City of Edmonton

Priority Growth Areas

MOBILITY STUDY

CIMA+ file number: Z0016285
June 5, 2025 – Review 04

City of Edmonton

Priority Growth Areas

MOBILITY STUDY

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Register of Revisions			
Issue No.	Reviewed by	Date	Description of the review
00	JN	2025-02-20	Draft report quality review.
01	JN	2025-02-21	Draft report issued for client review.
02	JN	2025-04-17	Draft executive summary issued
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03	JN	2025-04-28	Final report quality review
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Confidentiality and Ownership

Executive Summary

Overview of the Process

The City of Edmonton undertook a comprehensive multi-modal mobility assessment for the planned re-zoning of lands within five Priority Growth Areas (PGAs) including 124 Street, Wîhkwêntôwin, 156 Street, Stony Plain Road, and University – Garneau. These PGAs represent a critical component of the City's strategy to accommodate projected growth as outlined in *The City Plan* (2020). The PGAs are located along established nodes and corridors intended to accommodate higher-density, mixed-use development and facilitate a modal shift away from single-occupancy vehicle travel.

To align the technical analysis with City policies and current best practices, the quantitative mobility assessment uses both traditional Level of Services (LOS) measures that focus on motor vehicle moving capacities and Multi-Modal Level of Service (MMLOS) measures. Historically, the traditional LOS framework used for transportation planning has quantitatively reviewed vehicle travel and qualitatively considered the safety and experience of other road users such as pedestrians, cyclists, and transit users. The MMLOS framework quantitatively considers the needs and experiences of all transportation users and allows planners and engineers to contextualize the assessment to match the character of the street and supporting policy objectives. This combined approach reflects the City's broader objective of creating a vibrant, sustainable, and connected urban environment that prioritizes the movement of people over vehicles. The application and results of these different approach is highlighted in **Figure E-1**.

The mobility assessment focused on identifying the impacts of proposed land use intensification allowed by PGA re-zoning, evaluating existing mobility infrastructure, and recommending context-sensitive improvements to ensure that each PGA can support its long-term vision for growth.

Existing Conditions and Operations

The assessment of existing conditions revealed that infrastructure quality and user experiences varied considerably across the PGAs. In many areas, neighbourhood renewal programs had recently been completed, contributing to improved sidewalk conditions and pedestrian environments. However, arterial corridors and some collector streets continued to feature narrow sidewalks or missing segments altogether, particularly outside of recently renewed areas.

Cycling infrastructure was unevenly distributed. While areas like University-Garneau and portions of the 124 Street and Wîhkwêntôwin areas benefit from protected bike lanes and shared-use pathways, other PGAs – especially the 156 Street area and portions of the Stony Plain Road area – lack adequate connectivity for cyclists of all ages and abilities. Furthermore, gaps were identified between existing and planned facilities, suggesting the need for more continuous networks to support safe and convenient cycling, not just within each PGA, but across the City.

Transit accessibility was generally strong in areas served by light rail transit (LRT) and high-frequency bus corridors. However, the quality of transit infrastructure, including bus shelters, transit priority measures, and signal coordination, varied widely. In many locations, transit service operates in mixed traffic without dedicated lanes or signal priority, reducing reliability and overall user experience. The importance of transit reliability on increasing transit ridership speaks to the benefit of projects such as the Valley Line West LRT expansion and the planned implementation of the bus rapid transit (BRT) system, with B1 and B2 routes expected to run through several of the PGAs evaluated as part of this assessment.

Vehicle operations were characterized by medium to high congestion levels on arterial roadways, particularly during peak periods. This was most notable in corridors close to the downtown core and around the University of Alberta. The qualitative assessment, supported by peak-hour Google Maps congestion data, confirmed that travel conditions on these routes often deteriorated during the busiest parts of the day.

Post-pandemic travel trends were also taken into account. Compared to 2016–2017, peak-hour vehicle volumes in 2024 were consistently lower, reflecting broader shifts in commuting behaviour and work-from-home adoption. Transit ridership has recovered to pre-pandemic levels, but active transportation and e-commerce-related vehicle activity has increased, prompting the need for a flexible, multimodal approach to future planning.

Future Conditions and Operations

Looking ahead to the forecast population horizon, travel demand within the PGAs is expected to grow significantly because of population intensification and redevelopment. Targeted intensification arising from the PGA rezoning, combined with organically occurring property redevelopment, is expected to add 43,000 people (representing 80% growth) to the study area population. While traffic volumes will increase, the rate of growth will be tempered by the availability and planned expansion of sustainable transportation infrastructure. Across the study areas, trips by all modes are forecast to increase by approximately 40%, comprised of a 32% increase in vehicle trips and a 49% increase in trips by foot, bike, and transit.

The Valley Line West LRT, the City's Active Transportation Network Expansion, and broader land use changes will all play a role in shaping these outcomes. PGAs that currently exhibit lower sustainable mode shares, such as the 156 Street area, have the potential to see the greatest relative gains by addressing infrastructure deficits and land use barriers. Conversely, areas like University – Garneau, where over 60% of trips are already made by sustainable modes, will require careful attention to preserve and enhance existing multimodal infrastructure as densities rise.

The MMLOS assessment framework was used to evaluate future performance under the assumption that no additional infrastructure beyond currently funded projects would be in place. These approved projects include Valley Line West LRT, Imagine Jasper Phase 2, and planned expansions to the active transportation network in 2025 and 2026. MMLOS targets based on road classification were adjusted for each mode based on City policy and planning directives such as pedestrian priority areas outlined in the District Plan, transit corridors based on LRT and BRT planning, and the cycling network identified in the Bike Plan. This analysis revealed that while some intersections and corridors could accommodate projected growth, others would experience level of service degradation — particularly for pedestrians and transit users — without targeted improvements. Key issues included uncontrolled conflicts between pedestrians and vehicles, gaps in cycling infrastructure, limited curbside transit amenities, and delays to on-street transit when travelling in mixed traffic with other vehicles.

Recommendations

The study provides detailed recommendations to support multi-modal mobility in each Priority Growth Area, aligned with the City's broader transportation and land use objectives. Recommendations are summarized in **Figure E2** through **Figure E6**.

Pedestrian improvements are recommended at many intersections and corridors. These include the installation of:

- curb extensions,
- leading pedestrian intervals (LPIs),
- wider sidewalks,
- audible crossing signals, and
- the prohibition of right turns on red (RTOR).

These enhancements aim to reduce conflicts, shorten crossing distances, and improve the overall comfort and accessibility of the pedestrian environment, particularly in designated pedestrian priority areas.

Cycling infrastructure improvements are also identified as a priority. The report recommends filling key gaps in the network by constructing new protected cycling facilities along corridors such as:

East / West Routes

- 100 Avenue,
- 102 Avenue,
- 111 Avenue,
- 114 Avenue,
- 87 Avenue, and
- 104 Avenue.

North/South Routes

- 112 Street,
- 118/119 Street,
- 158 Street,
- 163 Street,
- 115 Street, and
- 116 Street.

These corridors will serve as district connectors, enabling residents to safely access destinations within and beyond the PGAs. Supplemental routing options are identified to create a robust cycling network, placing most residents within 400 m of a low stress cycling facility.

Transit recommendations include the implementation of:

- transit only lanes,
- queue jump lanes,
- transit signal priority, and
- the enhancement of passenger amenities such as shelters, benches, and lighting.

These changes are intended to reduce delay, improve reliability, and enhance the user experience, especially in areas served by the Valley Line West LRT and planned BRT routes. In particular, intersections along 109 Street, Stony Plain Road, and 87 Avenue are identified as high-priority locations for transit-focused investment beyond the current investment in the West Valley Line LRT.

In terms of **vehicle operations**, the report recommends optimizing signal timing and reallocating right-of-way where necessary to improve multimodal performance. In some cases, protected-only turning movements and signal timing adjustments are proposed to improve safety and reduce delay. However, consistent with the direction outlined in The City Plan, the report acknowledges that vehicle level of service may not meet the public expectations (specifically in the peak hour) at all locations and that any anticipated congestion will be managed through multi-modal investments rather than expanded roadway capacity.

The improvements suggested in this report are not solely required to support PGA redevelopment, rather, they address identified gaps in the mobility network and help to improve the overall MMLOS to optimize the potential people moving capacity of the mobility network. Some of the identified improvements align with existing long-term planning and strategy documents, such as the Bike Plan, while others can be integrated into the land development review process. Recommendations from this report should be reviewed with each future development application for opportunities to integrate infrastructure upgrades with densification. The implementation time frame may be tied to the rate at which redevelopment occurs rather than a year or City-wide population threshold.

High-level capital cost estimates for the recommended improvements total approximately $11.4 million, summarized by PGA in **Table E1**. At the pre-conceptual design stage, these costs estimates should be considered ± 50% as further assessment will be required to fully understand impacts of each project. These estimates cover a range of interventions, from minor upgrades to missing pedestrian and cyclist connections, to more substantial intersection reconstructions. Costs associated with major corridor reconfigurations (e.g., 109 Street or 82 Avenue as part of the B1/B2 BRT implementation) are excluded and will require further study and engagement.

Costs associated with improvements anticipated to be explored and implemented as part of upcoming neighbourhood renewal projects (such as Wîhkwêntôwin and Glenwood 163 Street West) have not been included in the table below. Costs within the 156 Street / Stony Plain Road area are higher than the other nodes due to a high number missing pedestrian and cycling facilities within the area. Many of the neighbourhoods in this area underwent renewal before the introduction of the City's current Complete Streets Design and Construction Standards in 2018, with many neighbourhood renewals completed in 2014 or earlier. These renewals often followed a strict "like for like" renewal program which typically did not consider implementation of cycling infrastructure or construction of missing sidewalk links.

Implementation of these improvements is recommended in a phased manner. Some small-scale improvements generally abutting redevelopment parcels necessary to support each development could become a condition of future development permits. These are localized improvements often abutting a parcel that have traditionally been undertaken as a condition of development by the property owner, including missing sidewalk connections, curb ramps, and alleyway upgrades. Short-term actions (0–5 years) would focus on high-impact, low-cost improvements such as signal timing adjustments, RTOR bans, and transit signal priority. Medium-term actions (5–10 years) would include expansion of the active transportation network and intersection reconfigurations. Long-term actions (10+ years) may involve comprehensive street reconstructions to fully align with the City's Complete Streets Design and Construction Standards.

Table E1 – High-Level Capital Costs

	124 Street / Wîhkwêntôwin	156 Street / Stony Plain Road	University-Garneau
Development Lead Initiatives	$60,000	$760,000	None
Short Term	$143,000	$500,000	$150,000
Medium Term	$840,000	$7,240,000	$1,690,000
Long Term**	• Transit oriented reconfiguration of 109 Street north of Jasper Avenue • Bi-directional cycling facilities along 111 Avenue • Bi-directional cycling facilities along 117 Avenue and 119 Avenue or 120 Avenue • Reconfiguration of 118 Avenue to accommodate eastbound and westbound bus only lanes	• Bi-directional cycling facilities along 102 Avenue paralleling Stony Plain Road • Pedestrian realm reconfiguration of Stony Plain Road from 156 Street to 163 Street, including transit signal priority at 163 Street • Extension of 100 Avenue Shared Pathway to 170 Street • Extension of cycling facilities on 153 Street and 163 Street • Reconfiguration of 87 Avenue to accommodate future BRT and active modes*	• Reconfiguration of 82 Avenue and implementation of Old Strathcona Public Realm Strategy* • Reconfiguration of 109 Street from 61 Avenue to Walterdale Hill Road/Saskatchewan Drive to improve transit and pedestrian realm* • Reconfiguration of 87 Avenue to improve transit service*
Total	$1.04 million	$8.50 million	$1.84 million

Notes:

* denotes scope which is expected to be undertaken as part of B1 + B2 BRT Concept Plan work

** costs associated with long term improvements are excluded and will require further study and engagement.

In summary, the mobility assessment confirms that Edmonton's Priority Growth Areas can accommodate planned intensification with strategic, coordinated investments in multimodal infrastructure. By prioritizing people-focused design and sustainable transportation options, the City can support vibrant, connected communities that meet the goals of The City Plan, the Energy Transition Strategy, and the broader vision for a more equitable and resilient Edmonton.

Figure E1 – Comparison of LOS and MMLOS Outcomes

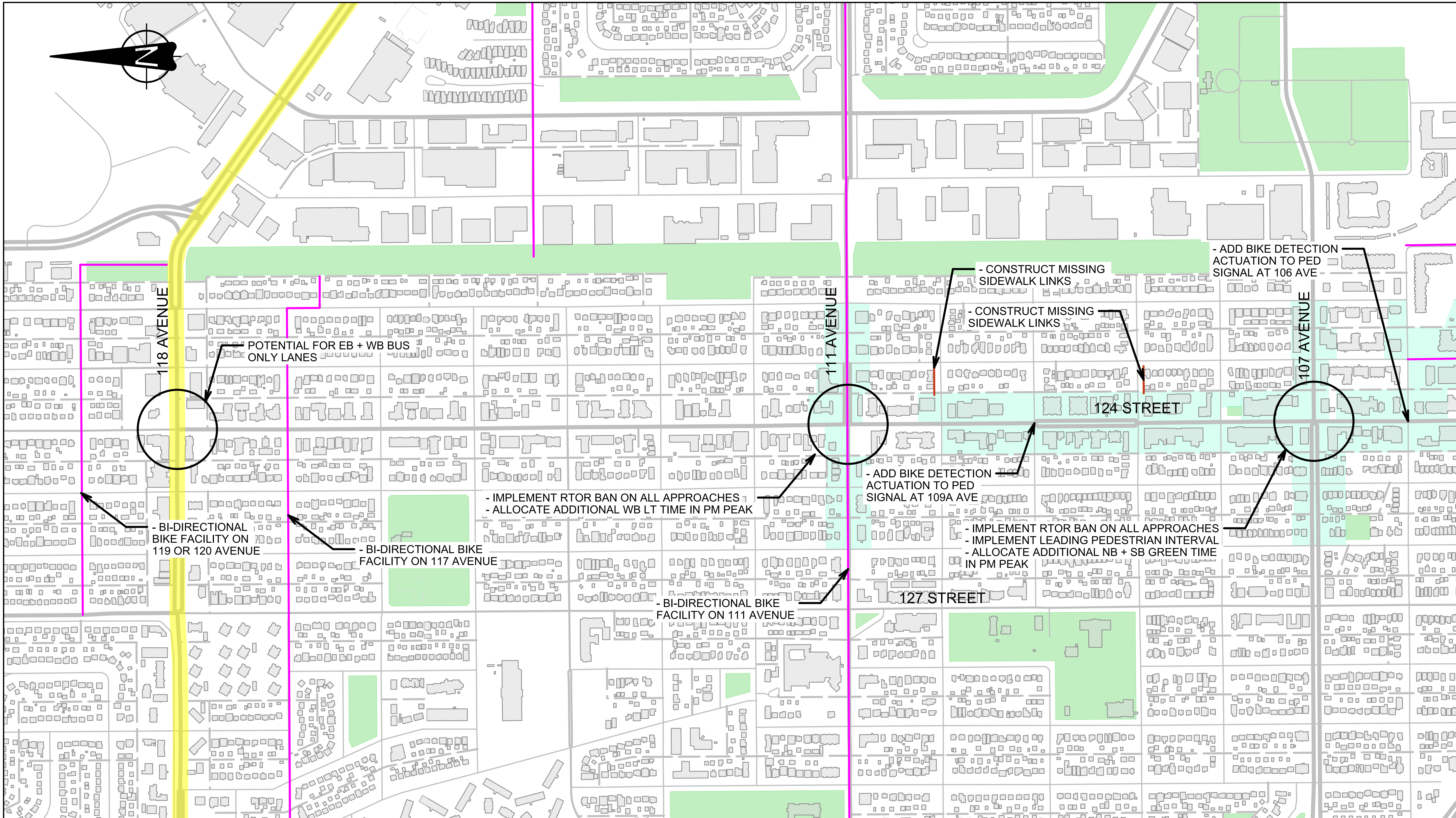
EXAMPLE – 109 Street and 87 Avenue

Located within the University-Garneau PGA, 109 Street is a commercial corridor while the intersection of 109 Street and 87 Avenue is a major access to the University of Alberta.

Based on the Scona District Plan, 109 Street and the west leg of 87 Avenue are pedestrian priority areas. The District Plan notes the following: “Enhance the pedestrian environment along 109 Street with a focus on protection, comfort and connectivity by separating sidewalks from the curb and including a treed landscaped boulevard, pedestrian-oriented lighting, public seating and improved connections and crossings”.

Additionally, bus-based mass transit routes B1 and B2 are expected through this intersection. B1 transit is expected to travel along 109 Street while B2 transit is expected to travel along the south leg of 109 Street and the west leg of 87 Avenue in the future. Concept planning for the routes has been initiated and will determine the exact routing and stop / station locations. Delivery timelines will be known once design work has been completed and funding for construction is allocated.

Traditional LOS Assessment	Multi-Modal Level of Service Assessment
Traditional LOS assessment quantitatively analyzes the efficient movement of vehicles, which can often be at odds with stated policy direction and does not offer a framework to assess the qualitative experience of other uses of a street in a comparable manner. In the case of 109 Street and 87 Avenue, the vehicle demand for northbound left turns is expected to nearly double in the PM peak hour following redevelopment. A second left turn lane is theoretically needed to address this capacity issue and reduce delays to an ‘acceptable’ level. This solution requires property acquisition with little room for improvements to the pedestrian realm or transit infrastructure. The traditional LOS leads to design decisions that often prioritize the car above all other modes of travel. Most striking – the additional turning lane may increase the total roadway capacity by just **200 people per hour per lane (pphpl)**, which will be eclipsed as the City continues to grow to 2 million.	The MMLOS quantitative assessment allows the City to evaluate streets for a variety of travel modes, including but not limited to the car. This framework evaluates each mode by the aspects of an intersection that most impact their experiences. • Pedestrians – uncontrolled conflicts with vehicles, crossing distance, cycle length, curb ramps • Cyclist – uncontrolled conflicts with vehicles, crossing distance, cycle length, bike infrastructure • Transit – delay, pedestrian LOS, and priority measures (queue jump lanes, TSP). • Vehicle – delay, presence of dedicated turn lanes. The MMLOS targets for each mode can be adjusted based on policy and planning directives. For 109 Street, pedestrian and transit MMLOS targets were adjusted upwards to reflect the emphasis placed on these modes in the District Plan and Mass Transit Plan. Recommendations using the MMLOS framework identify that curb lanes on 109 Street should be converted to transit-only lanes. A scramble crosswalk allows pedestrians to cross all legs of the intersection without vehicle conflicts. By optimizing signal timing, delay to vehicles can be partially offset. When comparing equivalent road space, transit lanes can move significantly more people than general purpose vehicle lanes. By investing in mass transit, the theoretical capacity of 109 Street increases by nearly **1,000 pphpl**, providing additional people-moving capacity for years to come.



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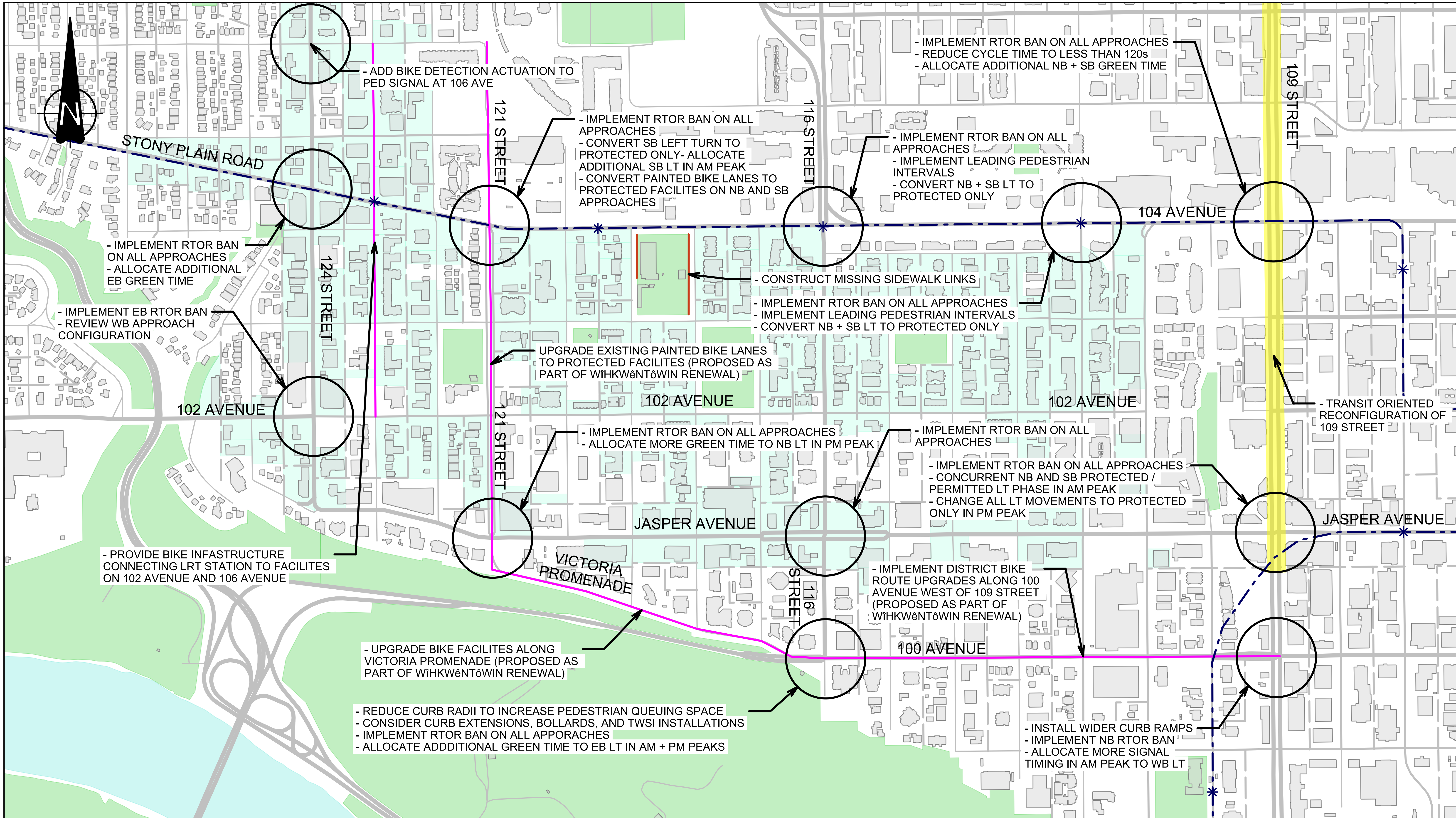
LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- MISSING SIDEWALK / ACTIVE MODES LINK
- MISSING CYCLING CONNECTION

FIGURE E-2 124 STREET PRIORITY GROWTH AREA POTENTIAL IMPROVEMENTS

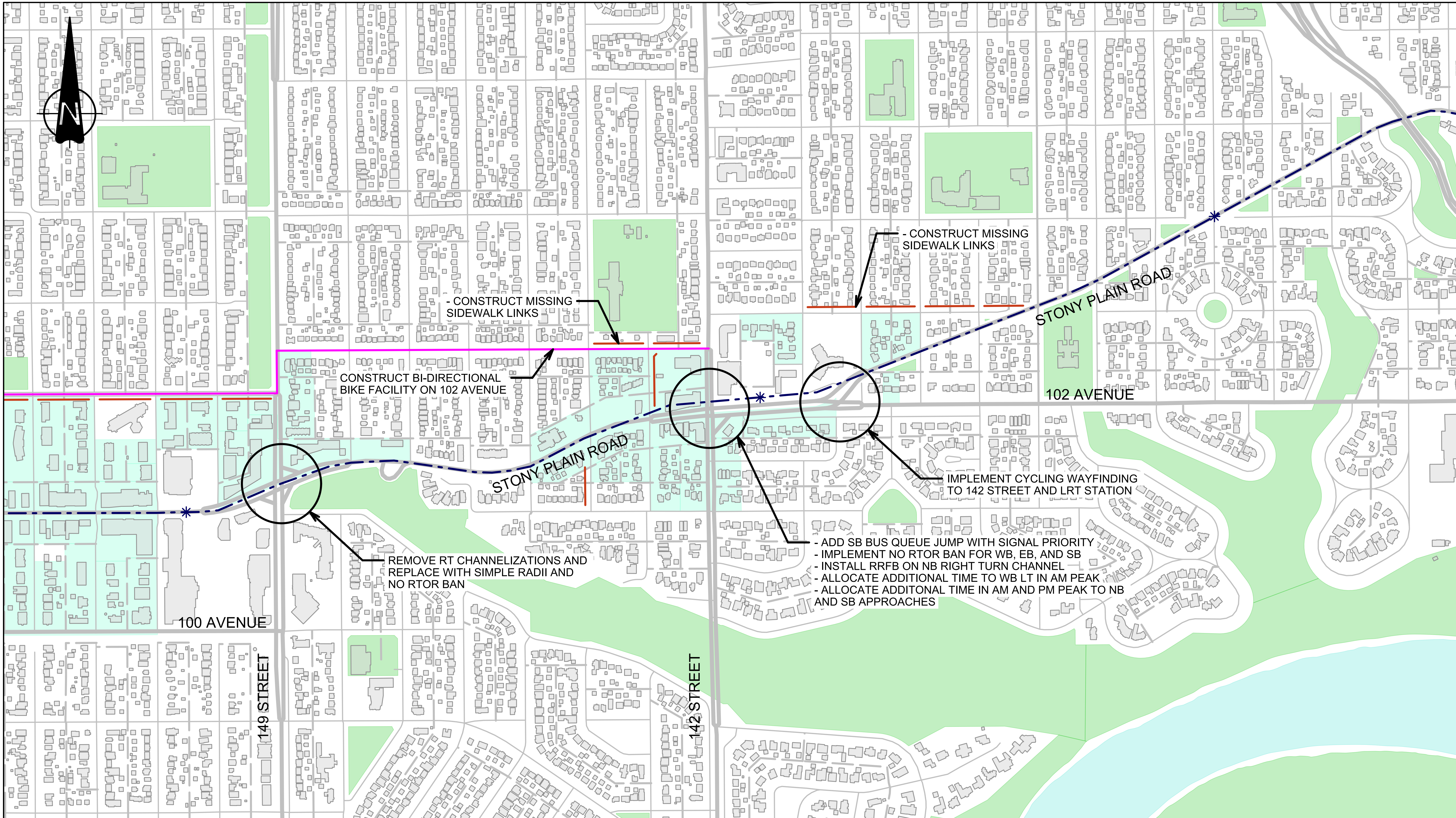


LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- LRT ALIGNMENT
- LRT STATION
- MISSING SIDEWALK
- MISSING CYCLING CONNECTION
- CORRIDOR UPGRADES REQUIRING FURTHER STUDY

NOTE:
Detailed design on the Valley Line West corridor is in progress through the P3 contract with Marigold Infrastructure Partners. The analysis completed for this study along the Valley Line corridor is based on "Summer 2024 Look Book" drawings and preliminary signal timings. Multi-modal performance at study intersections along the Valley Line corridor are subject to changes to the design, with any major design chagnse requiring further study to understand any impacts.

FIGURE E-3 WîHKWêNTôWIN PRIORITY GROWTH AREA POTENTIAL IMPROVEMENTS

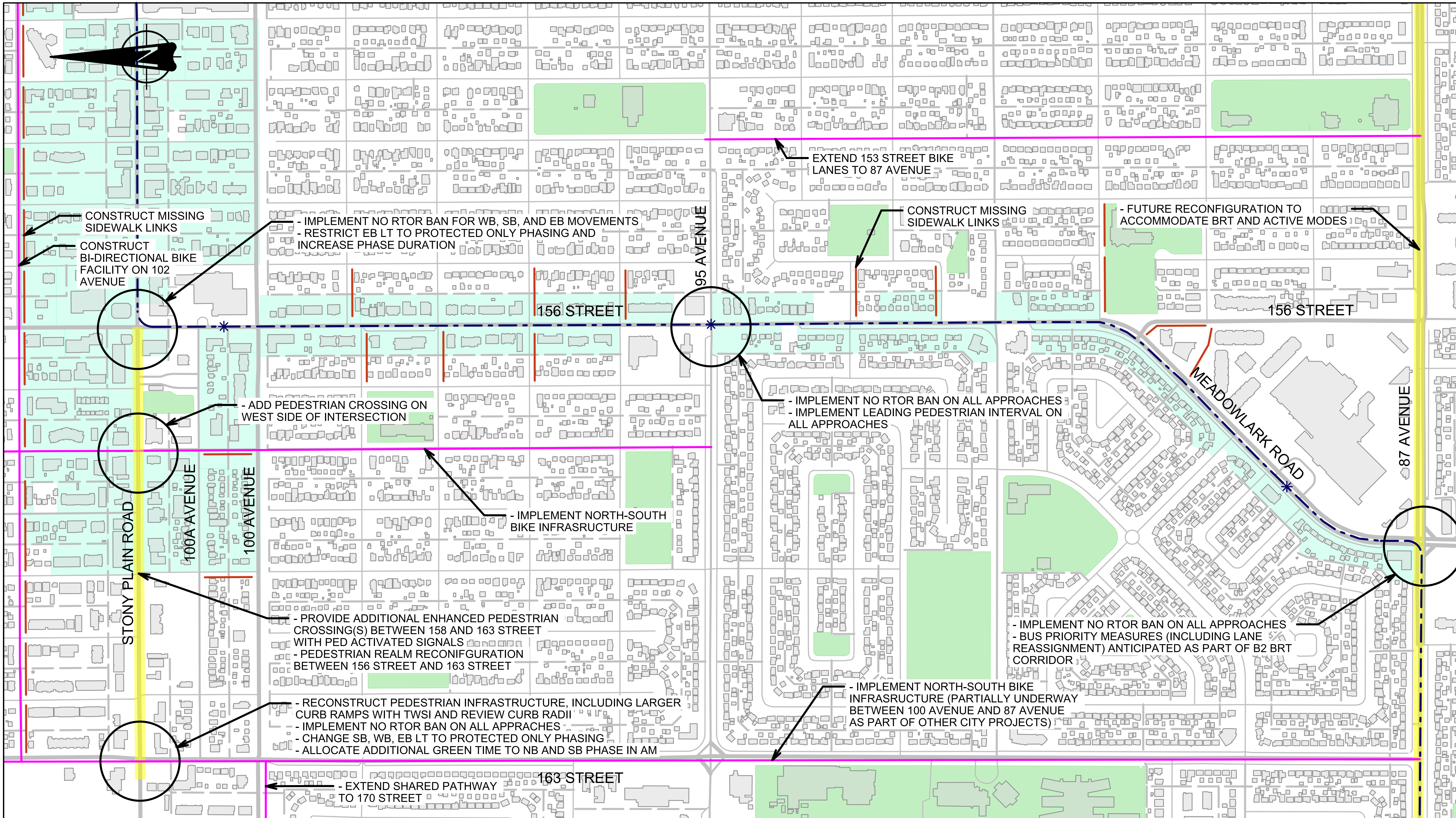


LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- LRT ALIGNMENT
- LRT STATION
- MISSING SIDEWALK
- MISSING CYCLING CONNECTION

NOTE:
Detailed design on the Valley Line West corridor is in progress through the P3 contract with Marigold Infrastructure Partners. The analysis completed for this study along the Valley Line corridor is based on "Summer 2024 Look Book" drawings and preliminary signal timings. Multi-modal performance at study intersections along the Valley Line corridor are subject to changes to the design, with any major design chagnse requiring further study to understand any impacts.

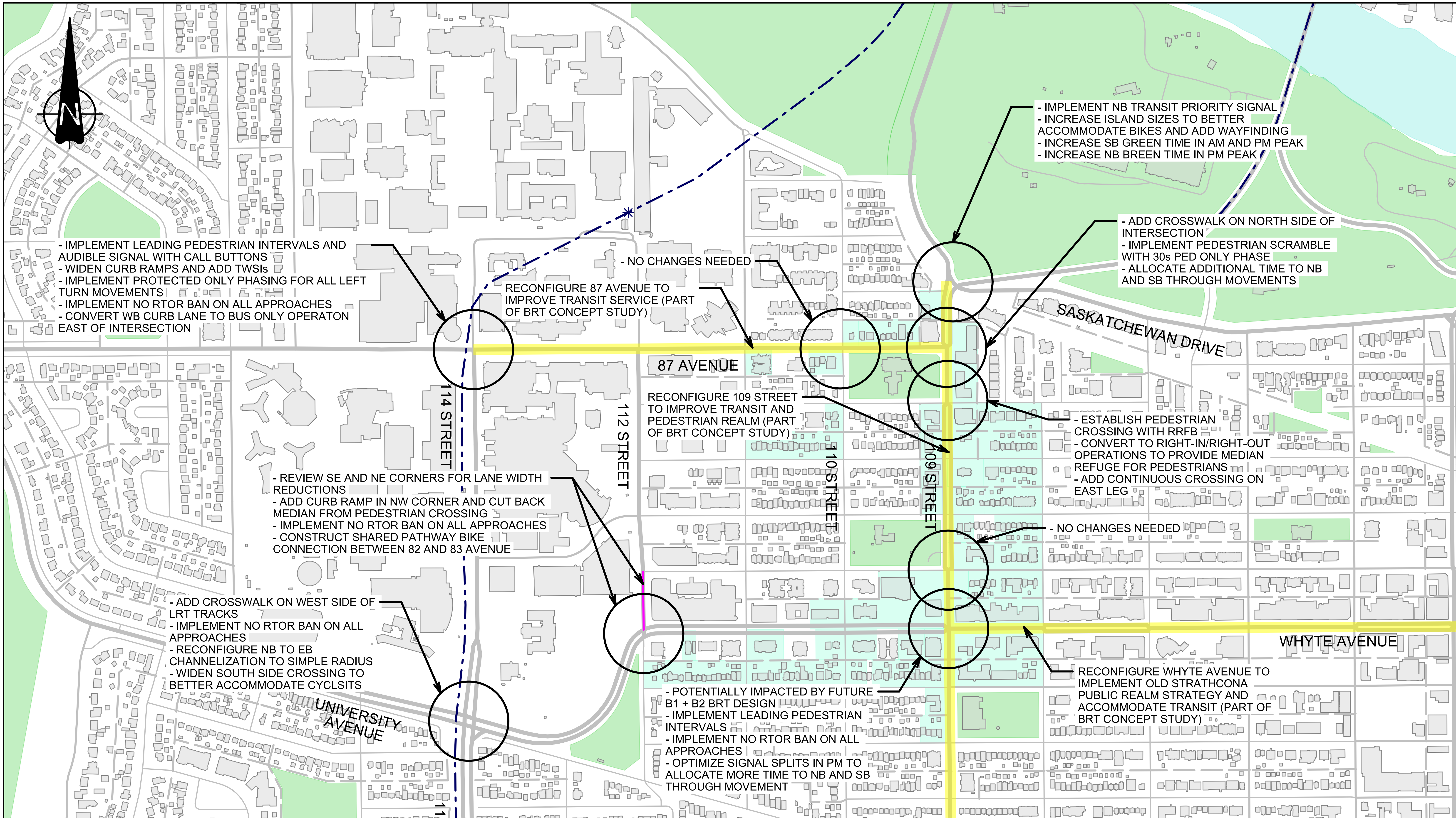
FIGURE E-4 STONY PLAIN PRIORITY GROWTH AREA POTENTIAL IMPROVEMENTS



LEGEND
- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- LRT ALIGNMENT
- LRT STATION
- MISSING SIDEWALK
- MISSING CYCLING CONNECTION
- CORRIDOR UPGRADES REQUIRING FURTHER STUDY

NOTE:
Concept planning for the B1 and B2 BRT routes has been initiated and will determine the exact routing, street configuration, and stop / station locations. Delivery timelines will be known once design work has been completed and funding for construction is allocated.

FIGURE E-5 156 STREET PRIORITY GROWTH AREA POTENTIAL IMPROVEMENTS



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LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- LRT ALIGNMENT
- LRT STATION
- MISSING SIDEWALK
- MISSING CYCLING CONNECTION
- CORRIDOR UPGRADES REQUIRING FURTHER STUDY

NOTE:
Concept planning for the B1 and B2 BRT routes has been initiated and will determine the exact routing, street configuration, and stop / station locations. Delivery timelines will be known once design work has been completed and funding for construction is allocated.

FIGURE E-6 GARNEAU PRIORITY GROWTH AREA POTENTIAL IMPROVEMENTS

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List of Abbreviations

AADT	Average Annual Daily Traffic
ADG	Accessible Design Guide (City of Edmonton)
AODA	Accessibility for Ontarians with Disabilities Act
BRT	Bus Rapid Transit
CSDSC	Complete Streets Design and Construction Standards (City of Edmonton)
DTA –	Dynamic Travel Assignment Model
HCM	Highway Capacity Manual, 7th Edition
LOS	Level of Service (traditional measure of vehicle-based operation)
LPI	Leading Pedestrian Interval
LRT	Light Rail Transit
LTS	Level of Traffic Stress (measurement of cyclist comfort)
MaaS	Mobility-as-a-Service
MMLOS	Multi-Modal Level of Service
OTC	Ontario Traffic Council
PGA	Priority Growth Area
PPHPL	People Per Hour Per Lane
RIRO	Right-In, Right-Out intersection
RRFB	Rectangular Rapid Flash Beacon
RTM	Regional Travel Demand Model
RTOR	Right Turn on Red
TAC	Transportation Association of Canada
TIA	Traffic Impact Assessment
TSP	Transit Signal Priority
TWSI	Tactile Warning Surface Indicator
V/C	Volume to Capacity Ratio (traditional measure of vehicle-based operation)
VPH	Vehicles per hour
VPHPL	Vehicles per hour per lane
VLW	Valley Line West (Light Rail Transit Expansion Project)

1. Introduction

The City of Edmonton (the City) undertook a comprehensive multi-modal mobility assessment for the planned re-zoning of lands within five Priority Growth Areas (PGAs), identify associated investments in the transportation network for all road users, and consider congestion management tools, programs or mechanisms to meet the unique needs of each of the five areas.

The Edmonton *City Plan (2020)* identifies nodes and corridors that each play a role in achieving The City Plan's vision at different stages of the City's growth to two million people. The node and corridor network has been identified for deliberate urban intensification, where the development of higher concentrations of residential, commercial and employment uses are anticipated. The nodes and corridors in the redeveloping area that are targeted to see the most growth between now and when the population reaches two million are nineteen Priority Growth Areas (PGAs). Five such PGAs have been selected for City-led higher density re-zoning efforts, including:

- 124 Street,
- Centre City – Wîhkwêntôwin,
- 156 Street,
- Stony Plain Road, and
- University – Garneau.

These five Priority Growth Areas are illustrated in **Figure 1-1**.

The City Plan notes that "*Edmonton will need to integrate mobility and land-use planning to ensure that we create more vibrant, well-connected, and economically prosperous districts in the future. This will mean shifting the mobility system from one that is predominantly focused on individual travel by car to one that prioritizes a broader array of movement options. An evolved mass transit system will anchor an overall mobility system of city-wide and district routes connecting all areas of the city, where those connections have historically been lacking. Transit and roadway networks that are integrated with pedestrian and cycling infrastructure will support choice throughout the mobility system.*"

These priorities are reinforced by Edmonton's *Community Energy Transition Strategy and Action Plan (2021)* which builds on the vision established in the City Plan. The Action Plan has set targets for Edmonton to become a carbon neutral community by 2050. The Energy Transition Strategy also outlines numerous pathways the City will take to reduce their carbon emissions and become a climate resilient community, one of which is a low carbon transportation system. This pathway relies on infill development, the complete buildout of the active transportation network by 2030, and 50% of trips made by sustainable modes by 2040.

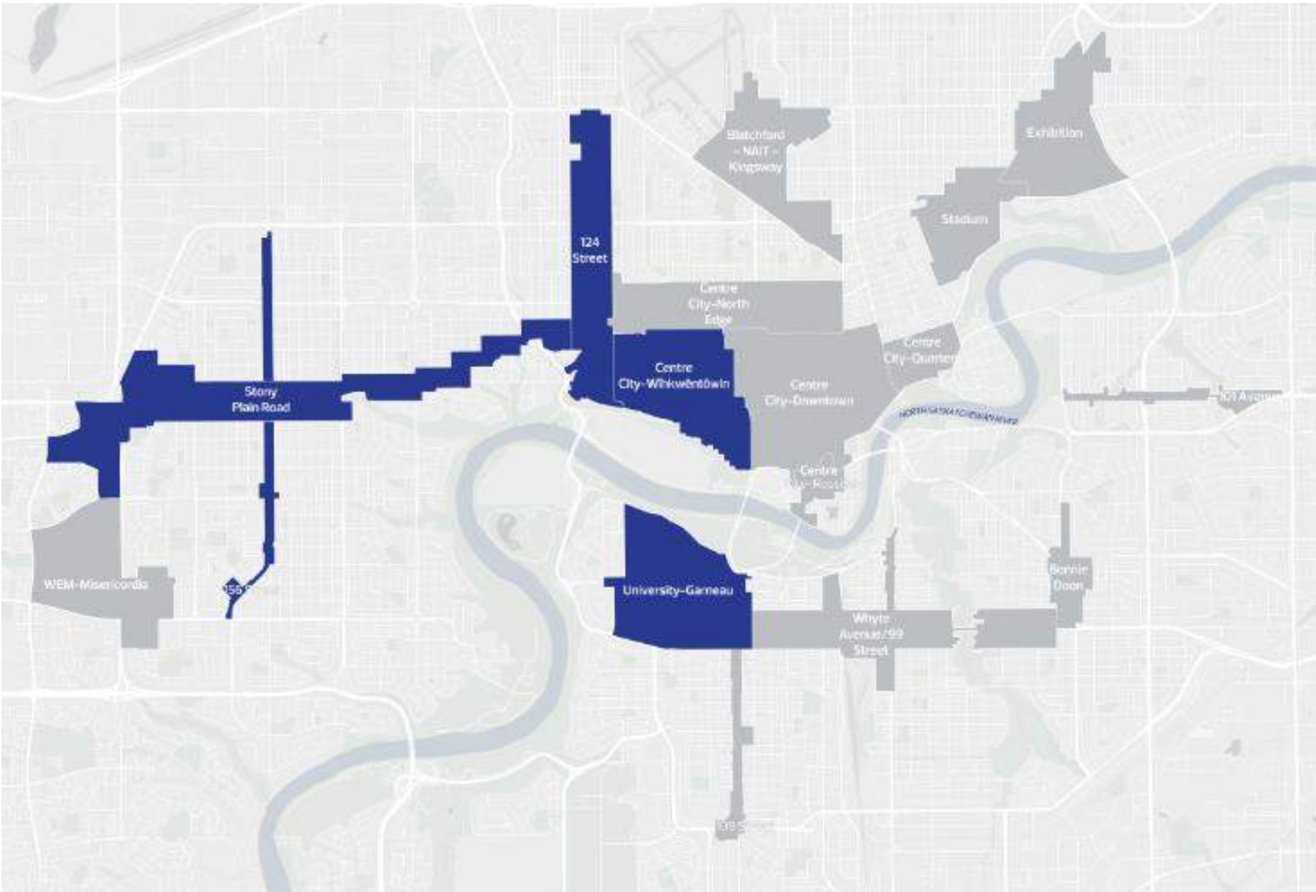


Figure 1-1 Priority Growth Areas

By putting people first, the City plans to shift long-range mobility priorities from private vehicles to a wide array of mode choices. To reflect these priorities in the mobility assessment, it is necessary to rethink traditional measures of effectiveness that centre vehicle delay and congestion. This mobility assessment focuses on moving as many people as possible in the limited right-of-way provided, not necessarily moving as many cars as possible. As such, a Multi-Modal Level of Service (MMLOS) framework lies at the core of the mobility assessment.

2. Priority Growth Areas

2.1 Overview of Anticipated Development

Based on the population growth, the City provided anticipated travel demand for the 1.25 Million population horizon from the Regional Travel Model (RTM) and Dynamic Travel Assignment model (DTA). Demographics and travel information was provided for the 'Do Nothing' baseline scenario and the Priority Growth Area redevelopment scenario. Both scenarios of the 1.25 Million population horizon model include network improvements from existing planned/on-going projects that are expected to be a part of the network at the time of PGA redevelopment.

To analyze the mobility impacts of accelerated growth concentration in PGAs, two scenarios were considered: a "Baseline" scenario and a "PGA Redevelopment" scenario. The PGA Redevelopment scenario assumed approximately 43,000 more residents within the study area than the Baseline scenario. To maintain the same CMA wide total population between the two scenarios, this additional growth in PGA areas was reallocated from developing areas within the city, reducing their population by 43,000. While this growth assumption aligns with the trend anticipated in the City Plan, this shift in growth distribution between the two scenarios resulted in changes to origin-destination (OD) travel patterns which had not been anticipated to the extent observed. However, the change in OD travel patterns was found logical (e.g., fewer residents in developing southeast and southwest areas resulted in fewer commuting trips from south Edmonton to downtown, reducing traffic on major roads accessing downtown). Therefore, despite an overall increase in travel demand in the PGA Redevelopment scenario, congestion on the road network within the PGAs and in the areas surrounding the PGAs was less than initially anticipated. Overall, the roads within PGAs and surrounding areas were found to be more congested than the Baseline, but the level of congestion was found to be less than expected as fewer road users from suburban areas were added to the model.

Notes on Population Growth Data

The intensification in the RTM and DTA assigned to the PGA was based on the proposed rezoning and associated building sizes presented to the public in the fall of 2024. Based on feedback from the public, zoning intensity and target parcels have been adjusted, but overall intensification remains very similar to what was modelled, decreasing by approximately 1.3%.

The traffic districts from the RTM and DTA encompass more than just the identified PGA zones. As such, the population and employment information expressed here represents PGA locations and surrounding parcels of land. The growth experienced between present day and the post-development population forecast is not solely attributed to PGA zones. This study considers the population growth within the areas adjacent to the studied PGA corridors in the 1.25 Million population horizon. However, the timeframe to achieve the redevelopment and densification of the PGAs will likely be beyond the 1.25 Million population horizon.

2.1.1 124 Street / Wîhkwêntôwin

The 124 Street and Wîhkwêntôwin priority growth areas are illustrated in **Figure 2-1**. Due to their proximity interconnectivity, these two areas have been considered together. The Wîhkwêntôwin City-Centre Node and 124 Street Primary Corridor are adjacent to each other and provide the surrounding neighbourhoods with access to a diverse range of homes and businesses. Both areas were selected for the opportunity to leverage existing strong market interest and help increase population around planned Valley Line West LRT stops.

The Wîhkwêntôwin Priority Growth Area includes most of the Wîhkwêntôwin neighbourhood from the River Valley north to 105 Avenue and from Rail Town Linear Park west to 122 Street. It forms part of the Centre-City Node, Edmonton's distinct cultural, economic, institutional and mobility hub with the highest density and mix of land uses. This node includes a critical mass of housing, employment and civic activities, with many Edmontonians working, living, visiting and attending institutions in the Centre-City.

The area has seen many new residential projects in recent years and will have access to several LRT stations with the completion of Valley Line West. As Edmonton's most prominent intensification area, the Centre-City Node looks to support a minimum density of 450 people per hectare according to The City Plan.

The 124 Street Primary Corridor is found at the western boundary of the Wîhkwêntôwin neighbourhood, running from Jasper Avenue in the south to 118 Avenue in the north. It runs through the Inglewood, Westmount and Wîhkwêntôwin neighbourhoods and includes the future 124 Street Valley Line West LRT stop.

The City Plan identifies Primary Corridors as the largest, most vibrant, and most prominent urban streets in the city and region. They serve as destinations in and of themselves, but also provide critical connections between nodes, the rest of the city, and the region. Primary Corridors target a minimum density of 150 people per hectare through mostly mid and some high-rise buildings.

Based on data from the RTM, a high-level review of demographic changes in the 124 Street traffic district is summarized in **Table 2.1**. Targeted intensification arising from the PGA rezoning, combined with organically occurring property redevelopment, is expected to add 25,000 people to the 124th Street and Wîhkwêntôwin areas by the post-development population horizon.

Table 2.1 124th Street / Wîhkwêntôwin Demographics

	Baseline	With PGA Rezoning Development (Modelled)
Population	24,810	50,070
Number of Units	15,160	32,030
Daily Trips per Household	6.44	6.19
% Trips by Sustainable Modes	42.27%	45.04%

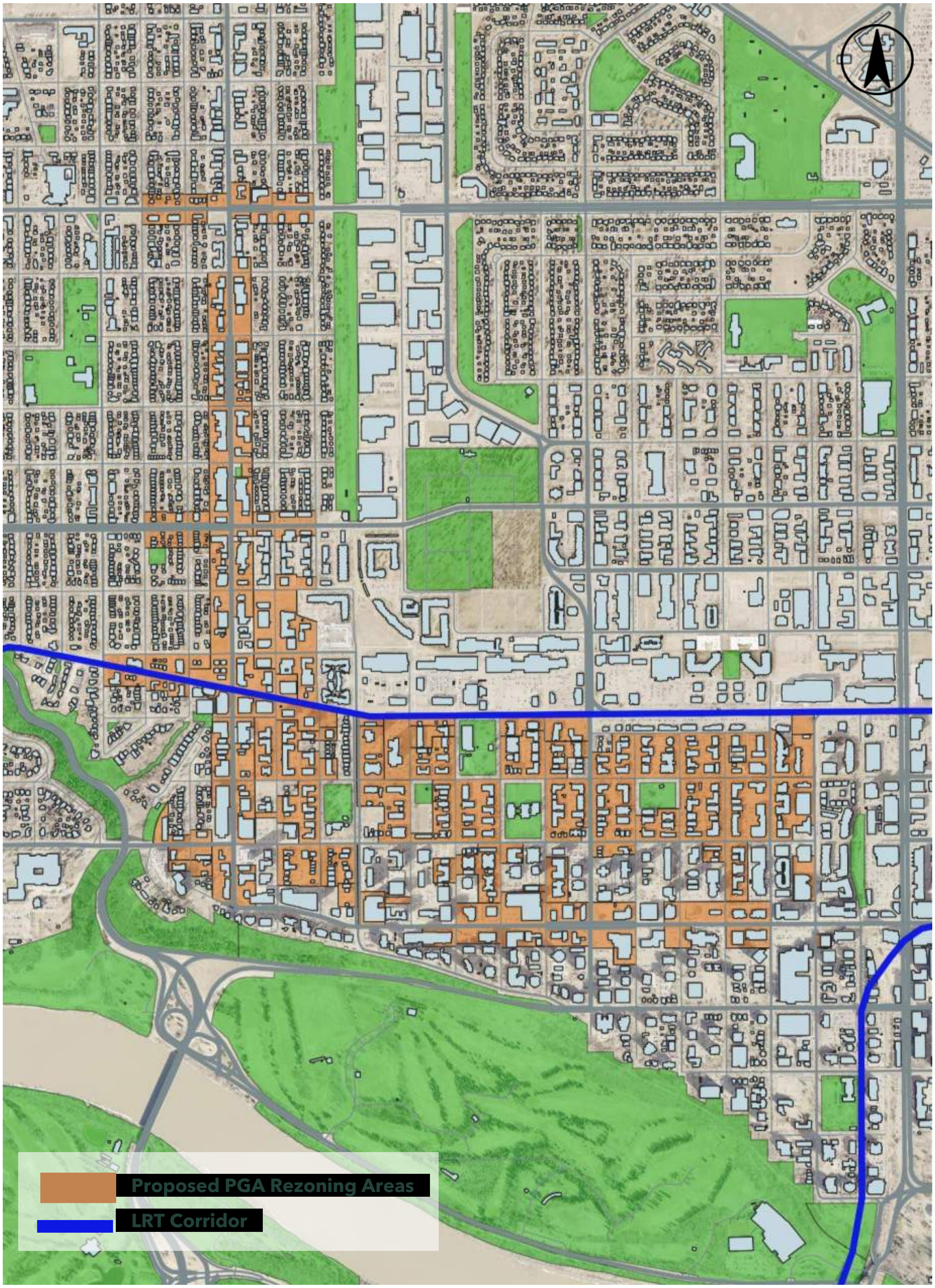


Figure 2-1 124 Street / Wîhkwêntôwin Priority Growth Areas

2.1.2 156 Street / Stony Plain Road

The Stony Plain Road and 156 Street priority growth areas are illustrated in **Figure 2-2.** Due to their proximity; these two areas have been considered together. Both the 156 Street Secondary Corridor and Stony Plain Road Primary Corridor were selected for their opportunity to increase population around planned Valley Line West LRT stops to support future ridership. The Stony Plain Road Primary Corridor was also selected to leverage existing strong market interest in the area.

The Stony Plain Road Primary Corridor runs from 126 Street in the east to 172 Street in the west. It runs through the neighbourhoods of Westmount, Glenora, Grovenor, Crestwood, Canora, West Jasper Place, Britannia-Youngstown and Glenwood.

The City Plan identifies Primary Corridors as the largest, most vibrant, and most prominent urban streets in the city and region. They serve as destinations in and of themselves, but also provide critical connections between nodes, the rest of the city, and the region. Primary Corridors target a minimum density of 150 people per hectare through mostly mid and some high-rise buildings.

The 156 Street Secondary Corridor runs from 87 Avenue in the south to 111 Avenue in the north. It runs through the neighbourhoods of Glenwood, West Jasper Place, Sherwood, Meadowlark Park, Canora, Britannia-Youngstown, Mayfield and High Park.

The City Plan defines Secondary Corridors as vibrant streets smaller in scale to Primary Corridors and with a more residential character, some commercial clusters, and local destinations for surrounding communities. Secondary Corridors target a minimum density of 75 people per hectare through low and some mid-rise buildings.

Based on data from the RTM, a high-level review of demographic changes is summarized in **Table 2.2** and **Table 2.3** for Stony Plain Road and 156 Street, respectively. Targeted intensification arising from PGA rezoning, combined with organically occurring property redevelopment, is expected to add 13,200 people to the Stony Plain Road and 156 Street areas by the post-development population horizon.

Table 2.2 Stony Plain Road Demographics

	Baseline	With PGA Rezoning Development (Modelled)
Population	8,600	19,630
Number of Units	4,370	11,730
Daily Trips per Household	7.86	6.79
% Trips by Sustainable Modes	25.28%	29.44%

Table 2.3 156th Street Demographics

	Baseline	With PGA Rezoning Development (Modelled)
Population	7,210	9,420
Number of Units	3,620	5,100
Daily Trips per Household	7.84	7.29
% Trips by Sustainable Modes	23.66%	24.80%

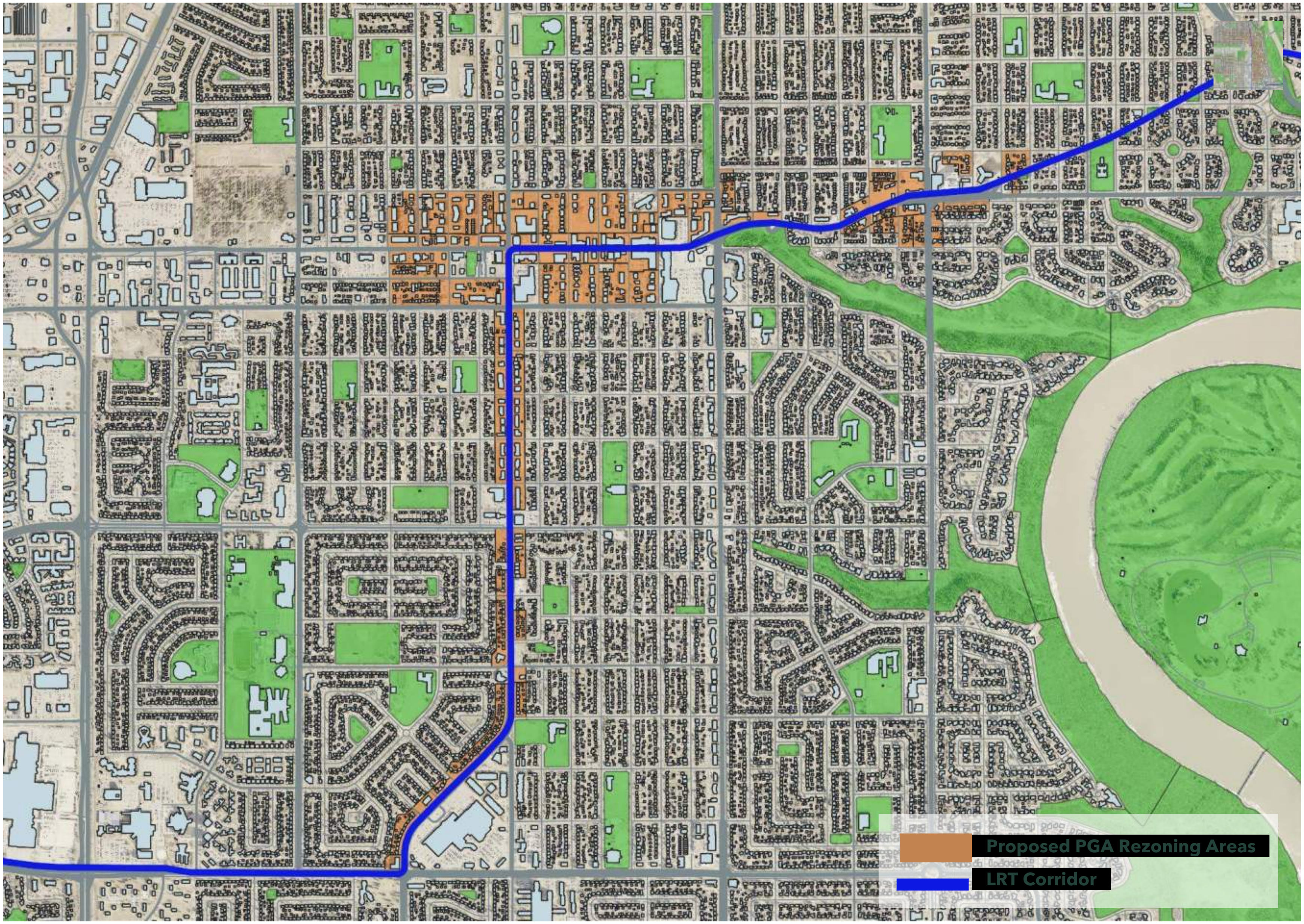


Figure 2-2 Stony Plain Road / 156 Street Priority Growth Areas

2.1.3 University – Garneau

The University-Garneau priority growth area is illustrated in **Figure 2-3**. The University-Garneau Major Node vacancy rate was around 1 percent in 2023[1]. There is a significant need to increase the amount of available housing, which is one of the key reasons this area was selected.

The University-Garneau Major Node generally extends from the River Valley south to 80 Avenue and 110 Street west to 118 Street. It is home to the University of Alberta, a significant institutional presence in the area which attracts visitors from across the local metropolitan region and beyond along with staff and student populations. Furthermore, the University of Alberta and Stollery Children's Hospitals are also situated within the University lands. In addition to its resident population, the node comprises a major health and education hub with direct access to the Capital/Metro Line LRT along with major arterial streets including 109 Street and 82 Avenue/University Avenue.

The City Plan defines Major Nodes as mixed-use destinations and urban communities which function as dense residential areas and employment hubs featuring large institutions, strategically located to serve broad catchment areas within Edmonton and the metropolitan region. A Major Node targets a minimum density of 250 people per hectare through mid and high-rise buildings

Based on data from the RTM, a high-level review of demographic changes is summarized in **Table 2.4** for the University-Garneau area. Targeted intensification arising from PGA rezoning, combined with organically occurring property redevelopment, is expected to add 5,080 people to the University-Garneau area by the post-development population horizon.

Table 2.4 University-Garneau Demographics

	Baseline	With PGA Rezoning Development (Modelled)
Population	14,300	19,380
Number of Units	8,410	11,800
Daily Trips per Household	6.64	6.35
% Trips by Sustainable Modes	58.73%	60.56%

[1] Canadian Mortgage and Housing Corporation (CMHC) Rental Market Survey

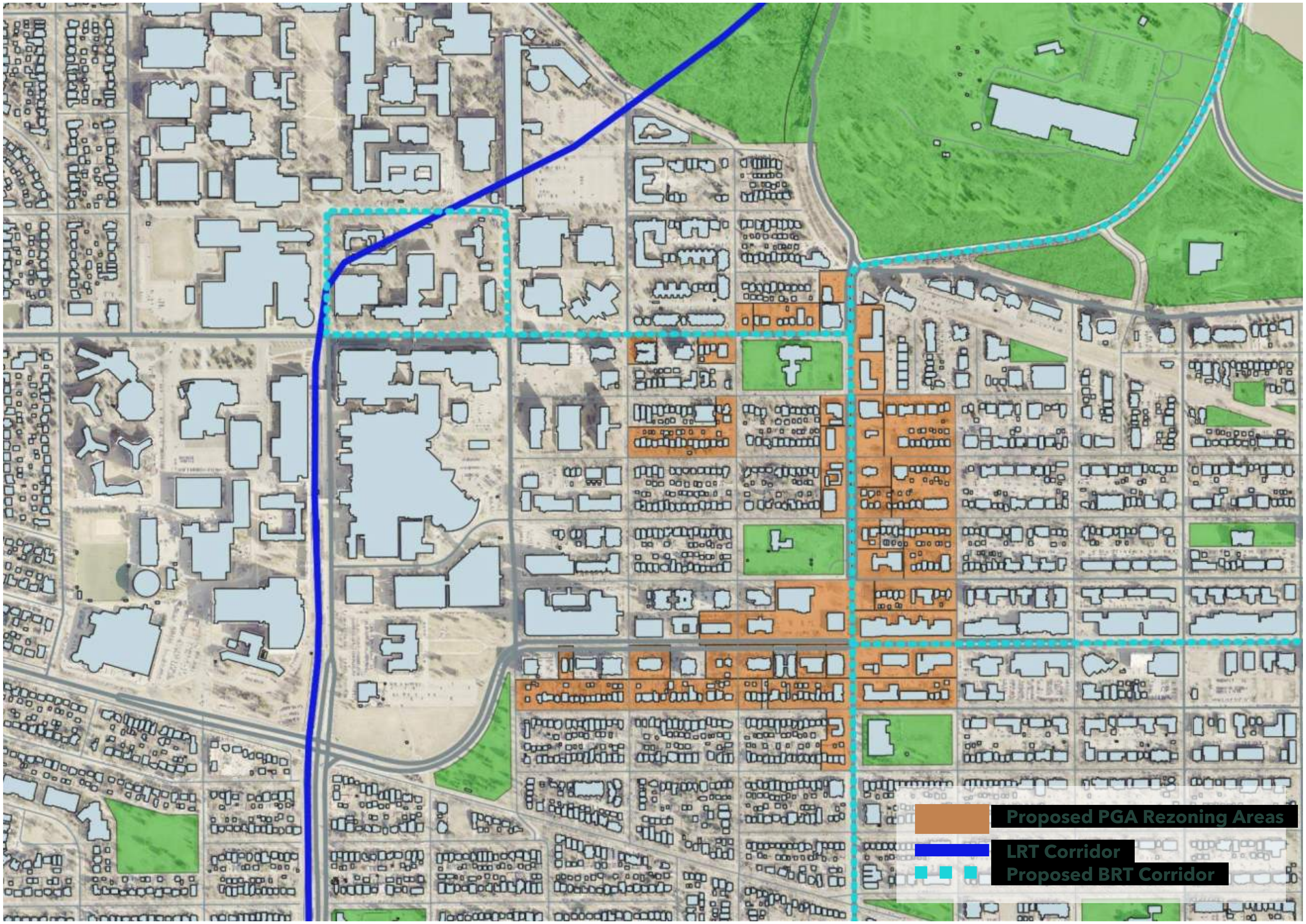


Figure 2-3 Garneau Priority Growth Areas

2.2 Travel Demand Assumptions

A number of assumptions were necessary to establish baseline and forecast scenarios.

Given that some population centres changed while employment areas were kept the same in the post-development population horizon, some travel patterns (origin / destination pairs) and modes choices are expected to change in the PGA scenario as compared to the Baseline scenario. This is a data limitation. Population growth will continue to occur in suburban neighbourhoods in addition to the PGA-related densification in core neighbourhoods; similarly, new employment centres may morph over time and may not reflect the model demographics.

It is assumed that the Valley Line West (VLW) Light Rail Transit (LRT) extension will be operational by the post-development population horizon, running along 104 Avenue / Stony Plain Road before turning south along 156 Street and west along 87 Avenue.

It is assumed that work on the Yellowhead Trail Freeway Conversion and Terwillegar Drive projects will similarly be complete, as will the Imagine Jasper Avenue project west of 114 Street. Furthermore, the demand assumptions do not consider roadway network changes from temporary closures due to construction.

It is assumed that all Active Transportation infrastructure identified in the 2024 – 2026 Active Transportation Network Expansion project list will be built by the post-development population horizon. These projects focused on connectors within Anthony Henday Drive, near-term priorities identified in the Bike Plan Implementation Guide, and routes within high bike-trip potential areas.

The mode split for households in PGA zones are much higher than citywide splits. The citywide sustainable mode split (transit and active modes) predicted in the RTM is 23.15% while the sustainable mode split in PGA zones ranges from 24.8% (156 Street) to 60.56% (University / Garneau). Priority Growth Areas were chosen based on their proximity to transit hubs, the existing and planned cycling network, and employment centres. Two insights can be drawn from these mode splits:

1. Densification in PGA will increase the demand for automobile travel, However, with better transit accessibility, availability of connected bike network, and higher proximity to amenities within the PGA, the rate of growth for vehicle travel demand is expected to be lower than typical suburban neighborhoods in Edmonton.
2. A PGA with lower mode split (such as 156 Street) indicates a neighbourhood is underserved by sustainable transportation choices and dense, mixed-use development.

2.2.1 Traffic Demand

Table 2.5 compares trips to, from, and within the 124th Street / Wîhkwêntôwin traffic districts for the post-development population horizon with and without PGA re-zoning.

Table 2.5 124th Street/Wîhkwêntôwin Trip Comparison

	Baseline	With PGA Rezoning Development	Change	Change (%)
AM Peak Vehicles Trips	16,669	22,876	6,207	37.2%
AM Peak Trips (All Modes)	31,617	47,403	15,786	49.9%
PM Peak Vehicle Trips	22,881	31,446	8,565	37.4%
PM Peak Trips (All Modes)	43,429	65,559	22,130	51.0%
% Sustainable Mode Split	42.27%	45.04%	-	6.6%

Table 2.6 and **Table 2.7** compare trips to, from, and within the Stony Plain Road and 156 Street traffic districts for the post-development population horizon with and without PGA re-zoning.

Table 2.6 Stony Plain Road Trip Comparison

	Baseline	With PGA Rezoning Development	Change	Change (%)
AM Peak Vehicles Trips	5,775	9,737	3,962	68.6%
AM Peak Trips (All Modes)	10,690	18,616	7,926	74.1%
PM Peak Vehicle Trips	7,983	12,856	4,873	61.0%
PM Peak Trips (All Modes)	13,684	23,516	9,832	71.9%
% Sustainable Mode Split	25.28%	29.44%	-	16.5%

Table 2.7 156th Street Trip Comparison

	Baseline	With PGA Rezoning Development	Change	Change (%)
AM Peak Vehicles Trips	3,791	4,703	912	24.1%
AM Peak Trips (All Modes)	6,902	8,593	1,691	24.5%
PM Peak Vehicle Trips	4,951	6,170	1,219	24.6%
PM Peak Trips (All Modes)	8,647	10,729	2,082	24.1%
% Sustainable Mode Split	23.66%	24.80%	-	4.8%

Table 2.8 compares trips to, from, and within the University traffic district for the post-development population horizon with and without PGA re-zoning.

Table 2.8 University Trip Comparison

	Baseline	With PGA Rezoning Development	Change	Change (%)
AM Peak Vehicles Trips	8,214	9,154	940	11.4%
AM Peak Trips (All Modes)	19,704	23,340	3,636	18.5%
PM Peak Vehicle Trips	13,422	14,305	883	6.6%
PM Peak Trips (All Modes)	30,158	34,323	4,165	13.8%
% Sustainable Mode Split	58.73%	60.56%	-	3.1%

2.3 Post-Pandemic Travel Behaviour

The City Plan was initially developed prior to the Covid-19 pandemic and adopted by City Council in December 2020, as we were collectively reacting to a changed societal landscape. The Plan "*is a testament to the power of […] an optimistic outlook, a willingness to shift our route to that destination as conditions change, and the reality that what happens in the world will always impact the speed with which we reach our destination*".

The way we travel was fundamentally impacted by Covid-19.

- In a study of the United States[2], work-from-home / flexible work arrangements for knowledge workers was anticipated to increase by 30% following the easing of pandemic gathering and travel restrictions. As a result, commuting by car was anticipated to drop 9% (from 71.9% to 65.5%) and commuting by transit was anticipated to drop 31% (from 10.9% to 7.5%). Though less robust, data published by Statistics Canada[3] found that, at the national level, 18.7% of employed people worked mostly from home in 2024 compared 7.1% in 2016. While transit ridership has returned to pre-pandemic levels, some auto commuting reductions may be expected in Edmonton.
- Temporal demands have shifted, resulting in peak hour spreading. This phenomenon frees previously used road capacity that could be reallocated to other users with fewer negative trade-offs to drivers.[4]
- Based on a high-level review of traffic counts within the study limits, traffic volumes in the peak periods were consistently lower in 2024 compared to 2016/2017. For example, at 124 Street and 102 Avenue, volumes for most approaches were 10% to 25% lower in 2024

[2] Javadinasr M, Maggasy T, Mohammadi M, et al. The Long-Term effects of COVID-19 on travel behavior in the United States: A panel study on work from home, mode choice, online shopping, and air travel.
[3] Statistics Canada: More Canadians Commuting in 2024 https://www150.statcan.gc.ca/n1/daily-quotidien/240826/dq240826a-eng.htm
[4] Bhagat-Conway MW, Zhang S. Rush hour-and-a-half: Traffic is spreading out post-lockdown.

compared to 2017. At 109 Street and 83 Avenue, volumes along 109 Street were approximately 20% lower in 2024 compared to 2017.

- As of late 2023, a study by the University of Toronto[5] estimates that pedestrian traffic in Edmonton's Central Business District was roughly 80% of pre-pandemic levels.
- Online shopping for commercial goods and daily needs grew during and after the pandemic. In-person grocery shopping was common pre-pandemic and while it is anticipated to remain the predominant form of grocery shopping post-pandemic it is anticipated to decrease by 8% (from 89.9% to 82.8%). The volume of commercial vehicles is anticipated to increase to reflect this demand for online shopping. [2]

Travel patterns and mode choice are not static, responding to the social and physical world around us. Via the City Plan, Edmonton is committed to provide a range of robust travel options for all road users in the future.

Overall, this means that post-pandemic highest peak hour volumes are generally lower than pre-pandemic volumes, with more peak spreading and day to day peak hour differences. This trend is reflected in available City Average Annual Weekday Traffic (AAWDT) volume data, which shows that overall daily volumes as of 2023 have began to meet or exceed pre-pandemic (2019) volumes by around 10% in developed areas.

Given that the City's modelling information is based on pre-pandemic traffic patterns, peak hour traffic volume results from the City's DTA model are anticipated to be conservative compared to real world traffic volumes. Because daily trips are not impacted by peak spreading while a decrease in commuter trips is offset by an increase in commercial trips, overall daily volumes are anticipated to be consistent.

[5] Downtown Recovery | School of Cities

3. Mobility Assessment Approach

As Edmonton's population continues to grow, the traditional model of vehicle-focused road expansion is becoming increasingly unsustainable, particularly in well-established and developed areas. Instead, the City is embracing a multi-modal approach aimed at moving people, and not just vehicles, more efficiently.

The Mobility Assessment Approach introduces the Multi-Modal Level of Service (MMLOS) framework, complementing the conventional, vehicle-centric Level of Service (LOS) quantitative methods. Historically, the traditional LOS framework used for transportation planning has quantitatively reviewed vehicle travel and qualitatively considered the safety and experience of other road users such as pedestrians, cyclists, and transit users. The MMLOS framework quantitatively considers the needs and experiences of all transportation users and allows planners and engineers to contextualize the assessment to match the character of the street and supporting policy objectives. This combined approach reflects the City's broader objective of creating a vibrant, sustainable, and connected urban environment that prioritizes the movement of people over vehicles.

Central to this new approach is congestion acceptance and management. Recognizing that some vehicle congestion is inevitable in dense, multi-use areas, the City instead aims to redistribute road space to prioritize the most efficient and equitable forms of movement. MMLOS allows for the adjustment of LOS ratings based on context, policy priorities, and user experience, acknowledging that lower vehicle LOS may be acceptable, or even desirable, when other users benefit.

The methodology employs tools and targets drawn from the Ontario Traffic Council's MMLOS Guidelines, adapted to reflect Edmonton's local street classifications as well as local policy documents including the City Plan, District Plans, Bike Plan, and Mass Transit Strategy. It evaluates corridor and intersection performance using detailed criteria for each travel mode, assigning grades from A (highest quality experience) to F (minimal acceptable standard). These grades inform design and investment decisions, ensuring alignment with broader city-building objectives.

Section 3 outlines a toolkit of mitigation measures that can improve LOS for various modes within existing right-of-way constraints, ranging from sidewalk enhancements to transit priority measures. It also compares the MMLOS process to traditional Transportation Impact Assessments (TIAs), emphasizing its more holistic and equitable lens.

Overall, the use of MMLOS provides a comprehensive and future-forward blueprint for evaluating and managing mobility in a growing, multimodal Edmonton.

3.1 Congestion Acceptance and Management

As the population of Edmonton grows towards two million residents, the total number of trips will increase substantially. In re-development areas, right-of-way is not available to endlessly expand the roadway to maintain vehicle Level of Service (LOS) at current levels. This is reinforced by the City Plan, "*with the exception of […] future growth areas, there will be limited opportunities to build or widen roads. Continued expansion of the road network, as a general strategy, is not an efficient use of limited resources and constraint space. We will prioritize a shift away from conventional investment in road expansion towards a greater diversity of modes that move people efficiently*".

Within Priority Growth Areas, the City intends to focus on reusing current road right-of-way space to move as many people as possible, rather than as many vehicles as possible. While the movement of personal and commercial vehicles will always play a role in Edmonton's Mobility Network, the City Plan affirms that "*Edmonton will maximize the efficiency of existing road infrastructure and implement targeted improvements in the road network using innovative technology and operational improvements*". As such, right-of-way space will be re-distributed between the various forms of travel, and the remaining vehicle space will be maximized to operate as efficiently as possible. Traditional measures of vehicle LOS are anticipated to deteriorate in the future as the City and regional population continues to grow.

The City Plan sets forward clear intentions to change the way transportation Level of Service is evaluated. "*We will move past traditional ways of measuring network performance aimed exclusively at improving vehicle delay and will pursue a holistic approach that also evaluates the mobility system in terms of public health and safety, equity, impacts to climate, the natural environment and urban form. Increasing efficiency of publicly owned facilities will also mean managing and treating parking, curbside space, and roadways as strategic public assets*".

The Multi-Modal Level of Service (MMLOS) approach to the mobility assessment outlined in Section 3.2 is designed to contextualize vehicle LOS within the experiences of other road users. A level of service 'F' for vehicles calculated using traditional methodologies may realistically be adjusted to a level of service 'D' (a more acceptable level) when considered within the broader mobility context for a given street. Congestion acceptance and congestion management become key components of the transportation planning and traffic engineering toolkit to make the most out of the constrained space. The adoption of MMLOS demonstrates the City's intention to move away from traditional car-oriented transportation investments and mobility policies to multi-modal approaches that prioritizes movement of people over vehicles. However, this does not mean that the City will stop investing in roadway expansions, upgrades, and maintenance. Instead, future planning, assessment, and investment in the mobility network will consider experiences and efficiencies of all users, including non-drivers and passengers.

MMLOS Example

The primary function of a downtown street designed to support retail, restaurants, and patios might be the low-stress movement of foot traffic. When evaluated using traditional LOS methods, this street may be assigned a LOS 'F' because it fails to move as many vehicles as efficiently as possible. MMLOS considers that the slow progression of traffic may be more valuable than efficiency in certain contexts.

Beyond infrastructure improvements which seek to utilize space more efficiently across the mobility network, additional actions and incentives should be considered as part of the City's future approach to travel demand management to encourage greater use of sustainable transportation modes towards the goal of reaching 50% of daily trips being made by walking, cycling, or transit within Edmonton. While the PGA mobility study does not consider measures beyond changes to physical infrastructure in detail, policies and programs aimed at reducing vehicle volumes can complement these changes to encourage greater use of sustainable modes. Incentives could include increasing transit frequency, reducing transit fares for all or equity-deserving groups, integrating bikeshare and rideshare programs into the City's transit network as a single Mobility-as-a-Service (MaaS) system, and expanding secure bike storage at transit stations. Disincentives to driving including congestion pricing and increased parking fees. As the City moves towards a multi-modal focused approach to mobility, these and other prospective measures should be assessed further as part of future studies.

3.2 Quantitative Assessment Approach

Level of Service (LOS) has historically used the Highway Capacity Manual (HCM) methodologies. LOS reflects the anticipated amount of delay a vehicle is likely to encounter while travelling through a study intersection around the same time-period as the analysis was completed.

However, the Ontario Traffic Council (OTC) Multi-Modal Level of Service (MMLOS) Guidelines note "*Since traditional LOS evaluations focus on vehicle delay and congestion (through metrics like intersection delay and volume-to-capacity or v/c ratios), they classify intersections that enable efficient and convenient conditions for drivers as well performing and intersections that are congested as poorly performing. But this approach does not take into consideration how any other users experience the intersection or if the efficient movement of vehicles is even aligned with the intent of that intersection within a municipality's larger planning context. As a result, the traditional LOS leads to design decisions that consistently prioritize the car above all other modes of travel. In response, an MMLOS approach offers municipalities a tool to evaluate and build streets that enable and encourage travel by modes other than the car.*"

The MMLOS approach provides LOS analysis for pedestrians, cyclists, and transit vehicles (busses) in addition to cars and trucks. This methodology features a broader set of criteria (discussed in Section 3.2.3) for each mode besides delay, with each criterion (or measure) assigned a weight that is applied in the overall analysis. While the LOS values for each mode follow the same letter designation from LOS A to LOS F as conventional HCM analysis, the LOS values calculated using the MMLOS approach are independent of the LOS used in the HCM methodology. Although traditional analysis of vehicle delay will still yield HCM results, the MMLOS analysis establishes a new way to define and evaluate LOS for all roadway users rather than solely focusing on the delays and congestion encountered by private vehicles. HCM LOS results remain applicable in the development of signal timing plans and geometric changes aimed to reduce vehicle delay.

Given the multi-modal nature of this project, a methodology such as the OTC MMLOS guidelines allow consideration of the overall operation of the mobility network within each Priority Growth Area.

3.2.1 MMLOS Targets

The OTC sets MMLOS target for pedestrians, cyclists, transit, trucks, and cars based on the characteristics of the street and surrounding land use. **Table 3.1** matches City of Edmonton street classifications from the latest draft of the Complete Streets Design and Construction and Standards (CSDCS) to the street classifications used by the OTC. While some characteristics of the OTC classifications may not directly align with those of Edmonton, comparable streets are listed as examples which currently exist within the city. Additionally, many of the OTC classifications place greater priority towards pedestrian, transit, and cycle modes, which matches the City's expectations of emphasizing people-moving capacity and providing safe options for all road users.

Of note, the City is in the process of updating the CSDCS, which includes an expanded street classification that has been incorporated in the table below. The updated document is expected to be published in Q3 2025.

Table 3.1 Street Classification

Edmonton Street Classifications	Ontario Traffic Council Street Classification
Downtown Core Roadway Examples: • 104 Street • 108 Street	**Downtown Avenue** • A street through a high-activity central business area or urban core • Moves moderate volumes of cycling, transit and vehicular traffic • Priority on enhanced pedestrian environment; balances priority of other modes • Width of vehicle zone is minimized • Urban design is highest quality
Street Oriented Mixed Used / Commercial Arterial Street Examples: • Whyte Avenue • 124 Street	**Urban Main Street** • A community "Main Street" or "High-street"; adjacent land use is primarily retail or mixed-use commercial • Moves moderate volumes of pedestrian, cycling, transit and vehicular traffic; might have transit priority features or lanes • Balances priority between all modes • Public realm is typically pedestrian (people) oriented; key local community destination • Street design typically emphasizes access over mobility
Street Oriented Collector Street Examples: • Towne Centre Boulevard • Gault Boulevard	**Urban Boulevard** • A multimodal corridor through an urban neighbourhood • Moves moderate volumes of pedestrian, cycling, transit and vehicular traffic • Balances priority between all modes • Adjacent land uses vary including residential, light commercial, schools, parks and community centres
Non-Street Oriented Arterial Street Examples: • 23 Avenue • 137 Avenue	**Neighbourhood Connector** • Major mobility corridor that connects neighbourhoods • Moves high volumes of vehicles over moderate distances • Priority on vehicles and trucks; balances service to other modes • Street design ideally has dedicated facilities for Active Transportation modes
Street Oriented Mixed Use Arterial or Collector Street Examples: • Mill Woods Road • Fort Road	**Neighbourhood Main Street** • A community "Main Street" or "High-street"; street balances mobility and access • Moves moderate to high volumes of cycling, transit and vehicle movements • Balances priority of all modes • Traditionally "auto-oriented" land use, but often subject to intensification or redevelopment • Likely to have mixed, but predominantly commercial land-use

Edmonton Street Classifications	Ontario Traffic Council Street Classification
Residential Collector or Enhanced Local Street Examples: • Glenridding Boulevard • McConachie Boulevard	**Neighbourhood Boulevard** • A multimodal corridor through a suburban neighbourhood • Moves low to moderate volumes of cycling and vehicle movements • Priority on cycling and pedestrian modes, balances other modes • Adjacent land uses vary including residential, light commercial, schools, parks and community centres
Principal Roadway or Truck Route Arterial Street Examples: • 170 Street • 91 Street	**Industrial Connector** • Major mobility corridor that connects industry with the surrounding areas and regional highway/ freeway network • Moves high volumes of vehicles and trucks over moderate distances • Priority on trucks with typically limited pedestrian accommodation; balances service to other modes • Adjacent land uses are often industrial/ manufacturing
Industrial Collector Street Examples: • 99 Street • 114 Avenue	**Industrial Boulevard** • A multimodal corridor through an industrial area that connects employees to jobs • Moves moderate volumes of trucks, transit, cyclists and pedestrians • Priority on trucks, balances other modes • Adjacent land uses are often industrial/ manufacturing

Based on the comparable street classifications from the OTC, the following MMLOS targets have been adopted from the guidelines and applied to the comparable Edmonton street types as summarized in **Table 3.2**. These targets are used for the analysis undertaken in Section 5.

Table 3.2 OTC MMLOS Targets

OTC / Edmonton Street Classifications	LOS Target				
	Ped	Bike	Transit	Truck	Cars
Downtown Avenue Downtown Core Roadway	B	C	D	D	D
Urban Main Street Street Oriented Mixed Used / Commercial Arterial Street	C	C	D	D	D
Urban Boulevard Street Oriented Collector Street	C	B	D	n/a	E
Neighbourhood Connector Non-Street Oriented Arterial Street	E	D	B	D	D
Neighbourhood Main Street Street Oriented Mixed Use Arterial or Collector Street	C	C	D	D	D
Neighbourhood Boulevard Residential Collector or Enhanced Local Street	D	B	D	n/a	E
Industrial Connector Principal Roadway or Truck Route Arterial Street	E	D	D	B	D
Industrial Boulevard Industrial Collector Street	D	D	D	B	E

The description of LOS by each mode is included in **Table 3.3** as per the OTC guidelines. These descriptions align with the objectives of Edmonton's CSDCS document which emphasize safety and collision prevention in street design, with modal priority being dependent on road classification. Generally, each of the respective LOS designations imply the following for a given mode:

- **LOS A** – Provides the highest quality experience for a given mode
- **LOS B** – Provides a high-quality experience for a given mode
- **LOS C** – Provides a good-quality experience for a given mode
- **LOS D** – Provides a moderate-quality experience for a given mode
- **LOS E** – Provides just above the minimal targeted standard for a given mode
- **LOS F** – Provides the minimal targeted standard for a given mode.

The meaning of LOS F in the MMLOS process differs from that of a conventional HCM analysis for traffic movements. Rather than being considered an outright "failure" solely based on delay, an LOS F for each mode in the MMLOS analysis reflects an extremely poor-quality, delayed, and/or unsafe experience, while still technically being traversable for users of that particular mode. Failure of a particular mode in the MMLOS context would instead mean that no facilities are provided at all. For instance, this would mean the absence of any space for pedestrians or cyclists at a given intersection, thus rendering the space impassable and resulting in the mode effectively being excluded from the MMLOS analysis process. This is discussed further in Section 3.2.3.

Table 3.3 OTC MMLOS Descriptions

	LOS A	LOS B	LOS C	LOS D	LOS E	LOS F
Pedestrians	• Pedestrians always have sufficient space to walk or roll in a social manner that is removed from traffic nuisance • Crossing distance and delay at intersections is always optimized for pedestrians • Crossing locations are always located with sufficient frequency to minimize detour	• Pedestrians very often have sufficient space to walk or roll in a social manner that is removed from traffic nuisance • Crossing distance and delay at intersections is very often optimized for pedestrians • Crossing locations are very often located with sufficient frequency to minimize detour	• Pedestrians often have sufficient space to walk or roll in a social manner that is removed from traffic nuisance • Crossing distance and delay at intersections is often optimized for pedestrians • Crossing locations are often located with sufficient frequency to minimize detour	• Pedestrians occasionally have sufficient space to walk or roll in a social manner that is removed from traffic nuisance • Crossing distance and delay at intersections is occasionally optimized for pedestrians • Crossing locations are occasionally located with sufficient frequency to minimize detour	• Pedestrians rarely have sufficient space to walk or roll in a social manner that is removed from traffic nuisance • Crossing distance and delay at intersections is rarely optimized for pedestrians • Crossing locations are rarely located with sufficient frequency to minimize detour	• Pedestrians do not have sufficient space to walk or roll in a social manner that is removed from traffic nuisance • Crossing distance and delay at intersections is not optimized for pedestrians • Crossing locations are not located with sufficient frequency to minimize detour
Cyclists	• Cyclists always have sufficient space to ride in a social manner that is removed from traffic nuisance • Delay at intersections is always optimized for cyclists • Exposure to conflict at intersections is always minimized	• Cyclists very often have sufficient space to ride in a social manner that is removed from traffic nuisance • Delay at intersections is very often optimized for cyclists • Exposure to conflict at intersections is very often minimized	• Cyclists often have sufficient space to ride in a social manner that is removed from traffic nuisance • Delay at intersections is often optimized for cyclists • Exposure to conflict at intersections is often minimized	• Cyclists occasionally have sufficient space to ride in a social manner that is removed from traffic nuisance • Delay at intersections is occasionally optimized for cyclists • Exposure to conflict at intersections is occasionally minimized	• Cyclists rarely have sufficient space to ride in a social manner that is removed from traffic nuisance • Delay at intersections is rarely optimized for cyclists • Exposure to conflict at intersections is rarely minimized	• Cyclists do not have sufficient space to ride in a social manner that is removed from traffic nuisance • Delay at intersections is not optimized for cyclists • Exposure to conflict at intersections is not minimized

	LOS A	LOS B	LOS C	LOS D	LOS E	LOS F
Transit	• Transit riders' experience is always seamless and attractive • Transit vehicles are never impeded by other traffic • The pedestrian environment leading to transit stops provides the highest quality experience	• Transit riders' experience is very often seamless and attractive • Transit vehicles are rarely impeded by other traffic • The pedestrian environment leading to transit stops provides a high-quality experience	• Transit riders' experience is often seamless and attractive • Transit vehicles are occasionally impeded by other traffic • The pedestrian environment leading to transit stops provides a medium-quality experience	• Transit riders' experience is occasionally seamless and attractive • Transit vehicles are often impeded by other traffic • The pedestrian environment leading to transit stops provides a low-quality experience	• Transit riders' experience is rarely seamless and attractive • Transit vehicles are very often impeded by other traffic • The pedestrian environment leading to transit stops provides the minimal acceptable experience	• Transit riders' experience is not seamless or attractive • Transit vehicles are almost always impeded by other traffic • The pedestrian environment leading to transit stops is nonexistent
Trucks	• Driver is always able to navigate turns with minimal concern for infringing on other lanes or facilities • Drivers never experience delay due to congestion	• Driver is very often able to navigate turns with minimal concern for infringing on other lanes or facilities • Drivers rarely experience delay due to congestion	• Driver is often able to navigate turns with minimal concern for infringing on other lanes or facilities • Drivers occasionally experience delay due to congestion	• Driver is occasionally able to navigate turns with minimal concern for infringing on other lanes or facilities • Drivers often experience delay due to congestion	• Driver is rarely able to navigate turns with minimal concern for infringing on other lanes or facilities • Drivers very often experience delay due to congestion	• Driver is not able to navigate turns with minimal concern for infringing on other lanes or facilities • Drivers almost always experience delay due to congestion
Cars	• Drivers never experience delay due to congestion • Parking and loading options are always available where appropriate • Dedicated turn lanes are always provided when warranted	• Drivers rarely experience delay due to congestion • Parking and loading options are very often available where appropriate • Dedicated turn lanes are very often provided when warranted	• Drivers occasionally experience delay due to congestion • Parking and loading options are often available where appropriate • Dedicated turn lanes are often provided when warranted	• Drivers often experience delay due to congestion • Parking and loading options are occasionally available where appropriate • Dedicated turn lanes are occasionally provided when warranted	• Drivers very often experience delay due to congestion • Parking and loading options are rarely available where appropriate • Dedicated turn lanes are rarely provided when warranted	• Drivers almost always experience delay due to congestion • Parking and loading options are not available • Dedicated turn lanes are not provided when warranted

3.2.2 Adjusting LOS Targets

Several other City documents relate directly to the PGA mobility study, either with regards to strategic direction or planned infrastructure.

The City Plan is a combined transportation and municipal development plan that establishes a planning framework towards a future population of two million people. This plan outlines an integrated land use and mobility system centred around a series of nodes and corridors across the City which will facilitate future urban intensification and mobility options. Many of these nodes and corridors overlap with the PGA areas identified as part of this study.

The City Plan establishes the general priorities which guide infrastructure planning for the mobility network. Many of these priorities centre on a goal of reaching 50% of daily trips being made by walking, cycling, or transit within Edmonton. To help achieve this goal, future transportation infrastructure within the PGA redevelopment areas must be designed to support the various policy intentions and subsequent directions within the City Plan which relate to sustainability, efficiency, and equity within the mobility network. Some key directions include:

- Policy Intention 4.2.1:
  - 4.2.1.1 Integrate mass transit with surrounding development
  - 4.2.1.2 Plan and design active transportation and transit networks in support of nodes and corridors
  - 4.2.1.3 Adapt City operations, equipment, and infrastructure to contribute to intensification
- Policy Intention 4.3.1: Ensure that the mobility system enables the efficient movement of people and goods within Edmonton and the Metropolitan Region
  - 4.3.1.2 Accept levels of congestion in different contexts to ensure an efficient use of resources
- Policy Intention 1.3.3: Support the elimination of poverty, its root causes and disparity in Edmonton's communities.
  - 1.3.3.5 Prioritize transportation investments and operations for people experiencing vulnerability.

To align with these points in the City Plan, standard MMLOS targets applied to both intersections and corridors based on the existing road classification (see **Table 3.2**) may be adjusted to reflect the planning objectives outlined in various supporting documents, as these documents have identified future infrastructure within the PGA areas. These supporting documents include the applicable District Plans, the Bike Plan, Mass Transit Study, and the Goods Movement Network. These plans show the existing and future networks for these modes, which is an important consideration when evaluating the target LOS for a particular mode. For example, when a corridor is identified as a priority route for transit through the City Plan and the applicable supporting documents (in this case, the Mass Transit Study and District Plans), the target LOS for transit should be increased by one grade. Adjustments to Levels of Service should be limited to an increase or decrease of no more than one grade from the base LOS for the given road classification.

However, the adjustment of LOS targets is context dependent given local considerations and the baseline LOS target given by the existing road classification. For instance, if a future bike route falls on a street classified as an Urban Boulevard (or Street-Oriented Collector Street in Edmonton), this gives a default cycling target LOS of B for this road classification. In this case, adjusting the target bike LOS to A is not warranted given that an LOS B is likely acceptable for an Urban Boulevard, so long as cyclists are provided with safe passage. Adjusting the intersection or corridor configuration to give more space to bikes and achieve a LOS A may reduce the performance of other modes and thus is not necessary given the unique circumstances. Similar instances have been identified in the analysis for transit and pedestrian modes at various intersections, which are discussed in Section 5. Furthermore, considerations towards trade-offs in the assessment process are further discussed in Section 3.2.3.5.

The following sections provide further details on each of the supporting documents used in adjusting MMLOS targets, guided by the policy priorities of the City Plan.

3.2.2.1 District Plans

District Plans outline envisioned development patterns and high-level infrastructure upgrades anticipated within groups of neighbourhoods which form a total of 15 districts across the City. The plans identify specific places where density and development are encouraged but on a more local and detailed level. These plans also outline where investments or changes should be made by the City to support targeted development (or "growth activation") in certain areas in tandem with population growth horizons. For example, this may include new or upgraded parks or amenities, specific areas targeted for future rezoning, and planned upgrades to the transportation network along the corridors within each district such as bike and mass transit routes. Several of the District Plans overlap with the identified PGA areas as part of this study.

Notably, the District Plans identify pedestrian priority areas where the safety and comfort of pedestrians are the most important considerations affecting the design and use of road right of way. The Design Policy explicitly notes that pedestrian experiences should be prioritized over maximizing the movement of vehicles. Therefore, the target pedestrian LOS at intersections which fall within a pedestrian priority area were increased by one level to support the implementation of this policy. Generally, this meant adjusting the pedestrian LOS to a level 'B' if the default target based on the street classification is lower than this.

3.2.2.2 Bike Plan and Bike Plan Implementation Guide

The City's Bike Plan provides strategic direction for how the City plans, designs, implements, operates and maintains bike infrastructure and programs, with further details on implementation, timelines, and route prioritization being provided within the Bike Plan Implementation Guide. The Implementation Guide includes a map of current and future bike routes which aim to connect missing links, provide cycling access to new areas, and increase the number of trips made by cycling. These are categorized into District Connector Routes, Neighbourhood Routes, and River Valley District Connector Routes and Shared Pathways. Several of these routes fall within the PGA areas, with some considered for near-term implementation.

The target cycling LOS at most intersections with existing or future bike infrastructure identified within the bike plan was adjusted upwards by one level where cycling infrastructure currently exists or was identified in the Bike Plan Implementation guide, depending on the facility, route type, and road classification. Overall, the analysis has sought to identify suitable north-south and east-west cycling routes for each intersection, whether they exist or are planned for the respective corridor. Some cases of larger intersections with prioritization of transit and vehicle movements have been purposely excluded from considering cycling LOS so long as a suitable alternative route exists or is identified in the Bike Plan, usually within a range of one to three city blocks and for both directions.

This approach does not exclude the possibility of additional cycling infrastructure at other intersections within the study area. Some other intersections have been identified which lack any reasonable and safe alternatives to accommodate cyclists' movement in the local area. Depending on the context, additional recommendations have been made to ensure the safe and efficient movement of cyclists while making reasonable accommodations for the movement of vehicles depending on the roadway classification, the presence of planned or existing designated bike corridors, and the type of bike facility. These recommendations are captured in Section 5.

3.2.2.3 Edmonton Mass Transit Study

The Edmonton Mass Transit Study for a 1.25 million population identifies a network of current and future corridors with varying transit service depending on the level of separation from conventional traffic along with stop and schedule frequency. This includes the following categories which are designed to provide a quicker and higher capacity service compared to conventional bus services:

- Limited Stop Rapid Transit: Allows faster travel than local and frequent bus routes by stopping at strategic locations and bypassing intermediate stops. These future routes are classified as Rapid Bus Routes, with several planned for implementation within the study PGA's and possibly utilizing higher capacity vehicles and varying transit priority.
- Semi-Exclusive Routes: Allows transit vehicles, like buses, to operate in a separate lane from other vehicles for parts of the corridor and are mixed with vehicles for other parts (i.e., at intersections, driveways and/or turn lanes). These types of routes are sometimes described as bus rapid transit (BRT). Within the PGA areas of this study, semi-exclusive routes include future routes B1 and B2 through the University/Garneau PGAs.
- Light Rail Transit (LRT): A style of urban, rail-based passenger service which can provide high capacity and speed but typically travels slower and uses smaller vehicles than heavy rail systems. In Edmonton, LRT includes High Floor LRT (Capital and Metro Lines) and Low Floor LRT (Valley Line). The under-construction Valley Line is the primary transit corridor which passes through many of the intersections within the Wîhkwêntôwin, 124 Street, 156 Street, and Stony Plain Road PGA's. The Capital Line, meanwhile, interfaces with a single intersection within the University – Garneau PGA.

Although the exact routing along with the extent of traffic separation and transit priority measures for much of the future bus routes (Rapid Bus and BRT) will not be known until the design stage, the target transit LOS at most intersections along future transit corridors (including the Valley Line) have been adjusted upwards by one level to facilitate fast and efficient transit service while making reasonable accommodations for private vehicles along with pedestrians and cyclists where appropriate. Specific design features may include dedicated right-of-way space along the corridor and/or transit signal priority at intersections.

3.2.2.4 Goods Movement

The City Plan identifies a core goods movements network along Anthony Henday Drive, Yellowhead Trail, Whitemud Drive and a score of other principal roadways. These roads are anticipated to support the largest volumes of vehicular traffic. The five selected PGAs do not overlap with major roadways and goods movements routes.

Heavy vehicles and vehicles carrying dangerous goods in / through Edmonton must follow the Truck Route Network, departing only to reach their destination by the most direct road. Some of these truck routes are present within the project areas. However, most of these truck routes overlap with pedestrian priority areas, cycling routes, or transit lines. Because active modes and transit LOS are prioritized at locations that overlap with truck routes, no manual adjustments to truck LOS were proposed as part of the assessment.

3.2.3 Measuring Performance

The Ontario Traffic Council MMLOS toolkit measures performance for corridors, signalized intersections, and unsignalized intersections by considering two categories of operations:

- An active transportation design check, and
- Performance measures of evaluating Level of Service.

By separating these two elements, appropriate weight can be placed on the minimum level of safety required at facilities for vulnerable road users before congestion and delay are considered for vehicles. An intersection or corridor that does not meet the current best practice guidance for the applicable active transportation facility type will not serve users of all ages and abilities, and as such does not provide any level of service to that mode in the OTC MMLOS toolkit.

References to the Accessibility for Ontarians with Disabilities Act (AODA) within the MMLOS analysis toolkit have been replaced by accessibility criteria for the design of public spaces issued by the City to reflect best practices within the City of Edmonton. This includes the City's Access Design Guide (ADG) along with Section 3.1.3 and 3.3.4 of the City's Complete Streets Design and Construction Standards document.

A summary of the OTC MMLOS segment and intersection measures is recreated in **Table 3.4**. Cells highlighted in light green represent operational measures that provide an "indication of priority for mobility of travellers by each mode [and] reflect the conditions during peak periods". Cells without highlights are design measures and are an "indication of a more permanent state or enduring level of services for the mode of travel [and] better reflect 24-hour conditions". Details for each of these measurement criteria are provided in the OTC MMLOS Guidelines.

Table 3.4 Summary of Intersection and Segment Measures

	Walking	Cycling	Transit	Trucks	Cars
Segment	Pedestrian facility width per CSDCS target	Bike facility width per CSDCS target	Transit facility type	Width of curb lane per CSDCS target	Mid-block v/c ratio
	Pedestrian buffer width per CSDCS target	Bike buffer width per CSDCS target	Presence of transit passenger amenities	Car level of service	Curb lane conflicts
	Maximum distance between controlled crossings	Conflicts with other modes	Pedestrian level of service (as a measure of transit passenger access)		
Signalized Intersection	Enhanced pedestrian measures	Enhanced bicycle measures	Presence of transit priority measures	Average effective turning radius	Percentage of turning movements with dedicated lanes
	Average effective turning radius	Average effective turning radius			
	Signal cycle length[6]	Signal cycle length[6]	*Transit movement delay[6]	Car level of service[6]	Intersection delay[6]
	Number of uncontrolled conflicts[6]	Number of uncontrolled conflicts[6]	Pedestrian level of service[6]		
Unsignalized Intersection	Marked controlled crossings	Presence of bike facilities	Pedestrian level of service	Average effective turning radius	Intersection delay[6]
	Average crossing distance	Requirement to stop	*Transit movement delay[6]	Car level of service[6]	
	Average effective turning radius	Average effective turning radius			

[6] These measures are considered ONLY when completing operational analysis
* For intersections with transit priority (transit signal priority, dedicated lanes, or tracks) along an approach, transit movement delay is calculated by dividing the approach delay in half. For intersections with transit priority on multiple approaches, the total transit movement delay for the intersection is the average of the calculated approach delays.

Each measure is graded and weighted based on factors outlined in the OTC MMLOS Guidelines and the accompanying Spreadsheet Analysis Tool.

If analysis indicates that certain modes do not meet LOS targets, adjustments to the cross-section elements or design may be needed. When considering trade-offs, priority should be given to approved mode plans (such as pedestrian priority areas) identified through documents such as the City Plan and supporting documents. This is discussed further in Section 3.2.3.5.

3.2.3.1 Segment Measures

For pedestrians, the facility width is a measure of comfort and accommodation, with all pedestrian facilities considered to be bi-directional by definition. Facility widths consider the requirement for mobility assistance devises and passing / overtaking, as well as social walking (side-by-side). The buffer width reflects the comfort and environmental quality for pedestrians with separation from adjacent vehicle lanes and associated nuisance impacts (noise, splash, fumes). Maximum distance between controlled crossings is a measure of delay and convenience for pedestrians and has a considerable impact on the detour required for pedestrians when accessing amenities on the other side of the street, as well as the safety considerations of pedestrians choosing to cross mid-block without a dedicated crossing.

For cyclists, the facility width per direction of travel is a measure of comfort and accommodation for cyclists, with facilities being either uni- or bidirectional. Bicycle facility width impacts the experience of cyclists through the ability to ride comfortably within the confines of the facility and avoid any obstacles that may be present, the ability to overtake another cyclist within the same facility, and the ability to ride side-by-side with another cyclist to take advantage of the social nature of cycling. Bicycle buffer width is a measure of comfort and environmental quality for cyclists, with separation from adjacent vehicle lanes reducing nuisance impacts. Conflicts with other modes within the bicycle facility is a measure of safety and comfort for cyclists, with conflicts caused by driveway crossings on a separated facility or by in-lane conflicts with vehicles sharing (loading), crossing, blocking a lane or bus stops.

For transit, the facility type is a measure of delay (and therefore priority) for transit, while the presence of transit passenger amenities is a measure of comfort and accommodation for transit riders. Pedestrian level of service is an indicator of the experience for transit riders in the segment, reflecting the level of comfort, safety, and delay for riders who are accessing or leaving the transit system at stops in the segment and represents a significant determinant to the overall transit experience.

For trucks, the width of the curb lane is an indicator of comfort for truck drivers and safety for all vehicles, with wider curb lanes allow trucks to maintain their lanes by providing space for minor maneuvering while avoiding friction with the curb. The car level of service is an indicator of vehicle experience in the intersections, with truck safety and delay in the general stream of traffic tracking with car safety and delay.

For cars, mid-block V/C ratio is a measure of delay and convenience for cars and their occupants. Curb lane width affects curb lane conflicts and is a measure of safety and delay for cars, with conflicts in the curb lane create the potential for collisions for drivers and other modes.

The cumulative impacts of these measures, as well as an example resultant LOS score for existing facilities is summarized in **Table 3.5** below.

Table 3.5 Segment Measures

Mode	Measure	Measure Considerations	Example LOS Scoring
Pedestrians	Facility Width	Based on widths ranging from less than 1.5m to more than 3.0m	A typical PGA arterial street (i.e., 124 Street) with a 3.0m monowalk, no dedicated buffer, and approximately 175m block length results in LOS C.
	Buffer Width (Furnishing Zone Width)	Based on width ranging from less than 1.0m to more than 2.5m	
	Maximum Distance Between Controlled Crossings	Based on distances ranging from 200m or less to more than 320m	
Cyclists	Width of Facility (per direction)	Based on widths ranging from less than 1.2m to more than 2.4m per direction	A protected bicycle facility (like 127 Street) with a 3.0m bi-directional bike lane and 0.6m, buffer and few conflicts results in LOS C.
	Buffer Width	Based on whether physical measures are present and the width of the buffer (either physical or painted)	
	Conflicts with Other Modes	Based on the number of conflicts and their relative severity (including driveways, bus stops, loading zones, crossing)	
Transit	Facility Type	Whether there are dedicated bus lanes, intersection priority measures, or mixed traffic operations (and the number of mixed traffic lanes)	A typical Edmonton transit corridor with moderate amenities (shelter, seating, waste bins) at each stop, operating in mixed traffic, with pedestrian LOS C results in LOS C.
	Passenger Amenities	Relative presence of amenities such as shelters, benches/seating, shade, trees, etc.	
	Pedestrian LOS	Based on pedestrian LOS calculated above	
Trucks	Width of Curb Lane	Based on widths ranging from less than 3.4m to more than 4.0m	A typical 3.7m (3.95m) travelled lane with car LOS C results in LOS C.
	Car LOS	Based on car LOS calculated below	
Cars	Mid-block v/c	Based on traditional analysis / modelling	A typical congested arterial (v/c under 1.00) and low curb lane conflicts results in LOS C.
	Curb Lane Conflicts	Based on range from 0 to more than 9	

3.2.3.2 Signalized Intersection Measures

For pedestrians, measures that enhance pedestrian comfort and conspicuity are an indicator of experience and safety. Average effective turning radius is a measure of safety and comfort for pedestrians and has a strong influence on the speed of turning vehicles and therefore the comfort of pedestrians when crossing the roadway. The signal cycle length is a measure of delay (and therefore priority) for pedestrians, with longer signal cycle lengths indicating a strong likelihood of longer average delays for pedestrians, and pedestrians being the most heavily impacted mode by delay. Uncontrolled points of conflict are a safety and comfort concern for pedestrians, with each point of conflict presenting a potential collision location and requiring additional attention for a pedestrian navigating the space.

For cyclists, measures that enhance cyclist comfort and conspicuity are an indicator of experience and safety. Bicycle facilities also separate cyclists from vehicular traffic in time and/or space. As with pedestrians, the average effective turning radius is a measure of safety and comfort for cyclists, having a strong influence on the speed of turning vehicles which dictates cyclist comfort and safety when crossing an intersection. The signal cycle length is a measure of delay (and therefore priority) for cyclists, with longer signal cycle lengths indicate a strong likelihood of longer average delays for cyclists, and with cyclist travel experience strongly impacted by delay. The number of uncontrolled points of conflict are a safety and comfort concern for cyclists, where each point of conflict is a potential collision location and requires additional attention for a cyclist navigating the space.

For transit, the presence of transit priority measures is a measure of delay (and therefore priority) for transit riders passing through the intersection. These transit priority measures can be physical modifications, signal modifications and/or operational measures (e.g., transit exemptions from turn prohibitions). The delay experienced by vehicle movements serving transit vehicles is a measure of delay (and therefore priority) for transit riders passing through the intersection. Pedestrian level of service is an indicator of the experience of transit riders boarding or alighting at stops near the intersection, and indicates the level of comfort, safety, and delay for riders who are accessing or leaving the transit system.

For trucks, the average effective turning radius is an indicator of comfort for truck drivers executing right turns and safety for all travellers using all modes, with larger average effective turning radii allowing trucks to complete right turns at higher speeds and without tracking out of their lanes. The car level of service is an indicator of vehicle experience in the intersections, where truck safety and delay in the general stream of traffic aligns with car safety and delay.

For cars, the percentage of turning movements with dedicated lanes is an indicator of safety and delay for drivers, where dedicated lanes allow vehicles passing through an intersection to avoid conflict with turning vehicles. Turning lanes also reduce delay to vehicles passing through the intersection by separating them from vehicles slowing or waiting to make a turn. The intersection delay experienced by vehicles passing through the intersection creates a less desirable experience for drivers

The cumulative impacts of these measures, as well as an example resultant LOS score for existing facilities is summarized in **Table 3.6** below.

Table 3.6 Signalized Intersection Measures

Mode	Measure	Measure Considerations	Example Scoring
Pedestrians	Enhanced Pedestrian Measures	Based on the presence of additional measures on all crossings.	A typical PGA arterial intersection (i.e., 124 Street/107 Avenue) with uncontrolled conflicts with turning vehicles and long cycle times results in LOS D.
	Average Effective Turning Radius (m)	Based on radii ranging from less than 9.0m (a turning speed under 15 km/h) to more than 18m (turning speed of more than 30 km/h).	
	Signal Cycle Length (s)	Based on cycles ranging from less than 60s to more than 120s.	
	Number of Uncontrolled Conflicts	Based on the ability to control/eliminate uncontrolled conflicts with pedestrians (i.e., protected only left turns, no right turn on red)	
Cyclists	Enhanced Bicycle Facilities	Based on the presence of additional measure (cross rides, green conflict markings, protected intersections, bike signal leads, protected phasing).	A protected bicycle facility intersection (like 127 Street/107 Avenue) with bike heads, markings, and turn restrictions results in LOS B due to longer signal cycles.
	Average Effective Turning Radius (m)	Same as for pedestrians.	
	Signal Cycle Length (s)	Same as for pedestrians.	
	Number of Uncontrolled Conflicts	Same as for pedestrians.	
Transit	Transit Priority Measures	Based on the presence of TPMs on intersection approaches.	A typical Edmonton transit arterial corridor intersection without TPMs, operating in mixed traffic, with pedestrian LOS C results in LOS C.
	Transit Movement Delay	Based on traditional analysis / modelling for vehicles.	
	Pedestrian LOS	Based on pedestrian LOS calculated above	
Trucks	Average Effective Turning Radius (m)	Same as for pedestrians, but with scores inversed (i.e., higher radius is better).	A typical non-truck route /truck route arterial intersection (i.e., 124 Street / 107 Avenue) would result in LOS D.
	Car LOS	Based on car LOS calculated below	
Cars	% of Movements with Dedicated Turning Lanes	Based on the percentage of movements that have separated turning lanes.	A typical arterial intersection (i.e., 124 Street / 107 Avenue) with some separated turning movements and moderate congestion results in LOS D.
	Intersection Delay (s)	Based on traditional analysis / modelling	

3.2.3.3 Unsignalized Intersection Measures

For pedestrians, the presence of marked controlled crossings is a measure of delay and safety, with marked controlled crossings increasing visibility and clearly indicate to drivers that pedestrians should be expected to cross. The average crossing distance for pedestrians is a measure of comfort and safety, where pedestrians are exposed to collisions with vehicles when they are crossing intersections. The average effective turning radius is a measure of safety for pedestrians and has a strong influence on the speed of turning vehicles.

For cyclists, the presence of bicycle facilities is a measure of comfort and safety, with cyclists more comfortable and more visible at intersections with dedicated facilities. Bicycle facilities also physically separate cyclists from vehicular traffic. The requirement to stop is a measure of delay and convenience for cyclists, with the frequency of stops being a significant determinant of the cycling experience. As with pedestrians, the average effective turning radius is a measure of safety for cyclists and has a strong influence on the speed of turning vehicles.

For transit, the pedestrian level of service is an indicator of the experience for transit riders boarding or alighting transit in close proximity to the intersection, and indicates the level of comfort, safety, and delay for riders who are accessing or leaving the transit system at stops near the intersection. The delay experienced by vehicle movements serving transit vehicles is a measure of delay (and therefore priority) for transit riders passing through the intersection.

For trucks, the average effective turning radius is an indicator of comfort for truck drivers executing right turns and safety for all travellers using all modes, with larger average effective turning radii allowing trucks to complete right turns at higher speeds and without tracking out of their lanes. The car level of service is an indicator of vehicle experience in the intersections, where truck safety and delay in the general stream of traffic aligns with car safety and delay.

For cars, intersection delay experienced by vehicles passing through the intersection creates a less desirable experience for drivers.

The cumulative impacts of these measures, as well as an example resultant LOS score for existing facilities is summarized in **Table 3.7** below.

Table 3.7 Unsignalized Intersection Measures

Mode	Measure	Measure Considerations	Example Scoring
Pedestrians	Average Crossing Distance (m)	Based on the crossing distance, including medians, between curb ramps, ranging from less than 7.0m to over 11.0m.	A typical PGA arterial intersection (i.e., 124 Street/109 Avenue) with a 16.0m crossing distance and marked crossings only across one leg results in LOS D.
	Marked Crossings	Based on the number of legs with marked crossings.	
	Average Effective Turning Radius (m)	Based on radii ranging from less than 9.0m (a turning speed under 15 km/h) to more than 18m (a turning speed of more than 30 km/h).	
Cyclists	Presence of Bicycle Facilities	Based on the presence of bike facilities on each approach to the intersection.	A bicycle facility intersection (like 124 Street/106 Avenue) with no controls for bikes (without dismounting and using the adjacent pedestrian signal) and stop control results in LOS D.
	Requirement to Stop	Based on whether bikes typically need to stop at the intersection, with facilities along the major road that rarely need to stop ranking highly, while those along minor roads that need to stop nearly always ranking low.	
	Average Effective Turning Radius (m)	Same as for pedestrians.	
Transit	Transit Movement Delay	Based on traditional analysis / modelling for vehicles.	A typical Edmonton transit arterial corridor intersection without TPMs, operating in mixed traffic, with pedestrian LOS C results in LOS C.
	Pedestrian LOS	Based on pedestrian LOS calculated above	
Trucks	Average Effective Turning Radius (m)	Same as for pedestrians, but with scores inversed (i.e., higher radius is better).	A typical non-truck route /truck route collector or local street intersection (i.e., 124 Street / 109 Avenue) would result in LOS D.
	Car LOS	Based on car LOS calculated below	
Cars	Intersection Delay (s)	Based on traditional analysis / modelling	A typical arterial intersection (i.e., 124 Street / 109 Avenue) would result in an overall LOS C.

3.2.3.4 Mitigation Measures Toolkit

Based on the measures and criteria, it becomes possible to build a toolkit to address deficiencies on a corridor or intersection level for all modes. As the PGA corridors all have limited availability to expand right of way, the recommendations herein consider the of reallocation of existing available right of way between modes to maximize the people moving capacity and experience at each location.

Working within the existing right of way constraints, a potential "toolkit" of localized improvements which could be considered to improve the overall LOS for each mode is summarized in **Figure 3-1**.

Figure 3-1 Mitigation Measures Toolkit

Mode	Potential Improvements
Pedestrians	• Construction of missing links • Addition of missing crosswalks • Addition / widening of curb ramps • Addition of marked crosswalks • Addition of tactile warning surface indicators (TWSI) • Removal of right turn channelization • Implementation of no right turn on red • Implementation of protected only left turns. • Implementation of scramble crosswalks • Addition of crosswalk protections (RRFB, signals) • Widening of sidewalks • Upgrades of crosswalks to continuous crossings • Wayfinding signage
Cyclists	• Construction of missing facilities • Upgrades to existing facilities • Crossing improvements (pavement markings, bike signals) • Wayfinding signage
Transit	• Addition of TPMs • Bus stop amenity improvements • Reallocation of lanes (parking or through) to transit-only operations
Truck	• Same as improvements for cars.
Cars	• Reallocate lanes between movements (i.e. turning lane becomes shared lane) • Revisions to signal timing operations. • Addition of protected left turns. • Restriction of movements (i.e., conversion to right-in/right-out)

The above localized improvements can be complimented with large scale, corridor level improvements along major routes, including exploring reconfiguration of street cross sections to reallocate space between various modes. These projects are generally big-picture activities that have impacts beyond the PGA and align with the long-term City building vision and include initiatives such as implementation of the Old Strathcona Public Realm Strategy or the B1/B2 Bus Rapid Transit corridors. These projects require multi-year engineering studies (from conceptual design through detailed design), complete with public engagement., with implementation of these changes can also be coordinated with street rehabilitation to maximize investment returns.

3.2.3.5 Trade Off Considerations

As mentioned in Section 3.2.2, achieving the target LOS for a particular mode at a single intersection may require trade-offs within the range of mitigation measures that will negatively affect the LOS of other modes, occasionally to the point of the target LOS not being achieved. This issue is predominant at many of the intersections within the PGA study area due to the constrained environment. When considering trade-offs, priority should be given to approved mode plans (such as pedestrian priority areas) identified through documents such as the City Plan and supporting documents.

At most of these intersections, the assigned road classification means that the target LOS assigned to the pedestrian, cyclist, and transit modes tend to be higher than that of vehicles. In these instances, this means that the proposed improvements recommended as part of the assessment prioritize these modes over vehicles, which reflects the City's overall approach regarding congestion acceptance. While this approach increases vehicle delay, adjustments to signal timing parameters tend to be the most useful and easiest measure for mitigating this delay without compromising the LOS of the remaining modes.

Other situations result in additional trade-offs between the remaining modes. For instance, at many intersections, parallel streets are identified as suitable alternatives for cycling corridors rather than recommending bike infrastructure be installed directly within the intersection, as this may take up space allocated for transit operations and pedestrians. In other cases, it may be impractical to add additional measures to improve the LOS of a particular mode either due to constructability issues or conflict with other parameters such as signal timing, delay, intersection geometry, and conflict points. Overall, these are situations where the target LOS for some modes may be unattainable, and where users of that mode may continue to face substandard conditions (i.e. inadequate pedestrian realm or transit being forced to remain in mixed traffic).

Overall, the approach to balancing an achievable LOS amongst all modes is context dependent based on the type, location, and unique characteristics of the intersection or corridor. Generally, the recommendations made are intended to be practical and to minimize required road reconstruction (particularly along the under-construction Valley Line), while balancing with the need to achieve the target LOS set by the MMLOS analysis.

3.2.4 Traditional Transportation Impact Assessments and MMLOS

Traditional Transportation Impact Assessments (TIAs) focus predominantly on the intersection performance as it pertains to single occupancy vehicles. Regardless of the software used (Synchro, Vistro, or others), the resulting analysis outputs focus on vehicle operations (LOS, delay, queues, v/c). MMLOS analysis takes the processes and outputs from a traditional TIA and adds additional layers focusing on a more fulsome analysis of user experience for all modes. While the overall process is similar between the two analyses, **Figure 3-2** below highlights how and where the two processes differ.

Figure 3-2 Traditional TIA vs MMLOS Analysis

	Traditional TIA	MMLOS Analysis
1	**Establish Site Context**	
	Includes high level qualitative analysis of roadway, transit, and active modes networks (i.e., travel lane allocation, presence of sidewalks / pathways / bike lanes, presence and frequency of transit). Identify missing links.	More in-depth review and ranked analysis of all existing modes – pedestrians, cyclist, transit, single occupancy vehicle, goods movement – size and type of facilities (type and width of walk, pathway, bike facility), frequency and type of transit). Identify missing links.
2	**Volumes**	
	Establish existing vehicle traffic volumes.	If available, also establish pedestrian, cyclist, and transit volumes.
3	**Pre-Development Corridor Operations**	
	Use traditional approaches (i.e., HCM method in Synchro/Vistro) to establish vehicle operations.	Adjust traditional results to account for all modes using OTC MMLOS approach, which provides overall people moving capacity and accounts for interaction between modes.
4	**Establish Future Development Scenario**	
	Provide overview of future development, calculate trip generation volumes, make modal split adjustments.	
5	**Establish Baseline Future Network**	
	Determine what the base case future network will look like, usually focused on vehicles only.	Determine what the future network will look like for all modes (including pedestrian, cyclist, and transit upgrades).

Step	Traditional TIA	MMLOS Analysis
6	**Establish Post-Development Corridor Operations**	
	Use traditional approaches to establish vehicle operations.	Adjust traditional results to account for all modes using OTC MMLOS approach as above.
7	**Identify Deficiencies and Upgrades**	
	Use HCM outputs (LOS, delay, queues, v/c) to identify constraints and potential upgrades.	Use adjusted MMLOS outputs to identify improvements for all modes to improve overall people moving capacity, noting interaction between modes. Focus heavily on safety and pedestrian / cyclist experience, and away from upgrades that solely benefit single occupancy vehicles.
8	**Analyze Post Development Network Operations with Recommended Improvements**	
	Use traditional approaches to establish vehicle operations.	Adjust traditional results to account for all modes using OTC MMLOS approach.
9	**Recommend Upgrades & Staging Triggers**	
	Review trigger points for implementation of upgrades/changes.	

Compared to the traditional TIA process with its sole quantitative consideration of vehicle LOS, applying MMLOS methodology to mobility assessments offers several advantages:

- Analyzing the pre-development transportation network with a multi-modal lens permits a broader understanding of how all users experience existing mobility infrastructure compared to vehicle users. In addition to vehicle delay, the MMLOS process considers additional parameters to measure the user experience of pedestrians, cyclists, and transit users with regards to safety and accessibility.
- The MMLOS guidelines set out pre-determined LOS targets for each mode under each street classification. The process provides flexibility to adjust these targets in either direction to reflect priorities based on local context, planned projects, or policy direction.
- The MMLOS toolkit shows how parameter adjustments influence each mode. This allows for an in-depth understanding of the interaction between modes and greater consideration of the trade offs involved in adjusting parameters to benefit one mode while negatively affecting another. For instance, adding additional pedestrian enhancements may reduce vehicle LOS, depending on the extent.

- Given the greater focus on improving user experiences for pedestrians, cyclists, and transit users under the MMLOS framework, the mitigation measures stemming from a typical MMLOS analysis trend towards a greater allocation of space and enhancements to these modes over single-occupancy vehicles. This matches the overall direction of emphasizing people moving capacity over private vehicles, aligning with the City's objectives of utilizing existing public right-of-way more efficiently for mobility.
- The MMLOS methodology shows a clear representation of the LOS performance of each mode at an intersection or along a segment between existing and forecast conditions. This provides additional justification towards the decision-making process for mobility infrastructure, with a clear outline of what mitigation measures could be implemented to achieve the target LOS for a selected mode.

Overall, integrating MMLOS principles into the City's mobility planning process will help prioritize people-focused design and sustainable transportation options, which is key to offering greater mode choice across the mobility network and meeting the priorities of Edmonton's City Plan and Energy Transition Strategy.

3.3 Qualitative Assessment Approach

In addition to the traditional quantitative assessment of pre-development intersection operations, a qualitative assessment of the existing mobility network was also undertaken to establish the baseline conditions to assist in the MMLOS analysis as well as to begin identifying potential pinch points within the mobility network which may need to be addressed to better accommodate development within each PGA.

The qualitative assessment was split into the core modes – pedestrians, cyclists, transit, and motor vehicles (including goods movement).

Pedestrian Facility Assessment

Existing pedestrian facilities were evaluated based on their type (monolithic or separate walkway) and width compared to the City's targets in the Complete Streets Design and Construction Standards (CSDCS). Different width targets were established for the two sidewalk types, which acknowledges the role a furnishing zone plays in pedestrian comfort, safety, and capacity.

For separate walks, the widths were assessed as follows:

- Poor: Less than 1.5m width

  These are sidewalks that represent the pre-CSDCS standards and do not allow for two people walking side by side to pass another person, or two people using mobility devices / strollers to pass each other.
- Fair: Between 1.5m and 2.5m

  Generally, these are sidewalks that have been upgraded with renewal and reconstruction to meet newer standards. While the CSDCS identifies 1.8m as the target width for the pedestrian through zone in non pedestrian oriented developments, existing constraints in mature neighbourhoods (including trees, utilities, and private landscaping) often limit the ability to widen older, substandard sidewalks to the full 1.8m, with 1.5m often selected as a compromise in these constrained areas.

- Good: Greater than 2.5m

  These are sidewalks that meet the desired target within CSCS for street-oriented developments.

For monolithic walks, the widths were assessed as follows:

- Poor: Less than 3.5m width:

  These are sidewalks that fall below the desired minimums for monolithic walks outlined in the CSCDS when considering the width of the pedestrian through zone and furnishing zone. CSDCS identifies the target width of the furnishing zone at 1.7m in order to accommodate trees, streetlights, signage, utility cabinets, waste bins, other appurtenances, and vehicle egress for curbside parking. When combined with a desired 1.8m pedestrian through zone, it results in a 3.5m minimum width (measured from the face of curb). Of note, many new monowalks installed in residential areas are approximately 2.1m in width, falling short of this target. The 2.1m width is sufficient to accommodate lower volume pedestrian travel and vehicle egress, particularly as streetlights, trees, and utilities are typically set behind the walk, however, they may feel congested when pedestrian volumes are high.

- Fair: Between 3.5m and 4.5m

  These sidewalks provide adequate space for a quality pedestrian experience, providing a larger pedestrian through zone that meets the CSDCS targets for street-oriented development, and include a frontage zone adjacent to buildings.

- Good: More than 4.5m

  These sidewalks meet and exceed the targets within CSCS for pedestrian priority areas.

Missing sidewalk links were also identified to highlight gaps within the network which may need to be addressed to accommodate future densification. For example, development of a parcel abutting a segment of roadway without sidewalk could trigger the requirement for construction of the missing sidewalk as part of the development whereas multi-block stretches of roadway without sidewalk may necessitate capital investment from the City.

Sidewalk widths were established through a review of existing City base file mapping, combined with aerial imagery, Google Streetview, and design drawings. The sidewalk assessment considers any known improvements that are currently underway or will begin construction in 2025. This includes the Valley Line West LRT and Imagine Jasper Avenue projects, where sidewalk widths were taken from the latest design packages. Project still in the design phase, such as the Wîhkwêntôwin neighbourhood renewal, are not reflected in the assessment as the final width of facilities are not known.

The City Plan pedestrian priority areas were overlaid overtop of the assessment to further highlight facilities that fall within areas of high anticipated pedestrian volumes.

Cyclist Facility Assessment

Cyclist facilities were evaluated based on the facility type and the level of protection and separation offered between cyclists, motor vehicles, and pedestrians, generally aligning with the facility classifications used by the City within the published bike map as well as the "Level of Traffic Stress" (LTS) for cyclists as defined in the City's Bike Plan.

Facilities were assessed into three categories:

- Protected and separated facilities:

  These include dedicated cycling facilities which are physically separated from other modes including pedestrians and motor vehicles.
- Shared pathway facilities:

  These include most pathways throughout the City which are shared between pedestrians and cyclists, but are separated from motor vehicles.
- On-street facilities:

  These include shared street and painted bike lanes that separate pedestrians and cyclists, but offer little to no separation between cyclists and motor vehicles.

Cycling facilities were assessed through a review of existing City base file mapping, combined with aerial imagery, Google Streetview, and design drawings. The cycling facility assessment considers any known improvements that are currently underway or will begin construction in 2025. This includes Valley Line West LRT and the Active Transportation Network Improvement Projects (including any planned routes in 2025 and 2026). Projects still in the design phase, such as the Wîhkwêntôwin neighbourhood renewal, are not reflected in the assessment as the final alignment and facility type are not known.

Transit Facility Assessment

Transit facilities were assessed on two components: presence of mass transit and frequency of transit routes along corridors. The mass transit assessment consisted of identifying three components:

- Existing LRT:

  Corridors and stops including a 400m and 800m "walking circle" surrounding each stop. This includes the existing Capital Line, Metro Line, and Valley Line SE LRT
- The under-construction Valley Line West LRT:

  Corridor and stops, including the 400m and 800m "walking circle" surrounding each stop.
- "B1" and "B2" Bus Based Mass Transit:

  The currently anticipated routing for the "B1" and "B2" Bus Based Mass Transit (BRT) corridors was considered within the post-development population horizon. Concept planning for the routes has been initiated and will determine the exact routing and stop / station locations. Delivery timelines will be known once design work has been completed and funding for construction is allocated.

Transit frequency along the existing corridor was also examined. Total directional peak hour bus volumes were analyzed, which included total AM and PM peak bus/hour in both direction along all bus route corridors. From the data, the highest peak hour bus volume direction for the corridor was selected as the basis for the assessment. This represents the "best case" level of existing transit service along the corridors during peak hours. As off-peak frequency data was not readily available, this assessment does provide somewhat limited insight into the frequency and reliability of transit service.

Studies show that the longer the headway (the lower the frequency), the more inconvenient transit service becomes, both because passengers have to plan their trip around transit service and because they incur more unproductive time during their trip. At headways of less than 10 minutes (more than 6 buses per hour), passengers are able to arrive without worrying about schedules, encouraging the decision to use transit over a personal vehicle, supporting a car-free lifestyle.[7]

Bus volumes were then grouped assessed into three categories:

- Low Frequency: Less than 6 buses per hour (i.e., a bus every 10 minutes or more) – these are corridors where even peak hour bus services is low
- Fair Frequency: 6 to 12 buses per hour (i.e., a bus every 5 to 10 minutes) – these are corridors where peak hours bus service starts to align with the frequency needed to support a car free lifestyle.
- Good Frequency: More than 12 buses per hour (i.e., a bus every 5 minutes or less) – these are corridors where peak hour bus service starts to exceed the frequency needed to support a car free lifestyle.

Motor Vehicle Facility Assessment

While operational assessments were undertaken at the intersection level as part of the overall analysis, a corridor level motor vehicle facility assessment was also undertaken. To qualify the data in a format that is commonly understood, Google Maps peak hour travel information was used to assess existing major corridor level operations. The assessment was specifically based on the highest observed PM peak hour congestion along a corridor (based on assessing travel in both directions) on a typical Tuesday. The assessment was limited to major roadway corridors (typically roadway classified as arterials and higher) due to limitations around the data available in Google Maps.

[7] National Academies of Sciences, Engineering, and Medicine. 2013. *Transit Cooperative Research Program (TCRP) Report 165: Transit Capacity and Quality of Service Manual, Third Edition*. Washington, DC: The National Academies Press. https://doi.org/10.17226/24766.

Corridor operations were assessed into four categories, aligning with the chromatic scale used by Google:

- No Congestion corresponding to green in Google Maps
- Low Congestion corresponding to yellow in Google Maps
- Moderate Congestion corresponding to light red in Google Maps
- Heavy Congestion corresponding to dark red/maroon in Google Maps

While this approach does not provide a definitive quantitative representation of corridor travel time or speed, it provides a high-level overview of corridor congestion levels and potential bottleneck locations. Furthermore, it corresponds to a scale that is generally intuitive and well known by the public.

Overall Qualitative Assessment

The resulting qualitative assessment thresholds applied to the project are summarized in **Table 3.8.**

Table 3.8 Qualitative Assessment Threshold Summary

	Pedestrians	Cyclists	Transit	Vehicles
Below Threshold	No sidewalk present	No cycling facility present	No transit service present	Dark red / maroon in Google Maps in PM peak hour
Low	Monolithic: Less than 3.5 m to face of curb Boulevard: Less than 1.5 m	Painted bike lanes or shared streets	Less than 6 buses per hour per direction in PM peak (a bus every 10 minutes)	Light red in Google Maps in PM peak hour
Middle	Monolithic: 3.5 m to 4.5 m to face of curb Boulevard: 1.5 m to 1.8 m	Shared pathways	Between 6 and 12 busses per hour per direction in PM peak (a bus every 5 to 10 minutes)	Orange in Google Maps in PM peak hour
High	Monolithic: More than 4.5 m to face of curb Boulevard: More than 2.5 m	Protected, separated facilities	More than 12 buses per hour per direction in PM Peak (a bus every 5 minutes or less) or within 400 m of an LRT station/stop.	Green in Google Maps in PM peak hour

4. Existing Mobility Network Qualitative Assessment

Qualitative assessments were undertaken for the areas surrounding each PGA. The pedestrian and cyclist assessments were encompassed an expanded area around each PGA, extending several blocks beyond the immediate PGA boundaries. The transit assessment focused on existing bus and LRT routes (including those currently under construction), while the vehicle assessment focused on arterial roadways (as classified in the Transportation System Bylaw).

Detailed design and construction on the Valley Line West corridor is in progress through the P3 contract with Marigold Infrastructure Partners. The analysis completed for this assessment along the Valley Line corridor is based on preliminary signal timings along with the lane geometry and cross-section elements provided in concept drawings, which is sufficient for the analysis completed.

The purpose of this study has been to identify the overall multi-modal impacts as a result of PGA rezoning. The traffic analysis completed is not intended to be a detailed operational analysis of the intersections along the Valley Line LRT and such a study would require final designs and operational signal timing plans. While multi-modal performance at study intersections along the Valley Line corridor are subject to minor changes to the final design, these are not expected to impact the study findings from the multi-modal quantitative assessment. Any major design changes would require further study to understand any impacts.

4.1 124 Street / Wîhkwêntôwin

While the assessment focuses on existing conditions, it does consider the planned improvements currently under construction as part of the Valley Line West LRT, as well as the Imagine Jasper Avenue implementation west of 114 Street. Of note, as planning and design work is still underway for the Wîhkwêntôwin neighbourhood renewal (comprising of the areas west of 109 Street, south of Grant MacEwan, and north of the river valley), with construction expected in 2026 to 2028, the assessment does not consider the future state conditions within the neighbourhood as discussions are still underway regarding potential implementation of cycling and pedestrian infrastructure, which will in turn impact other modes within the community.

The Westmount neighbourhood renewal, comprising the areas between Groat Road and the former CN tracks west of 121 Street, and between 111 Avenue and Plain Road, as well as the areas between Stony Plain Road and the Groat Ravine west of 124 Street, was completed in 2017. Inglewood neighborhood renewal, comprising of the areas between Groat Road and the former CN tracks west of 121 Street, and between 111 Avenue and 118 Avenue, was completed in 2021. As such, outside of the arterial roads which are renewed through a separate program, the existing pedestrian, cyclists, transit, and vehicle infrastructure within these communities is not anticipated to undergo any immediate further changes.

4.1.1 Pedestrians

As shown in **Figure 4-1** and **Figure 4-2**, aside from several isolated pockets, most streets within the area have sidewalk infrastructure on both sides of the street. Sidewalks along local and collector streets tend to be separated, with widths of 1.5 to 1.8m, resulting in a score of "fair". Sidewalks along arterials tend to be monolithic, with those along some corridors falling into the "poor" rating, especially along the streets branching off from the pedestrian priority areas. Sidewalks within pedestrian priority areas tend to vary in dimensions, and consideration should be given to reallocation of space to enhance the pedestrian realm with future renewal efforts, as is being done as part of the Imagine Jasper Avenue project.

4.1.2 Cyclists

As shown in **Figure 4-3** and **Figure 4-4,** cycling infrastructure in these areas consists of a mix of on-street painted facilities, shared roadways, shared pathway, and dedicated protected facilities. The 127 Street and 102 Avenue protected bike lanes, along with the former CN rail corridor shared pathway west of 122 Street provide the backbone of the bike network in the area, with on-street facilities along 121 Street, 106 Avenue, 100 Avenue/Victoria Promenade, 112 Street, and 110 Street, and 105 Avenue providing additional connectivity. Together, these facilities provide a network of bike infrastructure within three blocks (or less) of any potential redevelopment.

With construction of the Valley Line West LRT, consideration should be given to providing dedicated direct cycling connections between the cycling network and station locations.

4.1.3 Transit

As shown in **Figure 4-5** and **Figure 4-6**, the area is well served by transit, including both bus based and LRT service. The Capital Line/Metro Line runs along 110 Street and Valley Line West runs along 104 Street / Stony Plain Road, putting a vast majority of the Wîhkwêntôwin area and the southern half of the 124 Street area within 800 metres of an LRT station.

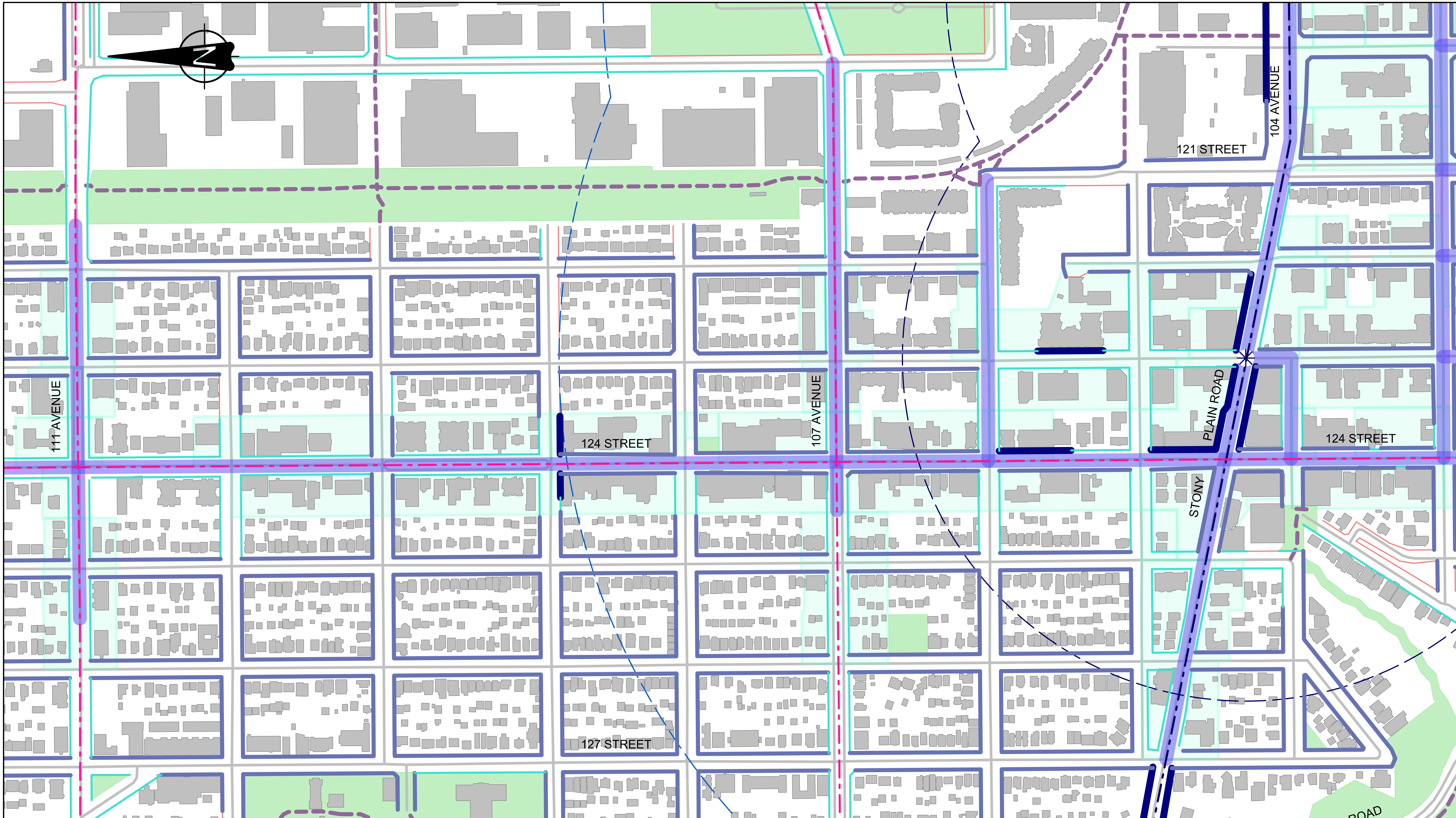
LRT service is complimented with the availability of multiple bus routes along 124 Street, 107 Avenue, 109 Street, and Jasper Avenue.

4.1.4 Vehicles

As shown in **Figure 4-7** and **Figure 4-8**, many of the arterial roadways within the PGA area experience medium to high congestion during peak hours. Because each intersection tends to experience higher volume during the PM peak hour, this was deemed to be a more suitable analogy for representing overall peak period congestion in these figures. AM peak period congestion, on the other hand, can reasonably be assumed to occur in the reserve direction. This is expected given the proximity to the downtown core and associated employment and education centres and is the focus of the network assessments discussed later in this report.

4.1.5 All Modes

Figure 4-9 and **Figure 4-10** show the combined results of the mobility network assessments for all of the modes listed above. When overlaid together, this highlights the overlapping importance of 124 Street, 107 Avenue, Stony Plain Road/104 Avenue, and Jasper Avenue to pedestrians, transit, and vehicles.



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- PEDESTRIAN PRIORITY AREA (PER DISTRICT PLAN)
- TRANSIT ROUTE
- LRT / BRT CORRIDOR
- LRT STATION & 400m + 800m RADII
- SHARED PATHWAY
- SIDEWALK: POOR (<3.5m MONO OR <1.5m SEPARATE)
- SIDEWALK: FAIR (3.5m TO 4.5m MONO OR 1.5 to 1.8m SEPARATE)
- SIDEWALK: GOOD (>4.5m MONO OR >1.8 SEPARATE)
- SIDEWALK: NONE

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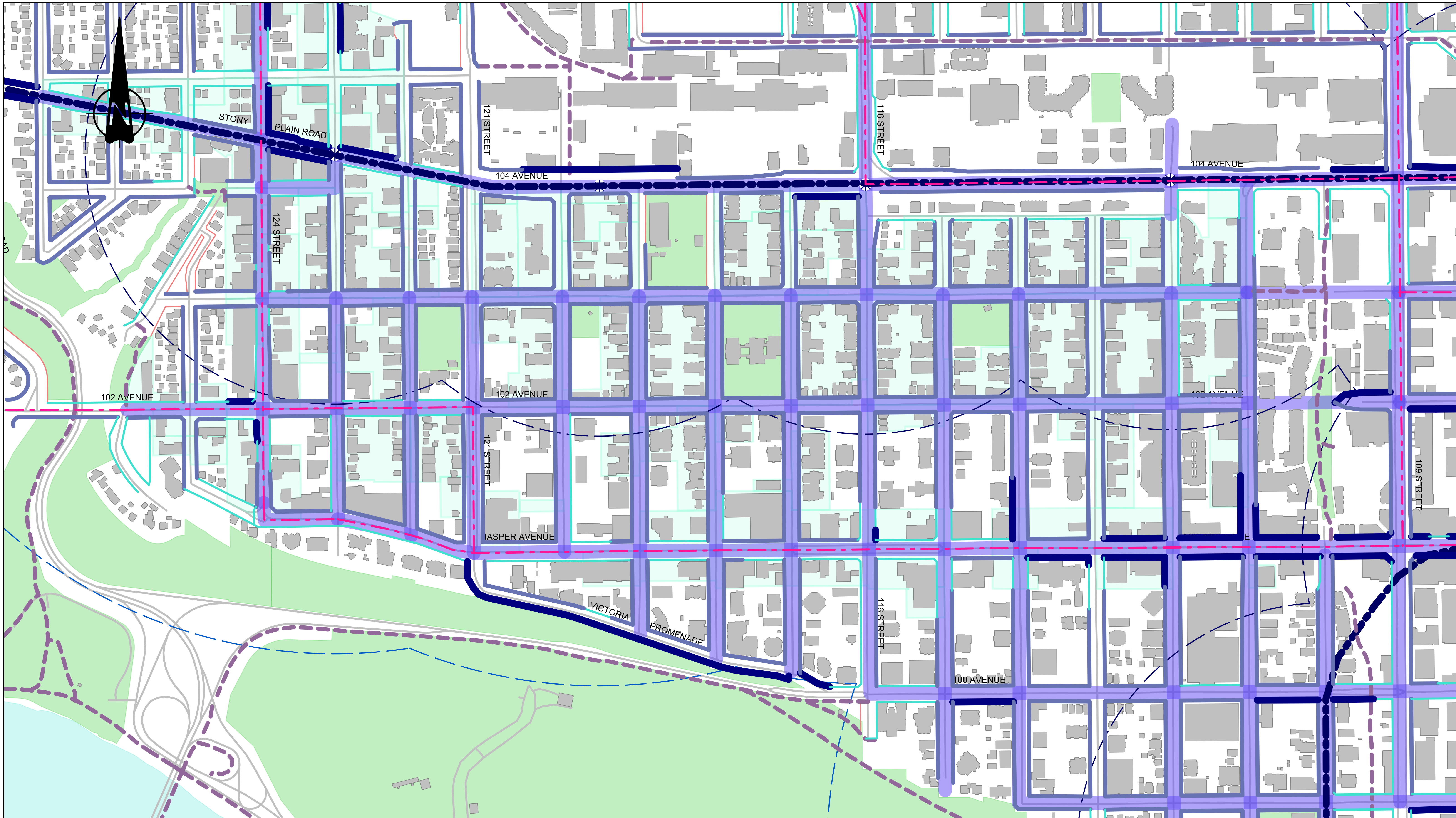
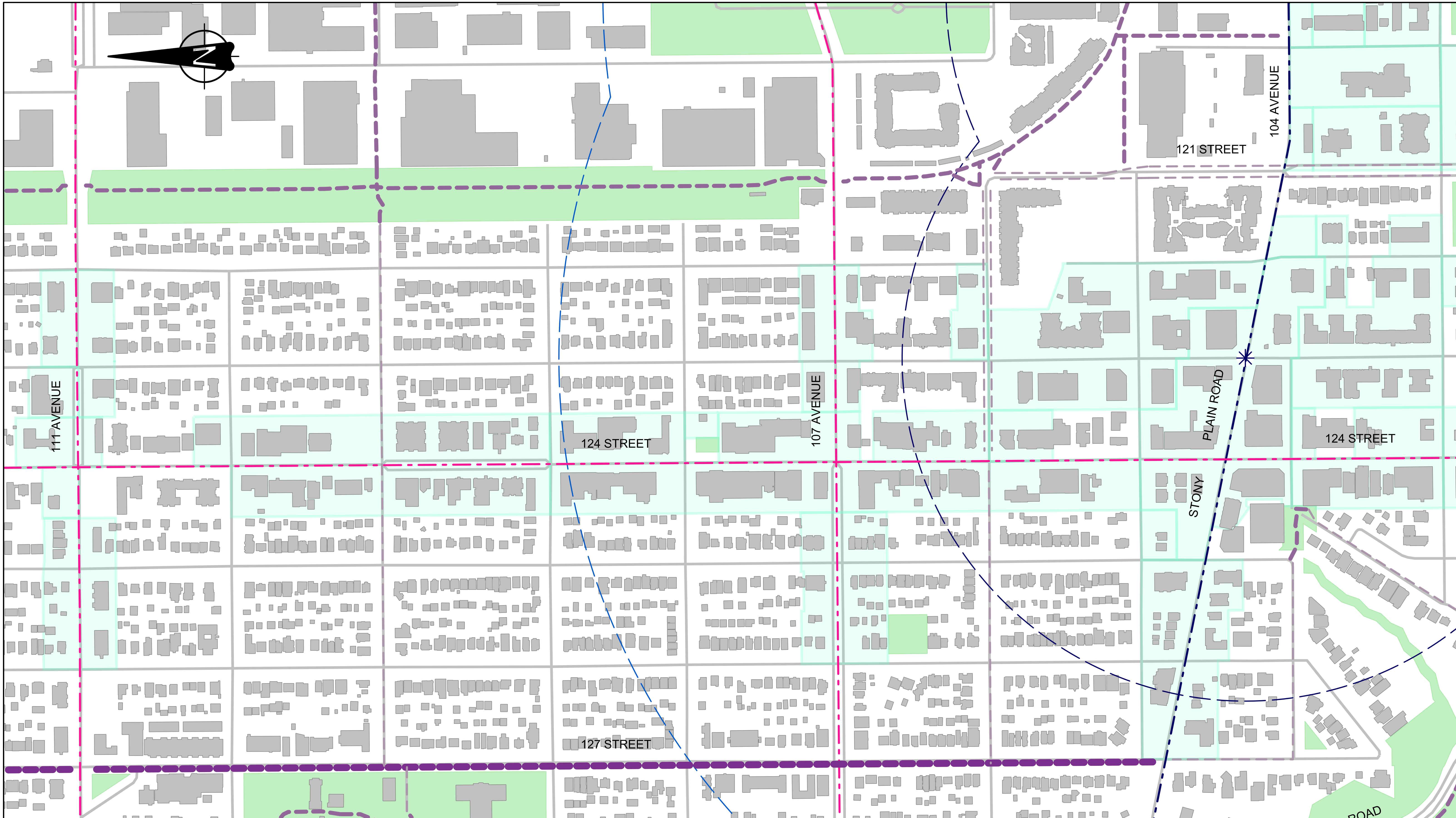
FIGURE 4-1 124 STREET PRIORITY GROWTH AREA EXISTING PEDESTRIAN CONDITIONS



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- PEDESTRIAN PRIORITY AREA (PER DISTRICT PLAN)
- TRANSIT ROUTE
- LRT / BRT CORRIDOR
- LRT STATION & 400m + 800m RADII
- SHARED PATHWAY
- SIDEWALK: POOR (<3.5m MONO OR <1.5m SEPARATE)
- SIDEWALK: FAIR (3.5m TO 4.5m MONO OR 1.5 to 1.8m SEPARATE)
- SIDEWALK: GOOD (>4.5m MONO OR >1.8 SEPARATE)
- SIDEWALK: NONE

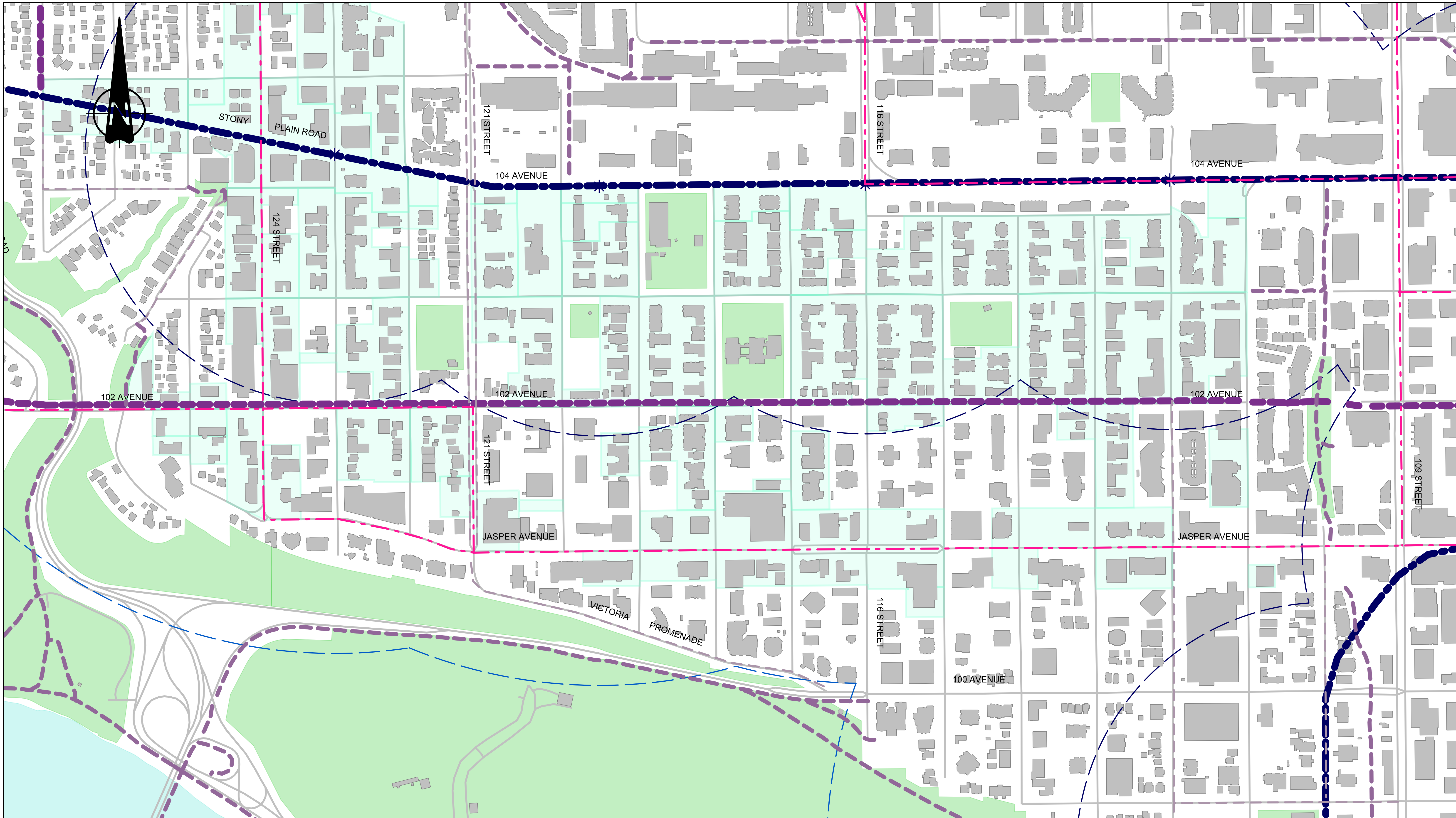
FIGURE 4-2 WîHKWêNTôWIN PRIORITY GROWTH AREA EXISTING PEDESTRIAN CONDITIONS



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- TRANSIT ROUTE
- LRT / BRT CORRIDOR
- LRT STATION & 400m + 800m RADII
- BIKE: PROTECTED, SEPARATED
- BIKE: SHARED PATHWAY
- BIKE: SHARED ROADWAY OPERATIONS/PAINTED

FIGURE 4-3 124 STREET PRIORITY GROWTH AREA EXISTING CYCLING CONDITIONS



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- TRANSIT ROUTE
- LRT / BRT CORRIDOR
- LRT STATION & 400m + 800m RADII
- BIKE: PROTECTED, SEPARATED
- BIKE: SHARED PATHWAY
- BIKE: SHARED ROADWAY OPERATIONS/PAINTED

FIGURE 4-4 WîHKWêNTôWIN PRIORITY GROWTH AREA EXISTING CYCLING CONDITIONS

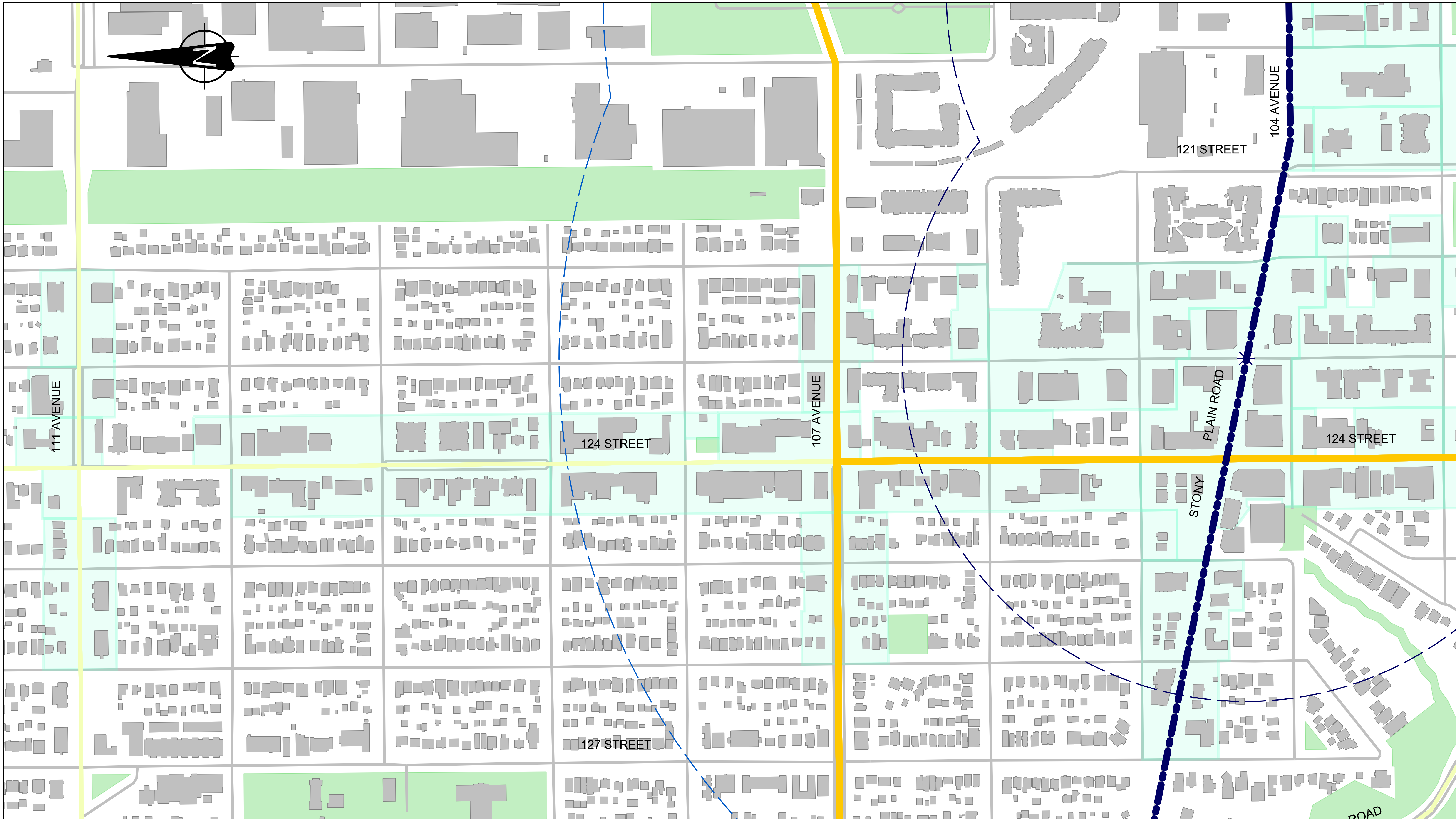
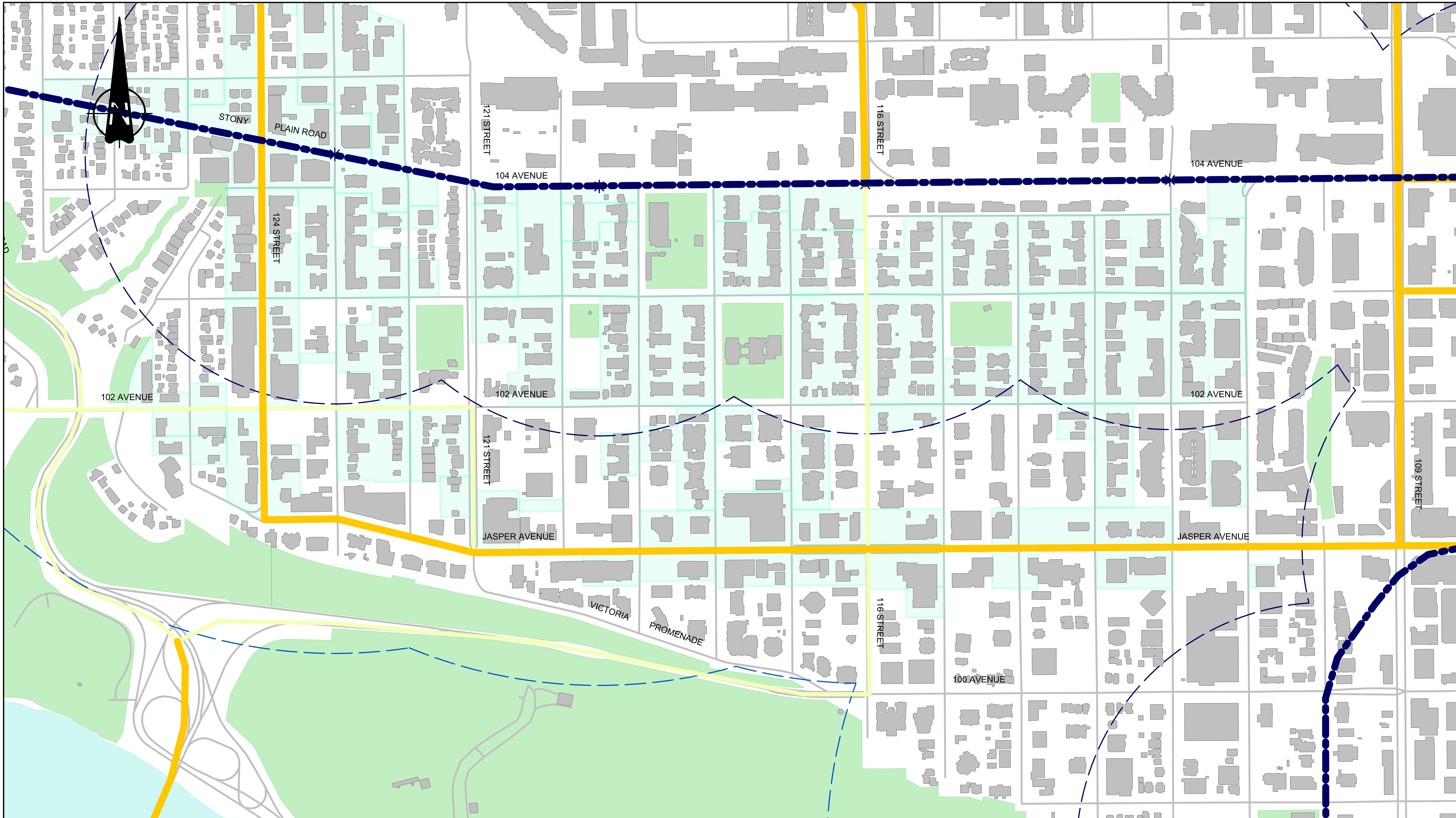


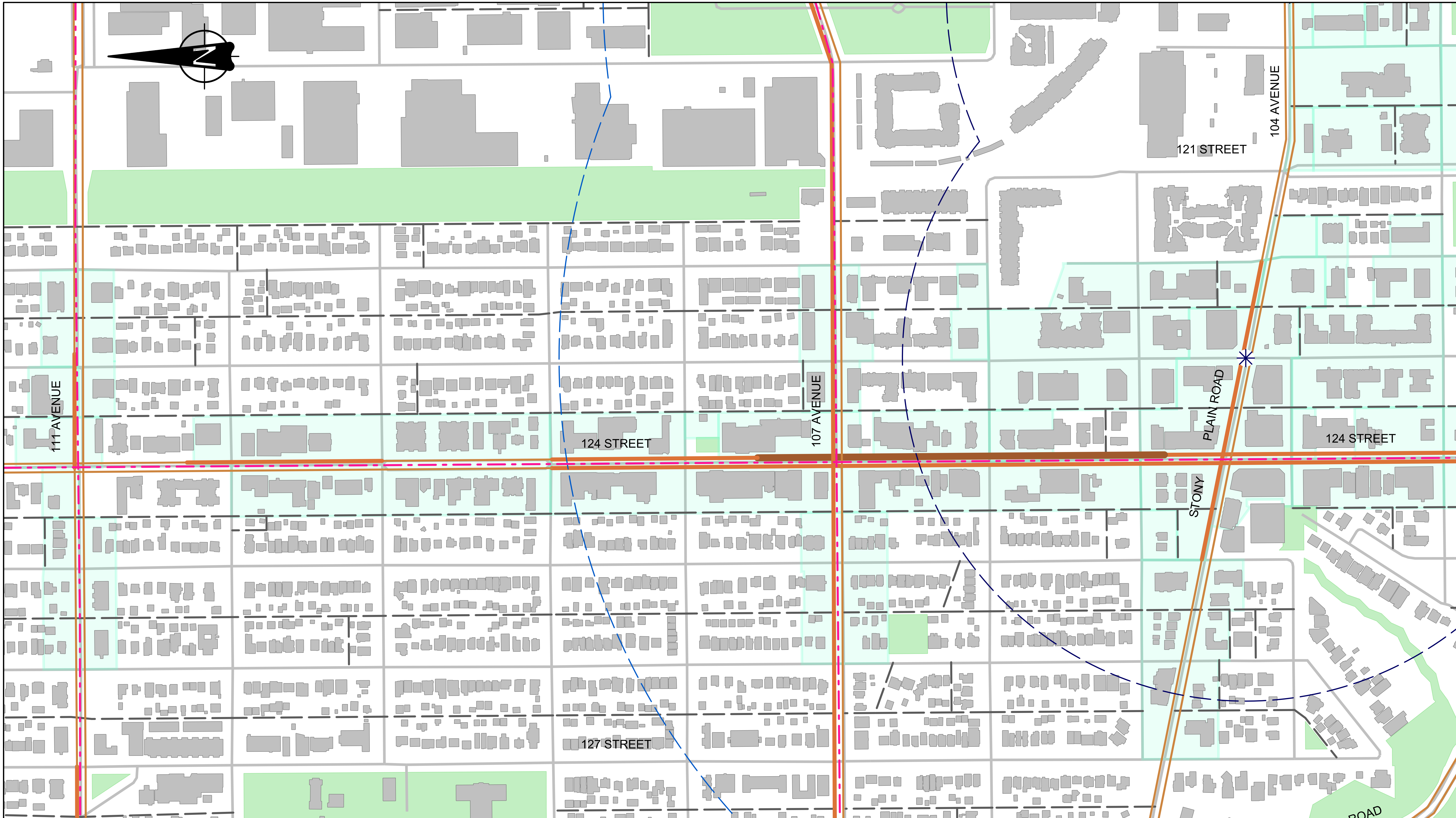
FIGURE 4-5 124 STREET PRIORITY GROWTH AREA EXISTING TRANSIT CONDITIONS



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- LRT CORRIDOR
- LRT STATION & 400m + 800m RADII
- ETS: LOW FREQUENCY
- ETS: MEDIUM FREQUENCY
- ETS: HIGH FREQUENCY

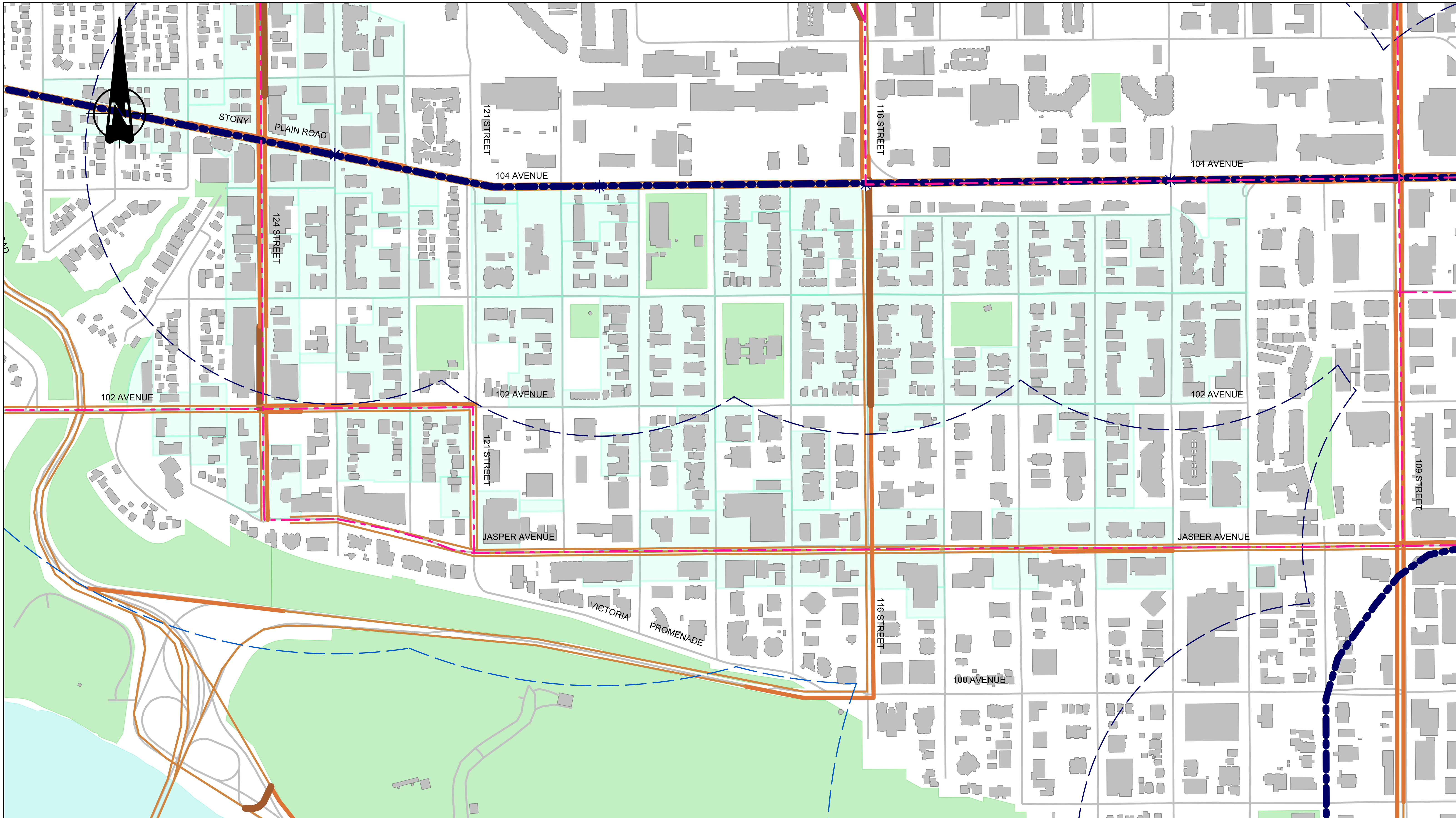
FIGURE 4-6 WîHKWêNTôWIN PRIORITY GROWTH AREA EXISTING TRANSIT CONDITIONS



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- TRANSIT ROUTE
- LRT / BRT CORRIDOR
- LRT STATION & 400m + 800m RADII
- ALLEYWAY
- TRAFFIC CONGESTION: LOW
- TRAFFIC CONGESTION: MEDIUM
- TRAFFIC CONGESTION: HIGH

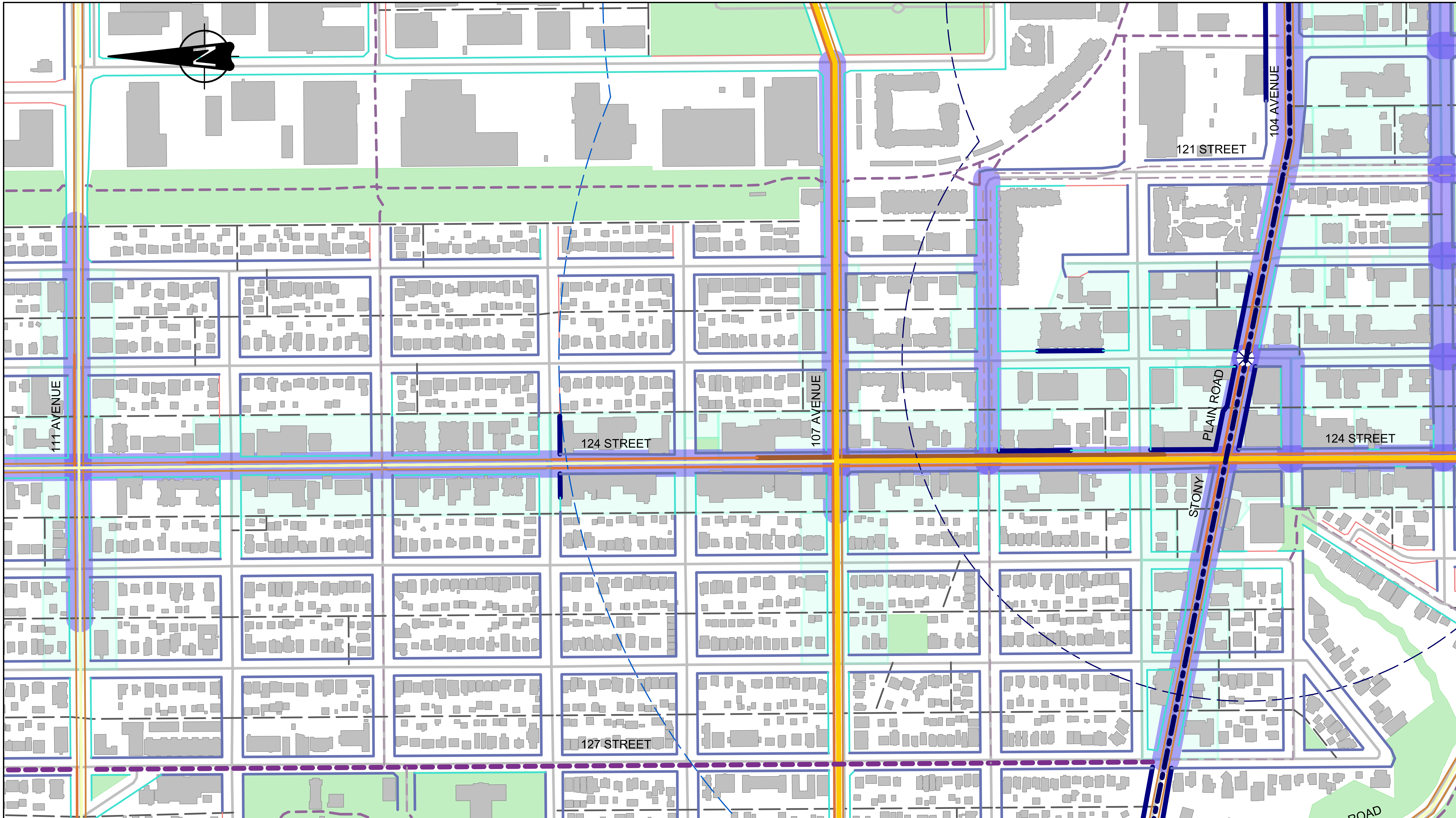
FIGURE 4-7 124 STREET PRIORITY GROWTH AREA EXISTING VEHICLE CONDITIONS (PM PEAK)



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- TRANSIT ROUTE
- LRT / BRT CORRIDOR
- LRT STATION & 400m + 800m RADII
- TRAFFIC CONGESTION: LOW
- TRAFFIC CONGESTION: MEDIUM
- TRAFFIC CONGESTION: HIGH

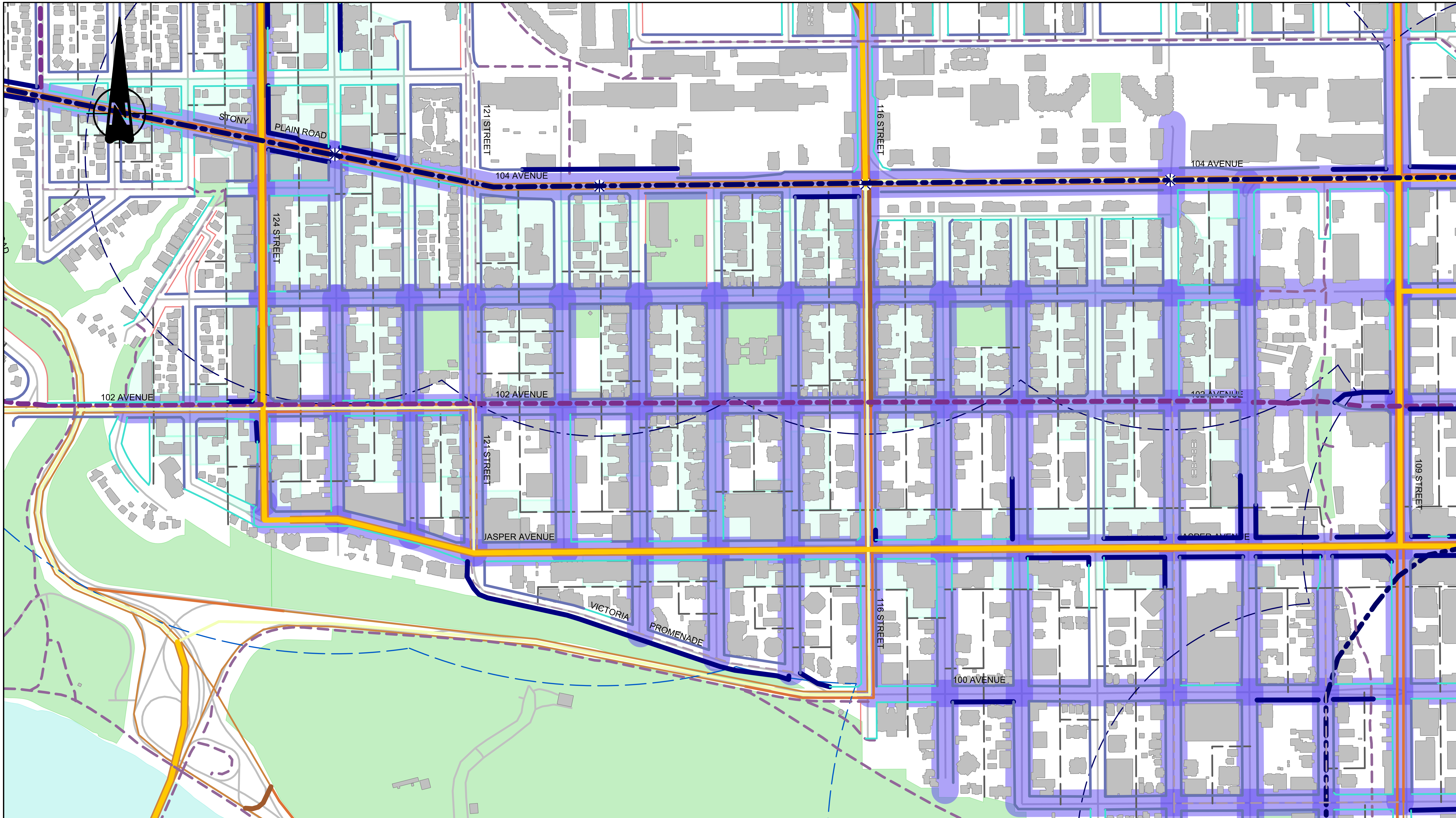
FIGURE 4-8 WîHKWêNTôWIN PRIORITY GROWTH AREA EXISTING VEHICLE CONDITIONS (PM PEAK)



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- PEDESTRIAN PRIORITY AREA (PER DISTRICT PLAN)
- LRT / BRT CORRIDOR
- TRAFFIC CONGESTION: LOW
- TRAFFIC CONGESTION: MEDIUM
- TRAFFIC CONGESTION: HIGH
- ETS: LOW FREQUENCY
- ETS: MEDIUM FREQUENCY
- ETS: HIGH FREQUENCY
- BIKE: PROTECTED, SEPARATED
- BIKE: SHARED PATHWAY
- BIKE: SHARED ROADWAY OPERATIONS/PAINTED
- SIDEWALK: POOR (<3.5m MONO OR <1.5m SEPARATE)
- SIDEWALK: FAIR (3.5m TO 4.5m MONO OR 1.5 to 1.8m SEPARATE)
- SIDEWALK: GOOD (>4.5m MONO OR >1.8 SEPARATE)
- SIDEWALK: NONE
- LRT STATION & 400m + 800m RADII

FIGURE 4-9 124 STREET PRIORITY GROWTH AREA EXISTING ALL MODES CONDITIONS



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- PEDESTRIAN PRIORITY AREA (PER DISTRICT PLAN)
- LRT / BRT CORRIDOR
- TRAFFIC CONGESTION: LOW
- TRAFFIC CONGESTION: MEDIUM
- TRAFFIC CONGESTION: HIGH
- ETS: LOW FREQUENCY
- ETS: MEDIUM FREQUENCY
- ETS: HIGH FREQUENCY
- BIKE: PROTECTED, SEPARATED
- BIKE: SHARED PATHWAY
- BIKE: SHARED ROADWAY OPERATIONS/PAINTED
- SIDEWALK: POOR (<3.5m MONO OR <1.5m SEPARATE)
- SIDEWALK: FAIR (3.5m TO 4.5m MONO OR 1.5 to 1.8m SEPARATE)
- SIDEWALK: GOOD (>4.5m MONO OR >1.8 SEPARATE)
- SIDEWALK: NONE
- LRT STATION & 400m + 800m RADII

FIGURE 4-10 WîHKWêNTôWIN PRIORITY GROWTH AREA EXISTING ALL MODES CONDITIONS

4.2 156 Street / Stony Plain Road

While the assessment focuses on existing conditions, it does consider the planned improvements currently under construction as part of the Valley Line West LRT.

Of note, multiple neighbourhood renewal projects have been completed within this area over the last 10 to 15 years, including:

- Glenora completed in 2016
- Grovenor completed in 2014
- Canora completed in 2013
- West Jasper Place (south of 100 Avenue) completed in 2012
- West Jasper Place (north of 100 Avenue) completed in 2020
- Meadowlark Park completed in 2010

Furthermore, many of the remaining neighbourhoods in the area underwent renewal prior to 2009, including:

- Britannia Youngstown
- Glenwood (east of 163 Street)
- Sherwood
- Jasper Park

As such, outside of the arterial roads which are renewed through a separate program, the existing pedestrian, cyclists, transit, and vehicle infrastructure within these communities is not anticipated to undergo any immediate further changes.

4.2.1 Pedestrians

As shown in **Figure 4-11**, **Figure 4-12** and **Figure 4-13**, there are several stretches of roadways where sidewalk exists only on one side. Most notably as it relates to the PGA areas, this includes:

- 103 Avenue between 143 Street and Stony Plain Road
- 102 Avenue between 144 Street and 142 Street and between 149 Street and 163 Street
- 101 Avenue between Ravine Drive and 142 Street
- Portions of 143 Street, 144 Street, and 145 Street approaching Stony Plain Road
- Portions of 91 Avenue, 92A Avenue, 93A Avenue, 96 Avenue, 97 Avenue, 98 Avenue, 99 Avenue approaching 156 Street
- 156 Street between Meadowlark Road and 90 Avenue
- 90 Avenue between Meadowlark Road and 156 Street

The remaining neighbourhood roads have sidewalk on both sides of the street, with a varied mix of monolithic and boulevard sidewalks, generally with widths of 1.5 to 1.8m, resulting in a score of "fair" for boulevard sidewalks and "poor" for monolithic sidewalks.

Sidewalks along arterials tend to be monolithic, with many along corridors outside of Stony Plain Road falling into the "poor" rating. Sidewalks within pedestrian priority areas tend to vary in dimensions, and consideration should be given to reallocation of space to enhance the pedestrian realm with future renewal efforts.

4.2.2 Cyclists

As shown in **Figure 4-14**, **Figure 4-15**, and **Figure 4-16**, cycling infrastructure in these areas consists predominantly of shared pathways that follow the river valley and ravine system, along with a limited mix of on-street painted facilities, shared roadways and shared pathway. The 102 Avenue corridor east of 138 Street provides a connection into downtown, while the 100 Avenue shared pathway provides some east-west connectivity. On-street facilities along 148 Street, 104 Avenue, and 95 Avenue further expand the cycling infrastructure, however, the quality of the infrastructure is less than that in other areas of the City.

Notably, the City's Active Transportation Network Expansion program includes enhancements to facilities along 148 Street, 144 Street, 104 Avenue, 95 Avenue, and 107 Avenue, which are expected to be constructed in 2026.

Overall, however, gaps exist within the active transportation network, with a lack of north-south connectivity paralleling the 156 Street corridor, and with no connectivity to between the cycling network and Valley Line LRT station locations.

4.2.3 Transit

As shown in **Figure 4-17**, **Figure 4-18**, and **Figure 4-19**, the area will be well served by LRT service, with Valley Line LRT running along Stony Plain Road and 156 Street, putting the 156 Street and Stony Plain corridors within 800 metres of an LRT station.

LRT service is complimented with the availability of bus routes, albeit with mixed service frequency, along parts of Stony Plain Road west of 156 Street, 87 Avenue, and to a lesser degree, along 95 Avenue, 149 Street, and 142 Street.

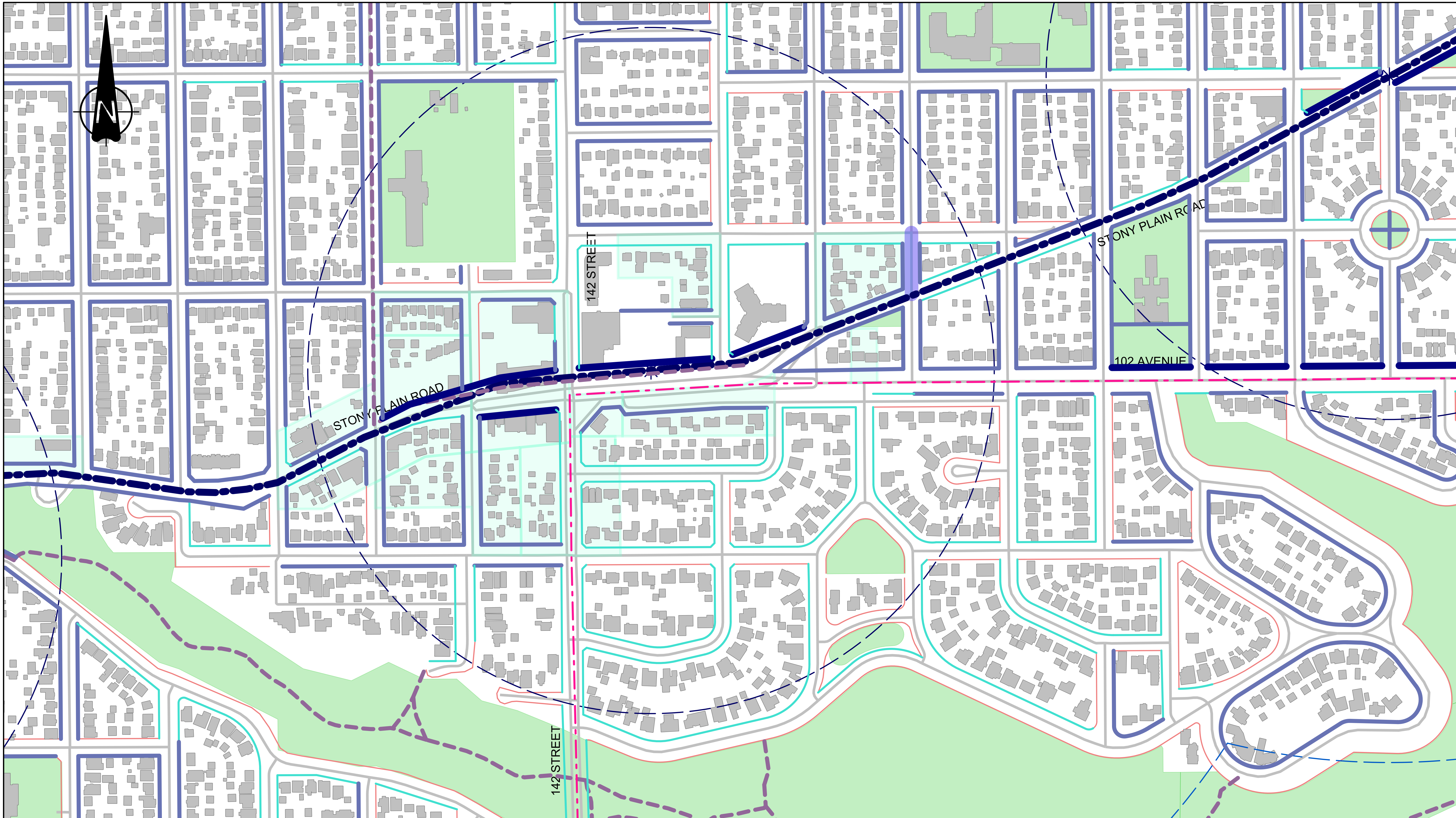
Overall, the transit users in this area would be expected to primarily utilize LRT service.

4.2.4 Vehicles

As shown in **Figure 4-20**, **Figure 4-21**, and **Figure 4-22**, many of the arterial roadways within the PGA area experience medium to high congestion during peak hours. Because each intersection tends to experience higher volume during the PM peak hour, this was deemed to be a more suitable analogy for representing overall peak period congestion in these figures. AM peak period congestion, on the other hand, can reasonably be assumed to occur in the reserve direction. This is expected given that the corridors serve as a commuter route to the downtown core and associated employment and education centres and is the focus of the network assessments discussed later in this report.

4.2.5 All Modes

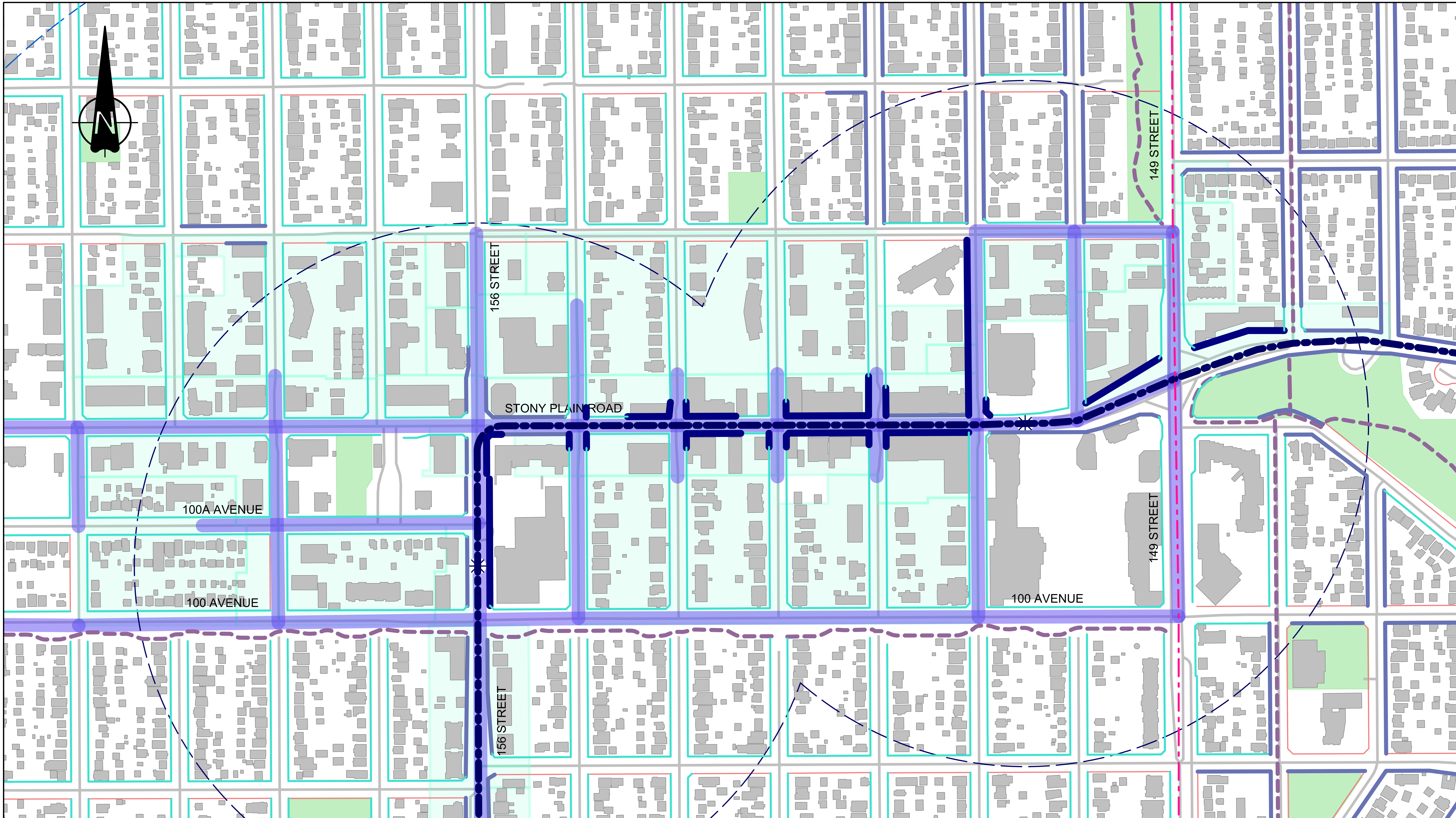
Figure 4-23, **Figure 4-24**, and **Figure 4-25** show the combined results of the mobility network assessments for all of the modes listed above. When overlaid together, this highlights the overlapping importance of 102 Avenue east of Stony Plain Road as an important cycling, vehicle, and transit corridor, as well as of Stony Plain Road west of 149 Street as an important transit, pedestrian, and vehicle corridor.



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- PEDESTRIAN PRIORITY AREA (PER DISTRICT PLAN)
- TRANSIT ROUTE
- LRT / BRT CORRIDOR
- LRT STATION & 400m + 800m RADII
- SHARED PATHWAY
- SIDEWALK: POOR (<3.5m MONO OR <1.5m SEPARATE)
- SIDEWALK: FAIR (3.5m TO 4.5m MONO OR 1.5 to 1.8m SEPARATE)
- SIDEWALK: GOOD (>4.5m MONO OR >1.8 SEPARATE)
- SIDEWALK: NONE

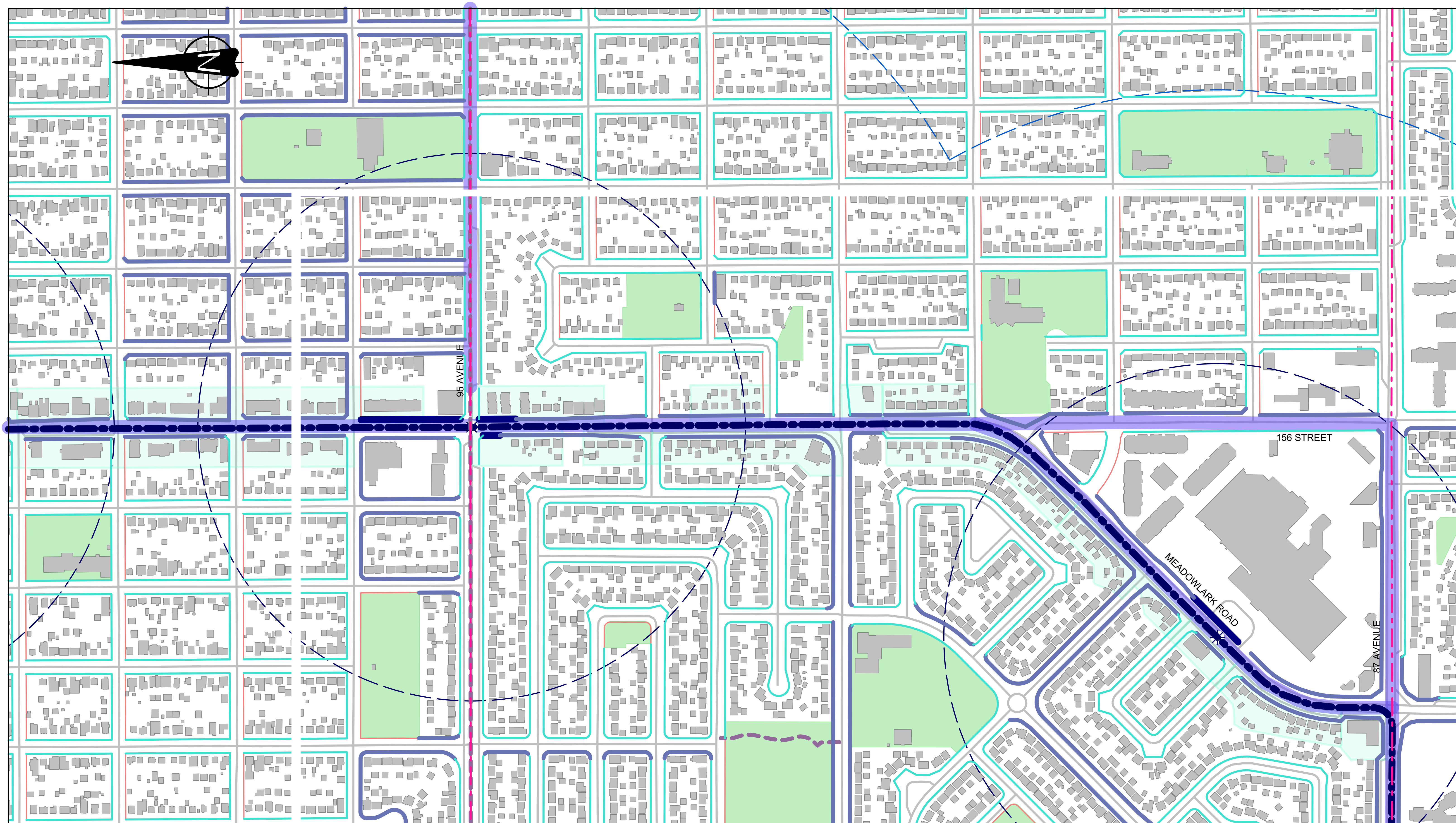
FIGURE 4-11 STONY PLAIN E. PRIORITY GROWTH AREA EXISTING PEDESTRIAN CONDITIONS



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- PEDESTRIAN PRIORITY AREA (PER DISTRICT PLAN)
- TRANSIT ROUTE
- LRT / BRT CORRIDOR
- LRT STATION & 400m + 800m RADII
- SHARED PATHWAY
- SIDEWALK: POOR (<3.5m MONO OR <1.5m SEPARATE)
- SIDEWALK: FAIR (3.5m TO 4.5m MONO OR 1.5 to 1.8m SEPARATE)
- SIDEWALK: GOOD (>4.5m MONO OR >1.8 SEPARATE)
- SIDEWALK: NONE

FIGURE 4-12 STONY PLAIN W. PRIORITY GROWTH AREA EXISTING PEDESTRIAN CONDITIONS



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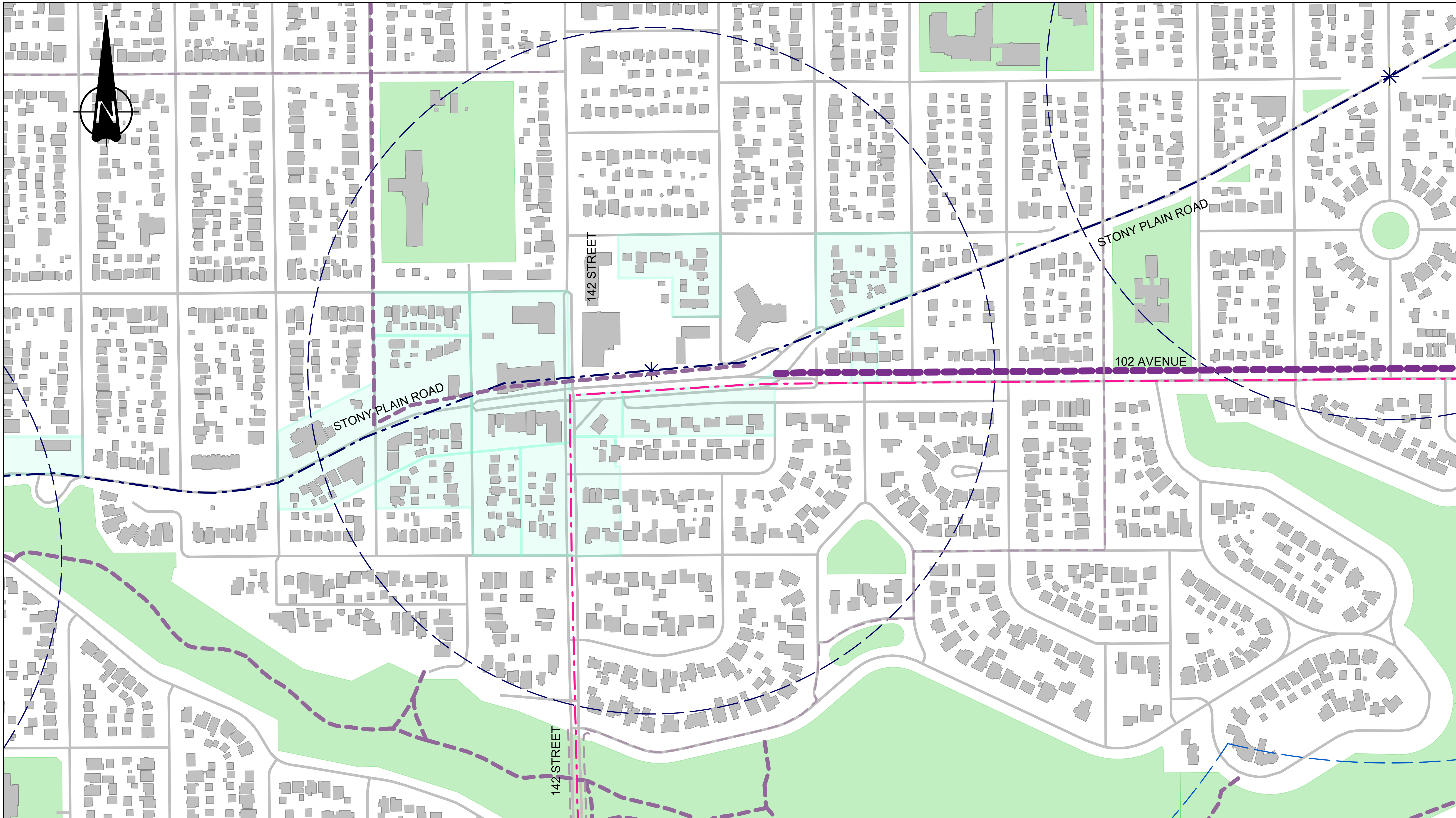
LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- PEDESTRIAN PRIORITY AREA (PER DISTRICT PLAN)
- TRANSIT ROUTE
- LRT / BRT CORRIDOR
- LRT STATION & 400m + 800m RADII
- SHARED PATHWAY
- SIDEWALK: POOR (<3.5m MONO OR <1.5m SEPARATE)
- SIDEWALK: FAIR (3.5m TO 4.5m MONO OR 1.5 to 1.8m SEPARATE)
- SIDEWALK: GOOD (>4.5m MONO OR >1.8 SEPARATE)
- SIDEWALK: NONE

FIGURE 4-13 156 STREET PRIORITY GROWTH AREA EXISTING PEDESTRIAN CONDITIONS



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- TRANSIT ROUTE
- LRT / BRT CORRIDOR
- LRT STATION & 400m + 800m RADII
- BIKE: PROTECTED, SEPARATED
- BIKE: SHARED PATHWAY
- BIKE: SHARED ROADWAY OPERATIONS/PAINTED

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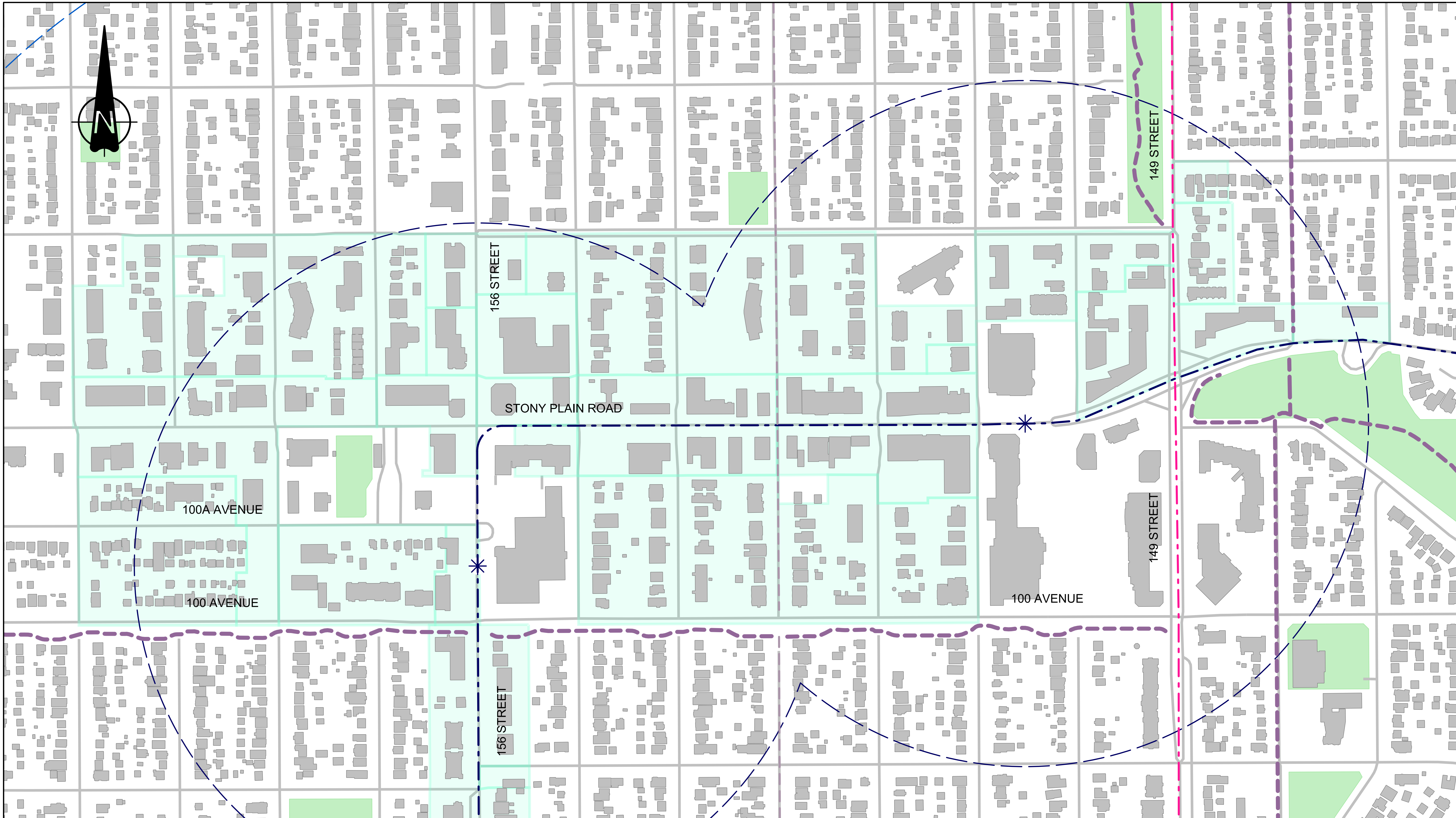
FIGURE 4-14 STONY PLAIN E. PRIORITY GROWTH AREA EXISTING CYCLING CONDITIONS



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- TRANSIT ROUTE
- LRT / BRT CORRIDOR
- LRT STATION & 400m + 800m RADII
- BIKE: PROTECTED, SEPARATED
- BIKE: SHARED PATHWAY
- BIKE: SHARED ROADWAY OPERATIONS/PAINTED

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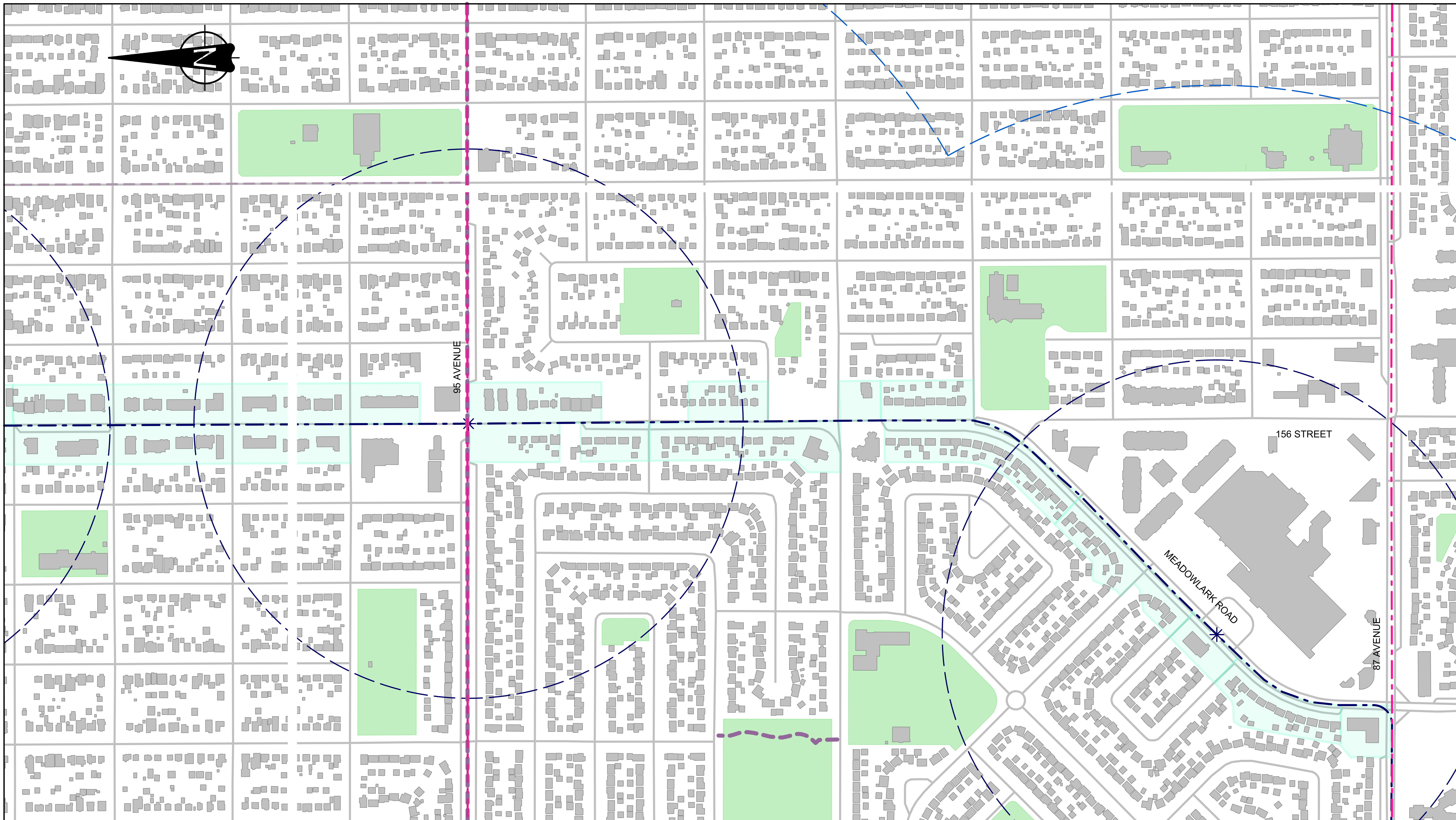
FIGURE 4-15 STONY PLAIN W. PRIORITY GROWTH AREA EXISTING CYCLING CONDITIONS



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- TRANSIT ROUTE
- LRT / BRT CORRIDOR
- LRT STATION & 400m + 800m RADII
- BIKE: PROTECTED, SEPARATED
- BIKE: SHARED PATHWAY
- BIKE: SHARED ROADWAY OPERATIONS/PAINTED

FIGURE 4-16 156 STREET PRIORITY GROWTH AREA EXISTING CYCLING CONDITIONS

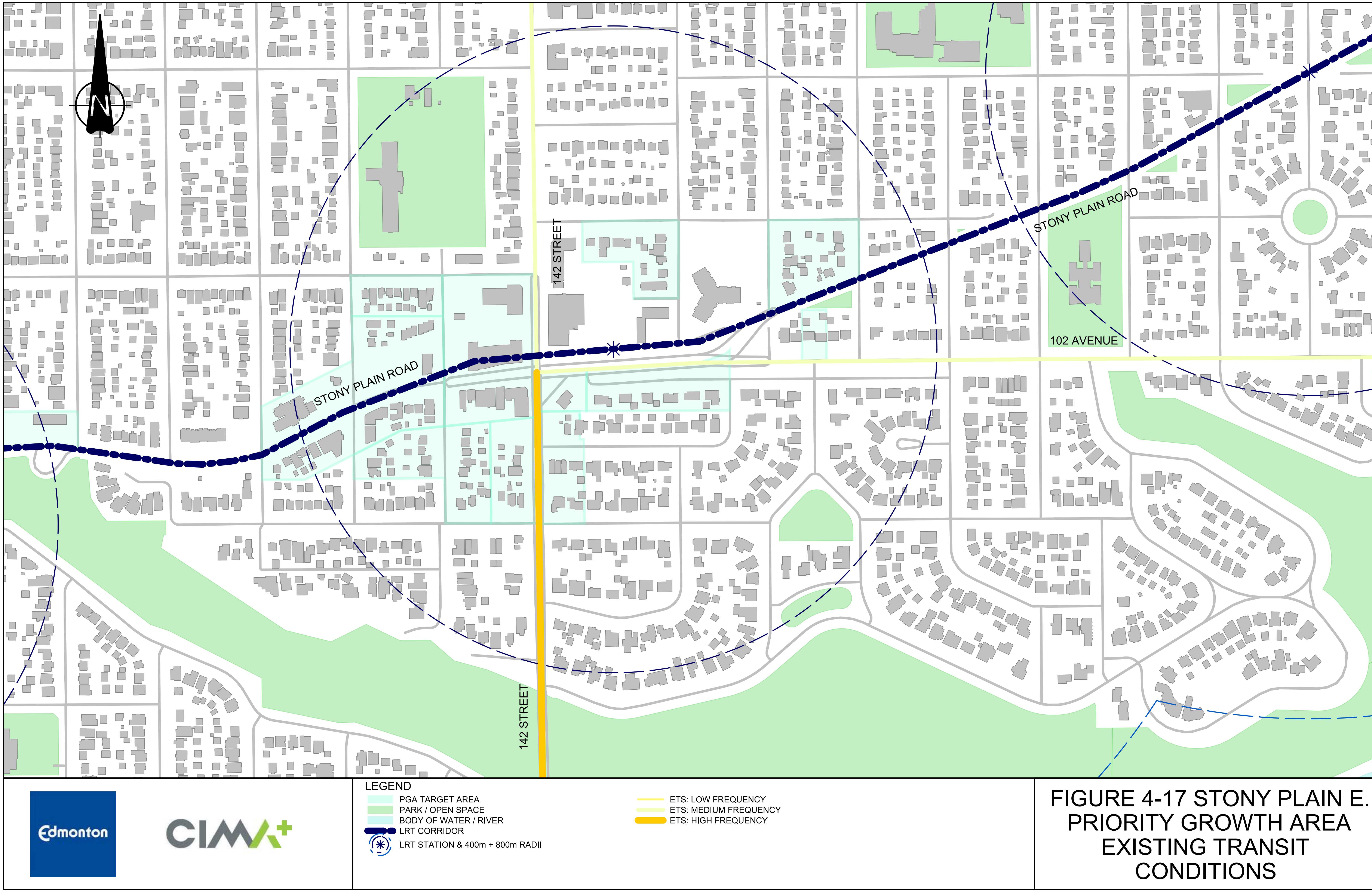
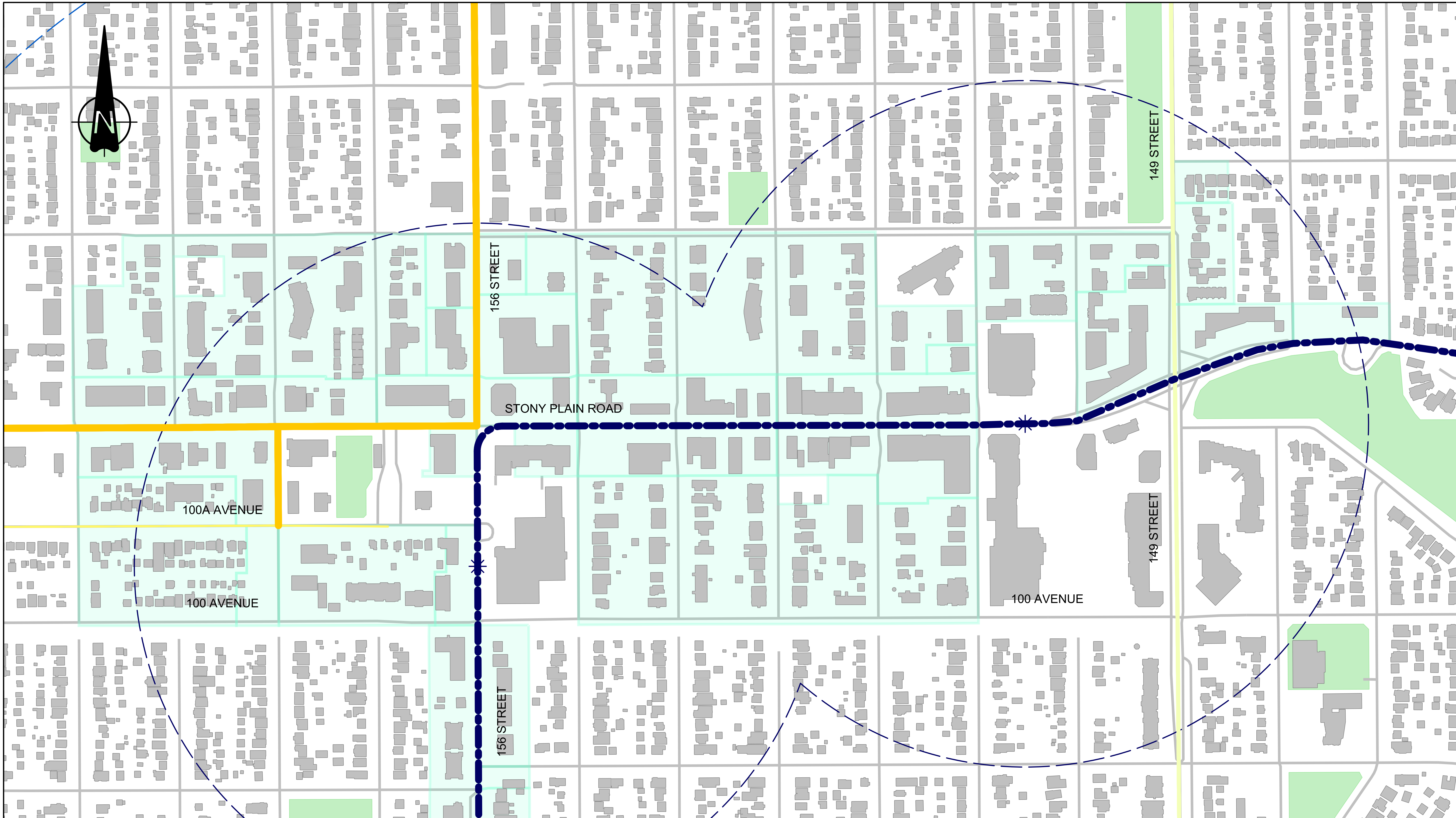


FIGURE 4-17 STONY PLAIN E. PRIORITY GROWTH AREA EXISTING TRANSIT CONDITIONS



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- LRT CORRIDOR
- LRT STATION & 400m + 800m RADII
- ETS: LOW FREQUENCY
- ETS: MEDIUM FREQUENCY
- ETS: HIGH FREQUENCY

FIGURE 4-18 STONY PLAIN W. PRIORITY GROWTH AREA EXISTING TRANSIT CONDITIONS

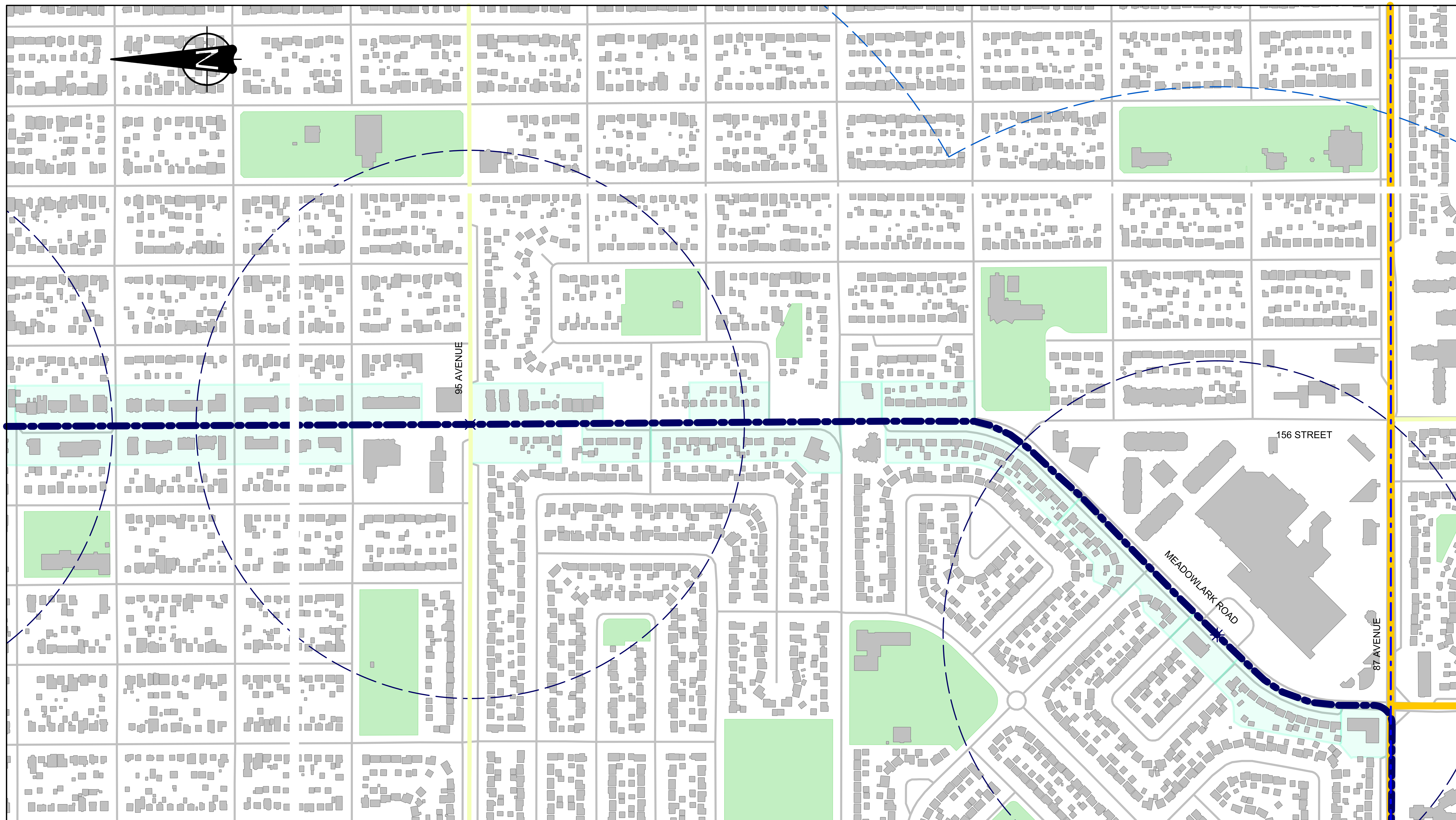
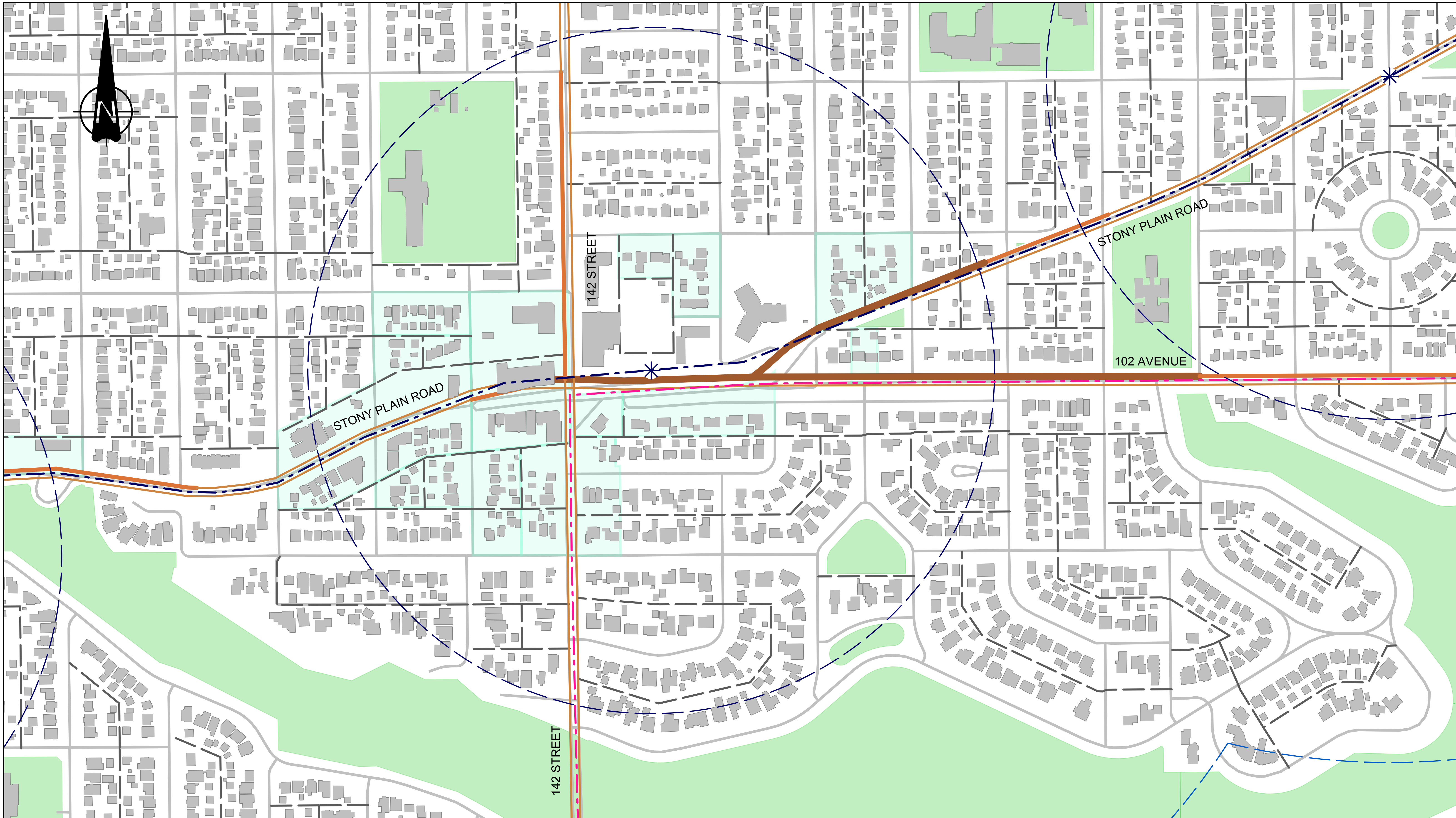


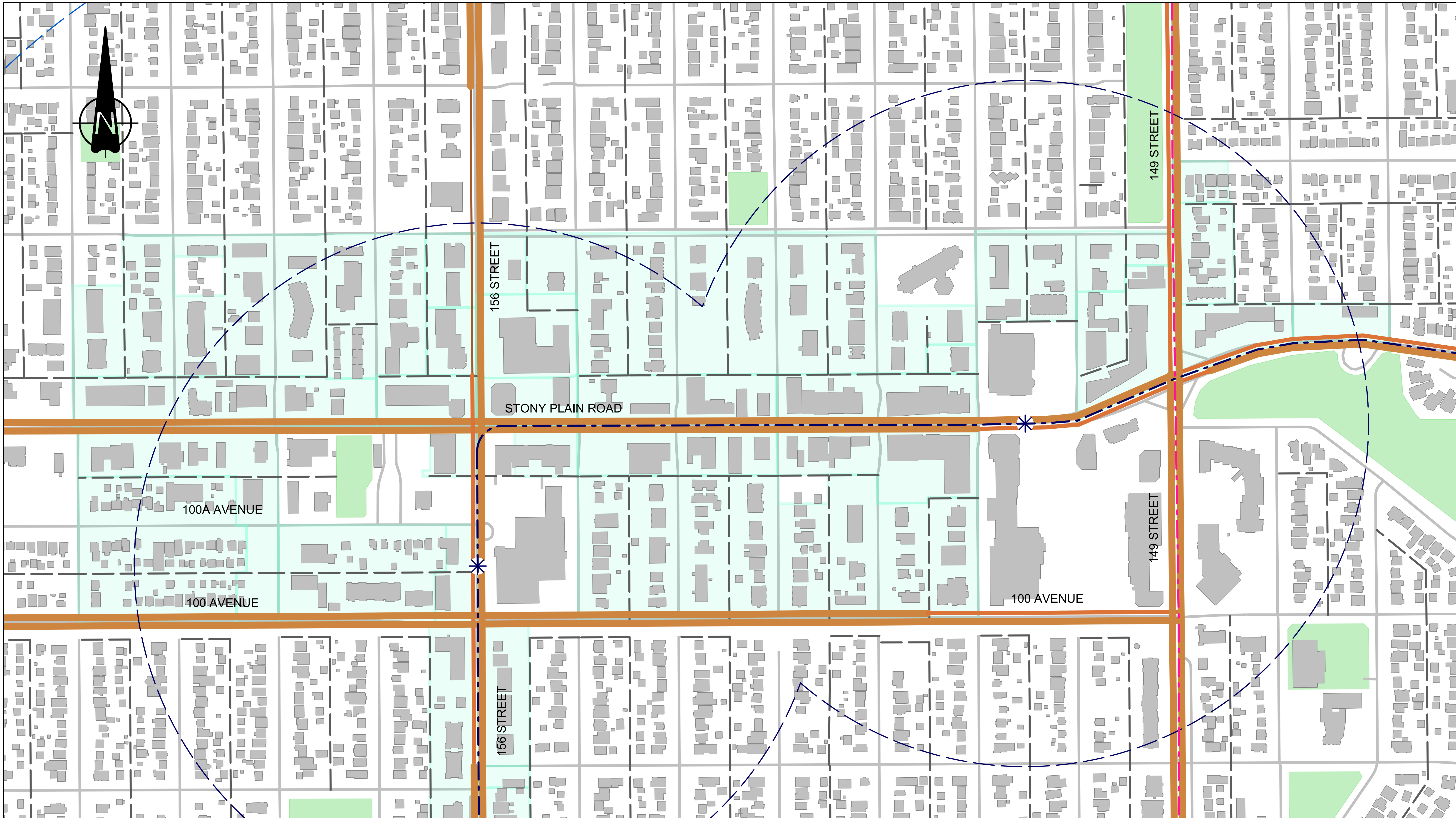
FIGURE 4-19 156 STREET PRIORITY GROWTH AREA EXISTING TRANSIT CONDITIONS



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- TRANSIT ROUTE
- LRT / BRT CORRIDOR
- LRT STATION & 400m + 800m RADII
- ALLEYWAY
- TRAFFIC CONGESTION: LOW
- TRAFFIC CONGESTION: MEDIUM
- TRAFFIC CONGESTION: HIGH

FIGURE 4-20 STONY PLAIN E. PRIORITY GROWTH AREA EXISTING VEHICLE CONDITIONS (PM PEAK)



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- TRANSIT ROUTE
- LRT / BRT CORRIDOR
- LRT STATION & 400m + 800m RADII
- TRAFFIC CONGESTION: LOW
- TRAFFIC CONGESTION: MEDIUM
- TRAFFIC CONGESTION: HIGH

FIGURE 4-21 STONY PLAIN W. PRIORITY GROWTH AREA EXISTING VEHICLE CONDITIONS (PM PEAK)

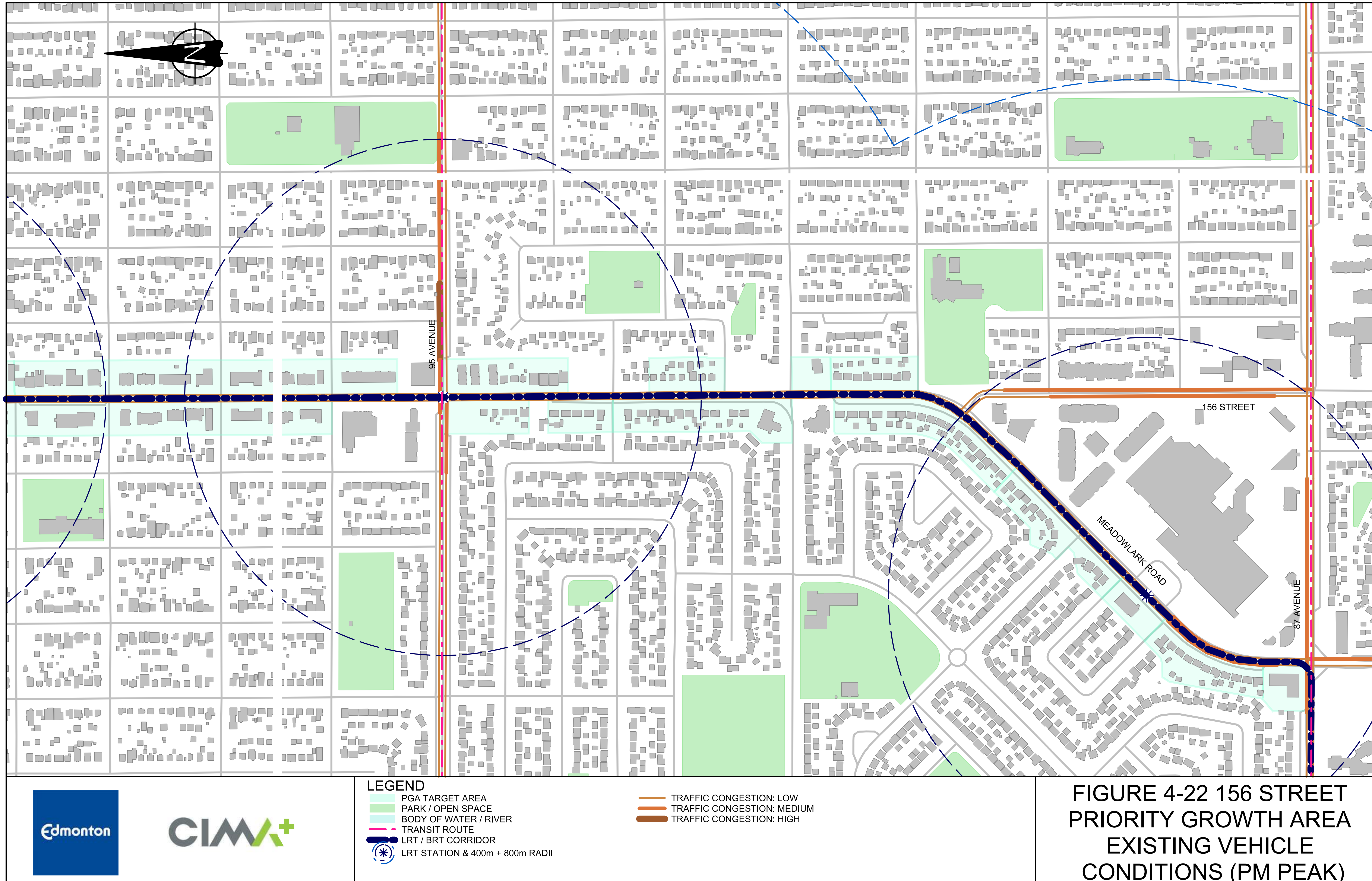
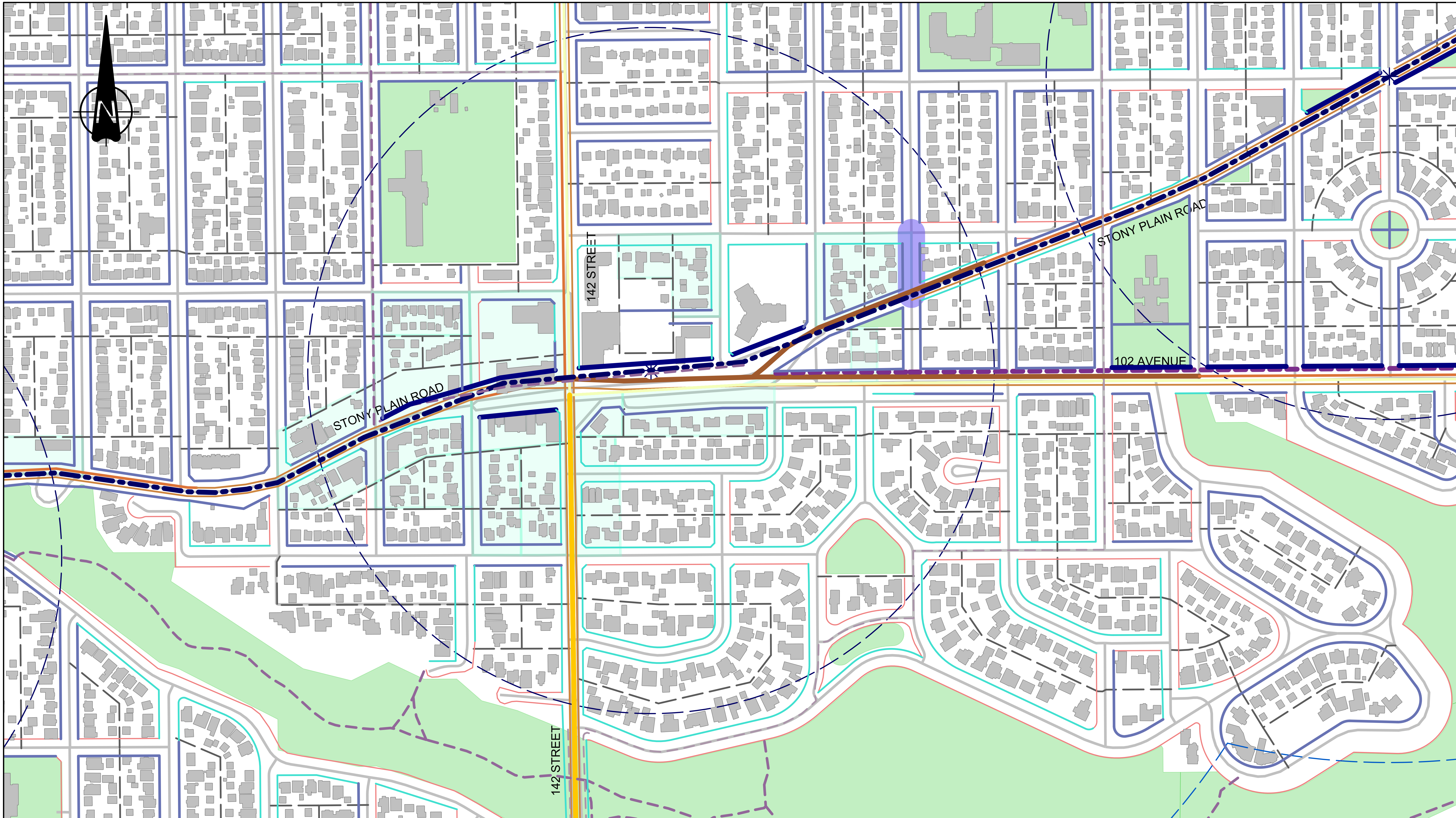


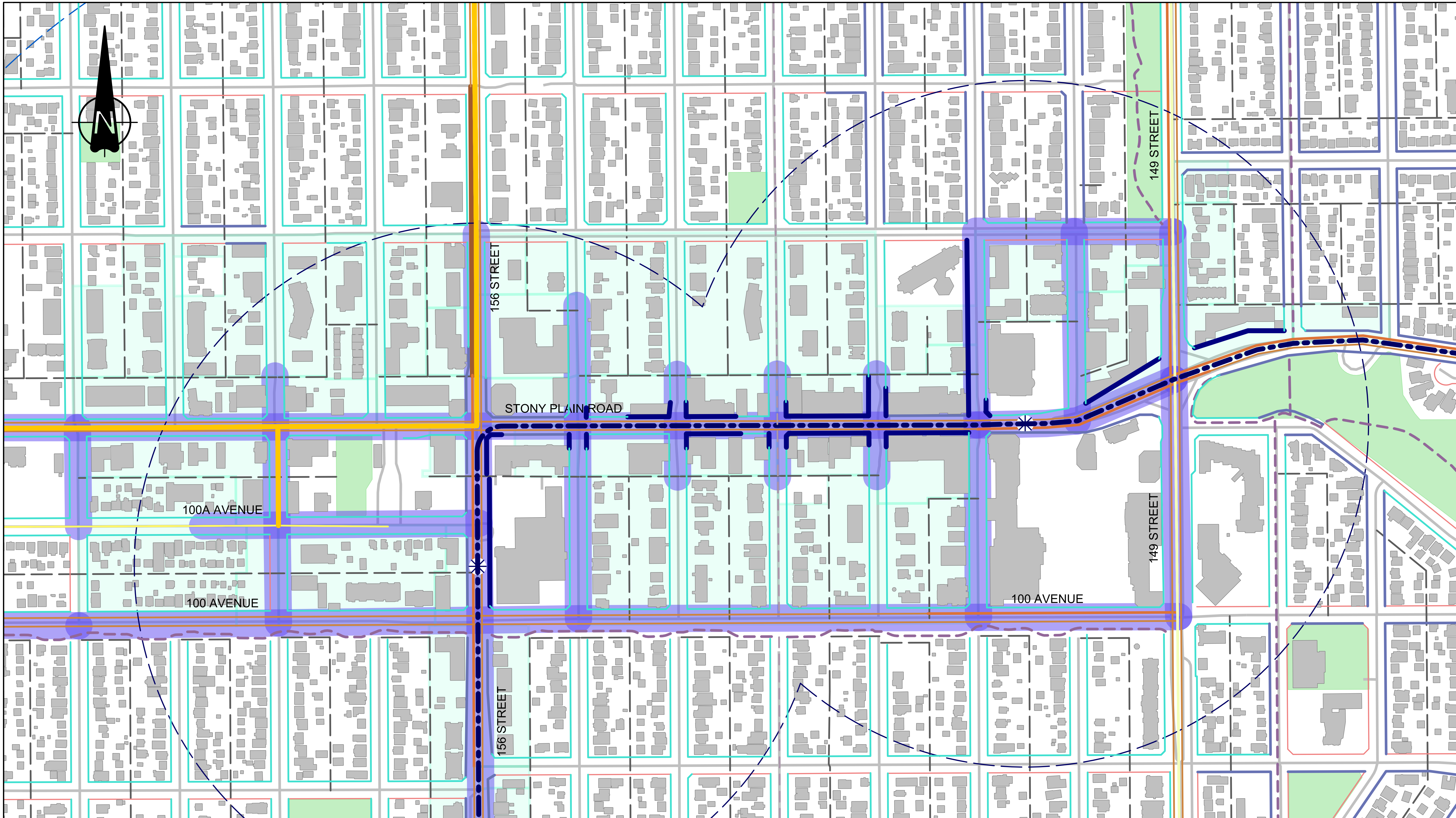
FIGURE 4-22 156 STREET PRIORITY GROWTH AREA EXISTING VEHICLE CONDITIONS (PM PEAK)



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- PEDESTRIAN PRIORITY AREA (PER DISTRICT PLAN)
- LRT / BRT CORRIDOR
- TRAFFIC CONGESTION: LOW
- TRAFFIC CONGESTION: MEDIUM
- TRAFFIC CONGESTION: HIGH
- ETS: LOW FREQUENCY
- ETS: MEDIUM FREQUENCY
- ETS: HIGH FREQUENCY
- BIKE: PROTECTED, SEPARATED
- BIKE: SHARED PATHWAY
- BIKE: SHARED ROADWAY OPERATIONS/PAINTED
- SIDEWALK: POOR (<3.5m MONO OR <1.5m SEPARATE)
- SIDEWALK: FAIR (3.5m TO 4.5m MONO OR 1.5 to 1.8m SEPARATE)
- SIDEWALK: GOOD (>4.5m MONO OR >1.8 SEPARATE)
- SIDEWALK: NONE
- LRT STATION & 400m + 800m RADII

FIGURE 4-23 STONY PLAIN E. PRIORITY GROWTH AREA EXISTING ALL MODES CONDITIONS



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- PEDESTRIAN PRIORITY AREA (PER DISTRICT PLAN)
- LRT / BRT CORRIDOR
- TRAFFIC CONGESTION: LOW
- TRAFFIC CONGESTION: MEDIUM
- TRAFFIC CONGESTION: HIGH
- ETS: LOW FREQUENCY
- ETS: MEDIUM FREQUENCY
- ETS: HIGH FREQUENCY
- BIKE: PROTECTED, SEPARATED
- BIKE: SHARED PATHWAY
- BIKE: SHARED ROADWAY OPERATIONS/PAINTED
- SIDEWALK: POOR (<3.5m MONO OR <1.5m SEPARATE)
- SIDEWALK: FAIR (3.5m TO 4.5m MONO OR 1.5 to 1.8m SEPARATE)
- SIDEWALK: GOOD (>4.5m MONO OR >1.8 SEPARATE)
- SIDEWALK: NONE
- LRT STATION & 400m + 800m RADII

FIGURE 4-24 STONY PLAIN W. PRIORITY GROWTH AREA EXISTING ALL MODES CONDITIONS

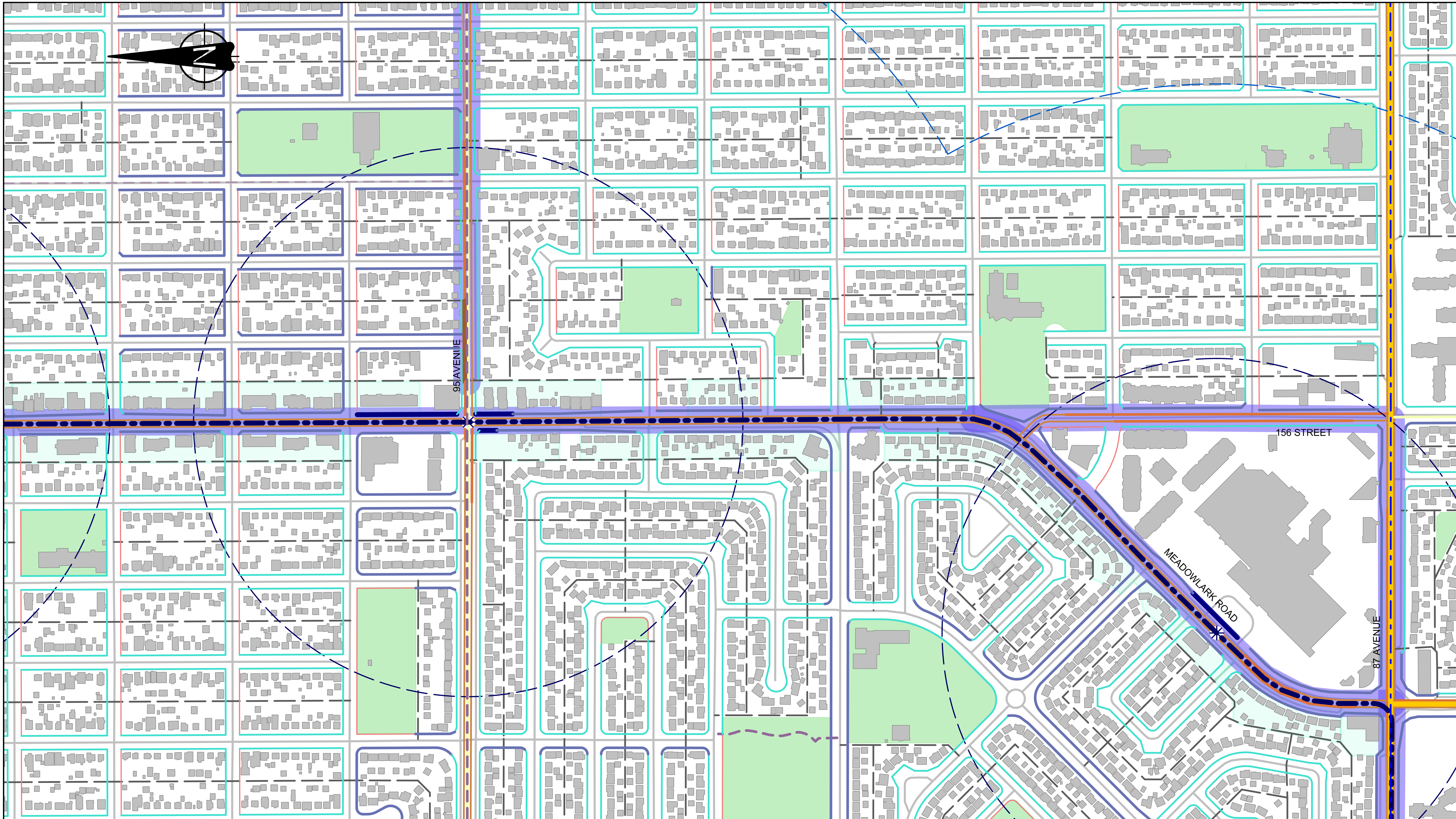


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FIGURE 4-25 156 STREET PRIORITY GROWTH AREA EXISTING ALL MODES CONDITIONS

4.3 University – Garneau

As the assessment focuses on existing conditions, and as there is no imminent approved capital investment by the City anticipated in this area, there were no future project considered in the assessment.

The Garneau neighbourhood completed renewal in 2023, with renewal of the neighbouring communities completed in 2021 for Strathcona, 2018 for McKernan, and 2017 for Queen Alexandria. As such, outside of the arterial roads which are renewed through a separate program, the existing pedestrian, cyclists, transit, and vehicle infrastructure within these communities is not anticipated to undergo any immediate further changes.

4.3.1 Pedestrians

As shown in **Figure 4-26**, the area is very well served by sidewalk infrastructure on both sides of the street. Sidewalks along local and collector streets tend to be separated, with widths of 1.5 to 1.8m, resulting in a score of "fair". Sidewalks along arterials tend to be monolithic, with those along some corridors falling into the "poor" rating, particularly along some stretches of 109 Street and Whyte Avenue west of 109 Street. The area does also have several locations with sidewalk widths assessed as "good". As noted in the Old Strathcona Public Realm Strategy, and other planning documents, and consideration should be given to reallocation of space to continue to enhance the pedestrian realm with future renewal and capital efforts.

4.3.2 Cyclists

As shown in **Figure 4-27**, cycling infrastructure in the Garneau area is extensive, consisting of a mix of shared roadways, shared pathway, and dedicated protected and separated facilities. The 83 Avenue and 110 Street bikeways provide the immediate backbone of the bike network in the area, with on-street and shared pathway facilities along portions of 112 Street, 84 Avenue, 85 Avenue, the CP Rail / Edmonton Radial Railway Street Car Line, Saskatchewan Drive, 88 Avenue, and into the River Valley (including along 109 Street and Walterdale Hill Road).

Together, these facilities provide a network of bike infrastructure generally within one block of any potential redevelopment.

4.3.3 Transit

As shown in **Figure 4-28**, the area is well served by transit, including both bus based and LRT service. The Capital Line/Metro Line runs through the University of Alberta to the west, putting the western half of the area within 800 metres of an LRT station. Future B1 and B2 BRT is also planned along Whyte Avenue and 109 Street, with potential connectivity to the University of Alberta along 87 Avenue. Concept planning for the routes has been initiated and will determine the exact routing and stop / station locations. Delivery timelines will be known once design work has been completed and funding for construction is allocated.

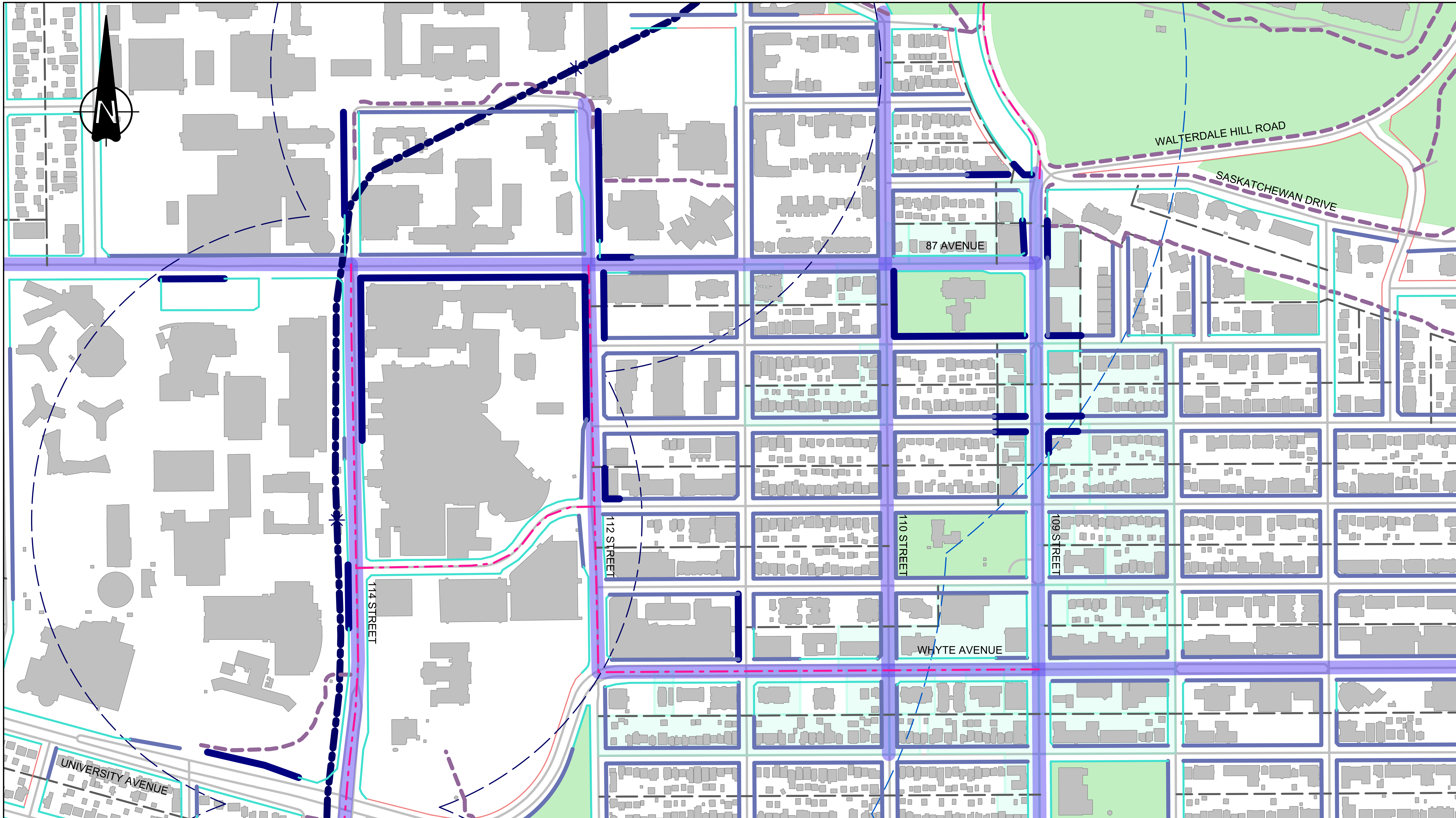
Existing LRT service is complimented with the availability of multiple bus routes along 109 Street, 112 Street, and Whyte Avenue, providing good connectivity through the area, and into downtown.

4.3.4 Vehicles

As shown in **Figure 4-29**, many of the arterial roadways within the PGA area experience medium to high congestion during peak hours. Because each intersection tends to experience higher volume during the PM peak hour, this was deemed to be a more suitable analogy for representing overall peak period congestion in these figures. AM peak period congestion, on the other hand, can reasonably be assumed to occur in the reserve direction. This is expected given the proximity to the downtown core as well as the University of Alberta, and associated employment and education centres, and is the focus of the network assessments discussed later in this report.

4.3.5 All Modes

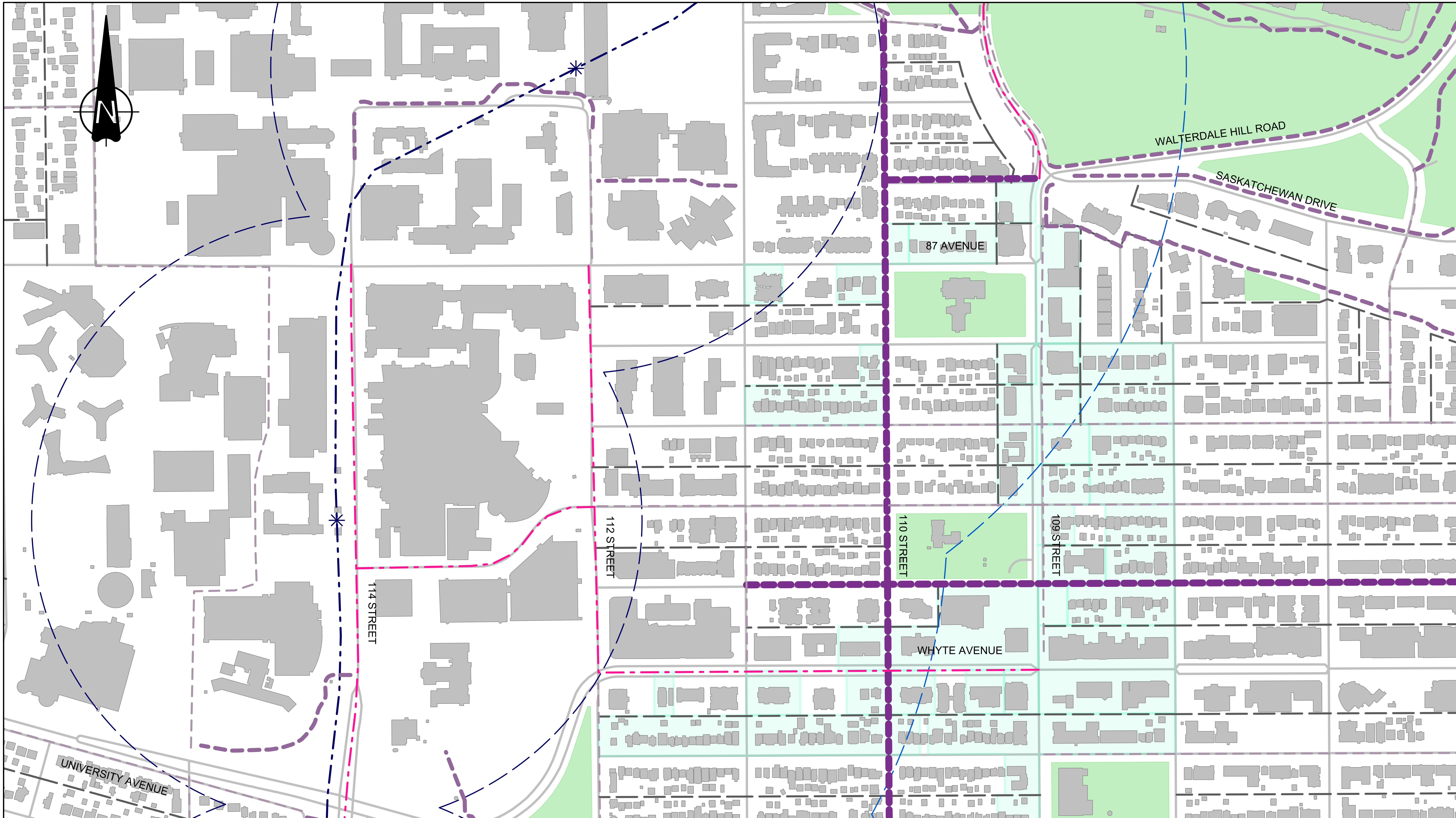
Figure 4-30 shows the combined results of the mobility network assessments for all of the modes listed above. When overlaid together, this highlights the overlapping importance of 109 Street and Whyte Avenue to pedestrians, transit, and vehicles, as well as the extensive cycling network that parallels these two corridors in the area.



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- PEDESTRIAN PRIORITY AREA (PER DISTRICT PLAN)
- TRANSIT ROUTE
- LRT / BRT CORRIDOR
- LRT STATION & 400m + 800m RADII
- SHARED PATHWAY
- SIDEWALK: POOR (<3.5m MONO OR <1.5m SEPARATE)
- SIDEWALK: FAIR (3.5m TO 4.5m MONO OR 1.5 to 1.8m SEPARATE)
- SIDEWALK: GOOD (>4.5m MONO OR >1.8 SEPARATE)
- SIDEWALK: NONE

FIGURE 4-26 GARNEAU PRIORITY GROWTH AREA EXISTING PEDESTRIAN CONDITIONS



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- TRANSIT ROUTE
- LRT / BRT CORRIDOR
- LRT STATION & 400m + 800m RADII
- BIKE: PROTECTED, SEPARATED
- BIKE: SHARED PATHWAY
- BIKE: SHARED ROADWAY OPERATIONS/PAINTED

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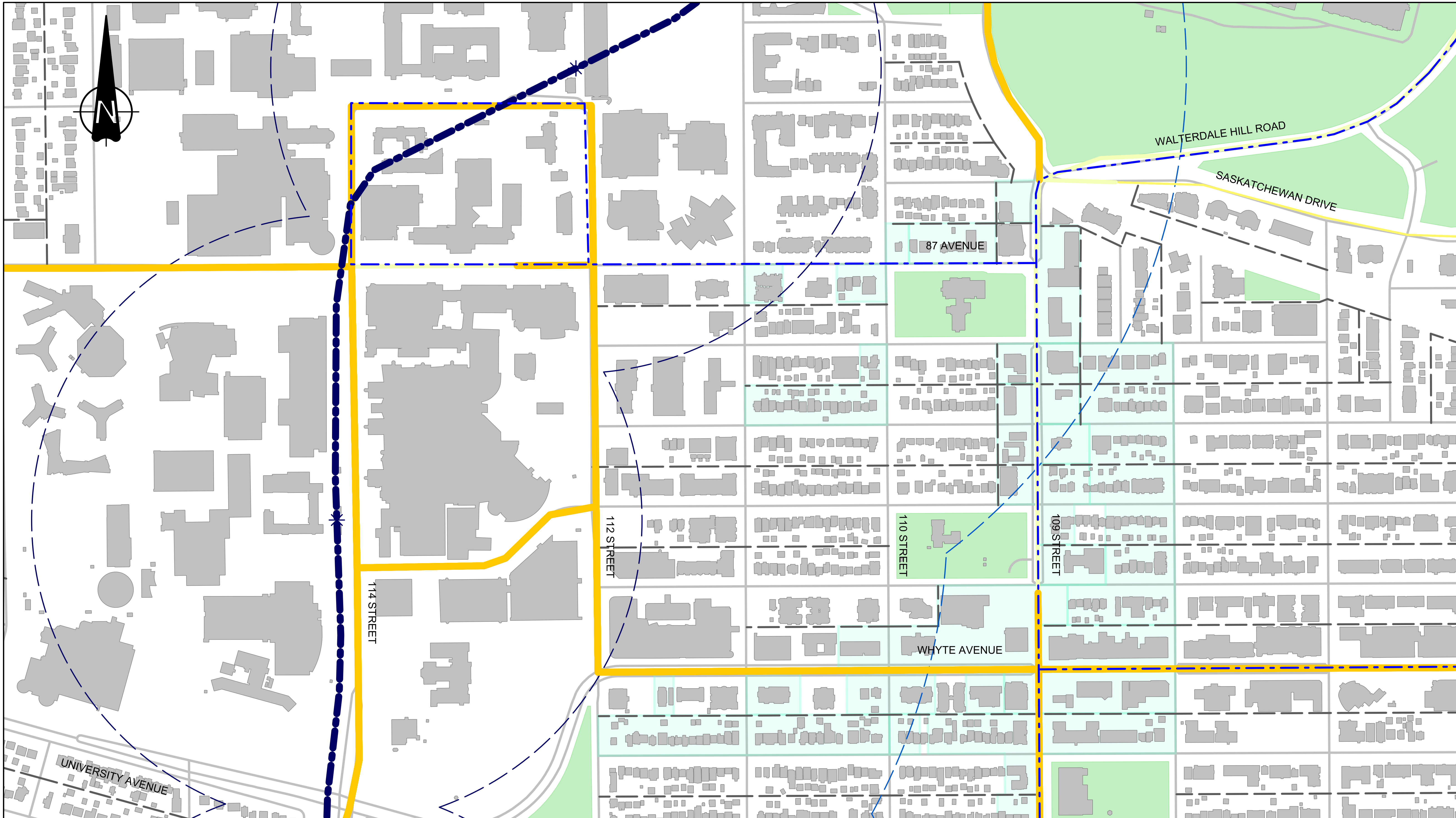
FIGURE 4-27 GARNEAU PRIORITY GROWTH AREA EXISTING CYCLING CONDITIONS



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LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- FUTURE BRT CORRIDOR
- LRT CORRIDOR
- LRT STATION & 400m + 800m RADII
- ETS: LOW FREQUENCY
- ETS: MEDIUM FREQUENCY
- ETS: HIGH FREQUENCY

FIGURE 4-28 GARNEAU PRIORITY GROWTH AREA EXISTING TRANSIT CONDITIONS

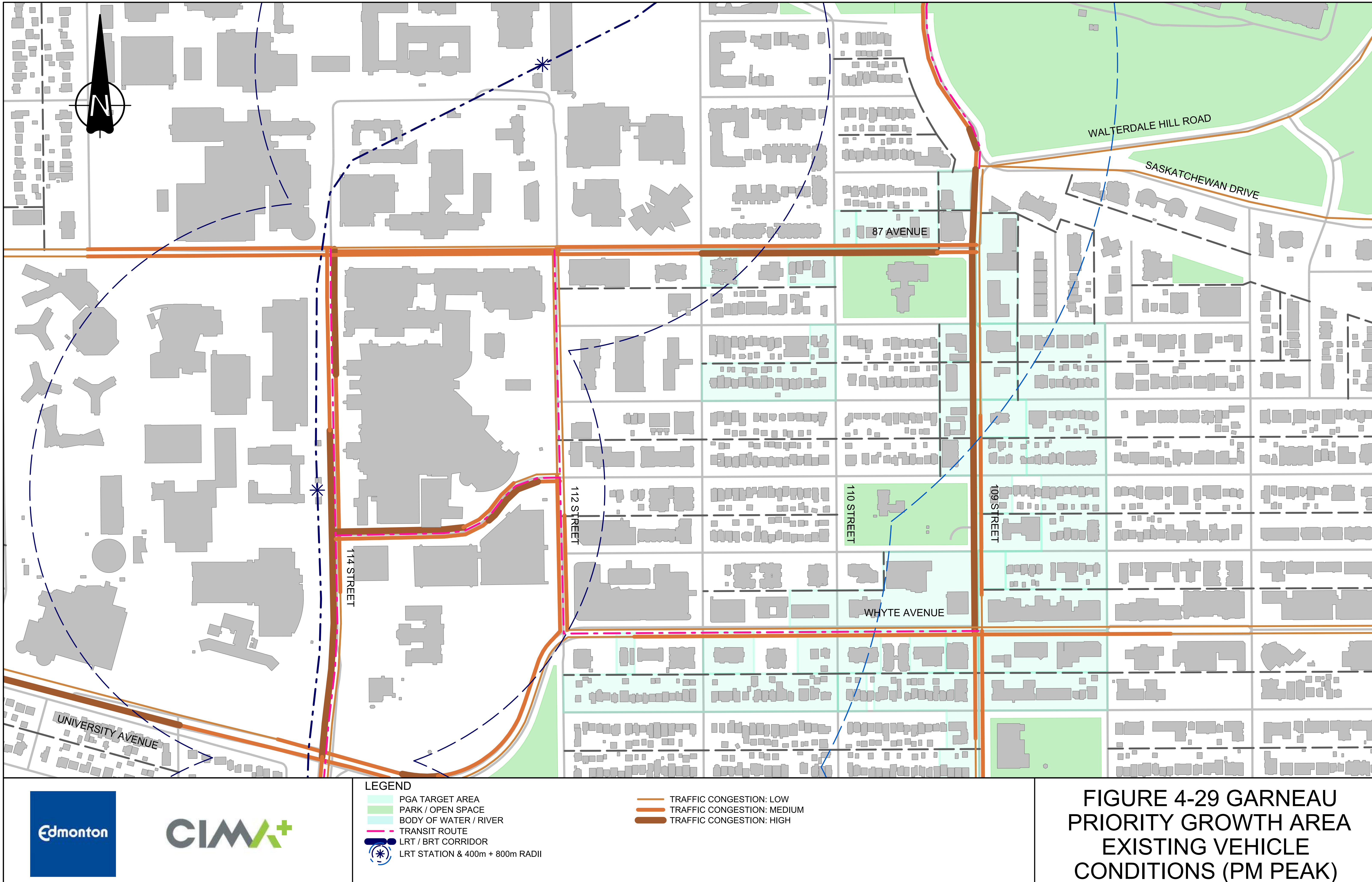
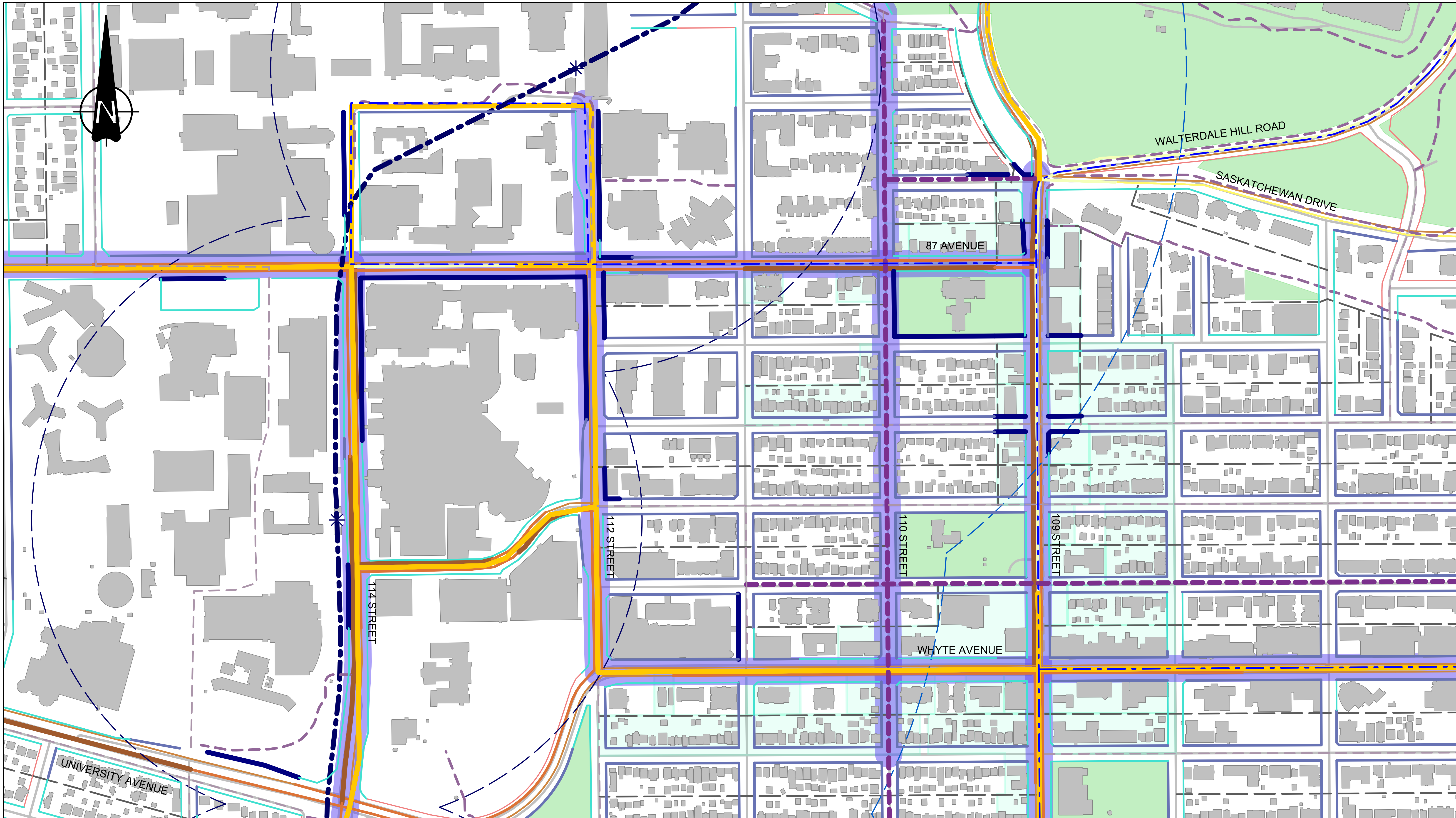


FIGURE 4-29 GARNEAU PRIORITY GROWTH AREA EXISTING VEHICLE CONDITIONS (PM PEAK)



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- PEDESTRIAN PRIORITY AREA (PER DISTRICT PLAN)
- LRT / BRT CORRIDOR
- TRAFFIC CONGESTION: LOW
- TRAFFIC CONGESTION: MEDIUM
- TRAFFIC CONGESTION: HIGH
- ETS: LOW FREQUENCY
- ETS: MEDIUM FREQUENCY
- ETS: HIGH FREQUENCY
- BIKE: PROTECTED, SEPARATED
- BIKE: SHARED PATHWAY
- BIKE: SHARED ROADWAY OPERATIONS/PAINTED
- SIDEWALK: POOR (<3.5m MONO OR <1.5m SEPARATE)
- SIDEWALK: FAIR (3.5m TO 4.5m MONO OR 1.5 to 1.8m SEPARATE)
- SIDEWALK: GOOD (>4.5m MONO OR >1.8 SEPARATE)
- SIDEWALK: NONE
- LRT STATION & 400m + 800m RADII

FIGURE 4-30 GARNEAU PRIORITY GROWTH AREA EXISTING ALL MODES CONDITIONS

4.4 Alleyways

As shown in the qualitative assessment figures, most parcels within all five PGA areas are served by both a front street and a rear alleyway. In many instances, future redevelopment will be required to take access to parking areas and waste collection from the alleyways, rather than the fronting street.

The condition of existing alleys varies throughout the PGA areas and includes gravel surfaced alleys, paved alleys, and fully hard surfaced alleyways, all typically set in a 6.0m right of way. Current City of Edmonton standards specify a 4.0m hard surfaced driving area for low density residential alleys (Figure 4-31, Standard Drawing 2040) and a 6.0m hard surfaced driving area, with a thicker pavement structure, for higher density residential and commercial alleys (Figure 4-32, Standard Drawing 2041). Both alley types require one vehicle to yield to another, oncoming vehicle.

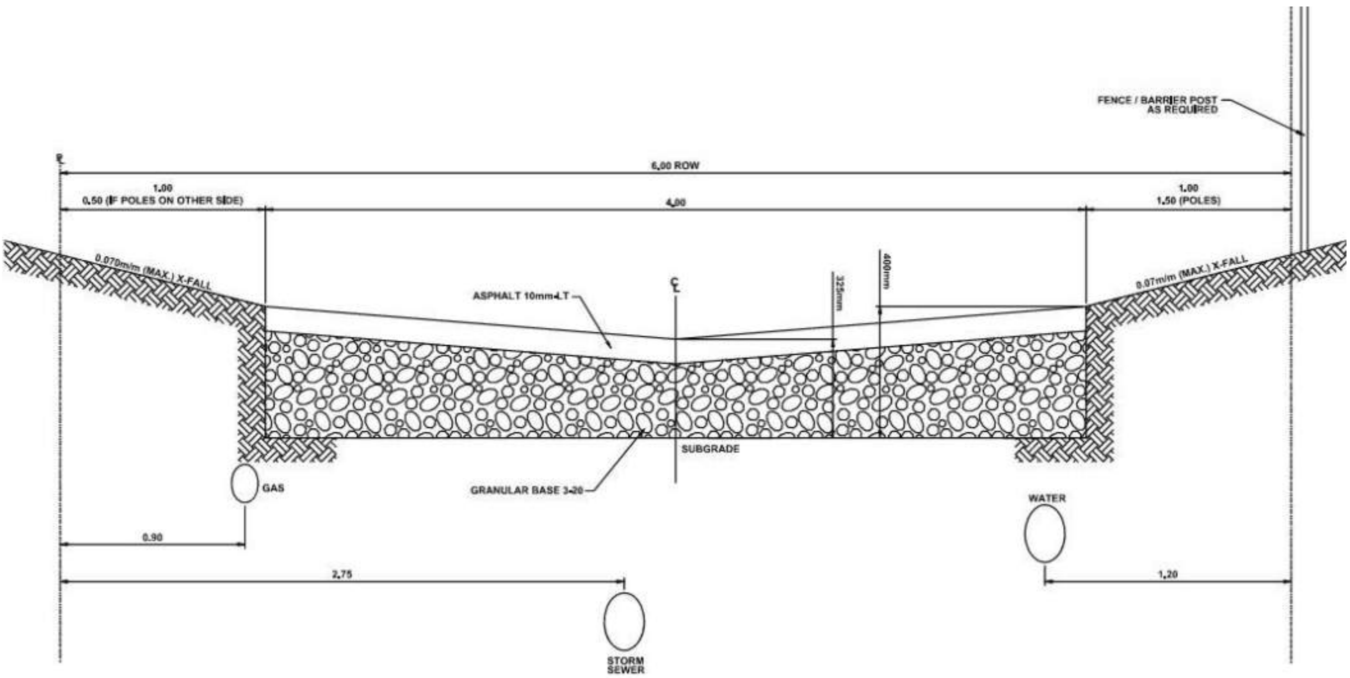


Figure 4-31 Typical City of Edmonton Residential Alley – Standard Drawing 2040

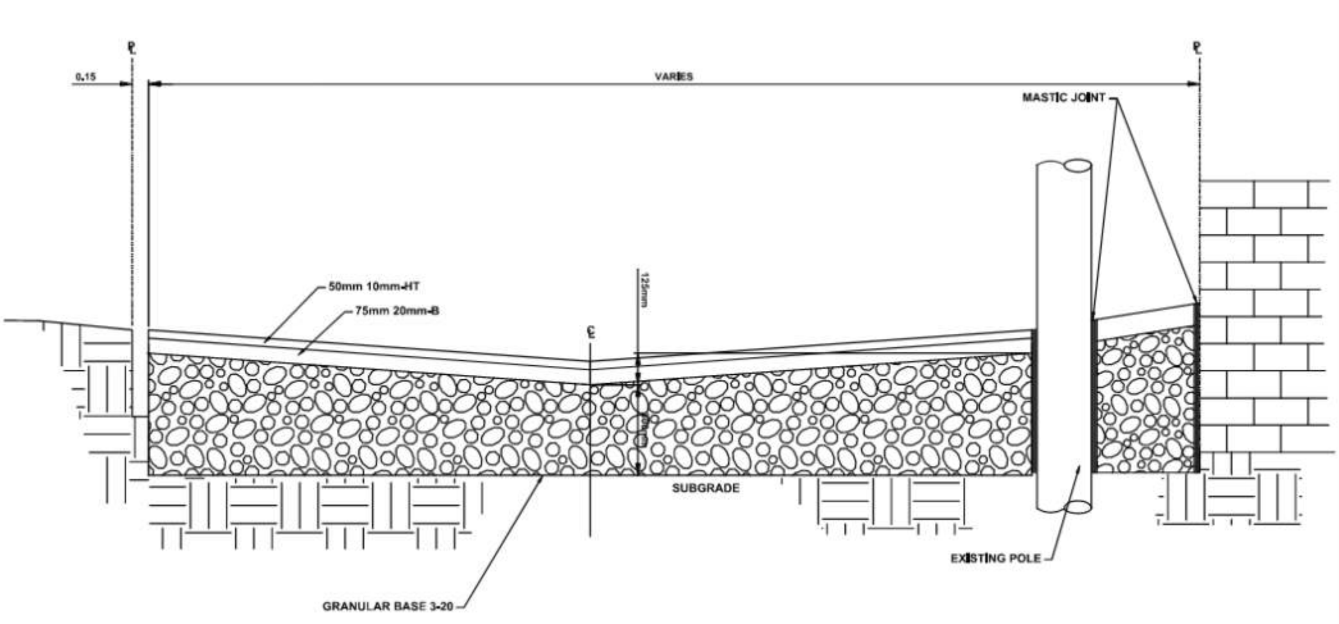


Figure 4-32 Typical City of Edmonton Commercial Alley – Standard Drawing 2041

Generally accepted typical volumes for alleyways are lower in residential alleys and higher for commercial alleys (which are also utilized for higher density residential developments), which is reflected in the width and pavement structure for typical residential and commercial alley standards. Increasing densification combined with rear alley access can result in increasing traffic volumes which may necessitate upgrades.

The potential increase in traffic volumes along the rear alleys can be mitigated by upgrading existing gravel and paved residential alleys to a commercial alley standard, both in width and pavement structure, combined with:

- Alleys can be converted to one-way operations to remove the conflict of vehicles travelling in opposing directions. However, enforcement of this conversion can often be difficult.
- Developments can be required to provide additional setbacks from the rear property line to any building envelopes or parking areas to provide additional passing space for oncoming vehicles.
- Along local streets, access to parkades and parking areas can be provided from the front street rather than the alley.

In addition to the above measures, existing alleys may require upgraded pavement structures to accommodate higher vehicle volumes and loading.

Depending on the scope of the changes, alley upgrades could potentially be pursued through the City's Alley Renewal Program in areas such as Business Improvement Districts.

4.5 Summary of Qualitative Analysis

The qualitative analysis provides the basis for the existing conditions considered in the post-development mobility assessment. In many cases, gaps identified from the qualitative analysis became the basis for recommendations made to improve the corridors and intersections within each PGA, tying into the MMLOS assessment process for each mode. While the roadway and transit mobility networks are fairly robust, the qualitative analysis provided an initial identification of locations where congestion should be anticipated in the traditional LOS analysis. The mobility network for pedestrians and active modes users, on the other hand, experiences more pronounced gaps, such as missing sidewalk connections or absent cycling corridors, which prohibit ease of movement. Filling these gaps become the baseline for improvements to the mobility network.

5. Post-Development Mobility Assessment

The post development mobility assessment is based on forecast travel demand following re-zoning and development in the Priority Growth Areas, initially without changes to the existing road network. This scenario is referred to as "Post Development without Improvements". Exceptions to this include the completion of the Valley Line West LRT expansion and Imagine Jasper Avenue Phase 2, along with the installation of all active transportation network improvements planned in the 2025 and 2026 budget. Each intersection within the PGA was analyzed in PTV Vistro using HCM 7th Edition methodology, then assessed in terms of their MMLOS for each mode using the OTC MMLOS toolkit.

Following this, each corridor and intersection was reassessed following the development of recommendations (referred to as "Post Development with Improvements") designed to achieve the minimum MMLOS targets based on the assigned OTC road classification as adapted to match Edmonton street classifications. Recommendations include but are not limited to:

- Alterations to the intersection approach cross sections (including addition or removal of travel lanes and adjustment of turning radii),
- Allocation of transit-only travel lanes and addition of transit-signal-priority (TSP),
- Recommendations for enhanced pedestrian measures such as audible crossing signals, tactile surface warning indicators (TWSIs), wider curb ramps, curb extensions, exclusive pedestrian phases, and leading pedestrian intervals (LPIs),
- Recommendations for improved cycling infrastructure,
- Banning of Right-Turn-on-Red (RTOR) movements for vehicles, and
- Changes to signal phases including cycle length, split time, and restrictions (i.e. protected-only vs. protected-permitted left turn phases).

Many of the recommendations listed in the following tables have already been identified by the City through long range planning exercises (i.e. the bike network) while others will require additional analysis and engagement with the community (i.e. potential reconfiguration of Stony Plain Road from 156 Street to 163 Street). This report provides additional justification to invest in these long-range plans or begin additional analysis where needed. These recommendations are not required to be implemented immediately but should be in place to support the full build-out of each PGA as it redevelops. Some of these recommendations may even be best implemented by developers as individual properties undergo construction.

Throughout the corridor and intersection mobility assessment, three icons have been used to represent operations and experiences at a glance:

MMLOS operations that meet or exceed appropriate thresholds are represented by a green checkmark.

A warning sign indicates that MMLOS standards are not consistently met throughout the day (time of day parking / bus lanes) or where infrastructure is not expected to meet MMLOS standards (most commonly where the bike network parallels the analysis corridor).

MMLOS operations that fall below acceptable thresholds are represented by a red cross.

Detailed design and construction on the Valley Line West corridor is in progress through the P3 contract with Marigold Infrastructure Partners. The analysis completed for this assessment along the Valley Line corridor is based on preliminary signal timings along with the lane geometry and cross-section elements provided in Summery 2024 "Look Book" concept drawings, which is sufficient for the analysis completed.

The purpose of this study has been to identify the overall multi-modal impacts as a result of the PGA rezoning and redevelopment. The traffic analysis completed is not intended to be a detailed operational analysis of the intersections along the Valley Line LRT and such a study would require final designs and operational signal timing plans. While multi-modal performance at study intersections along the Valley Line corridor are subject to minor changes to the final design, these are not expected to impact the study findings from the multi-modal quantitative assessment. Any major design changes would require further study to understand any impacts.

To incorporate additional delays induced by the Valley Line LRT (and Capital Line at 114 Street and 82/University Avenue) operations on vehicular traffic, the default flow saturation rate was adjusted from 1900 vehicles/hour to 1750 vehicles/hour for each vehicle movement conflicting with the at-grade LRT crossings. This change simulates the additional delays arising from the LRT signal priority during the pre-emptive signal phase.

5.1 124 Street / Wîhkwêntôwin

Each intersection within the 124 Street / Wîhkwêntôwin PGA was assessed in PTV Vistro using HCM 7th Edition, then exported into the OTC MMLOS toolkit to better weigh the operations and experiences of vehicle delay against all multimodal travel. Detailed HCM LOS and MMLOS tables for each intersection are included in **Appendices A** through **F.** These tables outline the HCM LOS and MMLOS results of both pre-development operations and post-development forecast operations, with the post-development forecast consisting of two scenarios: 1) Post-Development without Improvements and 2) Post Development with Improvements.

An overview of the AM and PM peak period MMLOS comparison of pre-development operations to post-development forecast operations (without improvements) are illustrated in **Figure 5-1** and **Figure 5-2**, while the operational results are presented in **Figure 5-3** and **Figure 5-4**.

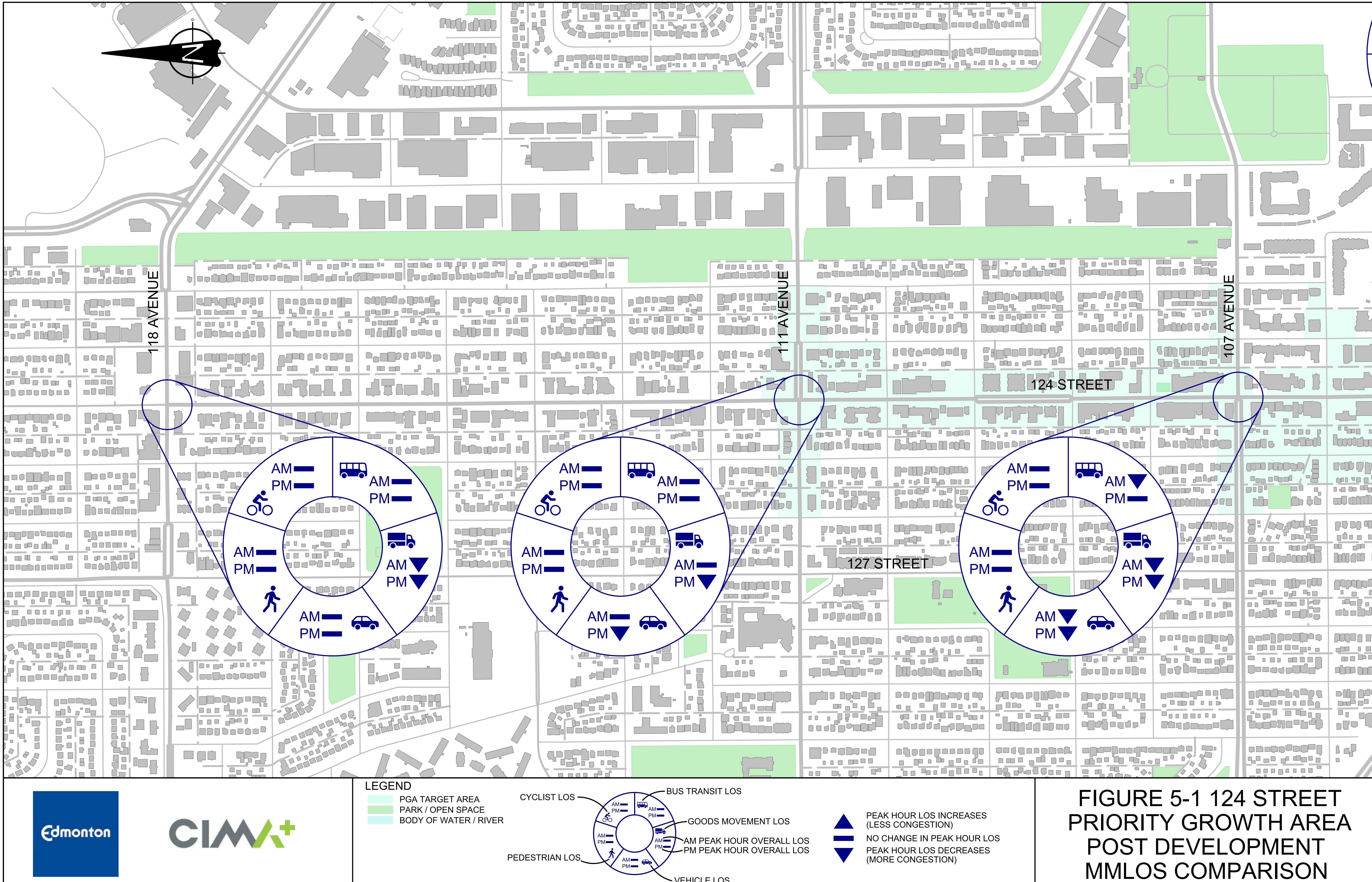


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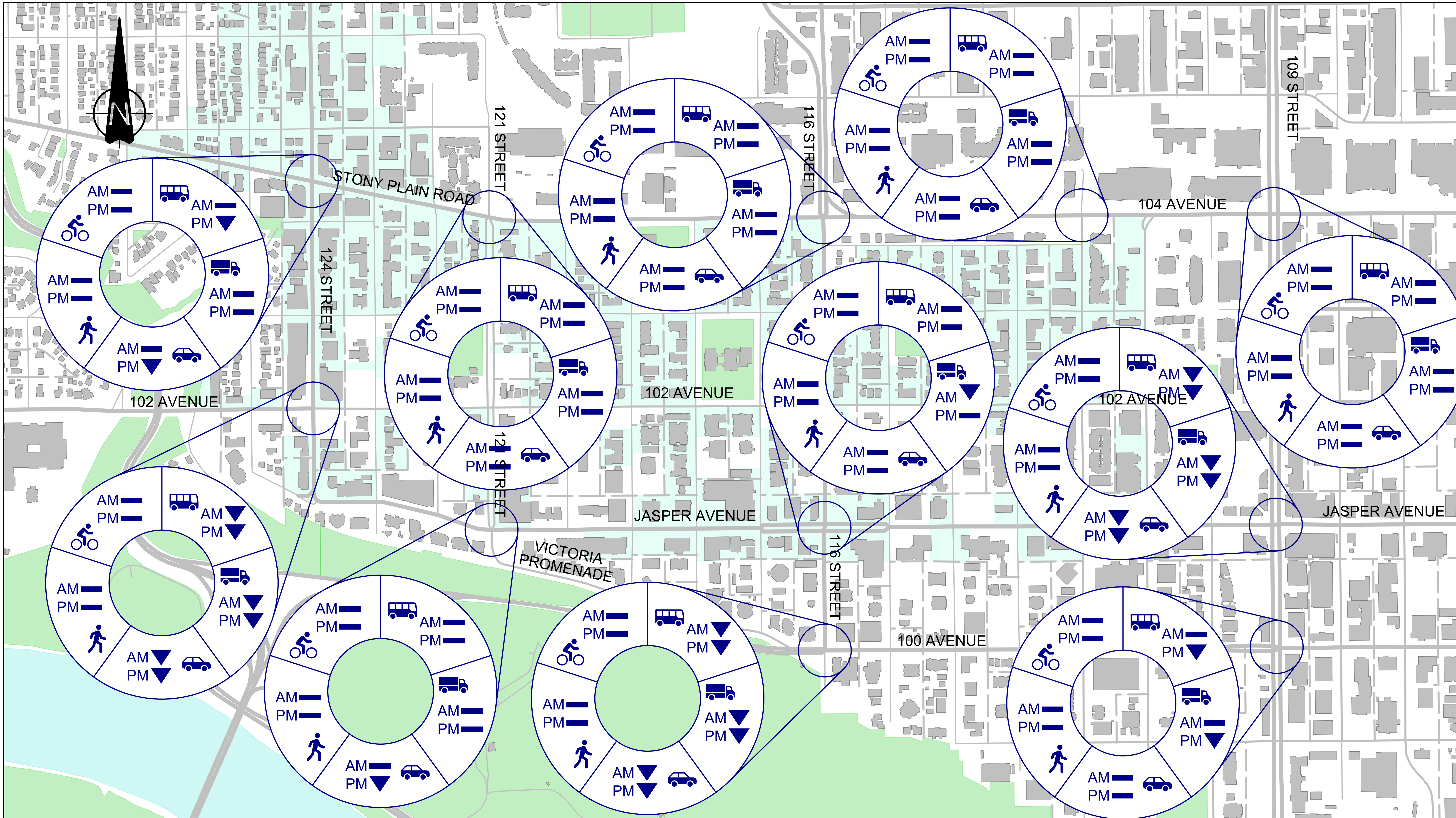
FIGURE 5-1 124 STREET PRIORITY GROWTH AREA POST DEVELOPMENT MMLOS COMPARISON



LEGEND

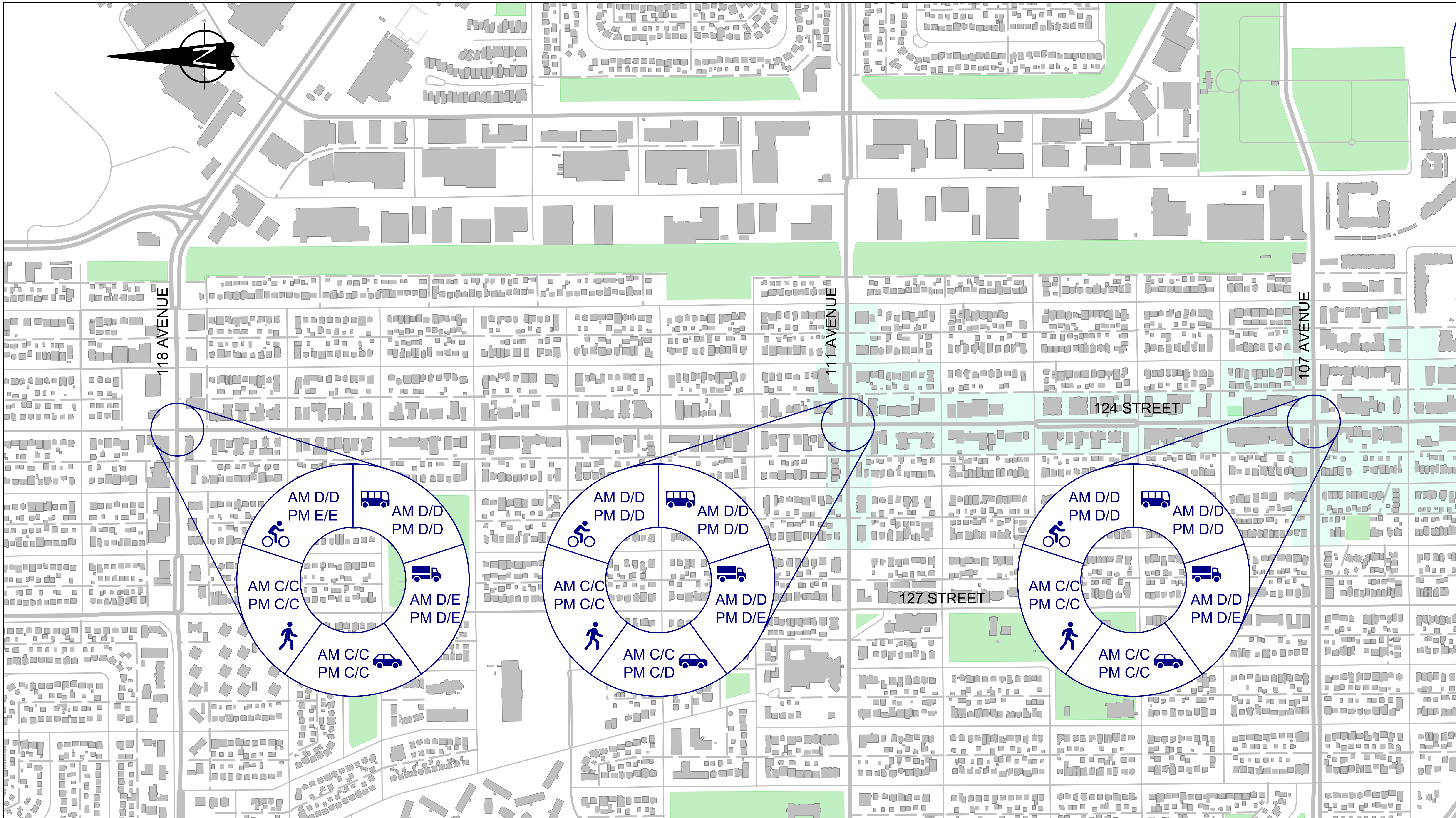
PGA TARGET AREA
PARK / OPEN SPACE
BODY OF WATER / RIVER

NOTE:
Detailed design on the Valley Line West corridor is in progress through the P3 contract with Marigold Infrastructure Partners. The analysis completed for this study along the Valley Line corridor is based on "Summer 2024 Look Book" drawings and preliminary signal timings. Multi-modal performance at study intersections along the Valley Line corridor are subject to changes to the design, with any major design chagnse requiring further study to understand any impacts.

CYCLIST LOS
BUS TRANSIT LOS
GOODS MOVEMENT LOS
AM PEAK HOUR OVERALL LOS
PM PEAK HOUR OVERALL LOS
PEDESTRIAN LOS
VEHICLE LOS

▲ PEAK HOUR LOS INCREASES (LESS CONGESTION)
▬ NO CHANGE IN PEAK HOUR LOS
▼ PEAK HOUR LOS DECREASES (MORE CONGESTION)

FIGURE 5-2 WîHKWêNTôWIN PRIORITY GROWTH AREA POST DEVELOPMENT MMLOS COMPARISON



Edmonton

CIMA+

LEGEND

PGA TARGET AREA
PARK / OPEN SPACE
BODY OF WATER / RIVER

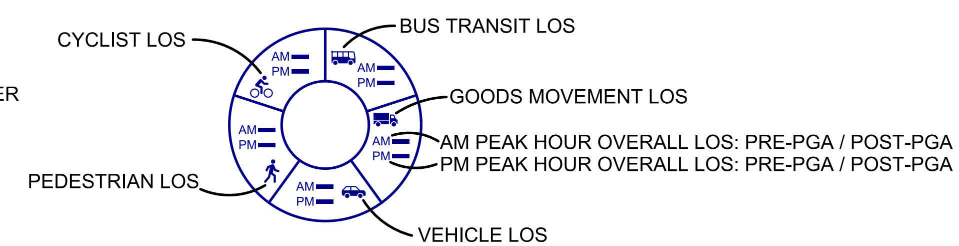
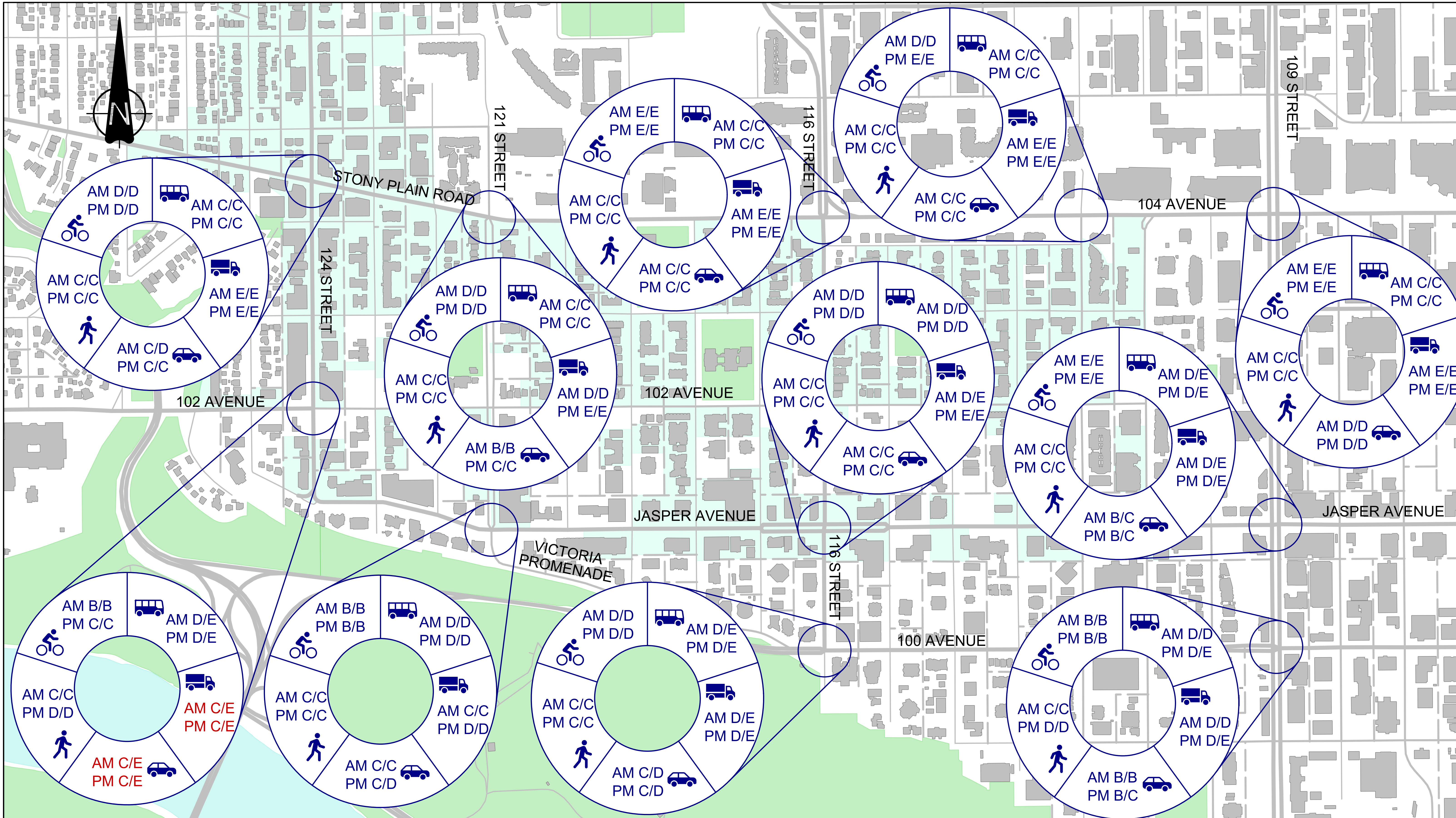


FIGURE 5-3 124 STREET PRIORITY GROWTH AREA POST DEVELOPMENT MMLOS RESULTS



LEGEND

PGA TARGET AREA

PARK / OPEN SPACE

BODY OF WATER / RIVER

NOTE:
Detailed design on the Valley Line West corridor is in progress through the P3 contract with Marigold Infrastructure Partners. The analysis completed for this study along the Valley Line corridor is based on "Summer 2024 Look Book" drawings and preliminary signal timings. Multi-modal performance at study intersections along the Valley Line corridor are subject to changes to the design, with any major design chagnse requiring further study to understand any impacts.

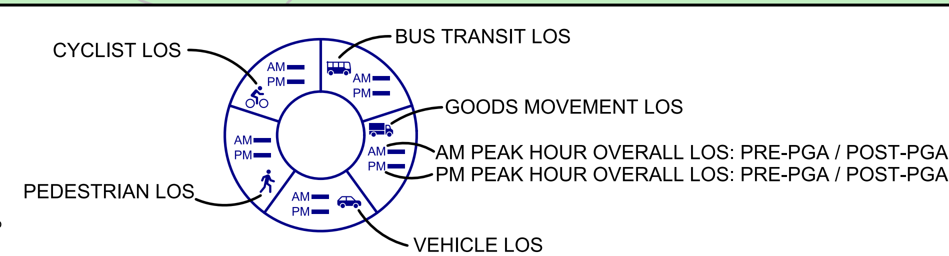


FIGURE 5-4 WîHKWêNTôWIN PRIORITY GROWTH AREA POST DEVELOPMENT MMLOS RESULTS

5.1.1 Recommended Mobility Assessment

A summary of the recommended qualitative and quantitative improvements is provided in **Figure 5-5** and **Figure 5-6**.

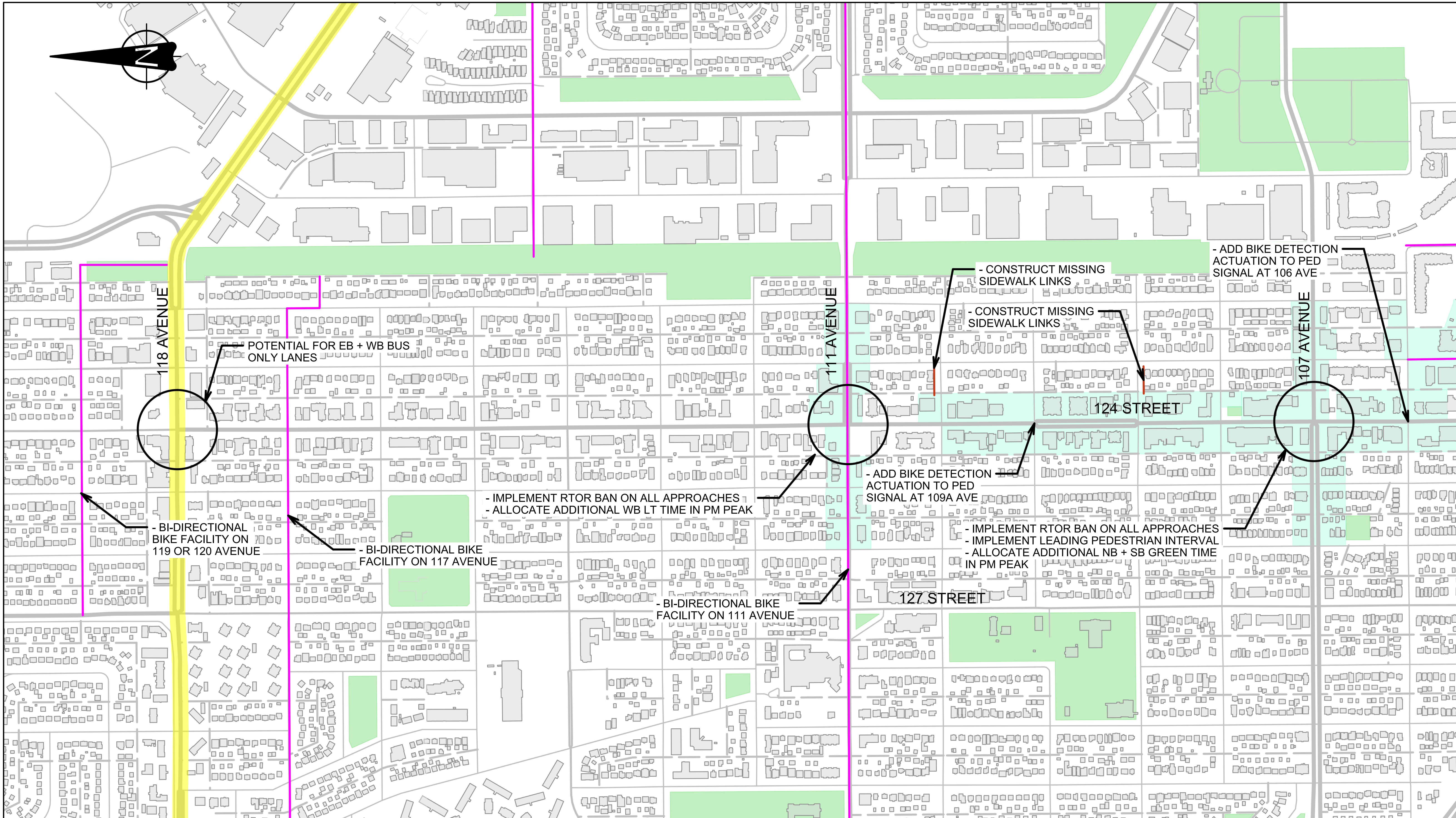
5.1.2 Qualitative Assessment

A review of missing pedestrian and cyclist facilities within the PGA was completed, identifying several missing links, ranging from short blocks to longer corridors, as shown in **Figure 5-5** and **Figure 5-6**.

5.1.3 Quantitative Assessments

Each intersection within the 124 Street / Wîhkwêntôwin PGA was assessed in terms of their MMLOS for each mode using the OTC MMLOS toolkit. Recommended changes requiring adjustments to the signal timings or lane configuration were analyzed for each intersection in PTV Vistro using HCM 7th Edition, with the resulting data on vehicle delay being exported into updated HCM LOS tables. The results of this analysis fed back into the MMLOS toolkit to calculate the final LOS for each mode. Detailed HCM LOS and MMLOS tables are included in **Appendices A through F**.

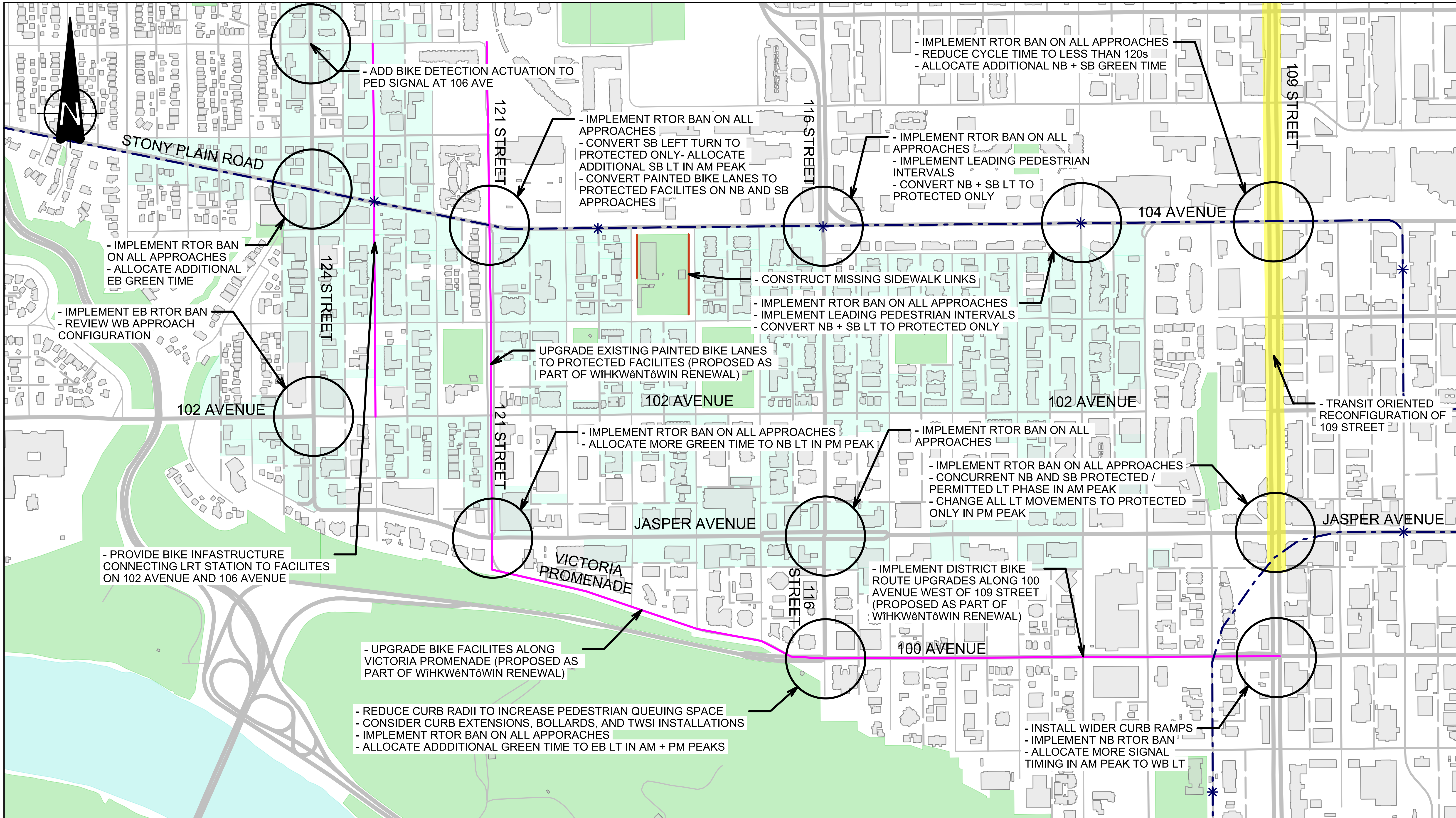
An overview of the AM and PM peak period MMLOS results comparing pre-development operations to post-development forecast operations without improvements illustrated in **Figure 5-3** and **Figure 5-4.**



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- MISSING SIDEWALK / ACTIVE MODES LINK
- MISSING CYCLING CONNECTION

FIGURE 5-5 124 STREET PRIORITY GROWTH AREA POTENTIAL IMPROVEMENTS



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- LRT ALIGNMENT
- LRT STATION
- MISSING SIDEWALK
- MISSING CYCLING CONNECTION
- CORRIDOR UPGRADES REQUIRING FURTHER STUDY

NOTE:
Detailed design on the Valley Line West corridor is in progress through the P3 contract with Marigold Infrastructure Partners. The analysis completed for this study along the Valley Line corridor is based on "Summer 2024 Look Book" drawings and preliminary signal timings. Multi-modal performance at study intersections along the Valley Line corridor are subject to changes to the design, with any major design chagnse requiring further study to understand any impacts.

FIGURE 5-6 WîHKWêNTôWIN PRIORITY GROWTH AREA POTENTIAL IMPROVEMENTS

5.1.3.1 109 Street Corridor

109 Street is a street oriented mixed-use / commercial arterial road. It is a pedestrian priority area from Jasper Avenue to 103 Avenue and supports a variety of transit uses.

109 Street is comprised of a 7-lane vehicle cross section, flanked by sidewalk. The curb lane is used for time-of-day parking, transit stops, loading zones, and the occasional patio extension. Parking is prohibited in both directions on weekdays during peak periods. The cross-section elements are illustrated in **Figure 5-7** through **Figure 5-9**.

Figure 5-7 109 Street Facing North (South of 100 Avenue)

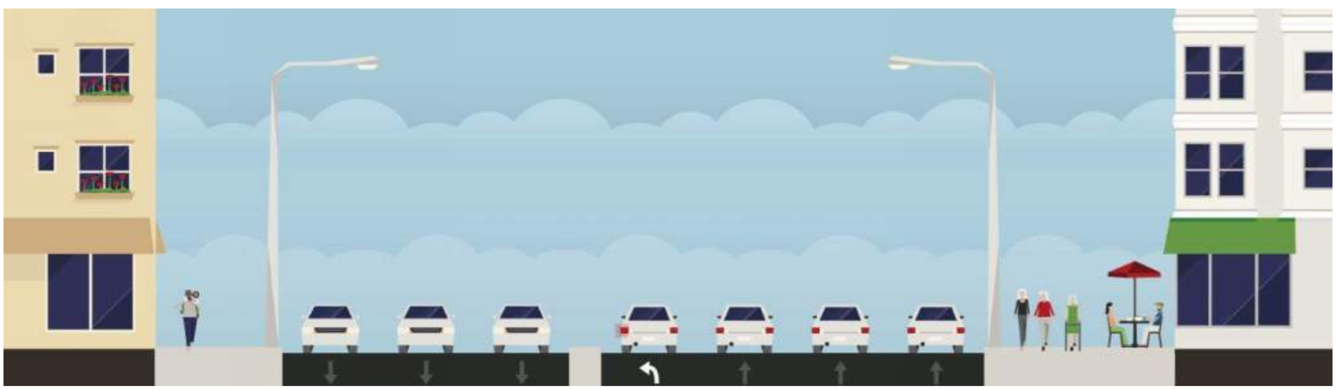


Figure 5-8 109 Street Facing North (South of Jasper Avenue)

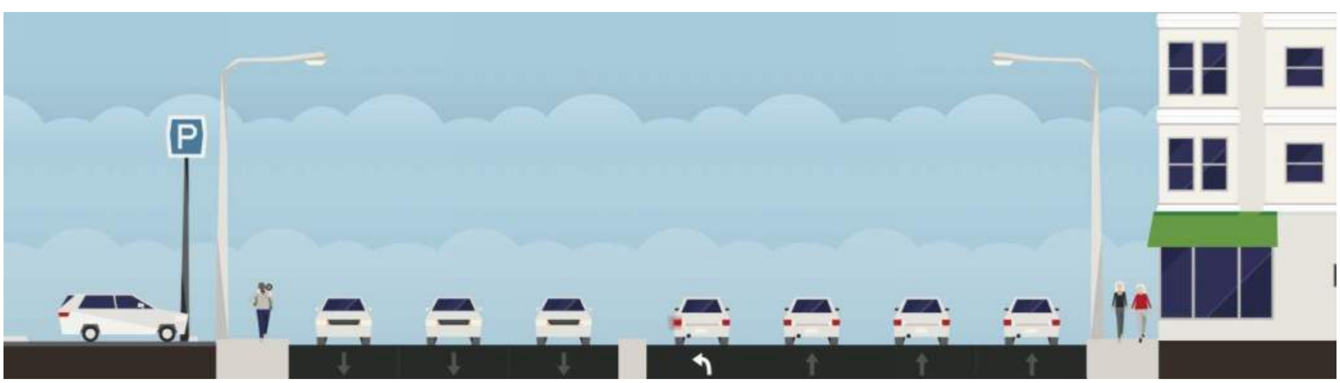


Figure 5-9 109 Street Facing North (South of 104 Avenue)

At a corridor level, pedestrian needs are not being met within the space allocated to them, spiling over into transit experiences. This may be addressed in a sliding scale of treatments:

- Option 1 – Remove one lane of traffic and shift the centreline to provide a bare minimum pedestrian buffer and furnishing zones. Vehicle and transit operations deteriorate slightly.
- Option 2 – Remove two traffic lanes to provide ample pedestrian buffer, furnishing zone, and parking bays. Implement time-of-day variable lane designation (similar to 97 Street NW) and left turn restrictions to mitigate reduced road capacity.
- Option 3 – Remove four traffic lanes to provide dedicated transit lanes and ample pedestrian buffer, furnishing zone, and parking bays, illustrated in **Figure 5-10**. The centre left turn lane could be maintained in this option. While this option significantly reduces the space allocated to private vehicles, it increases the theoretical capacity of the roadway from 4,400 – 12,000 vph to 9,200 – 19,200 vph[8].
  - Option 3.1 – Based on the recommendations made in the 2022 Infill Roadmap report, the centre left turn lane could be removed and bike lanes could be added to the corridor, through parallel facilities exist to the west along the High Level Bridge Street Car corridor and Railtown Park.

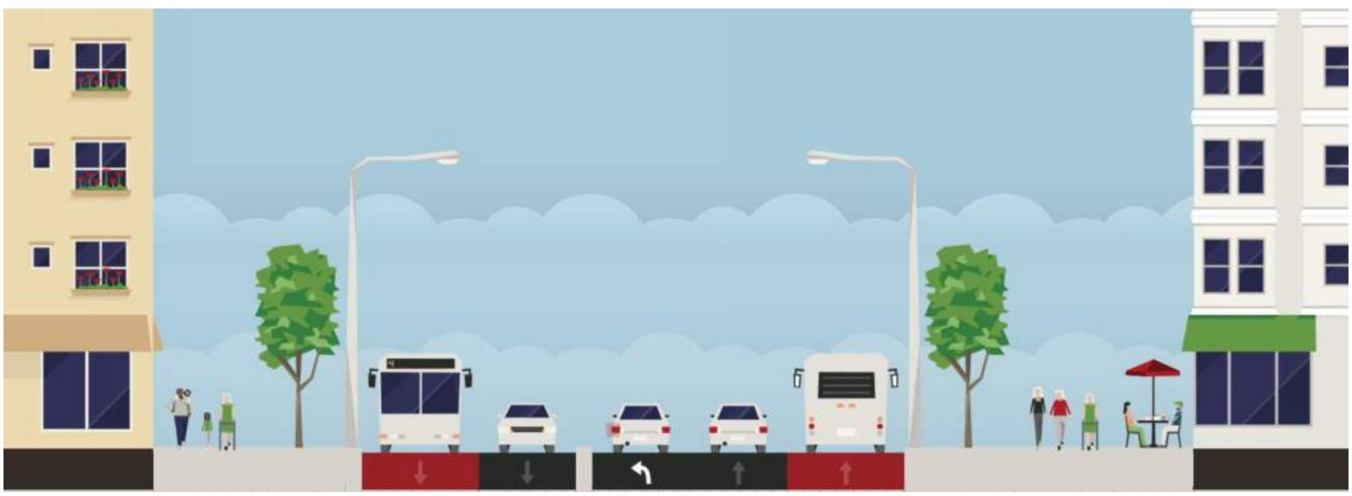


Figure 5-10 Potential 109 Street (Wîhkwêntôwin) Corridor Facing North (Jasper Avenue to 105 Avenue / Beyond)

At a high level, Option 3 would be preferable. Further study and engagement are required to confirm the long -term vision for this corridor, and as such these changes may not be possible before the post-development population horizon.

[8] National Association of City Transportation Officials (NACTO) "Transit Street Design Guide"

Expected multimodal operations at the corridor level are summarized in **Table 5.1** based on Option 3; however, individual intersection assessments in the following sections capture smaller changes that can be implemented in the meantime. Detailed MMLOS tables which analyze each corridor under existing and recommended conditions are found in **Appendix G** and **Appendix H**, respectively.

Table 5.1 MMLOS 109 Street from 99 Avenue to 104 Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS C	LOS C	LOS D
Post-Development without Improvements Corridor Performance	✗	n/a	✗	✓
Post-Development with Improvements Corridor Performance	✓	n/a	✓	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the corridor encompassing a Pedestrian Priority Area. • Transit: Target LOS adjusted from D to C due to future transit routes (110X RapidBus) and various existing bus routes along portions of the corridor. At a corridor level, pedestrian MMLOS is predominantly affected by limited buffer width (furnishing zone, parking, or bike lanes). Pedestrian LOS is acceptable in off-peak periods when curb lanes are used for parking. The outer-most curb lane may be reallocated to the pedestrian realm to provide consistent buffers and furnishing zones. Cycling facilities are not expected on 109 Street. North/south cycling demand must be met through the shared use path between 109 and 110 Street and protected bi-directional bike lane on 106 Street, one block to the west and three blocks to the east respectively. At a corridor level, transit MMLOS is predominately affected by the low presence of passenger amenities. Most transit stops on 109 Street are not accompanied by shelter or seating; shade is provided by building height rather than vegetation. Enhanced transit passenger amenities and an improved pedestrian realm result in a passing transit MMLOS.			

5.1.3.1.1 109 Street and 100 Avenue

The intersection of 109 Street and 100 Avenue is fully signalized. 100 Avenue is a pedestrian priority area and part of the cycling network. There is no on-street transit at this location; however, both the Capital and Metro LRT lines run underground, parallel to 109 Street, with a station one block south and west.

Figure 5-11 109 Street and 100 Avenue

West of the intersection, 100 Avenue is comprised of a 3-lane vehicle cross section flanked by sidewalk. A bi-directional bike lane on the north side of the street ties into the shared use path that runs between 109 and 110 Avenue. East of the intersection, 100 Avenue is comprised of a protected bi-directional bike lane and a 4-lane vehicle cross section, flanked by sidewalk. Parking is not permitted on 100 Avenue. The cross-section elements are illustrated in **Figure 5-12**.

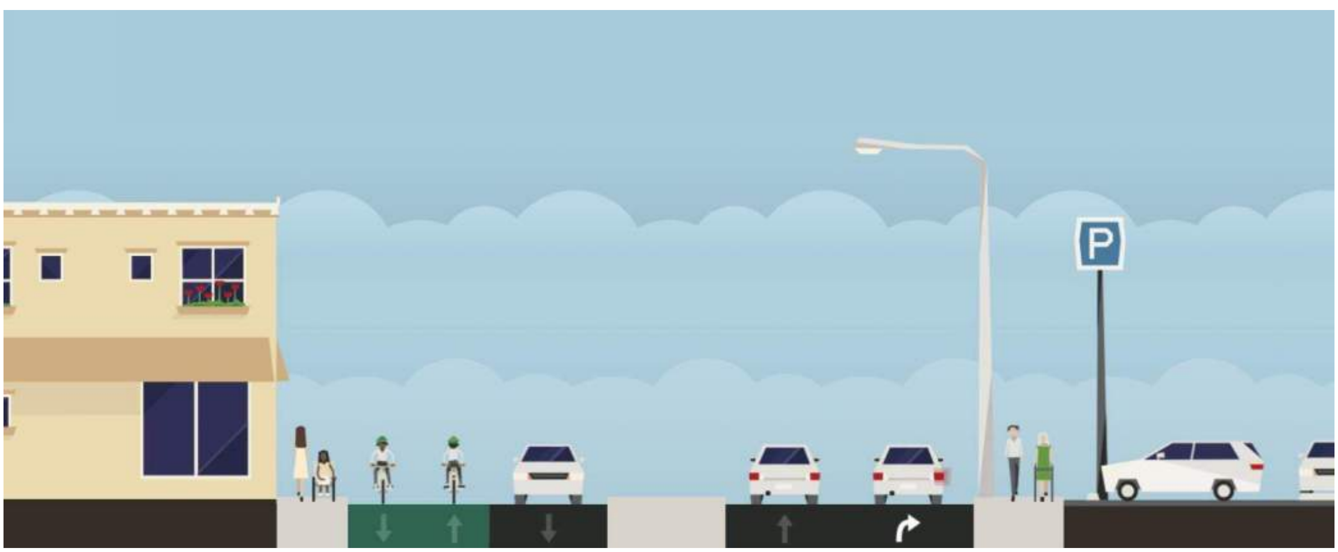


Figure 5-12 100 Avenue Facing East

Expected multimodal operations following rezoning and development are summarized in **Table 5.2**, comparing MMLOS outcomes with and without recommended changes to the road network. Being located within a pedestrian priority area and along an existing cycling corridor, some changes are necessary to bring the pedestrian LOS within accepted targets.

Table 5.2 MMLOS 109 Street and 100 Avenue

<table>
<tr><th>Mode</th><th>Pedestrian</th><th>Cyclist</th><th>Transit</th><th>Motor Vehicles</th></tr>
<tr><td>Original Target</td><td>LOS C</td><td>LOS C</td><td>LOS D</td><td>LOS D</td></tr>
<tr><td>Adjusted Target</td><td>LOS B</td><td>LOS B</td><td>LOS D</td><td>LOS D</td></tr>
<tr><td>Post-Development without Improvements Intersection Performance</td><td>✗</td><td>✓</td><td>n/a</td><td>✓</td></tr>
<tr><td>Notes</td><td colspan="4">Pedestrian LOS is largely affected by long cycle lengths and a lack of enhanced pedestrian measures. The existing curb ramps at this intersection do not meet the City’s Complete Streets Design and Construction Standards.
The target LOS was adjusted for the following modes:
• Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area.
• Cyclists: Target LOS adjusted from C to B due to the intersection being situated along the 100 Avenue Cycling Corridor (On-Street protected bike lane).
There is currently no transit service through this intersection.</td></tr>
<tr><td>Post-Development with Improvements Intersection Performance</td><td>✓</td><td>✓</td><td>n/a</td><td>✓</td></tr>
<tr><td>Recommended Treatment</td><td colspan="4">Pedestrian MMLOS may be addressed by:
• Installing wider curb ramps with bi-directional grooves as the current ramps are not wide enough to directly align with the pedestrian crossing.
• Installing an audible pedestrian crossing with call buttons similar to other intersections in the area.
• Restricting RTOR movements for northbound traffic, reducing the number of uncontrolled pedestrians-vehicles conflicts.
No specific changes are required to address cyclist MMLOS.
No specific changes are required to address transit MMLOS.
Declining vehicle MMLOS may be mitigated by:
• AM peak period: allocate more green time to westbound left turning vehicles.
• PM peak period: no signal timing changes are required.</td></tr>
</table>

Under current traffic volumes, the intersection performs quite well with an HCM LOS of C for both peak periods. Using forecasted volumes under the Post-Development Without Improvements scenario, the LOS of the westbound left movement drops to LOS F in the AM peak period due to an increase in eastbound through traffic. In the PM peak period, a similar drop to LOS F is also shown for the westbound through movement due an increase in expected volume and the addition a protected phase for westbound left movements. However, the increase in total intersection delay under both peak periods is maintained at six (6) seconds.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.3** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.3 Traditional LOS 109 Street and 100 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	N/A	1006	65	97	1763	96	N/A	551	226	69	234	68	
	v/c Ratio		0.53	0.53	0.63	0.71	0.72		0.99	0.48	0.96	0.42	0.48	0.777
	LOS		C	C	E	B	C		E	C	F	C	D	C
	Delay (s)		23.1	24.6	61.2	18.7	21.1		66.1	27.0	89.8	26.6	53.4	30.12
	95th % Queue (m)		79.2	82.0	41.9	116.8	125.1		189.2	52.3	34.4	59.1	27.6	
Post-Development with Improvements	Volume	N/A	1006	65	97	1763	96	N/A	551	226	69	234	68	
	v/c Ratio		0.6	0.61	0.7	0.8	0.8		0.86	0.41	0.63	0.36	0.53	0.738
	LOS		C	C	E	C	C		D	C	D	C	E	C
	Delay (s)		27.8	30.4	69.7	25.2	29.3		38.5	22.95	54.3	21.9	58.1	30.12
	95th % Queue (m)		87.1	91.2	45.2	136.2	147.5		148.4	47.4	26.0	53.0	29.0	
PM Peak														
Post-Development without Improvements	Volume	N/A	591	22	49	1425	185	N/A	198	88	132	609	66	
	v/c Ratio		0.45	0.46	0.14	0.63	0.63		0.52	0.31	0.33	1.05	0.2	0.618
	LOS		C	D	C	B	C		D	D	C	F	D	D
	Delay (s)		33.9	35.7	34.1	18.6	20.4		38.3	35.4	26.8	86.0	35.1	36.41
	95th % Queue (m)		62.2	64.5	15.3	108.7	112.0		63.5	24.4	34.4	245	21.1	
Post-Development with Improvements	Volume	N/A	591	22	49	1425	185	N/A	198	88	132	609	66	
	v/c Ratio		0.45	0.46	0.14	0.63	0.63		0.52	0.31	0.33	1.05	0.2	0.619
	LOS		C	D	C	B	C		D	D	C	F	D	D
	Delay (s)		33.9	35.7	34.1	18.6	20.4		38.3	35.4	26.8	86.0	35.1	36.4
	95th % Queue (m)		62.2	64.5	15.3	108.7	112.0		63.5	24.4	34.4	245	21.1	

5.1.3.1.2 109 Street and Jasper Avenue

The intersection of 109 Street and Jasper Avenue is a fully signalized intersection. Jasper Avenue is a pedestrian priority area. Transit service runs along Jasper Avenue and the north leg of 109 Street.

Jasper Avenue is comprised of a 6-lane vehicle cross section flanked by sidewalk. Parking is occasionally permitted through the use of parking bays. The cross-section elements are illustrated in **Figure 5-14**.

Figure 5-13 109 Street and Jasper Avenue

Figure 5-14 Jasper Avenue Facing East

Expected multimodal operations following rezoning and development are summarized in **Table 5.4**, comparing MMLOS outcomes with and without recommended changes to the road network. Changes made to this intersection focus on improving the pedestrian LOS. As the intersection already features various enhanced pedestrian features including bollards, TWSIs, enhanced storage, and curb extensions, further changes focus on limiting the number of uncontrolled conflicts between pedestrians and vehicles.

Table 5.4 MMLOS 109 Street and Jasper Avenue

<table>
<tr><th>Mode</th><th>Pedestrian</th><th>Cyclist</th><th>Transit</th><th>Motor Vehicles</th></tr>
<tr><td>Original Target</td><td>LOS C</td><td>LOS C</td><td>LOS D</td><td>LOS D</td></tr>
<tr><td>Adjusted Target</td><td>LOS B</td><td>LOS C</td><td>LOS D</td><td>LOS D</td></tr>
<tr><td>Post-Development without Improvements Intersection Performance</td><td>✗</td><td>⚠</td><td>✗ (PM only)</td><td>✓</td></tr>
<tr><td>Notes</td><td colspan="4">Pedestrian LOS is largely affected by long cycle lengths and uncontrolled conflicts with turning vehicles.

The target LOS was adjusted for the following modes:
• Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area.

Cyclist facilities are not expected on Jasper Avenue. East/west cycling demand must be met through the protected bi-directional bike lanes on 102 Avenue and 100 Avenue, one block to the north and south respectively.

Due to the high intersection delay, low pedestrian LOS, and lack of any transit priority, the transit LOS fails during the PM peak period as busses are forced to travel in mixed traffic.</td></tr>
<tr><td>Post-Development with Improvements Intersection Performance</td><td>✓</td><td>⚠</td><td>✓</td><td>✓</td></tr>
<tr><td>Recommended Treatment</td><td colspan="4">To achieve the target LOS for pedestrians, possible conflicts between pedestrians and motorists must be reduced. Changes to the total cycle length or intersection radii are not required if these conflicts are managed.
• Ban RTOR movements on all approaches during both peak periods.
• AM peak period: Change the northbound left to a dedicated protected-permitted phase concurrent with a protected-only southbound left movement. Adjust the westbound left to a protected-only phase.
• PM peak period: Change all left turn phases to protected-only.

No specific changes are required to address cyclist MMLOS.

Transit MMLOS targets can be met by:
• Implementing the identified improvements to the pedestrian realm.
• Transit is still expected to share space with general traffic and will experience delays, TSP may be considered for higher order busses but is not required to meet MMLOS targets.</td></tr>
</table>

	Vehicle intersection performance can be improved by: • Dedicating the outermost eastbound-through lane to a shared through-right lane. This adds capacity for the expected increase in eastbound right vehicles and will not increase the risk of collisions with southbound vehicles or pedestrians due to the RTOR ban.

Under current traffic volumes, the intersection performs quite well with an HCM LOS of C for both peak periods, while the southbound left movement is the most delayed. Using forecasted volumes under the Post-Development Without Improvements scenario, the intersection LOS in the AM peak period drops significantly to LOS F. However, this appears to be heavily skewed by the eastbound right movement, which shows over a tripling of volume between the current and forecasted data. This movement alone cause the intersection to fail, with most other movements exhibiting an LOS between B and E. This failure also causes the queue length to spillover well past upstream intersections.

In the PM peak period, the eastbound right movement is again problematic, but not nearly to the same extent as in the AM. Instead, the movement with the highest delay and LOS F is the westbound through movement, likely due to a near doubling in anticipated traffic volumes which also will likely create queuing issues along the Jasper Avenue corridor. Overall, the intersection performs at an LOS E during the PM peak period.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.5** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.5 Traditional LOS 109 Street and Jasper Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	265	681	83	96	1174	49	140	969	682	148	419	113	
	v/c Ratio	0.94	0.53	0.21	0.68	0.87	0.89	0.37	1.01	1.74	0.7	0.34	0.25	1.12
	LOS	E	C	C	E	D	D	B	F	F	D	C	C	F
	Delay (s)	72.6	23.1	27.3	69.3	44.2	54.8	19.1	61.9	374.4	38.9	22.9	22.2	87.2
	95th % Queue (m)	90	77	20	45	120	136	29	166	513	40	50	24	
Post-Development with Improvements	Volume	265	681	83	96	1174	49	140	969	682	148	419	113	
	v/c Ratio	0.97	0.79	0.25	0.68	0.94	0.96	0.35	1.24	1.54	0.25	0.35	0.28	1.03
	LOS	F	D	C	E	D	E	B	F	F	B	C	C	F
	Delay (s)	85.3	40.9	29.6	66.9	54.8	70.8	17.6	155.8	283.0	13.5	23.2	22.8	93.2
	95th % Queue (m)	96	100	23	44	132	153	28	297	392	25	50	27	
PM Peak														
Post-Development without Improvements	Volume	186	439	90	68	1104	170	141	795	368	179	1367	174	
	v/c Ratio	0.65	0.32	0.24	0.33	0.89	0.99	0.72	0.89	1.04	0.73	1.2	0.43	0.90
	LOS	D	C	C	D	D	E	D	D	F	D	F	C	E
	Delay (s)	36.2	20.4	29.6	43.2	48.0	78.5	46.2	46.0	94.6	40.6	135.5	29.5	73.1
	95th % Queue (m)	53	51	24	26	136	168	45	128	147	53	342	47	
Post-Development with Improvements	Volume	186	439	90	68	1104	170	141	795	368	179	1367	174	
	v/c Ratio	1.11	0.52	0.32	0.41	1.02	1.17	1.02	0.87	1.11	0.33	1.2	0.47	0.98
	LOS	F	D	C	D	F	F	F	D	F	B	F	C	F
	Delay (s)	150.4	36.3	34.1	52.8	75.9	142.2	127.8	53.3	115.6	15.7	135.5	30.6	92.4
	95th % Queue (m)	113	68	29	28	167	224	85	139	171	36	342	53	

5.1.3.1.3 109 Street and 104 Avenue

The configuration of the 109 Street and 104 Avenue intersection is based on Valley Line LRT concept drawings. The nearest LRT stations are located two blocks to the east and west. 104 Avenue is a pedestrian priority area while 109 Street supports high-frequency district transit routes.

104 Avenue is comprised of a centre-running LRT and a 5-lane vehicle cross section, flanked by sidewalk. Parking is not permitted on 104 Avenue. The cross-section elements are illustrated in **Figure 5-16.**

Figure 5-15 109 Street and 104 Avenue

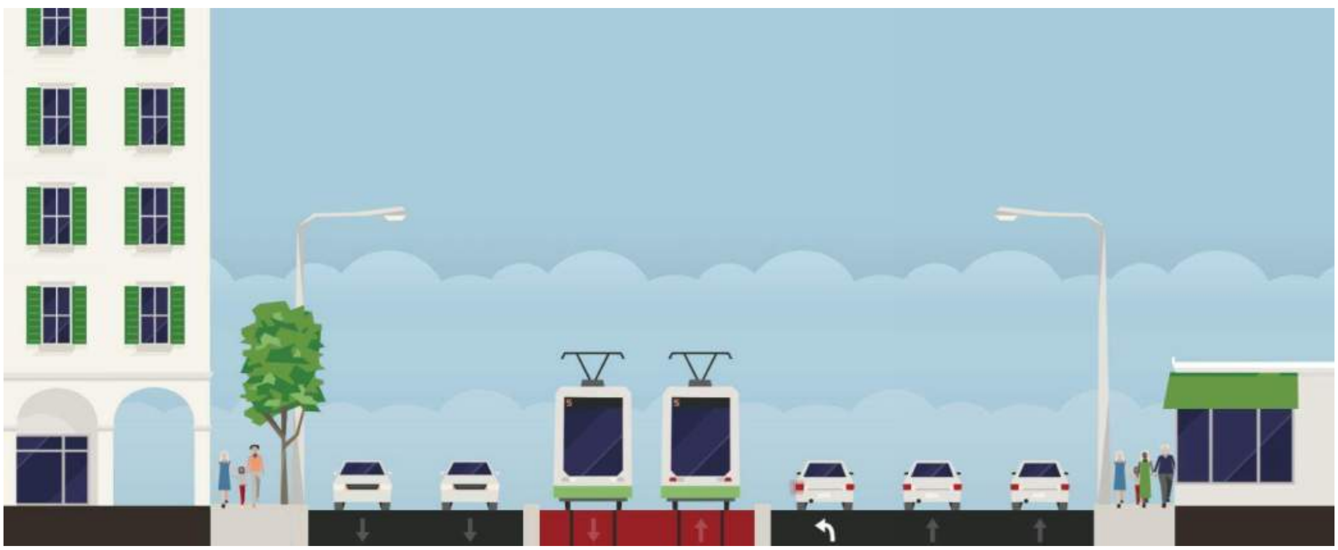


Figure 5-16 104 Avenue Facing East

Expected multimodal operations following rezoning and development are summarized in **Table 5.6**, comparing MMLOS outcomes with and without recommended changes to the road network. This intersection experiences high traffic and pedestrian volumes due to its central location adjacent to MacEwan University and features a wide cross section with the integration of the Valley Line LRT. Various bus routes travel through the intersection and require a higher turning radius at three of the four corners.

The purpose of the study has been to identify the overall multi-modal impacts as a result of PGA rezoning. The traffic analysis completed is not intended to be a detailed operational analysis of the intersections along the Valley Line LRT and such a study would require final designs and operational signal timing plans.

Table 5.6 MMLOS 109 Street and 104 Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS C	LOS C	LOS D
Post-Development without Improvements Intersection Performance	✗	⚠	✓	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area. • Transit: Target LOS adjusted from D to C due to the intersection being situated along various future transit routes (Valley Line, R9X and 110X RapidBus). Pedestrian LOS is largely affected by wider corner radii, long cycle lengths and uncontrolled conflicts with turning vehicles. Cyclist facilities are not expected on 104 Avenue. East/west cycling demand must be met on 105 Avenue protected bike lanes and 102 Avenue protected bi-directional bike lanes, two blocks to the north and south respectively.			
Post-Development with Improvements Intersection Performance	⚠	⚠	✓	✓
Recommended Treatment	Pedestrian MMLOS may be improved by: • Implementing LPIs on all pedestrian phases in both peak periods to prioritize pedestrian movement. • Banning RTOR movements to reduces the number of possible pedestrian-vehicle conflicts to its lowest level. Unfortunately, these measures are not enough to increase the pedestrian LOS to an acceptable target. • We recommend that the City explore the possibility of reducing the total signal cycle length at this intersection to less than 120 seconds, as this would likely be the most cost-effective way to achieve the target LOS for pedestrians.			

	The viability of a reduced signal cycle length is questionable, as this may not be compatible with the signal timing plan designed for the LRT line. Aside from this, the only other way to realistically achieve the target pedestrian LOS is to reduce the average effective turning radius (of all four corners) to less than 9.0 m, which may not be possible due to the existing bus and truck movements. No specific changes are required to address cyclist MMLOS. No specific changes are required to address transit MMLOS. To address vehicle MMLOS, we recommend: • AM peak period: allocate more green time to the northbound and southbound phases. This improves vehicle LOS significantly compared to the signal timing data provided as part of the Valley Line West analysis. However, this altered plan assumes compatibility with the pre-emptive signal phasing that will prioritize the movement of Valley Line vehicles. • PM peak period: no signal timing changes are required.

Using current traffic volumes and using the planned configuration for the Valley Line West, traffic performance at this intersection is notably poor, with an HCM LOS of F for all northbound and southbound movements in both the AM and PM peak period. along with the eastbound left. However, the performance of most movements improves using traffic data from the Post-Development Without Improvements scenario, as the forecasted volume for these movements is lower than the present day, likely because of the effects of the completed Valley Line on traffic distribution. However, the northbound, southbound, and eastbound left movements experience a breakdown of flow in the AM peak period in the Post-Development Without Improvements scenario, with large increases in delay and v/c ratio.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.7** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.7 Traditional LOS 109 Street and 104 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	163	634	33	159	1218	12	89	706	231	N/A	256	197	
	v/c Ratio	2.07	0.56	0.57	2.02	1.03	1.03	1.29	0.52	0.54		0.19	0.29	0.676
	LOS	F	D	D	F	F	F	F	C	C		C	C	F
	Delay (s)	594	50.2	53.4	571	93.7	107.2	276.8	24.3	24.9		24.9	26.8	109.8
	95th % Queue (m)	183	90.6	96.3	177.0	202.9	224.8	87.8	128.1	121.6		39.0	57.8	
Post-Development with Improvements	Volume	163	634	33	159	1218	12	89	706	231	N/A	256	197	
	v/c Ratio	0.87	0.48	0.49	0.85	0.87	0.88	0.7	0.82	0.86		0.38	0.7	0.69
	LOS	F	D	D	F	E	E	F	E	E		D	E	E
	Delay (s)	103.3	43.3	45.4	99.8	59.9	68.4	93.5	56.3	62.3		50.8	65.4	61.9
	95th % Queue (m)	97.9	85.1	89.7	94.5	169.4	186.3	58.5	195.2	189.9		58.3	93.8	
PM Peak														
Post-Development without Improvements	Volume	152	1121	28	101	1023	44	55	372	110	N/A	661	438	
	v/c Ratio	0.97	0.85	0.86	0.64	0.79	0.8	0.46	0.31	0.33		0.65	0.88	0.7
	LOS	F	E	E	F	E	E	F	C	C		D	E	E
	Delay (s)	135.4	62.8	71.4	87.2	58.6	65.8	82.3	28.0	28.5		47.7	68.4	60.8
	95th % Queue (m)	106.3	167.5	183.1	63.9	152.0	164.5	35.2	78.0	75.2		131.2	179.9	
Post-Development with Improvements	Volume	152	1121	28	101	1023	44	55	372	110	N/A	661	438	
	v/c Ratio	0.97	0.95	0.96	0.64	0.89	0.9	0.46	0.34	0.36		0.72	1.08	0.738
	LOS	F	F	F	F	E	F	F	C	C		D	F	E
	Delay (s)	135.4	80.0	94.1	87.2	70.3	82.9	82.3	31.7	32.2		53.5	121.8	76.8
	95th % Queue (m)	106.3	185.8	206.3	63.9	164.8	182.0	35.2	84.2	80.9		138.3	250.7	

This intersection was identified for further sensitivity analysis to investigate future vehicle capacity constraints. The Post-Development Without Improvements scenario forecasts notable decreases in through traffic on all approaches, particularly in the AM peak period. Therefore, additional scenarios were analyzed with forecasted growth rates of 10% and 20% applied to movements which saw a decrease in volumes between the existing conditions and the City's post-development model. Full results are shown in **Appendix I** and **Appendix J**.

In the AM peak period, these growth scenarios of added through traffic lead to a breakdown of flow for most movements aside from westbound and northbound through and right traffic. Minor optimization can be made to the signal timing plan to allocate a small amount of green time from the southbound left movement to the remaining phases which results in a small reduction in overall intersection delay, but further changes would require additional lanes (not possible given the intersection's location) or increasing the signal cycle length, which is unlikely given the presence of the LRT phasing and undesirable due to the additional crossing delay for pedestrians.

In the PM peak period, saturated flow conditions are more predominant, aside from the eastbound through and right lanes. While transferring green time from the east-west phasing group to the north-south reduces overall intersection delay, nearly every movement still exhibits an LOS F during peak volumes. Given the geometric and signal constraints at this intersection arising from the LRT line, options to address vehicle capacity constraints at this intersection under these elevated growth scenarios are limited. Traffic patterns should be monitored upon completion of the Valley Line West to assess the line's impacts on traffic distribution at this intersection and along the 109 Street corridor.

5.1.3.2 124 Street Corridor

124 Street is a street oriented mixed-use /commercial arterial road. It is a pedestrian priority area from Jasper Avenue to 112 Avenue and supports a variety of transit uses.

For much of its length, 124 Street is comprised of a 5-lane vehicle cross section flanked by sidewalk. Parking is prohibited on the east side during the weekday PM peak hour. Parking is prohibited on the west side during the weekday AM peak hour. Beginning north 111 Avenue, the cross section decreases to 4- and eventually a 3-lanes as the character become more residential oriented. The cross-section elements are illustrated in **Figure 5-17** through **Figure 5-21**.

Figure 5-17 124 Street Facing North (South of 102 Avenue)

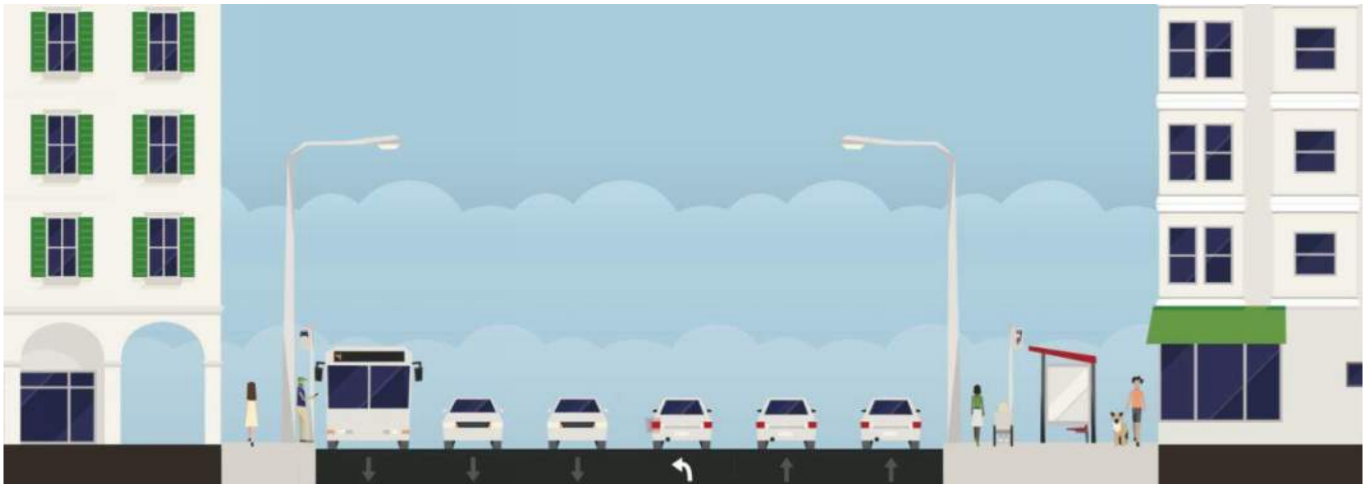


Figure 5-18 124 Street Facing North (South of Stony Plain Road)

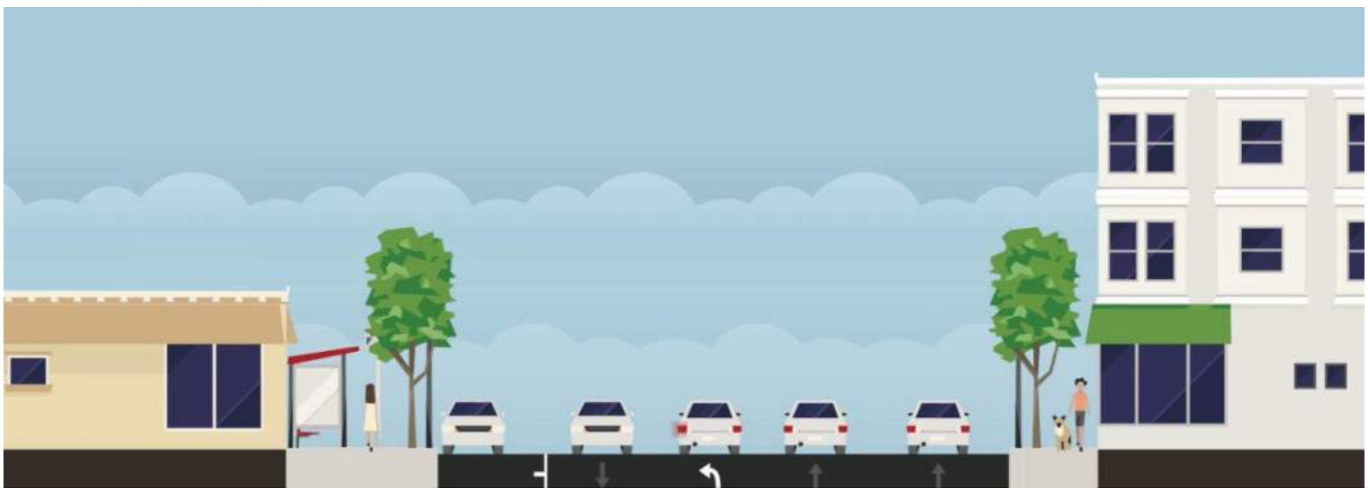


Figure 5-19 124 Street Facing North (South of 107 Avenue)

Figure 5-20 124 Street Facing North (South of 111 Avenue)

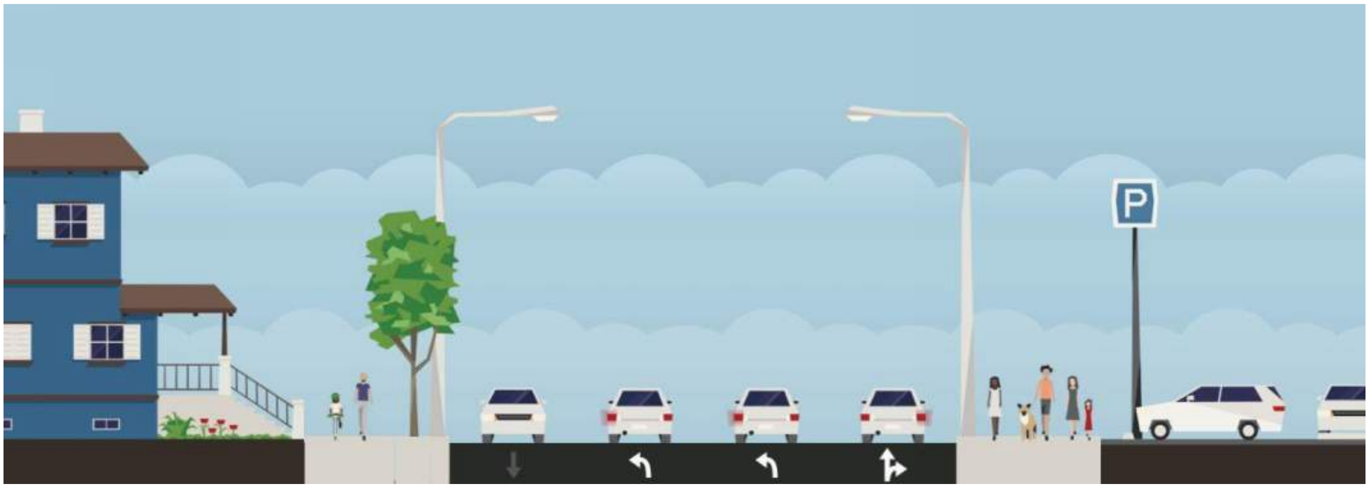


Figure 5-21 124 Street Facing North (South of 118 Avenue)

At a corridor level, the current 124 Street cross section meets forecast MMLOS targets. However, as a pedestrian priority area and frequent transit corridor, additional emphasis should be placed on the pedestrian realm. The current use of curb lanes as patio extensions indicates a need for additional public realm. As buildings redevelop, frontage should be reserved for the public realm. Current parking restrictions in peak periods may be reassigned to transit lanes, increasing reliability and travel time.

Additional cycling infrastructure is needed to support the current planned network:

- Bike detection or actuation is required on 106 and 109a Avenue where these bike boulevards intersect with 124 Street to improve circulation and controlled crossing opportunities.
- The 2022 Infill Roadmap report identified opportunities to install a bi-directional bike lane on the south side of 111 Avenue. Combined with the cycling facility on 114 Avenue identified in the Bike Plan, this would close a large gap in the east/west cycling network.
- The spacing between the cycling infrastructure on 114 Avenue and the bike boulevard on 122 Avenue leaves a 1,300 m gap in the east-west cycling network. Routing options should be explored on 117 Avenue and either 119 or 120 Avenue.

Additional study and engagement will be required to determine the type of facility best suited to the 111 Avenue, 117 Avenue and 120 Avenue corridors.

Expected multimodal operations at the corridor level are summarized in **Table 5.8** based on these recommendations; however, individual intersection assessments in the following sections capture incremental changes that can be implemented in the meantime. Detailed MMLOS tables which analyze each corridor under existing and recommended conditions are found in **Appendix G** and **Appendix H**, respectively.

Table 5.8 MMLOS 124 Street from 102 Avenue to 118 Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS C	LOS D	LOS D
Post-Development without Improvements Corridor Performance	✓	n/a	✓	✓
Post-Development with Improvements Corridor Performance	✓	n/a	✓	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the corridor encompassing a Pedestrian Priority Area. Cyclist facilities are not expected on 124 Street. North/south cycling demand must be met on 121 Street (painted bike lanes from Jasper to 105 Avenue, shared use path from 105 to 118 Avenue, and shared street to the north), three blocks to the east, or the protected bi-directional bike lane on 127 Street (via the bike boulevard on Wadhurst Road), three blocks to the west. At ~650 m separation, the north/south bike network coverage is nearing minimum thresholds and additional routes may be considered. Bike actuated crossing control is required where bike boulevards cross 124 Street at 106 and 109a Avenue. Adding transit passenger amenities where they are currently missing and dedicating curb lanes to busses in the peak period will increase transit corridor MMLOS to LOS A.				

5.1.3.2.1 124 Street and 102 Avenue

The intersection of 124 Street and 102 Avenue is fully signalized. 124 Street and the east leg of 102 Avenue are pedestrian priority areas. 102 Avenue is part of the cycling network. Both 124 Street and 102 Avenue support frequent bus routes.

Figure 5-22 124 Street and 102 Avenue

West of the intersection, 102 Avenue is comprised of a protected bi-directional bike lane and a 4-lane vehicle cross section that flares to a 5-lane cross section at the intersection, flanked by sidewalk. Parking is not permitted west of the intersection. East of the intersection, 102 Avenue is comprised of a protected bi-directional bike lane and a 2-lane vehicle cross section, flanked by sidewalk. Parking is occasionally provided using parking bays. The cross-section elements are illustrated in **Figure 5-23**.

Figure 5-23 102 Avenue Facing East

Treatment options that affect 102 Avenue are uncertain at this time. The Wîhkwêntôwin Neighbourhood is currently undertaking a renewal process, and designs have not been finalized. Current design options include improved public realm and the maintenance of two-way traffic or increased public realm and conversion to one-way traffic. Another possible 102 Avenue cross section, converting the one block immediately east of 124 Street to a transit only street, is illustrated in **Figure 5-24**.

Figure 5-24 Proposed 102 Avenue Cross Section (124 Street to 123 Street)

Expected multimodal operations following rezoning and development are summarized in **Table 5.9**, comparing MMLOS outcomes with and without recommended changes to the road network. Upgrades to the intersection take a balanced approach to enhance each mode and reduce overall intersection delay as much as possible.

Table 5.9 MMLOS 124 Street and 102 Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS B	LOS D	LOS D
Post-Development without Improvements Intersection Performance	✗	✗ (PM Peak)	✗	✗
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area. • Cyclists: Target LOS adjusted from C to B due to the intersection being situated along the 102 Avenue Cycling Corridor (On-Street protected bike lane). Pedestrian MMLOS is largely affected by long cycle lengths and uncontrolled conflicts with turning vehicles. Cyclist MMLOS on 102 Avenue fails in the PM peak due to long cycle lengths.			

	Transit MMLOS is largely affected by the delays experienced while travelling in mixed traffic lanes. Vehicle MMLOS falls below targets. This is largely affected by long delays (traffic forecasts more than double northbound left and westbound through demand resulting in HCM LOS F for these approaches) and few movements are provided dedicated turn lanes (i.e. demand for one turn movements will affect multiple turn movements).			
Post-Development with Improvements Intersection Performance	✓	✓	✓	✓
Recommended Treatment	The total vehicle delay in both peak periods is heavily skewed by the westbound approach due to a significant increase in the forecasted peak hour traffic volume for the westbound through movement, which saturates the single shared lane. As part of the Neighbourhood Renewal, the City is contemplating a one-way conversion of 102 Avenue. The City could also consider converting the east leg into a transit and bike-only block (between 124 and 123 Street). Analysis assumes that eastbound through volume are evenly diverted to eastbound right and eastbound left movements. Westbound traffic would be similarly diverted to the north and south. Pedestrian MMLOS may be improved by: • Banning eastbound RTOR movements to eliminate an uncontrolled conflict between vehicles and pedestrians, the existing ban for southbound RTOR should be maintained. • The transit and bike-only configuration allows for the elimination of northbound right and westbound right movements, which reduces the number of conflicts for pedestrians. • Exploring curb extensions, especially the southwest corner, to minimize the average effective turning radius of vehicles. Cyclist MMLOS may be addressed by: • Eliminating the westbound right turn movement and exploring curb extensions. Transit MMLOS may be addressed by: • Converting the east leg of 102 Avenue (from 124 to 123 Street) to a transit and bike-only lane. • Extending the concrete island on the west leg which separates the bike lane from the travel lane to reduce the turning radius for southbound right vehicles. This may also require adjustments to the crosswalk location. Vehicle MMLOS may be addressed by: • Converting the east leg of 102 Avenue (from 124 to 123 Street) to a transit and bike-only lane.			

	• Converting the existing eastbound through/left shared lane into a dedicated left turn lane. Based on volume redistribution (and assuming 12 westbound busses per hour on this approach), the overall intersection delay is reduced significantly. • Updating signal timing plans to overlap permitted right turn phases with eastbound left and westbound through phases. • AM peak period: allocate more green time to the northbound through and left movements. Alternatively, the City could explore reducing the signal cycle length at this intersection to 100 s or lower, although this would affect signal coordination along 124 Street and may not be viable.

Under current traffic volumes, the intersection performs quite well with an HCM LOS of C for both peak periods and most movements exhibiting either LOS B or C. Under forecasted volumes, however, the LOS of the westbound shared lane on the east approach drops significantly to a LOS F in both peak periods due to significant increases in westbound through and right traffic. This degrades the overall intersection LOS to an F, and results in saturated conditions for westbound vehicles and busses on this approach and an extremely long queue length.

Another large increase in traffic volume is observed for northbound left traffic in the PM peak period. This delay increase, however, is more manageable than that facing the east approach.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.10** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.10 Traditional LOS 124 Street and 102 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	393	241	2	N/A	414	69	173	189	1027	N/A	395	45	
	v/c Ratio	0.49	0.58	0.36		0.45	0.47	0.63		0.69		1.77		0.719
	LOS	D	D	C		C	C	C		B		F		F
	Delay (s)	35.8	38.7	20.2		29.7	30.3	25.1		17.1		405.9		83.0
	95th % Queue (m)	45.4	48.1	53.9		65.0	65.8	80.8		85.5		371.1		
Post-Development with Improvements	Volume	593	241	N/A	N/A	414	269	268	N/A	1122	N/A	12	N/A	
	v/c Ratio	0.9	0.98	0.37		0.7	0.8	0.95		1.04		0.04		0.597
	LOS	E	F	C		D	D	D		F		C		D
	Delay (s)	67.8	85.1	20.9		39.7	47.0	50.2		73.4		32.4		39.0
	95th % Queue (m)	90.8	102.9	54.5		99.2	107.6	208.7		246.5		3.5		
PM Peak														
Post-Development without Improvements	Volume	1326	304	4	N/A	376	101	5	198	570	N/A	261	165	
	v/c Ratio	1.03	1.13	0.35		0.48	0.51	0.37		0.36		1.98		0.71
	LOS	F	F	B		D	D	C		B		F		F
	Delay (s)	74.4	107.4	13.1		35.4	36.5	30.3		10.9		506		110.3
	95th % Queue (m)	197.5	246.0	55.7		71.5	72.7	59.4		40.4		387.6		
Post-Development with Improvements	Volume	1456	387	N/A	N/A	376	230	105	N/A	670	N/A	12	N/A	
	v/c Ratio	1.23	1.32	0.43		0.62	0.7	0.76		0.84		0.05		0.678
	LOS	F	F	B		D	D	D		D		D		F
	Delay (s)	150.7	189.8	14.4		39.5	43.9	44.3		51.2		41.8		96.7
	95th % Queue (m)	329.8	384.2	71.0		93.4	98.6	123.8		129.2		4.3		

5.1.3.2.2 124 Street and Stony Plain Road

The configuration of the 124 Street and Stony Plain Road intersection is based on Valley Line LRT concept drawings. An LRT station is located immediately east of the intersection. Both 124 Street and Stony Plain Road are pedestrian priority areas.

West of the intersection, Stony Plain Road is comprised of a centre-running LRT and two vehicle lanes flanked by sidewalk. East of the intersection, Stony Plain Road is comprised of a centre-running LRT and three vehicle lanes flanked by sidewalk. Parking is not permitted Stony Plain Road. The cross-section elements are illustrated in **Figure 5-26**.

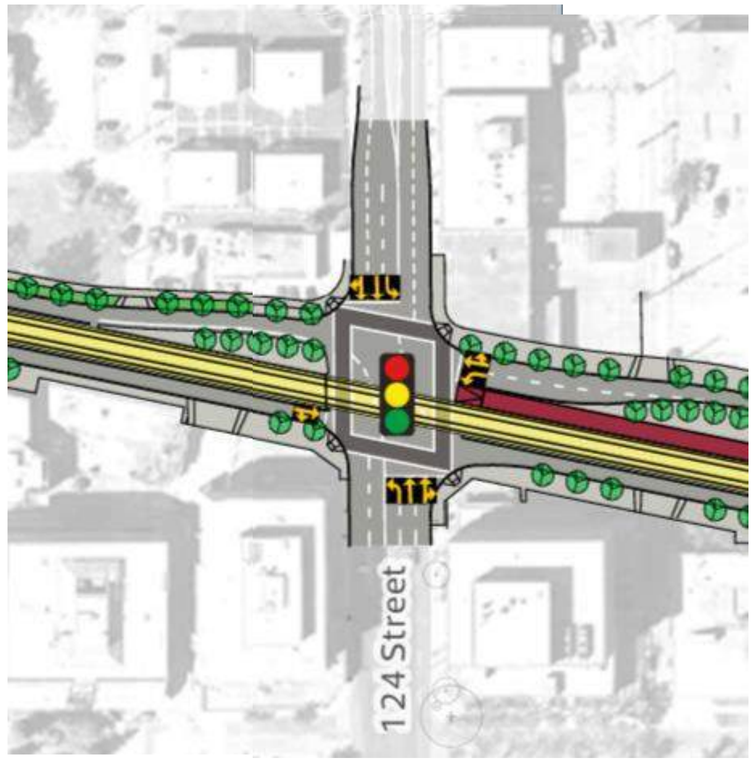


Figure 5-25 124 Street and Stony Plain Road

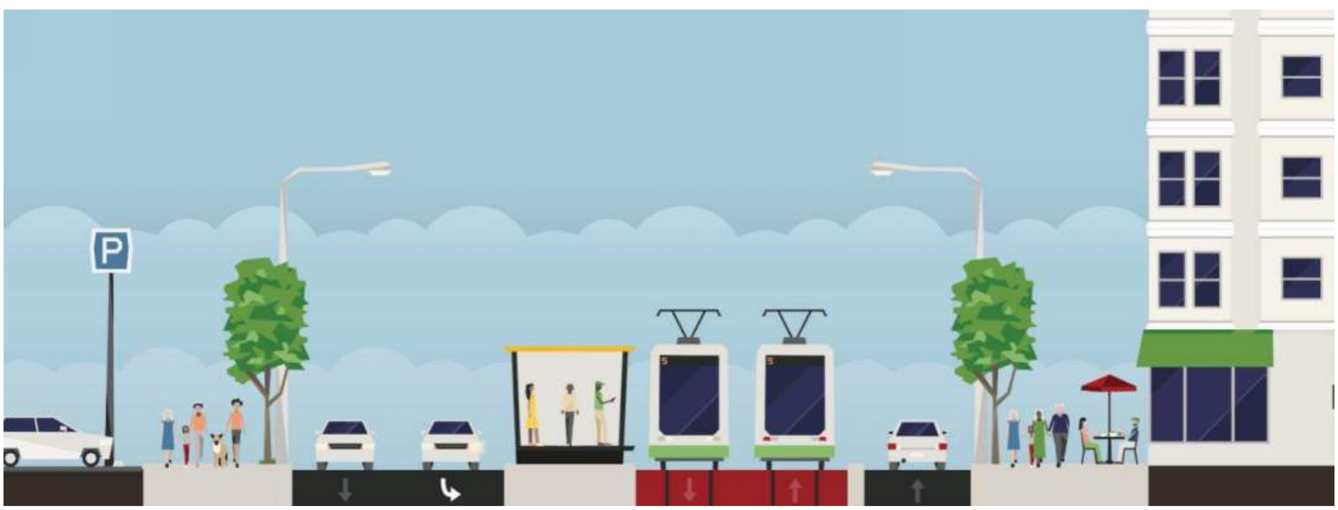


Figure 5-26 Stony Plain Road Facing East

Expected multimodal operations following rezoning and development are summarized in **Table 5.11**, comparing MMLOS outcomes with and without recommended changes to the road network.

The purpose of the study has been to identify the overall multi-modal impacts as a result of PGA rezoning. The traffic analysis completed is not intended to be a detailed operational analysis of the intersections along the Valley Line LRT and such a study would require final designs and operational signal timing plans.

Table 5.11 MMLOS 124 Street and Stony Plain Road

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS C	LOS C	LOS D
Post-Development without Improvements Intersection Performance	✗	⚠	✓	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area. • Transit: Target LOS adjusted from D to C due to the intersection being situated along the Valley Line LRT. Pedestrian LOS is largely affected by long cycle lengths and uncontrolled conflicts with turning vehicles. East/west cycling demand must be met on 105 Avenue or 106 Avenue (painted bike lanes) and 102 Avenue protected bi-directional bike lanes, two blocks to the north and south respectively. North/south cycling demand is met by facilities located on 127 Street (protected) three blocks west, or 121 Street three blocks east.				
Post-Development with Improvements Intersection Performance	✓	⚠	✓	✓
Recommended Treatment	**All recommendations along the Valley Line West corridor will need to be coordinated with Marigold Infrastructure Partners.** To improve pedestrian MMLOS, we recommend: • Ban RTOR movements to minimize the number of uncontrolled pedestrian conflicts. This is based on the assumption that the Valley Line West project will feature various pedestrian enhancements in its final design such as enhanced storage, audible crossing signals, lower curb radii, and/or other features as indicated in the design overview and available renderings. No specific changes are required to address cyclist MMLOS. No specific changes are required to address transit MMLOS.				

	Vehicle MMLOS deterioration can be mitigated by: • AM peak period: allocating more green time to the eastbound phase while maintaining the total signal cycle length. • PM peak period: no signal timing changes are necessary.

Under current traffic volumes, the intersection performs fairly with an HCM LOS of D for both peak periods. Using forecasted volumes under the Post-Development Without Improvements scenario, the LOS of the single eastbound lane (for through and right traffic) drops to LOS F in the AM peak period due to a large increase in traffic volumes. This degrades the intersection LOS to E, and results in queuing spillover along Stony Plain Road.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.12** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.12 Traditional LOS 124 Street and Stony Plain Road

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	75	558	39	50	582	3	N/A	500	195	4	131	31	
	v/c Ratio	0.23	0.66	0.68	0.16	0.65	0.65		1.19		0.03	0.2		0.662
	LOS	C	D	D	C	D	D		F		D	B		E
	Delay (s)	26.2	44.7	45.7	25.3	44.1	44.2		141.4		50.0	17.8		72.1
	95th % Queue (m)	20.5	102.2	101.7	13.4	99.7	99.6		356.6		1.7	35.6		
Post-Development with Improvements	Volume	75	558	39	50	582	3	N/A	500	195	4	131	31	
	v/c Ratio	0.3	0.75	0.77	0.21	0.73	0.73		0.94		0.05	0.18		0.679
	LOS	C	D	E	C	D	D		D		E	B		D
	Delay (s)	33.2	53.3	55.3	31.8	51.9	52.0		52.2		55.7	13.5		48.7
	95th % Queue (m)	23.9	111.2	111.3	15.5	107.1	107.1		234.0		2.0	30.6		
PM Peak														
Post-Development without Improvements	Volume	154	500	95	203	391	12	N/A	238	81	36	442	117	
	v/c Ratio	0.33	0.66	0.69	0.52	0.45	0.45		0.65		0.24	0.77		0.637
	LOS	C	D	D	C	D	D		D		D	D		D
	Delay (s)	22.9	44.8	47.1	28.6	37.8	38.0		43.4		53.7	36.2		38.7
	95th % Queue (m)	39.6	102.3	100.9	57.0	68.1	67.8		104.1		15.9	158.4		
Post-Development with Improvements	Volume	154	500	95	203	391	12	N/A	238	81	36	442	117	
	v/c Ratio	0.33	0.68	0.71	0.53	0.45	0.45		0.67		0.24	0.79		0.651
	LOS	C	D	D	C	D	D		D		D	D		D
	Delay (s)	23.0	45.4	48.1	29.0	37.8	38.0		44.4		53.7	37.4		39.4
	95th % Queue (m)	39.6	104.7	103.1	57.2	68.3	68.0		107.5		15.9	164.2		

5.1.3.2.3 124 Street and 107 Avenue

The intersection of 124 Street and 107 Avenue is fully signalized. 124 Street and 107 Avenue are pedestrian priority areas and support frequent transit routes.

West of the intersection, 107 Avenue is comprised of a 5-lane vehicle cross section flanked by sidewalk. Parking is not permitted west of the intersection. East of the intersection, 107 Avenue is comprised of a 6-lane vehicle cross section flanked by sidewalk. Parking is permitted on the south side. Left turns are not permitted on 107 Avenue in the weekday AM or PM peak periods. The cross-section elements are illustrated in **Figure 5-28.**

Figure 5-27 124 Street and 107 Avenue

Figure 5-28 107 Avenue Facing East

Expected multimodal operations following rezoning and development are summarized in **Table 5.13**, comparing MMLOS outcomes with and without recommended changes to the road network.

Table 5.13 MMLOS 124 Street and 107 Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS C	LOS D	LOS D
Post-Development without Improvements Intersection Performance	✗	⚠	✓	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area. Pedestrian LOS is largely affected by long cycle lengths and uncontrolled conflicts with turning vehicles. Cycling facilities are planned on 107 Avenue between 163 Street and Groat Road to the west of the study intersection in 2026; however, there are currently no bike facilities planned for 107 Avenue directly east and west of 124 Street. East/west cycling demand must be met on 106 Avenue (bike boulevard west of 124 Street and painted bike lanes to the east) or 109a Avenue bike boulevard, one block to the south and three blocks to the north respectively. Of note, there does not appear to be any bike actuated crossing control where bike boulevards cross 124 Street at 106 and 109a Avenue, nor does 106 Avenue connect to the broader community to the west.			
Post-Development with Improvements Intersection Performance	✓	⚠	✓	✓
Recommended Treatment	Pedestrian MMLOS may be addressed by: • Implementing LPIs on all pedestrian phases in both peak periods to prioritize pedestrian movement. • Banning RTOR movements on all approaches. • Maintaining existing restrictions on westbound and eastbound left turns during peak hours. No specific changes are required to address cyclist MMLOS. No specific changes are required to address transit MMLOS. Vehicle MMLOS deterioration can be mitigated by: • AM peak period: no signal changes are required. • PM peak period: allocation additional green time to the northbound and southbound phases to improve traffic flow. The total signal cycle length can remain the same.			

Under current traffic volumes, the intersection performs quite well with an HCM LOS of C for both peak periods. Using forecasted volumes under the Post-Development Without Improvements scenario, the LOS of the southbound through/right lane drops to LOS F in the PM peak period, partly due to an increase in volume but also because parking is permitted in the curbside lane during the PM peak. From the added delay to this movement and minor increases to others, the intersection LOS is degraded to D in the PM peak period.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.14** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.14 Traditional LOS 124 Street and 107 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	264	591	118	160	445	107	N/A	1506	220	N/A	556	66	
	v/c Ratio	0.6	0.71	0.72	0.43	0.55	0.56		0.86	0.25		0.32	0.07	0.728
	LOS	C	D	D	A	C	C		C	B		B	B	C
	Delay (s)	28.1	35.4	35.8	2.7	32.2	32.4		27.7	15.1		15.4	13.2	26.2
	95th % Queue (m)	65.7	96.5	92.9	1.1	74.3	71.2		170.8	36.3		51.4	9.8	
Post-Development with Improvements	Volume	264	591	118	160	445	107	N/A	1506	220	N/A	556	66	
	v/c Ratio	0.62	0.63	0.63	0.45	0.49	0.49		0.88	0.29		0.33	0.08	0.726
	LOS	C	C	C	A	C	C		C	B		B	B	C
	Delay (s)	30.5	30.6	30.8	2.7	28.6	28.8		29.7	16.1		16.1	13.8	25.8
	95th % Queue (m)	65.4	91.6	87.7	1.2	71.7	68.4		176.5	42.2		52.8	11.3	
PM Peak														
Post-Development without Improvements	Volume	184	660	94	169	585	89	N/A	888	462	N/A	1457	120	
	v/c Ratio	0.54	0.64	0.65	0.4	1.15			0.56	0.61		0.93	0.15	0.851
	LOS	C	C	C	A	F			C	C		D	B	D
	Delay (s)	29.9	33.3	33.6	2.9	122.7			24.1	27.0		40.6	18.6	44.5
	95th % Queue (m)	45.8	103.5	100.7	1.0	313.2			102.5	102.8		208.3	23.5	
Post-Development with Improvements	Volume	184	660	94	169	585	89	N/A	888	462	N/A	1457	120	
	v/c Ratio	0.53	0.54	0.55	0.35	0.97			0.66	0.8		1.09	0.2	0.85
	LOS	C	C	C	A	E			C	D		F	C	D
	Delay (s)	27.8	27.1	27.3	2.4	59.6			30.6	40.5		86.6	23.5	51.2
	95th % Queue (m)	39.8	95.1	92.1	0.8	227.5			115.1	136.0		287.6	30.1	

5.1.3.2.4 124 Street and 111 Avenue

The intersection of 124 Street and 111 Avenue is fully signalized. 124 Street and 111 Avenue are pedestrian priority areas, and both support frequent transit routes.

111 Avenue is comprised of a 6-lane vehicle cross section flanked by sidewalk. Parking is not permitted along 111 Avenue. Eastbound left turns are prohibited in the AM peak period. The cross-section elements are illustrated in **Figure 5-30**.

Figure 5-29 124 Street and 111 Avenue

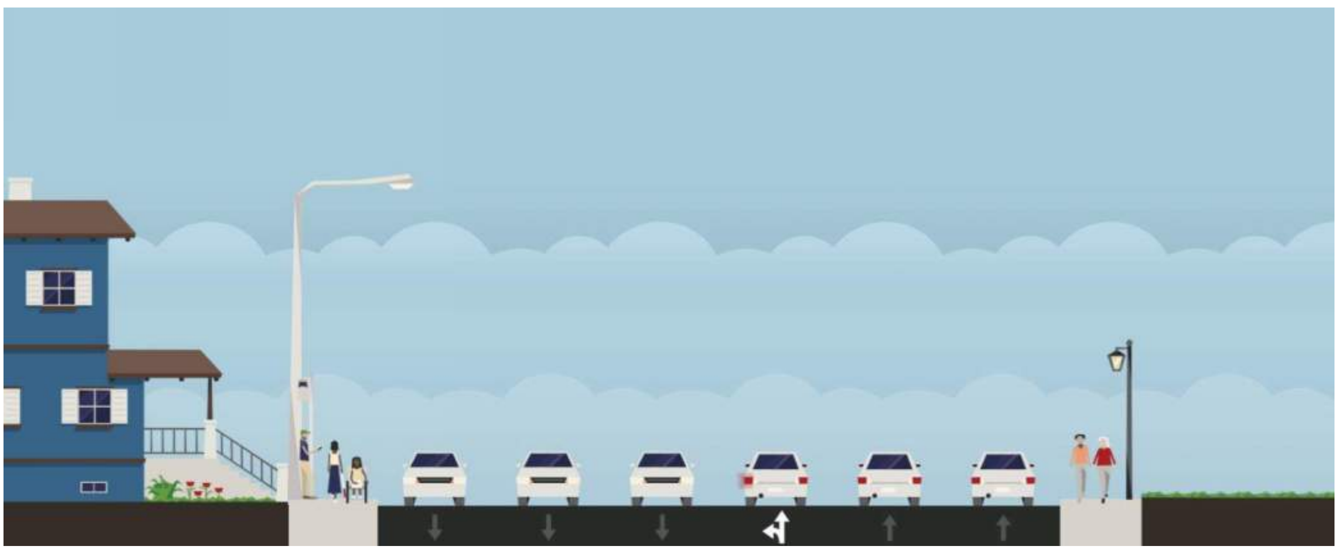


Figure 5-30 111 Avenue Facing East

Expected multimodal operations following rezoning and development are summarized in **Table 5.15**, comparing MMLOS outcomes with and without recommended changes to the road network.

Table 5.15 MMLOS 124 Street and 111 Avenue

<table>
<tr><th>Mode</th><th>Pedestrian</th><th>Cyclist</th><th>Transit</th><th>Motor Vehicles</th></tr>
<tr><td>Original Target</td><td>LOS C</td><td>LOS C</td><td>LOS D</td><td>LOS D</td></tr>
<tr><td>Adjusted Target</td><td>LOS B</td><td>LOS C</td><td>LOS D</td><td>LOS D</td></tr>
<tr><td>Post-Development without Improvements Intersection Performance</td><td>✗</td><td>⚠</td><td>✓</td><td>✓</td></tr>
<tr><td>Notes</td><td colspan="4">The target LOS was adjusted for the following modes:
• Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area.
Pedestrian LOS is largely affected by medium to long cycle lengths and uncontrolled conflicts with turning vehicles.
Cycling facilities are planned on 111 Avenue between 121 Street and Kingsway to the east of the study intersection in 2025; however, the Bike Plan does not identify any network beyond this point. East/west cycling demand must be met on the 109A Avenue bike boulevard, two blocks to the south, or 114 Avenue shared use path, three blocks to the north. Of note, there does not appear to be any bike actuated crossing control where the bike boulevard crosses 124 Street. The east/west network spacing is ~900 m, exceeding minimum network coverage.</td></tr>
<tr><td>Post-Development with Improvements Intersection Performance</td><td>✓</td><td>⚠</td><td>✓</td><td>✓</td></tr>
<tr><td>Recommended Treatment</td><td colspan="4">Pedestrian MMLOS may be addressed by:
• Banning RTOR movements on all approaches. This is anticipated to have minimal impact on traffic performance due to the shared through/right lane configurations.
Cycling MMLOS may be addressed by:
• Expanding network coverage on 111 Avenue, as identified in the 2022 Infill Roadmap.
No specific changes are required to address transit MMLOS.
Vehicle MMLOS deterioration can be mitigated by:
• AM peak period: no signal changes are required.
• PM peak period: allocate additional green time to the westbound left movement.</td></tr>
</table>

Under current traffic volumes, the intersection performs quite well with an HCM LOS of C for both peak periods. Using forecasted volumes under the Post-Development Without Improvements scenario, the LOS of the westbound left movement drops to LOS F in the PM peak period due to an increase in eastbound through traffic. This results in the overall intersection LOS falling to D. The performance of the intersection in the AM peak period, meanwhile, is largely unchanged between the two scenarios.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.16** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.16 Traditional LOS 124 Street and 111 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	274	431	148	133	543	72	N/A	1459	94	42	809	53	
	v/c Ratio	0.71	0.54	0.54	0.33	0.54	0.55		0.78	0.77	0.62	0.4	0.4	0.628
	LOS	C	C	C	C	C	C		C	D	C	B	B	C
	Delay (s)	31.6	29.4	29.5	22.2	29.4	29.5		32.0	35.3	23.4	17.5	17.6	28.5
	95th % Queue (m)	66.0	74.8	70.3	29.9	78.1	76.0		128.0	133.8	59.8	63.1	62.1	
Post-Development with Improvements	Volume	274	431	148	133	543	72	N/A	1459	94	42	809	53	
	v/c Ratio	0.72	0.55	0.56	0.33	0.55	0.55		0.79	0.78	0.63	0.4	0.4	0.633
	LOS	C	C	C	C	C	C		C	D	C	B	B	C
	Delay (s)	31.9	29.5	29.7	22.3	29.4	29.5		32.3	35.9	23.8	17.7	17.8	28.7
	95th % Queue (m)	66.1	76.8	71.9	29.9	78.9	76.7		129.3	135.5	60.5	63.7	62.6	
PM Peak														
Post-Development without Improvements	Volume	181	508	126	202	646	88	5	1042	197	123	1661	119	
	v/c Ratio	0.54	0.68	0.69	0.53	0.81	0.81	0.54	0.57	0.57	1.13	0.74	0.75	0.68
	LOS	C	D	D	C	D	D	C	C	C	F	C	C	D
	Delay (s)	28.9	39.6	40.2	31.5	42.0	42.4	25.6	26.5	26.9	102.5	25.3	25.7	39.6
	95th % Queue (m)	47.6	96.7	92.6	58.2	112.6	109.6	101.8	101.2	95.8	222.3	152.0	149.7	
Post-Development with Improvements	Volume	181	508	126	202	646	88	5	1042	197	123	1661	119	
	v/c Ratio	0.55	0.67	0.67	0.59	0.84	0.84	0.54	0.56	0.57	1.08	0.74	0.74	0.686
	LOS	C	D	D	C	D	D	C	C	C	F	C	C	D
	Delay (s)	29.6	38.5	39.0	33.9	43.5	44.0	25.2	25.9	26.3	84.4	24.6	25.0	37.3
	95th % Queue (m)	48.2	97.4	92.8	59.9	115.8	112.4	105.7	100.5	94.6	201.5	150.8	148.2	

5.1.3.2.5 124 Street and 118 Avenue

The intersection of 124 Street and 118 Avenue is fully signalized. 118 Avenue supports local transit routes and has been identified for future rapid transit.

118 Avenue is comprised of a 7-lane vehicle cross section flanked by sidewalk. Parking is not permitted on the south side regardless of day or time. Parking is not permitted on the north side during the PM Peak period. The cross-section elements are illustrated in **Figure 5-32**.

Figure 5-31 124 Street and 118 Avenue

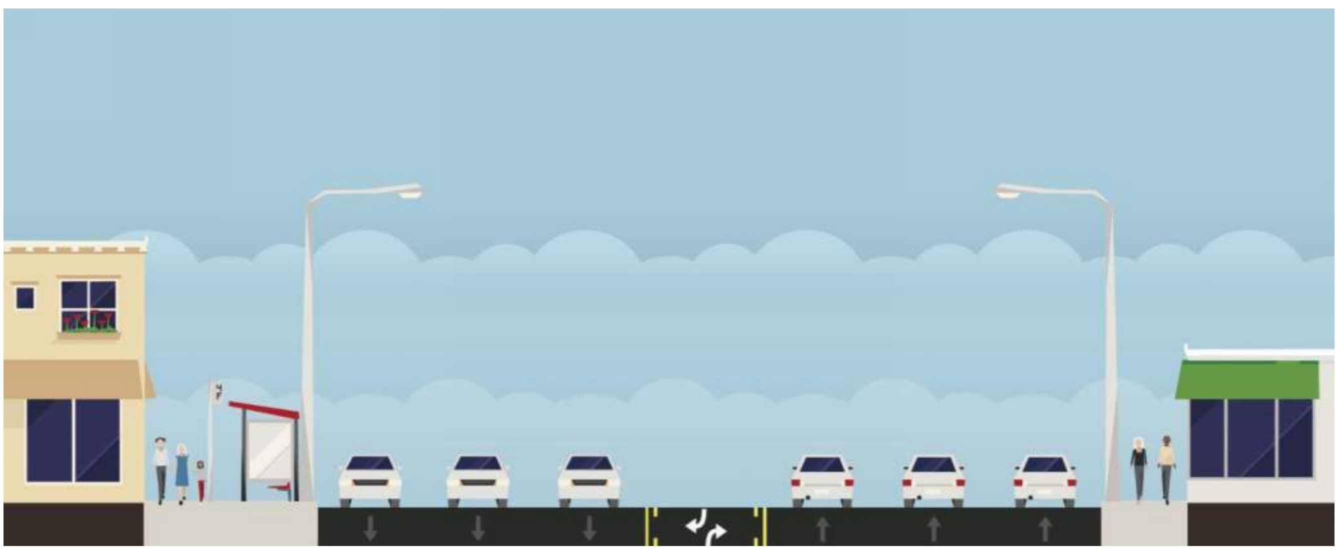


Figure 5-32 118 Avenue Facing East

The proposed cross section changes on 118 Avenue are illustrated in **Figure 5-33**.

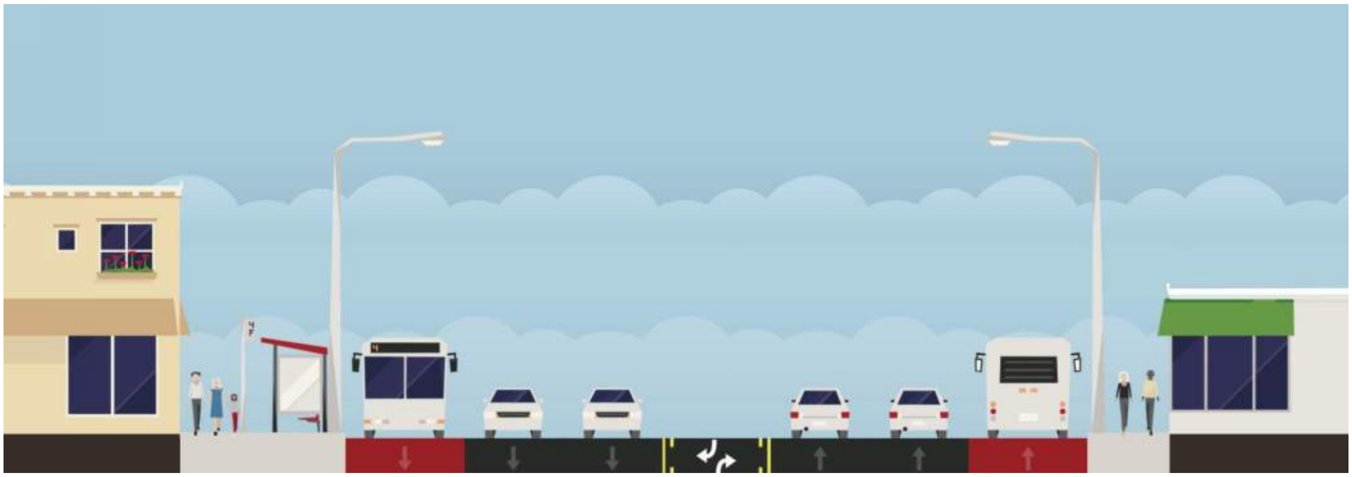


Figure 5-33 Potential 118 Avenue Cross Section (121a Street to 127 Street)

Expected multimodal operations following rezoning and development are summarized in **Table 5.17**, comparing MMLOS outcomes with and without recommended changes to the road network. This intersection is not located within a pedestrian priority area but is a planned route for the future R12 Rapid Bus.

Table 5.17 MMLOS 124 Street and 118 Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS C	LOS C	LOS C	LOS D
Post-Development without Improvements Intersection Performance	✓	⚠	✗	✓
Notes	No adjustments were made to the target LOS for any mode. Cycling facilities are planned on 118 Avenue (Kingsway) between 121 Street and 113 Street to the east of the study intersection in 2025; however, the Bike Plan does not identify any network extending further west. East/west cycling demand must be met through bike boulevards on 109a Avenue and 122 Avenue, nine blocks to the south and four blocks to the north respectively. The bike plan identifies 114 Avenue as a future District Connector cycling route, though timing of any further upgrades to the existing pathway are unknown. Even with the shared pathway cycling facility on 114 Avenue, the east/west network spacing is ~1,400 m, exceeding minimum network coverage. Transit LOS falls below the threshold, largely due to the delay experienced while travelling in mixed traffic without priority measures.			

Post-Development with Improvements Intersection Performance	✓	⚠	✓	✓
Recommended Treatment	No upgrades are required to meet pedestrian MMLOS targets. As 118 Avenue redevelops, additional opportunities to increase the pedestrian buffer and furnishing zone should be explored. Cycling MMLOS may be addressed by expanding network coverage on: • 117 and 119 / 120 Avenue. Transit MMLOS may be addressed by: • Exclusive bus lanes with transit signal priority on 118 Avenue, removing one through lane in each direction. The theoretical capacity of the roadway nearly doubles from 4,400 – 12,000 vph to 10,400 – 22,400 vph by re-allocating space to high frequency transit. Impacts to vehicle MMLOS may be mitigated by: • AM peak period: allocate more green time to eastbound traffic. • PM peak period: no changes to signal timing are required.			

Under current traffic volumes, the intersection performs quite well with an HCM LOS of C for both peak periods. Using forecasted volumes under the Post-Development Without Improvements scenario, the LOS of the eastbound through and right movements drops to LOS F in the AM peak period due to a large increase in projected traffic volumes, with the expected queue length extending to 126 Street. In the PM peak period, this LOS change is only exhibited by the eastbound right movement, albeit not as severe. These increases in delay result in an overall LOS of D for the intersection in both peak periods. While the proposed transit lanes would increase the theoretical roadway capacity along 118 Avenue, the analysis shows that this may worsen the flow of car traffic in the AM peak period.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.18** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.18 Traditional LOS 124 Street and 118 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	352	44	200	140	170	23	30	1532	405	44	811	108	
	v/c Ratio	0.33	0.32		0.48	0.35		0.15	1.06	1.09	0.16	0.38	0.38	0.698
	LOS	B	C		D	C		C	F	F	C	B	B	D
	Delay (s)	19.3	20.1		42.6	29.1		34.6	75.7	98.8	23.0	18.9	19.7	52.9
	95th % Queue (m)	36.3	49.2		48.8	52.0		9.5	228.5	253.3	8.9	62.4	64.2	
Post-Development with Improvements	Volume	352	44	200	140	170	23	30	1532	405	44	811	108	
	v/c Ratio	0.39	0.36		0.49	0.35		0.15	1.3	1.4	0.16	0.49	0.5	0.86
	LOS	C	C		D	C		C	F	F	C	B	B	F
	Delay (s)	23.9	24.0		43.8	29.1		34.6	176.2	221.5	22.4	18.5	18.6	111.3
	95th % Queue (m)	40.6	54.8		49.6	52.0		9.5	516.6	587.2	8.1	88.6	86.3	
PM Peak														
Post-Development without Improvements	Volume	401	38	220	87	36	37	25	925	512	115	1426	171	
	v/c Ratio	0.27	0.31		0.34	0.15		0.31	0.84	1.00	0.45	0.72	0.73	0.593
	LOS	B	B		D	C		E	D	F	C	C	C	D
	Delay (s)	17.2	18.4		44.8	31.1		63.5	43.3	80.8	31.8	30.4	34.0	38.4
	95th % Queue (m)	41.4	52.0		32.6	20.3		12.5	139.9	186.5	31.0	134.2	141.2	
Post-Development with Improvements	Volume	401	38	220	87	36	37	25	925	512	115	1426	171	
	v/c Ratio	0.4	0.43		0.38	0.15		0.27	0.87	0.92	0.41	0.78	0.8	0.661
	LOS	C	C		D	C		E	D	D	C	C	C	C
	Delay (s)	29.0	30.2		48.3	31.1		57.1	39.7	47.8	26.3	25.7	27.0	33.7
	95th % Queue (m)	55.4	67.2		34.1	20.3		11.8	202.9	203.8	23.1	179.8	182.1	

5.1.3.3 104 Avenue Corridor

104 Avenue is a street oriented mixed-use /commercial arterial road. It is a pedestrian priority area from 121 Street to 105 Street and is undergoing major reconstruction as part of the Valley Line West LRT project.

104 Avenue is comprised of a centre-running LRT and 4-lane vehicle cross section flanked by sidewalk. The vehicle cross section expands at intersections to provide dedicated left and right turn bays as needed. A shared use path replaces the north sidewalk between 121 and 118 Street. Parking is not permitted on 104 Avenue. The cross-section elements are illustrated in **Figure 5-34** through **Figure 5-36**.

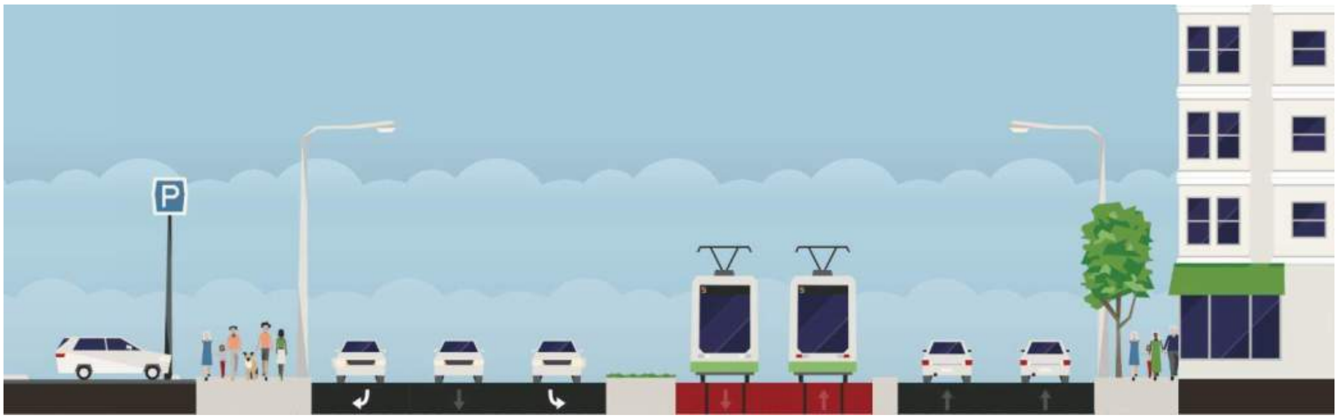


Figure 5-34 104 Avenue Facing East (West of 121 Street)

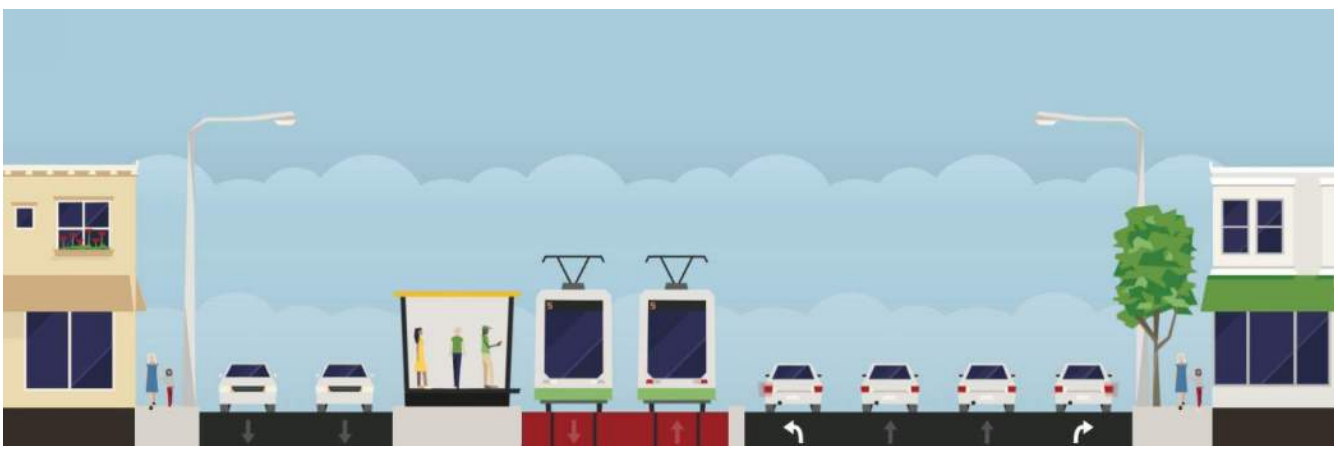


Figure 5-35 104 Avenue Facing East (West of 116 Street)

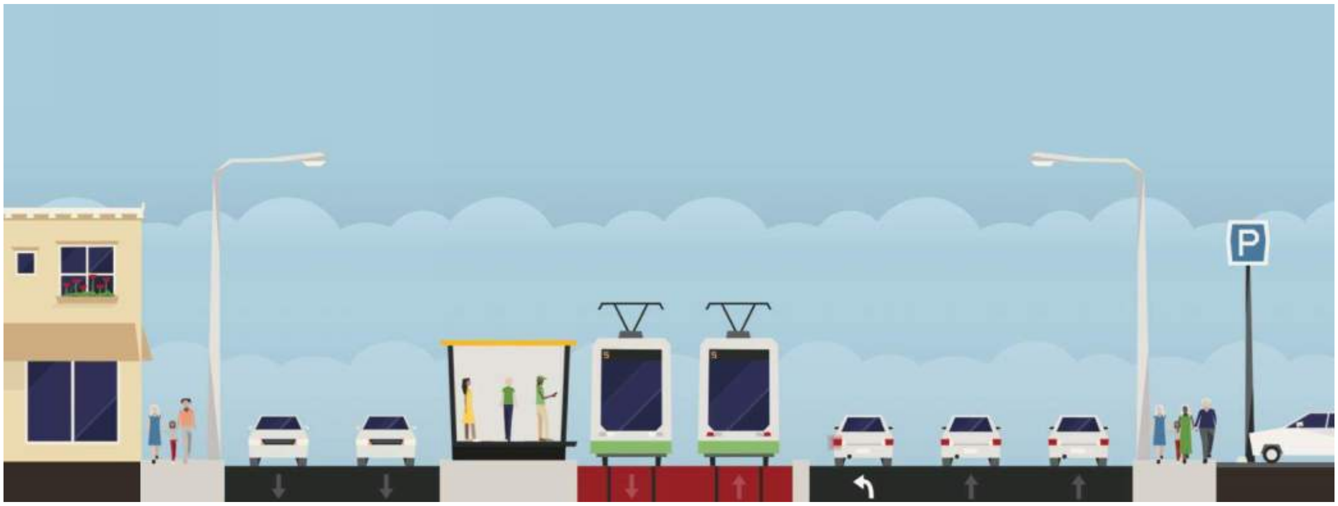


Figure 5-36 104 Avenue Facing East (West of 112 Street)

An assessment of the 104 Avenue corridor was made based on the Valley Line West LRT renderings and should be confirmed with construction details. The changes to 104 Avenue create a much more multimodal environment but pedestrian experiences fall short of MMLOS targets. Ensuring 104 Avenue is constructed with at least 2.6 m unobstructed walk width, or a 1.6 m buffer / furnishing zone will result in acceptable pedestrian experiences at the corridor level.

Additional cycling infrastructure is needed to support the current planned network. The 2022 Infill Roadmap report identified opportunities to install a bike lane on 116 Street while the Wîhkwêntôwin neighbourhood renewal has proposed new connections on 118/119 and 112 Street. The combination of all three routes provides robust cycling network coverage. While the Wîhkwêntôwin neighbourhood renewal routes are planned for near-term implementation as part of the renewal itself, it is uncertain whether 116 Street will adopt similar infrastructure. Therefore, no changes to 116 Street are assumed as part of this assessment.

Expected multimodal operations at the corridor level are summarized in **Table 5.19** based on these recommendations however, individual intersection assessments in the following sections capture incremental changes that can be implemented in the meantime. Detailed MMLOS tables which analyze each corridor under existing and recommended conditions are found in **Appendix G** and **Appendix H**, respectively.

Table 5.19 MMLOS 104 Avene from 121 Street to 109 Street

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS C	LOS C	LOS D
Post-Development without Improvements Corridor Performance	✗	n/a	✓	✓
Post-Development with Improvements Corridor Performance	✓	n/a	✓	✓
Notes	**All recommendations along the Valley Line West corridor will need to be coordinated with Marigold Infrastructure Partners.** The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the corridor encompassing a Pedestrian Priority Area. • Transit: Target LOS adjusted from D to C due to the Valley Line LRT present within the corridor. Throughout much of the corridor, the pedestrian realm either consists of a wide walk or a wide furnishing / buffer zone. There are a handful of instances where both criteria are met. Pedestrian MMLOS may be improved by: • Ensuring both a wide pedestrian walk width (≥2.6 m) and buffer zone (≥1.6 m) are provided. While cyclist facilities are not expected on 104 Street, VLW plans include a shared use path on the north side of the street between 121 Street and 118 Street (future district connector). Broader east/west cycling demand must be met on 105 Avenue protected bike lanes / 106 Avenue painted bike lanes and 102 Avenue protected bi-directional bike lanes, two block to the north and south respectively.			

5.1.3.3.1 121 Street and 104 Avenue

The configuration of the 121 Street and 104 Avenue / Stony Plain Road intersection is based on Valley Line LRT concept drawings. LRT stations are located one block east and west of the intersection. 124 Street is part of the cycling network while 104 Avenue is a pedestrian priority area.

121 Street is comprised of a 5-lane vehicle cross section and painted bike lanes, flanked by sidewalk. Parking is permitted in both directions. The cross-section elements are illustrated in **Figure 5-38.**

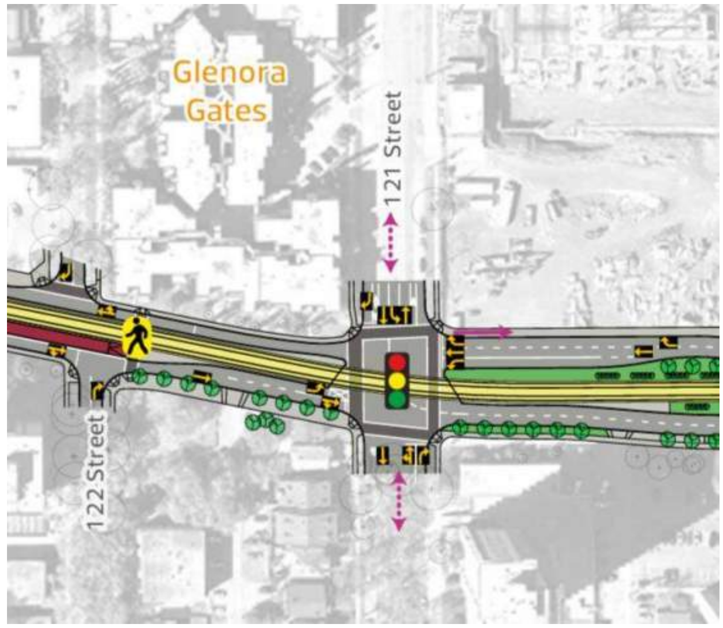


Figure 5-37 121 Street and 104 Avenue

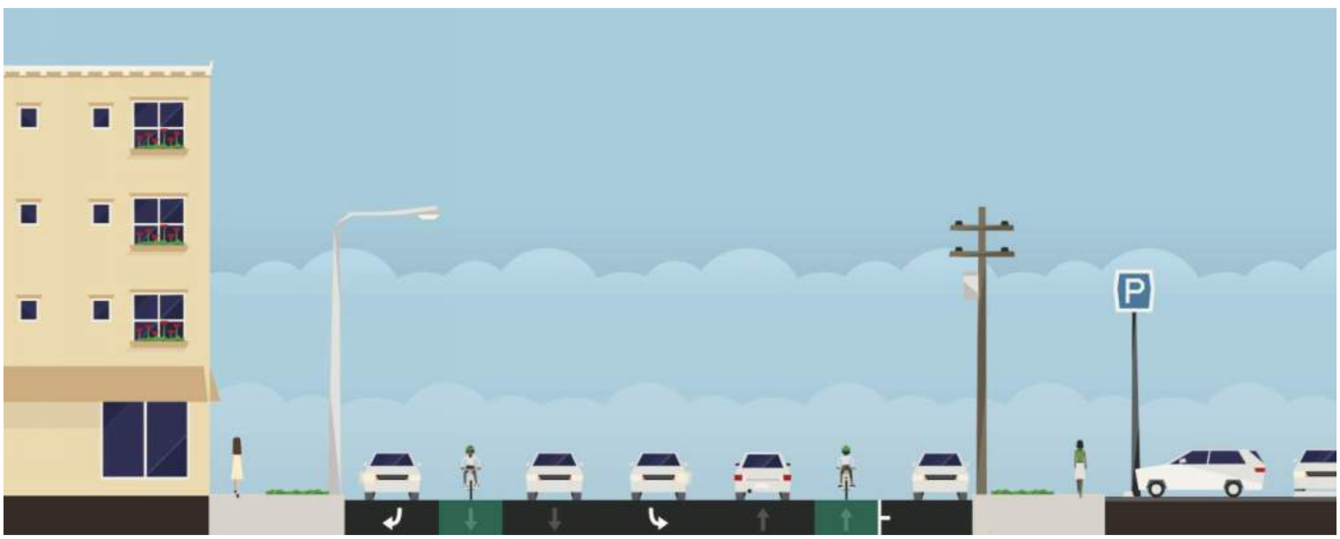


Figure 5-38 121 Street Facing North

Expected multimodal operations following rezoning and development are summarized in **Table 5.20**, comparing MMLOS outcomes with and without recommended changes to the road network.

The purpose of the study has been to identify the overall multi-modal impacts as a result of PGA rezoning. The traffic analysis completed is not intended to be a detailed operational analysis of the intersections along the Valley Line LRT and such a study would require final designs and operational signal timing plans.

Table 5.20 MMLOS 121 Street and 104 Avenue

<table>
<tr><th>Mode</th><th>Pedestrian</th><th>Cyclist</th><th>Transit</th><th>Motor Vehicles</th></tr>
<tr><td>Original Target</td><td>LOS C</td><td>LOS C</td><td>LOS D</td><td>LOS D</td></tr>
<tr><td>Adjusted Target</td><td>LOS B</td><td>LOS B</td><td>LOS C</td><td>LOS D</td></tr>
<tr><td>Post-Development without Improvements Intersection Performance</td><td>✗</td><td>✗</td><td>✓</td><td>✓</td></tr>
<tr><td>Notes</td><td colspan="4">The target LOS was adjusted for the following modes:
• Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area.
• Cyclists: Target LOS adjusted from C to B due to the intersection being situated along the 124 Street Cycling Corridor (painted bike lane).
• Transit: Target LOS adjusted from D to C due to the intersection being situated along the Valley Line LRT.
Pedestrian LOS is largely affected by long cycle lengths and uncontrolled conflicts with turning vehicles.
Painted bike lanes on 121 Street may not provide low-stress riding for cyclists of all ages and abilities and diminishes the safe operation of cyclists through the intersection.</td></tr>
<tr><td>Post-Development with Improvements Intersection Performance</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Recommended Treatment</td><td colspan="4">All recommendations along the Valley Line West corridor will need to be coordinated with Marigold Infrastructure Partners.
The design of the Valley Line West assumes enhanced pedestrian facilities including audible pedestrian signals, TWSIs, and enhanced storage. To achieve the target pedestrian MMLOS, we recommend:
• Banning RTOR movements on each approach to reduce the number of uncontrolled conflicts between vehicles and pedestrians.
• Implement a protected-only southbound left turn phase in both peak periods.
To address cyclist MMLOS, we recommend:
• Installing protected bike lanes at this intersection to facilitate the safe passage of cyclists and reduce the risk of vehicle conflict.</td></tr>
</table>

	The analysis assumes the removal of the parking lane on the south approach to accommodate a uni-directional facility, which may differ from the future design implemented as part of the Wîhkwêntôwin neighbourhood renewal. A similar facility on the north approach, however, can likely be accommodated without any parking removal. No specific changes are required to address transit MMLOS. Declining vehicle MMLOS may be mitigated by implementing the following: • AM peak period: allocate more green time to the southbound left movement to mitigate the effects of protected-only phasing. • PM peak period: no signal timing changes are required.

Under current traffic volumes, the intersection performs fairly with an HCM LOS of C and D for the AM and PM peak periods, respectively. Using forecasted volumes under the Post-Development Without Improvements scenario, the overall LOS of the intersection in both peak periods remains the same. In fact, a reduction in total delay is observed due to some reductions in anticipated traffic volume, and no critical (LOS F) movements are present.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.21** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.21 Traditional LOS 121 Street and 104 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	N/A	106	38	170	160	15	37	444	13	6	169	25	
	v/c Ratio	0.29		0.12	0.37	0.29	0.03	0.33	0.64		0.05	0.24	0.04	0.455
	LOS	D		D	C	C	C	E	C		D	C	C	C
	Delay (s)	41.5		38.6	31.2	29.7	25.7	60.6	31.7		52.5	22.8	20.3	31.9
	95th % Queue (m)	39.0		12.0	53.4	48.7	3.6	17.9	125.8		2.7	44.0	5.3	
Post-Development with Improvements	Volume	N/A	106	38	170	160	15	37	444	13	6	169	25	
	v/c Ratio	0.42			0.6	0.23	0.03	0.27	0.87		0.04	0.32	0.06	0.515
	LOS	D			D	C	B	E	E		D	C	C	D
	Delay (s)	44.7			53.4	21.7	19.0	55.7	55.7		50.3	32.7	28.8	45.1
	95th % Queue (m)	55.8			69.5	40.5	3.4	16.8	162.7		2.6	54.3	7.4	
PM Peak														
Post-Development without Improvements	Volume	N/A	197	36	75	257	50	39	203	9	30	512	69	
	v/c Ratio	0.49		0.1	0.17	0.41	0.09	0.32	0.35		0.24	0.83	0.13	0.496
	LOS	D		D	C	C	C	E	C		E	D	C	D
	Delay (s)	43.7		35.9	24.4	27.9	22.6	58.4	29.1		56.1	46.8	25.7	38.0
	95th % Queue (m)	71.3		10.8	19.9	72.3	11.5	18.3	62.4		13.8	167.1	17.2	
Post-Development with Improvements	Volume	N/A	197	36	75	257	50	39	203	9	30	512	69	
	v/c Ratio	0.6			0.47	0.41	0.1	0.32	0.35		0.24	0.83	0.15	0.538
	LOS	D			E	C	C	E	C		E	D	C	D
	Delay (s)	47.6			59.8	27.9	22.8	58.4	29.2		56.1	46.8	25.9	40.5
	95th % Queue (m)	85.4			34.9	72.3	12.9	18.3	62.7		13.8	167.1	19.2	

5.1.3.3.2 116 Street and 104 Avenue

The configuration of the 116 Street and 104 Avenue intersection is based on Valley Line LRT concept drawings. LRT stations are located on either side of the intersection. 104 Avenue and the south leg of 116 Street are pedestrian priority areas.

116 Street is comprised of a 5-lane vehicle cross section, flanked by sidewalk. Parking in not permitted on 116 Street. The cross-section elements are illustrated in **Figure 5-40.**

Figure 5-39 116 Street and 104 Avenue

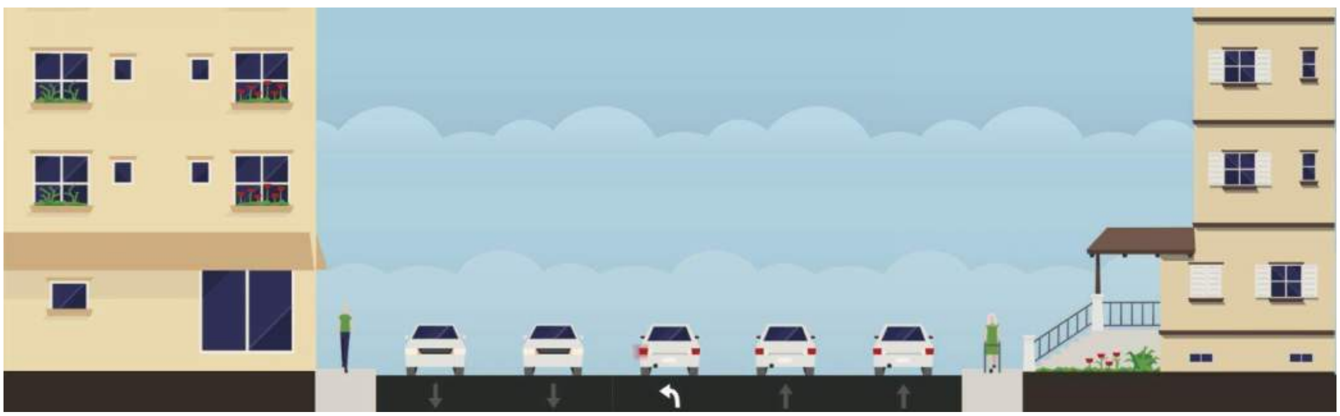


Figure 5-40 116 Street Facing North

Expected multimodal operations following rezoning and development are summarized in **Table 5.22**, comparing MMLOS outcomes with and without recommended changes to the road network.

The purpose of the study has been to identify the overall multi-modal impacts as a result of PGA rezoning. The traffic analysis completed is not intended to be a detailed operational analysis of the intersections along the Valley Line LRT and such a study would require final designs and operational signal timing plans.

Table 5.22 MMLOS 116 Street and 104 Avenue

<table>
<tr><th>Mode</th><th>Pedestrian</th><th>Cyclist</th><th>Transit</th><th>Motor Vehicles</th></tr>
<tr><td>Original Target</td><td>LOS C</td><td>LOS C</td><td>LOS D</td><td>LOS D</td></tr>
<tr><td>Adjusted Target</td><td>LOS B</td><td>LOS C</td><td>LOS C</td><td>LOS D</td></tr>
<tr><td>Post-Development without Improvements Intersection Performance</td><td>✗</td><td>⚠</td><td>✓</td><td>✓</td></tr>
<tr><td>Notes</td><td colspan="4">The target LOS was adjusted for the following modes:
Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area.
Transit: Target LOS adjusted from D to C due to the intersection being situated along the Valley Line LRT.
Pedestrian LOS is largely affected by long cycle lengths and uncontrolled conflicts with turning vehicles.

Cyclist facilities are not expected on 116 Street in the near term. North/south cycling demand must be met on the future cycling facilities for either 118 Street or 119 Street along with 112 Street planned for implementation as part of the Wîhkwêntôwin neighbourhood renewal.</td></tr>
<tr><td>Post-Development with Improvements Intersection Performance</td><td>✓</td><td>⚠</td><td>✓</td><td>✓</td></tr>
<tr><td>Recommended Treatment</td><td colspan="4">All recommendations along the Valley Line West corridor will need to be coordinated with Marigold Infrastructure Partners.

Pedestrian MMLOS may be addressed by:
Implementing LPIs on all pedestrian phases in both peak periods to prioritize pedestrian movement.
Banning RTOR movements on all approaches.
In the PM peak period, the addition of protected-only phasing to the northbound and southbound left turning movements to minimize the number of uncontrolled pedestrian-vehicle conflicts.
No specific changes are required to address cyclist MMLOS.

No specific changes are required to address transit MMLOS.

No specific changes are required to address vehicle MMLOS.</td></tr>
</table>

Under current traffic volumes inputted into the planned intersection layout of the Valley Line West, the intersection exhibits a HCM LOS of D in the AM peak period and E for the PM peak period. Using forecasted volumes under the Post-Development Without Improvements scenario, the LOS of the eastbound right lane drops from C to E in the AM peak period due to a significant increase in anticipated volume. The overall intersection performance, however, remains largely the same. In the PM peak period, a similar change occurs for southbound through movements for the same reason. However, the overall intersection delay improves slightly due to a drop in volumes on other movements, particularly in the westbound direction.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.23** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.23 Traditional LOS 116 Street and 104 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	88	319	7	89	434	16	47	793	427	77	316	62	
	v/c Ratio	0.85	0.37	0.37	0.17	0.62	0.02	0.38	0.8	0.93	0.63	0.37	0.38	0.62
	LOS	F	D	D	C	C	B	E	D	E	E	C	C	D
	Delay (s)	112.1	36.8	36.9	20.5	29.4	18.4	60.8	45.0	69.8	74.9	34.3	34.8	46.0
	95th % Queue (m)	57.9	56.3	56.2	21.5	116.6	3.2	22.5	130.5	154.0	40.9	61.7	60.4	
Post-Development with Improvements	Volume	88	319	7	89	434	16	47	793	427	77	316	62	
	v/c Ratio	1.47	0.44	0.44	0.17	0.69	0.03	0.38	0.93	1.22	0.63	0.43	0.45	0.656
	LOS	F	D	D	C	D	C	E	E	F	E	D	D	E
	Delay (s)	340.6	42.2	42.4	20.5	35.1	21.3	60.8	60.5	162.9	74.9	39.4	40.2	75.6
	95th % Queue (m)	89.2	60.4	60.3	21.4	126.9	3.9	22.5	148.1	249.3	40.9	66.7	65.3	
PM Peak														
Post-Development without Improvements	Volume	98	310	29	81	566	8	143	341	162	72	513	350	
	v/c Ratio	0.46	0.36	0.36	0.16	1.01	0.01	0.74	0.41	0.42	0.37	1	1.08	0.785
	LOS	D	D	D	C	F	C	E	D	D	E	F	F	E
	Delay (s)	36.2	37.1	37.3	21.2	82.0	26.7	76.7	41.1	43.3	57.1	91.7	117.8	71.0
	95th % Queue (m)	29.4	60.6	59.9	20.7	245.6	2.0	73.3	62.9	57.9	33.5	204.2	203.3	
Post-Development with Improvements	Volume	98	310	29	81	566	8	143	341	162	72	513	350	
	v/c Ratio	0.86	0.41	0.42	0.42	1.13	0.02	0.74	0.48	0.56	0.37	1.23	1.35	0.829
	LOS	F	D	D	E	F	C	E	D	D	E	F	F	F
	Delay (s)	112.8	42.0	42.4	58.5	125.1	30.0	76.7	46.2	51.9	57.1	175.9	226.8	116.9
	95th % Queue (m)	64.8	64.6	63.9	38.3	294.5	2.5	73.3	66.3	68.2	33.5	284.2	283.9	

5.1.3.3.3 112 Street and 104 Avenue

The configuration of the 112 Street and 104 Avenue intersection is based on Valley Line LRT concept drawings. LRT stations are located on either side of the intersection. 104 Avenue is a pedestrian priority area.

112 Street is comprised of a 4-lane vehicle cross section flanked by sidewalk. Parking is permitted on both sides of the street. The cross-section elements are illustrated in **Figure 5-42**

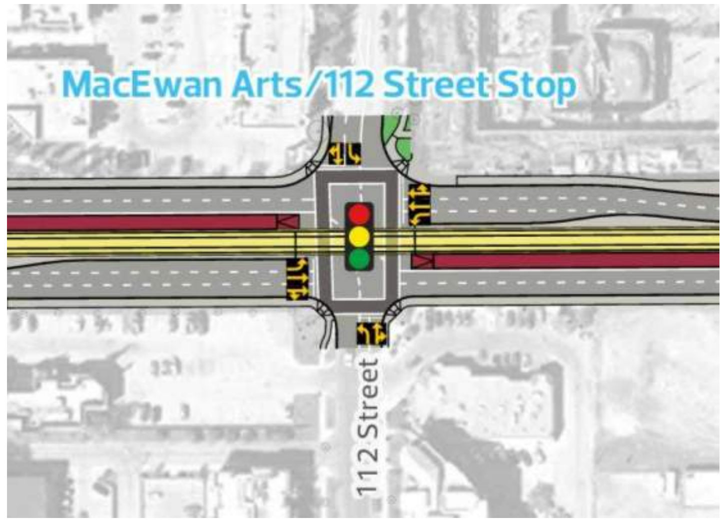


Figure 5-41 112 Street and 104 Avenue

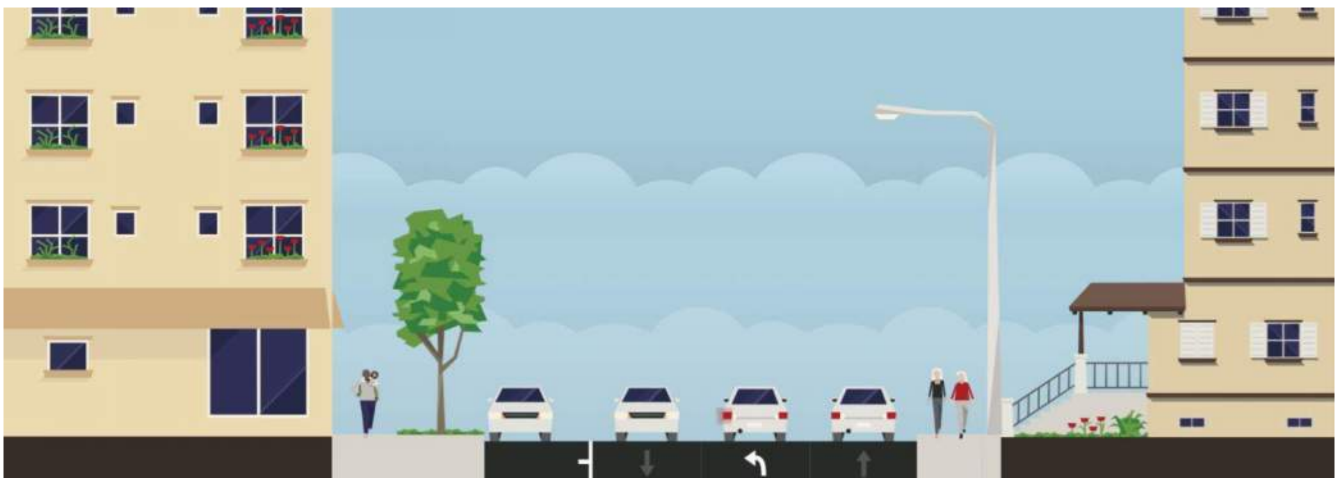


Figure 5-42 112 Street Facing North

Expected multimodal operations following rezoning and development are summarized in **Table 5.24**, comparing MMLOS outcomes with and without recommended changes to the road network.

The purpose of the study has been to identify the overall multi-modal impacts as a result of PGA rezoning. The traffic analysis completed is not intended to be a detailed operational analysis of the intersections along the Valley Line LRT and such a study would require final designs and operational signal timing plans.

Table 5.24 MMLOS 112 Street and 104 Avenue

<table>
<tr><th>Mode</th><th>Pedestrian</th><th>Cyclist</th><th>Transit</th><th>Motor Vehicles</th></tr>
<tr><td>Original Target</td><td>LOS C</td><td>LOS C</td><td>LOS D</td><td>LOS D</td></tr>
<tr><td>Adjusted Target</td><td>LOS B</td><td>LOS C</td><td>LOS C</td><td>LOS D</td></tr>
<tr><td>Post-Development without Improvements Intersection Performance</td><td>✗</td><td>⚠</td><td>✓</td><td>✓</td></tr>
<tr><td>Notes</td><td colspan="4">The target LOS was adjusted for the following modes:

Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area.
Transit: Target LOS adjusted from D to C due to the intersection being situated along the Valley Line LRT.

Pedestrian LOS is largely affected by long cycle lengths and uncontrolled conflicts with turning vehicles.

Cyclist facilities have been planned for 112 Street as part of the upcoming Wîhkwêntôwin neighbourhood renewal. While the design and facility type are unknown, it is assumed that the width of 112 Street would allow for the installation of on-street bike lanes in place of existing parking lanes, without alterations to the existing configuration of travel lanes. Therefore, no changes to the intersection geometry are incorporated into the analysis, and the recommendations made would not restrict the provision of cycling facilities either. Meanwhile, east-west cycling demand is currently met on 105 Avenue a block north or 102 Avenue two blocks south.</td></tr>
<tr><td>Post-Development with Improvements Intersection Performance</td><td>✓</td><td>⚠</td><td>✓</td><td>✓</td></tr>
<tr><td>Recommended Treatment</td><td colspan="4">All recommendations along the Valley Line West corridor will need to be coordinated with Marigold Infrastructure Partners.

Pedestrian MMLOS can be addressed by:

Implementing LPIs on all pedestrian phases in both peak periods to prioritize pedestrian movement.
Banning RTOR movements on all approaches.
In the PM peak period, the addition of protected-only phasing to the northbound and southbound left turning movements to minimize the number of uncontrolled pedestrian-vehicle conflicts.

To address cyclist MMLOS, we recommend:</td></tr>
</table>

	• Implementing cyclist facilities on 112 Street as planned as part of the upcoming Wîhkwêntôwin neighbourhood renewal. No specific changes are required to address transit MMLOS. No specific changes are required to address vehicle MMLOS.

Under current traffic volumes inputted into the planned intersection layout of the Valley Line West, the intersection exhibits an HCM LOS of D for both peak periods. Using forecasted volumes under the Post-Development Without Improvements scenario, no changes are observed to the LOS of any movement nor the intersection itself.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.25** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.25 Traditional LOS 112 Street and 104 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	58	105	140	75	142	6	12	907	32	56	426	27	
	v/c Ratio	0.14	0.42		0.23	0.24		0.1	0.75	0.75	0.46	0.36	0.37	0.488
	LOS	C	C		D	C		D	D	D	E	C	C	D
	Delay (s)	30.1	28.4		37.0	24.8		52.4	40.4	40.8	64.1	28.7	28.8	35.6
	95th % Queue (m)	18.0	67.9		26.5	40.8		5.3	144.7	144.2	27.5	65.7	65.2	
Post-Development with Improvements	Volume	58	105	140	75	142	6	12	907	32	56	426	27	
	v/c Ratio	0.16	0.5		0.29	0.27		0.1	0.84	0.85	0.46	0.41	0.42	0.502
	LOS	C	C		D	C		D	D	D	E	C	C	D
	Delay (s)	34.5	33.9		44.3	28.5		52.4	51.3	52.4	64.1	33.0	33.3	43.2
	95th % Queue (m)	19.5	77.4		29.5	44.6		5.3	161.6	161.5	27.5	70.6	70.0	
PM Peak														
Post-Development without Improvements	Volume	168	116	35	17	94	18	5	447	60	46	671	55	
	v/c Ratio	0.48	0.3		0.05	0.22		0.02	0.4	0.41	0.2	0.57	0.58	0.404
	LOS	D	C		D	C		D	C	C	D	D	D	D
	Delay (s)	45.3	33.1		37.5	31.7		46.9	31.6	32.0	50.0	36.0	36.4	35.7
	95th % Queue (m)	67.5	50.4		6.2	36.5		2.1	78.3	77.1	19.7	113.4	112.0	
Post-Development with Improvements	Volume	168	116	35	17	94	18	5	447	60	46	671	55	
	v/c Ratio	0.92	0.47		0.09	0.34		0.02	0.59	0.62	0.2	0.84	0.86	0.474
	LOS	F	D		D	D		D	D	D	D	E	E	E
	Delay (s)	105.8	48.6		51.6	45.2		46.9	47.5	49.1	50.0	62.2	65.7	60.3
	95th % Queue (m)	96.3	63.0		7.6	45.7		2.1	95.4	94.6	19.7	146.3	146.8	

5.1.3.4 Jasper Avenue Corridor

Jasper Avenue is a street oriented mixed-use /commercial arterial road. It is a pedestrian priority area from 124 to 109 Street and supports a variety of transit routes. Imagine Jasper Avenue is a revitalization project from 109 to 124 Street that is currently ongoing. Construction of Phase 1, from 109 to 114 Street, was completed in 2021 and Phase 2 expected to start in 2025 and will take three years to complete.

West of 114 Street, Jasper Avenue is comprised of a 7-lane vehicle cross section flanked by sidewalk. The south parking lane becomes a dedicated transit, taxi, and bike lane during the weekday AM peak period. The north parking lane becomes a dedicated transit, taxi, and bike lane in the weekday PM peak period. East of 114 Street, Jasper Avenue is comprised of a 5-lane vehicle cross section flanked by sidewalk. Parking is provided through dedicated lay-bys. The cross-section elements are illustrated in **Figure 5-43** through **Figure 5-45**.

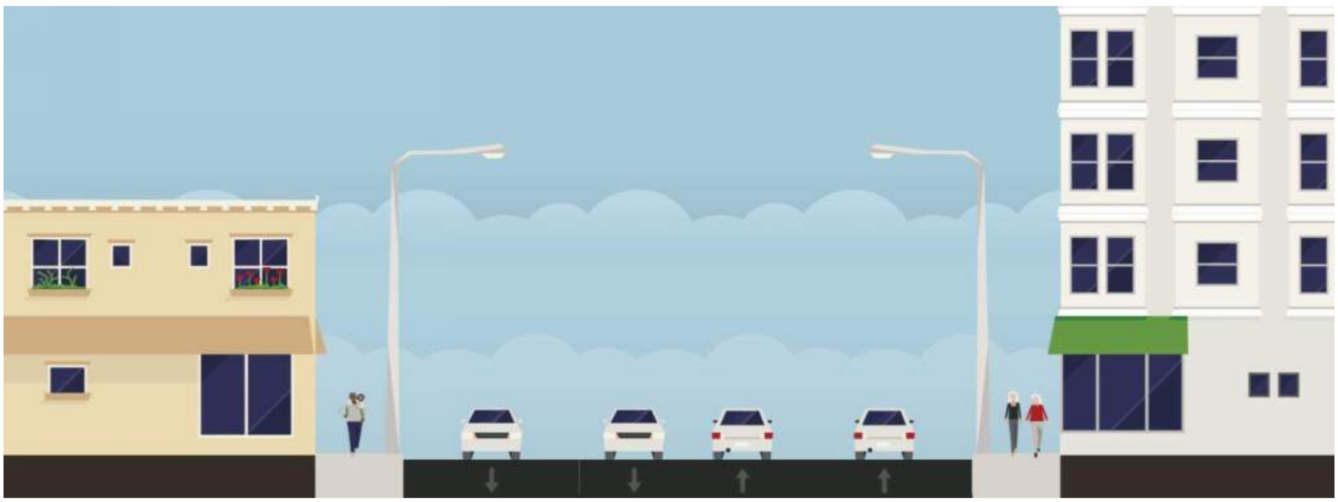


Figure 5-43 Jasper Avenue Facing East (West of 121 Street)

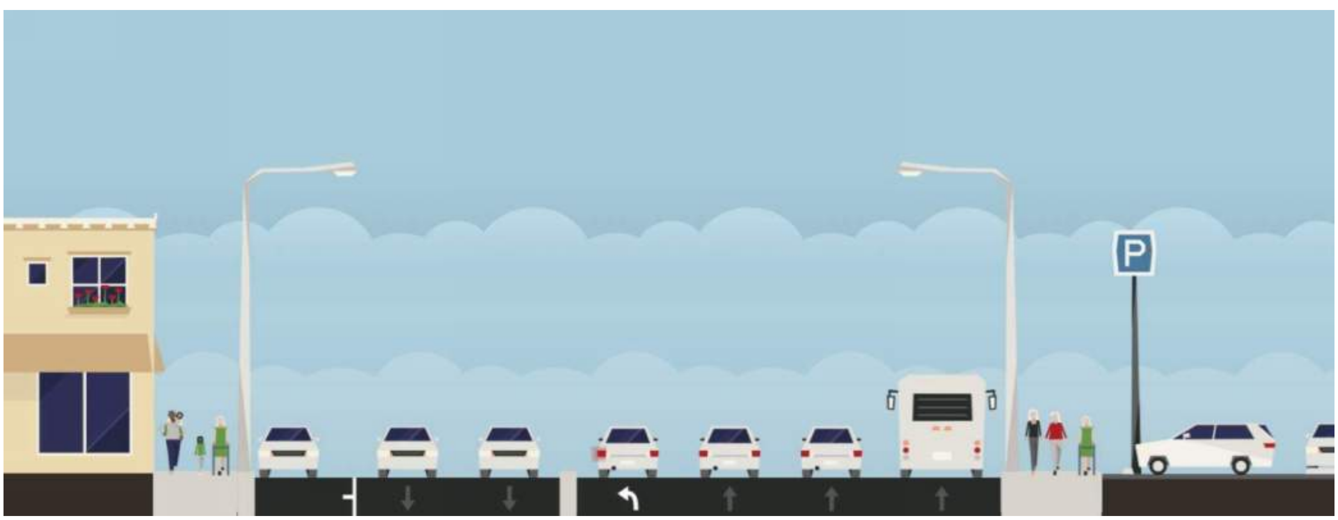


Figure 5-44 Jasper Avenue Facing East (West of 116 Street)

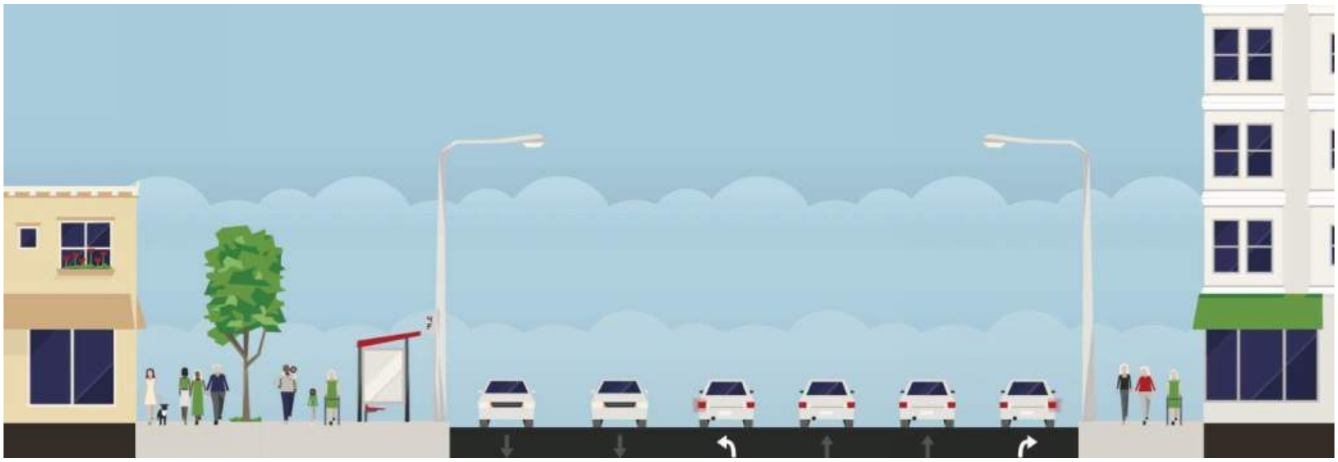


Figure 5-45 Jasper Avenue Facing East (West of 109 Street)

At a corridor level, the proposed Imagine Jasper Avenue cross section meets forecast MMLOS targets. Additional cycling infrastructure is needed to support the current planned network:

- A parallel cycling network is needed on 100 Avenue, identified in the Bike Plan, between 117 and 110 Street.
- The 2022 Infill Roadmap report identified opportunities to install a bike lane on 116 Street while the Imagine Jasper Avenue project has proposed bike lanes on 121 Street and the Wîhkwêntôwin neighbourhood renewal will implement bike connections on either 118 or 119 Street as well as 112 Street. The combination of all four routes provides robust cycling network coverage. While the Wîhkwêntôwin neighbourhood renewal and Imagine Jasper routes are planned for near-term implementation as part of the projects themselves, it is uncertain whether bike infrastructure will be constructed on 116 Avenue in the near term. Therefore, no changes to 116 Street are assumed as part of this assessment.

Expected multimodal operations at the corridor level are summarized in **Table 5.26** based on these recommendations however, individual intersection assessments in the following sections capture incremental changes that can be implemented in the meantime. Detailed MMLOS tables which analyze each corridor under existing and recommended conditions are found in **Appendix G** and **Appendix H**, respectively.

Table 5.26 MMLOS Jasper Avene from 124 Street to 109 Street

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS C	LOS D	LOS D
Post-Development without Improvements Corridor Performance	✓	n/a	✓	✓
Post-Development with Improvements Corridor Performance	✓	n/a	✓	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the corridor encompassing a Pedestrian Priority Area. Cyclist facilities are not expected on Jasper Avenue. East/west cycling demand must be met on 102 Avenue protected bi-directional bike lanes, one block to the north and along 100 Avenue, one block to the south. The continuation of the 100 Avenue protected bike lane from 117 to 110 Street will be required and is expected to be implemented as part of the upcoming Wîhkwêntôwin neighbourhood renewal. Transit passenger amenities are plentiful where Imagine Jasper Avenue revitalization has already occurred. While transit amenities west of 114 Street do not currently meet these same standards, they are assumed to be complete by the post-development population horizon.			

5.1.3.4.1 121 Street and Jasper Avenue

The intersection of 121 Street and Jasper Avenue is fully signalized. Jasper Avenue and the north leg of 121 Street are pedestrian priority areas. 121 Street is part of the cycling network. Jasper Avenue and the north leg of 121 Street support frequent transit service.

121 Street is comprised of painted bike lanes and a 4-lane vehicle cross section, flanked by sidewalk. Curb lanes are used as right turn lanes at intersections, parking, and patio extensions. The south leg of the intersection becomes 100 Avenue, a one-way northbound street with protected bike lanes. The cross-section elements are illustrated in **Figure 5-47.**

Figure 5-46 121 Street and Jasper Avenue

Figure 5-47 121 Street Facing North

Expected multimodal operations following rezoning and development are summarized in **Table 5.27**, comparing MMLOS outcomes with and without recommended changes to the road network. The existing cross section at this intersection will be reconstructed as part of the Imagine Jasper project which is included in this analysis.

Table 5.27 MMLOS 121 Street and Jasper Avenue

<table>
<tr><th>Mode</th><th>Pedestrian</th><th>Cyclist</th><th>Transit</th><th>Motor Vehicles</th></tr>
<tr><td>Original Target</td><td>LOS C</td><td>LOS C</td><td>LOS D</td><td>LOS D</td></tr>
<tr><td>Adjusted Target</td><td>LOS B</td><td>LOS B</td><td>LOS D</td><td>LOS D</td></tr>
<tr><td>Post-Development without Improvements Intersection Performance</td><td>✗</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Notes</td><td colspan="4">The target LOS was adjusted for the following modes:
• Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area.
• Cyclists: Target LOS adjusted from C to B due to the intersection being situated along the 121 Street Cycling Corridor (On-Street protected bike lane).
Pedestrian LOS is largely affected by medium to long cycle lengths and uncontrolled conflicts with turning vehicles. Additionally, pedestrian crossing is not supported across the west leg.</td></tr>
<tr><td>Post-Development with Improvements Intersection Performance</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Recommended Treatment</td><td colspan="4">To meet pedestrian LOS target, we recommend:
• Banning RTOR movements in the northbound, southbound, and westbound directions to minimize the number of uncontrolled pedestrian conflicts.
We have assumed that the Imagine Jasper project will feature various pedestrian enhancements in its final design such as enhanced storage, audible crossing signals, lower curb radii, bollards, and/or other features as indicated in the design overview and available renderings.
No specific changes are required to address cyclist MMLOS. Separated bike lanes on 121 Street are to be constructed as part of the Imagine Jasper project which will tie into existing painted lanes north and south of the intersection until further adjustments are made as part of the Wîhkwêntôwin neighbourhood renewal project.
No specific changes are required to address transit MMLOS.
Declining vehicle MMLOS may be mitigated by implementing the following:
• AM peak period: no signal timing changes required.
• PM peak period: allocate more green time to the northbound left movement.</td></tr>
</table>

Using current traffic volumes inputted into the future intersection configuration being built as part of the Imagine Jasper project, the intersection exhibits an HCM LOS of B during the AM peak period and D during the PM peak period. The lower LOS of the PM peak period is attributed to the LOS F of the northbound left movement, which experiences a high volume of vehicles and subsequent delay due to limited storage space along the Victoria Promenade/100 Avenue. Using forecasted volumes under the Post-Development Without Improvements scenario, the overall LOS of the intersection and most movements remains unchanged in both peak periods.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.28** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.28 Traditional LOS 121 Street and Jasper Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
PGA Forecast Existing Intersection	Volume	117	62	27	90	N/A	16	3	1468	N/A	N/A	539	44	
	v/c Ratio	0.48	0.2			0.33		0.73	0.76			0.29	0.29	0.575
	LOS	D	C			D		B	C			B	B	B
	Delay (s)	48.5	29.4			37.2		19.1	20.4			10.2	10.3	19.9
	95th % Queue (m)	44.2	23.7			33.6		144.3	136.1			42.0	42.3	
PGA Forecast Recommended Intersection	Volume	117	62	27	90	N/A	16	3	1468	N/A	N/A	539	44	
	v/c Ratio	0.48	0.21			0.34		0.73	0.76			0.29	0.29	0.578
	LOS	D	C			D		B	C			B	B	B
	Delay (s)	48.9	29.5			37.4		19.1	20.4			10.2	10.3	20.0
	95th % Queue (m)	44.4	24.6			34.4		144.3	136.1			42.4	42.7	
PGA Forecast Existing Intersection	Volume	281	63	32	86	0	26	13	799	N/A	N/A	1331	66	
	v/c Ratio	1.38	0.24			0.39		0.4	0.41			0.64	0.65	0.639
	LOS	F	C			D		B	B			B	B	D
	Delay (s)	251.4	35.0			44.4		10.7	11.0			15.1	15.4	40.5
	95th % Queue (m)	210.7	29.5			41.2		64.9	63.4			121.1	122.5	
PGA Forecast Recommended Intersection	Volume	281	63	32	86	0	26	13	799	N/A	N/A	1331	66	
	v/c Ratio	0.63	0.15			0.23		0.61	0.64			0.88	0.89	0.642
	LOS	D	C			C		C	C			D	D	C
	Delay (s)	41.6	20.3			25.1		25.4	26.5			39.3	41.1	34.7
	95th % Queue (m)	91.5	21.8			29.9		84.1	110.8			196.0	200.3	

5.1.3.4.2 116 Street and Jasper Avenue

The intersection of 116 Street and Jasper Avenue is fully signalized. 116 Street and Jasper Avenue are pedestrian priority areas. Frequent transit routes run along Jasper Avenue while local routes run along 116 Street.

116 Street is comprised of a 4-lane vehicle cross section flanked by sidewalk. Parking is not permitted on 116 Street. The cross-section elements are illustrated in **Figure 5-49.**

Figure 5-48 116 Street and Jasper Avenue

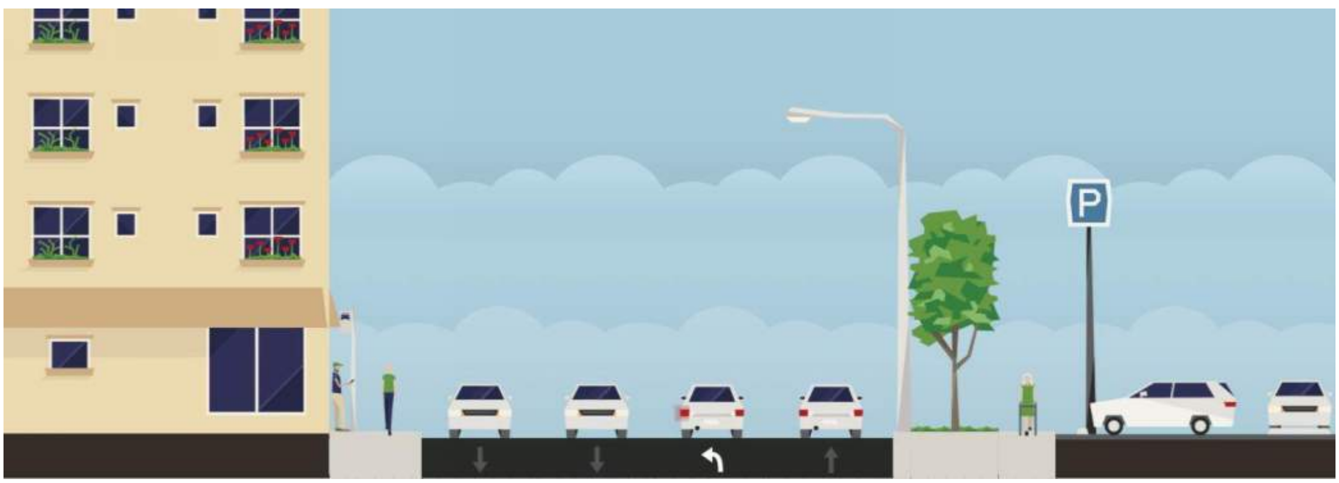


Figure 5-49 116 Street Facing North

Expected multimodal operations following rezoning and development are summarized in **Table 5.29**, comparing MMLOS outcomes with and without recommended changes to the road network. The existing cross section at this intersection will be reconstructed as part of the Imagine Jasper project which is included in this analysis. This will remove one through/parking lane in the westbound and eastbound direction.

Table 5.29 MMLOS 116 Street and Jasper Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS C	LOS D	LOS D
Post-Development without Improvements Intersection Performance	✗	⚠	✓	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area. Pedestrian LOS is largely affected by long cycle lengths and uncontrolled conflicts with turning vehicles. Cyclist facilities are not expected on 116 Street in the near term. North/south cycling demand must be met on the future cycling facilities for either 118 Street or 119 Street along with 112 Street planned for implementation as part of the Wîhkwêntôwin neighbourhood renewal.			
Post-Development with Improvements Intersection Performance	✓	⚠	✓	✓
Recommended Treatment	To address pedestrian MMLOS, we recommend: • Banning RTOR movements to minimize the number of uncontrolled pedestrian conflicts, which will have minimal impact on traffic performance due to the shared through/right lane configuration called for in the design of the Imagine Jasper project. We have assumed that the Imagine Jasper project will feature various pedestrian enhancements in its final design such as enhanced storage, audible crossing signals, lower curb radii, bollards, and/or other features as indicated in the design overview and available renderings. No specific changes are required to address cyclist MMLOS. No specific changes are required to address transit MMLOS. No specific changes are required to address vehicle MMLOS.			

Using current traffic volumes inputted into the future intersection configuration being built as part of the Imagine Jasper project, the intersection exhibits an HCM LOS of C in the AM peak period and D in the PM peak period. Using forecasted volumes under the Post-Development Without Improvements scenario, the LOS of the intersection drops to E in the AM peak period primarily due to an increase in eastbound through and right turning traffic, which may cause queue back ups extending to 119 Street. In the PM peak period, the eastbound and westbound left movements also experience larger delay due to increases in opposing through traffic. The overall LOS of the intersection, however, remains at D.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.30** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.30 Traditional LOS 116 Street and Jasper Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	149	320	68	222	556	39	37	1518	291	25	560	19	
	v/c Ratio	0.44	0.78		0.68	0.59	0.6	0.11	1.06	1.11	0.35	0.34	0.35	0.883
	LOS	C	D		D	C	D	C	F	F	E	B	B	E
	Delay (s)	24.0	43.6		37.6	34.8	35.1	21.1	74.6	91.6	62.7	16.2	16.3	55.5
	95th % Queue (m)	34.9	113.7		60.9	83.4	82.3	8.5	312.3	342.2	12.0	56.2	55.8	
Post-Development with Improvements	Volume	149	320	68	222	556	39	37	1518	291	25	560	19	
	v/c Ratio	0.44	0.8		0.69	0.6	0.6	0.11	1.08	1.13	0.35	0.35	0.35	0.9
	LOS	C	D		D	C	D	C	F	F	E	B	B	E
	Delay (s)	24.1	44.8		38.6	35.0	35.2	21.2	80.2	101.0	62.7	16.2	16.3	59.4
	95th % Queue (m)	34.9	116.9		61.4	84.1	82.9	8.5	328.0	365.8	12.0	56.5	56.1	
PM Peak														
Post-Development without Improvements	Volume	179	405	50	125	341	125	74	978	121	157	1472	41	
	v/c Ratio	0.44	0.79		0.4	0.4	0.42	1.13	0.86	0.87	0.94	0.95	0.96	0.688
	LOS	B	D		C	C	C	F	D	D	E	D	D	D
	Delay (s)	17.0	43.2		26.7	29.5	30.0	206.3	45.4	46.7	71.9	49.7	52.7	47.9
	95th % Queue (m)	35.6	137.2		31.1	66.0	63.1	62.5	168.7	166.0	64.4	234.6	240.3	
Post-Development with Improvements	Volume	179	405	50	125	341	125	74	978	121	157	1472	41	
	v/c Ratio	0.44	0.8		0.41	0.42	0.43	1.13	0.87	0.88	0.94	0.95	0.97	0.784
	LOS	B	D		C	C	C	F	D	D	E	D	D	D
	Delay (s)	17.2	43.9		27.0	29.7	30.4	206.3	46.5	48.1	71.9	50.2	53.7	48.6
	95th % Queue (m)	35.7	139.7		31.2	68.0	64.7	62.5	172.5	169.7	64.4	236.3	242.8	

5.1.3.5 100 Avenue Corridor

100 Avenue is a street-oriented collector road. It is a pedestrian priority area from 116 to 109 Street. Cycling infrastructure is present west of 116 Street and east of 110 Street. Additional cycling infrastructure is planned along the west leg of the intersection (Victoria Park Road) in 2025. While the exact facility type is not yet known, current temporary measures have converted the eastbound curb lane into a shared use path. Transit does not run on 100 Avenue.

On either side of 116 Street, 100 Avenue is comprised of a 5-lane vehicle cross section flanked by sidewalk. This gradually narrows to a 2-lane vehicle cross section flanked by boulevard walks between 115 Street to 112 Street. From 112 Street eastward, 100 Avenue is comprised of a 3-lane vehicle cross section flanked by sidewalk. Parking is generally prohibited with some exceptions. A bi-directional bike lane on the north side of the street ties into the shared use path that runs parallel to 109 Street. Sample cross-section elements are illustrated in **Figure 5-50** and **Figure 5-51**.

Figure 5-50 100 Avenue Facing East (West of 116 Street)

Figure 5-51 100 Avenue Facing East (West of 109 Street)

At a corridor level, the 100 Avenue cross section does not meet forecast MMLOS targets. Additional cycling infrastructure is needed to support the current planned network:

- The gap in the 100 Avenue cycling network must be filled between 117 and 110 Street. At this time, we have assumed that the future cycling facility will continue to be a protected bi-directional bike lane on the north side of the street, implemented as part of the Wîhkwêntôwin neighbourhood renewal process.
- Depending on the active transportation facility constructed on Victoria Park Road, the 100 Avenue cross section at 116 Street could be reduced further, reallocating space to the pedestrian realm in place of the southern curb lane, illustrated in **Figure 5-52**.
- The 2022 Infill Roadmap report identified opportunities to install a bike lane on 116 Street while the Wîhkwêntôwin neighbourhood renewal has proposed new connections on 118 Street or 119 Street and 112 Street. The combination of all three routes provides robust cycling network coverage. While the Wîhkwêntôwin neighbourhood renewal routes are planned for near-term implementation as part of the renewal itself, it is uncertain whether 116 Street will adopt similar infrastructure in the near term. Therefore, no changes to 116 Street are assumed as part of this assessment.

Figure 5-52 Potential 100 Avenue Cross Section Facing East (115 Street to 116 Street)

Expected multimodal operations at the corridor level are summarized in **Table 5.31** based on these recommendations however, individual intersection assessments in the following sections capture incremental changes that can be implemented in the meantime. Detailed MMLOS tables which analyze each corridor under existing and recommended conditions are found in **Appendix G** and **Appendix H**, respectively.

Table 5.31 MMLOS 100 Avene from 116 Street to 109 Street

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS B	LOS D	LOS E
Adjusted Target	LOS B	LOS B	LOS D	LOS E
Post-Development without Improvements Corridor Performance	✓	✗	na	✓
Post-Development with Improvements Corridor Performance	✓	✓	na	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the corridor encompassing a Pedestrian Priority Area. The expansion of the 100 Avenue cycling facility from 117 to 110 Street will be required and is expected to be implemented as part of the upcoming Wîhkwêntôwin neighbourhood renewal. East/west cycling demand must be met on 102 Avenue protected bi-directional bike lanes, two blocks to the north until the cycling network is expanded.			

5.1.3.5.1 116 Street and 100 Avenue

The intersection of 116 Street and 100 Avenue is fully signalized, with the south leg providing access to a commercial parking lot. The north leg of 116 Street and east leg of 100 Avenue are pedestrian priority areas. 100 Avenue is identified in the Bike Plan as part of the cycling network; however, no infrastructure currently exists between 117 and 110 Street. Local transit runs along 116 Street before tuning onto Victoria Park Road.

Figure 5-53 116 Street and 100 Avenue

116 Street is comprised of a 4-lane vehicle cross section, flanked by sidewalk. Parking is permitted in the northbound curb lane outside of weekday peak periods. The cross-section elements are illustrated in **Figure 5-54**.

Figure 5-54 116 Street Facing North

Expected multimodal operations following rezoning and development are summarized in **Table 5.32**, comparing MMLOS outcomes with and without recommended changes to the road network.

Table 5.32 MMLOS 116 Street and 100 Avenue

<table>
<tr><th>Mode</th><th>Pedestrian</th><th>Cyclist</th><th>Transit</th><th>Motor Vehicles</th></tr>
<tr><td>Original Target</td><td>LOS C</td><td>LOS B</td><td>LOS D</td><td>LOS E</td></tr>
<tr><td>Adjusted Target</td><td>LOS B</td><td>LOS B</td><td>LOS D</td><td>LOS E</td></tr>
<tr><td>Post-Development without Improvements Intersection Performance</td><td>✗</td><td>✗</td><td>✗</td><td>✓</td></tr>
<tr><td>Notes</td><td colspan="4">The target LOS was adjusted for the following modes:
• Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area.
Pedestrian LOS is largely affected by medium to long cycle lengths and uncontrolled conflicts with turning vehicles.
Cycling LOS does not meet the target LOS due to a lack of existing cycling facilities, which are not expected on 116 Street in the near term. North/south cycling demand must be met on the future cycling facilities for either 118 Street or 119 Street along with 112 Street planned for implementation as part of the Wîhkwêntôwin neighbourhood renewal. However, the 100 Avenue corridor is identified as an east-west cycling route as part of the Bike Plan.
Transit LOS fails in part due to a low pedestrian LOS, but also due to a lack of transit priority and high intersection delay</td></tr>
<tr><td>Post-Development with Improvements Intersection Performance</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Recommended Treatment</td><td colspan="4">To address pedestrian MMLOS, we recommend:
• Banning RTOR movements for each approach.
• Enhanced measures which could include increased storage, audible crossing signals, bollards, or curb extensions. Updates to the intersection geometry should emphasize a low turning radius (less than 9.0m) to enhance the pedestrian LOS.
East-west cycling demand is anticipated to be met by the construction of a future facility on 100 Avenue. While this may be included as part of the Wîhkwêntôwin neighbourhood renewal, currently scheduled for 2026-2028, it is not included in the Post-Development Without Improvements scenario as implementation and facility type is uncertain. However, the recommended intersection geometry assumes an on-street bidirectional cycling lane on the northern side of 100 Avenue approaching the intersection from the east, with a direct connection to the Victoria promenade. This corresponds to the existing cycling lane further east and removes the right turn lane to consolidate the existing outermost through lane into a shared through/right lane.</td></tr>
</table>

	No specific changes are required to address transit MMLOS, which improves on part of improved pedestrian access and reduced vehicle delay. Declining vehicle MMLOS may be mitigated by implementing the following: • AM peak period: allocate more green time to the eastbound left turn phase Total cycle length should not increase to maintain pedestrian MMLOS. • PM peak period: allocate more green time to the eastbound left turn phase Total cycle length should not increase to maintain pedestrian MMLOS.

Under current traffic volumes, the intersection performs well with an HCM LOS of C in the both the AM and PM peak periods. Using forecasted volumes under the Post-Development Without Improvements scenario, the LOS of the shared eastbound left/through lane drops to a LOS F in both peak periods because of anticipated increases in traffic volume in both movements and for westbound through traffic. This causes the overall intersection LOS to drop to E in both peak periods.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.33** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing. The recommended intersection geometry assumes an on-street cycling facility along the northern side of 100 Avenue on the east approach, which will consolidate the existing right turn and outermost through lane into a single shared lane.

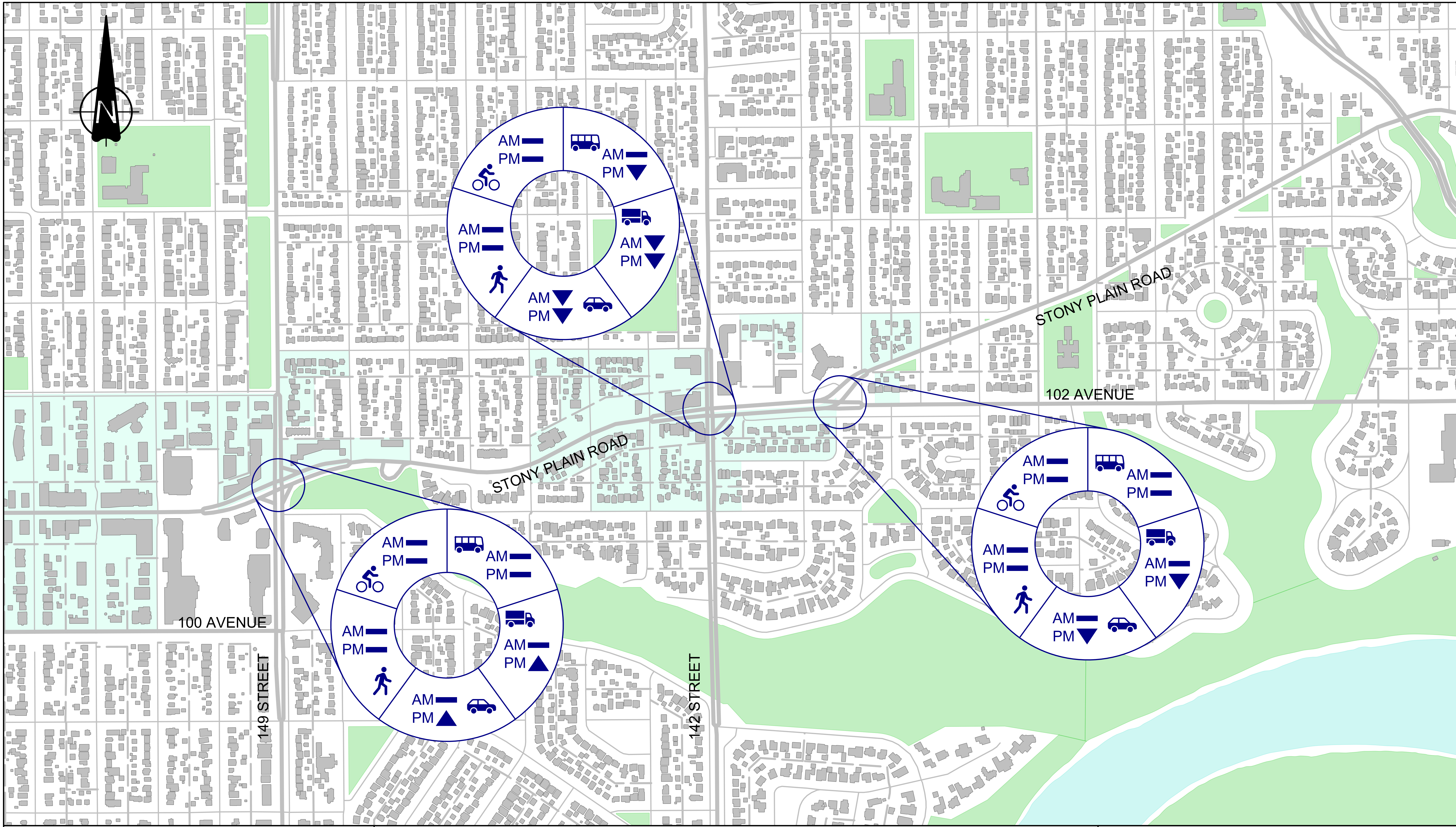
Table 5.33 Traditional LOS 116 Street and 100 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	7	3	8	275	7	551	455	818	13	4	635	83	
	v/c Ratio	0.06			0.57		0.51	1.29	0.95		0.62	0.67	0.17	0.519
	LOS	C			C		B	F	D		D	D	C	E
	Delay (s)	22.4			33.7		12.4	165.7	45.5		35.1	37.3	26.6	61.3
	95th % Queue (m)	3.9			80.7		76.4	305.3	196.8		83.0	95.9	19.2	
Post-Development with Improvements	Volume	7	3	8	275	7	551	455	818	13	4	635	83	
	v/c Ratio	0.13			0.88		0.56	1.01	0.78		0.71	0.78		0.864
	LOS	C			E		B	F	B		D	D		D
	Delay (s)	32.1			68.2		13.4	58.0	19.5		38.5	43.7		36.8
	95th % Queue (m)	5.5			110.6		87.1	150.2	126.3		98.0	112.3		
PM Peak														
Post-Development without Improvements	Volume	26	26	9	141	3	454	505	420	35	8	965	98	
	v/c Ratio	0.17			0.33		0.52	1.34	0.56		0.63	0.65	0.14	0.682
	LOS	C			C		C	F	B		C	C	C	E
	Delay (s)	29.4			33.5		20.3	190.1	15.6		29.2	30.2	20.2	56.5
	95th % Queue (m)	17.2			45.8		88.2	278.0	84.3		127.0	119.6	20.1	
Post-Development with Improvements	Volume	26	26	9	141	3	454	505	420	35	8	965	98	
	v/c Ratio	0.26			0.44		0.57	1.08	0.51		0.7	0.74		0.732
	LOS	D			D		C	F	B		C	C		D
	Delay (s)	38.0			43.0		21.5	91.5	10.5		31.8	34.1		38.8
	95th % Queue (m)	20.4			53.2		99.5	156.5	68.3		146.5	136.1		

5.2 156 Street / Stony Plain Road

Each intersection within the 156 Street / Stony Plain Road PGA was assessed in PTV Vistro using HCM 7th Edition, then exported into the OTC MMLOS toolkit to better weight the operations and experiences of vehicle delay against all multimodal travel. Detailed HCM LOS and MMLOS tables are included in **Appendices A through F**. These tables outline the HCM LOS and MMLOS results of both pre-development operations and post-development forecast operations along each corridor and at each intersection, with the post-development forecast consisting of two scenarios: 1) Post-Development without Improvements and 2) Post Development with Improvements.

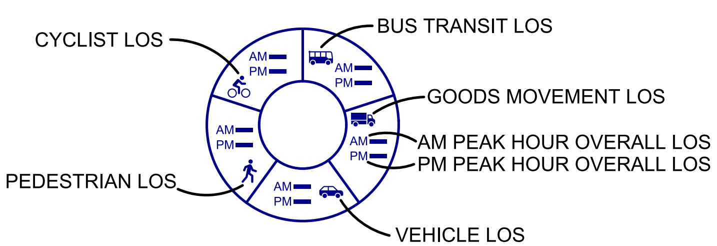
An overview of the AM and PM peak period MMLOS results comparing pre-development operations to post-development forecast operations (without improvements) are illustrated in **Figure 5-55** to **Figure 5-58**.



LEGEND

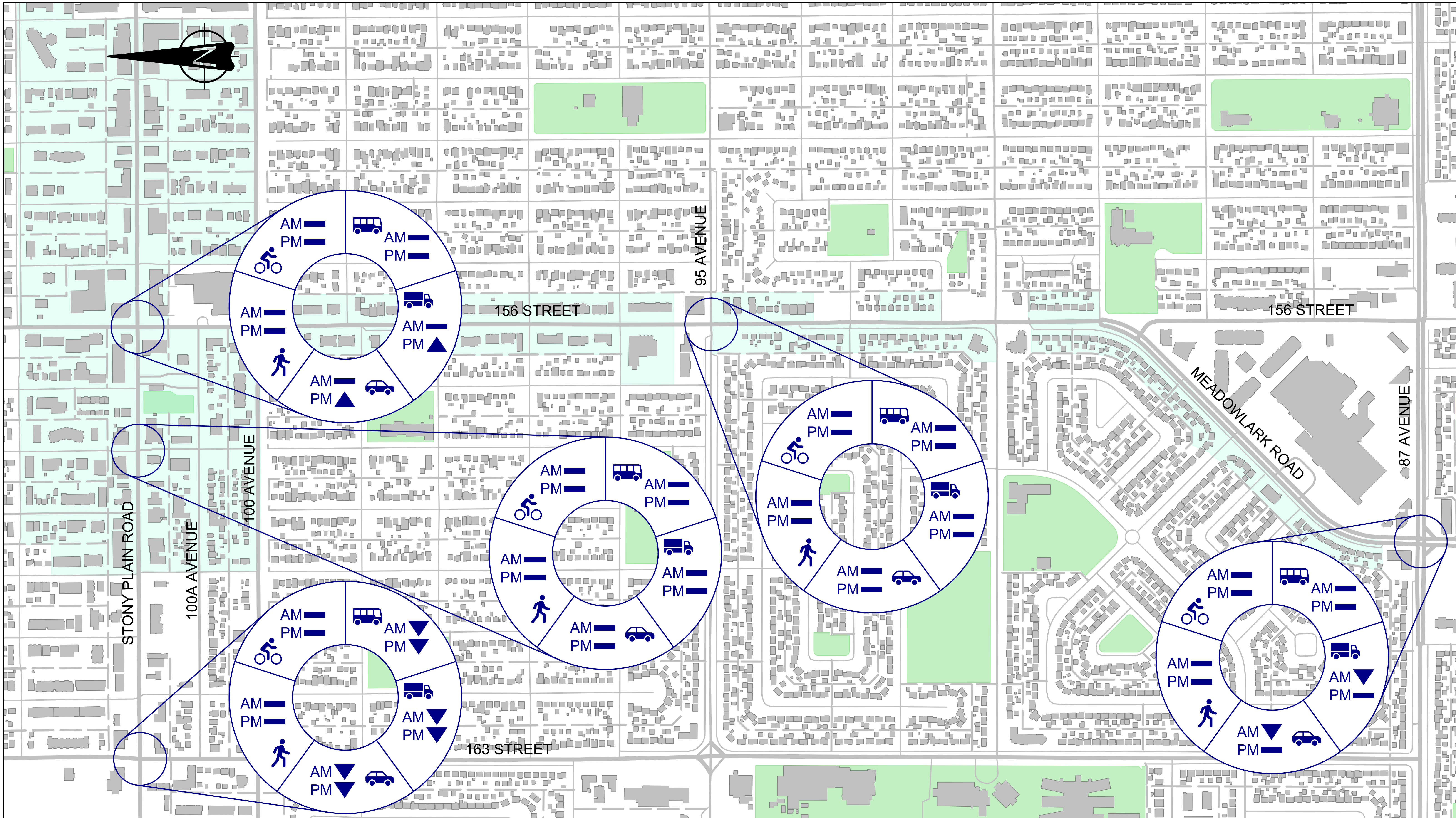
PGA TARGET AREA
PARK / OPEN SPACE
BODY OF WATER / RIVER

NOTE:
Detailed design on the Valley Line West corridor is in progress through the P3 contract with Marigold Infrastructure Partners. The analysis completed for this study along the Valley Line corridor is based on "Summer 2024 Look Book" drawings and preliminary signal timings. Multi-modal performance at study intersections along the Valley Line corridor are subject to changes to the design, with any major design chagnse requiring further study to understand any impacts.



▲ PEAK HOUR LOS INCREASES (LESS CONGESTION)
▬ NO CHANGE IN PEAK HOUR LOS
▼ PEAK HOUR LOS DECREASES (MORE CONGESTION)

FIGURE 5-55 STONY PLAIN PRIORITY GROWTH AREA POST DEVELOPMENT MMLOS COMPARISON



LEGEND

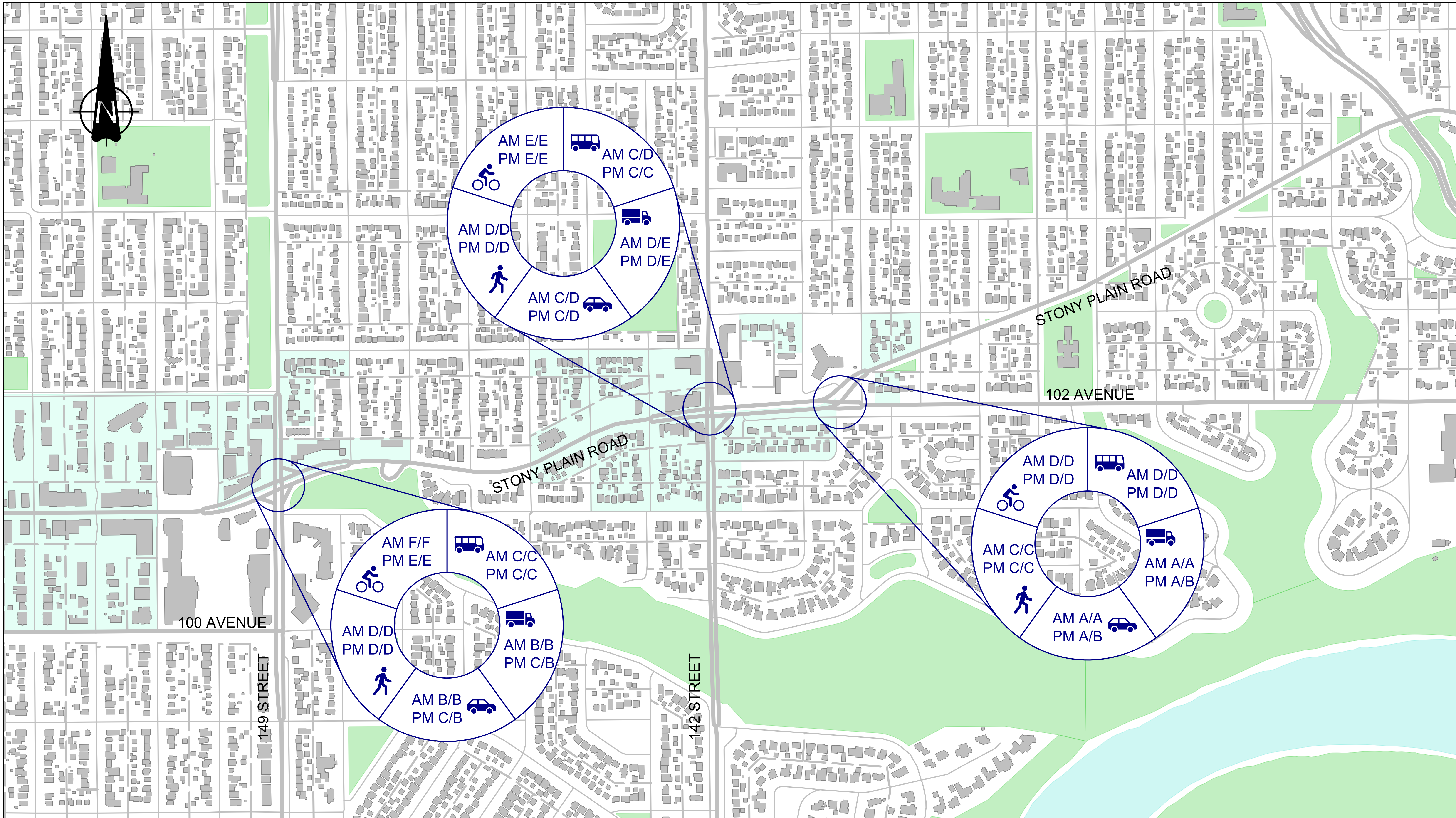
PGA TARGET AREA
PARK / OPEN SPACE
BODY OF WATER / RIVER

NOTE:
Detailed design on the Valley Line West corridor is in progress through the P3 contract with Marigold Infrastructure Partners. The analysis completed for this study along the Valley Line corridor is based on "Summer 2024 Look Book" drawings and preliminary signal timings. Multi-modal performance at study intersections along the Valley Line corridor are subject to changes to the design, with any major design chagnse requiring further study to understand any impacts.

CYCLIST LOS
BUS TRANSIT LOS
GOODS MOVEMENT LOS
AM PEAK HOUR OVERALL LOS
PM PEAK HOUR OVERALL LOS
PEDESTRIAN LOS
VEHICLE LOS

PEAK HOUR LOS INCREASES (LESS CONGESTION)
NO CHANGE IN PEAK HOUR LOS
PEAK HOUR LOS DECREASES (MORE CONGESTION)

FIGURE 5-56 156 STREET PRIORITY GROWTH AREA POST DEVELOPMENT MMLOS COMPARISON

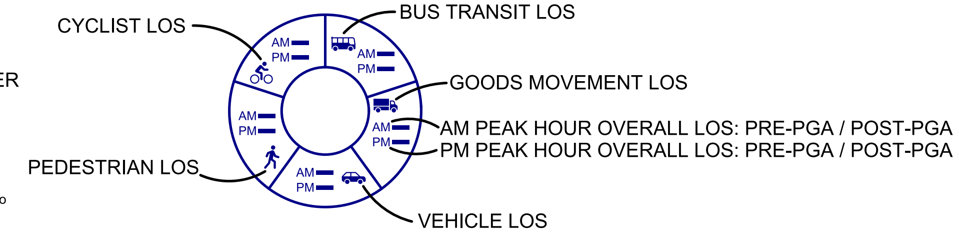


Edmonton

CIMA+

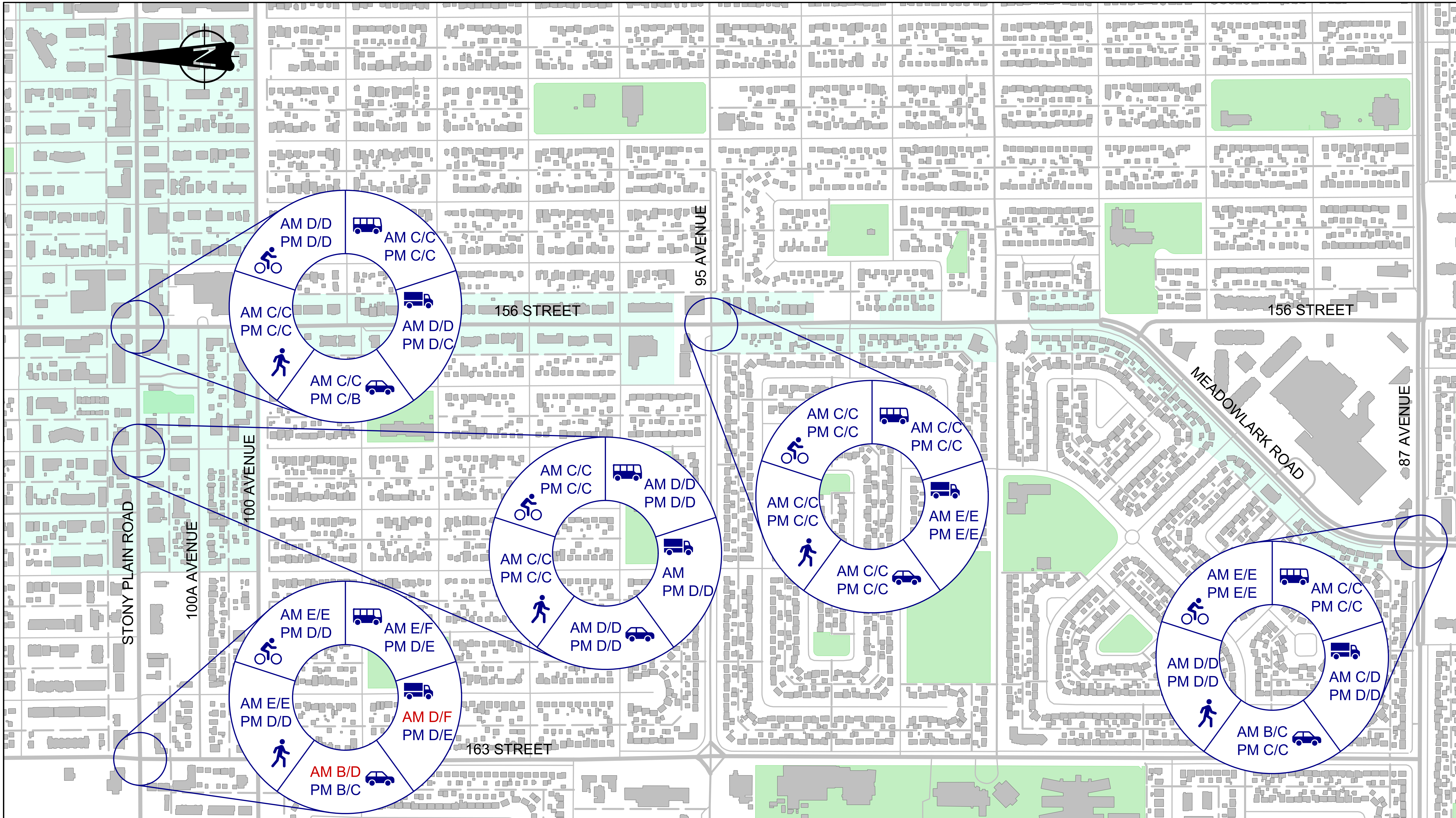
LEGEND

PGA TARGET AREA
PARK / OPEN SPACE
BODY OF WATER / RIVER



NOTE:
Detailed design on the Valley Line West corridor is in progress through the P3 contract with Marigold Infrastructure Partners. The analysis completed for this study along the Valley Line corridor is based on "Summer 2024 Look Book" drawings and preliminary signal timings. Multi-modal performance at study intersections along the Valley Line corridor are subject to changes to the design, with any major design chagnse requiring further study to understand any impacts.

FIGURE 5-57 STONY PLAIN PRIORITY GROWTH AREA POST DEVELOPMENT MMLOS RESULTS



LEGEND

PGA TARGET AREA
PARK / OPEN SPACE
BODY OF WATER / RIVER

NOTE:
Detailed design on the Valley Line West corridor is in progress through the P3 contract with Marigold Infrastructure Partners. The analysis completed for this study along the Valley Line corridor is based on "Summer 2024 Look Book" drawings and preliminary signal timings. Multi-modal performance at study intersections along the Valley Line corridor are subject to changes to the design, with any major design chagnse requiring further study to understand any impacts.

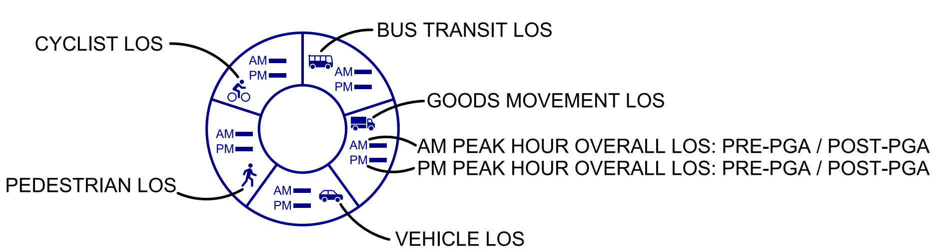


FIGURE 5-58 156 STREET PRIORITY GROWTH AREA POST DEVELOPMENT MMLOS RESULTS

5.2.1 Recommended Mobility Assessment

A summary of the recommended qualitative and quantitative assessments is provided **Figure 5-59** and **Figure 5-60**.

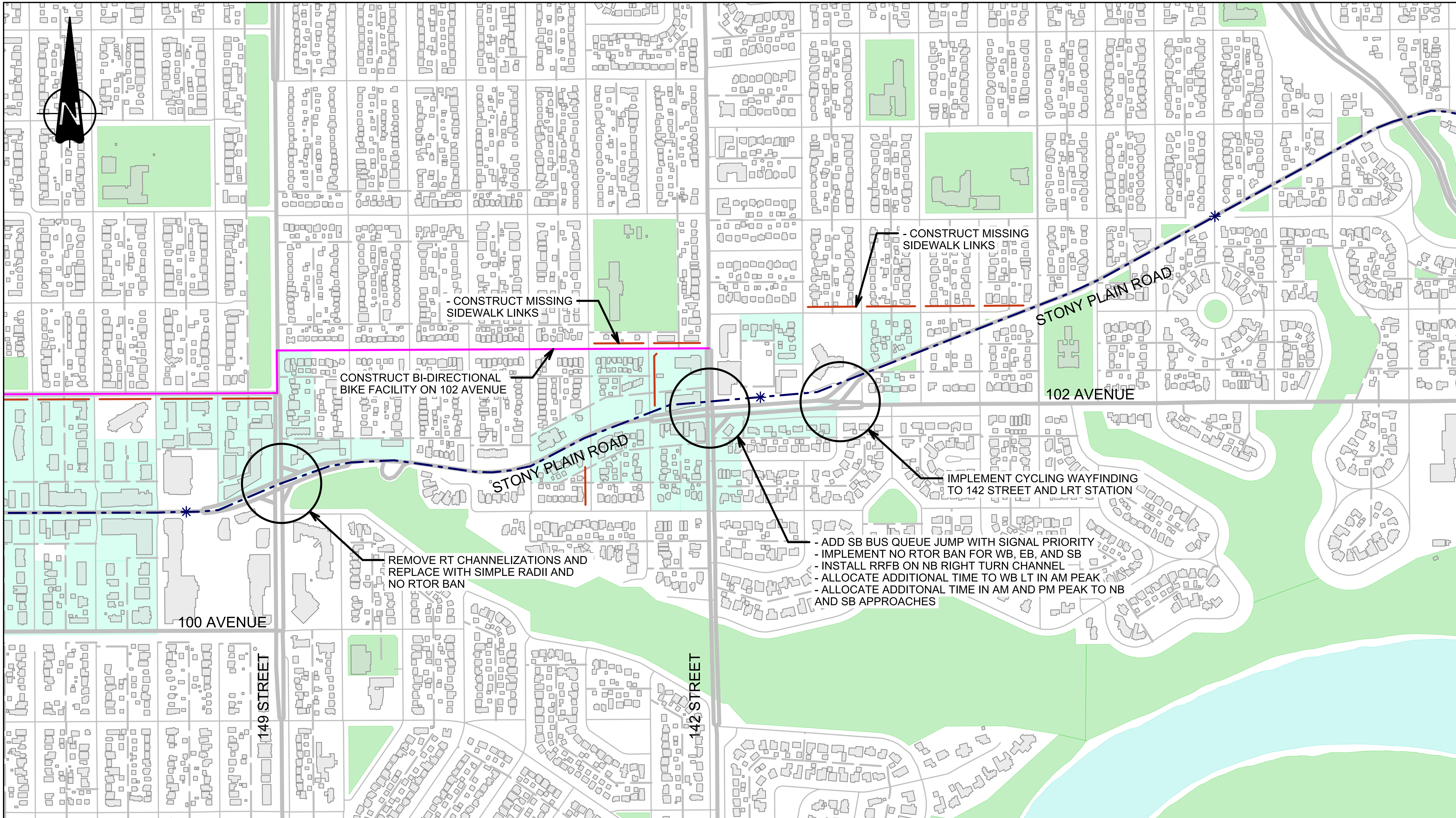
5.2.2 Qualitative Assessment

A review of missing pedestrian and cyclist facilities within the PGA was completed, identifying several missing links, ranging from short blocks to longer corridors, as shown in **Figure 5-59** and **Figure 5-60**.

5.2.3 Quantitative Assessments

Each intersection within the 156 Street / Stony Plain Road PGA was assessed in terms of their MMLOS for each mode using the OTC MMLOS toolkit. Recommended changes requiring adjustments to the signal timings or lane configuration were analyzed for each intersection in PTV Vistro using HCM 7th Edition, with the resulting data on vehicle delay being exported into updated HCM LOS tables. The results of this analysis fed back into the MMLOS toolkit to calculate the final LOS for each mode. Detailed HCM LOS and MMLOS tables are included in **Appendices A through F**.

An overview of the AM and PM peak period MMLOS results comparing pre-development operations to post-development forecast operations without improvements are illustrated in **Figure 5-57** and **Figure 5-58**.

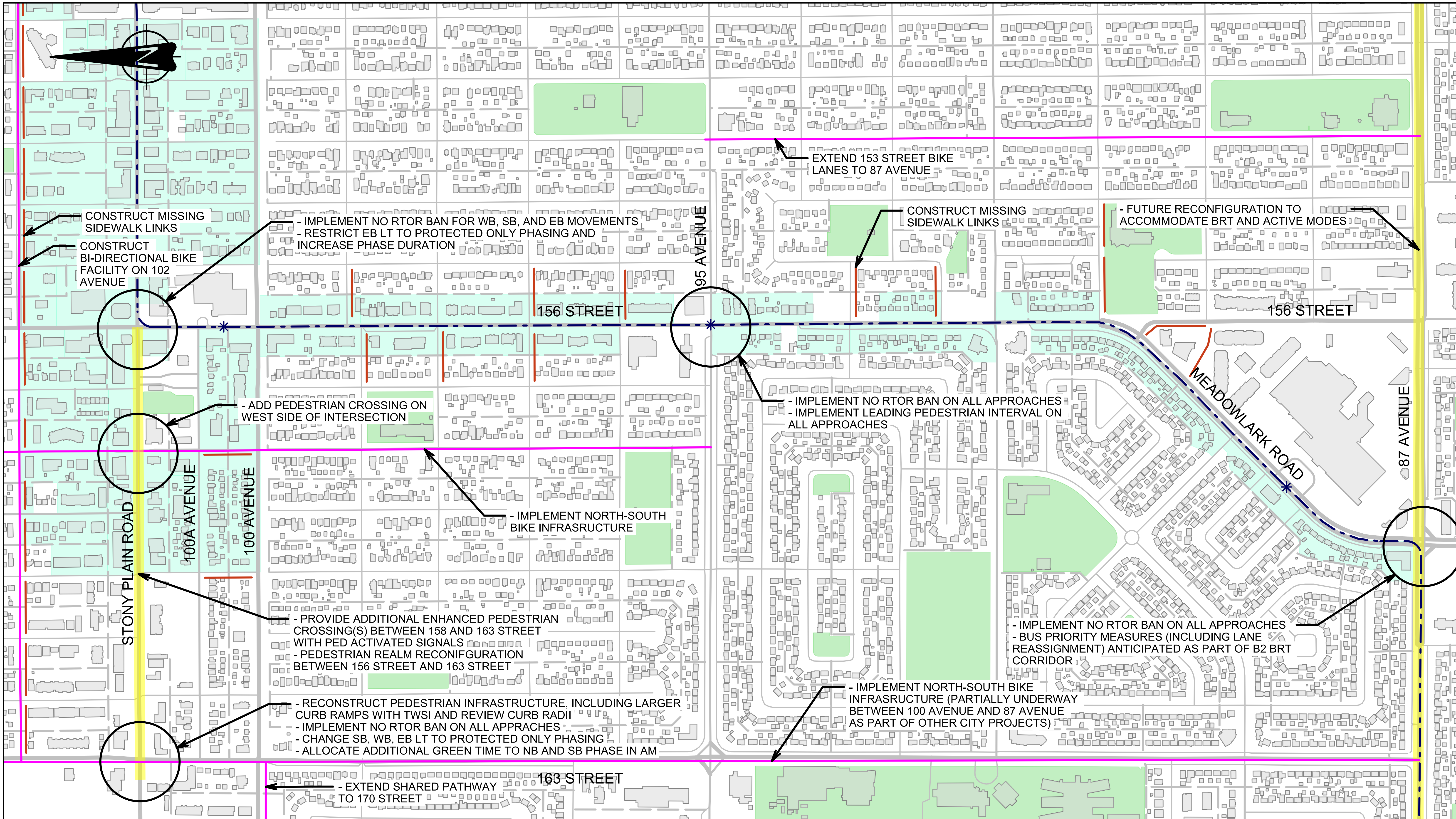


LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- LRT ALIGNMENT
- LRT STATION
- MISSING SIDEWALK
- MISSING CYCLING CONNECTION

NOTE:
Detailed design on the Valley Line West corridor is in progress through the P3 contract with Marigold Infrastructure Partners. The analysis completed for this study along the Valley Line corridor is based on "Summer 2024 Look Book" drawings and preliminary signal timings. Multi-modal performance at study intersections along the Valley Line corridor are subject to changes to the design, with any major design chagnse requiring further study to understand any impacts.

FIGURE 5-59 STONY PLAIN PRIORITY GROWTH AREA POTENTIAL IMPROVEMENTS



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LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- LRT ALIGNMENT
- LRT STATION
- MISSING SIDEWALK
- MISSING CYCLING CONNECTION
- CORRIDOR UPGRADES REQUIRING FURTHER STUDY

NOTE:
Concept planning for the B1 and B2 BRT routes has been initiated and will determine the exact routing, street configuration, and stop / station locations. Delivery timelines will be known once design work has been completed and funding for construction is allocated.

FIGURE 5-60 156 STREET PRIORITY GROWTH AREA POTENTIAL IMPROVEMENTS

5.2.3.1 Stony Pain Road Corridor

Stony Plain Road is a street oriented mixed-use / commercial arterial road. It is a pedestrian priority area from 127 to 121 Street and 149 to 170 Street. From 121 Street to 156 Street, it is undergoing major reconstruction as part of the Valley Line West LRT project.

Stony Plain Road along the LRT alignment is typically comprised of a centre-running LRT and 2-lane vehicle cross section flanked by sidewalk. The vehicle cross section expands at critical intersection to provide left and right turn bays as appropriate. Parking is occasionally provided using parking bays.

Stony Plain Road between 156 and 163 Street is comprised of a 4-lane vehicle cross section flanked by sidewalk. Beginning at 158 Street, the eastbound curb lane is reserved transit, taxi, and bikes in the weekday AM peak period. Parking is occasionally provided using parking bays. The cross-section elements are illustrated in **Figure 5-61** through **Figure 5-66**.

Figure 5-61 Stony Plain Road Facing East (East of 102 Avenue)

Figure 5-62 Stony Plain Road Facing East (West of 142 Street)

Figure 5-63 Stony Plain Road Facing East (West of 149 Street)

Figure 5-64 Stony Plain Road Facing East (East of 156 Street)

Figure 5-65 Stony Plain Road Facing East (West of 158 Street)

Figure 5-66 Stony Plain Road Facing East (West of 163 Street)

An assessment of the Stony Plain Road corridor was made based on the Valley Line West LRT renderings and should be confirmed with construction details. The changes to Stony Plain Road create a much more multimodal environment but pedestrian experiences fall short of MMLOS targets. Additional active transportation infrastructure is needed to support the current planned network:

- Ensuring Stony Plain Road is constructed with at least 2.6 m unobstructed walk width or a 1.6 m buffer / furnishing zone will improve pedestrian experiences at the corridor level.
- Controlled crossing is required at 144 Street to provide regular crossing opportunities for pedestrians and allow cyclists to access the cycling network planned on 144 Street north of Stony Plain Road. Implementation of this crossing may be challenging due to the need for a crossing of the LRT tracks.
- Crossing control is recommended at either 161 or 162 Street to provide regular crossing opportunities for pedestrians, especially given the transit stops located on either side of the street midway between these two intersections.

- Cycling infrastructure is not expected along Stony Plain Road.
  - Parallel east/west routes are required along 100 Avenue to the south and 104 Avenue to the north. Gaps in the cycling network must be filled along 104 Avenue (from 156 to 163 Street). Though not identified in the Bike Plan, the City should consider extending the 100 Avenue facility to the west. Additionally, the Infill Road map identified the need for a parallel route on 102 Avenue. While the minimum cycling network coverage is achieved with routes on 104 and 100 Avenue, additional coverage on 102 Avenue will facilitate more movement by bike.
  - North/south cycling routes cross Stony Plain Road at 136 Street, 144 Street (crossing control needed), 146, 153, and 163 Street. Gaps in the cycling network must be filled on 163 Street between Stony Plain Road and 95 Street. Additionally, we recommend the City consider include 158 Street as part of their cycling network. As a local road with reasonable north-south connectivity, 158 Street provides must needed network coverage and a low-stress environment.

Stony Plain Road between 156 and 163 Street is over-sized for the vehicle demand. The lane reductions associated with the LRT force vehicle traffic to take other routes between the city centre and amenities in the west. Traffic volumes only increase beyond ~800 vph at 163 Street where traffic diverts back onto Stony Plain Road from the north and south. As a result, right-of-way can be reallocated from cars to other uses such as transit and the pedestrian realm.

An example cross section illustrates an expanded pedestrian realm in **Figure 5-67** but the cross section could include parking bays and any other number of street uses.

Figure 5-67 Potential Stony Plain Road Corridor Facing East (156 Street to 163 Street)

Expected multimodal operations at the corridor level are summarized in **Table 5.34** based on these recommendations; however, individual intersection assessments in the following sections capture incremental changes that can be implemented in the meantime. Detailed MMLOS tables which analyze each corridor under existing and recommended conditions are found in **Appendix G** and **Appendix H**, respectively.

Table 5.34 MMLOS Stony Plain Road from 165 Street to 102 Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS C	LOS C	LOS D
Post-Development without Improvements Corridor Performance (156 Street to 102 Avenue)	⚠	✓**	✓	✓
Post-Development with Improvements Corridor Performance (156 Street to 102 Avenue)	✓	✓**	✓	✓
Notes	**All recommendations along the Valley Line West corridor will need to be coordinated with Marigold Infrastructure Partners.** The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the corridor encompassing a Pedestrian Priority Area. • Transit: Target LOS adjusted from D to C due to the Valley Line LRT present within the corridor. Throughout most of the corridor, controlled pedestrian crossing are provided every ~100 m. There are no controlled crossing opportunities between 145 and 142 Street, a distance of ~350 m which exceeds recommended spacing and may result in jaywalking. **Shared use path constructed as part of the LRT connects 144 Street and the existing shared use path on 102 Avenue, is not present along entire corridor.			

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Post-Development without Improvements Corridor Performance (165 to 156 Street)	✗	n/a	✓	✓
Post-Development with Improvements Corridor Performance (165 to 156 Street)	✓	n/a	✓	✓
Notes	Throughout this section of Stony Plain Road, sidewalks are narrow with no buffer between pedestrians and vehicles. There are no controlled crossing opportunities between 160 and 163 Street, a distance of ~350 m which exceed recommended spacing and may result in jaywalking. Cycling facilities are not expected on Stony Plain Road. East/west cycling demand may be met by the shared-use path on 100 Avenue, two blocks south; however, there are no formal connections from 100 Avenue to the north at this time. Transit LOS meets the threshold but passenger amenities are inconsistently provided along the corridor. Vehicle LOS meets the threshold but the number of curb lane conflicts (private accesses) detracts from overall operations. To address pedestrian and transit MMLOS, we recommend: • Reallocating existing travel lanes to other uses, an expansion of the pedestrian realm and an increase in transit passenger amenities. Vehicle LOS does not deteriorate with these changes as the street was over-sized. • Implementing new controlled pedestrian crossing opportunities. Cycling facilities are not expected on Stony Plain Road. East/west cycling demand may be met two blocks south and three blocks north.				

5.2.3.1.1 Stony Plain Road and 102 Avenue

The configuration of the Stony Plain Road and 102 Avenue intersection is based on Valley Line LRT concept drawings. An LRT station is located one block west of the intersection. The east leg of 102 Avenue is part of the existing cycling network. For cross section consistency, Stony Plain Road is considered the north leg at this T-intersection.

West of the intersection, 102 Avenue is comprised of a shared use path, LRT runningway, 6-lane vehicle cross section, and a residential service road. East of the intersection, 102 Avenue is comprised of a shared use path, a 5-lane vehicle cross section, and a residential service road. Parking is permitted on 102 Avenue. The cross-section elements are illustrated in **Figure 5-69.**

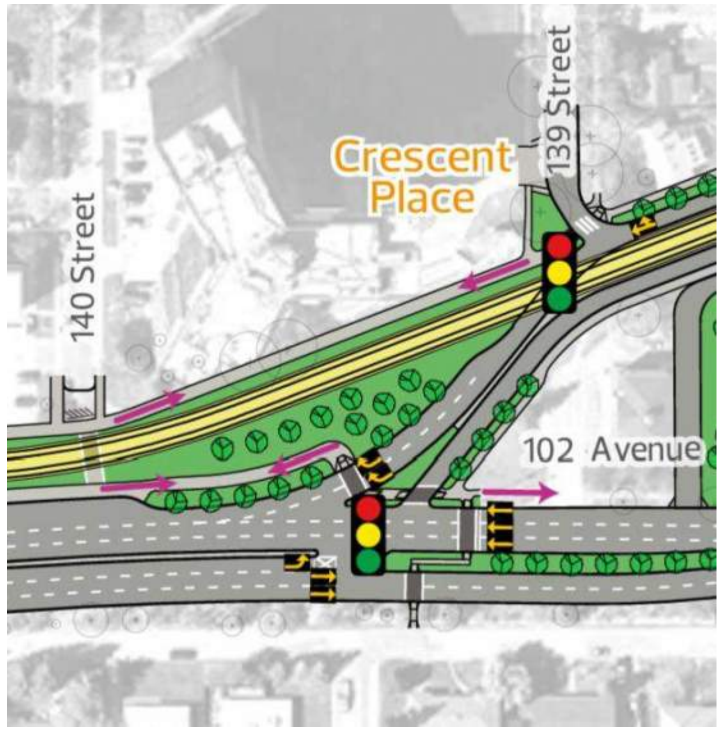


Figure 5-68 Stony Plain Road and 102 Avenue

Figure 5-69 102 Avenue Facing East

Expected multimodal operations following rezoning and development are summarized in **Table 5.35**, comparing MMLOS outcomes with and without recommended changes to the road network. This intersection is the planned terminus of the 102 Avenue Bikeway.

The purpose of the study has been to identify the overall multi-modal impacts as a result of PGA rezoning. The traffic analysis completed is not intended to be a detailed operational analysis of the intersections along the Valley Line LRT and such a study would require final designs and operational signal timing plans.

Table 5.35 MMLOS Stony Plain Road and 102 Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS B	LOS D	LOS E
Adjusted Target	LOS C	LOS B	LOS D	LOS E
Post-Development without Improvements Intersection Performance	✓	⚠	✓	✓
Notes	No adjustments were made to the target LOS for any mode. North/south cycling demand may be accommodated on the 136 Street bike boulevard or 144 Street (construction in 2026), three blocks to the east and four blocks to the west respectively. Additionally, 138 Street (half a block east) provides a connection to the bike boulevard leading to 142 Street south over MacKinnon Ravine Park.			
Post-Development with Improvements Intersection Performance	✓	✓	✓	✓
Recommended Treatment	**All recommendations along the Valley Line West corridor will need to be coordinated with Marigold Infrastructure Partners.** No specific changes are required to address pedestrian MMLOS. To meet cycling MMLOS targets, the following cycling network is required: • VLW plans show a shared use path connection between 102 Avenue and 144 Street (construction in 2026) on the north side but no controlled crossing at 144 Street. The portion of 142 Street north of Ravine Drive is listed as a future District Connector in the City's Bike Plan but the timing of implementation is uncertain. • The intersection between Stony Plain Road and 144 Street is the terminus of the 102 Avenue Bikeway for east/west bike traffic. The last kilometer of this bikeway should feature clear signage and markings that direct cyclists towards 136 Street, 142 Street (southbound), and 144 Street (northbound). Further cycling demand to the west must be met on 100 and 104 Avenue. No specific changes are required to address transit MMLOS. No specific changes are required to address vehicle MMLOS.			

Using current traffic volumes inputted into the future intersection configuration being built as part of the Valley Line West project, the intersection exhibits an HCM LOS of B during both peak periods. Using forecasted volumes under the Post-Development Without Improvements scenario, the LOS of the eastbound left movement intersection drops to E in the AM peak period likely due to a large increase in anticipated traffic volume. A similar change (to LOS D) is observed for the westbound through movement in the PM peak period. However, overall intersection performance remains largely the same for both peak periods.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.36** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.36 Traditional LOS Stony Plain Road and 102 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	N/A	N/A	N/A	N/A	N/A	252	531	1353	N/A	N/A	938	N/A	
	v/c Ratio						0.25	0.92	0.49			0.32		0.564
	LOS						C	E	A			B		B
	Delay (s)						30.4	60.7	5.2			13.1		19.14
	95th % Queue (m)						34.3	193.0	65.2			58.4		
Post-Development with Improvements	Volume	N/A	N/A	N/A	N/A	N/A	252	531	1353	N/A	N/A	938	N/A	
	v/c Ratio						0.25	0.92	0.49			0.32		0.564
	LOS						C	E	A			B		B
	Delay (s)						30.4	60.7	5.2			13.05		19.14
	95th % Queue (m)						34.3	193.0	65.2			58.4		
PM Peak														
Post-Development without Improvements	Volume	N/A	N/A	N/A	N/A	N/A	706	362	525	N/A	N/A	1488	N/A	
	v/c Ratio						0.42	0.38	0.19			0.8		0.518
	LOS						B	B	A			D		C
	Delay (s)						16.1	16.0	3.8			35.3		23.4
	95th % Queue (m)						63.8	70.3	18.9			136.8		
Post-Development with Improvements	Volume	N/A	N/A	N/A	N/A	N/A	706	362	525	N/A	N/A	1488	N/A	
	v/c Ratio						0.42	0.38	0.19			0.8		0.518
	LOS						B	B	A			D		C
	Delay (s)						16.1	16.0	3.8			35.3		23.4
	95th % Queue (m)						63.8	70.3	18.9			136.8		

5.2.3.1.2 Stony Plain Road and 142 Street

The configuration of the Stony Plain Road and 142 Street intersection is based on Valley Line LRT concept drawings. An LRT station is located immediately east of the intersection.

142 Street is comprised of a 7-lane vehicle cross section flanked by sidewalk. The northbound curb lane will be used as a transit queue jump lane Parking is not permitted on 142 Street. The cross-section elements are illustrated in **Figure 5-71.**

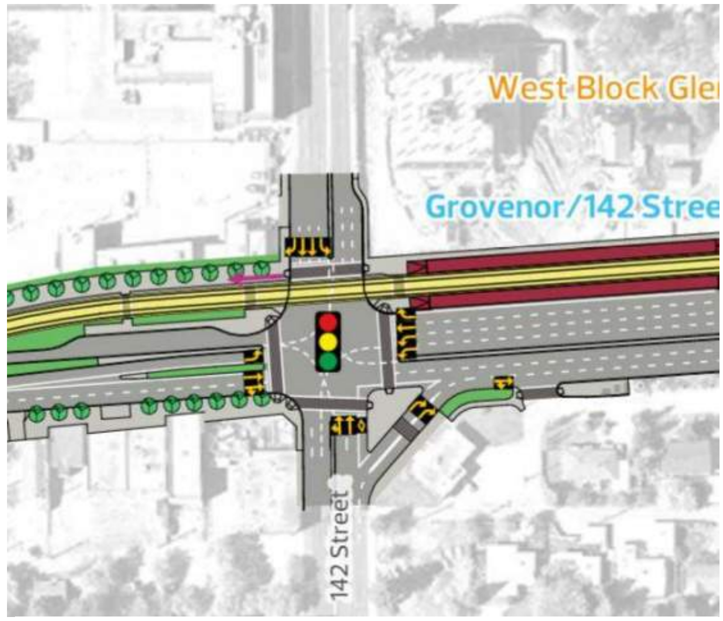


Figure 5-70 Stony Plain Road and 142 Street

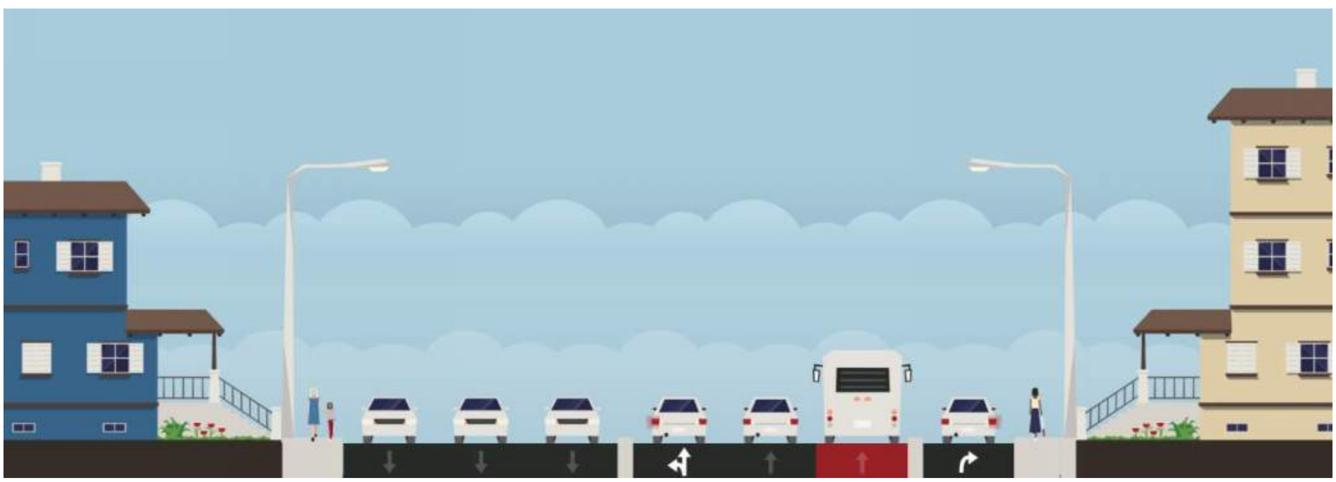


Figure 5-71 142 Street Facing North

Expected multimodal operations following rezoning and development are summarized in **Table 5.37**, comparing MMLOS outcomes with and without recommended changes to the road network. This intersection is a convergence of two arterial roadways along with the Valley Line LRT. Transit LOS at this intersection currently fails because of the delay experienced by busses traveling in mixed traffic lanes. This intersection is classified as a Neighbourhood Connector, demanding a higher MMLOS for transit compared to other intersections in the network. For this classification, the target transit MMLOS was not adjusted, as LOS B is a realistic target considering the level of vehicle traffic at this intersection. To attain appropriate transit MMLOS levels, it is necessary to increase the pedestrian LOS despite not being a pedestrian priority area.

The purpose of the study has been to identify the overall multi-modal impacts as a result of PGA rezoning. The traffic analysis completed is not intended to be a detailed operational analysis of the intersections along the Valley Line LRT and such a study would require final designs and operational signal timing plans.

Table 5.37 MMLOS Stony Plain Road and 142 Street

<table>
<tr><th>Mode</th><th>Pedestrian</th><th>Cyclist</th><th>Transit</th><th>Motor Vehicles</th></tr>
<tr><td>Original Target</td><td>LOS E</td><td>LOS D</td><td>LOS B</td><td>LOS D</td></tr>
<tr><td>Adjusted Target</td><td>LOS D</td><td>LOS D</td><td>LOS B</td><td>LOS D</td></tr>
<tr><td>Post-Development without Improvements Intersection Performance</td><td>✓</td><td>⚠</td><td>✗</td><td>✓</td></tr>
<tr><td>Notes</td><td colspan="4">The target LOS was adjusted for the following modes:
Pedestrians: Target LOS adjusted from E to D due to the intersection being situated adjacent to a future LRT station.
While pedestrian LOS is considered acceptable for this road classification, improvements should be considered to improve user experiences near the transit station.

North/south cycling demand may be accommodated on the 136 Street bike boulevard or 144 Street (construction in 2026), four blocks to the east and two blocks to the west respectively. Additionally, 138 Street (two blocks east) provides a connection to the bike boulevard leading to 142 Street south over MacKinnon Ravine Park. However, the east/west planned routing of the bike network through the area presents issues of continuity, particularly for westbound bike traffic. It is unclear whether the current design plans for VLW allow westbound cyclists from the 102 Avenue bikeway to continue westward to 142 Street without dismounting.

Transit LOS is affected by poor pedestrian LOS and delays experienced by busses using mixed traffic lanes. Despite the future Valley Line LRT, the target LOS for transit was not adjusted upwards considering the level of vehicle traffic at this intersection, while the target LOS B for a neighbourhood connector roadway (non-street oriented arterial street) is acceptable for transit passage.</td></tr>
<tr><td>Post-Development with Improvements Intersection Performance</td><td>✓</td><td>⚠</td><td>✓</td><td>✓</td></tr>
<tr><td>Recommended Treatment</td><td colspan="4">All recommendations along the Valley Line West corridor will need to be coordinated with Marigold Infrastructure Partners.

To improve pedestrian and transit MMLOS, we recommend:</td></tr>
</table>

	• Banning RTOR on the westbound, eastbound, and southbound approaches reduces the number of uncontrolled pedestrian conflicts. • Additional pedestrian enhancement measures be installed such as a Rectangular Rapid Flashing Beacon (RRFB) at the pedestrian conflict within the channelized double right turn lanes for northbound vehicles to warn them of crossing pedestrians. To address cyclist MMLOS, we note: • Wayfinding must be clearly labelled for cyclists should 144 Avenue be designated as the primary north-south bikeway for this District Connector corridor. • Should the northern portion of 142 Street (north of Ravine Drive) feature dedicated cycling infrastructure in the future, the 102 Avenue Bikeway should be extended to the intersection of 142 Avenue and Stony Plain Road to provide continuity. To meet transit MMLOS targets, we recommend: • A southbound queue jump lane be installed with transit signal priority, similar to the south approach as part of the Valley Line West project. Besides ensuring transit priority at all approaches, this measure is anticipated to reduce transit movement delay compared to the Post-Development Without Improvements scenario. The resulting lane configuration for southbound vehicles is illustrated in Figure 5-72. **NOTE** Higher order transit does not currently run on 142 Street north of the intersection. If higher order transit is not anticipated on 142 Street after the introduction of VLW, this recommendation may be omitted and transit LOS may fall below targets with the understanding that not all approaches warrant treatment. To mitigate impacts to vehicle MMLOS, we recommend: • AM peak period: allocate more green time to the westbound left protected turn phase • PM peak period: allocate slightly more green time to the north and south approaches to reduce overall intersection delay.

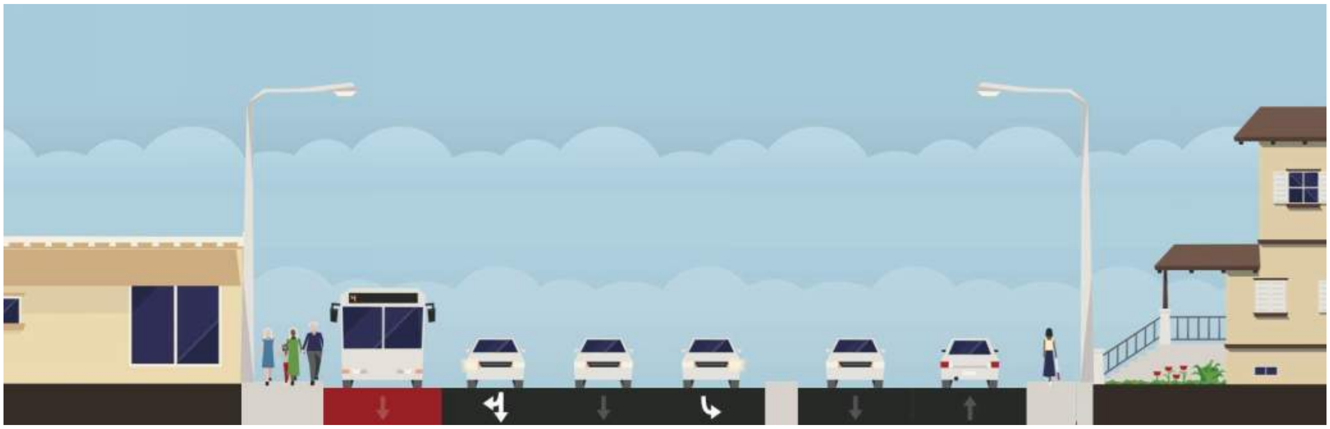


Figure 5-72 Proposed 142 Street Cross Section

Using current traffic volumes inputted into the future intersection configuration being built as part of the Valley Line West project, the intersection exhibits an HCM LOS of E in both peak periods. Using forecasted volumes under the Post-Development Without Improvements scenario, the LOS of the intersection drops to F in both peak periods. In the AM peak period, this is due to increases in anticipated traffic volumes for all northbound movements along with westbound left and through traffic, thus causing all of these movements to fail under peak loads with the largest delay experienced by westbound left turning traffic. In the PM peak period, the deterioration in LOS is less severe. However, significant delays will be experienced by all left turning movements in addition to southbound through traffic. The delay for southbound traffic is attributed to an increase in traffic volume along with a prioritization of green time to the east-west phases and Valley Line LRT.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.38** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.38 Traditional LOS Stony Plain Road and 142 Street

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	103	1023	1236	31	420	31	65	617	13	513	666	11	
	v/c Ratio	1.11	1.03	1.1	0.12	0.27	0.04	0.59	0.56	0.56	2.22	1.19	0.02	0.944
	LOS	F	F	F	C	B	B	E	D	D	F	F	C	F
	Delay (s)	114.7	85.1	99.4	26.2	19.4	16.9	76.0	39.4	39.5	621.0	143.2	29.7	147.0
	95th % Queue (m)	269.2	244.4	251.2	7.3	49.4	6.0	35.2	100.0	99.6	264.0	350.2	3.0	
Post-Development with Improvements	Volume	103	1023	1236	31	420	31	65	617	13	513	666	11	
	v/c Ratio	1.19	1.11	1.16	0.17	0.31	0.32	0.32	0.56	0.56	1.19	1.19	0.03	0.96
	LOS	F	F	F	C	C	C	D	D	D	F	F	C	F
	Delay (s)	149.5	113.7	121.9	30.3	24.7	24.8	51.9	39.4	39.5	157.6	143.2	29.7	108.5
	95th % Queue (m)	297.2	285.8	276.1	8.5	61.0	60.4	27.5	100.0	99.6	152.5	350.2	3.3	
PM Peak														
Post-Development without Improvements	Volume	14	661	358	10	928	6	75	519	32	1405	730	59	
	v/c Ratio	1.14	0.75	0.38	0.19	1.22	0.01	0.67	0.77	0.78	1.03	0.71	0.07	0.904
	LOS	F	E	D	F	F	D	F	E	E	F	C	B	F
	Delay (s)	145.1	61.2	45.6	86.6	173.8	47.5	99.6	75.9	77.6	81.4	33.7	19.4	91.5
	95th % Queue (m)	196.5	155.8	68.9	7.2	303.9	2.3	53.0	138.8	132.6	332.7	231.9	14.5	
Post-Development with Improvements	Volume	14	661	358	10	928	6	75	519	32	1405	730	59	
	v/c Ratio	1.04	0.67	0.34	0.13	1.03	1.04	0.73	1.01	1.02	1.02	0.76	0.08	0.9
	LOS	F	D	D	E	F	F	F	F	F	F	D	C	F
	Delay (s)	107.3	52.0	40.6	75.9	110.4	110.8	110.4	123.9	130.4	76.1	39.1	22.1	80.9
	95th % Queue (m)	170.3	145.0	65.5	6.5	256.2	256.1	56.1	172.2	165.7	325.1	248.9	17.4	

5.2.3.1.3 Stony Plain Road and 149 Street

The configuration of the Stony Plain Road and 149 Street intersection is based on Valley Line LRT concept drawings. 149 Street and the west leg of Stony Plain Road are pedestrian priority areas. An LRT station is located one block west of the intersection. A future pedestrian and cyclist crossing is planned one block to the east.

149 Street is comprised of a 4-lane vehicle cross section, widening to six lanes at the intersection, flanked by sidewalk. Parking is not permitted on 149 Street. The cross-section elements are illustrated in **Figure 5-74.**

Figure 5-73 Stony Plain Road and 149 Street

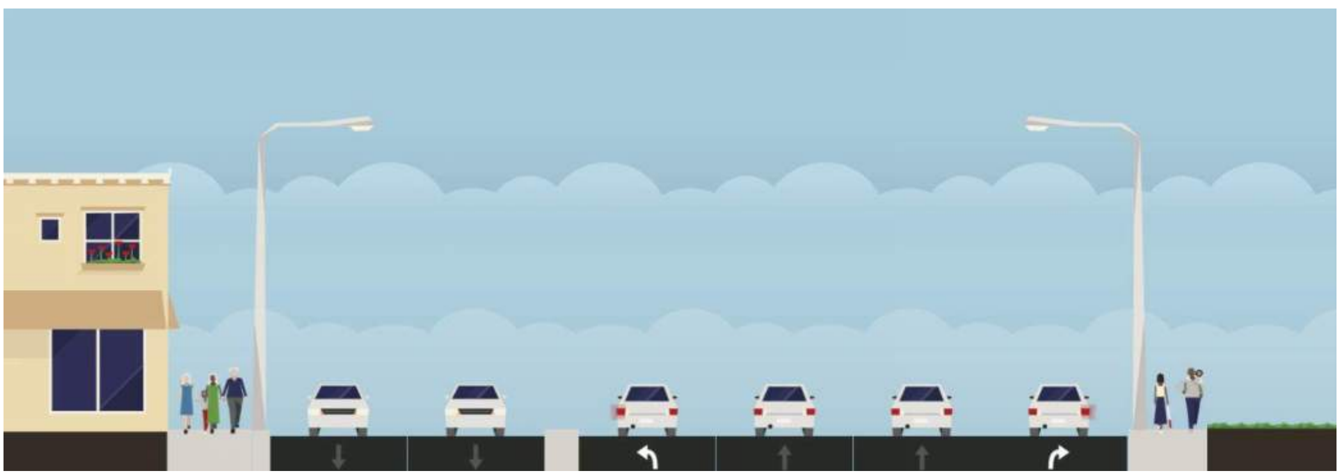


Figure 5-74 149 Street Facing North

Stony Plain Road is comprised of centre-running LRT and two traffic lanes flanked by sidewalk. The west leg of Stony Plain Road widens to three lanes at the intersection, while the east leg widens to five lanes at the intersection. Parking is occasionally provided using parking bays. The cross-section elements are illustrated in **Figure 5-75**.

The purpose of the study has been to identify the overall multi-modal impacts as a result of PGA rezoning. The traffic analysis completed is not intended to be a detailed operational analysis of the intersections along the Valley Line LRT and such a study would require final designs and operational signal timing plans.

Figure 5-75 Stony Plain Road Facing East

Expected multimodal operations following rezoning and development are summarized in **Table 5.39**, comparing MMLOS outcomes with and without recommended changes to the road network. This intersection is located within the Stony Plain Road Pedestrian Priority Area. The intersection is classified as a Neighbourhood Main Street as it is the entry point for the Stony Plain Road Commercial Area.

Table 5.39 MMLOS Stony Plain Road and 149 Street

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS C	LOS C	LOS D
Post-Development without Improvements Intersection Performance	✗	⚠	✓	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area. • Transit: Target LOS adjusted from D to C due to the intersection being situated along the Valley Line LRT. Pedestrian LOS is affected by long cycle lengths and the number of uncontrolled conflicts with turning vehicles exacerbated by three channelized right turn lanes which significantly increase the effective turning radius for vehicles.			

	North/south cycling demand may be met by the cycling infrastructure on 148 Street (construction in 2026) or the bike boulevard on 153 Street, one block to the east and four blocks to the west respectively. East-west cycling traffic is accommodated a block south on 100 Avenue.			
Post-Development with Improvements Intersection Performance	⚠	⚠	✓	✓
Recommended Treatment	**All recommendations along the Valley Line West corridor will need to be coordinated with Marigold Infrastructure Partners.** Three treatment options could be used to address pedestrian MMLOS: • Remove the channelized islands to both reduce the effective turning radius and the number of uncontrolled pedestrian conflicts, but increase total pedestrian crossing distance. Combined with a RTOR ban, this increases pedestrian MMLOS to 'B'. • Convert the channelized islands to a high-entry angle design to reduce the effective turning radius. This increases the pedestrian MMLOS to 'C'. • Reduce the signal cycle length, though this is not ideal due to the coordination in place along the Valley Line corridor. • Regardless of the above, RTOR should be banned on the southbound approach. Changes to intersection geometry at this location are unlikely to be implemented in the near term as the "existing" configuration is being constructed as part of the Valley Line West LRT. Therefore, the pedestrian MMLOS will remain at D until such changes are implemented. No specific changes are required to address cyclist MMLOS. No specific changes are required to address transit MMLOS. No specific changes are required to address vehicle MMLOS.			

Using current traffic volumes inputted into the future intersection configuration being built as part of the Valley Line West project, the intersection exhibits an HCM LOS of D in the AM peak period and F in the PM peak period. The poor LOS in the PM peak is attributed to delays experienced by westbound through traffic due to the single remaining westbound through lane west of 149 Street. Using forecasted volumes under the Post-Development Without Improvements scenario, the LOS of the intersection remains unchanged in the AM peak period, with the delay slightly improving because of some reductions in anticipated traffic volumes. In the PM peak period, the number of forecasted vehicles in the westbound through movement drops since it is anticipated that the Valley Line West will deter westbound through traffic towards alternative routes. Therefore, the overall performance of the intersection improves to LOS D despite the westbound through LOS remaining at F. This is because all other movements exhibit LOS B, C, and D.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.40** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.40 Traditional LOS Stony Plain Road and 149 Street

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	45	827	111	11	644	65	100	472	46	57	500	264	
	v/c Ratio	0.24	0.76	0.19	0.04	0.46	0.09	0.67	0.82	0.08	0.2	0.87	0.49	0.585
	LOS	D	D	C	C	C	C	E	D	C	D	E	D	D
	Delay (s)	46.3	40.6	29.3	23.3	25.8	20.9	73.6	50.7	29.8	51.9	55.3	37.2	41.6
	95th % Queue (m)	18.1	127.7	29.4	2.7	82.5	13.8	51.9	159.6	12.2	11.7	174.7	77.3	
Post-Development with Improvements	Volume	45	827	111	11	644	65	100	472	46	57	500	264	
	v/c Ratio	0.24	0.76	0.21	0.04	0.46	0.1	0.67	0.82	0.09	0.2	0.87	0.54	0.585
	LOS	D	D	C	C	C	C	E	D	C	D	E	D	D
	Delay (s)	46.3	40.6	29.6	23.3	25.8	21.0	73.6	50.7	29.9	51.9	55.3	38.6	41.6
	95th % Queue (m)	18.1	127.7	32.9	2.7	82.5	15.6	51.9	159.6	13.8	11.7	174.7	85.8	
PM Peak														
Post-Development without Improvements	Volume	53	696	340	24	1059	89	109	281	85	274	482	73	
	v/c Ratio	0.19	0.62	0.57	0.07	0.95	0.15	0.55	0.68	0.22	0.72	1.17	0.19	0.687
	LOS	C	C	C	B	D	C	D	D	C	D	F	C	D
	Delay (s)	22.7	30.3	31.2	17.4	49.5	23.6	52.3	44.7	33.4	53.3	139.2	32.9	54.5
	95th % Queue (m)	10.7	87.3	80.1	4.5	158.1	18.7	42.5	88.5	22.4	52.2	239.7	19.3	
Post-Development with Improvements	Volume	53	696	340	24	1059	89	109	281	85	274	482	73	
	v/c Ratio	0.19	0.62	0.63	0.07	0.95	0.17	0.55	0.68	0.24	0.72	1.17	0.21	0.687
	LOS	C	C	C	B	D	C	D	D	C	D	F	C	D
	Delay (s)	22.8	30.3	33.2	17.4	49.5	23.8	52.3	44.7	33.8	53.3	139.2	33.2	54.4
	95th % Queue (m)	10.7	87.3	90.0	4.5	158.1	21.0	42.5	88.5	25.3	52.2	239.7	21.5	

This intersection was identified for further sensitivity analysis to investigate future vehicle capacity constraints. The Post-Development Without Improvements scenario forecasts a decrease in vehicle volume on various movements across all approaches in both the AM and PM peak periods, but most notably the northbound through movement in the AM peak and the westbound through movement in the PM peak due to anticipated traffic redistribution upon the Valley Line West's opening. However, additional scenarios were analyzed with forecasted growth rates of 10% and 20% applied to movements which saw a decrease in volumes between the existing conditions and the City's post-development model. Full results are shown in **Appendix I** and **Appendix J**.

In the AM peak period using the same recommendations in **Table 5.39**, these alternative growth scenarios result in an LOS F for the northbound and westbound through movements, while all other movements remain at LOS E or higher. Overall intersection performance is reduced to LOS E under the 10% growth scenario and F in the 20% growth scenario. To mitigate this, re-allocating only a few (less than 5) seconds of green time from the left turning phases to the through phases manages to improve the overall intersection performance to D in the 10% growth scenario and E in the 20% growth scenario due to reductions in delay for through movements. Changes to the total cycle length were not considered due to possible impacts with the anticipated LRT phasing along with pedestrian delay.

In the PM peak period, the delay on the WBT movement increases significantly under these alternative growth scenarios, which results in an overall intersection delay of LOS F for both despite all other movements being LOS D or higher. Adopting the same treatment as the AM peak period also mitigates the total intersection delay primarily due to improved traffic flow for westbound vehicles, although the overall intersection performance in the 20% growth scenario remains at LOS F. No other changes are recommended should these alternative growth scenarios materialize.

5.2.3.1.4 Stony Plain Road and 156 Street

The configuration of the Stony Plain Road and 156 Street intersection is based on Valley Line LRT concept drawings. Stony Plain Road and 156 Street are pedestrian priority areas. The north leg of 156 Street supports high-frequency district transit routes. An LRT station is located one block south of the intersection and the Jasper Place Transit Centre (bus) is located one block to the west.

South of the intersection, 156 Street is comprised of curb-side LRT and two traffic lanes, flanked by sidewalk. North of the intersection, 156 Street is comprised of a 4-lane cross section that narrows to three lanes at the intersection. Parking is not permitted on 156 Street. The cross-section elements are illustrated in **Figure 5-77.**

Figure 5-76 Stony Plain Road and 156 Street

Figure 5-77 156 Street Facing North

Expected multimodal operations following rezoning and development are summarized in **Table 5.41**, comparing MMLOS outcomes with and without recommended changes to the road network. This intersection is located within the Stony Plain Road Pedestrian Priority area adjacent to the Jasper Place LRT stop.

The purpose of the study has been to identify the overall multi-modal impacts as a result of PGA rezoning. The traffic analysis completed is not intended to be a detailed operational analysis of the intersections along the Valley Line LRT and such a study would require final designs and operational signal timing plans.

Table 5.41 MMLOS Stony Plain Road and 156 Street

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS C	LOS C	LOS D
Post-Development without Improvements Intersection Performance	✗	⚠	✓	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area. • Transit: Target LOS adjusted from D to C due to the intersection being situated along the Valley Line LRT and future R12 RapidBus route. Pedestrian LOS is affected by long cycle lengths and uncontrolled conflicts with turning vehicles. The intersection is anticipated to feature enhanced pedestrian features such as median refuge and enhanced storage. While the intersection design features a channelized northbound right turn lane, the pedestrian crossing is situated prior to the curve. Thus, the average turning radius for the intersection is taken from the remainder of the approaches. North/south cycling demand may be met by the bike boulevard on 153 Street, three blocks to the east. Additional nearby north/south cycling routes should be considered. East/west cycling traffic is accommodated on 100 Avenue (one block south).			
Post-Development with Improvements Intersection Performance	✓	⚠	✓	✓
Recommended Treatment	**All recommendations along the Valley Line West corridor will need to be coordinated with Marigold Infrastructure Partners.** To address pedestrian MMLOS, we recommend: • Banning RTOR for the westbound and southbound movements (eastbound RTOR is already banned). • Restricting the eastbound left turn to protected-only during both peak periods.			

	No specific changes are required to address cyclist MMLOS. No specific changes are required to address transit MMLOS. Impacts to vehicle MMLOS may be mitigated by: • Both peak periods: adjust the signal timing to add more green time to the eastbound left phase along with the eastbound and westbound through phases.

Using current traffic volumes inputted into the future intersection configuration being built as part of the Valley Line West project, the intersection exhibits an HCM LOS of D in both peak periods. Using forecasted volumes under the Post-Development Without Improvements scenario, the LOS of the intersection drops to E in the AM peak period. This is due to an increase in delay for westbound through/right traffic, which shares a single lane and experiences an increase in anticipated traffic volumes. However, the same lane experiences a drop in anticipated traffic volumes in the PM peak thus improving the overall intersection LOS to C. This is likely due to future westbound traffic being diverted towards alternative routes because of the Valley Line West alignment.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.42** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.42 Traditional LOS Stony Plain Road and 156 Street

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	N/A	265	87	N/A	86	192	271	278	36	N/A	636	100	
	v/c Ratio		0.36	0.11		0.12	0.26	0.93	0.36			1.17		0.66
	LOS		C	C		C	C	E	C			F		E
	Delay (s)		24.1	20.6		20.6	22.6	73.6	21.2			133.0		71.5
	95th % Queue (m)		68.9	18.8		20.7	44.9	94.2	74.4			367.6		
Post-Development with Improvements	Volume	N/A	265	87	N/A	86	192	271	278	36	N/A	636	100	
	v/c Ratio		0.5	0.16		0.16	0.42	0.99	0.29			1.02		0.725
	LOS		D	C		C	D	F	B			F		E
	Delay (s)		37.3	30.9		30.9	35.5	102.2	12.3			73.5		55.3
	95th % Queue (m)		84.3	23.9		26.3	63.4	135.1	56.9			284.1		
PM Peak														
Post-Development without Improvements	Volume	N/A	193	82	N/A	276	146	237	258	25	N/A	642	32	
	v/c Ratio		0.34	0.14		0.48	0.26	0.62	0.27			0.79		0.598
	LOS		C	C		C	C	C	B			D		C
	Delay (s)		31.6	28.5		34.6	30.4	28.5	13.4			35.0		29.9
	95th % Queue (m)		60.2	21.7		84.4	40.2	53.6	54.1			187.1		
Post-Development with Improvements	Volume	N/A	193	82	N/A	276	146	237	258	25	N/A	642	32	
	v/c Ratio		0.36	0.15		0.52	0.29	0.75	0.26			0.97		0.687
	LOS		C	C		D	C	E	B			E		D
	Delay (s)		34.3	30.8		37.8	32.9	61.2	11.9			63.7		45.2
	95th % Queue (m)		62.5	22.6		87.9	42.1	96.3	50.1			244.5		

5.2.3.1.5 Stony Plain Road and 158 Street

The intersection of Stony Plain Road and 158 Street is a pedestrian actuated two-way stop-controlled intersection. Stony Plain Road and 158 Street are pedestrian priority areas. The Jasper Place Transit Centre is located ~120 m to the east.

South of the intersection, 158 Street is comprised of a 3-lane vehicle cross section, flanked by sidewalk. Parking is permitted on the east side of the street. North of the intersection, 158 Street is a 4-lane vehicle cross section. Parking is permitted on both sides of the street. The cross-section elements are illustrated in **Figure 5-79.**

Figure 5-78 Stony Plain Road and 158 Street

Figure 5-79 158 Street Facing North

Expected multimodal operations following rezoning and development are summarized in **Table 5.43**, comparing MMLOS outcomes with and without recommended changes to the road network.

Table 5.43 MMLOS Stony Plain Road and 158 Street

<table>
<tr><th>Mode</th><th>Pedestrian</th><th>Cyclist</th><th>Transit</th><th>Motor Vehicles</th></tr>
<tr><td>Original Target</td><td>LOS C</td><td>LOS C</td><td>LOS D</td><td>LOS D</td></tr>
<tr><td>Adjusted Target</td><td>LOS B</td><td>LOS C</td><td>LOS D</td><td>LOS D</td></tr>
<tr><td>Post-Development without Improvements Intersection Performance</td><td>✗</td><td>✗</td><td>✓</td><td>✓</td></tr>
<tr><td>Notes</td><td colspan="4">The target LOS was adjusted for the following modes:
• Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area.
Pedestrian crossing is limited to the east side of Stony Plain Road and does not provide direct connections to all approaching pedestrian facilities. As a result, minimum design thresholds are not met for LOS targets.
158 Street has the potential to be a low stress cycling corridor; however, crossing control at Stony Plain Road is not accessible. Cycling LOS theoretically passes based on experiential factors but fails to meet minimum design thresholds.</td></tr>
<tr><td>Post-Development with Improvements Intersection Performance</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Recommended Treatment</td><td colspan="4">To address pedestrian MMLOS, we recommend:
• Adding crosswalk on the west leg; necessary to meet the minimum requirements for pedestrians at this location.
• Banning RTOR on all approaches.
To address cycling MMLOS, we recommend:
• Designating 158 Street a low stress cycling corridor (as a local road with reasonable north-south connectivity) to connect current and future east-west corridors including 95 Avenue, 100 Avenue, 104 Avenue, and 107 Avenue. This does not need to be a protected facility, but it should be clearly shown through traffic calming, pavement markings, and signage that the corridor is a cycling facility, with bike detection at controlled crossing points.
No specific changes are required to address transit MMLOS.
No specific changes are required to address vehicle MMLOS.</td></tr>
</table>

Under current traffic volumes, the intersection experiences minimal delay with an HCM LOS of B in both peak periods, with all movements also operating at LOS B.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.44** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.44 Traditional LOS Stony Plain Road and 158 Street

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	32	14	51	5	2	21	18	334	17	21	398	8	
	v/c Ratio	0.15			0.04			0.23		0.24	0.24		0.26	0.184
	LOS	B			B			B		B	B		B	B
	Delay (s)	14.8			13.9			10.6		10.8	10.8		10.9	11.3
	95th % Queue (m)	12.8			3.5			21.2		19.9	24.7		23.2	
Post-Development with Improvements	Volume	32	14	51	5	2	21	18	334	17	21	398	8	
	v/c Ratio	0.15			0.04			0.23		0.24	0.25		0.26	0.187
	LOS	B			B			B		B	B		B	B
	Delay (s)	14.9			13.9			10.6		10.8	10.8		10.9	11.3
	95th % Queue (m)	13.6			3.7			21.4		20.0	24.8		23.3	
PM Peak														
Post-Development without Improvements	Volume	36	18	66	6	9	35	20	314	15	46	516	10	
	v/c Ratio	0.17			0.07			0.22		0.24	0.36		0.38	0.241
	LOS	B			B			B		B	B		B	B
	Delay (s)	12.8			11.9			11.3		11.5	12.6		13.0	12.3
	95th % Queue (m)	13.6			5.3			19.8		18.8	34.8		33.9	
Post-Development with Improvements	Volume	36	18	66	6	9	35	20	314	15	46	516	10	
	v/c Ratio	0.18			0.07			0.22		0.24	0.36		0.38	0.245
	LOS	B			B			B		B	B		B	B
	Delay (s)	12.9			12.0			11.4		11.6	12.6		13.0	12.4
	95th % Queue (m)	14.5			5.7			20.0		18.9	34.9		34.0	

5.2.3.1.6 Stony Plain Road and 163 Street

The intersection of Stony Plain Road and 163 Street is fully signalized. Stony Plain Road and the south leg of 163 Street are pedestrian priority areas. Stony Plain Road supports high-frequency district transit routes. The north leg of 163 Street is part of the cycling network.

South of the intersection, 163 Street is comprised of a 4-lane vehicle cross section, flanked by sidewalk. Parking is not permitted on 163 Street. North of the intersection, 163 Street is comprised of a 4-lane vehicle cross section, flanked by sidewalk. Sidewalk on the west side terminates 60 m north of the intersection. Parking is permitted in both directions. The cross-section elements are illustrated in **Figure 5-81.**

Figure 5-80 Stony Plain Road and 163 Street

Figure 5-81 163 Street Facing North

Expected multimodal operations following rezoning and development are summarized in **Table 5.45**, comparing MMLOS outcomes with and without recommended changes to the road network. Despite being located within a Pedestrian Priority area, the pedestrian experience at this intersection is notably poor.

Table 5.45 MMLOS Stony Plain Road and 163 Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS B	LOS C	LOS D
Post-Development without Improvements Intersection Performance	✗	⚠	✗	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area. • Cyclists: Target LOS adjusted from C to B due to the intersection being situated along the 163 Street Cycling Corridor (facility unknown). • Transit: Target LOS adjusted from D to C due to the intersection being situated along the future R12 RapidBus route. Pedestrian LOS falls well below targets, largely due to long cycle lengths, limited enhanced treatment measures, and uncontrolled conflicts with turning vehicles. Currently, pedestrians face poor storage, deteriorated sidewalks, outdated curb ramps, and a lack of call buttons for either the pedestrian phase or an audible warning. Cyclist LOS does not meet targets. Exact facility type for the 163 Street district connector is unknown (construction in 2026). Transit LOS is negatively affected by pedestrian LOS, a lack of transit priority, and delays experienced while traveling in mixed vehicle lanes. The future westbound R12 Rapid Bus Route will run along Stony Plain Road and cross through this intersection.			
Post-Development with Improvements Intersection Performance	✓	✓	✓	✓
Recommended Treatment	To address pedestrian MMLOS, we recommend: • Implementing enhanced pedestrian measures such as improved curb ramps, increased pedestrian storage, TWSIs, and pedestrian call buttons for audible crossing signals. • Realigning the curbs at each intersection corner to enforce an effective turning radius for vehicles of 9.0m or less. • Banning RTOR movements on all approaches. • Changing the southbound, westbound, and eastbound left turn phases to protected-only phasing to minimize uncontrolled conflicts between vehicles and			

	pedestrians, with northbound left remaining as protected-permitted to prevent excessive increases in vehicle delay. To address cycling MMLOS: • The type of facility running north-south along 163 Street through the intersection is unknown, but it may reasonably be assumed that the corridor will feature a shared pathway facility which will require cyclists to cross along the crosswalk. We recommend that whichever crosswalk is used for the cyclist crossing be wide enough to accommodate pedestrians and cyclists separately and prevent the need for cyclists to dismount. To address transit MMLOS, we recommend: • Transit priority measures are necessitated to accommodate busses to address excessive delays. Widening of the road right-of-way to accommodate a westbound queue-jumping lane with transit signal priority is likely the best option for this intersection given that westbound vehicles already experience a poor LOS during the AM peak. This measure will require property acquisition. Deteriorating vehicle MMLOS may be mitigated by: • AM peak period: allocate more green time to the northbound and southbound phases to minimize overall intersection delay, particularly for the northbound left and through movements. • PM peak period: allocate a roughly equal amount of green time between the west-east and north-south phases.

Under current traffic volumes, the intersection exhibits an HCM LOS of C in both peak periods. Using forecasted volumes under the Post-Development Without Improvements scenario, the LOS of the intersection drops to F in the AM peak period primarily due to increases in northbound traffic, which cause the delay and queue length to worsen significantly with a LOS F. Most other movements, however, remain largely the same. In the PM peak period, the intersection LOS drops to D only, which is attributed to an increase in vehicle delay for the northbound left movement. Most other movements remain unchanged.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.46** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.46 Traditional LOS Stony Plain Road and 163 Street

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	732	610	242	18	114	258	15	98	6	72	991	23	
	v/c Ratio	0.97	1.34		0.32	0.17	0.41	0.13	0.08	0.08	0.15	0.75	0.75	0.962
	LOS	D	F		E	C	C	D	C	C	C	D	D	F
	Delay (s)	53.1	206.4		79.7	28.8	33.4	54.5	26.9	26.9	31.3	43.1	43.2	86.9
	95th % Queue (m)	220.7	536.6		11.3	35.0	74.6	7.1	15.1	15.0	23.4	165.6	164.7	
Post-Development with Improvements	Volume	732	610	242	18	114	258	15	98	6	72	991	23	
	v/c Ratio	1.08	1.03		0.18	0.13	0.34	0.16	0.1	0.11	0.78	0.97	0.97	0.904
	LOS	F	F		E	B	C	E	C	C	E	E	E	E
	Delay (s)	95.4	73.7		61.6	18.7	21.9	59.4	34.7	34.7	74.1	79.0	79.4	72.9
	95th % Queue (m)	267.6	343.4		9.2	27.2	67.1	6.8	17.7	17.6	36.9	216.5	215.6	
PM Peak														
Post-Development without Improvements	Volume	345	200	190	38	429	235	54	281	39	73	848	33	
	v/c Ratio	1.14	0.79		0.34	0.86	0.5	0.24	0.19	0.2	0.12	0.52	0.53	0.609
	LOS	F	D		E	E	D	D	B	B	B	C	C	D
	Delay (s)	143.4	53.4		64.2	58.9	40.7	37.7	19.9	19.9	13.8	25.5	25.6	50.6
	95th % Queue (m)	169.9	132.6		19.0	156.9	73.0	19.6	38.1	37.3	13.9	109.3	108.4	
Post-Development with Improvements	Volume	345	200	190	38	429	235	54	281	39	73	848	33	
	v/c Ratio	0.86	0.77		0.19	0.79	0.51	0.22	0.29	0.3	0.31	0.78	0.78	0.657
	LOS	D	D		D	D	D	D	C	C	D	D	D	D
	Delay (s)	48.1	48.9		49.2	49.7	38.6	47.8	32.9	33.1	49.8	48.1	48.5	46.0
	95th % Queue (m)	105.3	133.2		15.6	145.6	77.9	21.6	52.0	50.9	30.0	147.6	146.6	

5.2.3.2 156 Street / Meadowlark Road Corridor

156 Street / Meadowlark Road is currently a Non-Street Oriented Arterial Road, but will transition to a Street Oriented Mixed Use Arterial Road for much of its length upon completion of the Valley Line (classified as a Neighbourhood Main Street under OTC guidelines). It is a pedestrian priority area from 87 Avenue to 102 Avenue. From 87 Avenue to Stony Plain Road, it is undergoing major reconstruction as part of the Valley Line West LRT project.

156 Street is comprised of centre-running LRT and a 2-lane vehicle cross section, flanked by sidewalk. The vehicle cross section expands at critical intersection to provide left and right turn bays as appropriate. Parking is occasionally permitted on the west side through the use of parking bays. The cross-section elements are illustrated in **Figure 5-82** through **Figure 5-84.**

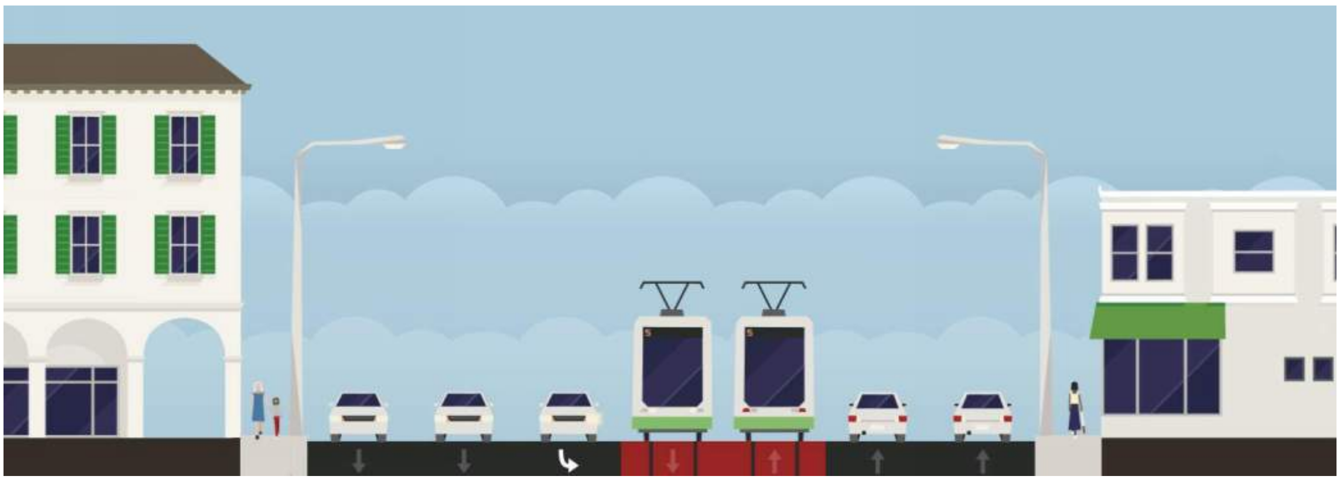


Figure 5-82 Meadowlark Road Facing North (North of 87 Avenue)

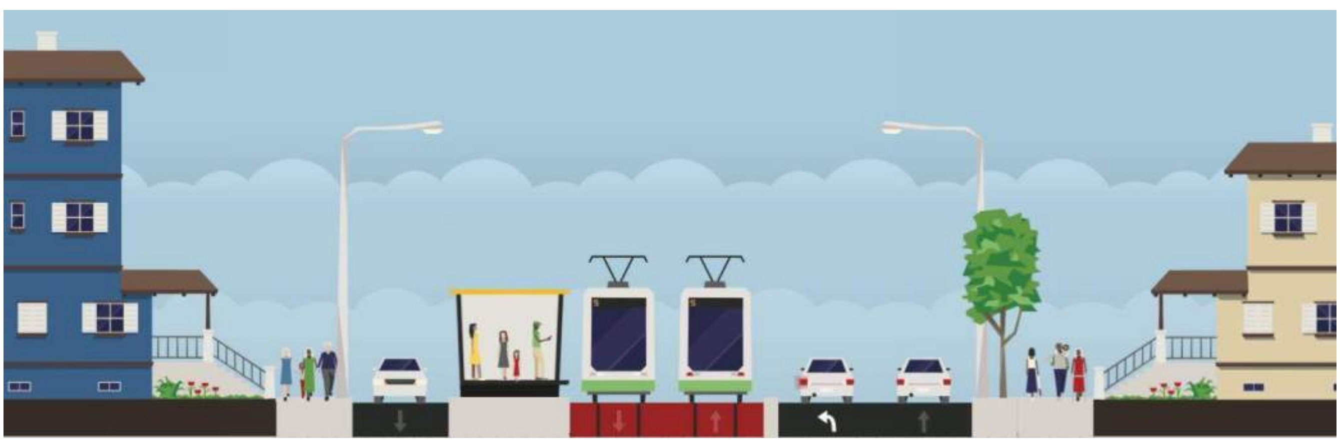


Figure 5-83 156 Street Facing North (South of 95 Avenue)

Figure 5-84 156 Street Facing North (South of Stony Plain Road)

An assessment of the 156 Street / Meadowlark Road corridor was made based on the Valley Line West LRT renderings and should be confirmed with construction details. The changes to 156 Street /and Meadowlark Road create a much more multimodal environment but pedestrian experiences fall short of MMLOS targets. Additional active transportation infrastructure is needed to support the current planned network:

- Ensuring 156 Street / Meadowlark Road are constructed with at least 2.6 m unobstructed walk width or a 1.6 m buffer / furnishing zone will improve pedestrian experiences at the corridor level.
- Pedestrian crossing control is recommended at 98 Avenue and 93a Avenue to provide regular crossing opportunities for pedestrians, especially young pedestrians walking to Meadowlark Christian School and the Sherwood Community Park. Implementation of these crossings may be challenging due to the need for a crossing of the LRT tracks.
- Cycling infrastructure is not expected along 156 Street / Meadowlark Road
  - Parallel north/south routes must be provided on 153 Street and 158 Street.
  - East/west cycling routes cross 156 Street / Meadowlark Road at 100 Avenue and 95 Avenue. 87 Avenue is identified as a future bike route in the Bike Plan, but no cycling amenities are included in the VLW renderings. There is a significant gap in cycling coverage between the existing 95 Avenue network and the proposed 87 Avenue network. 92 Avenue is the only continuous route and should be considered but will require a protected or physically separated facility. A less direct route could be explored on 90 Avenue / 160 Street but this is not preferred.

Expected multimodal operations at the corridor level are summarized in **Table 5.47** based on these recommendations however, individual intersection assessments in the following sections capture incremental changes that can be implemented in the meantime. Detailed MMLOS tables which analyze each corridor under existing and recommended conditions are found in **Appendix G** and **Appendix H**, respectively.

Table 5.47 MMLOS 156 Street from Stony Plain Road to 87 Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS C	LOS C	LOS D
Post-Development without Improvements Corridor Performance	⚠	n/a	✓	✓
Post-Development with Improvements Corridor Performance	✗	n/a	✓	✓
Notes	**All recommendations along the Valley Line West corridor will need to be coordinated with Marigold Infrastructure Partners.** The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the corridor encompassing a Pedestrian Priority Area. • Transit: Target LOS adjusted from D to C due to the Valley Line LRT present within the corridor. Throughout most of the corridor, controlled pedestrian crossing are provided every ~120 m. There are no controlled crossing opportunities between 97 and 99 Avenue, a distance of ~320 m and between 92 and 95 Avenue, a distance of ~400 m. These distances exceed recommended spacing and may result in jaywalking, especially for children walking to Meadowlark Christian School. To improve pedestrian MMLOS, we recommend: • Implementing additional crossing opportunities. Due to the limited buffer zone along much of the sidewalk, the pedestrian LOS is improved to an LOS C but does not reach the targeted LOS B. Cycling facilities are not expected on 156 Street. A bike boulevard runs parallel to the corridor on 153 Street between 95 and 100 Avenue and the Bike Plan identifies an extension to the south, but timing is unknown. There is not sufficient north/south cycling routes within an acceptable distance of 156 Street to meet demand at this time.			

5.2.3.2.1 156 Street and 95 Avenue

The intersection configuration of 156 Street and 95 Avenue is based on Valley Line LRT concept drawings, along with the installation of a cycling facility as part of the 95 Avenue District Connector. 156 Street and the east leg of 87 Avenue are also pedestrian priority areas.

95 Avenue is comprised of a 4-lane vehicle cross section flanked by residential service roads and sidewalk. A cycling facility is planned for construction in 2026 however, the facility type is not yet known. Parking is not permitted on 95 Avenue. The cross-section elements are illustrated in **Figure 5-86.**

Figure 5-85 156 Street and 95 Avenue

Figure 5-86 95 Avenue Facing East

Expected multimodal operations following rezoning and development are summarized in **Table 5.48**, comparing MMLOS outcomes with and without recommended changes to the road network. This intersection is located between the two platforms planned as part of the Glenwood/Sherwood stop along the Valley Line LRT. Besides being a pedestrian priority zone, this intersection will also feature an east-west future bike facility as part of the 95 Avenue District Connector. The target LOS for bikes was not adjusted at this location as an LOS B was deemed acceptable for this corridor.

The purpose of the study has been to identify the overall multi-modal impacts as a result of PGA rezoning. The traffic analysis completed is not intended to be a detailed operational analysis of the intersections along the Valley Line LRT and such a study would require final designs and operational signal timing plans.

Table 5.48 MMLOS 156 Street and 95 Avenue

<table>
<tr><th>Mode</th><th>Pedestrian</th><th>Cyclist</th><th>Transit</th><th>Motor Vehicles</th></tr>
<tr><td>Original Target</td><td>LOS C</td><td>LOS B</td><td>LOS D</td><td>LOS E</td></tr>
<tr><td>Adjusted Target</td><td>LOS B</td><td>LOS B</td><td>LOS C</td><td>LOS E</td></tr>
<tr><td>Post-Development without Improvements Intersection Performance</td><td>✗</td><td>✗</td><td>✓</td><td>✓</td></tr>
<tr><td>Notes</td><td colspan="4">The target LOS was adjusted for the following modes:
Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area.
Transit: Target LOS adjusted from D to C due to the intersection being situated along the Valley Line LRT.
Pedestrian LOS falls just short of the target, largely due to long cycle lengths and uncontrolled conflicts with turning vehicles.

Despite the presence of the 95 Avenue Bike corridor, the target LOS for cyclists was not adjusted upwards as a target LOS B for an urban boulevard (street-oriented collector street) is acceptable for cyclist passage.

It is assumed that the future bike facility will be constructed as a shared use path along the south side of 95 Avenue, although this design has not been confirmed. Despite the presence of a dedicated facility, cyclist LOS does not meet the target for an Urban Boulevard due to the number of conflicts with turning vehicles. North-south cycling demand is currently met by 153 Street three blocks east.</td></tr>
<tr><td>Post-Development with Improvements Intersection Performance</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Recommended Treatment</td><td colspan="4">All recommendations along the Valley Line West corridor will need to be coordinated with Marigold Infrastructure Partners.

To address pedestrian MMLOS, we recommend:
Banning RTOR movements on all approaches.
Implementing LPIs on all pedestrian phases in both peak periods to prioritize pedestrian movement.
To address the cycling MMLOS:</td></tr>
</table>

	• The cycling facility type for the future 95 Avenue District Connector is unknown. The analysis assumes a shared use path built on the south side of 95 Avenue and requiring cyclists to use the crosswalk to cross through the intersection. By banning RTOR movements for northbound vehicles, cyclists will encounter only two conflicts with vehicles which manages to raise the cycling MMLOS to B. No specific changes are required to address transit MMLOS. No specific changes are required to address vehicle MMLOS.

Using current traffic volumes inputted into the future intersection configuration being built as part of the Valley Line West project, the intersection exhibits an HCM LOS of D in both peak periods. Using forecasted volumes under the Post-Development Without Improvements scenario, this LOS remains unchanged in both peak periods. The intersection experiences a reduction in total delay during the PM peak period due to anticipated drops in future through traffic anticipated as part of the Valley Line completion.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.49** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.49 Traditional LOS 156 Street and 95 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	227	182	134	44	203	92	36	342	45	68	293	31	
	v/c Ratio	0.75	0.45		0.27	0.53		0.10	0.76		0.22	0.64		0.557
	LOS	E	C		D	D		C	D		C	D		D
	Delay (s)	62.5	29.1		53.9	38.0		25.6	48.4		28.2	42.3		42.7
	95th % Queue (m)	93.8	84.2		19.3	90.6		9.7	130.3		19.1	105.4		
Post-Development with Improvements	Volume	227	182	134	44	203	92	36	342	45	68	293	31	
	v/c Ratio	0.79	0.48		0.46	0.63		0.10	0.82		0.21	0.68		0.568
	LOS	E	C		E	D		C	D		C	D		D
	Delay (s)	67.0	30.5		69.8	45.3		25.0	54.6		27.7	45.8		47.2
	95th % Queue (m)	96.7	89.3		23.1	100.9		9.5	139.1		18.7	110.2		
PM Peak														
Post-Development without Improvements	Volume	93	166	113	71	222	70	78	310	66	85	329	11	
	v/c Ratio	0.49	0.57		0.37	0.58		0.16	0.59		0.19	0.53		0.471
	LOS	E	D		D	D		B	C		B	C		D
	Delay (s)	58.2	42.2		54.4	42.6		19.1	34.3		19.9	32.3		37.5
	95th % Queue (m)	42.1	90.2		31.0	95.2		17.4	108.1		19.2	97.5		
Post-Development with Improvements	Volume	93	166	113	71	222	70	78	310	66	85	329	11	
	v/c Ratio	0.49	0.7		0.37	0.71		0.16	0.68		0.18	0.6		0.483
	LOS	E	D		D	D		B	D		C	D		D
	Delay (s)	58.2	52.1		54.4	52.1		19.3	41.3		20.3	37.9		43.8
	95th % Queue (m)	42.1	102.6		31.0	106.5		17.3	119.8		19.1	105.2		

This intersection was identified for further sensitivity analysis to investigate future vehicle capacity constraints. The Post-Development Without Improvements scenario forecasts a heavy decrease in vehicle volume on the northbound through movement in the AM peak period, along with all through movements in the PM peak period due to anticipated traffic redistribution upon the Valley Line West's opening. However, additional scenarios were analyzed with forecasted growth rates of 10% and 20% applied to movements which saw a decrease in volumes between the existing conditions and the City's post-development model. These were analyzed with the recommended changes provided in **Table 5.48**. Full results are shown in **Appendix I** and **Appendix J**.

Aside from an increase in delay in the northbound through movement, other impacts to vehicle performance in the AM peak period are minimal and the overall intersection LOS does not change from D. Therefore, no changes are required in this period to address the additional growth.

In the PM peak period, however, more negative impacts to LOS are observed in the northbound and southbound through movements, which drop to LOS F under both growth scenarios thus causing the overall intersection performance to fall to F as well. This can be mitigated by allocating more green time from each of the protected left phases to the northbound and southbound through phases in both growth scenarios. While this causes the northbound left LOS to drop to F, the overall intersection performance improves to E.

5.2.3.2.2 Meadowlark Road and 87 Avenue

The configuration of the Meadowlark Road and 87 Avenue intersection is based on Valley Line LRT concept drawings. Meadowlark Road and 87 Avenue are pedestrian priority areas. In addition to LRT, 87 Avenue supports high-frequency district transit routes and B2 bus rapid transit in the future.

West of the intersection, 87 Avenue is comprised of a 5-lane vehicle cross section with centre-running LRT, flanked by sidewalk. Parking is occasionally permitted on the north side through the use of parking bays. East of the intersection, 87 Avenue is comprised of a 5-lane vehicle cross section flanked by sidewalk. Parking is not permitted. The cross-section elements are illustrated in **Figure 5-88**.

Figure 5-87 110 Street and 87 Avenue

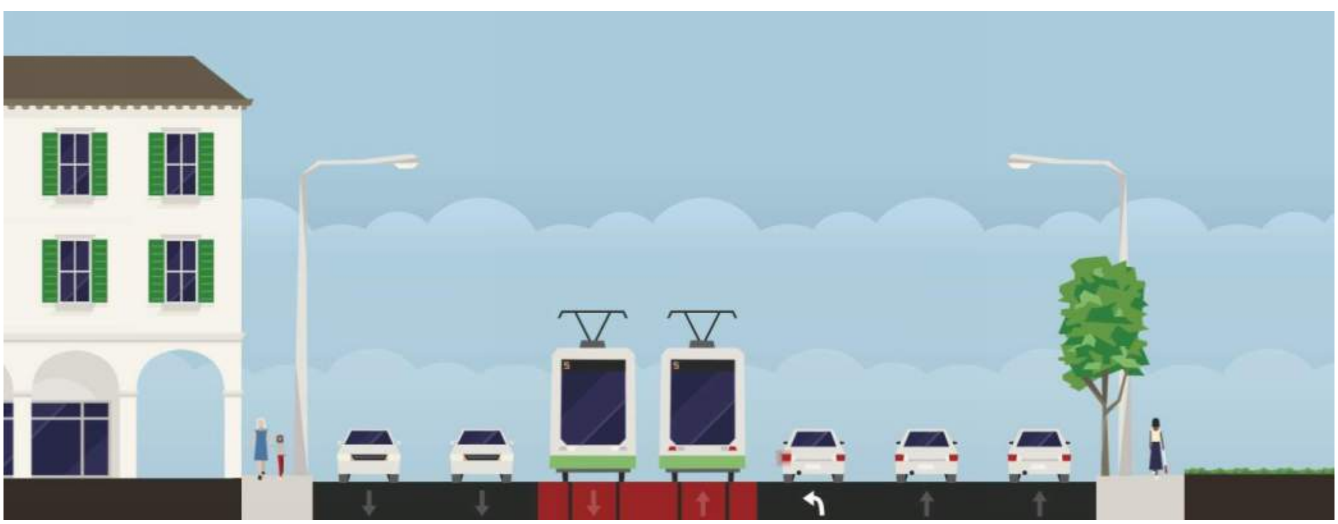


Figure 5-88 87 Avenue Facing East

Expected multimodal operations following rezoning and development are summarized in **Table 5.50**, comparing MMLOS outcomes with and without recommended changes to the road network. This intersection is a confluence of several transit routes including the Valley Line LRT, R6 Rapidbus, and B2 BRT. Being classified as a Neighbourhood Connector intersection, this designation emphasizes transit connectivity over any other mode with a target LOS of B. The Bike Plan identifies future cycling infrastructure on 87 Avenue, which is not included as part of VLW construction.

The purpose of the study has been to identify the overall multi-modal impacts as a result of PGA rezoning. The traffic analysis completed is not intended to be a detailed operational analysis of the intersections along the Valley Line LRT and such a study would require final designs and operational signal timing plans.

Table 5.50 MMLOS Meadowlark Road and 87 Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS E	LOS D	LOS B	LOS D
Adjusted Target	LOS D	LOS D	LOS B	LOS D
Post-Development without Improvements Intersection Performance	✓	✗	✗	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from E to D due to the intersection being located within a Pedestrian Priority Area. Cyclist LOS fails to meet targets. The Bike Plan identifies future cycling infrastructure on 87 Avenue or a parallel corridor. Cycling infrastructure is not included on 87 Avenue as part of VLW construction. Despite the presence of the Valley Line LRT and various future RapidBus routes, the target LOS for transit was not adjusted upwards as a target LOS B for a neighbourhood connector (non-street oriented arterial street) is appropriate considering the level of traffic and is acceptable for transit passage. Transit LOS fails to meet targets. This is predominantly affected by pedestrian experiences and a lack of transit priority measures for non-LRT transit (rapid and frequent bus service).			
Post-Development with Improvements Intersection Performance	✓	✓	⚠	✓
Recommended Treatment	**All recommendations along the Valley Line West corridor will need to be coordinated with Marigold Infrastructure Partners.** No specific changes are required to address pedestrian MMLOS.			

	To address the cyclist MMLOS, we recommend: • Implementing the 87 Avenue District Connector bike network. The analysis assumes that a separated facility will be built on either side of 87 Avenue and will not remove travel lanes for vehicles. To address transit MMLOS, we recommend: • Implement planned BRT using semi-exclusive routing. We have assumed this requires the removal of one through lane for traffic in both the eastbound and westbound direction. This increases vehicle delay, particularly for the remaining eastbound through/right lane. Adopting this measure results in transit MMLOS 'C' since the south approach does not feature transit priority measures. **NOTE** The R6 Rapidbus is expected to make a northbound left in mixed traffic at this intersection. Considering both the intersection geometry and the expectation that the Rapidbus travel in mixed traffic, it is difficult to justify introducing transit priority measures for this approach. Transit MMLOS may fall below targets with the understanding that not all approaches warrant treatment. • Transit MMLOS may be elevated through improvements to pedestrian MMLOS. This would require additional pedestrian enhancement measures, restrictions on RTOR and protected-only left movements (which increases vehicle delay significantly), along with either a reduction in intersection corner radii or reduction in signal cycle length. These improvements may be considered but are not recommended at this time. To mitigate deterioration to vehicle MMLOS, we recommend: • Optimizing signal phase timing to allocate more green time to the eastbound and westbound phases to reduce intersection delay.

Using current traffic volumes inputted into the future intersection configuration being built as part of the Valley Line West project, the intersection exhibits an HCM LOS of C and D in the AM and PM peak periods, respectively. Using forecasted volumes under the Post-Development Without Improvements scenario, the intersection experiences minor increases in delay in the AM peak period, but not because of one single movement. In the PM peak period, a similar increase in delay is mostly attributed to the westbound left movement experiencing LOS F. This is due to a doubling of the anticipated volume on this movement between the two scenarios.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.51** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

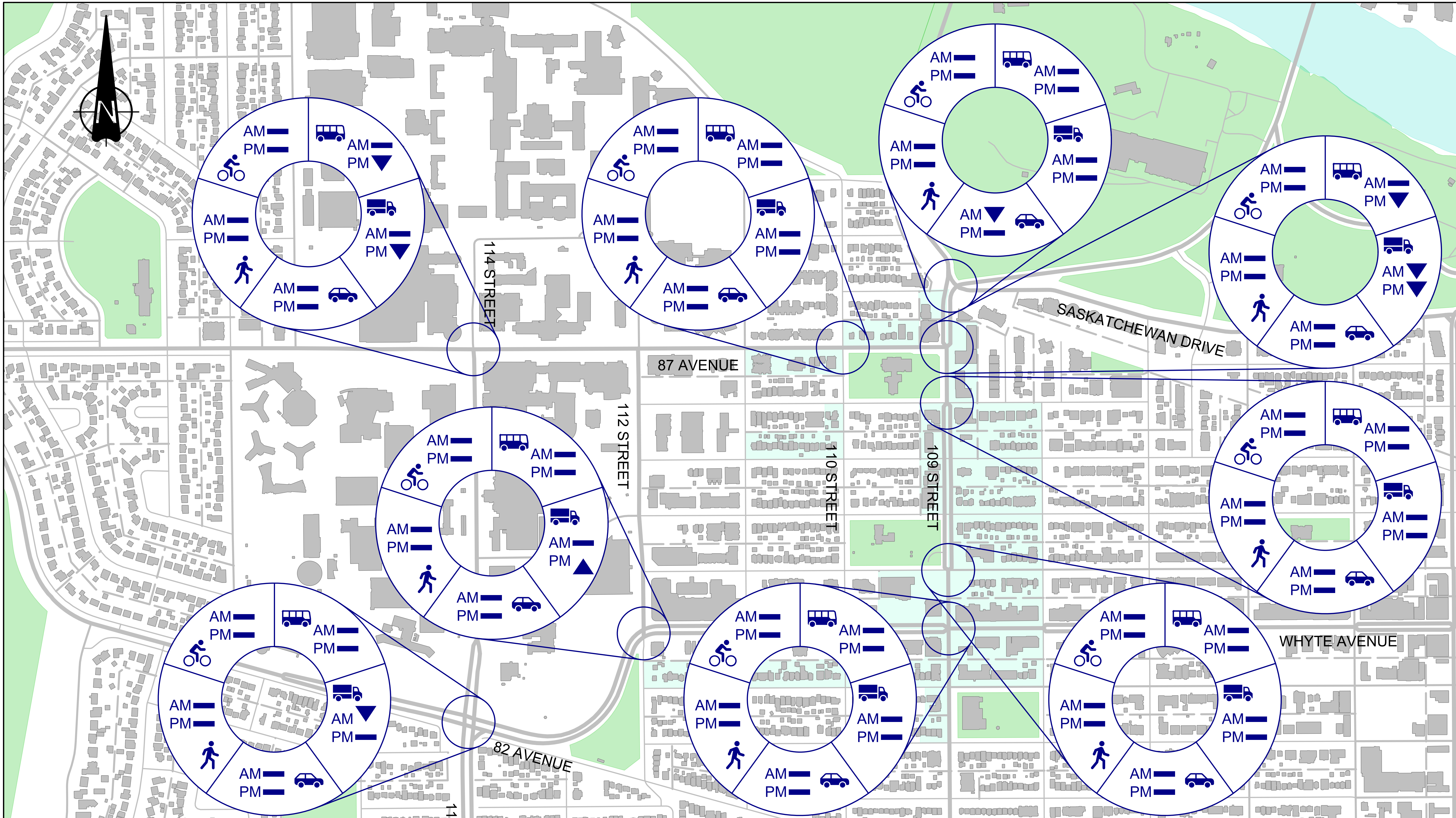
Table 5.51 Traditional LOS 109 Street and 100 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	236	374	770	32	219	13	149	601	91	163	213	17	
	v/c Ratio	0.82	0.26	0.88	0.35	0.24	0.25	0.29	0.66	0.67	0.51	0.24	0.24	0.617
	LOS	E	C	C	E	D	D	C	D	D	C	C	C	D
	Delay (s)	70.3	24.6	31.8	67.8	35.0	35.2	27.2	44.2	45.2	33.5	34.2	34.3	38.0
	95th % Queue (m)	101.9	50.1	159.1	16.9	38.4	38.2	42.8	114.8	112.3	50.9	37.5	37.1	
Post-Development with Improvements	Volume	236	374	770	32	219	13	149	601	91	163	213	17	
	v/c Ratio	0.82	0.26	0.9	0.35	0.24	0.25	0.33	1.33		0.69	0.44		0.815
	LOS	E	C	C	E	D	D	C	F		D	D		E
	Delay (s)	70.3	24.6	34.1	67.8	35.0	35.2	28.2	204.9		46.5	37.9		78.9
	95th % Queue (m)	101.9	50.1	163.2	16.9	38.4	38.3	43.3	430.0		57.8	74.7		
PM Peak														
Post-Development without Improvements	Volume	62	394	330	22	234	77	66	450	379	435	408	29	
	v/c Ratio	0.41	0.4	0.47	0.15	0.33	0.35	0.13	0.78	0.84	1.02	0.36	0.37	0.628
	LOS	E	D	C	D	D	D	B	D	E	F	C	C	D
	Delay (s)	59.6	36.7	27.6	52.2	36.5	37.2	18.8	49.5	57.1	86.1	30.7	30.9	47.3
	95th % Queue (m)	28.8	64.7	81.0	9.5	52.9	51.5	14.9	143.9	135.7	157.0	66.0	65.0	
Post-Development with Improvements	Volume	62	394	330	22	234	77	66	450	379	435	408	29	
	v/c Ratio	0.91	0.36	0.48	0.32	0.29	0.31	0.16	1.37		1.34	0.58		0.834
	LOS	F	C	C	E	C	C	B	F		F	C		F
	Delay (s)	142.1	33.2	28.5	67.9	32.9	33.5	19.6	218.3		215.8	30.7		115.2
	95th % Queue (m)	47.7	61.8	82.3	12.0	49.8	48.4	14.7	514.8		262.9	117.6		

5.3 University – Garneau

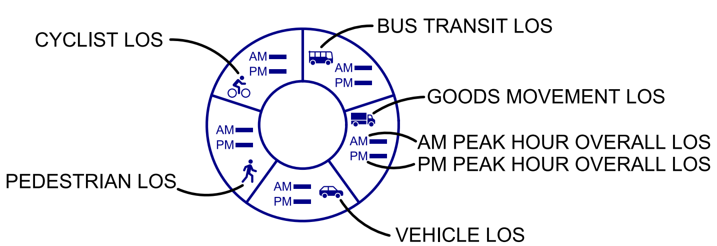
Each intersection within the University-Garneau PGA was assessed in PTV Vistro using HCM 7th Edition, then exported into the OTC MMLOS toolkit to better weight the operations and experiences of vehicle delay against all multimodal travel. Detailed HCM LOS and MMLOS tables are included in **Appendices A through F**. These tables outline the HCM LOS and MMLOS results of both pre-development operations and post-development forecast operations along each corridor and at each intersection, with the post-development forecast consisting of two scenarios: 1) Post-Development without Improvements and 2) Post Development with Improvements.

An overview of the AM and PM peak period MMLOS results comparing pre-development operations to post-development forecast operations (without improvements) are illustrated in **Figure 5-89** through **Figure 5-90**.



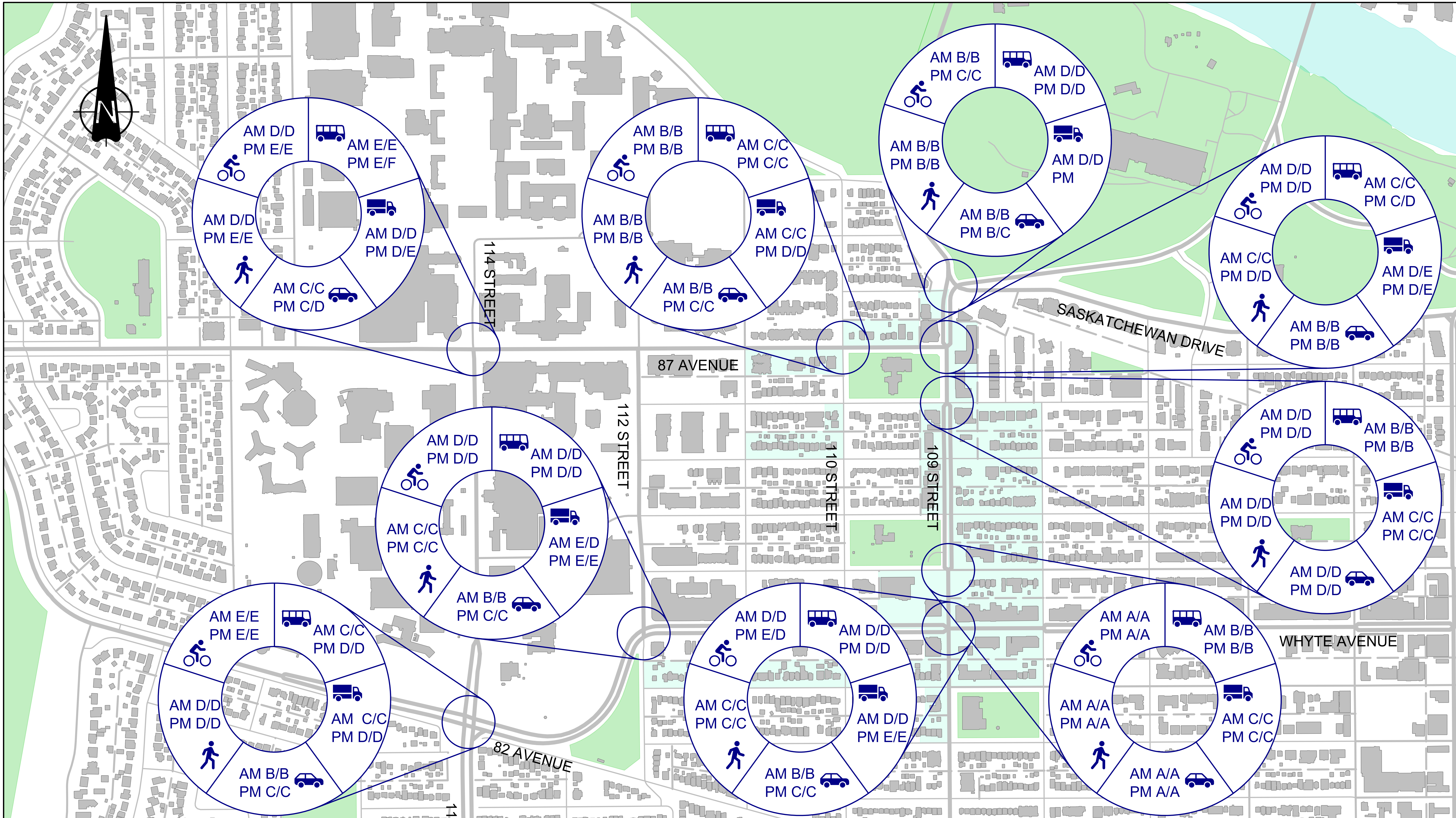
LEGEND

PGA TARGET AREA
PARK / OPEN SPACE
BODY OF WATER / RIVER



PEAK HOUR LOS INCREASES (LESS CONGESTION)
NO CHANGE IN PEAK HOUR LOS
PEAK HOUR LOS DECREASES (MORE CONGESTION)

FIGURE 5-89 GARNEAU PRIORITY GROWTH AREA POST DEVELOPMENT MMLOS COMPARISON



LEGEND

PGA TARGET AREA
PARK / OPEN SPACE
BODY OF WATER / RIVER

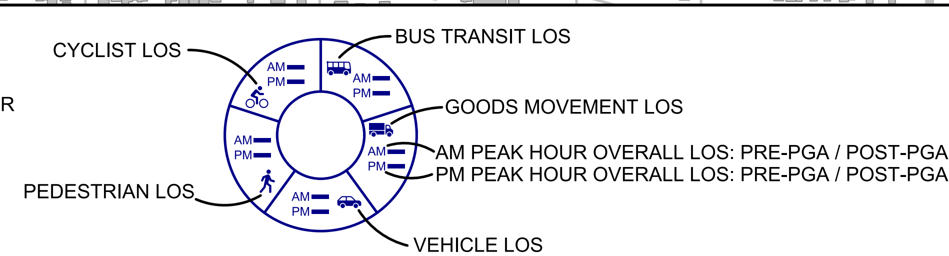


FIGURE 5-90 GARNEAU PRIORITY GROWTH AREA POST DEVELOPMENT MMLOS RESULTS

5.3.1 Recommended Mobility Assessment

A summary of the recommended qualitative and quantitative assessments is provided in **Figure 5-91.**

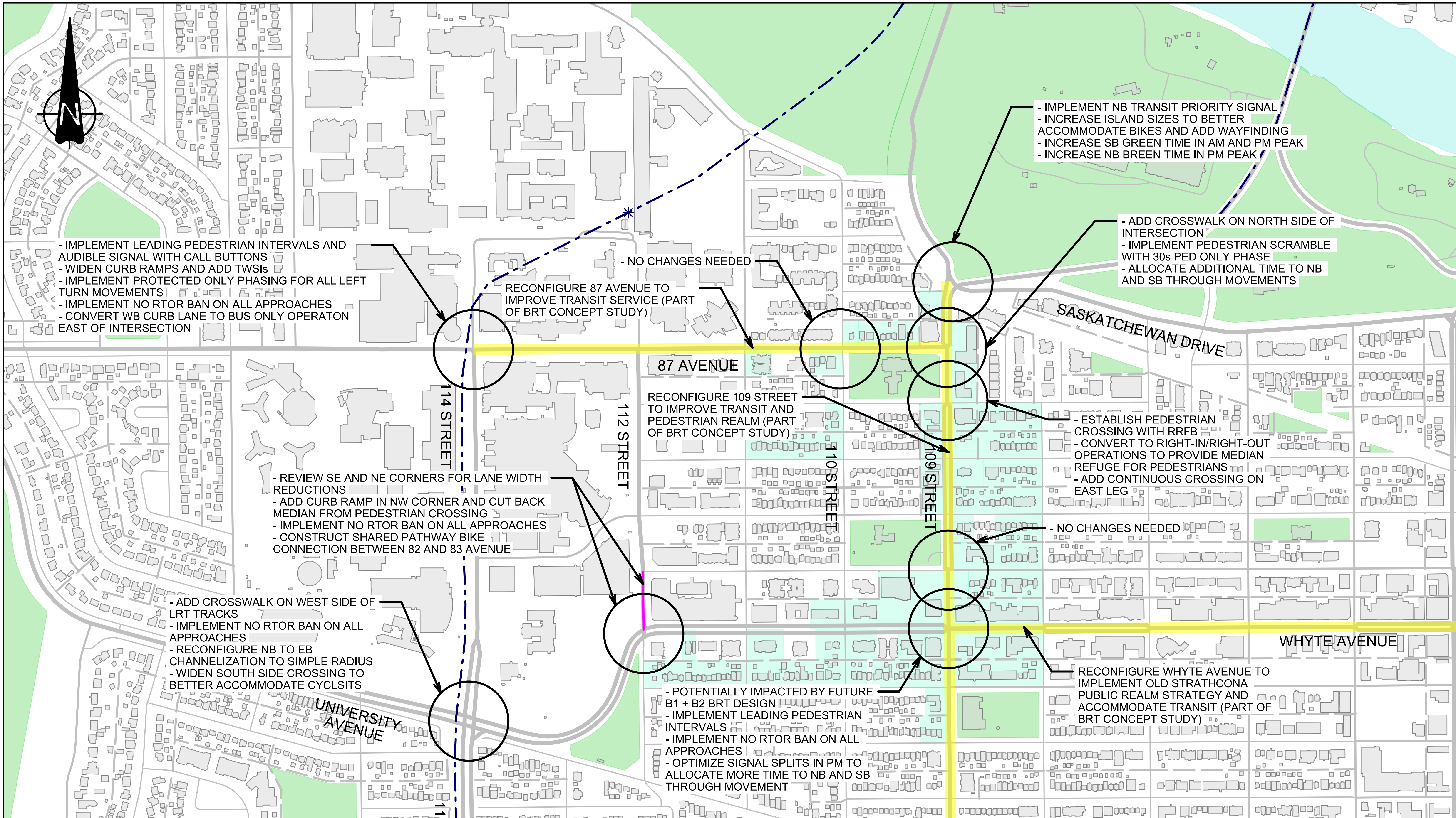
5.3.2 Qualitative Assessment

A review of missing pedestrian and cyclist facilities within the PGA was completed, identifying several missing links, ranging from short blocks to longer corridors, as shown in **Figure 5-91.**

5.3.3 Quantitative Assessments

Each intersection within the Garneau PGA was assessed in terms of their MMLOS for each mode calculated using the OTC MMLOS toolkit. Recommended changes requiring adjustments to the signal timings or lane configuration were analyzed for each intersection in PTV Vistro using HCM 7th Edition, with the resulting data on vehicle delay being exported into updated HCM LOS tables. The results of this analysis fed back into the MMLOS toolkit to calculate the final LOS for each mode. Detailed HCM LOS and MMLOS tables are included in **Appendices A through F**.

An overview of the AM and PM peak period MMLOS results comparing pre-development operations to post-development forecast operations without improvements are illustrated in **Figure 5-90**.



LEGEND

- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER
- LRT ALIGNMENT
- LRT STATION
- MISSING SIDEWALK
- MISSING CYCLING CONNECTION
- CORRIDOR UPGRADES REQUIRING FURTHER STUDY

NOTE:
Concept planning for the B1 and B2 BRT routes has been initiated and will determine the exact routing, street configuration, and stop / station locations. Delivery timelines will be known once design work has been completed and funding for construction is allocated.

FIGURE 5-91 GARNEAU PRIORITY GROWTH AREA POTENTIAL IMPROVEMENTS

5.3.3.1 109 Street Corridor

109 Street is a street oriented mixed-use /commercial arterial road. It is a pedestrian priority area from 88 Avenue southward and supports a variety of transit uses. Both the B1 and B2 mass transit are expected to travel along 109 Street in the future.

109 Street is comprised of a 6-lane vehicle cross section, flanked by sidewalk. The cross section expands to seven lanes at 82 Avenue and 87 Avenue to accommodate left turn bays. Parking in not permitted south of 84 Avenue, north of this point parking is permitted on the west side outside of the PM peak period. Beginning at 82 Avenue, the northbound curb lane is reserved for right turning vehicles and through transit, taxis, and bikes. The cross-section elements are illustrated in **Figure 5-92** through **Figure 5-96**.

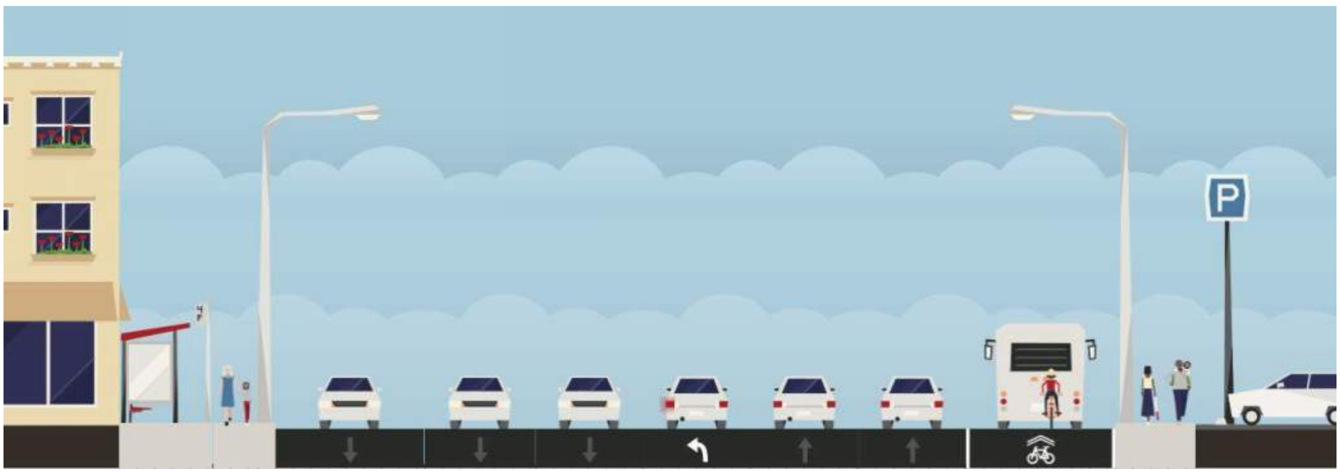


Figure 5-92 109 Street Facing North (South of 82 Avenue)

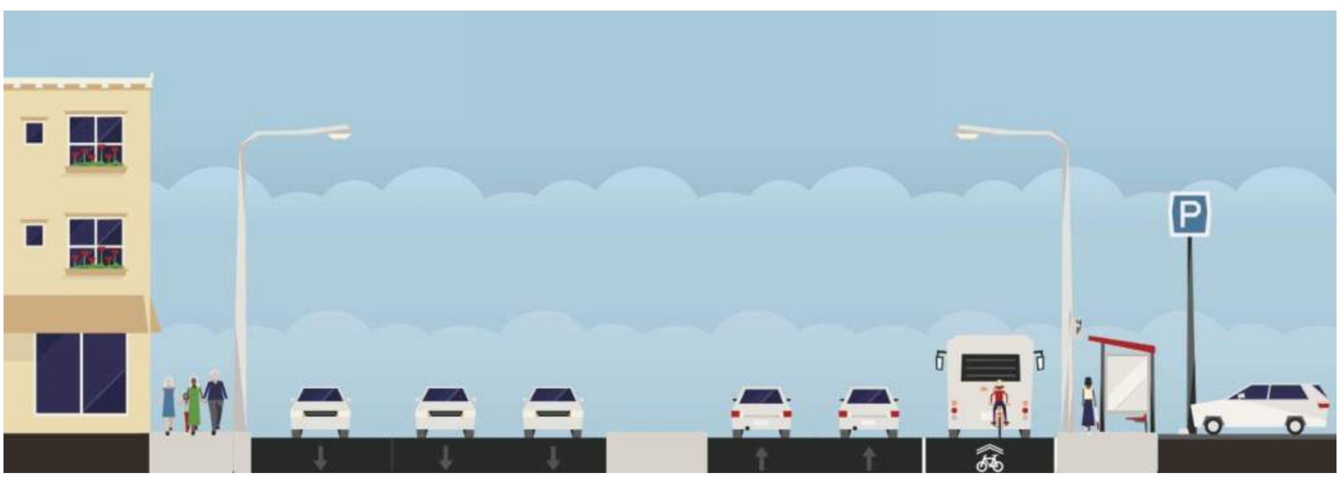


Figure 5-93 109 Street Facing North (South of 83 Avenue)

Figure 5-94 109 Street Facing North (South of 86 Avenue)

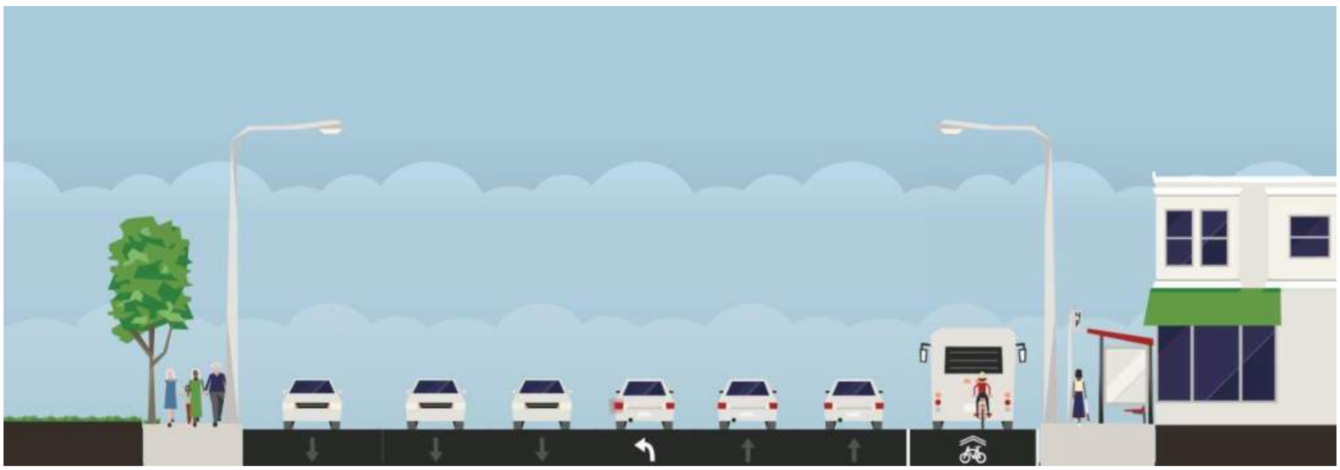


Figure 5-95 109 Street Facing North (South of 87 Avenue)

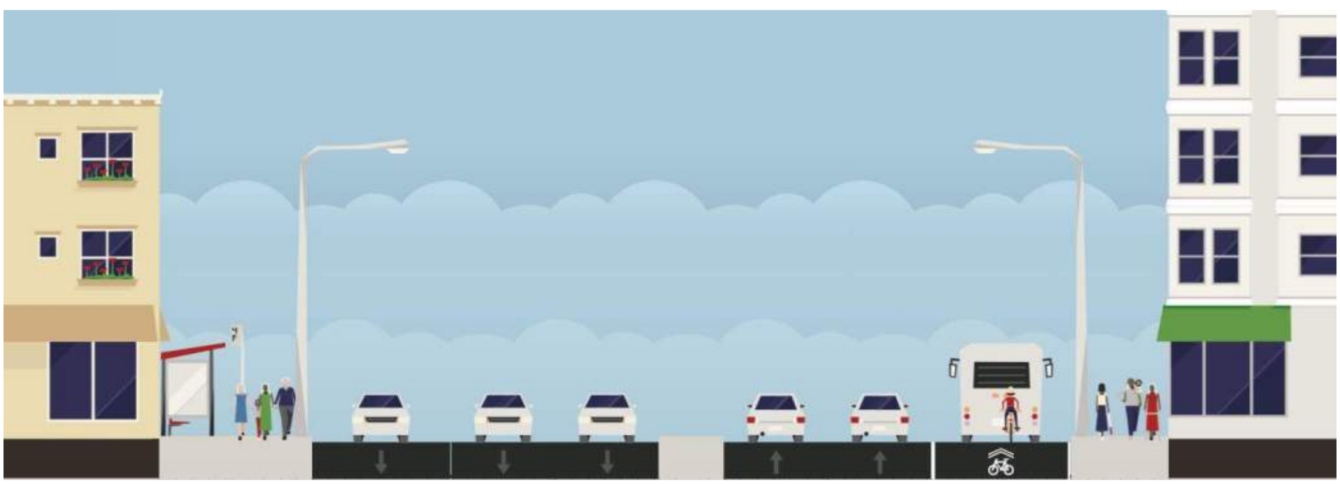


Figure 5-96 109 Street Facing North (South of 88 Avenue)

At an intersection level, MMLOS demand can be met on 109 Street without significant geometric changes. At a corridor level, pedestrian needs are not being met within the space allocated to them. Preliminary modifications to the corridor include dedicated transit lanes in both directions of travel as part of B1 and B2 BRT route planning, illustrated in **Figure 5-97**. Further modifications to the cross section could include reallocating vehicle space to the pedestrian realm, illustrated in **Figure 5-98**. With the introduction of higher order transit, the theoretical capacity of the roadway is not diminished.

Figure 5-97 Potential 109 Street (Garneau) Corridor Facing North (82 Avenue to 88 Avenue)

Figure 5-98 Potential 109 Street (Garneau) Corridor with Pedestrian Realm Facing North (82 Avenue to 88 Avenue)

Cycling infrastructure is not expected on 109 Street. Parallel routes are provided on 106 Street, 110 Street, and 111 Street. East/west routes cross 109 Street at University Avenue, 83 Avenue, 88 Avenue All development within the Garneau PGA will occur within 400 m of a low-stress cycling facility.

Additional study and engagement will be required to determine the BRT runningway and appropriate pedestrian realm but vehicle capacity must be reduced to support other uses on 109 Street. Expected multimodal operations at the corridor level are summarized in **Table 5.52** based on these recommendations however, individual intersection assessments in the following sections capture incremental changes that can be implemented in the meantime. Detailed MMLOS tables which analyze each corridor under existing and recommended conditions are found in **Appendix G** and **Appendix H**, respectively.

Table 5.52 MMLOS 109 Street from 81 Avenue to 89 Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS C	LOS C	LOS D
Post-Development without Improvements Corridor Performance	⚠	n/a	✓	✓
Post-Development with Improvements Corridor Performance	⚠	n/a	✓	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the corridor encompassing a Pedestrian Priority Area. • Transit: Target LOS adjusted from D to C due to the future B1/B2 BRT present within the corridor, along with existing bus services. Pedestrian LOS fails during the PM peak periods when the curb lane is used for vehicle traffic and there is minimal pedestrian realm buffer. While the curb lane is used for parking in off-peak periods, pedestrian LOS is acceptable. To address pedestrian MMLOS at the corridor level, we recommend: • Additional pedestrian realm – both unobstructed walk width and buffer / furnished zone must be increased. This should also include additional passenger amenities such as shelters, benches, and shade trees. Cycling facilities are not expected on 109 Street. A ~50 m shared use path on the east side of the street connects the protected cycling facility on 88 Avenue to a shared street between Saskatchewan Drive and 87 Avenue. Broader north/south cycling demand must be met through the bi-directional bike lane on 110 Street one block to the west, and cycle track on 106 Street, three blocks to the east. Transit LOS is acceptable, but additional passenger amenities should be explored such as shelters, benches, and shade.			

5.3.3.1.1 109 Street and 82 Avenue

The intersection of 109 Street and 82 Avenue is fully signalized. Both 109 Street and 82 Avenue are pedestrian priority areas. B1 and B2 transit are expected to travel along 109 Street and the east leg of 82 Avenue in the future.

West of the intersection, 82 Avenue is comprised of a 6-lane vehicle cross section flanked by sidewalk. East of the intersection, 82 Avenue is comprised of a 7-lane vehicle cross section flanked by sidewalk. Curb lanes are used for transit stops, parking and loading zones, and patio extensions. The cross-section elements are illustrated in **Figure 5-100**.

Figure 5-99 109 Street and 82 Avenue

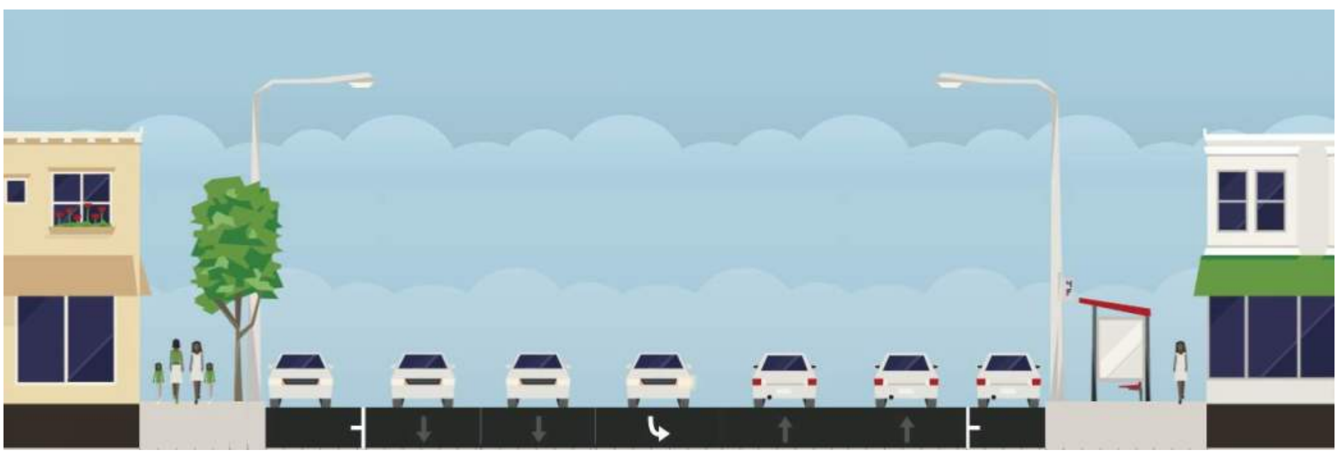


Figure 5-100 82 Avenue Facing East

Expected multimodal operations following rezoning and development are summarized in **Table 5.53**, comparing MMLOS outcomes with and without recommended changes to the road network. While the design and routing of the future B1 and B2 BRT routes is yet to be finalized, the recommended geometry includes running BRT lanes in place of the present outer travel / parking lanes.

Table 5.53 MMLOS 109 Street and 82 Avenue

<table>
<tr><th>Mode</th><th>Pedestrian</th><th>Cyclist</th><th>Transit</th><th>Motor Vehicles</th></tr>
<tr><td>Original Target</td><td>LOS C</td><td>LOS C</td><td>LOS D</td><td>LOS D</td></tr>
<tr><td>Adjusted Target</td><td>LOS B</td><td>LOS C</td><td>LOS C</td><td>LOS D</td></tr>
<tr><td>Post-Development without Improvements Intersection Performance</td><td>✗</td><td>⚠</td><td>✗</td><td>✓</td></tr>
<tr><td>Notes</td><td colspan="4">The target LOS was adjusted for the following modes:
Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area.
Transit: Target LOS adjusted from D to C due to the intersection being situated along the future B1 and B2 Bus Rapid Transit (BRT) routes.
Pedestrian LOS falls below target due to long cycle lengths and the number of conflicts with turning vehicles.
East/west cycling demand must be met through the bi-direction bike lane on 83 Avenue, one block to the north.
The transit LOS reflects pedestrian experiences. Improvements associated with the B1 and B2 mass transit are expected to improve LOS to acceptable standards.</td></tr>
<tr><td>Post-Development with Improvements Intersection Performance</td><td>✓</td><td>⚠</td><td>✓</td><td>✓</td></tr>
<tr><td>Recommended Treatment</td><td colspan="4">To address pedestrian MMLOS, we recommend:
Banning RTOR to minimize uncontrolled vehicle-pedestrian conflicts.
Implementing Leading Pedestrian Intervals on all approaches.
A pedestrian scramble crossing was tested during the analysis, but the impacts on vehicle and transit delay were significant and this treatment was ruled out.
No specific changes are required to address cyclist MMLOS.
To address transit MMLOS, we recommend:
Implementing planned exclusive transit runningway in both directions. Combined with pedestrian improvements, transit MMLOS is expected to meet target levels.
Impacts to vehicle MMLOS may be mitigated by:
AM Peak Period: no additional changes to signal timing plans.
PM Peak Period: optimize split time to allocate more green time to the northbound and southbound through phases.</td></tr>
</table>

Under current traffic volumes, the intersection exhibits an HCM LOS of C and D in the AM and PM peak periods, respectively. Using forecasted volumes under the Post-Development Without Improvements scenario, the intersection experiences minor increases in delay in the AM peak period, but not because of one single movement. In the PM peak period, a larger increase in delay is mostly attributed to the westbound left movement experiencing LOS F and the southbound right movement experience an LOS E. The increased delay for both movements is due to an increase in anticipated traffic volumes, with southbound right traffic sharing a lane with through vehicles. The overall intersection LOS, however, remains at D.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.54** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing. The recommended intersection configuration includes the provision of transit lanes.

Table 5.54 Traditional LOS 109 Street and 82 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	426	1553	112	76	805	58	55	516	78	74	744	239	
	v/c Ratio	0.73	0.93	0.14	0.29	0.45	0.46	0.61	0.62	0.63	0.5	0.86	0.61	0.748
	LOS	C	C	B	C	C	C	E	C	C	D	D	C	C
	Delay (s)	21.3	33.3	12.8	23.5	23.8	25.1	56.2	32.7	33.0	47.0	36.9	32.4	30.9
	95th % Queue (m)	74.1	192	16.6	11.2	66.4	69.9	21.0	78.6	79.1	26.6	104.5	61.7	
Post-Development with Improvements	Volume	426	1553	112	76	805	58	55	516	78	74	744	239	
	v/c Ratio	0.83	0.99	1.02	0.32	0.7	0.7	0.74	0.59	0.6	0.48	1.06	1.11	0.865
	LOS	C	D	F	C	C	C	E	C	C	D	F	F	D
	Delay (s)	32.0	52.6	61.2	25.3	33.1	33.5	63.5	31.0	31.2	46.0	78.2	98.5	52.9
	95th % Queue (m)	84.8	249	267	12.1	113	111.3	22.6	77.6	77.9	26.2	191.2	199	
PM Peak														
Post-Development without Improvements	Volume	205	899	169	239	1769	76	115	595	342	204	556	156	
	v/c Ratio	0.81	0.75	0.31	0.67	0.97	0.99	0.36	0.88	0.99	1.05	0.57	0.4	0.828
	LOS	D	C	C	C	D	E	C	D	E	F	C	C	D
	Delay (s)	52.2	34.5	25.7	31.4	51.4	66.4	25.9	42.6	64.4	97.3	31.7	29.2	47.5
	95th % Queue (m)	61.1	124	40.7	59.3	195	224.7	29.9	141.4	159.3	81.5	78.8	39.8	
Post-Development with Improvements	Volume	205	899	169	239	1769	76	115	595	342	204	556	156	
	v/c Ratio	0.98	0.7	0.73	0.77	1.18	1.21	0.52	1.06	1.24	1.06	0.84	0.96	1.021
	LOS	F	C	C	D	F	F	D	F	F	F	D	E	F
	Delay (s)	96.8	28.7	30.3	39.3	124	137.8	37.7	85.0	161.0	103	42.1	56.0	89.5
	95th % Queue (m)	74.8	135	133	60.2	434	458.7	35.8	196.6	251.5	86.2	114.9	123	

5.3.3.1.2 109 Street and 83 Avenue

The intersection of 109 Street and 83 Avenue is right-in, right-out stop controlled with actuated pedestrian and cyclist crossing control. 109 Street is a pedestrian priority area while 82 Avenue is part of the cycling network. B1 and B2 transit are expected to travel along 109 Street in the future.

83 Avenue is comprised of a single eastbound vehicle lane and a protected bi-directional bike lane, flanked by sidewalk. Parking is permitted west of the intersection. The cross-section elements are illustrated in **Figure 5-102.**

Figure 5-101 109 Street and 83 Avenue

Figure 5-102 83 Avenue Facing East

Expected multimodal operations following rezoning and development are summarized in **Table 5.55**, comparing MMLOS outcomes with and without recommended changes to the road network. This intersection currently operates very well for all modes. Actuated crossing control for pedestrians and cyclists on 83 Avenue results in responsive crossing opportunities for active modes while limiting delay for vehicles and transit on 109 Street.

Table 5.55 MMLOS 109 Street and 83 Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS B	LOS C	LOS D
Post-Development without Improvements Intersection Performance	✓	✓	✓	✓
Notes	-			
Post-Development with Improvements Intersection Performance	✓	✓	✓	✓
Recommended Treatment	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area. • Cyclists: Target LOS adjusted from C to B due to the intersection being situated along the 83 Avenue Cycling Corridor (On-Street protected bike lane). • Transit: Target LOS adjusted from D to C due to the intersection being situated along the future B1 and B2 Bus Rapid Transit (BRT) routes. No specific changes are required to address pedestrian MMLOS. No specific changes are required to address cyclist MMLOS. No specific changes are required to address transit MMLOS; however, we recommend the following. • The existing northbound transit lane can be retained in its current form. Currently, northbound right turning vehicles are permitted to use this lane while turning onto 83 Avenue. Due to the low volume of this movement, this arrangement can stay in place as the impact on transit LOS is negligible. • The outermost southbound lane must be converted to a dedicated transit lane as part of the future BRT. No specific changes are required to address vehicle MMLOS.			

Under current traffic volumes, the intersection experiences minimal delay with an HCM LOS of A in both peak periods, with all movements also operating at LOS A. As no forecasted volumes are available, future intersection performance is unknown but is anticipated to be largely unchanged. A small increase in delay is anticipated for southbound through vehicles in the PM peak period due to the future installation of the transit lane.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.56** based on forecast traffic volumes following PGA re-zoning and development.

Table 5.56 Traditional LOS 109 Street and 83 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	N/A	1043	11	N/A	582	N/A	N/A	N/A	44	N/A	N/A	N/A	
	v/c Ratio		0.4	0.01		0.23				0.07				0.394
	LOS		A	A		A				D				A
	Delay (s)		3.2	1.9		2.5				38.8				5.9
	95th % Queue (m)		27.9	0.4		12.8				3.3				
Post-Development with Improvements	Volume	N/A	1043	11	N/A	582	N/A	N/A	N/A	44	N/A	N/A	N/A	
	v/c Ratio		0.4	0.01		0.23				0.07				0.394
	LOS		A	A		A				D				A
	Delay (s)		3.2	1.9		2.5				38.8				5.9
	95th % Queue (m)		27.9	0.4		12.8				3.3				
PM Peak														
Post-Development without Improvements	Volume	N/A	860	33	N/A	1272	N/A	N/A	N/A	130	N/A	N/A	N/A	
	v/c Ratio		0.4	0.03		0.4				0.1				0.324
	LOS		A	A		A				C				A
	Delay (s)		7.8	5.5		7.8				31.9				9.14
	95th % Queue (m)		55.1	3.0		54.3				9.2				
Post-Development with Improvements	Volume	N/A	860	33	N/A	1272	N/A	N/A	N/A	130	N/A	N/A	N/A	
	v/c Ratio		0.4	0.03		0.6				0.1				0.444
	LOS		A	A		A				C				B
	Delay (s)		7.8	5.5		9.9				31.9				10.4
	95th % Queue (m)		55.1	3.0		88.9				9.2				

5.3.3.1.3 109 Street and 86 Avenue

The intersection of 109 Street and 86 Avenue is a two-way stop-controlled intersection. 109 Street is a pedestrian priority area. B1 and B2 transit are expected to travel along 109 Street in the future.

West of the intersection, 86 Avenue is comprised of a single westbound vehicle lane and a parking lane, flanked by sidewalk. East of the intersection, 86 Avenue is comprised of two vehicle lanes and one parking lane, flanked by sidewalk. Curb extensions have been constructed across 86 Avenue on the southeast and southwest quadrant. The cross-section elements are illustrated in **Figure 5-104.**

Figure 5-103 109 Street and 86 Avenue

Figure 5-104 86 Avenue Facing West

Expected multimodal operations following rezoning and development are summarized in **Table 5.57**, comparing MMLOS outcomes with and without recommended changes to the road network. The MMLOS analysis for this intersection differs from others in that unsignalized intersections have a different set of LOS criteria for each mode. Improvements to this intersection focus on improving the pedestrian experience while potentially restricting westbound through and left movements to reduce delay and collision risk.

Table 5.57 MMLOS 109 Street and 86 Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS C	LOS C	LOS D
Post-Development without Improvements Intersection Performance	✗	⚠	✓	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area. • Transit: Target LOS adjusted from D to C due to the intersection being situated along the future B1 and B2 Bus Rapid Transit (BRT) routes. Pedestrian LOS is based on crossing distance, the presence of marked crossings, and the average effective turning radius of vehicles. This parameter currently fails due to the lack of marked crossings across 109 Street, despite the presence of TWSIs indicating east-west crossings on both sides of 86 Avenue. The nearest controlled crossings are one block to the north or south, ~100 m away. East/west cycling demand is expected to be met on 83 Avenue or 88 Avenue, three blocks to the south and two blocks to the north respectively. Vehicle LOS is considered acceptable from a multi-modal perspective; however, the stop-controlled east leg experiences significant delays in both peak periods.			
Post-Development with Improvements Intersection Performance	⚠	⚠	✓	✓
Recommended Treatment	Pedestrian MMLOS will continue to fail due to the large average crossing distance, a distance that cannot be reduced without compromising vehicle and transit MMLOS. Pedestrian MMLOS can be raised to 'C' by implementing the following: • Upgrade this crossing with a pedestrian actuated Rectangular Rapid Flashing Beacon (RRFB), although TAC warrants for this installation are not met based on controlled crossing separation. • Extend the existing median on 109 Street to the north creating a right-in/right-out only designation for the east leg of 86 Avenue. The median may provide a possible refuge space for pedestrians. • Optionally, consider a continuous crossing or a curb extension on the east leg of the intersection.			

	Establishing a proper crossing at this location is appropriate given the location within a pedestrian priority area and improving ease of access to the future BRT line. No specific changes are required to address cyclist MMLOS. Transit MMLOS will be addressed by the implementation of planned BRT routes using an exclusive runningway. No specific changes are required to address vehicle MMLOS. Westbound through and left turns – the source of intersection delay – were removed from consideration to reflect the proposed RIRO configuration.

Due to no signals present at this intersection, all northbound and southbound through movements operate at an HCM LOS A in both peak periods, with southbound left exhibiting LOS C and B in the AM and PM peak periods, respectively. Currently, westbound traffic is controlled by a stop control and there is no signage prohibiting westbound through or left movements. Therefore, the small number of vehicles attempting these movements are faced with an extremely significant delay due to the constant flow of northbound and southbound traffic along 109 Street. This skews the overall intersection performance to F, but this is not indicative of the true performance as these delays affect only a very small number of vehicles in reality, if any.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.58** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing. The recommended intersection configuration includes the provision of transit lanes.

Table 5.58 Traditional LOS 109 Street and 86 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	N/A	1776	24	19	927	67	N/A	N/A	N/A	1	8	91	
	v/c Ratio		0.02	0	0.06	0.01	0				0.05	0.53	0.33	
	LOS		A	A	C	A	A				F	F	F	F
	Delay (s)		0	0	15.9	0	0				289	342.2	115	4.74
	95th % Queue (m)		0	0	0.24	0.12	0				42.2	42.2	42.2	
Post-Development with Improvements	Volume	N/A	1776	24	19	927	67	N/A	N/A	N/A	N/A	N/A	91	
	v/c Ratio		0.02	0	0.06	0.01	0						0.35	
	LOS		A	A	C	A	A						D	D
	Delay (s)		0	0	15.9	0	0						25.8	0.91
	95th % Queue (m)		0	0	0.24	0.12	0						11.3	
Post-Development without Improvements	Volume	N/A	1129	40	54	2032	51	N/A	N/A	N/A	2	15	36	
	v/c Ratio		0	0	0.11	0.02	0				0.05	3.27	0.11	
	LOS		A	A	B	A	A				F	F	F	F
	Delay (s)		0	0	12.1	0	0				1452	2145	1372	25.35
	95th % Queue (m)		0	0	0.71	0.24	0				56.3	56.3	56.3	
Post-Development with Improvements	Volume	N/A	1129	40	54	2032	51	N/A	N/A	N/A	N/A	N/A	36	
	v/c Ratio		0	0	0.11	0.02	0						0.09	
	LOS		A	A	B	A	A						C	C
	Delay (s)		0	0	12.1	0	0						15.4	0.36
	95th % Queue (m)		0	0	0.71	0.24	0						2.36	

5.3.3.1.4 109 Street and 87 Avenue

The intersection of 109 Street and 87 Avenue is a major access to the University of Alberta, the east leg is an access to a commercial parking lot. 109 Street and the west leg of 87 Avenue are pedestrian priority areas; however, pedestrians crossing is prohibited across the north leg of the intersection. B1 transit is expected to travel along 109 Street while B2 transit is expected to travel along the south leg of 109 Street and the west leg of 87 Avenue in the future.

Figure 5-105 109 Street and 87 Avenue

West of the intersection, 87 Avenue is comprised of a 5-lane vehicle cross-section flanked by sidewalk. Parking is permitted on the north side. The east leg of the intersection is a commercial access, permitting left and right turns onto 109 Street. The cross-section elements are illustrated in **Figure 5-106**.

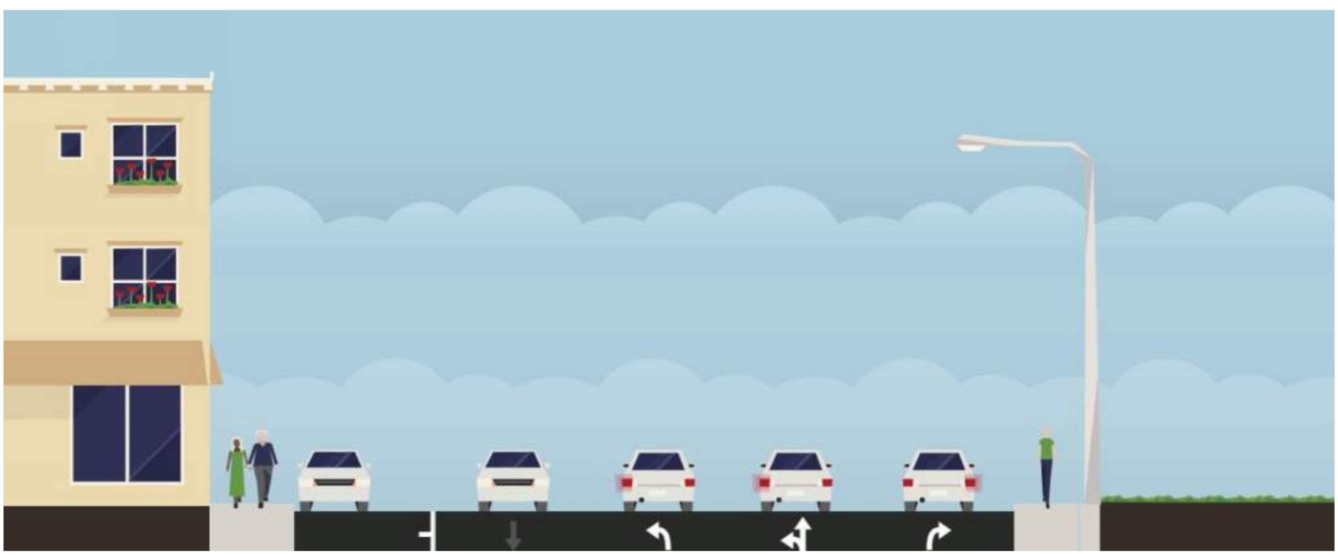


Figure 5-106 87 Avenue Facing East

Expected multimodal operations following rezoning and development are summarized in **Table 5.59**, comparing MMLOS outcomes with and without recommended changes to the road network. This intersection does not meet the minimum design requirements for pedestrian infrastructure, providing marked pedestrian crossings to all approaching pedestrian facilities.

Table 5.59 MMLOS 109 Street and 87 Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS C	LOS C	LOS D
Post-Development without Improvements Intersection Performance	✗	⚠	✗ (PM Peak)	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area. • Transit: Target LOS adjusted from D to C due to the intersection being situated along the future B1 and B2 Bus Rapid Transit (BRT) routes. This intersection does not meet the design requirements for pedestrian infrastructure, providing marked pedestrian crossings to all approaching pedestrian facilities. Pedestrians are required to make a three-stage crossing to stay on the north side of the street. This is likely to avoid conflicts with the dual eastbound left turn lane which operates under a dedicated phase. North/south cycling demand is expected to be met on 110 Avenue, one block to the west. East/west cycling demand is expected to be met on 88 Avenue, one blocks to the north. Transit LOS fails in the PM peak period due to delays experienced by southbound vehicles travelling in mixed traffic lanes.			
Post-Development with Improvements Intersection Performance	✓	⚠	✓	✓
Recommended Treatment	To meet pedestrian MMLOS targets, we recommend: • Implementing a scramble crosswalk. This is the only reasonable method to safely accommodate pedestrians in all directions and to attain the target pedestrian LOS, which is justified for a pedestrian priority area. No specific changes are required to address cyclist MMLOS. Transit MMLOS will be addressed by the implementation of planned BRT routes using exclusive runningway. It is assumed that the remaining lanes allocated for vehicles in the southbound direction will be a single through lane and a shared through/right lane. To mitigate deteriorating vehicle MMLOS, we recommend:			

	• Allocating additional green time to the north and south through phases in both peak periods. • PM peak period: Increase the signal cycle length from 110 to 220 seconds.

Under current traffic volumes, the intersection exhibits an HCM LOS of C in both peak periods. Using forecasted volumes under the Post-Development Without Improvements scenario, the intersection experiences a drop to LOS D in the AM period, which is attributed to an increase in anticipated traffic volumes affecting the delay of northbound left turning and southbound through traffic. In the PM peak period, the LOS also drops to D for the same reason, but also due to a heightened delay for eastbound vehicles.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.60** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing. The recommended intersection configuration includes the provision of transit lanes.

Adopting the recommended measures results in a significant increase in overall vehicle delay and queue length for the anticipated traffic volumes, particularly for the southbound through and northbound left movements (assuming a pedestrian-only phase length of 30 seconds). With the anticipated growth in traffic volumes and queue, this intersection is a critical point along the 109 Street corridor for vehicle traffic as the anticipated southbound queue will spillback well beyond the intersection at 88 Avenue to the north.

Table 5.60 Traditional LOS 109 Street and 87 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	686	1171	10	N/A	833	231	267	0	160	20	N/A	65	
	v/c Ratio	1.04	0.57	0.01		0.75	0.79	0.37	0.37	0.45	0.1		0.16	0.489
	LOS	F	B	A		D	D	C	C	C	D		C	D
	Delay (s)	75.3	11.4	8.1		37.6	46.6	33.1	33.1	31.4	39.1		28.7	36.3
	95th % Queue (m)	182.8	84.9	1.1		97.7	108.4	38.3	38.3	39.9	6.3		15.4	
Post-Development with Improvements	Volume	686	1171	10	N/A	833	231	267	0	160	20	N/A	65	
	v/c Ratio	1.45	0.68	0.01		1.08	1.12	0.85	0.86	1.15	0.28		0.45	0.526
	LOS	F	B	A		F	F	E	E	F	D		D	F
	Delay (s)	248.3	19.0	5.3		98.3	114.8	59.9	60.2	130.1	52.1		45.6	100.7
	95th % Queue (m)	425.9	112	0.8		217	234.4	53.5	53.7	80.2	7.5		20.2	
PM Peak														
Post-Development without Improvements	Volume	350	806	9	N/A	1835	175	532	72	243	59	N/A	197	
	v/c Ratio	1.1	0.37	0.01		0.77	0.77	0.93	1.03	0.9	0.9		0.52	0.869
	LOS	F	A	A		C	C	F	F	E	F		D	D
	Delay (s)	120.7	8.4	1.8		23.6	26.5	80.4	103.8	66.0	86.7		37.9	42.8
	95th % Queue (m)	121.5	54.2	0.3		149	155.3	122.8	153.9	88.2	30.7		59.2	
Post-Development with Improvements	Volume	350	806	9	N/A	1835	175	532	72	243	59	N/A	197	
	v/c Ratio	0.92	0.39	0.01		1.4	1.39	1.34	1.39	0.88	1.8		0.7	1.073
	LOS	F	B	A		F	F	F	F	F	F		F	F
	Delay (s)	108.8	19.5	6.4		252	249.5	273.9	296.1	114.4	496		92.0	188.9
	95th % Queue (m)	130.8	120	1.4		862	858.5	270.9	302.2	154.0	74.5		117	

This intersection was identified for further sensitivity analysis to investigate future vehicle capacity constraints in the AM peak period. The Post-Development Without Improvements scenario forecasts a decrease in vehicle volume on the northbound through, southbound right, and eastbound movements. Therefore, additional scenarios were analyzed with forecasted growth rates of 10% and 20% applied to these movements between the existing conditions and the City's post-development model. All remaining movements, however, assume the same number as predicted by the model. Full results are shown in **Appendix I** and **Appendix J**.

In the AM peak period, both scenarios cause an increase in delay and LOS F for the southbound and eastbound through and right movements, with the eastbound right being the worst performing. Unfortunately, options to adjust the signal timing under the current cycle length are limited in these instances due to the dedicated pedestrian phase, which is necessary to achieve the target pedestrian LOS. Therefore, increasing the cycle length to 200 seconds for the AM peak period is likely the best option in these advanced growth scenarios to address vehicle capacity concerns and maintain coordination with other intersections along the 109 Street corridor, as implementing this measure alone does not decrease the pedestrian LOS. Using this timing plan, delay is minimized when most of the green time is allocated to the northbound and southbound phases. In this 10% growth scenario, this results in a total intersection delay and v/c ratio being similar to the original Post-Development With Improvements scenario with the recommended changes in **Table 5.59**. For the 20% growth scenario, the overall intersection performance is lower, but once again the total delay can be minimized by allocating most green time to the northbound and southbound phases.

5.3.3.1.5 109 Street and 88 Avenue / Saskatchewan Drive / Walterdale Hill Road

The intersection of 109 Street and 88 Avenue is the convergence of four roadways. 109 Street is a pedestrian priority area. 88 Avenue is part of the cycling network. B1 transit is expected to travel along 109 Street onto the Walterdale Bridge in the future.

88 Avenue is comprised of a single westbound vehicle lane and a bi-directional cycle track, flanked by sidewalk. The cross-section elements are illustrated in **Figure 5-108**.

Figure 5-107 109 Street and 88 Avenue

Figure 5-108 88 Avenue Facing East

Expected multimodal operations following rezoning and development are summarized in **Table 5.61**, comparing MMLOS outcomes with and without recommended changes to the road network. This intersection features a complex layout to accommodate the series of movements between each approach for all modes.

Table 5.61 MMLOS 109 Street and 88 Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS B	LOS C	LOS D
Post-Development without Improvements Intersection Performance	✓	✗ (PM Peak)	✗	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area. • Cyclists: Target LOS adjusted from C to B due to the intersection being situated at the confluence of various bike routes. • Transit: Target LOS adjusted from D to C due to the intersection being situated along the future B1 Bus Rapid Transit (BRT) route. Bicycle facilities fall short of targets in the PM peak hour as a result of long cycle lengths. Physical infrastructure meets the complex movements at this intersection. The dedicated northbound transit lane along 109 Street becomes a right turn lane at this intersection, forcing transit to share space with other vehicles and increasing delay.			
Post-Development with Improvements Intersection Performance	✓	✓	✓	✓
Recommended Treatment	No specific changes are required to address pedestrian MMLOS. To address cyclist MMLOS, we recommend: • Installing enhancements to the existing bike facilities such as increasing the size of the pedestrian island to accommodate cyclists demand through the two-stage crossing. • Improving signage and wayfinding to aid cyclists in navigating to their intended route. To address transit MMLOS, we recommend: • Implement north and southbound curbside transit-only lanes south of the intersection. The northbound vehicle lane configuration will be reduced to two lanes (one lane towards Walterdale Hill and one towards Saskatchewan Drive). • Implement a queue jump phase (assumed 8 seconds in Vistro) to give transit signal priority to northbound busses, allowing them to bypass the flow of traffic while merging onto Walterdale Hill.			

	Deterioration to the vehicle MMLOS may be mitigated by the following: • AM peak period: slight increase in green time allocated to the southbound left phase. • PM Peak Period: Increase in green time allocated to the southbound-through and northbound phases.

Under current traffic volumes, the intersection exhibits an HCM LOS of C in both peak periods, respectively. Using forecasted volumes under the Post-Development Without Improvements scenario, the southbound movements towards Saskatchewan Drive experience a drop in LOS to E from a near doubling of anticipated traffic volume. The overall intersection LOS, however, remains at C. In the PM peak period, an increase in southbound volume from the High Level Bridge towards 109 Street cause this movement to fail and the intersection LOS to drop to E, with the queue extending northwards back onto the bridge.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.62** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing. The recommended intersection configuration includes the provision of transit lanes.

Table 5.62 Traditional LOS 109 Street and 88 Avenue/Saskatchewan Drive/Walterdale Hill Road

Scenario	Measure of Effectiveness	Northbound		Southbound				Eastbound			Westbound			Overall
		TH	RT	LT	TH 1	TH 2	RT	RT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	1252	251	26	773	1043	180	N/A	N/A	N/A	N/A	N/A	N/A	
	v/c Ratio	0.72		0.95		0.8	0.84							0.662
	LOS	B		E		C	C							C
	Delay (s)	18.0		57.0		25.9	29.7							31.56
	95th % Queue (m)	96.8		132.8		133.3	142.3							
Post-Development with Improvements	Volume	1252	251	26	773	1043	180	N/A	N/A	N/A	N/A	N/A	N/A	
	v/c Ratio	1.07		0.95		0.8	0.84							0.859
	LOS	F		E		C	C							C
	Delay (s)	67.0		57.0		25.9	29.7							63.51
	95th % Queue (m)	251.5		132.8		133.3	142.3							
PM Peak														
Post-Development without Improvements	Volume	1163	372	47	457	2010	91	N/A	N/A	N/A	N/A	N/A	N/A	
	v/c Ratio	0.86		0.41		1.03	1.05							0.631
	LOS	C		C		F	F							E
	Delay (s)	30.1		23.7		58.7	64.0							61.35
	95th % Queue (m)	134.0		63.0		339.8	352.6							
Post-Development with Improvements	Volume	1163	372	47	457	2010	91	N/A	N/A	N/A	N/A	N/A	N/A	
	v/c Ratio	0.96		0.68		0.82	0.83							0.635
	LOS	C		D		B	B							D
	Delay (s)	33.7		41.3		14.7	15.5							35.56
	95th % Queue (m)	201.0		81.6		158.5	163.2							

*NBT: To Walterdale Hill Road
*NBR: To Saskatchewan Drive
*SBL: To Walterdale Hill
*SBT1: To Saskatchewan Drive
*SBT2: To 109 Street
*SBR: To 88 Avenue

5.3.3.2 114 Street Corridor

114 Street is a street oriented mixed-use /commercial arterial road. It is a pedestrian priority area from 87 Avenue southward and supports a variety of transit uses including the Capital line LRT.

114 Street is typically comprised of a 5-lane vehicle cross section, flanked by sidewalk. South of 82 Avenue, the west sidewalk becomes a shared use path. LRT begins running parallel to the corridor at-grade just south of 87 Avenue. Parking is not permitted on 114 Street. The cross-section elements are illustrated in **Figure 5-109** through **Figure 5-110**.

Figure 5-109 114 Street Facing North (South of 82 Avenue)

Figure 5-110 114 Street Facing North (South of 87 Avenue)

At an intersection level, MMLOS demand can be met on 114 Street without significant geometric changes. At a corridor level, it is clear that pedestrian needs are not being met within the space allocated to them. This could be addressed by expanding the sidewalk and increasing the furnished zone along Corbett Field or connecting pedestrians at 82 Avenue to the shared use path in the northwest quadrant of the intersection – moving pedestrians away from motor vehicles.

On-street cycling infrastructure is not expected on 114 Street between 82 and 87 Avenue. Demand must be met through the bike boulevard one block west on 115 Street, but this offers little protection for cyclists within the University. Cyclists may also use a series of shared us pathways to navigate north/south through the university, though this network is neither direct nor continuous. A formal, protected cycling network within the University may require significant engagement with appropriate stakeholders.

Expected multimodal operations at the corridor level are summarized in **Table 5.63** based on these recommendations however, individual intersection assessments in the following sections capture incremental changes that can be implemented in the meantime. Detailed MMLOS tables which analyze each corridor under existing and recommended conditions are found in **Appendix G** and **Appendix H**, respectively.

Table 5.63 MMLOS 114 Street from 82 Avenue to 87 Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS C	LOS C	LOS D
Post-Development without Improvements Corridor Performance	✗	⚠	✓	✓
Post-Development with Improvements Corridor Performance	✓	⚠	✓	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the corridor encompassing a Pedestrian Priority Area. • Transit: Target LOS adjusted from D to C due to the future B1/B2 BRT present within the corridor, along with existing bus services. At a corridor level, pedestrian MMLOS is predominantly affected by limited buffer width (furnishing zone, parking, or bike lanes). Pedestrian realm should be widened where possible. Consider a connection between the 82 Avenue intersection and the shared use path in the northwest quadrant to provide an alternate connection into campus away from vehicles. The shared use path meets cyclist MMLOS targets but does not continue north of 82 Avenue. Demand must be met through the bike boulevard one block west on 115 Street. Within the University, 115 Street and 116 Street are considered part of the on-street cycling network but offer no physical protections for cyclist. Cyclists may also use a series of shared us pathways to navigate north/south through the university, though this network is neither direct nor continuous.			

5.3.3.2.1 114 Street and 82 Avenue / University Avenue

The intersection of 114 Street and 82 Avenue / University Avenue is a primary access to the University of Alberta. The Capital Line LRT runs parallel to 114 Street at-grade. 114 Street is considered a pedestrian priority area; however, pedestrian crossing is not supported across the west leg of the intersection.

Figure 5-111 114 Street and 82 Avenue / University Avenue

West of the intersection, University Avenue is comprised of a sidewalk, a 7-lane vehicle cross section, and a residential service road that serves the cycling network. The cross-section elements are illustrated in **Figure 5-112**. East of the intersection, 82 Avenue is comprised of a 6-lane vehicle cross section and a wide sidewalk. Parking is not permitted on 82 Avenue / University Avenue.

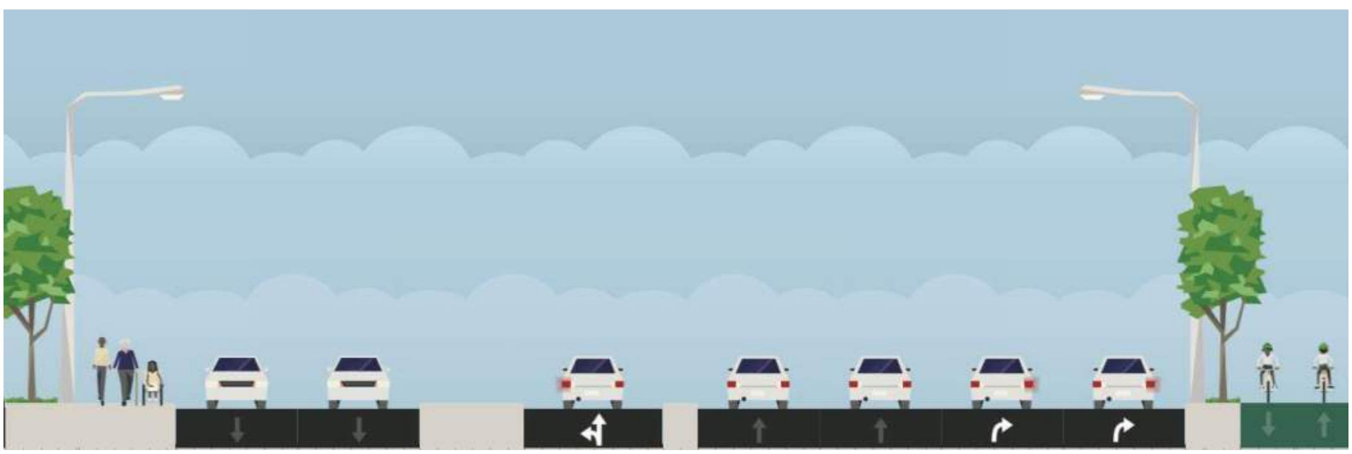


Figure 5-112 University Avenue Facing East

Expected multimodal operations following rezoning and development are summarized in **Table 5.64**, comparing MMLOS outcomes with and without recommended changes to the road network. Being classified as a Neighbourhood Connector intersection, this emphasizes transit movement over all other modes. Currently, on-street transit experiences delays in the PM peak as busses travel in mixed traffic with heavy vehicle demand and signal pre-emption required for at-grade LRT crossing, which heavily impacts the intersection performance.

This intersection does not meet the design requirements for pedestrian infrastructure – providing marked pedestrian crossings to all approaching pedestrian facilities.

Table 5.64 MMLOS 114 Street and 82 Avenue / University Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS D	LOS D	LOS B	LOS D
Adjusted Target	LOS C	LOS C	LOS B	LOS D
Post-Development without Improvements Intersection Performance	✗	⚠	✗	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted two levels from E to C due to the intersection being located within a Pedestrian Priority Area. • Cyclists: Target LOS adjusted from D to C due to the intersection being situated along the University Avenue Cycling Corridor (Shared Pathway and Service Road). This intersection does not meet the design requirements for pedestrian infrastructure – providing marked pedestrian crossings to all approaching pedestrian facilities. Pedestrians are required to make a three-stage crossing to stay on the west side of the street, closest to most transit services. A shared use path connects cyclists on the south side of 82 Avenue to the residential service road. However, because of the LRT crossing and mixing with pedestrians, cyclists are generally expected to dismount to cross the intersection. North-south bike traffic is relegated to 115 Avenue one block west, which connects directly to the University but provides minimal cyclist protections. The target LOS for transit was not adjusted as a target LOS of B for a neighbourhood connector roadway (non-street oriented arterial roadway) is appropriate considering the level of traffic and is acceptable for transit passage. On-street transit experiences delays in the PM peak and is affected by pedestrian LOS.			
Post-Development with Improvements Intersection Performance	✓	⚠	⚠	✓
Recommended Treatment	To meet pedestrian MMLOS targets, we recommend: • Installing a crosswalk on the west approach to ensure safe and convenient pedestrian access, particularly towards the University to the north and McKernan Belgravia LRT station to the south. This would require that the current stop bar for eastbound vehicles be set back appropriately. The crossing phase for pedestrians on this leg would overlap with the north-south through phase, which must be increased to accommodate the Flashing Don't Walk time.			

- Banning RTOR movements for all approaches.
- Converting the channelized northbound right turn island to a high entry angle design to reduce vehicle speeds through the pedestrian crossing.

To address cyclist MMLOS, the City may consider:

- Upgrading and/or widening the existing pedestrian crossing on the south leg to permit continuous bike travel across 114 Street. This is optional as the existing crossing is not hazardous to cyclists and is generally acceptable for this route.
- The City may consider working with the University of Alberta to establish a cycling network on campus.

To address transit MMLOS, we recommend:

- Rebuilding this at-grade LRT crossing as a grade separated crossing as suggested in The City's Mass Transit Study[9], published in 2020. Doing so would improve the vehicle and transit LOS and provide greater comfort to pedestrians crossing the west leg.

NOTE
Until grade separation is implemented, options for increasing surface transit LOS are limited. Given the existing LRT priority and no plans for semi-exclusive bus routes through this intersection, an overall transit LOS of 'C' is considered acceptable for this intersection.

To mitigate deterioration to vehicle MMLOS, we recommend:

- AM peak period: increasing the cycle length to 190 seconds, allowing for more green time to be allocated to each of the left turn phases.
- PM peak period: no additional changes to signal timing are required.

Under current traffic volumes, the intersection exhibits an HCM LOS of D and F in the AM and PM peak periods, respectively. Using forecasted volumes under the Post-Development Without Improvements scenario with no changes to intersection geometry or signal timing, minor increases in delay are anticipated in the AM peak period for all left turning movements due to increased traffic volume. The overall intersection LOS, however, remains at D. In the PM peak period, the overall intersection delay is expected to improve to LOS E, with the improvement attributed to a decrease in through traffic, particularly in the southbound direction.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.65** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing as discussed in **Table 5.64**.

[9] Mass Transit Study – Edmonton's Future Mass Transit Network (2020) – IBI Group

Table 5.65 Traditional LOS 114 Street and 82 Avenue/University Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	870	546	170	N/A	294	40	46	347	566	153	423	18	
	v/c Ratio	0.96	0.3	0.64		0.55	0.05	0.77	0.50	0.38	0.78	0.55	0.55	0.642
	LOS	E	B	E		E	B	F	E	B	F	E	E	D
	Delay (s)	59.0	17.5	66.5		62.4	14.9	95.7	55.9	13.6	80.9	56.7	56.9	46.0
	95th % Queue (m)	194.3	69.0	77.8		72.4	8.2	30.4	80.3	64.6	45.5	99.8	99.0	
Post-Development with Improvements	Volume	870	546	170	N/A	294	40	46	347	566	153	423	18	
	v/c Ratio	0.96	0.3	0.64		0.55	0.05	0.77	0.50	0.38	0.78	0.55	0.55	0.645
	LOS	E	B	E		E	B	F	E	B	F	E	E	D
	Delay (s)	59.4	17.4	65.3		62.3	14.9	95.4	55.9	13.6	81.2	56.9	57.0	46.0
	95th % Queue (m)	194.9	68.9	77.0		72.4	9.1	30.3	80.3	64.6	45.6	100.4	99.5	
PM Peak														
Post-Development without Improvements	Volume	624	314	149	N/A	722	33	17	206	648	289	217	16	
	v/c Ratio	0.88	0.19	0.52		1.25	0.04	0.46	0.28	0.48	0.88	0.22	0.23	0.652
	LOS	E	C	E		F	B	F	D	B	E	D	D	E
	Delay (s)	57.1	20.2	57.2		178	18.6	80.9	45.8	18.5	74.0	36.9	36.9	72.0
	95th % Queue (m)	133.4	42.1	63.2		235	7.5	10.1	44.0	81.9	74.5	44.7	44.1	
Post-Development with Improvements	Volume	624	314	149	N/A	722	33	17	206	648	289	217	16	
	v/c Ratio	1	0.19	0.43		1.03	0.05	0.46	0.28	0.51	0.88	0.23	0.23	0.652
	LOS	F	C	D		F	B	F	D	C	E	D	D	D
	Delay (s)	76.5	20.1	51.7		83.0	18.6	81.4	46.3	22.1	74.5	37.3	37.4	55.0
	95th % Queue (m)	150.4	42.1	60.7		172	8.2	10.2	44.5	89.6	75.0	45.7	44.9	

This intersection was identified for further sensitivity analysis to investigate future vehicle capacity constraints. The Post-Development Without Improvements scenario forecasts notable decreases in through traffic, particularly in the northbound and southbound directions in the AM and PM peak periods, respectively. Therefore, additional scenarios were analyzed with forecasted growth rates of 10% and 20% applied to movements which saw a decrease in volumes between the existing conditions and the City's post-development model. Full results are shown in **Appendix I** and **Appendix J**.

In the AM peak period, this increase in volume only impacts the northbound movements, particularly the northbound left which experiences LOS F under both scenarios, compared to LOS E in the Post-Development Without Improvements model. However, the relatively minor increase in delay does not justify transferring additional green time away from the other phases to the northbound left movement since the east-west phases already experience decreased LOS, and the northbound through phase must be kept at a sufficient green time to allow enough crossing time for pedestrians on the recommended crosswalk across the west approach. Therefore, no further improvements are required should these alternative growth scenarios materialize.

In the PM peak period, the southbound through lanes are the sole lane group to experience a significant delay increase compared to the Post-Development Without Improvements model, which causes the overall intersection LOS to decrease to F in both scenarios. However, alternative signal timing plans which increase the green time allocation to this phase or increase the overall cycle length do not have a notable effect on reducing this movement delay. As such, improvements to southbound traffic flow are likely only possible with additional through lanes, which is unlikely given the presence of the LRT tracks. Given that the delay experienced by southbound through vehicles under these growth scenarios is not much larger than what is experienced under current volumes, no further improvements are necessary should the southbound through volume attain this level of growth. However, traffic volumes should be monitored for this intersection to complete further analysis as development of the surrounding area takes place.

5.3.3.2.2 114 Street and 87 Avenue

The intersection of 114 Street and 87 Avenue is fully signalized. B2 transit is expected to travel along 87 Avenue into the University of Alberta in the future.

87 Avenue Street is comprised of a 5-lane vehicle cross section, flanked by sidewalk. Parking is occasionally provided through the use of parking bays. The cross-section elements are illustrated in **Figure 5-114.**

Figure 5-113 114 Street and 87 Avenue

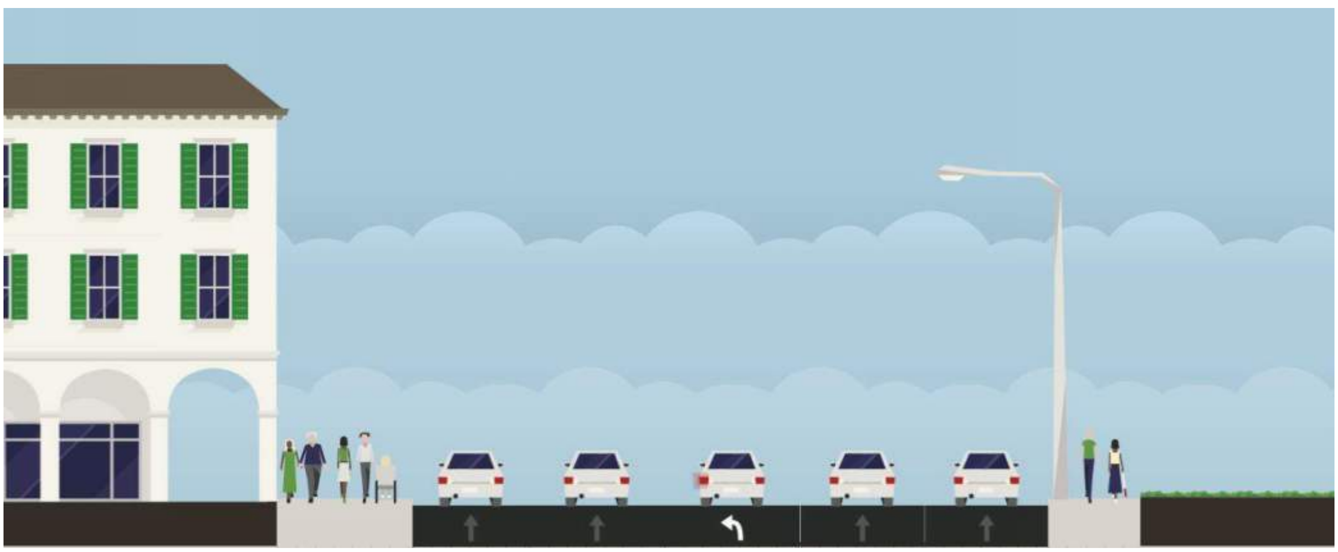


Figure 5-114 87 Avenue Facing East

Expected multimodal operations following rezoning and development are summarized in **Table 5.66**, comparing MMLOS outcomes with and without recommended changes to the road network.

Table 5.66 MMLOS 114 Street and 87 Avenue

<table>
<tr><th>Mode</th><th>Pedestrian</th><th>Cyclist</th><th>Transit</th><th>Motor Vehicles</th></tr>
<tr><td>Original Target</td><td>LOS C</td><td>LOS B</td><td>LOS D</td><td>LOS E</td></tr>
<tr><td>Adjusted Target</td><td>LOS B</td><td>LOS B</td><td>LOS C</td><td>LOS E</td></tr>
<tr><td>Post-Development without Improvements Intersection Performance</td><td>✗</td><td>⚠</td><td>✗</td><td>✓</td></tr>
<tr><td>Notes</td><td colspan="4">The target LOS was adjusted for the following modes:
Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area.
Transit: Target LOS adjusted from D to C due to the intersection being situated along the future B2 Bus Rapid Transit (BRT) and 920X RapidBus routes.
Pedestrian LOS is impacted by the lack of enhanced facilities, wide corner radii, long cycle lengths, and uncontrolled conflicts with turning vehicles.

No cycling infrastructure is provided. East/west cycling demand is expected to be met on 88 Avenue, one block to the north. North/south cycling demand is satisfied by the 115 Avenue neighbourhood route, just west of the intersection.

Transit LOS is impacted by the poor pedestrian LOS and delays resulting from operating in mixed traffic.</td></tr>
<tr><td>Post-Development with Improvements Intersection Performance</td><td>✓</td><td>⚠</td><td>✓</td><td>✓</td></tr>
<tr><td>Recommended Treatment</td><td colspan="4">To attain the target pedestrian MMLOS, we recommend:
Banning RTOR movements on all approaches.
Implementing LPIs on all pedestrian phases in both peak periods to prioritize pedestrian movement.
Implementing audible pedestrian signals with call buttons.
Installing wider curb ramps with TWSIs.
Implement protected-only left turn phasing for the north-, east-, and westbound approaches in both peak periods to reduce the number of uncontrolled conflicts with pedestrians. Additionally, the same measure should be adopted for the southbound left movement in the PM peak period.
No specific changes are required to address cyclist MMLOS.

To address transit MMLOS, we recommend:</td></tr>
</table>

	• Converting the curbside westbound through lane to a dedicated transit-only lane to accommodate bus movements into the University bus loop. • Implement the noted pedestrian enhancements. Deterioration to vehicle MMLOS can be partially mitigated by: • Allocating more green time to all through phases while maintaining cycle length.

Under current traffic volumes, the intersection exhibits an HCM LOS of D in both peak periods. Using forecasted volumes under the Post-Development Without Improvements scenario, the total intersection delay decreases in the AM peak period due to less anticipated volume in the northbound left movement, thus elevating the LOS of this movement to D. The overall intersection LOS, however, remains at D. In the PM peak period, the intersection fails due to a near doubling of anticipated traffic volumes in the eastbound through direction, thus causing this movement to fail and significant spillback problems with the resulting queue length.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.67** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.67 Traditional LOS 114 Street and 87 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	299	141	148	19	28	24	71	280	302	61	575	86	
	v/c Ratio	0.72	0.16	0.19	0.08	0.06	0.08	0.22	0.58	0.77	0.21	0.79	0.88	0.46
	LOS	D	B	B	D	C	C	C	D	D	C	D	E	D
	Delay (s)	44.4	13.0	13.4	36.1	29.6	29.9	23.4	35.3	47.6	23.9	49.1	61.2	40.9
	95th % Queue (m)	93.3	23.3	22.7	6.0	6.8	6.8	15.5	79.5	89.9	14.2	106.5	114.5	
Post-Development with Improvements	Volume	299	141	148	19	28	24	71	280	302	61	575	86	
	v/c Ratio	0.75	0.16	0.2	0.08	0.06	0.08	0.72	0.56	0.74	0.54	1.43		0.657
	LOS	D	B	B	D	C	C	E	C	D	E	F		F
	Delay (s)	47.2	13.5	14.0	36.5	29.6	29.9	55.6	33.9	44.3	62.6	239.9		104.1
	95th % Queue (m)	95.9	23.9	23.3	6.0	6.8	6.8	27.2	78.1	87.1	27.4	428.1		
PM Peak														
Post-Development without Improvements	Volume	309	82	154	60	84	54	48	948	349	85	832	38	
	v/c Ratio	1.02	0.11	0.26	0.32	0.18	0.24	0.15	1.39	0.6	0.43	0.66	0.68	0.83
	LOS	F	B	C	D	D	D	B	F	C	C	C	C	F
	Delay (s)	101.8	19.3	21.4	48.8	36.0	37.5	18.6	218.1	29.9	32.1	32.7	33.5	97.9
	95th % Queue (m)	145.2	18.1	33.6	23.9	21.8	21.8	9.3	599.6	85.0	21.0	117.4	117.4	
Post-Development with Improvements	Volume	309	82	154	60	84	54	48	948	349	85	832	38	
	v/c Ratio	1.27	0.12	0.32	0.53	0.19	0.25	0.6	1.28	0.6	0.45	1.29		0.833
	LOS	F	C	C	E	D	D	E	F	C	E	F		F
	Delay (s)	198.6	21.8	25.0	70.1	36.1	37.8	58.2	165.8	27.4	56.5	173.1		131.9
	95th % Queue (m)	198.4	19.5	40.9	30.0	22.8	22.7	19.9	518.5	89.1	36.4	488.6		

5.3.3.3 82 Avenue Corridor

82 Avenue is a street oriented mixed-use /commercial arterial road. It is a pedestrian priority area from 112 Street eastward and supports a variety of transit uses including the future B1 and B2 mass transit. The Old Strathcona Public Realm Strategy defines the future vision for the 82 Avenue corridor between 109 Street and 99 Street, however, timelines for implementation of the vision are unknown.

82 Avenue is comprised of a 6-lane vehicle cross section, flanked by sidewalk. The cross section expands to seven lanes at 109 Street to accommodate left turn bays. Parking is prohibited on the north side during the AM peak period and on the south side during the PM peak period. The cross-section elements are illustrated in **Figure 5-115** and **Figure 5-116**.

Figure 5-115 82 Avenue Facing East (East of 112 Street)

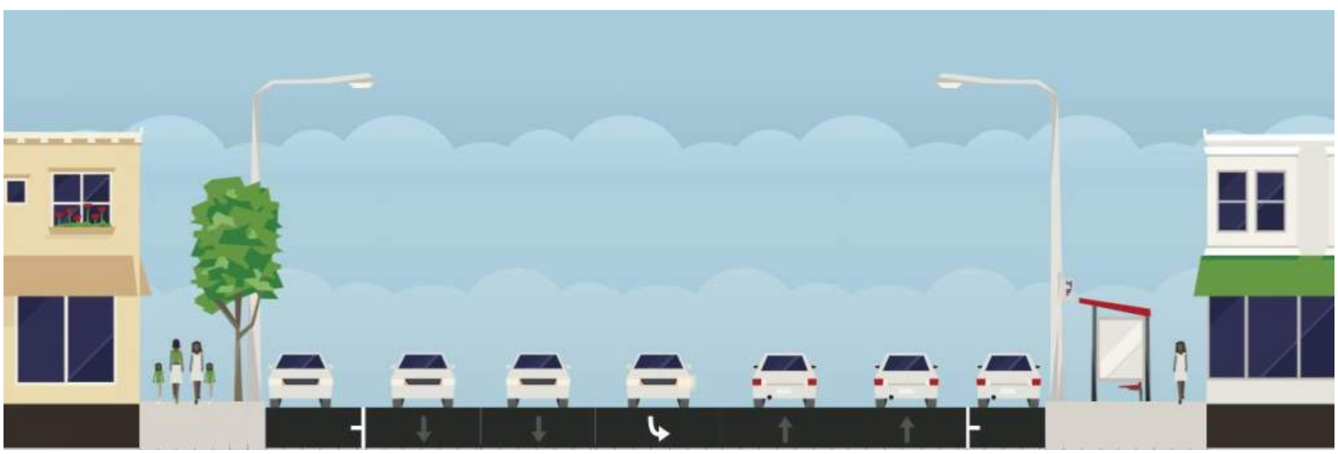


Figure 5-116 82 Avenue Facing East (East of 109 Street)

At an intersection level, MMLOS demand can be met on 82 Avenue without significant geometric changes. At a corridor level, pedestrian needs are not being met within the space allocated to them. Ample pedestrian realm is provided on the north side of the corridor through street-oriented frontage between 110 Street and 112 Street. As the area re-develops, additional frontage can be claimed for pedestrian uses; however, this is a long term and incomplete approach. Curb lanes may be repurposed into the pedestrian realm to provide transit amenities, parking pays, and other furnishing zones elements, illustrated in **Figure 5-117**.

Figure 5-117 Potential 82 Avenue Corridor

On-street cycling infrastructure is not expected on 82 Avenue. Parallel routes must meet cycling demand on University Avenue, 83 Avenue and 88 Avenue. North/south routes intersection 82 Avenue at 106 Street, 110 Street, 111 Street, and 112 Street (south of intersection). Further study and consultation would be required to implement these changes.

Expected multimodal operations at the corridor level are summarized in **Table 5.68** based on these recommendations however, individual intersection assessments in the following sections capture incremental changes that can be implemented in the meantime. Detailed MMLOS tables which analyze each corridor under existing and recommended conditions are found in **Appendix G** and **Appendix H**, respectively.

Table 5.68 MMLOS 82 Avenue from 109 Street to 112 Street

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS C	LOS D	LOS D
Post-Development without Improvements Corridor Performance	⚠	n/a	✓	✓
Post-Development with Improvements Corridor Performance	✓	n/a	✓	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the corridor encompassing a Pedestrian Priority Area. At a corridor level, pedestrian MMLOS is predominantly affected by limited buffer width (furnishing zone, parking, or bike lanes). Pedestrian LOS fails during peak periods but is acceptable in off-peak periods when curb lanes are used for parking. Converting the time-of-day parking lanes to pedestrian realm, transit amenities, and parking bays provides the needed protection for a comfortable pedestrian experience without disrupting vehicle LOS. Cycling facilities are not expected on 82 Avenue. East/west cycling demand must be met through the bi-direction bike lane on 83 Avenue, one block to the north.			

5.3.3.3.1 112 Street and 82 Avenue

The intersection of 112 Street and 82 Avenue is a primary access to the University of Alberta. This intersection is a gateway between a car-centric cross-section and street-oriented space along 82 Avenue. The north leg of 112 Street and east leg of 82 Avenue are pedestrian priority areas. 112 Street is considered part of the bike network.

South of the intersection, 112 Street is comprised of a painted southbound bike lane and a shared northbound cycling / vehicle lane, flanked by sidewalk. North of the intersection, 112 Street becomes a 5-lane cross section flanked by sidewalk, cyclists are expected to share the road with vehicles. Parking is permitted north of the intersection in the northbound curb lane. The cross-section elements are illustrated in **Figure 5-119.**

Figure 5-118 112 Street and 82 Avenue

Figure 5-119 112 Street Facing North

Expected multimodal operations following rezoning and development are summarized in **Table 5.69**, comparing MMLOS outcomes with and without recommended changes to the road network. This intersection is situated at a transition point along 82 Avenue between a street-oriented urban boulevard and a high-capacity arterial roadway.

Table 5.69 MMLOS 112 Street and 82 Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS D	LOS D
Adjusted Target	LOS B	LOS C	LOS D	LOS D
Post-Development without Improvements Intersection Performance	✗	✗	✓	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area. Pedestrian LOS is largely impacted by long cycle lengths and uncontrolled conflicts with turning vehicles. The 112 Street bicycle facility type is not continuous through the intersection and pavement markings do not provide guidance. While high-quality cycling facilities are present to the east on 111 Street and 110 Street, additional protections should be considered to connect cyclists on 112 Street with the bike route on 82 Avenue at a minimum. Several of the approach and departure lanes are wider than a typical travel lane. A portion of the vehicle lane width on 112 Street could be reallocate to other uses.			
Post-Development with Improvements Intersection Performance	✓	✓	✓	✓
Recommended Treatment	To address pedestrian MMLOS, we re commend: • Constructing curb extensions at the northeast and southeast corners of the intersection to narrow the intersection approaches, reduce crossing distances, and delineate parking areas. • Install bi-directional curb ramps on the northwest corner • Either cut back the concrete median separating east and westbound traffic that protrudes into the west crossing or extend the median to include an accessible pedestrian path. • Banning RTOR movements on all approaches to minimize the number of uncontrolled conflicts with vehicles. To address cyclist MMLOS, we recommend: • Installing a shared pathway facility on the west side of 112 Street to connect cyclists to and from 83 Avenue. Adopting this measure ensures safe passage of cyclists			

	through the intersection and can be coordinated with the southbound left turn phase to avoid conflicts with vehicles. On-street protected cycling facilities were considered but ultimately ruled out. Removal of a southbound left turn lane has a significant impact on traffic delay, and transit LOS by extension. Additionally, removal of a northbound receiving lane is not ideal due to the presence of a bus stop immediately north of the intersection. No specific changes are required to address transit MMLOS. Deterioration to vehicle MMLOS can be mitigated by: • AM peak period: no signal timing changes are required. • PM peak period: allocate more green time to the southbound left phase. The total cycle length should not increase.

Under current traffic volumes, the intersection exhibits an HCM LOS of D in both peak periods. Using forecasted volumes under the Post-Development Without Improvements scenario, the intersection experiences a minor decrease in overall delay and an improvement to LOS C in the AM peak period. In the PM peak period, the westbound right movement fails due to a large increase in anticipated traffic volume and the sharing of the outermost lane with through traffic. The overall intersection LOS, however, remains at D.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.70** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.70 Traditional LOS 112 Street and 82 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	N/A	95	18	219	N/A	81	112	405	N/A	N/A	426	556	
	v/c Ratio		0.21		0.39		0.17	0.8	0.29			0.57	0.82	0.544
	LOS		C		C		C	D	B			C	D	C
	Delay (s)		25.6		33.7		25.2	54.8	18.3			24.0	36.0	29.1
	95th % Queue (m)		27.8		32.4		18.2	42.4	41.2			94.4	133	
Post-Development with Improvements	Volume	N/A	95	18	219	N/A	81	112	405	N/A	N/A	426	556	
	v/c Ratio		0.21		0.39		0.19	0.8	0.29			0.57	0.91	0.585
	LOS		C		C		C	D	B			C	D	C
	Delay (s)		25.7		33.8		25.5	54.8	18.3			24.0	46.0	32.26
	95th % Queue (m)		28.4		32.5		20.4	42.4	41.2			94.4	163	
PM Peak														
Post-Development without Improvements	Volume	N/A	42	19	837	N/A	148	69	286	N/A	N/A	364	420	
	v/c Ratio		0.07		0.72		0.18	0.76	0.34			0.83	1.1	0.719
	LOS		B		C		B	E	C			D	F	D
	Delay (s)		11.9		25.7		13.0	63.0	34.1			54.6	120	48.5
	95th % Queue (m)		9.7		105		23.5	29.7	44.0			126.3	188	
Post-Development with Improvements	Volume	N/A	42	19	837	N/A	148	69	286	N/A	N/A	364	420	
	v/c Ratio		0.08		0.91		0.24	0.75	0.25			0.6	0.87	0.752
	LOS		B		D		B	E	C			C	D	D
	Delay (s)		17.8		47.4		19.8	62.4	25.2			33.0	51.9	40.6
	95th % Queue (m)		12.8		140		33.9	29.6	36.8			100.5	140	

5.3.3.4 87 Avenue Corridor

87 Avenue is a street oriented mixed-use /commercial arterial road. It is a pedestrian priority area from and supports a variety of transit uses including the future B1 and B2 mass transit.

The 87 Avenue cross section is variable. Through the University of Alberta, it is comprised of a 5-lane vehicle cross section, flanked by sidewalk. Through the residential area to the east, it is typically a 3-lane cross section flanked by sidewalk. The centre lane provides back-to-back left turn storage. Expect between 109 and 110 Street, parking is prohibited in both directions. The cross-section elements are illustrated in **Figure 5-120** through **Figure 5-122**.

Figure 5-120 87 Avenue Facing East (West of 114 Street)

Figure 5-121 87 Avenue Facing East (West of 110 Street)

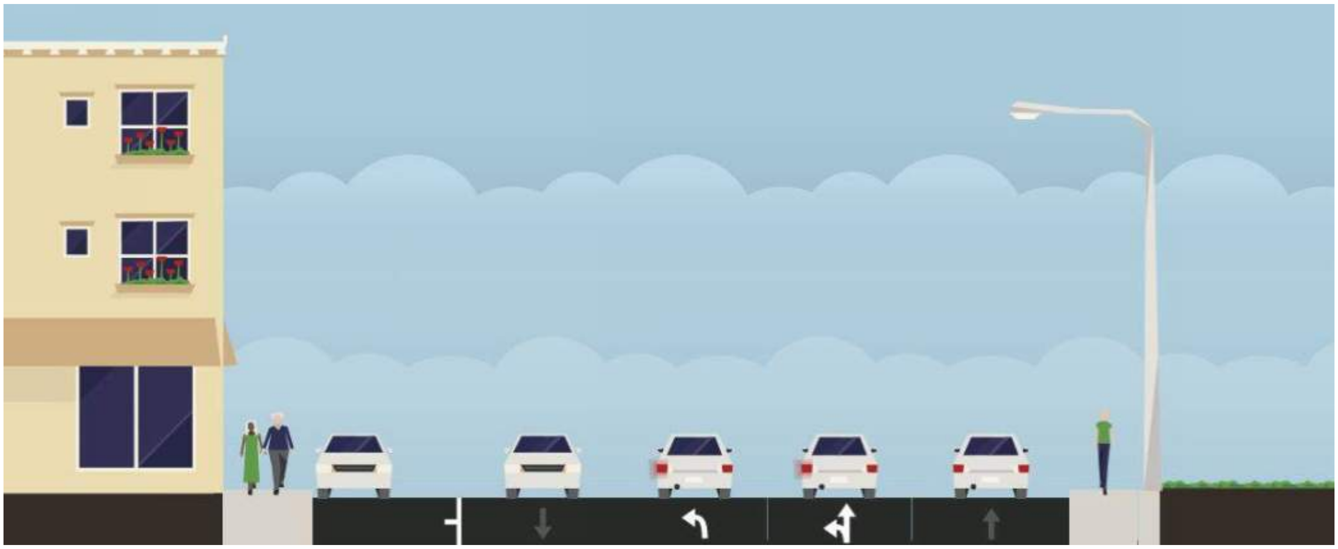


Figure 5-122 87 Avenue Facing East (West of 109 Street)

At an intersection level, MMLOS demand can be met on 87 Avenue without significant geometric changes. At a corridor level, pedestrian needs are not being met within the space allocated to them. The possible B2 BRT routing along 87 Avenue complicates the development of treatment options. If the BRT design results in exclusive transit lanes, 87 Avenue may be reduced to a single lane, one-way street or a transit only street. In the case of a transit only street, the pedestrian realm may be expanded by reallocating a vehicle lane to other uses. If the BRT design results in mixed traffic lanes, public realm may be acquired by eliminating left turn lanes except where absolutely necessary, illustrated in **Figure 5-123**. Further study and consultation would be required to implement these changes.

Figure 5-123 Potential 87 Avenue Corridor Facing East (110 Street to 112 Street)

On-street cycling infrastructure is not expected on 87 Avenue. Parallel routes must meet cycling demand on University Avenue, 83 Avenue and 88 Avenue. North/south routes intersection 87 Avenue at 106 Street, 110 Street, and 111 Street.

Expected multimodal operations at the corridor level are summarized in **Table 5.71** based on these recommendations however, individual intersection assessments in the following sections capture incremental changes that can be implemented in the meantime. Detailed MMLOS tables which analyze each corridor under existing and recommended conditions are found in **Appendix G** and **Appendix H**, respectively.

Table 5.71 MMLOS 87 Avenue from 109 Street to 114 Street

<table>
<tr><th>Mode</th><th>Pedestrian</th><th>Cyclist</th><th>Transit</th><th>Motor Vehicles</th></tr>
<tr><td>Original Target</td><td>LOS C</td><td>LOS C</td><td>LOS C</td><td>LOS D</td></tr>
<tr><td>Adjusted Target</td><td>LOS B</td><td>LOS C</td><td>LOS C</td><td>LOS D</td></tr>
<tr><td>Post-Development without Improvements Corridor Performance</td><td>✗</td><td>n/a</td><td>✓</td><td>✓</td></tr>
<tr><td>Post-Development with Improvements Corridor Performance</td><td>✓</td><td>n/a</td><td>✓</td><td>✓</td></tr>
<tr><td>Notes</td><td colspan="4">The target LOS was adjusted for the following modes:
• Pedestrians: Target LOS adjusted from C to B due to the corridor encompassing a Pedestrian Priority Area.
At a corridor level, pedestrian MMLOS is predominantly affected by narrow sidewalk width. As this area redevelops, efforts should be made to maintain the treelined streets and increase walk width.
Cycling facilities are not expected on 87 Avenue. East/west cycling demand is expected to be met on 88 Avenue, one block to the north.
Removal of the centre left turn lane can be used to provide future transit amenities and improved pedestrian realm.</td></tr>
</table>

5.3.3.4.1 110 Street and 87 Avenue

The intersection of 110 Street and 87 Avenue is a pedestrian and cyclist actuated two-way stop-controlled intersection. 110 Street and 87 Avenue are pedestrian priority areas. 110 Street is part of the cycling network. B2 transit is expected to travel along 87 Avenue into the University of Alberta in the future.

110 Street is comprised of one northbound vehicle lane and a bi-directional bike lane, flanked by sidewalk. Parking in not permitted on 110 Street. The cross-section elements are illustrated in **Figure 5-125**.

Figure 5-124 110 Street and 87 Avenue

Figure 5-125 110 Street Facing North

Expected multimodal operations following rezoning and development are summarized in **Table 5.72**, comparing MMLOS outcomes with and without recommended changes to the road network. This intersection currently operates very well for all modes. Actuated crossing control for pedestrians and cyclists on 110 Street results in responsive crossing opportunities for active modes while limiting delay for vehicles 87 Avenue. A target LOS of B for cyclists is appropriate for an Urban Boulevard.

Table 5.72 MMLOS 110 Street and 87 Avenue

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS B	LOS D	LOS E
Adjusted Target	LOS B	LOS B	LOS C	LOS E
Post-Development without Improvements Intersection Performance	✓	✓	n/a	✓
Notes	The target LOS was adjusted for the following modes: • Pedestrians: Target LOS adjusted from C to B due to the intersection being located within a Pedestrian Priority Area. • Transit: Target LOS adjusted from D to C due to the intersection being situated along the future B2 Bus Rapid Transit (BRT) route. This intersection currently operates very well for all modes. Actuated crossing control for pedestrians and cyclists on 110 Street results in responsive crossing opportunities for active modes while limiting delay for vehicles 87 Avenue. Despite the presence of the 110 Street Bike Route (On-street protected bike lane), the target LOS for cyclists was not adjusted upwards as a target LOS B for a urban boulevard (street-oriented collector street) is acceptable for cyclist passage. The existing bike lane along 110 Street operates on the cross street, which is a low-traffic residential road.			
Post-Development with Improvements Intersection Performance	✓	✓	✓	✓
Recommended Treatment	While the future B2 BRT route may travel along 87 Avenue, minimal delays are anticipated at this intersection due to limited cross traffic. As the current intersection meets the target LOS for all modes, no changes are needed.			

Under current traffic volumes, the intersection experiences minimal delay with an HCM LOS of A and B in the AM and PM peak periods, respectively, with all eastbound and westbound movements operating at LOS A. As no forecasted volumes are available, future intersection performance is unknown but is anticipated to be largely unchanged.

Traditional HCM LOS reporting for vehicle traffic operations are summarized in **Table 5.73** based on forecast traffic volumes following PGA re-zoning and development. The table compares the AM and PM peak hour operations with and without recommended changes to intersection geometry and signal timing.

Table 5.73 Traditional LOS 110 Street and 87 Avenue

Scenario	Measure of Effectiveness	Northbound			Southbound			Eastbound			Westbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
Post-Development without Improvements	Volume	4	67	79	N/A	N/A	N/A	13	350	N/A	N/A	580	148	
	v/c Ratio	0.56						0.14	0.14			0.41	0.12	0.414
	LOS	D						A	A			A	A	A
	Delay (s)	47.2						1.8	1.8			3.1	1.8	9.9
	95th % Queue (m)	26.6						6.1	5.8			32.6	5.5	
Post-Development with Improvements	Volume	4	67	79	N/A	N/A	N/A	13	350	N/A	N/A	580	148	
	v/c Ratio	0.56						0.14	0.14			0.41	0.12	0.414
	LOS	D						A	A			A	A	A
	Delay (s)	47.2						1.8	1.8			3.1	1.8	9.9
	95th % Queue (m)	26.6						6.1	5.8			32.6	5.5	
PM Peak														
Post-Development without Improvements	Volume	10	41	69	N/A	N/A	N/A	16	553	N/A	N/A	265	88	
	v/c Ratio	0.15						0.24	0.24			0.22	0.08	0.263
	LOS	D						A	A			A	A	B
	Delay (s)	37.0						5.3	5.3			5.1	4.4	10.6
	95th % Queue (m)	17.3						27.8	26.2			26.9	7.3	
Post-Development with Improvements	Volume	10	41	69	N/A	N/A	N/A	16	553	N/A	N/A	265	88	
	v/c Ratio	0.15						0.24	0.24			0.22	0.08	0.263
	LOS	D						A	A			A	A	B
	Delay (s)	37.0						5.3	5.3			5.1	4.4	10.6
	95th % Queue (m)	17.3						27.8	26.2			26.9	7.3	

6. Cost Estimates for Network Improvements

High level capital cost estimates were prepared for the intersection level recommended improvements, along with missing pedestrian and cyclist connections. Where recommendations overlap with planned Wîhkwêntôwin neighbourhood renewal, costs were not included. Costs for full scale corridor reconfigurations (such as those along 109 Street, or implementation of the Old Strathcona Public Realm Strategy along 82 Avenue) have not been included as further study and engagement will be required for these corridors to determine a preferred configuration. A summary is provided in **Table 6.1**, and more detailed estimates can be found in **Appendix K**. Unit costs are based on the 2023 City of Bid Tabs to reflect available actual construction costs.

Table 6.1 Recommended Improvements

Component	Probable Capital Cost
124 Street / Wîhkwêntôwin Area	
109 Street / 100 Avenue	$45,000
109 Street / Jasper Avenue	$5,000
109 Street / 104 Avenue	$5,000
124 Street / 102 Avenue	$1,000
124 Street / Stony Plain Road	$5,000
124 Street / 107 Avenue	$5,000
124 Street / 111 Avenue	$5,000
124 Street / 118 Avenue	No changes.
121 Street / Stony Plain Road	$5,000
121 Street / Jasper Avenue	$5,000
116 Street / Stony Plain Road	$6,000
116 Street / Jasper Avenue	$5,000
116 Street / 100 Avenue	$45,000
112 Street / Stony Plain Road	$6,000
Missing Pedestrian Links	$60,000
Missing Cycling Links & Signals	$840,000
Total	**$1,043,000**
156 Street / Stony Plain Road	
Stony Plain Road / 102 Avenue	$5,000
Stony Plain Road / 142 Street	$150,000
Stony Plain Road / 149 Street	$3,000,000
Stony Plain Road / 156 Street	$5,000
Stony Plain Road / 158 Street	$185,000

Component	Probable Capital Cost
Stony Plain Road / 163 Street	$145,000
156 Street / 95 Avenue	$5,000
Meadowlark Road / 87 Avenue	$5,000
Missing Pedestrian Links	$2,100,000
Missing Cycling Links	$2,900,000
Total	**$8,500,000**
Garneau	
82 Avenue / 114 Street	$335,000
82 Avenue / 114 Street	$675,000
82 Avenue / 109 Street	$5,000
109 Street / 83 Avenue	No changes.
109 Street / 86 Avenue	$330,000
109 Street / 87 Avenue	$80,000
109 Street / Saskatchewan Drive / 88 Avenue / Walterdale Hill Road	$350,000
87 Avenue / 110 Street	No changes.
87 Avenue / 114 Street	$65,000
Missing Pedestrian Links	No changes.
Missing Cycling Links	No changes.
Total	**$1,840,000**
Grand Total	**$10,383,000**

7. Improvement Prioritization

The improvements suggested in this report are not required to support PGA redevelopment, rather, they address identified gaps in the mobility network and help to improve the overall MMLOS to optimize the potential people moving capacity of the network. Some of the improvements identified align with existing long-term planning and strategy documents, such as the Bike Plan. In many cases, the various recommended improvements should not be considered as a condition of future development as they address existing network gaps for some modes, improving modal levels of service, and increasing people moving capacity. Rather, the PGA redevelopment would potentially impact the prioritization of these improvements among other City-wide priorities.

Overall, the recommended network improvements can be grouped together and prioritized based on the scale of the investment required, whether they can be achieved as part of potential developer led improvements, and anticipated timelines for their implementation. Broadly, the improvements can be grouped as:

- Potential developer led improvements:

  These are localized improvements that are necessary to support development of individual parcels that have traditionally been conditioned as a requirement of development. These can include construction of missing sidewalk connections abutting the parcel, construction of missing curb ramps adjacent to the development, and alleyway upgrades.
- Short term City led improvements:

  These are high-impact, low-cost improvements that can be implemented by the City with comparatively little design work required. These include adding missing curb ramps, RRFBs, signal timing changes, right turn on red restrictions, implementation of protected left turn phasing, and addition of transit priority measures. These changes can be implemented over a 0-to-5-year timeframe.
- Medium term City led improvements:

  These are improvements that require a moderate level of design effort to address gaps and missing links in the pedestrian and cycling network and reconfigure intersections. These changes could be implemented over a 5-to-10-year timeframe.
- Long-Term City led improvements:

  These are large scale, corridor level improvements along major corridors, including exploring reconfiguration of street cross sections to reallocate space between various modes. These projects are generally bigger-picture activities that have impacts beyond the PGA and align with the long-term City building vision. These projects will require a multi-year engineering study (from conceptual design through detailed design), complete with public engagement. Implementation of these changes can also be coordinated with street rehabilitation to maximize investment returns. Given the effort required to complete the background studies, these changes would be implemented over a 10+ year timeframe.

The resulting grouping of improvements is presented in the table on the following pages.

124 Street / Wîhkwêntôwin Area

Developer Led Initiatives		Short Term Initiatives		Medium Term Initiatives		Long-Term Initiatives
Project	**Cost**	**Project**	**Cost**	**Project**	**Cost**	
Missing Sidewalks:		Intersection Improvements:		New Cycling Facilities:		Transit oriented reconfiguration of 109 Street north of Jasper Avenue
109 Avenue E 124 St	$30,000	109 Street / 100 Avenue	$45,000	123 Street LRT Connection – Shared Street Facility	$490,000	Bi-directional cycling facilities along 111 Avenue
110 Avenue E 124 St	$30,000	109 Street / Jasper Avenue	$5,000	100 Avenue Bike Lane - Protected Separate Facility	***	Bi-directional cycling facilities along 117 Avenue and 119 Avenue or 120 Avenue
		109 Street / 104 Avenue	$5,000	Ped Signal Bike Actuation Retrofit - 124 St / 106 Ave	$175,000	Reconfiguration of 118 Avenue to accommodate eastbound and westbound bus only lanes
		124 Street / 102 Avenue	$1,000	Ped Signal Bike Actuation Retrofit - 124 St / 109A Ave	$175,000	
		124 Street / Stony Plain Road	$5,000	112 Street Cycling Facility	***	
		124 Street / 107 Avenue	$5,000	116 Street Cycling Facility	***	
		124 Street / 111 Avenue	$5,000	118/119 Street Cycling Facility	***	
		121 Street / Stony Plain Road	$5,000	Victoria Promenade Bike Lane Upgrades	***	
		121 Street / Jasper Avenue	$5,000	121 Street Bike Lane Upgrades	***	
		116 Street / Stony Plain Road	$6,000			
		116 Street / Jasper Avenue	$5,000			
		116 Street / 100 Avenue	$45,000			
		112 Street / Stony Plain Road	$6,000			
Total	**$60,000**	**Total***	**$143,000**	**Total**	**$840,000**	

***These improvements are anticipated to be explored and potentially constructed with Wîhkwêntôwin neighbourhood renewal and therefore costs have not been estimated.

*Rounded up from $143,000

156 Street / Stony Plain Area

Developer Led Initiatives		**Short Term Initiatives**		**Medium Term Initiatives**		**Long-Term Initiatives**
Project	**Cost**	**Project**	**Cost**	**Project**	**Cost**	
Missing Sidewalks:		Intersection Improvements:		Missing Sidewalks:		Bi-directional cycling facilities along 102 Avenue paralleling Stony Plain Road
143 Street (SPR - 103 Ave)	$60,000	Stony Plain Road / 102 Avenue	$5,000	103 Avenue (137 St - 140 St)	$185,000	
144 Street S of SPR	$40,000	Stony Plain Road / 142 Street**	$150,000	103 Avenue (142 St - 144 St)	$95,000	Pedestrian realm reconfiguration of Stony Plain Road from 156 Street to 163 Street, including transit signal priority at 163 Street
158 Street N. 100 Avenue	$60,000	Stony Plain Road / 156 Street**	$5,000	102 Avenue (149 St to 163 St)	$830,000	
160 Street N. 100 Avenue	$60,000	Stony Plain Road / 158 Street	$185,000	91 Avenue (154 St - 156 St)	$110,000	
99 Avenue E 156 Street	$60,000	Stony Plain Road / 163 Street	$145,000	90 Ave E Meadowlark Rd	$55,000	Extension of the 100 Avenue Shared Pathway to 170 Street
99 Avenue W 156 Street	$60,000	156 Street / 95 Avenue	$5,000	156 Street S. Meadowlark Rd	$65,000	
98 Avenue W 156 Street	$60,000	Meadowlark Road / 159 Street / 87 Avenue ** / ****	$5,000			Extension of cycling facilities on 153 Street and 163 Street
97 Avenue E 156 Street	$60,000			Intersection Improvements:		
97 Avenue W 156 Street	$60,000			Stony Plain Road / 149 Street**	$3,000,000	Reconfiguration of 87 Avenue to accommodate future BRT and active modes.****
96 Avenue E 156 Street	$60,000					
93a Avenue E 156 Street	$60,000			New Cycling Facilities:		
93a Avenue W 156 Street	$60,000			158 Street Shared Street Facility	$1,900,000	
92a Avenue E 156 Street	$60,000			153 Street Shared Facility Extension	$1,000,000	
Total	**$760,000**	**Total**	**$500,000**	**Total**	**$7,240,000**	

**These improvements are above and beyond what is being constructed as part of the Valley Line West LRT P3 Project and may require coordination with the P3 Contractor ("Marigold") for future implementation.

****Improvements in this area are planned to be explored as part of the B1 + B2 BRT Concept Planning study.

Garneau Area

Developer Led Initiatives		Short Term Initiatives		Medium Term Initiatives		Long-Term Initiatives
Project	**Cost**	**Project**	**Cost**	**Project**	**Cost**	
None identified.	N/A	Intersection Improvements:		82 Avenue / 114 Street	$335,000	Reconfiguration of 82 Avenue and implementation of Old Strathcona Public Realm Strategy****
		82 Avenue / 109 Street****	$5,000	82 Avenue / 112 Street	$675,000	Reconfiguration of 109 Street from 61 Avenue to Walterdale Hill Road/Saskatchewan Drive to improve transit and pedestrian realm****
		109 Street / 87 Avenue****	$80,000	109 Street / 86 Avenue****	$330,000	Reconfiguration of 87 Avenue to improve transit service****
		87 Avenue / 114 Street	$65,000	Saskatchewan Drive / 109 Street / Walterdale Hill Road Intersection****	$350,000	
Total	**N/A**	**Total**	**$150,000**	**Total**	**$1,690,000**	

****Improvements in this area are planned to be explored as part of the B1 + B2 BRT Concept Planning study.

8. Conclusion and Recommendations

The five initially targeted Priority Growth Areas (124 Street/Wîhkwêntôwin, 156 Street/Stony Plain Road, and University-Garneau) form an integral component of the City's long-term urban densification strategy. As Edmonton moves toward the 1.25 million population horizon and beyond, these areas provide an important opportunity to accommodate growth and densification, offering the infrastructure needed for multi-modal transportation and a lower reliance on single occupancy vehicles.

The analysis focused on utilizing a Multi-Modal Level of Service (MMLOS) framework to optimize people moving capacity, shifting the focus from vehicle delay to a broader perspective that includes pedestrians, cyclists, transit, and goods movement.

The multi-modal mobility assessment confirms that existing infrastructure can functionally accommodate the anticipated densification with only limited decreases in level of service for some modes. Targeted improvements can further be undertaken to accommodate higher-density developments while addressing existing network gaps for some modes, improving modal levels of service, and increasing people moving capacity.

Small scale improvements abutting redevelopment parcels should become a condition of future development permits. These are localized improvements that are necessary to support development of individual parcels, which have traditionally been undertaken as a condition of development by the property owner. These improvements can include construction of missing sidewalk connections abutting the parcel, construction of missing curb ramps adjacent to the development, and alleyway upgrades.

Developers may also be asked to provide:

- Pedestrian oriented frontage such as furnishing zones, setbacks, and room for transit amenities to replace auto-oriented frontage such as parking lots,
- Easements to ensure a permeable pedestrian network if deemed necessary by the scale of the proposed development,
- Access management from alleys and minor roads or opportunities to consolidate existing accesses,
- Secure bike parking above and beyond current zoning requirements, and

Large scale corridor improvements requiring street reconfigurations could be considered in the long-term. Some of these improvements may be undertaken as part of other projects (such as reconfiguration of 82 Avenue, 87 Avenue, and 109 Street in the Garneau area as part of the B1 and B2 BRT implementation), while other may require stand alone studies and engagement, particularly:

- Transit oriented reconfiguration of 109 Street north of Jasper Avenue
- Bi-directional cycling facilities along 111 Avenue
- Bi-directional cycling facilities along 117 Avenue and 119 Avenue or 120 Avenue
- Cycling facilities along 112 Street and 118 or 119 Street, which are anticipated to be explored as part of the Wîhkwêntôwin neighbourhood renewal.
- Bi-directional cycling facilities along 102 Avenue paralleling Stony Plain Road

- Bi-directional cycling facilities on 158 Street
- Pedestrian realm reconfiguration of Stony Plain Road from 156 Street to 163 Street
- Extension of the 100 Avenue Shared Pathway to 170 Street
- Extension of cycling facilities on 153 Street and 163 Street

The implementation of these improvements will require capital investments from the City, ranging from minor signage and curb crossing improvements, to more extensive intersection upgrades and construction of missing pedestrian and cyclist corridors, to address noted gaps in the multimodal network. This capital investment implementation can be phased such that:

- **Short-term (0-5 years):** High-impact, low-cost improvements (signal timing, RTOR bans, transit priority measures).
- **Medium-term (5-10 years):** Cycling and pedestrian network expansion, missing link construction, intersection reconfigurations.
- **Long-term (10+ years):** Street reconfigurations.

Furthermore, some improvements could be combined with other capital projects, such as arterial renewal or future BRT implementation, to optimize delivery and reduce potential for rework. Smaller scale improvements, such as short sections of missing sidewalk or missing curb ramps, could also be conditioned with future redevelopment.

Beyond the improvement to increase multimodal capacity within the PGAs, upgrades to alleyways may also be required to support densification. In areas where rear alleys exist, potential increase in traffic volumes along the rear alleys can be mitigated by upgrading existing gravel and paved residential alleys to a commercial alley standard, both in width and pavement structure, along with requiring developments to provide additional setbacks from the rear property line to any building envelopes or parking areas to provide additional passing space for oncoming vehicles. Construction of the alley upgrades could be considered as part of neighbourhood and alley renewal, or as a condition of redevelopment.