0.003	0.400	0.000	0.745
Control Delay, s/veh	9.8	4.9	2.8	6.7	2.5	13.5
LOS	A	A	A	A	A	B
95th %tile Queue, veh	1	0	0	2	0	7

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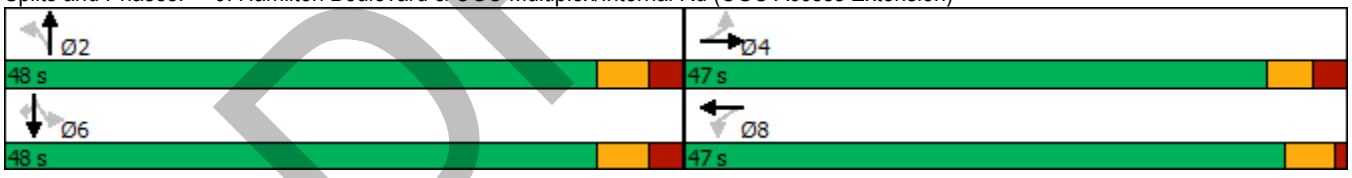
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	0	79	0	0	0	37	541	0	0	1057	72
Future Volume (vph)	42	0	79	0	0	0	37	541	0	0	1057	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	100.0		0.0	0.0		80.0
Storage Lanes	1		0	0		0	2		0	0		2
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00
Ped Bike Factor												
Frt		0.850										0.850
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1789	1601	0	0	1883	0	1789	3579	0	0	3579	1601
Flt Permitted	0.757						0.210					
Satd. Flow (perm)	1426	1601	0	0	1883	0	396	3579	0	0	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37										78
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		310.3			283.9			321.6			541.6	
Travel Time (s)		22.3			20.4			19.3			32.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	46	0	86	0	0	0	40	588	0	0	1149	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	86	0	0	0	0	40	588	0	0	1149	78
Turn Type	Perm	NA					Perm	NA			NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	5.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	46.8	46.8		22.5	22.5		36.2	36.2		36.2	36.2	36.2
Total Split (s)	47.0	47.0		47.0	47.0		48.0	48.0		48.0	48.0	48.0
Total Split (%)	49.5%	49.5%		49.5%	49.5%		50.5%	50.5%		50.5%	50.5%	50.5%
Yellow Time (s)	3.3	3.3		3.5	3.5		3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	2.5	2.5		1.0	1.0		2.5	2.5		2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	5.8	5.8			4.5		6.2	6.2			6.2	6.2
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Act Effct Green (s)	12.2	12.2					34.5	34.5			34.5	34.5

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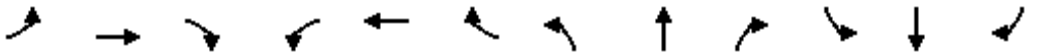
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.23	0.23					0.64	0.64			0.64	0.64
v/c Ratio	0.14	0.22					0.16	0.26			0.50	0.07
Control Delay	17.4	11.9					12.4	8.6			10.8	3.4
Queue Delay	0.0	0.0					0.0	0.0			0.0	0.0
Total Delay	17.4	11.9					12.4	8.6			10.8	3.4
LOS	B	B					B	A			B	A
Approach Delay		13.9						8.8			10.3	
Approach LOS		B						A			B	
Queue Length 50th (m)	3.0	3.2					1.3	10.4			25.1	0.0
Queue Length 95th (m)	11.3	13.7					12.3	49.6			112.3	7.6
Internal Link Dist (m)		286.3			259.9			297.6			517.6	
Turn Bay Length (m)							100.0					80.0
Base Capacity (vph)	1155	1304					324	2932			2932	1325
Starvation Cap Reductn	0	0					0	0			0	0
Spillback Cap Reductn	0	0					0	0			0	0
Storage Cap Reductn	0	0					0	0			0	0
Reduced v/c Ratio	0.04	0.07					0.12	0.20			0.39	0.06

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 54			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 10.1		Intersection LOS: B	
Intersection Capacity Utilization 46.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Hamilton Boulevard & CGC Multiplex/Internal Rd (CGC Access Extension)



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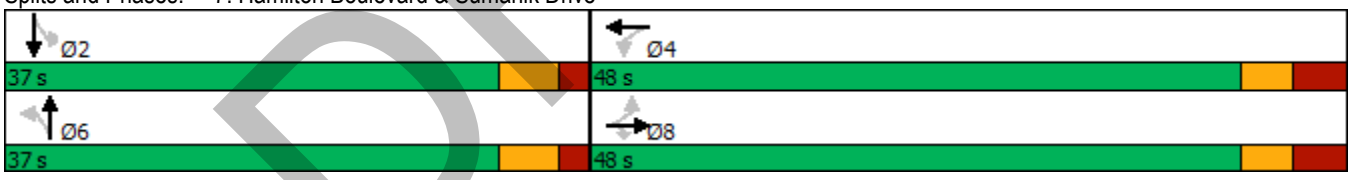
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	4	14	3	0	15	11	459	23	24	776	34
Future Volume (vph)	20	4	14	3	0	15	11	459	23	24	776	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	50.0		20.0	0.0		0.0	90.0		0.0	80.0		50.0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.850		0.886			0.993			0.994	
Flt Protected	0.950	0.967			0.992		0.950			0.950		
Satd. Flow (prot)	1700	1730	1601	0	1655	0	1789	3553	0	1789	3557	0
Flt Permitted					0.941		0.323			0.458		
Satd. Flow (perm)	1789	1789	1601	0	1570	0	608	3553	0	863	3557	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			35		35			7			6	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		630.9			204.4			391.2			321.6	
Travel Time (s)		45.4			14.7			23.5			19.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	22	4	15	3	0	16	12	499	25	26	843	37
Shared Lane Traffic (%)	41%											
Lane Group Flow (vph)	13	13	15	0	19	0	12	524	0	26	880	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8		8	4			6			2		
Detector Phase	8	8	8	4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	47.8	47.8	47.8	47.8	47.8		35.7	35.7		35.7	35.7	
Total Split (s)	48.0	48.0	48.0	48.0	48.0		37.0	37.0		37.0	37.0	
Total Split (%)	56.5%	56.5%	56.5%	56.5%	56.5%		43.5%	43.5%		43.5%	43.5%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.5	3.5	3.5	3.5	3.5		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.8		6.8		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Act Effct Green (s)	7.4	7.4	7.4		7.4		31.4	31.4		31.4	31.4	

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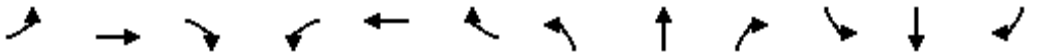
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.19	0.19	0.19		0.19		0.82	0.82		0.82	0.82	
v/c Ratio	0.04	0.04	0.04		0.06		0.02	0.18		0.04	0.30	
Control Delay	15.8	15.8	3.9		5.2		4.3	3.1		4.1	3.6	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	15.8	15.8	3.9		5.2		4.3	3.1		4.1	3.6	
LOS	B	B	A		A		A	A		A	A	
Approach Delay		11.5			5.2			3.2			3.6	
Approach LOS		B			A			A			A	
Queue Length 50th (m)	0.6	0.6	0.0		0.0		0.0	0.0		0.0	0.0	
Queue Length 95th (m)	4.4	4.4	2.1		2.8		1.9	15.7		3.1	28.2	
Internal Link Dist (m)		606.9			180.4			367.2			297.6	
Turn Bay Length (m)	50.0		20.0				90.0			80.0		
Base Capacity (vph)	1719	1719	1539		1510		512	2997		727	3000	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	0.01	0.01	0.01		0.01		0.02	0.17		0.04	0.29	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 38.1			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.30			
Intersection Signal Delay: 3.7		Intersection LOS: A	
Intersection Capacity Utilization 50.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Hamilton Boulevard & Sumanik Drive



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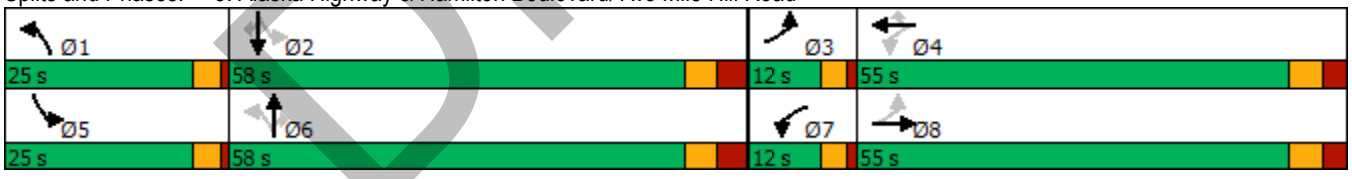
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	428	8	264	911	742	12	186	176	395	138	156
Future Volume (vph)	127	428	8	264	911	742	12	186	176	395	138	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	120.0		0.0	0.0		110.0	125.0		110.0	260.0		110.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												
Frt		0.997				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3568	0	1789	3579	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.128			0.417			0.657			0.556		
Satd. Flow (perm)	241	3568	0	785	3579	1601	1237	3579	1601	1047	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				627			191			170
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		541.6			225.0			695.8			804.3	
Travel Time (s)		32.5			13.5			41.7			48.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	138	465	9	287	990	807	13	202	191	429	150	170
Shared Lane Traffic (%)												
Lane Group Flow (vph)	138	474	0	287	990	807	13	202	191	429	150	170
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4	6		6	2		2
Detector Phase	3	8		7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	25.0		5.0	25.0	25.0	5.0	25.0	25.0	5.0	25.0	25.0
Minimum Split (s)	9.0	54.7		9.0	54.7	54.7	9.0	57.2	57.2	9.0	57.2	57.2
Total Split (s)	12.0	55.0		12.0	55.0	55.0	25.0	58.0	58.0	25.0	58.0	58.0
Total Split (%)	8.0%	36.7%		8.0%	36.7%	36.7%	16.7%	38.7%	38.7%	16.7%	38.7%	38.7%
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0		1.0	3.0	3.0	1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		-1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.7		2.5	6.7	6.7	4.0	7.2	7.2	4.0	7.2	7.2
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min		None	Min	Min	None	Min	Min	None	Min	Min
Act Effct Green (s)	59.3	48.6		62.3	48.6	48.6	38.7	29.5	29.5	57.8	50.6	50.6

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.46	0.38		0.48	0.38	0.38	0.30	0.23	0.23	0.45	0.39	0.39
v/c Ratio	0.67	0.35		0.63	0.74	0.81	0.03	0.25	0.37	0.73	0.11	0.23
Control Delay	38.2	31.0		30.1	39.8	15.8	20.4	40.8	7.0	34.1	25.8	4.5
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	38.2	31.0		30.1	39.8	15.8	20.4	40.8	7.0	34.1	25.8	4.5
LOS	D	C		C	D	B	C	D	A	C	C	A
Approach Delay		32.6			29.2			24.3			25.7	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	17.5	42.4		38.8	106.3	37.8	1.8	22.1	0.0	77.5	11.8	0.0
Queue Length 95th (m)	#48.1	73.6		80.7	171.9	128.1	5.4	32.0	17.0	105.1	21.0	13.7
Internal Link Dist (m)		517.6			201.0			671.8			780.3	
Turn Bay Length (m)	120.0					110.0	125.0		110.0	260.0		110.0
Base Capacity (vph)	207	1341		452	1344	992	605	1414	748	589	1478	761
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.35		0.63	0.74	0.81	0.02	0.14	0.26	0.73	0.10	0.22

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 129.2			
Natural Cycle: 130			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 28.5		Intersection LOS: C	
Intersection Capacity Utilization 96.4%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 8: Alaska Highway & Hamilton Boulevard/Two Mile Hill Road



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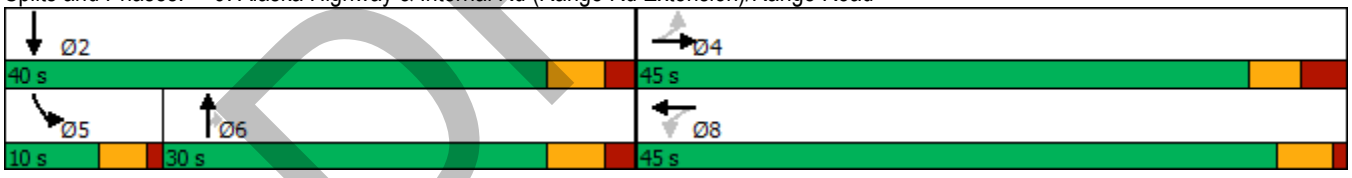
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	98	0	20	0	412	173	13	461	0
Future Volume (vph)	0	0	0	98	0	20	0	412	173	13	461	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		175.0	130.0		0.0
Storage Lanes	0		0	1		0	0		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												
Frt					0.850				0.850			
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	1883	0	1789	1601	0	0	3579	1601	1789	3579	0
Flt Permitted				0.757						0.950		
Satd. Flow (perm)	0	1883	0	1426	1601	0	0	3579	1601	1789	3579	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					327				188			
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		122.4			1141.1			889.8			404.2	
Travel Time (s)		8.8			82.2			45.8			20.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	0	0	107	0	22	0	448	188	14	501	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	107	22	0	0	448	188	14	501	0
Turn Type				Perm	NA			NA	Perm	Prot	NA	
Protected Phases		4			8			6		5	2	
Permitted Phases	4			8					6			
Detector Phase	4	4		8	8			6	6	5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	5.0			20.0	20.0	5.0	20.0	
Minimum Split (s)	44.3	44.3		22.5	22.5			27.7	27.7	9.0	25.7	
Total Split (s)	45.0	45.0		45.0	45.0			30.0	30.0	10.0	40.0	
Total Split (%)	52.9%	52.9%		52.9%	52.9%			35.3%	35.3%	11.8%	47.1%	
Yellow Time (s)	3.3	3.3		3.5	3.5			3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		1.0	1.0			2.0	2.0	1.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.3		4.5	4.5			5.7	5.7	4.0	5.7	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?								Yes	Yes	Yes		
Recall Mode	None	None		None	None			Min	Min	None	Min	
Act Effct Green (s)				9.0	9.0			26.3	26.3	5.8	27.9	

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio				0.21	0.21			0.60	0.60	0.13	0.64	
v/c Ratio				0.37	0.04			0.21	0.18	0.06	0.22	
Control Delay				19.2	0.1			7.0	2.4	19.0	5.2	
Queue Delay				0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay				19.2	0.1			7.0	2.4	19.0	5.2	
LOS				B	A			A	A	B	A	
Approach Delay					15.9			5.6			5.5	
Approach LOS					B			A			A	
Queue Length 50th (m)				5.9	0.0			7.4	0.0	0.8	8.4	
Queue Length 95th (m)				20.0	0.0			23.8	9.0	5.4	16.5	
Internal Link Dist (m)		98.4			1117.1			865.8			380.2	
Turn Bay Length (m)									175.0	130.0		
Base Capacity (vph)				1319	1506			2339	1111	248	2959	
Starvation Cap Reductn				0	0			0	0	0	0	
Spillback Cap Reductn				0	0			0	0	0	0	
Storage Cap Reductn				0	0			0	0	0	0	
Reduced v/c Ratio				0.08	0.01			0.19	0.17	0.06	0.17	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 43.8			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.37			
Intersection Signal Delay: 6.6		Intersection LOS: A	
Intersection Capacity Utilization 30.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Alaska Highway & Internal Rd (Range Rd Extension)/Range Road



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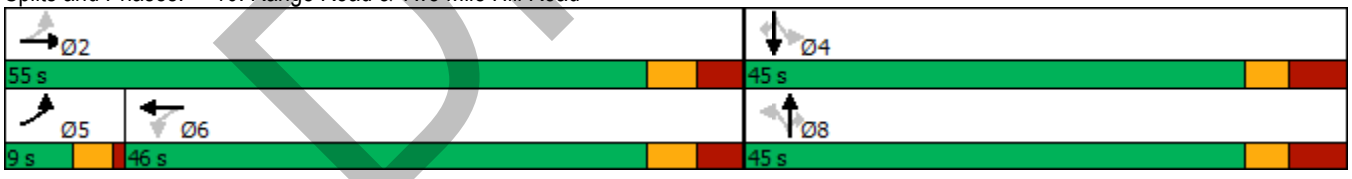
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	692	11	145	1587	324	39	108	211	238	59	227
Future Volume (vph)	135	692	11	145	1587	324	39	108	211	238	59	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	140.0		0.0	75.0		175.0	0.0		30.0	0.0		50.0
Storage Lanes	1		0	1		1	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.975				0.850			0.850
Flt Protected	0.950			0.950				0.987			0.961	
Satd. Flow (prot)	1789	3571	0	1789	5013	0	0	1859	1601	0	1810	1601
Flt Permitted	0.093			0.362				0.751			0.665	
Satd. Flow (perm)	175	3571	0	682	5013	0	0	1414	1601	0	1252	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			51				143			126
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		225.0			1098.9			1141.1			1649.4	
Travel Time (s)		13.5			65.9			82.2			118.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	147	752	12	158	1725	352	42	117	229	259	64	247
Shared Lane Traffic (%)												
Lane Group Flow (vph)	147	764	0	158	2077	0	0	159	229	0	323	247
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		6	6		8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	9.0	31.2		31.2	31.2		14.8	14.8	14.8	43.8	43.8	43.8
Total Split (s)	9.0	55.0		46.0	46.0		45.0	45.0	45.0	45.0	45.0	45.0
Total Split (%)	9.0%	55.0%		46.0%	46.0%		45.0%	45.0%	45.0%	45.0%	45.0%	45.0%
Yellow Time (s)	3.0	3.7		3.7	3.7		3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	3.5		3.5	3.5		4.5	4.5	4.5	4.5	4.5	4.5
Lost Time Adjust (s)	0.0	-1.0		0.0	0.0			0.0	0.0		-1.3	0.0
Total Lost Time (s)	4.0	6.2		7.2	7.2			7.8	7.8		6.5	7.8
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Recall Mode	None	Max		Max	Max		Min	Min	Min	Min	Min	Min
Act Effct Green (s)	51.3	49.1		39.1	39.1			29.3	29.3		30.6	29.3

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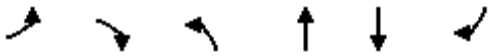
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.55	0.53		0.42	0.42			0.32	0.32		0.33	0.32
v/c Ratio	0.80	0.40		0.55	0.97			0.36	0.38		0.78	0.42
Control Delay	46.5	14.8		31.4	40.5			26.0	10.9		41.6	13.6
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	46.5	14.8		31.4	40.5			26.0	10.9		41.6	13.6
LOS	D	B		C	D			C	B		D	B
Approach Delay		19.9			39.9			17.1			29.4	
Approach LOS		B			D			B			C	
Queue Length 50th (m)	12.5	42.2		21.4	131.2			21.5	10.9		51.0	15.7
Queue Length 95th (m)	#46.5	63.2		47.2	#189.5			37.4	27.7		82.3	34.6
Internal Link Dist (m)		201.0			1074.9			1117.1			1625.4	
Turn Bay Length (m)	140.0			75.0					30.0			50.0
Base Capacity (vph)	184	1897		288	2146			572	733		524	723
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.80	0.40		0.55	0.97			0.28	0.31		0.62	0.34

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 92.5			
Natural Cycle: 95			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 31.8		Intersection LOS: C	
Intersection Capacity Utilization 83.1%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 10: Range Road & Two Mile Hill Road



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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	25	0	374	360	50
Future Volume (Veh/h)	0	25	0	374	360	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	27	0	407	391	54
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	622	222	445			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	622	222	445			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	100			
cM capacity (veh/h)	419	781	1112			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	27	204	204	261	184
Volume Left	0	0	0	0	0
Volume Right	27	0	0	0	54
cSH	781	1700	1700	1700	1700
Volume to Capacity	0.03	0.12	0.12	0.15	0.11
Queue Length 95th (m)	0.8	0.0	0.0	0.0	0.0
Control Delay (s)	9.8	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	9.8	0.0		0.0	
Approach LOS	A				

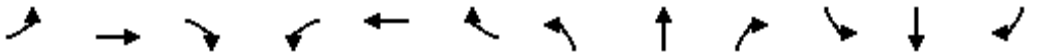
Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	21.5%	ICU Level of Service	A
Analysis Period (min)	15		

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APPENDIX C – SYNCHRO REPORTS – INTERSECTION IMPROVEMENTS (2040 BACKGROUND CONDITION)

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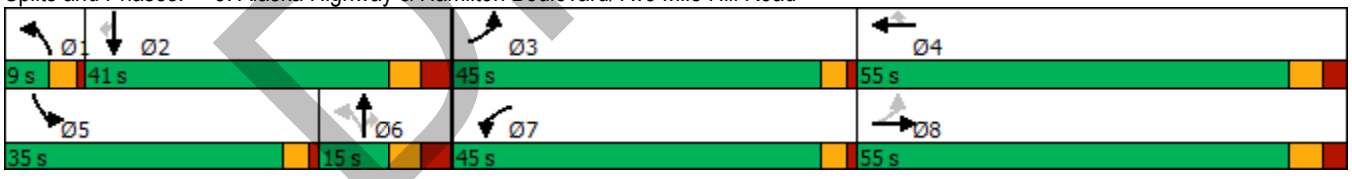
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	885	22	261	673	341	18	147	202	611	147	106
Future Volume (vph)	135	885	22	261	673	341	18	147	202	611	147	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	120.0		0.0	0.0		110.0	125.0		110.0	260.0		110.0
Storage Lanes	1		0	2		1	1		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor												
Frt		0.996				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3564	0	3471	3579	1601	1789	3579	1601	3471	3579	1601
Flt Permitted	0.304			0.950			0.651			0.950		
Satd. Flow (perm)	573	3564	0	3471	3579	1601	1226	3579	1601	3471	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				371			220			115
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		541.6			225.0			695.8			804.3	
Travel Time (s)		32.5			13.5			41.7			48.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	147	962	24	284	732	371	20	160	220	664	160	115
Shared Lane Traffic (%)												
Lane Group Flow (vph)	147	986	0	284	732	371	20	160	220	664	160	115
Turn Type	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8					4	6		6			2
Detector Phase	3	8		7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	25.0		5.0	25.0	25.0	5.0	9.0	9.0	5.0	9.0	9.0
Minimum Split (s)	9.0	54.7		9.0	54.7	54.7	9.0	57.2	57.2	9.0	57.2	57.2
Total Split (s)	45.0	55.0		45.0	55.0	55.0	9.0	15.0	15.0	35.0	41.0	41.0
Total Split (%)	30.0%	36.7%		30.0%	36.7%	36.7%	6.0%	10.0%	10.0%	23.3%	27.3%	27.3%
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0		1.0	3.0	3.0	1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		-1.5	0.0	0.0	0.0	0.0	0.0	-1.5	0.0	0.0
Total Lost Time (s)	4.0	6.7		2.5	6.7	6.7	4.0	7.2	7.2	2.5	7.2	7.2
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min		None	Min	Min	None	Min	Min	None	Min	Min
Act Effct Green (s)	53.9	40.0		19.8	47.1	47.1	22.6	14.0	14.0	29.7	43.4	43.4

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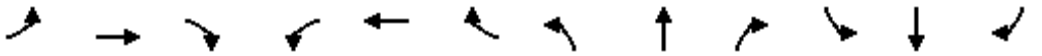
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.44	0.32		0.16	0.38	0.38	0.18	0.11	0.11	0.24	0.35	0.35
v/c Ratio	0.41	0.85		0.51	0.54	0.44	0.08	0.39	0.58	0.79	0.13	0.18
Control Delay	21.9	48.4		54.1	33.9	5.2	27.3	54.0	12.6	53.5	29.0	5.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.9	48.4		54.1	33.9	5.2	27.3	54.0	12.6	53.5	29.0	5.9
LOS	C	D		D	C	A	C	D	B	D	C	A
Approach Delay		45.0			30.3			29.9			43.5	
Approach LOS		D			C			C			D	
Queue Length 50th (m)	15.8	106.7		30.7	64.9	0.0	2.8	19.1	0.0	70.8	12.8	0.0
Queue Length 95th (m)	46.1	#237.1		64.3	141.2	24.8	8.7	33.2	21.0	#171.8	26.1	12.6
Internal Link Dist (m)		517.6			201.0			671.8			780.3	
Turn Bay Length (m)	120.0					110.0	125.0		110.0	260.0		110.0
Base Capacity (vph)	727	1466		1255	1527	895	248	406	377	960	1269	642
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.67		0.23	0.48	0.41	0.08	0.39	0.58	0.69	0.13	0.18

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 123.4			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 37.8		Intersection LOS: D	
Intersection Capacity Utilization 75.8%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 8: Alaska Highway & Hamilton Boulevard/Two Mile Hill Road



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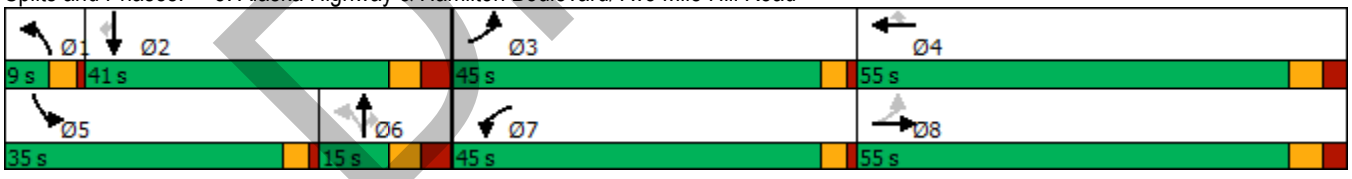
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	428	8	264	911	742	12	186	176	395	138	156
Future Volume (vph)	127	428	8	264	911	742	12	186	176	395	138	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	120.0		0.0	0.0		110.0	125.0		110.0	260.0		110.0
Storage Lanes	1		0	2		1	1		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor												
Frt		0.997				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3568	0	3471	3579	1601	1789	3579	1601	3471	3579	1601
Flt Permitted	0.187			0.950			0.657			0.950		
Satd. Flow (perm)	352	3568	0	3471	3579	1601	1237	3579	1601	3471	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				740			191			170
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		541.6			225.0			695.8			804.3	
Travel Time (s)		32.5			13.5			41.7			48.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	138	465	9	287	990	807	13	202	191	429	150	170
Shared Lane Traffic (%)												
Lane Group Flow (vph)	138	474	0	287	990	807	13	202	191	429	150	170
Turn Type	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8					4	6		6			2
Detector Phase	3	8		7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	25.0		5.0	25.0	25.0	5.0	9.0	9.0	5.0	9.0	9.0
Minimum Split (s)	9.0	54.7		9.0	54.7	54.7	9.0	57.2	57.2	9.0	57.2	57.2
Total Split (s)	45.0	55.0		45.0	55.0	55.0	9.0	15.0	15.0	35.0	41.0	41.0
Total Split (%)	30.0%	36.7%		30.0%	36.7%	36.7%	6.0%	10.0%	10.0%	23.3%	27.3%	27.3%
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0		1.0	3.0	3.0	1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		-1.5	0.0	0.0	0.0	0.0	0.0	-1.5	0.0	0.0
Total Lost Time (s)	4.0	6.7		2.5	6.7	6.7	4.0	7.2	7.2	2.5	7.2	7.2
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min		None	Min	Min	None	Min	Min	None	Min	Min
Act Effct Green (s)	58.6	44.6		19.0	50.8	50.8	22.4	13.8	13.8	21.3	36.5	36.5

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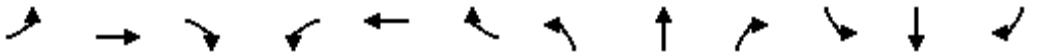
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.49	0.38		0.16	0.43	0.43	0.19	0.12	0.12	0.18	0.31	0.31
v/c Ratio	0.45	0.35		0.52	0.65	0.73	0.05	0.48	0.54	0.69	0.14	0.28
Control Delay	20.4	31.4		51.8	32.9	8.8	26.8	52.4	12.1	53.9	29.4	5.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.4	31.4		51.8	32.9	8.8	26.8	52.4	12.1	53.9	29.4	5.3
LOS	C	C		D	C	A	C	D	B	D	C	A
Approach Delay		28.9			26.2			32.6			38.0	
Approach LOS		C			C			C			D	
Queue Length 50th (m)	11.1	35.1		28.1	78.9	7.7	1.9	22.0	0.0	42.8	12.2	0.0
Queue Length 95th (m)	43.6	93.5		64.8	#216.6	80.1	6.5	40.4	19.7	93.5	24.5	14.8
Internal Link Dist (m)		517.6			201.0			671.8			780.3	
Turn Bay Length (m)	120.0					110.0	125.0		110.0	260.0		110.0
Base Capacity (vph)	726	1526		1306	1552	1113	258	417	355	999	1241	666
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.31		0.22	0.64	0.73	0.05	0.48	0.54	0.43	0.12	0.26

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 118.5			
Natural Cycle: 140			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 29.6		Intersection LOS: C	
Intersection Capacity Utilization 75.4%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 8: Alaska Highway & Hamilton Boulevard/Two Mile Hill Road



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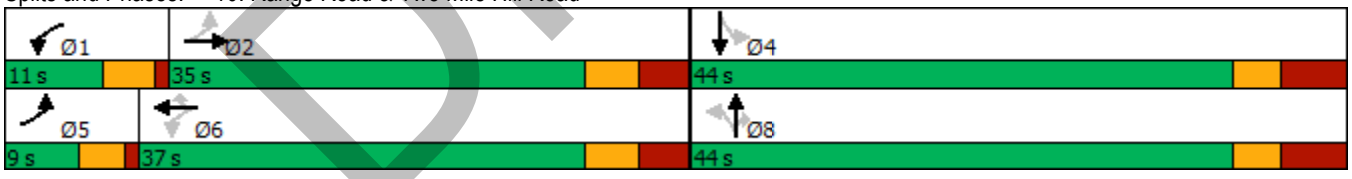
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	206	1341	19	77	518	174	7	79	265	338	65	160
Future Volume (vph)	206	1341	19	77	518	174	7	79	265	338	65	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	140.0		0.0	75.0		175.0	0.0		30.0	0.0		50.0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998				0.850			0.850		0.893	
Flt Protected	0.950			0.950				0.996		0.950		
Satd. Flow (prot)	1789	5132	0	1789	5142	1601	0	1876	1601	1789	1682	0
Flt Permitted	0.430			0.129				0.967		0.696		
Satd. Flow (perm)	810	5132	0	243	5142	1601	0	1821	1601	1311	1682	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				189			168		168	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		225.0			1098.9			1141.1			1649.4	
Travel Time (s)		13.5			65.9			82.2			118.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	224	1458	21	84	563	189	8	86	288	367	71	174
Shared Lane Traffic (%)												
Lane Group Flow (vph)	224	1479	0	84	563	189	0	94	288	367	245	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		
Detector Phase	5	2		1	6	6	8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	9.0	31.2		9.5	31.2	31.2	14.8	14.8	14.8	43.8	43.8	
Total Split (s)	9.0	35.0		11.0	37.0	37.0	44.0	44.0	44.0	44.0	44.0	
Total Split (%)	10.0%	38.9%		12.2%	41.1%	41.1%	48.9%	48.9%	48.9%	48.9%	48.9%	
Yellow Time (s)	3.0	3.7		3.5	3.7	3.7	3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	1.0	3.5		1.0	3.5	3.5	4.5	4.5	4.5	4.5	4.5	
Lost Time Adjust (s)	0.0	-1.0		0.0	0.0	0.0		0.0	0.0	-1.8	-1.3	
Total Lost Time (s)	4.0	6.2		4.5	7.2	7.2		7.8	7.8	6.0	6.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Recall Mode	None	Max		None	Max	Max	Min	Min	Min	Min	Min	
Act Effct Green (s)	37.7	31.6		39.1	30.0	30.0		28.4	28.4	30.3	29.8	

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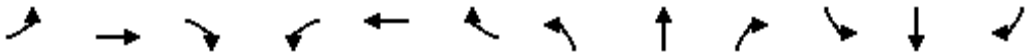
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.46	0.38		0.47	0.36	0.36		0.34	0.34	0.37	0.36	
v/c Ratio	0.52	0.75		0.36	0.30	0.27		0.15	0.44	0.77	0.34	
Control Delay	20.4	27.7		17.3	20.5	4.6		18.4	10.3	34.2	7.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	20.4	27.7		17.3	20.5	4.6		18.4	10.3	34.2	7.5	
LOS	C	C		B	C	A		B	B	C	A	
Approach Delay		26.8			16.6			12.3			23.5	
Approach LOS		C			B			B			C	
Queue Length 50th (m)	19.6	79.1		6.8	23.6	0.0		10.0	13.1	49.6	7.9	
Queue Length 95th (m)	37.5	#115.7		15.9	35.6	13.5		19.7	31.5	80.9	22.3	
Internal Link Dist (m)		201.0			1074.9			1117.1			1625.4	
Turn Bay Length (m)	140.0			75.0		175.0			30.0			
Base Capacity (vph)	428	1962		237	1868	702		803	800	607	860	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.52	0.75		0.35	0.30	0.27		0.12	0.36	0.60	0.28	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 82.7			
Natural Cycle: 85			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 22.2		Intersection LOS: C	
Intersection Capacity Utilization 78.6%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 10: Range Road & Two Mile Hill Road



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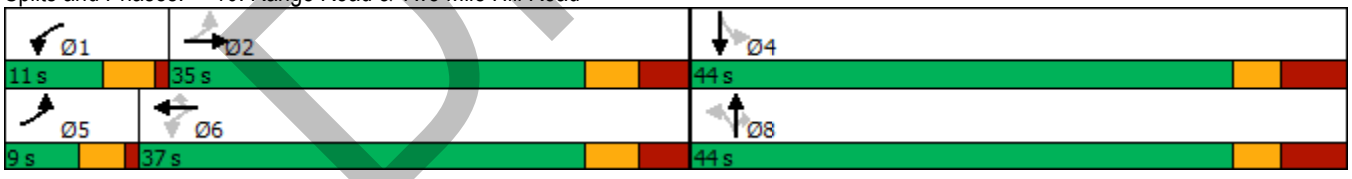
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	692	11	145	1587	324	39	108	211	238	59	227
Future Volume (vph)	135	692	11	145	1587	324	39	108	211	238	59	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	140.0		0.0	75.0		175.0	0.0		30.0	0.0		50.0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998				0.850			0.850		0.881	
Flt Protected	0.950			0.950				0.987		0.950		
Satd. Flow (prot)	1789	5132	0	1789	5142	1601	0	1859	1601	1789	1659	0
Flt Permitted	0.142			0.297				0.763		0.656		
Satd. Flow (perm)	267	5132	0	559	5142	1601	0	1437	1601	1236	1659	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				352			206		167	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		225.0			1098.9			1141.1			1649.4	
Travel Time (s)		13.5			65.9			82.2			118.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	147	752	12	158	1725	352	42	117	229	259	64	247
Shared Lane Traffic (%)												
Lane Group Flow (vph)	147	764	0	158	1725	352	0	159	229	259	311	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		
Detector Phase	5	2		1	6	6	8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	9.0	31.2		9.5	31.2	31.2	14.8	14.8	14.8	43.8	43.8	
Total Split (s)	9.0	35.0		11.0	37.0	37.0	44.0	44.0	44.0	44.0	44.0	
Total Split (%)	10.0%	38.9%		12.2%	41.1%	41.1%	48.9%	48.9%	48.9%	48.9%	48.9%	
Yellow Time (s)	3.0	3.7		3.5	3.7	3.7	3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	1.0	3.5		1.0	3.5	3.5	4.5	4.5	4.5	4.5	4.5	
Lost Time Adjust (s)	0.0	-1.0		0.0	0.0	0.0		0.0	0.0	-1.8	-1.3	
Total Lost Time (s)	4.0	6.2		4.5	7.2	7.2		7.8	7.8	6.0	6.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Recall Mode	None	Max		None	Max	Max	Min	Min	Min	Min	Min	
Act Effct Green (s)	36.4	29.2		39.4	30.1	30.1		23.4	23.4	25.2	24.7	

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.47	0.38		0.51	0.39	0.39		0.30	0.30	0.32	0.32	
v/c Ratio	0.66	0.40		0.41	0.87	0.42		0.37	0.37	0.65	0.49	
Control Delay	29.5	19.8		14.8	29.5	4.2		23.0	5.6	29.9	11.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	29.5	19.8		14.8	29.5	4.2		23.0	5.6	29.9	11.7	
LOS	C	B		B	C	A		C	A	C	B	
Approach Delay		21.4			24.5			12.7			20.0	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	9.9	29.3		10.9	83.1	0.0		18.1	2.4	31.8	15.5	
Queue Length 95th (m)	#36.7	49.4		27.3	#145.0	17.6		32.2	15.6	53.9	34.4	
Internal Link Dist (m)		201.0			1074.9			1117.1			1625.4	
Turn Bay Length (m)	140.0			75.0		175.0			30.0			
Base Capacity (vph)	224	1925		387	1991	835		675	862	610	893	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.66	0.40		0.41	0.87	0.42		0.24	0.27	0.42	0.35	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 77.8			
Natural Cycle: 85			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 22.1		Intersection LOS: C	
Intersection Capacity Utilization 84.3%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 10: Range Road & Two Mile Hill Road



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APPENDIX D – SYNCHRO REPORTS – 2040 WEEKDAY TOTAL CONDITION

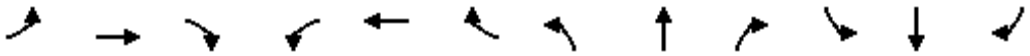
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Intersection	
Intersection Delay, s/veh	11.0
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	1	1	2	2
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	39	120	983	406
Demand Flow Rate, veh/h	40	123	1002	414
Vehicles Circulating, veh/h	363	1025	59	40
Vehicles Exiting, veh/h	91	36	344	1108
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.3	11.4	13.6	5.1
Approach LOS	A	B	B	A

Lane	Left	Left	Left	Right	Left	Right
Designated Moves	LTR	LTR	L	TR	L	TR
Assumed Moves	LTR	LTR	L	TR	L	TR
RT Channelized						
Lane Util	1.000	1.000	0.007	0.993	0.048	0.952
Follow-Up Headway, s	2.609	2.609	2.535	2.535	2.535	2.535
Critical Headway, s	4.976	4.976	4.544	4.544	4.544	4.544
Entry Flow, veh/h	40	123	7	995	20	394
Cap Entry Lane, veh/h	953	485	1346	1346	1369	1369
Entry HV Adj Factor	0.975	0.976	1.000	0.981	1.000	0.979
Flow Entry, veh/h	39	120	7	976	20	386
Cap Entry, veh/h	929	473	1346	1320	1369	1341
V/C Ratio	0.042	0.254	0.005	0.739	0.015	0.288
Control Delay, s/veh	4.3	11.4	2.7	13.7	2.7	5.2
LOS	A	B	A	B	A	A
95th %tile Queue, veh	0	1	0	7	0	1

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	8	16	9	0	59	0	51	0	0	0	11	0
Future Volume (vph)	8	16	9	0	59	0	51	0	0	0	11	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	17	10	0	64	0	55	0	0	0	12	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	36	64	55	12
Volume Left (vph)	9	0	55	0
Volume Right (vph)	10	0	0	0
Hadj (s)	-0.08	0.03	0.23	0.03
Departure Headway (s)	4.0	4.1	4.4	4.2
Degree Utilization, x	0.04	0.07	0.07	0.01
Capacity (veh/h)	870	854	797	829
Control Delay (s)	7.2	7.4	7.7	7.3
Approach Delay (s)	7.2	7.4	7.7	7.3
Approach LOS	A	A	A	A

Intersection Summary				
Delay			7.5	
Level of Service			A	
Intersection Capacity Utilization			24.7%	ICU Level of Service
Analysis Period (min)			15	

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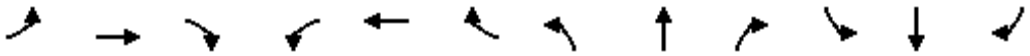


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	166	0	32	76	0	86
Future Volume (Veh/h)	166	0	32	76	0	86
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	180	0	35	83	0	93
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				356		
pX, platoon unblocked						
vC, conflicting volume			180		333	180
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			180		333	180
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		100	89
cM capacity (veh/h)			1396		645	863

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	180	118	93
Volume Left	0	35	0
Volume Right	0	0	93
cSH	1700	1396	863
Volume to Capacity	0.11	0.03	0.11
Queue Length 95th (m)	0.0	0.6	2.7
Control Delay (s)	0.0	2.4	9.7
Lane LOS		A	A
Approach Delay (s)	0.0	2.4	9.7
Approach LOS			A

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	29.8%	ICU Level of Service	A
Analysis Period (min)	15		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	71	41	2	21	14	25	74	0	11	59	0	31
Future Volume (vph)	71	41	2	21	14	25	74	0	11	59	0	31
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	77	45	2	23	15	27	80	0	12	64	0	34

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	124	65	92	98
Volume Left (vph)	77	23	80	64
Volume Right (vph)	2	27	12	34
Hadj (s)	0.15	-0.14	0.13	-0.04
Departure Headway (s)	4.6	4.4	4.6	4.4
Degree Utilization, x	0.16	0.08	0.12	0.12
Capacity (veh/h)	753	775	744	768
Control Delay (s)	8.4	7.7	8.2	8.0
Approach Delay (s)	8.4	7.7	8.2	8.0
Approach LOS	A	A	A	A

Intersection Summary				
Delay	8.1			
Level of Service	A			
Intersection Capacity Utilization	23.7%	ICU Level of Service	A	
Analysis Period (min)	15			

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Intersection	
Intersection Delay, s/veh	3.7
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	139	143	69	39
Demand Flow Rate, veh/h	142	146	71	40
Vehicles Circulating, veh/h	40	107	159	78
Vehicles Exiting, veh/h	78	123	23	175
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.6	4.0	3.7	3.2
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	142	146	71	40
Cap Entry Lane, veh/h	1325	1237	1173	1274
Entry HV Adj Factor	0.980	0.979	0.974	0.969
Flow Entry, veh/h	139	143	69	39
Cap Entry, veh/h	1298	1212	1143	1235
V/C Ratio	0.107	0.118	0.061	0.031
Control Delay, s/veh	3.6	4.0	3.7	3.2
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

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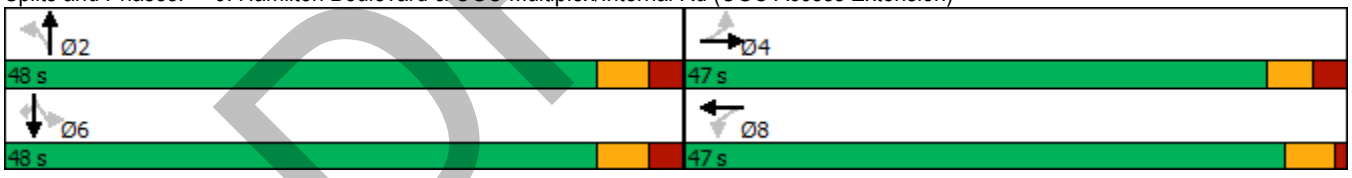
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	2	28	6	4	219	71	1138	4	65	805	53
Future Volume (vph)	37	2	28	6	4	219	71	1138	4	65	805	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	100.0		0.0	0.0		80.0
Storage Lanes	1		0	0		0	2		0	0		2
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00
Ped Bike Factor												
Frt		0.859			0.871							0.850
Flt Protected	0.950				0.999		0.950				0.996	
Satd. Flow (prot)	1789	1618	0	0	1639	0	1789	3579	0	0	3564	1601
Flt Permitted	0.451				0.994		0.269				0.736	
Satd. Flow (perm)	849	1618	0	0	1631	0	507	3579	0	0	2634	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			24							58
Link Speed (k/h)		50			48			60			60	
Link Distance (m)		310.3			283.9			321.6			541.6	
Travel Time (s)		22.3			21.3			19.3			32.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	40	2	30	7	4	238	77	1237	4	71	875	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	32	0	0	249	0	77	1241	0	0	946	58
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	5.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	46.8	46.8		22.5	22.5		36.2	36.2		36.2	36.2	36.2
Total Split (s)	47.0	47.0		47.0	47.0		48.0	48.0		48.0	48.0	48.0
Total Split (%)	49.5%	49.5%		49.5%	49.5%		50.5%	50.5%		50.5%	50.5%	50.5%
Yellow Time (s)	3.3	3.3		3.5	3.5		3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	2.5	2.5		1.0	1.0		2.5	2.5		2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	5.8	5.8			4.5		6.2	6.2			6.2	6.2
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Act Effct Green (s)	16.4	16.4			17.7		41.8	41.8			41.8	41.8

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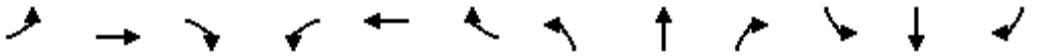
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.23	0.23			0.25		0.59	0.59			0.59	0.59
v/c Ratio	0.20	0.08			0.58		0.26	0.59			0.61	0.06
Control Delay	22.4	7.8			25.3		13.9	12.8			14.0	3.9
Queue Delay	0.0	0.0			0.0		0.0	0.0			0.0	0.0
Total Delay	22.4	7.8			25.3		13.9	12.8			14.0	3.9
LOS	C	A			C		B	B			B	A
Approach Delay		15.9			25.3			12.8			13.4	
Approach LOS		B			C			B			B	
Queue Length 50th (m)	4.2	0.2			25.2		3.7	40.4			31.3	0.0
Queue Length 95th (m)	10.7	5.2			43.2		21.0	125.5			103.7	6.6
Internal Link Dist (m)		286.3			259.9			297.6			517.6	
Turn Bay Length (m)							100.0					80.0
Base Capacity (vph)	508	982			1018		308	2177			1602	996
Starvation Cap Reductn	0	0			0		0	0			0	0
Spillback Cap Reductn	0	0			0		0	0			0	0
Storage Cap Reductn	0	0			0		0	0			0	0
Reduced v/c Ratio	0.08	0.03			0.24		0.25	0.57			0.59	0.06

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 70.5			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 14.3		Intersection LOS: B	
Intersection Capacity Utilization 93.0%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 6: Hamilton Boulevard & CGC Multiplex/Internal Rd (CGC Access Extension)



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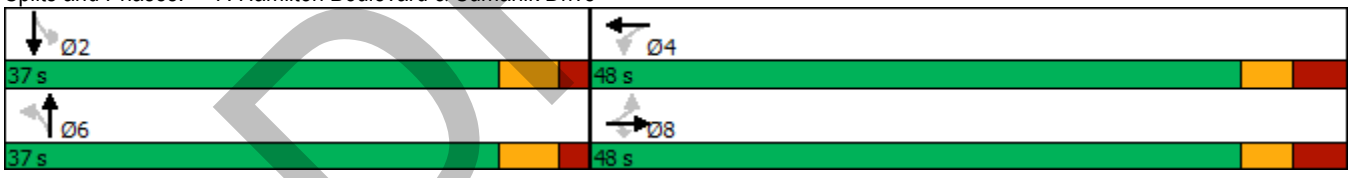
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	0	14	1	46	6	895	66	18	311	18
Future Volume (vph)	3	0	0	14	1	46	6	895	66	18	311	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	50.0		20.0	0.0		0.0	90.0		0.0	80.0		50.0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt					0.898			0.990			0.992	
Flt Protected	0.950	0.950			0.989		0.950			0.950		
Satd. Flow (prot)	1700	1700	1883	0	1673	0	1789	3543	0	1789	3550	0
Flt Permitted	0.889	0.889			0.921		0.538			0.259		
Satd. Flow (perm)	1591	1591	1883	0	1558	0	1013	3543	0	488	3550	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					31			10			8	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		630.9			204.4			391.2			321.6	
Travel Time (s)		45.4			14.7			23.5			19.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	3	0	0	15	1	50	7	973	72	20	338	20
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	1	2	0	0	66	0	7	1045	0	20	358	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8		8	4			6			2		
Detector Phase	8	8	8	4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	47.8	47.8	47.8	47.8	47.8		35.7	35.7		35.7	35.7	
Total Split (s)	48.0	48.0	48.0	48.0	48.0		37.0	37.0		37.0	37.0	
Total Split (%)	56.5%	56.5%	56.5%	56.5%	56.5%		43.5%	43.5%		43.5%	43.5%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.5	3.5	3.5	3.5	3.5		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.8		6.8		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Act Effct Green (s)	8.3	8.3			8.3		35.2	35.2		35.2	35.2	

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.18	0.18			0.18		0.76	0.76		0.76	0.76	
v/c Ratio	0.00	0.01			0.22		0.01	0.39		0.05	0.13	
Control Delay	18.0	18.5			14.5		4.5	4.9		5.2	3.8	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	18.0	18.5			14.5		4.5	4.9		5.2	3.8	
LOS	B	B			B		A	A		A	A	
Approach Delay		18.3			14.5			4.9			3.9	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	0.1	0.2			3.3		0.2	23.3		0.6	6.2	
Queue Length 95th (m)	1.1	1.5			11.0		1.4	38.2		2.9	11.5	
Internal Link Dist (m)		606.9			180.4			367.2			297.6	
Turn Bay Length (m)	50.0						90.0			80.0		
Base Capacity (vph)	1365	1365			1341		744	2607		358	2612	
Starvation Cap Reductn	0	0			0		0	0		0	0	
Spillback Cap Reductn	0	0			0		0	0		0	0	
Storage Cap Reductn	0	0			0		0	0		0	0	
Reduced v/c Ratio	0.00	0.00			0.05		0.01	0.40		0.06	0.14	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 46.1			
Natural Cycle: 85			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.39			
Intersection Signal Delay: 5.1		Intersection LOS: A	
Intersection Capacity Utilization 47.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Hamilton Boulevard & Sumanik Drive



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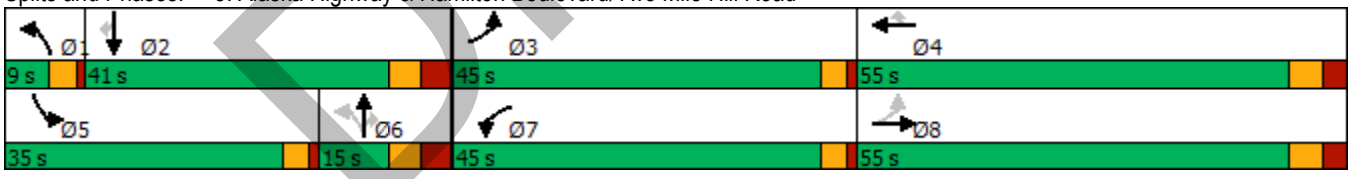
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	1120	22	404	740	341	18	180	382	611	173	120
Future Volume (vph)	180	1120	22	404	740	341	18	180	382	611	173	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	120.0		0.0	0.0		110.0	125.0		110.0	260.0		110.0
Storage Lanes	1		0	2		1	1		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor												
Frt		0.997				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3568	0	3471	3579	1601	1789	3579	1601	3471	3579	1601
Flt Permitted	0.303			0.950			0.633			0.950		
Satd. Flow (perm)	571	3568	0	3471	3579	1601	1192	3579	1601	3471	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				371			390			130
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		541.6			225.0			695.8			804.3	
Travel Time (s)		32.5			13.5			41.7			48.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	196	1217	24	439	804	371	20	196	415	664	188	130
Shared Lane Traffic (%)												
Lane Group Flow (vph)	196	1241	0	439	804	371	20	196	415	664	188	130
Turn Type	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8					4	6		6			2
Detector Phase	3	8		7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	25.0		5.0	25.0	25.0	5.0	9.0	9.0	5.0	9.0	9.0
Minimum Split (s)	9.0	54.7		9.0	54.7	54.7	9.0	57.2	57.2	9.0	57.2	57.2
Total Split (s)	45.0	55.0		45.0	55.0	55.0	9.0	15.0	15.0	35.0	41.0	41.0
Total Split (%)	30.0%	36.7%		30.0%	36.7%	36.7%	6.0%	10.0%	10.0%	23.3%	27.3%	27.3%
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0		1.0	3.0	3.0	1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		-1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.7		2.5	6.7	6.7	4.0	7.2	7.2	4.0	7.2	7.2
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min		None	Min	Min	None	Min	Min	None	Min	Min
Act Effct Green (s)	65.7	49.6		26.9	61.5	61.5	22.7	14.3	14.3	29.7	43.0	43.0

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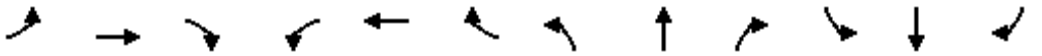
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.46	0.35		0.19	0.43	0.43	0.16	0.10	0.10	0.21	0.30	0.30
v/c Ratio	0.52	0.99		0.67	0.52	0.41	0.09	0.54	0.81	0.91	0.17	0.23
Control Delay	23.1	68.8		59.5	33.8	4.8	32.6	65.1	20.2	71.8	37.0	6.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.1	68.8		59.5	33.8	4.8	32.6	65.1	20.2	71.8	37.0	6.4
LOS	C	E		E	C	A	C	E	C	E	D	A
Approach Delay		62.6			34.1			34.6			56.5	
Approach LOS		E			C			C			E	
Queue Length 50th (m)	22.3	165.4		55.5	76.9	0.0	3.4	27.3	6.4	85.4	20.4	0.0
Queue Length 95th (m)	59.6	#369.4		97.7	164.0	24.8	9.8	42.7	40.3	#194.5	33.2	14.5
Internal Link Dist (m)		517.6			201.0			671.8			780.3	
Turn Bay Length (m)	120.0					110.0	125.0		110.0	260.0		110.0
Base Capacity (vph)	691	1251		1070	1557	905	213	361	512	780	1088	576
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.99		0.41	0.52	0.41	0.09	0.54	0.81	0.85	0.17	0.23

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 141.4			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 47.7		Intersection LOS: D	
Intersection Capacity Utilization 87.7%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 8: Alaska Highway & Hamilton Boulevard/Two Mile Hill Road



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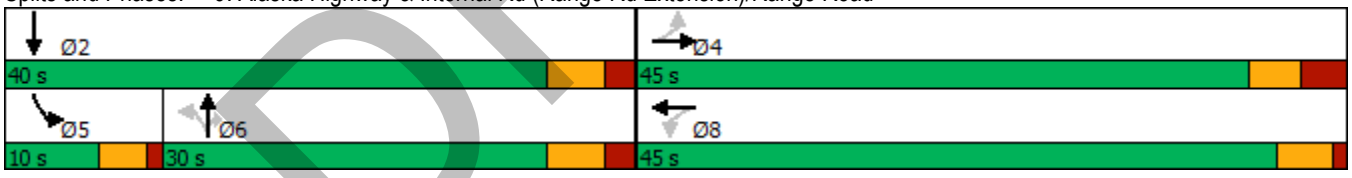
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	213	37	126	36	19	3	87	295	147	52	464	134
Future Volume (vph)	213	37	126	36	19	3	87	295	147	52	464	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		175.0	130.0		0.0
Storage Lanes	0		0	1		0	0		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.955			0.981				0.850		0.966	
Flt Protected		0.972		0.950				0.989		0.950		
Satd. Flow (prot)	0	1748	0	1789	1848	0	0	3539	1601	1789	3457	0
Flt Permitted		0.811		0.545				0.699		0.950		
Satd. Flow (perm)	0	1459	0	1026	1848	0	0	2501	1601	1789	3457	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		39			3				160		53	
Link Speed (k/h)		48			50			70			70	
Link Distance (m)		122.4			1141.1			889.8			404.2	
Travel Time (s)		9.2			82.2			45.8			20.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	232	40	137	39	21	3	95	321	160	57	504	146
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	409	0	39	24	0	0	416	160	57	650	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Prot	NA	
Protected Phases		4			8			6		5	2	
Permitted Phases	4			8			6		6			
Detector Phase	4	4		8	8		6	6	6	5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	5.0		20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	44.3	44.3		22.5	22.5		27.7	27.7	27.7	9.0	25.7	
Total Split (s)	45.0	45.0		45.0	45.0		30.0	30.0	30.0	10.0	40.0	
Total Split (%)	52.9%	52.9%		52.9%	52.9%		35.3%	35.3%	35.3%	11.8%	47.1%	
Yellow Time (s)	3.3	3.3		3.5	3.5		3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		1.0	1.0		2.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.3		4.5	4.5			5.7	5.7	4.0	5.7	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	None	None		None	None		Min	Min	Min	None	Min	
Act Effct Green (s)		20.9		22.8	22.8			21.8	21.8	6.2	27.0	

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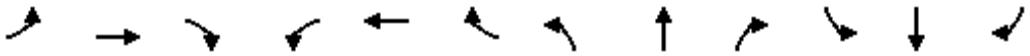
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.34		0.38	0.38			0.36	0.36	0.10	0.45	
v/c Ratio		0.77		0.10	0.03			0.46	0.24	0.31	0.41	
Control Delay		27.1		13.4	11.6			20.4	5.1	35.9	12.4	
Queue Delay		0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay		27.1		13.4	11.6			20.4	5.1	35.9	12.4	
LOS		C		B	B			C	A	D	B	
Approach Delay		27.1			12.8			16.1			14.3	
Approach LOS		C			B			B			B	
Queue Length 50th (m)		38.5		2.9	1.5			20.5	0.0	6.3	21.7	
Queue Length 95th (m)		72.8		8.6	5.7			42.5	12.6	19.8	46.9	
Internal Link Dist (m)		98.4			1117.1			865.8			380.2	
Turn Bay Length (m)									175.0	130.0		
Base Capacity (vph)		999		726	1308			1061	771	187	2092	
Starvation Cap Reductn		0		0	0			0	0	0	0	
Spillback Cap Reductn		0		0	0			0	0	0	0	
Storage Cap Reductn		0		0	0			0	0	0	0	
Reduced v/c Ratio		0.41		0.05	0.02			0.39	0.21	0.30	0.31	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 60.6			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 17.8		Intersection LOS: B	
Intersection Capacity Utilization 76.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 9: Alaska Highway & Internal Rd (Range Rd Extension)/Range Road



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	226	1712	19	77	700	174	7	116	265	338	84	168
Future Volume (vph)	226	1712	19	77	700	174	7	116	265	338	84	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	140.0		0.0	75.0		175.0	0.0		30.0	0.0		50.0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998				0.850			0.850		0.900	
Flt Protected	0.950			0.950				0.997		0.950		
Satd. Flow (prot)	1789	5132	0	1789	5142	1601	0	1878	1601	1789	1695	0
Flt Permitted	0.328			0.129				0.975		0.671		
Satd. Flow (perm)	618	5132	0	243	5142	1601	0	1836	1601	1264	1695	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				189			167		138	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		225.0			1098.9			1141.1			1649.4	
Travel Time (s)		13.5			65.9			82.2			118.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	246	1861	21	84	761	189	8	126	288	367	91	183
Shared Lane Traffic (%)												
Lane Group Flow (vph)	246	1882	0	84	761	189	0	134	288	367	274	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		
Detector Phase	5	2		1	6	6	8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	9.0	31.2		9.5	31.2	31.2	14.8	14.8	14.8	43.8	43.8	
Total Split (s)	9.0	35.0		11.0	37.0	37.0	44.0	44.0	44.0	44.0	44.0	
Total Split (%)	10.0%	38.9%		12.2%	41.1%	41.1%	48.9%	48.9%	48.9%	48.9%	48.9%	
Yellow Time (s)	3.0	3.7		3.5	3.7	3.7	3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	1.0	3.5		1.0	3.5	3.5	4.5	4.5	4.5	4.5	4.5	
Lost Time Adjust (s)	0.0	-1.0		0.0	0.0	0.0		0.0	0.0	-1.8	-1.3	
Total Lost Time (s)	4.0	6.2		4.5	7.2	7.2		7.8	7.8	6.0	6.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Recall Mode	None	Max		None	Max	Max	Min	Min	Min	Min	Min	
Act Effct Green (s)	37.7	31.6		39.1	30.0	30.0		29.0	29.0	30.8	30.3	

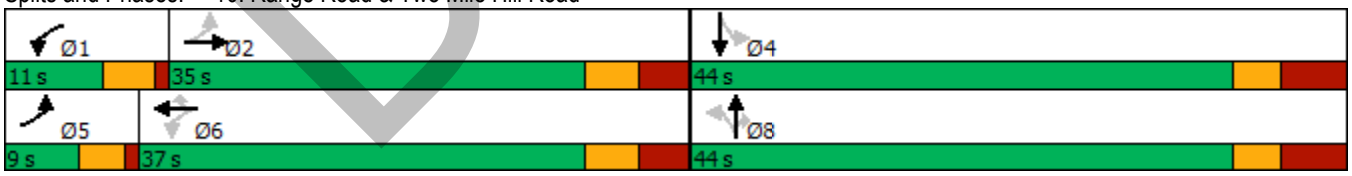
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.45	0.38		0.47	0.36	0.36		0.35	0.35	0.37	0.36	
v/c Ratio	0.70	0.97		0.36	0.41	0.27		0.21	0.43	0.79	0.39	
Control Delay	30.1	42.9		17.5	21.8	4.6		19.1	10.3	35.8	10.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	30.1	42.9		17.5	21.8	4.6		19.1	10.3	35.8	10.6	
LOS	C	D		B	C	A		B	B	D	B	
Approach Delay		41.4			18.3			13.1			25.1	
Approach LOS		D			B			B			C	
Queue Length 50th (m)	22.5	~128.0		7.0	34.2	0.0		14.6	13.2	50.3	14.5	
Queue Length 95th (m)	#52.8	#171.4		15.9	48.4	13.5		26.4	31.6	82.8	31.6	
Internal Link Dist (m)		201.0			1074.9			1117.1			1625.4	
Turn Bay Length (m)	140.0			75.0		175.0			30.0			
Base Capacity (vph)	350	1949		236	1856	698		805	795	581	845	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.70	0.97		0.36	0.41	0.27		0.17	0.36	0.63	0.32	

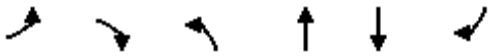
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 83.2			
Natural Cycle: 95			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 30.4		Intersection LOS: C	
Intersection Capacity Utilization 85.7%		ICU Level of Service E	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Range Road & Two Mile Hill Road



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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	111	0	580	539	60
Future Volume (Veh/h)	0	111	0	580	539	60
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	121	0	630	586	65
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	934	326	651			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	934	326	651			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	82	100			
cM capacity (veh/h)	265	670	931			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	121	315	315	391	260
Volume Left	0	0	0	0	0
Volume Right	121	0	0	0	65
cSH	670	1700	1700	1700	1700
Volume to Capacity	0.18	0.19	0.19	0.23	0.15
Queue Length 95th (m)	5.0	0.0	0.0	0.0	0.0
Control Delay (s)	11.6	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.6	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	30.4%	ICU Level of Service	A
Analysis Period (min)	15		

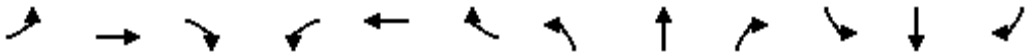
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Intersection	
Intersection Delay, s/veh	11.6
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	1	1	2	2
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	97	84	556	1102
Demand Flow Rate, veh/h	99	85	568	1124
Vehicles Circulating, veh/h	1063	633	155	27
Vehicles Exiting, veh/h	88	89	1007	691
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	11.0	6.3	7.7	14.0
Approach LOS	B	A	A	B

Lane	Left	Left	Left	Right	Left	Right
Designated Moves	LTR	LTR	L	TR	L	TR
Assumed Moves	LTR	LTR	L	TR	L	TR
RT Channelized						
Lane Util	1.000	1.000	0.007	0.993	0.054	0.946
Follow-Up Headway, s	2.609	2.609	2.535	2.535	2.535	2.535
Critical Headway, s	4.976	4.976	4.544	4.544	4.544	4.544
Entry Flow, veh/h	99	85	4	564	61	1063
Cap Entry Lane, veh/h	467	724	1233	1233	1386	1386
Entry HV Adj Factor	0.980	0.988	1.000	0.980	0.984	0.980
Flow Entry, veh/h	97	84	4	552	60	1042
Cap Entry, veh/h	457	715	1233	1208	1363	1358
V/C Ratio	0.212	0.117	0.003	0.457	0.044	0.767
Control Delay, s/veh	11.0	6.3	2.9	7.8	3.0	14.6
LOS	B	A	A	A	A	B
95th %tile Queue, veh	1	0	0	2	0	8

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	24	30	26	0	43	0	34	0	0	0	29	0
Future Volume (vph)	24	30	26	0	43	0	34	0	0	0	29	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	33	28	0	47	0	37	0	0	0	32	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	87	47	37	32
Volume Left (vph)	26	0	37	0
Volume Right (vph)	28	0	0	0
Hadj (s)	-0.10	0.03	0.23	0.03
Departure Headway (s)	4.0	4.2	4.5	4.3
Degree Utilization, x	0.10	0.05	0.05	0.04
Capacity (veh/h)	877	841	775	814
Control Delay (s)	7.4	7.4	7.7	7.4
Approach Delay (s)	7.4	7.4	7.7	7.4
Approach LOS	A	A	A	A

Intersection Summary				
Delay			7.5	
Level of Service			A	
Intersection Capacity Utilization			26.4%	ICU Level of Service
Analysis Period (min)			15	

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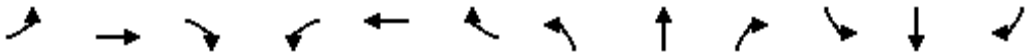


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	92	0	79	195	0	49
Future Volume (Veh/h)	92	0	79	195	0	49
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	100	0	86	212	0	53
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				356		
pX, platoon unblocked						
vC, conflicting volume			100		484	100
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			100		484	100
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		100	94
cM capacity (veh/h)			1493		511	956

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	100	298	53
Volume Left	0	86	0
Volume Right	0	0	53
cSH	1700	1493	956
Volume to Capacity	0.06	0.06	0.06
Queue Length 95th (m)	0.0	1.4	1.3
Control Delay (s)	0.0	2.5	9.0
Lane LOS		A	A
Approach Delay (s)	0.0	2.5	9.0
Approach LOS			A

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	31.3%	ICU Level of Service	A
Analysis Period (min)	15		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	51	26	5	63	35	50	41	0	6	25	0	18
Future Volume (vph)	51	26	5	63	35	50	41	0	6	25	0	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
Hourly flow rate (vph)	55	28	5	68	38	54	45	0	7	27	0	20

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	88	160	52	47
Volume Left (vph)	55	68	45	27
Volume Right (vph)	5	54	7	20
Hadj (s)	0.12	-0.08	0.13	-0.11
Departure Headway (s)	4.4	4.1	4.6	4.4
Degree Utilization, x	0.11	0.18	0.07	0.06
Capacity (veh/h)	786	844	729	759
Control Delay (s)	8.0	8.1	8.0	7.7
Approach Delay (s)	8.0	8.1	8.0	7.7
Approach LOS	A	A	A	A

Intersection Summary				
Delay			8.0	
Level of Service			A	
Intersection Capacity Utilization			19.5%	ICU Level of Service
Analysis Period (min)			15	

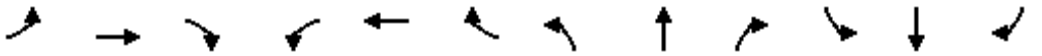
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Intersection	
Intersection Delay, s/veh	3.4
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	109	96	61	55
Demand Flow Rate, veh/h	111	98	62	56
Vehicles Circulating, veh/h	56	72	102	69
Vehicles Exiting, veh/h	69	92	65	101
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.5	3.5	3.3	3.2
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	111	98	62	56
Cap Entry Lane, veh/h	1303	1282	1244	1286
Entry HV Adj Factor	0.979	0.980	0.988	0.988
Flow Entry, veh/h	109	96	61	55
Cap Entry, veh/h	1276	1256	1229	1271
V/C Ratio	0.085	0.076	0.050	0.044
Control Delay, s/veh	3.5	3.5	3.3	3.2
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

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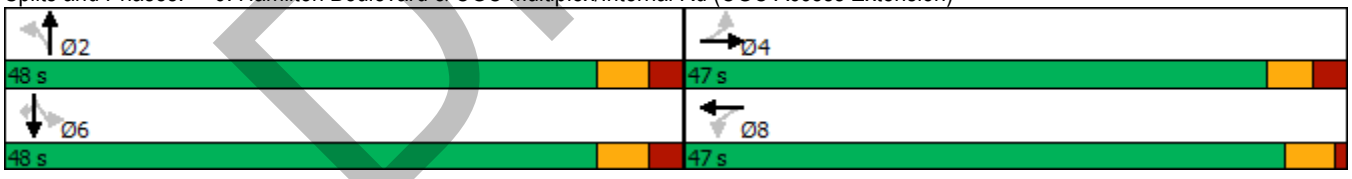
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	3	79	5	2	134	37	598	6	100	1128	72
Future Volume (vph)	42	3	79	5	2	134	37	598	6	100	1128	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	100.0		0.0	0.0		80.0
Storage Lanes	1		0	0		0	2		0	0		2
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00
Ped Bike Factor												
Frt		0.855			0.871			0.998				0.850
Flt Protected	0.950				0.998		0.950				0.996	
Satd. Flow (prot)	1789	1610	0	0	1637	0	1789	3571	0	0	3564	1601
Flt Permitted	0.587				0.992		0.161				0.817	
Satd. Flow (perm)	1106	1610	0	0	1627	0	303	3571	0	0	2924	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			146			1				78
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		310.3			283.9			321.6			541.6	
Travel Time (s)		22.3			20.4			19.3			32.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	46	3	86	5	2	146	40	650	7	109	1226	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	89	0	0	153	0	40	657	0	0	1335	78
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	5.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	46.8	46.8		22.5	22.5		36.2	36.2		36.2	36.2	36.2
Total Split (s)	47.0	47.0		47.0	47.0		48.0	48.0		48.0	48.0	48.0
Total Split (%)	49.5%	49.5%		49.5%	49.5%		50.5%	50.5%		50.5%	50.5%	50.5%
Yellow Time (s)	3.3	3.3		3.5	3.5		3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	2.5	2.5		1.0	1.0		2.5	2.5		2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	5.8	5.8			4.5		6.2	6.2			6.2	6.2
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Act Effct Green (s)	13.0	13.0			14.3		45.9	45.9			45.9	45.9

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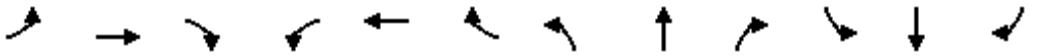
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.18	0.18			0.20		0.64	0.64			0.64	0.64
v/c Ratio	0.23	0.28			0.35		0.21	0.29			0.71	0.07
Control Delay	23.9	18.3			6.2		13.7	8.2			14.7	3.3
Queue Delay	0.0	0.0			0.0		0.0	0.0			0.0	0.0
Total Delay	23.9	18.3			6.2		13.7	8.2			14.7	3.3
LOS	C	B			A		B	A			B	A
Approach Delay		20.2			6.2			8.5			14.0	
Approach LOS		C			A			A			B	
Queue Length 50th (m)	4.9	6.7			0.7		1.4	12.3			37.7	0.0
Queue Length 95th (m)	11.6	15.7			10.9		13.5	56.0			#179.7	7.6
Internal Link Dist (m)		286.3			259.9			297.6			517.6	
Turn Bay Length (m)							100.0					80.0
Base Capacity (vph)	659	969			1056		195	2301			1884	1059
Starvation Cap Reductn	0	0			0		0	0			0	0
Spillback Cap Reductn	0	0			0		0	0			0	0
Storage Cap Reductn	0	0			0		0	0			0	0
Reduced v/c Ratio	0.07	0.09			0.14		0.21	0.29			0.71	0.07

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 71.2			
Natural Cycle: 105			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 12.3		Intersection LOS: B	
Intersection Capacity Utilization 84.2%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: Hamilton Boulevard & CGC Multiplex/Internal Rd (CGC Access Extension)



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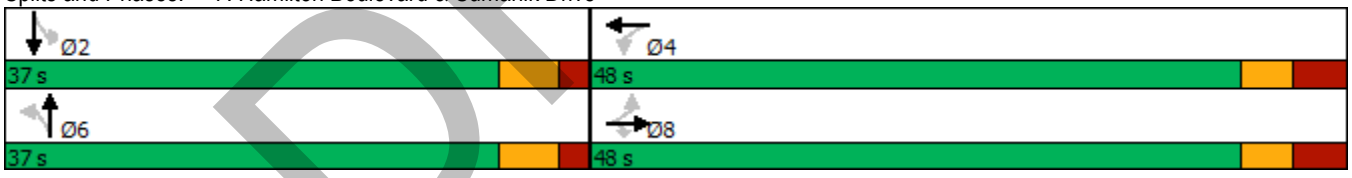
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	4	14	7	0	26	11	512	31	52	827	34
Future Volume (vph)	20	4	14	7	0	26	11	512	31	52	827	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	50.0		20.0	0.0		0.0	90.0		0.0	80.0		50.0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.850		0.895			0.991			0.994	
Flt Protected	0.950	0.967			0.989		0.950			0.950		
Satd. Flow (prot)	1700	1730	1601	0	1667	0	1789	3546	0	1789	3557	0
Flt Permitted					0.940		0.305			0.429		
Satd. Flow (perm)	1789	1789	1601	0	1585	0	574	3546	0	808	3557	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			35		35			8			5	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		630.9			204.4			391.2			321.6	
Travel Time (s)		45.4			14.7			23.5			19.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	22	4	15	8	0	28	12	557	34	57	899	37
Shared Lane Traffic (%)	41%											
Lane Group Flow (vph)	13	13	15	0	36	0	12	591	0	57	936	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8		8	4			6			2		
Detector Phase	8	8	8	4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	47.8	47.8	47.8	47.8	47.8		35.7	35.7		35.7	35.7	
Total Split (s)	48.0	48.0	48.0	48.0	48.0		37.0	37.0		37.0	37.0	
Total Split (%)	56.5%	56.5%	56.5%	56.5%	56.5%		43.5%	43.5%		43.5%	43.5%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.5	3.5	3.5	3.5	3.5		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.8		6.8		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Act Effct Green (s)	7.4	7.4	7.4		7.4		32.0	32.0		32.0	32.0	

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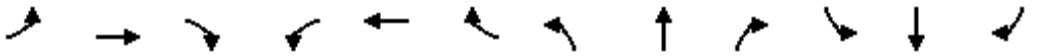
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.19	0.19	0.19		0.19		0.82	0.82		0.82	0.82	
v/c Ratio	0.04	0.04	0.04		0.11		0.03	0.20		0.09	0.32	
Control Delay	16.3	16.3	3.9		8.7		4.2	3.2		4.1	3.6	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	16.3	16.3	3.9		8.7		4.2	3.2		4.1	3.6	
LOS	B	B	A		A		A	A		A	A	
Approach Delay		11.8			8.7			3.2			3.7	
Approach LOS		B			A			A			A	
Queue Length 50th (m)	0.7	0.7	0.0		0.1		0.0	0.0		0.0	0.0	
Queue Length 95th (m)	4.7	4.7	2.1		5.8		1.9	17.5		5.5	30.1	
Internal Link Dist (m)		606.9			180.4			367.2			297.6	
Turn Bay Length (m)	50.0		20.0				90.0			80.0		
Base Capacity (vph)	1716	1716	1537		1522		476	2943		670	2952	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	0.01	0.01	0.01		0.02		0.03	0.20		0.09	0.32	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 38.8			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.32			
Intersection Signal Delay: 3.8		Intersection LOS: A	
Intersection Capacity Utilization 55.9%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 7: Hamilton Boulevard & Sumanik Drive



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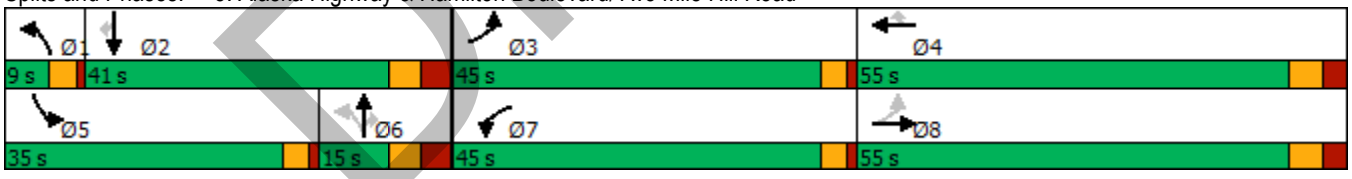
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	567	8	497	1044	742	12	212	321	395	179	183
Future Volume (vph)	154	567	8	497	1044	742	12	212	321	395	179	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	120.0		0.0	0.0		110.0	125.0		110.0	260.0		110.0
Storage Lanes	1		0	2		1	1		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor												
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3571	0	3471	3579	1601	1789	3579	1601	3471	3579	1601
Flt Permitted	0.146			0.950			0.629			0.950		
Satd. Flow (perm)	275	3571	0	3471	3579	1601	1185	3579	1601	3471	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				695			349			199
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		541.6			225.0			695.8			804.3	
Travel Time (s)		32.5			13.5			41.7			48.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	167	616	9	540	1135	807	13	230	349	429	195	199
Shared Lane Traffic (%)												
Lane Group Flow (vph)	167	625	0	540	1135	807	13	230	349	429	195	199
Turn Type	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8					4	6		6			2
Detector Phase	3	8		7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	25.0		5.0	25.0	25.0	5.0	9.0	9.0	5.0	9.0	9.0
Minimum Split (s)	9.0	54.7		9.0	54.7	54.7	9.0	57.2	57.2	9.0	57.2	57.2
Total Split (s)	45.0	55.0		45.0	55.0	55.0	9.0	15.0	15.0	35.0	41.0	41.0
Total Split (%)	30.0%	36.7%		30.0%	36.7%	36.7%	6.0%	10.0%	10.0%	23.3%	27.3%	27.3%
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0		1.0	3.0	3.0	1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		-1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.7		2.5	6.7	6.7	4.0	7.2	7.2	4.0	7.2	7.2
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min		None	Min	Min	None	Min	Min	None	Min	Min
Act Effct Green (s)	57.5	40.6		27.9	52.9	52.9	22.4	13.7	13.7	20.0	34.8	34.8

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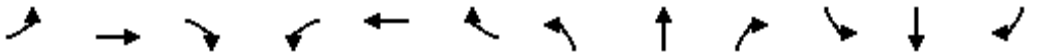
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.46	0.33		0.23	0.43	0.43	0.18	0.11	0.11	0.16	0.28	0.28
v/c Ratio	0.56	0.53		0.69	0.74	0.75	0.05	0.58	0.72	0.77	0.19	0.34
Control Delay	27.1	39.8		51.1	36.6	10.8	30.1	58.1	13.9	61.9	34.5	6.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.1	39.8		51.1	36.6	10.8	30.1	58.1	13.9	61.9	34.5	6.1
LOS	C	D		D	D	B	C	E	B	E	C	A
Approach Delay		37.2			31.4			31.4			41.9	
Approach LOS		D			C			C			D	
Queue Length 50th (m)	13.8	55.8		53.9	101.5	14.0	1.9	26.1	0.0	45.2	16.7	0.0
Queue Length 95th (m)	55.7	138.6		121.2	#276.0	108.8	7.4	50.1	27.4	102.8	34.9	17.2
Internal Link Dist (m)		517.6			201.0			671.8			780.3	
Turn Bay Length (m)	120.0					110.0	125.0		110.0	260.0		110.0
Base Capacity (vph)	694	1475		1261	1529	1082	240	396	487	920	1191	665
Starvation Cap Reductn	0	0		0	0	4	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.42		0.43	0.74	0.75	0.05	0.58	0.72	0.47	0.16	0.30

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 123.8			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 34.2		Intersection LOS: C	
Intersection Capacity Utilization 76.9%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 8: Alaska Highway & Hamilton Boulevard/Two Mile Hill Road



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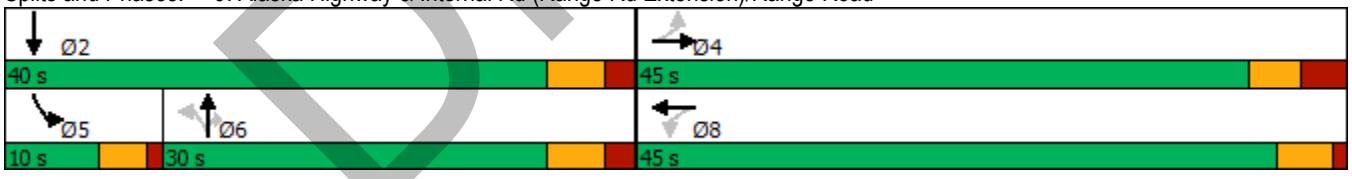
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	171	27	88	98	32	20	153	412	173	13	493	176
Future Volume (vph)	171	27	88	98	32	20	153	412	173	13	493	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		175.0	130.0		0.0
Storage Lanes	0		0	1		0	0		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.958			0.942				0.850		0.961	
Flt Protected		0.971		0.950				0.987		0.950		
Satd. Flow (prot)	0	1752	0	1789	1774	0	0	3532	1601	1789	3439	0
Flt Permitted		0.784		0.598				0.650		0.950		
Satd. Flow (perm)	0	1415	0	1126	1774	0	0	2326	1601	1789	3439	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			22				188		71	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		122.4			1141.1			889.8			404.2	
Travel Time (s)		8.8			82.2			45.8			20.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	186	29	96	107	35	22	166	448	188	14	536	191
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	311	0	107	57	0	0	614	188	14	727	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Prot	NA	
Protected Phases		4			8			6		5	2	
Permitted Phases	4			8			6		6			
Detector Phase	4	4		8	8		6	6	6	5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	5.0		20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	44.3	44.3		22.5	22.5		27.7	27.7	27.7	9.0	25.7	
Total Split (s)	45.0	45.0		45.0	45.0		30.0	30.0	30.0	10.0	40.0	
Total Split (%)	52.9%	52.9%		52.9%	52.9%		35.3%	35.3%	35.3%	11.8%	47.1%	
Yellow Time (s)	3.3	3.3		3.5	3.5		3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		1.0	1.0		2.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.3		4.5	4.5			5.7	5.7	4.0	5.7	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	None	None		None	None		Min	Min	Min	None	Min	
Act Effct Green (s)		15.9		17.8	17.8			22.8	22.8	6.0	24.2	

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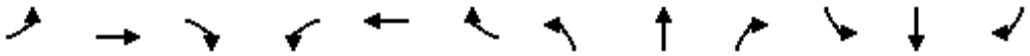
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.30		0.34	0.34			0.43	0.43	0.11	0.46	
v/c Ratio		0.69		0.28	0.09			0.61	0.24	0.07	0.45	
Control Delay		23.3		15.6	9.3			17.5	3.7	27.3	10.3	
Queue Delay		0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay		23.3		15.6	9.3			17.5	3.7	27.3	10.3	
LOS		C		B	A			B	A	C	B	
Approach Delay		23.3			13.4			14.3			10.6	
Approach LOS		C			B			B			B	
Queue Length 50th (m)		20.6		6.6	2.0			19.6	0.0	1.1	19.0	
Queue Length 95th (m)		53.5		20.1	9.4			#65.4	12.1	6.8	42.8	
Internal Link Dist (m)		98.4			1117.1			865.8			380.2	
Turn Bay Length (m)									175.0	130.0		
Base Capacity (vph)		1091		902	1426			1118	867	212	2356	
Starvation Cap Reductn		0		0	0			0	0	0	0	
Spillback Cap Reductn		0		0	0			0	0	0	0	
Storage Cap Reductn		0		0	0			0	0	0	0	
Reduced v/c Ratio		0.29		0.12	0.04			0.55	0.22	0.07	0.31	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 52.6			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 14.2		Intersection LOS: B	
Intersection Capacity Utilization 73.6%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 9: Alaska Highway & Internal Rd (Range Rd Extension)/Range Road



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	943	11	145	1904	324	39	135	211	238	91	243
Future Volume (vph)	148	943	11	145	1904	324	39	135	211	238	91	243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	140.0		0.0	75.0		175.0	0.0		30.0	0.0		50.0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998				0.850			0.850		0.891	
Flt Protected	0.950			0.950				0.989		0.950		
Satd. Flow (prot)	1789	5132	0	1789	5142	1601	0	1863	1601	1789	1678	0
Flt Permitted	0.142			0.186				0.697		0.639		
Satd. Flow (perm)	267	5132	0	350	5142	1601	0	1313	1601	1204	1678	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				352			178		166	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		225.0			1098.9			1141.1			1649.4	
Travel Time (s)		13.5			65.9			82.2			118.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	161	1025	12	158	2070	352	42	147	229	259	99	264
Shared Lane Traffic (%)												
Lane Group Flow (vph)	161	1037	0	158	2070	352	0	189	229	259	363	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		
Detector Phase	5	2		1	6	6	8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	9.0	31.2		9.5	31.2	31.2	14.8	14.8	14.8	43.8	43.8	
Total Split (s)	9.0	35.0		11.0	37.0	37.0	44.0	44.0	44.0	44.0	44.0	
Total Split (%)	10.0%	38.9%		12.2%	41.1%	41.1%	48.9%	48.9%	48.9%	48.9%	48.9%	
Yellow Time (s)	3.0	3.7		3.5	3.7	3.7	3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	1.0	3.5		1.0	3.5	3.5	4.5	4.5	4.5	4.5	4.5	
Lost Time Adjust (s)	0.0	-1.0		0.0	0.0	0.0		0.0	0.0	-1.8	-1.3	
Total Lost Time (s)	4.0	6.2		4.5	7.2	7.2		7.8	7.8	6.0	6.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Recall Mode	None	Max		None	Max	Max	Min	Min	Min	Min	Min	
Act Effct Green (s)	36.4	29.1		39.4	30.1	30.1		23.7	23.7	25.6	25.1	

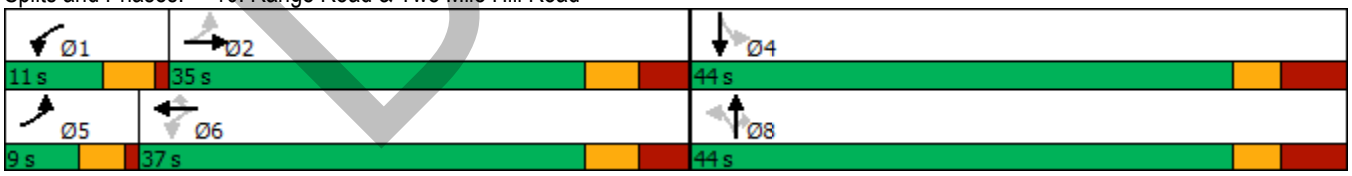
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.47	0.37		0.50	0.39	0.39		0.30	0.30	0.33	0.32	
v/c Ratio	0.73	0.54		0.53	1.04	0.42		0.47	0.38	0.66	0.56	
Control Delay	34.9	21.8		19.1	59.3	4.3		25.5	7.2	30.5	14.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	34.9	21.8		19.1	59.3	4.3		25.5	7.2	30.5	14.2	
LOS	C	C		B	E	A		C	A	C	B	
Approach Delay		23.5			49.4			15.5			21.0	
Approach LOS		C			D			B			C	
Queue Length 50th (m)	11.1	43.0		11.1	~123.6	0.0		22.3	5.3	32.1	22.0	
Queue Length 95th (m)	#43.0	69.3		#28.2	#191.3	17.6		39.1	19.1	54.5	44.6	
Internal Link Dist (m)		201.0			1074.9			1117.1			1625.4	
Turn Bay Length (m)	140.0			75.0		175.0			30.0			
Base Capacity (vph)	222	1913		297	1982	833		614	844	591	899	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.73	0.54		0.53	1.04	0.42		0.31	0.27	0.44	0.40	

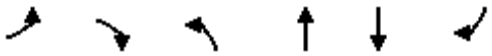
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 78.1			
Natural Cycle: 95			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 36.3		Intersection LOS: D	
Intersection Capacity Utilization 95.2%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Range Road & Two Mile Hill Road



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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	57	0	545	536	148
Future Volume (Veh/h)	0	57	0	545	536	148
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	62	0	592	583	161
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	960	372	744			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	960	372	744			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	90	100			
cM capacity (veh/h)	255	625	859			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	62	296	296	389	355
Volume Left	0	0	0	0	0
Volume Right	62	0	0	0	161
cSH	625	1700	1700	1700	1700
Volume to Capacity	0.10	0.17	0.17	0.23	0.21
Queue Length 95th (m)	2.5	0.0	0.0	0.0	0.0
Control Delay (s)	11.4	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.4	0.0		0.0	
Approach LOS	B				

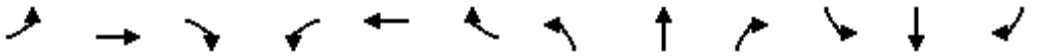
Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	29.7%	ICU Level of Service	A
Analysis Period (min)	15		

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APPENDIX E – SYNCHRO REPORTS – INTERSECTION IMPROVEMENTS (2040 TOTAL CONDITION)

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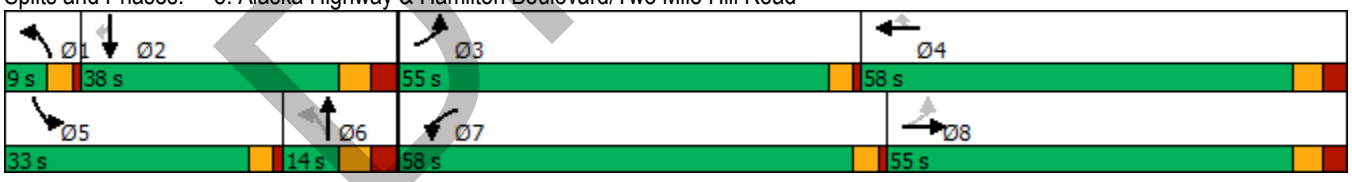
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	1120	22	404	740	341	18	180	382	611	173	120
Future Volume (vph)	180	1120	22	404	740	341	18	180	382	611	173	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	120.0		0.0	0.0		110.0	125.0		110.0	260.0		110.0
Storage Lanes	1		0	2		1	1		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor												
Frt		0.997				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	5126	0	3471	3579	1601	1789	3579	1601	3471	3579	1601
Flt Permitted	0.291			0.950			0.633			0.950		
Satd. Flow (perm)	548	5126	0	3471	3579	1601	1192	3579	1601	3471	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				371			415			130
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		541.6			225.0			695.8			804.3	
Travel Time (s)		32.5			13.5			41.7			48.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	196	1217	24	439	804	371	20	196	415	664	188	130
Shared Lane Traffic (%)												
Lane Group Flow (vph)	196	1241	0	439	804	371	20	196	415	664	188	130
Turn Type	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Free	Prot	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8					4	6		Free			2
Detector Phase	3	8		7	4	4	1	6		5	2	2
Switch Phase												
Minimum Initial (s)	5.0	25.0		5.0	25.0	25.0	5.0	6.0		5.0	6.0	6.0
Minimum Split (s)	9.0	54.7		9.0	54.7	54.7	9.0	57.2		9.0	57.2	57.2
Total Split (s)	55.0	55.0		58.0	58.0	58.0	9.0	14.0		33.0	38.0	38.0
Total Split (%)	34.4%	34.4%		36.3%	36.3%	36.3%	5.6%	8.8%		20.6%	23.8%	23.8%
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	3.7		3.0	3.7	3.7
All-Red Time (s)	1.0	3.0		1.0	3.0	3.0	1.0	3.5		1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		-1.5	0.0	0.0	0.0	0.0		-1.5	0.0	0.0
Total Lost Time (s)	4.0	6.7		2.5	6.7	6.7	4.0	7.2		2.5	7.2	7.2
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Min		None	Min	Min	None	Min		None	Min	Min
Act Effct Green (s)	54.8	38.9		26.3	50.5	50.5	21.6	13.1	129.8	31.8	42.5	42.5

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.42	0.30		0.20	0.39	0.39	0.17	0.10	1.00	0.24	0.33	0.33
v/c Ratio	0.55	0.81		0.63	0.58	0.44	0.09	0.54	0.26	0.78	0.16	0.21
Control Delay	24.5	48.0		53.4	35.2	5.0	30.5	60.7	0.4	54.5	33.6	6.3
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	24.5	48.0		53.4	35.2	5.0	30.5	60.7	0.4	54.5	33.6	6.3
LOS	C	D		D	D	A	C	E	A	D	C	A
Approach Delay		44.8			33.2			20.1			44.1	
Approach LOS		D			C			C			D	
Queue Length 50th (m)	20.9	94.5		48.2	73.1	0.0	3.0	24.4	0.0	73.5	18.1	0.0
Queue Length 95th (m)	58.5	#193.6		96.6	160.3	24.4	9.7	42.0	0.0	#192.3	33.1	14.4
Internal Link Dist (m)		517.6			201.0			671.8			780.3	
Turn Bay Length (m)	120.0					110.0	125.0		110.0	260.0		110.0
Base Capacity (vph)	806	1991		1548	1545	902	222	360	1601	850	1170	611
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.62		0.28	0.52	0.41	0.09	0.54	0.26	0.78	0.16	0.21

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 129.8			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 37.3		Intersection LOS: D	
Intersection Capacity Utilization 74.3%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 8: Alaska Highway & Hamilton Boulevard/Two Mile Hill Road



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	567	8	497	1044	742	12	212	321	395	179	183
Future Volume (vph)	154	567	8	497	1044	742	12	212	321	395	179	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	120.0		0.0	0.0		110.0	125.0		110.0	260.0		110.0
Storage Lanes	1		0	2		1	1		1	2		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor												
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	5132	0	3471	3579	1601	1789	3579	1601	3471	3579	1601
Flt Permitted	0.149			0.950			0.629			0.950		
Satd. Flow (perm)	281	5132	0	3471	3579	1601	1185	3579	1601	3471	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				740			349			199
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		541.6			225.0			695.8			804.3	
Travel Time (s)		32.5			13.5			41.7			48.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	167	616	9	540	1135	807	13	230	349	429	195	199
Shared Lane Traffic (%)												
Lane Group Flow (vph)	167	625	0	540	1135	807	13	230	349	429	195	199
Turn Type	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8					4	6		6			2
Detector Phase	3	8		7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	25.0		5.0	25.0	25.0	5.0	6.0	6.0	5.0	6.0	6.0
Minimum Split (s)	9.0	54.7		9.0	54.7	54.7	9.0	57.2	57.2	9.0	57.2	57.2
Total Split (s)	41.0	55.0		41.0	55.0	55.0	9.0	12.0	12.0	42.0	45.0	45.0
Total Split (%)	27.3%	36.7%		27.3%	36.7%	36.7%	6.0%	8.0%	8.0%	28.0%	30.0%	30.0%
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0		1.0	3.0	3.0	1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		-1.5	0.0	0.0	0.0	0.0	0.0	-1.5	0.0	0.0
Total Lost Time (s)	4.0	6.7		2.5	6.7	6.7	4.0	7.2	7.2	2.5	7.2	7.2
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min		None	Min	Min	None	Min	Min	None	Min	Min
Act Effct Green (s)	57.8	41.2		26.9	52.8	52.8	19.6	10.8	10.8	22.0	34.3	34.3

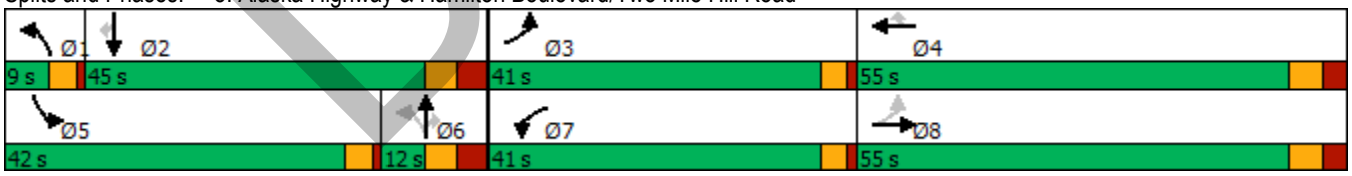
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.48	0.34		0.22	0.44	0.44	0.16	0.09	0.09	0.18	0.28	0.28
v/c Ratio	0.55	0.36		0.70	0.73	0.72	0.06	0.72	0.76	0.68	0.19	0.33
Control Delay	25.2	34.7		51.6	35.1	8.8	29.8	67.0	16.4	54.3	32.5	5.6
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	25.2	34.7		51.6	35.1	8.8	29.8	67.0	16.4	54.3	32.5	5.6
LOS	C	C		D	D	A	C	E	B	D	C	A
Approach Delay		32.7			30.1			36.3			37.4	
Approach LOS		C			C			D			D	
Queue Length 50th (m)	12.5	34.2		51.8	94.6	7.6	1.9	~33.5	0.0	42.6	16.6	0.0
Queue Length 95th (m)	55.8	90.2		125.5	#293.1	84.1	7.1	50.5	27.7	99.0	33.6	16.4
Internal Link Dist (m)		517.6			201.0			671.8			780.3	
Turn Bay Length (m)	120.0					110.0	125.0		110.0	260.0		110.0
Base Capacity (vph)	661	2185		1178	1560	1115	218	318	460	1208	1352	728
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.29		0.46	0.73	0.72	0.06	0.72	0.76	0.36	0.14	0.27

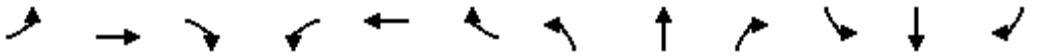
Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 121.1			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 32.6		Intersection LOS: C	
Intersection Capacity Utilization 75.3%		ICU Level of Service D	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Alaska Highway & Hamilton Boulevard/Two Mile Hill Road



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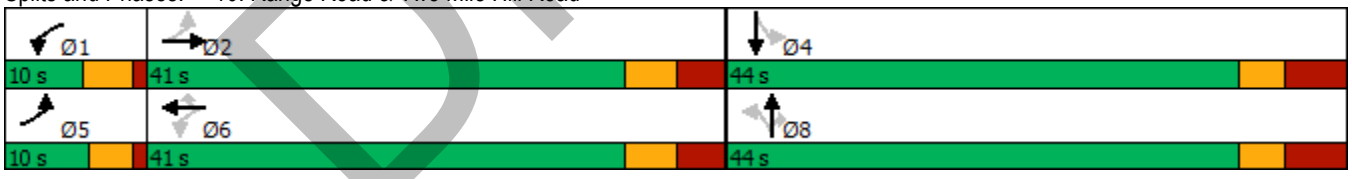
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	226	1712	19	77	700	174	7	116	265	338	84	168
Future Volume (vph)	226	1712	19	77	700	174	7	116	265	338	84	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	140.0		0.0	75.0		175.0	0.0		30.0	0.0		50.0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998				0.850			0.850		0.900	
Flt Protected	0.950			0.950				0.997		0.950		
Satd. Flow (prot)	1789	5132	0	1789	5142	1601	0	1878	1601	1789	1695	0
Flt Permitted	0.311			0.114				0.975		0.671		
Satd. Flow (perm)	586	5132	0	215	5142	1601	0	1836	1601	1264	1695	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				189			153		126	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		225.0			1098.9			1141.1			1649.4	
Travel Time (s)		13.5			65.9			82.2			118.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	246	1861	21	84	761	189	8	126	288	367	91	183
Shared Lane Traffic (%)												
Lane Group Flow (vph)	246	1882	0	84	761	189	0	134	288	367	274	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		
Detector Phase	5	2		1	6	6	8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	9.0	31.2		9.5	31.2	31.2	14.8	14.8	14.8	43.8	43.8	
Total Split (s)	10.0	41.0		10.0	41.0	41.0	44.0	44.0	44.0	44.0	44.0	
Total Split (%)	10.5%	43.2%		10.5%	43.2%	43.2%	46.3%	46.3%	46.3%	46.3%	46.3%	
Yellow Time (s)	3.0	3.7		3.5	3.7	3.7	3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	1.0	3.5		1.0	3.5	3.5	4.5	4.5	4.5	4.5	4.5	
Lost Time Adjust (s)	0.0	-1.0		0.0	0.0	0.0		0.0	0.0	-1.8	-1.3	
Total Lost Time (s)	4.0	6.2		4.5	7.2	7.2		7.8	7.8	6.0	6.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Recall Mode	None	Max		None	Max	Max	Min	Min	Min	Min	Min	
Act Effct Green (s)	44.2	37.3		42.2	34.0	34.0		30.3	30.3	32.1	31.6	

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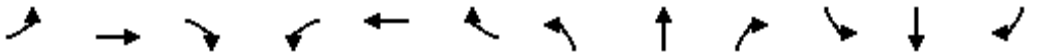
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.49	0.42		0.47	0.38	0.38		0.34	0.34	0.36	0.35	
v/c Ratio	0.66	0.88		0.42	0.39	0.26		0.22	0.45	0.81	0.40	
Control Delay	25.6	32.3		19.3	21.8	4.3		21.4	12.4	40.8	12.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	25.6	32.3		19.3	21.8	4.3		21.4	12.4	40.8	12.7	
LOS	C	C		B	C	A		C	B	D	B	
Approach Delay		31.5			18.4			15.2			28.8	
Approach LOS		C			B			B			C	
Queue Length 50th (m)	23.9	119.1		7.5	36.5	0.0		16.1	16.4	55.7	17.6	
Queue Length 95th (m)	#45.9	#162.2		15.7	48.9	13.2		28.8	36.6	90.6	36.6	
Internal Link Dist (m)		201.0			1074.9			1117.1			1625.4	
Turn Bay Length (m)	140.0			75.0		175.0			30.0			
Base Capacity (vph)	370	2141		199	1954	725		747	742	540	787	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.66	0.88		0.42	0.39	0.26		0.18	0.39	0.68	0.35	

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 89.4			
Natural Cycle: 95			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 26.3		Intersection LOS: C	
Intersection Capacity Utilization 85.7%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 10: Range Road & Two Mile Hill Road



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	943	11	145	1904	324	39	135	211	238	91	243
Future Volume (vph)	148	943	11	145	1904	324	39	135	211	238	91	243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	140.0		0.0	75.0		175.0	0.0		30.0	0.0		50.0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998				0.850			0.850		0.891	
Flt Protected	0.950			0.950				0.989		0.950		
Satd. Flow (prot)	1789	5132	0	1789	5142	1601	0	1863	1601	1789	1678	0
Flt Permitted	0.091			0.219				0.604		0.632		
Satd. Flow (perm)	171	5132	0	412	5142	1601	0	1138	1601	1190	1678	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				352			160		123	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		225.0			1098.9			1141.1			1649.4	
Travel Time (s)		13.5			65.9			82.2			118.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	161	1025	12	158	2070	352	42	147	229	259	99	264
Shared Lane Traffic (%)												
Lane Group Flow (vph)	161	1037	0	158	2070	352	0	189	229	259	363	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		
Detector Phase	5	2		1	6	6	8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	9.0	31.2		9.5	31.2	31.2	14.8	14.8	14.8	43.8	43.8	
Total Split (s)	10.0	51.0		10.0	51.0	51.0	44.0	44.0	44.0	44.0	44.0	
Total Split (%)	9.5%	48.6%		9.5%	48.6%	48.6%	41.9%	41.9%	41.9%	41.9%	41.9%	
Yellow Time (s)	3.0	3.7		3.5	3.7	3.7	3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	1.0	3.5		1.0	3.5	3.5	4.5	4.5	4.5	4.5	4.5	
Lost Time Adjust (s)	0.0	-1.0		0.0	0.0	0.0		0.0	0.0	-1.8	-1.3	
Total Lost Time (s)	4.0	6.2		4.5	7.2	7.2		7.8	7.8	6.0	6.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Recall Mode	None	Max		None	Max	Max	Min	Min	Min	Min	Min	
Act Effct Green (s)	53.3	45.1		52.3	44.1	44.1		27.0	27.0	28.8	28.3	

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.55	0.47		0.54	0.46	0.46		0.28	0.28	0.30	0.29	
v/c Ratio	0.82	0.43		0.52	0.88	0.38		0.59	0.41	0.73	0.63	
Control Delay	49.6	18.7		18.1	30.4	3.4		37.5	10.9	42.4	23.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	49.6	18.7		18.1	30.4	3.4		37.5	10.9	42.4	23.5	
LOS	D	B		B	C	A		D	B	D	C	
Approach Delay		22.8			26.0			22.9			31.4	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	13.0	46.3		12.6	126.5	0.0		30.1	9.6	42.7	37.8	
Queue Length 95th (m)	#54.3	66.4		26.2	#185.1	16.2		51.4	27.3	70.0	65.6	
Internal Link Dist (m)		201.0			1074.9			1117.1			1625.4	
Turn Bay Length (m)	140.0			75.0		175.0			30.0			
Base Capacity (vph)	196	2405		303	2355	924		430	705	473	733	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.82	0.43		0.52	0.88	0.38		0.44	0.32	0.55	0.50	

Intersection Summary			
Area Type:	Other		
Cycle Length: 105			
Actuated Cycle Length: 96.2			
Natural Cycle: 95			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 25.6		Intersection LOS: C	
Intersection Capacity Utilization 95.2%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 10: Range Road & Two Mile Hill Road

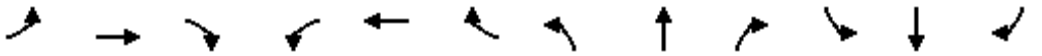


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APPENDIX F – SYNCHRO REPORTS – CLOSURE OF SUMANIK DRIVE BETWEEN VALLEYVIEW DRIVE AND ALASKA HIGHWAY

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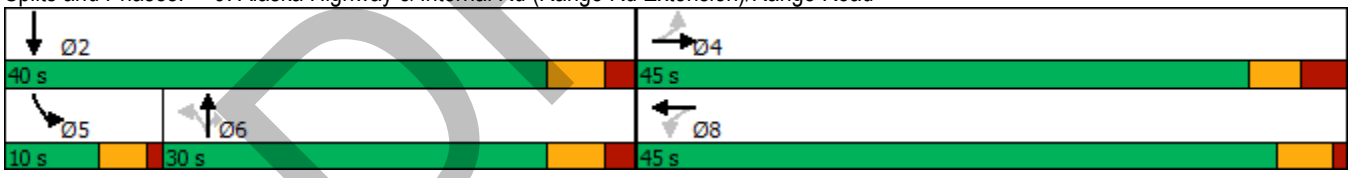
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	213	37	237	36	19	3	87	295	147	52	464	194
Future Volume (vph)	213	37	237	36	19	3	87	295	147	52	464	194
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		175.0	130.0		0.0
Storage Lanes	0		0	1		0	0		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.934			0.981				0.850		0.956	
Flt Protected		0.979		0.950				0.989		0.950		
Satd. Flow (prot)	0	1722	0	1789	1848	0	0	3539	1601	1789	3421	0
Flt Permitted		0.848		0.464				0.678		0.950		
Satd. Flow (perm)	0	1492	0	874	1848	0	0	2426	1601	1789	3421	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		74			3				160		91	
Link Speed (k/h)		48			50			70			70	
Link Distance (m)		122.4			1141.1			889.8			404.2	
Travel Time (s)		9.2			82.2			45.8			20.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	232	40	258	39	21	3	95	321	160	57	504	211
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	530	0	39	24	0	0	416	160	57	715	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Prot	NA	
Protected Phases		4			8			6		5	2	
Permitted Phases	4			8			6		6			
Detector Phase	4	4		8	8		6	6	6	5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	5.0		20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	44.3	44.3		22.5	22.5		27.7	27.7	27.7	9.0	25.7	
Total Split (s)	45.0	45.0		45.0	45.0		30.0	30.0	30.0	10.0	40.0	
Total Split (%)	52.9%	52.9%		52.9%	52.9%		35.3%	35.3%	35.3%	11.8%	47.1%	
Yellow Time (s)	3.3	3.3		3.5	3.5		3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		1.0	1.0		2.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.3		4.5	4.5			5.7	5.7	4.0	5.7	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	None	None		None	None		Min	Min	Min	None	Min	
Act Effct Green (s)		25.3		27.2	27.2			22.1	22.1	6.2	27.3	

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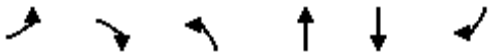
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.39		0.42	0.42			0.34	0.34	0.09	0.42	
v/c Ratio		0.85		0.11	0.03			0.51	0.25	0.34	0.48	
Control Delay		30.0		13.0	11.0			23.5	5.5	39.6	14.3	
Queue Delay		0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay		30.0		13.0	11.0			23.5	5.5	39.6	14.3	
LOS		C		B	B			C	A	D	B	
Approach Delay		30.0			12.2			18.5			16.2	
Approach LOS		C			B			B			B	
Queue Length 50th (m)		52.5		2.9	1.5			23.7	0.0	7.0	27.8	
Queue Length 95th (m)		98.1		8.7	5.5			45.4	13.1	20.6	53.7	
Internal Link Dist (m)		98.4			1117.1			865.8			380.2	
Turn Bay Length (m)									175.0	130.0		
Base Capacity (vph)		965		575	1217			958	729	174	1947	
Starvation Cap Reductn		0		0	0			0	0	0	0	
Spillback Cap Reductn		0		0	0			0	0	0	0	
Storage Cap Reductn		0		0	0			0	0	0	0	
Reduced v/c Ratio		0.55		0.07	0.02			0.43	0.22	0.33	0.37	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 65.3			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 20.5		Intersection LOS: C	
Intersection Capacity Utilization 85.4%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 9: Alaska Highway & Internal Rd (Range Rd Extension)/Range Road



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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	71	43	88	25	34	31
Future Volume (vph)	71	43	88	25	34	31
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	77	47	96	27	37	34

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	124	123	71
Volume Left (vph)	77	96	0
Volume Right (vph)	47	0	34
Hadj (s)	-0.07	0.19	-0.25
Departure Headway (s)	4.3	4.5	4.1
Degree Utilization, x	0.15	0.15	0.08
Capacity (veh/h)	807	780	841
Control Delay (s)	8.0	8.2	7.4
Approach Delay (s)	8.0	8.2	7.4
Approach LOS	A	A	A

Intersection Summary			
Delay	8.0		
Level of Service	A		
Intersection Capacity Utilization	26.1%	ICU Level of Service	A
Analysis Period (min)	15		

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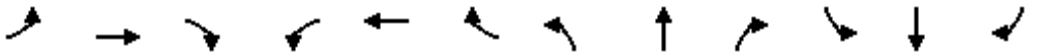


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	252	0	32	136	0	86
Future Volume (Veh/h)	252	0	32	136	0	86
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	274	0	35	148	0	93
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				356		
pX, platoon unblocked						
vC, conflicting volume			274		492	274
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			274		492	274
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		100	88
cM capacity (veh/h)			1289		521	765

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	274	183	93
Volume Left	0	35	0
Volume Right	0	0	93
cSH	1700	1289	765
Volume to Capacity	0.16	0.03	0.12
Queue Length 95th (m)	0.0	0.6	3.1
Control Delay (s)	0.0	1.7	10.4
Lane LOS		A	B
Approach Delay (s)	0.0	1.7	10.4
Approach LOS			B

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	37.5%	ICU Level of Service	A
Analysis Period (min)	15		

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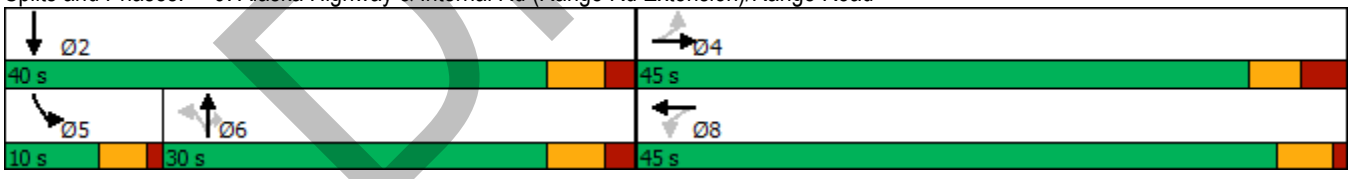
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	171	27	145	98	32	20	153	412	173	13	493	324
Future Volume (vph)	171	27	145	98	32	20	153	412	173	13	493	324
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		175.0	130.0		0.0
Storage Lanes	0		0	1		0	0		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.943			0.942				0.850		0.941	
Flt Protected		0.976		0.950				0.987		0.950		
Satd. Flow (prot)	0	1733	0	1789	1774	0	0	3532	1601	1789	3367	0
Flt Permitted		0.813		0.541				0.613		0.950		
Satd. Flow (perm)	0	1444	0	1019	1774	0	0	2194	1601	1789	3367	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		57			22				188		217	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		122.4			1141.1			889.8			404.2	
Travel Time (s)		8.8			82.2			45.8			20.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	186	29	158	107	35	22	166	448	188	14	536	352
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	373	0	107	57	0	0	614	188	14	888	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Prot	NA	
Protected Phases		4			8			6		5	2	
Permitted Phases	4			8			6		6			
Detector Phase	4	4		8	8		6	6	6	5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	5.0		20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	44.3	44.3		22.5	22.5		27.7	27.7	27.7	9.0	25.7	
Total Split (s)	45.0	45.0		45.0	45.0		30.0	30.0	30.0	10.0	40.0	
Total Split (%)	52.9%	52.9%		52.9%	52.9%		35.3%	35.3%	35.3%	11.8%	47.1%	
Yellow Time (s)	3.3	3.3		3.5	3.5		3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		1.0	1.0		2.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.3		4.5	4.5			5.7	5.7	4.0	5.7	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	None	None		None	None		Min	Min	Min	None	Min	
Act Effct Green (s)		18.0		19.9	19.9			24.7	24.7	5.9	26.2	

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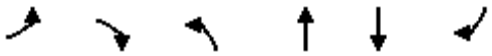
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.32		0.35	0.35			0.44	0.44	0.10	0.46	
v/c Ratio		0.75		0.30	0.09			0.64	0.23	0.07	0.53	
Control Delay		24.8		15.8	8.9			20.0	3.9	29.2	10.1	
Queue Delay		0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay		24.8		15.8	8.9			20.0	3.9	29.2	10.1	
LOS		C		B	A			B	A	C	B	
Approach Delay		24.8			13.4			16.2			10.4	
Approach LOS		C			B			B			B	
Queue Length 50th (m)		26.3		7.2	2.2			21.7	0.0	1.2	21.3	
Queue Length 95th (m)		62.7		20.4	9.2			#74.6	12.9	7.1	51.8	
Internal Link Dist (m)		98.4			1117.1			865.8			380.2	
Turn Bay Length (m)									175.0	130.0		
Base Capacity (vph)		1037		753	1317			973	815	195	2189	
Starvation Cap Reductn		0		0	0			0	0	0	0	
Spillback Cap Reductn		0		0	0			0	0	0	0	
Storage Cap Reductn		0		0	0			0	0	0	0	
Reduced v/c Ratio		0.36		0.14	0.04			0.63	0.23	0.07	0.41	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 56.6			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 15.1		Intersection LOS: B	
Intersection Capacity Utilization 81.9%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 9: Alaska Highway & Internal Rd (Range Rd Extension)/Range Road



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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	51	31	76	50	25	18
Future Volume (vph)	51	31	76	50	25	18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	55	34	83	54	27	20

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	89	137	47
Volume Left (vph)	55	83	0
Volume Right (vph)	34	0	20
Hadj (s)	-0.07	0.16	-0.22
Departure Headway (s)	4.2	4.3	4.0
Degree Utilization, x	0.10	0.16	0.05
Capacity (veh/h)	813	811	866
Control Delay (s)	7.7	8.1	7.2
Approach Delay (s)	7.7	8.1	7.2
Approach LOS	A	A	A

Intersection Summary			
Delay	7.9		
Level of Service	A		
Intersection Capacity Utilization	24.9%	ICU Level of Service	A
Analysis Period (min)	15		

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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	149	0	79	343	0	49
Future Volume (Veh/h)	149	0	79	343	0	49
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	162	0	86	373	0	53
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				356		
pX, platoon unblocked						
vC, conflicting volume			162		707	162
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			162		707	162
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		100	94
cM capacity (veh/h)			1417		377	883

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	162	459	53
Volume Left	0	86	0
Volume Right	0	0	53
cSH	1700	1417	883
Volume to Capacity	0.10	0.06	0.06
Queue Length 95th (m)	0.0	1.5	1.5
Control Delay (s)	0.0	1.9	9.3
Lane LOS		A	A
Approach Delay (s)	0.0	1.9	9.3
Approach LOS			A

Intersection Summary			
Average Delay		2.0	
Intersection Capacity Utilization		43.6%	ICU Level of Service A
Analysis Period (min)		15	

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APPENDIX G – VSMP LAND USE PLAN

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APPENDIX H – VSMP TRANSPORTATION CONCEPT PLAN

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