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.

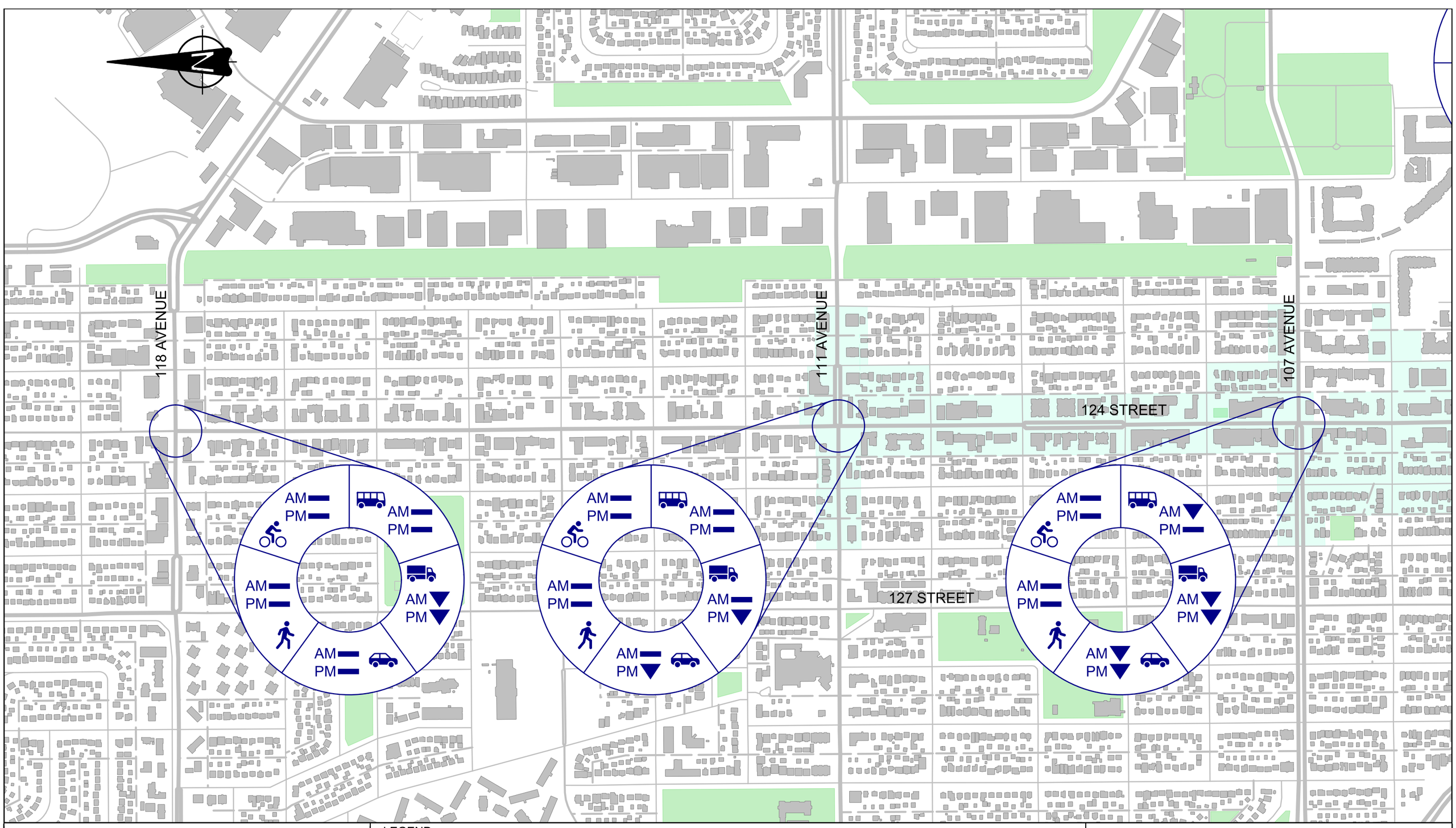
The purpose of this study has been to identify the overall multi-modal impacts as a result of the PGA rezoning and redevelopment. The traffic analysis completed is not intended to be a detailed operational analysis of the intersections along the Valley Line LRT and such a study would require final designs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

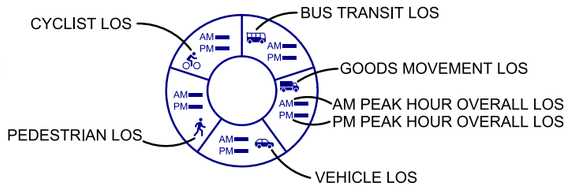
Each intersection within the 124 Street / Wîhkwêntôwin PGA was assessed in PTV Vistro using HCM 7th Edition, then exported into the OTC MMLOS toolkit to better weigh the operations and experiences of vehicle delay against all multimodal travel. Detailed HCM LOS and MMLOS tables for each intersection 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**.



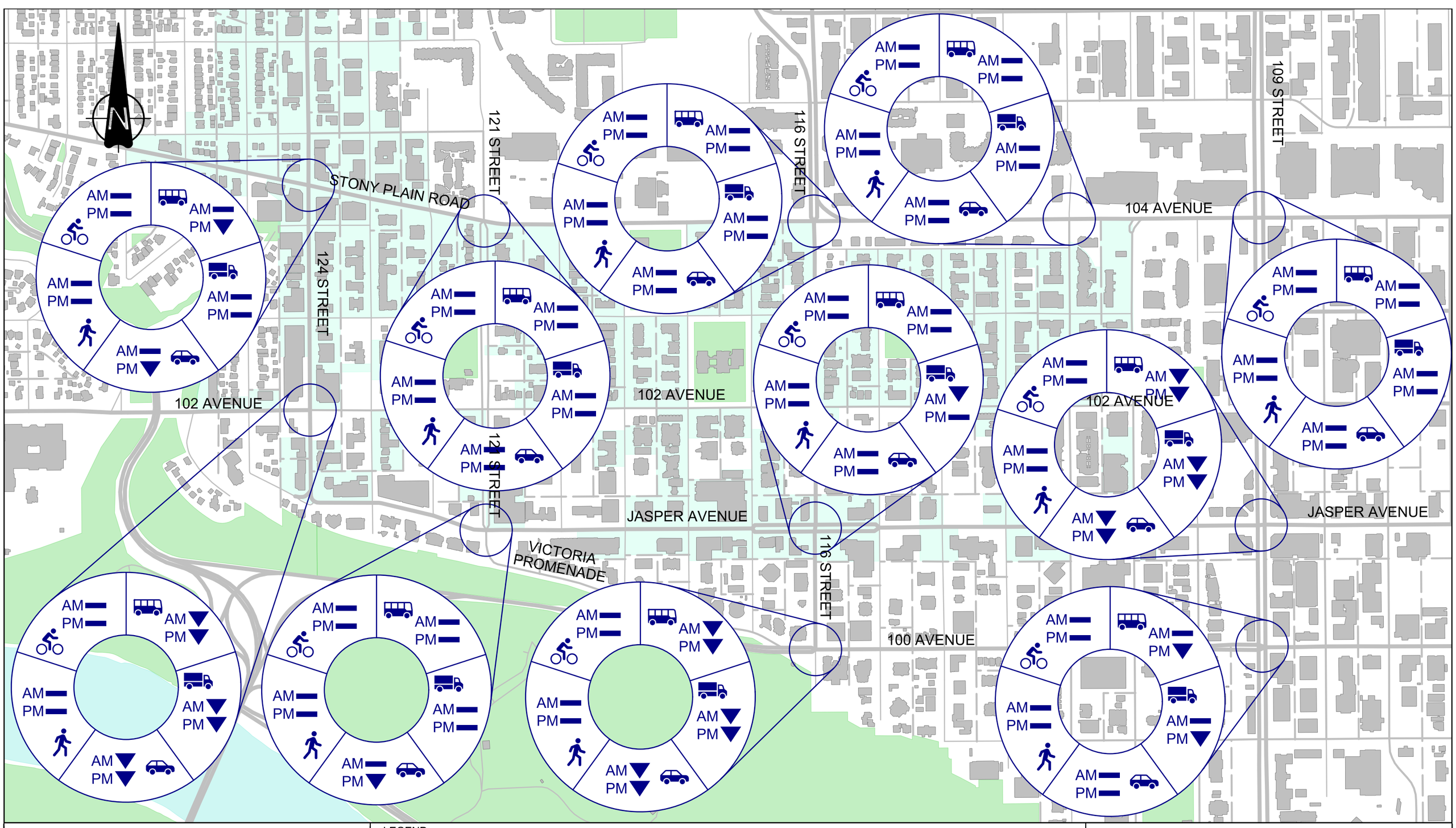
LEGEND

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



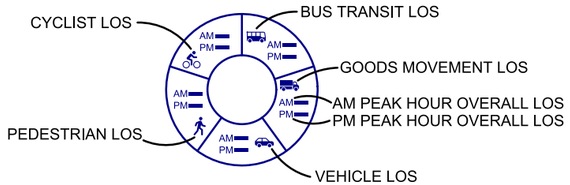
Edmonton

CIMA+

LEGEND

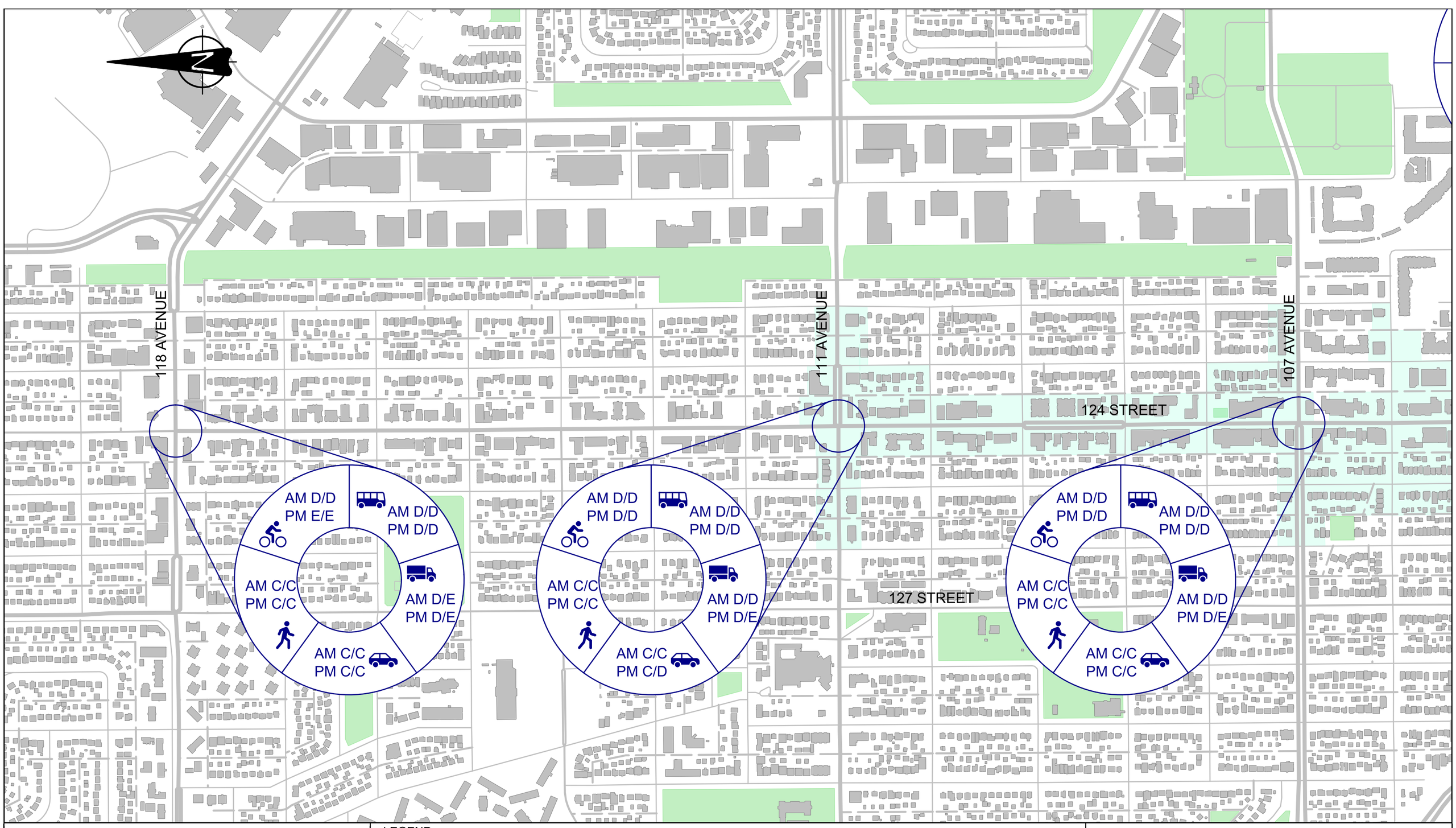
- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER

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.



- 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



LEGEND

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

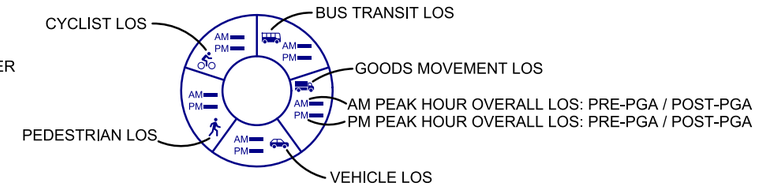
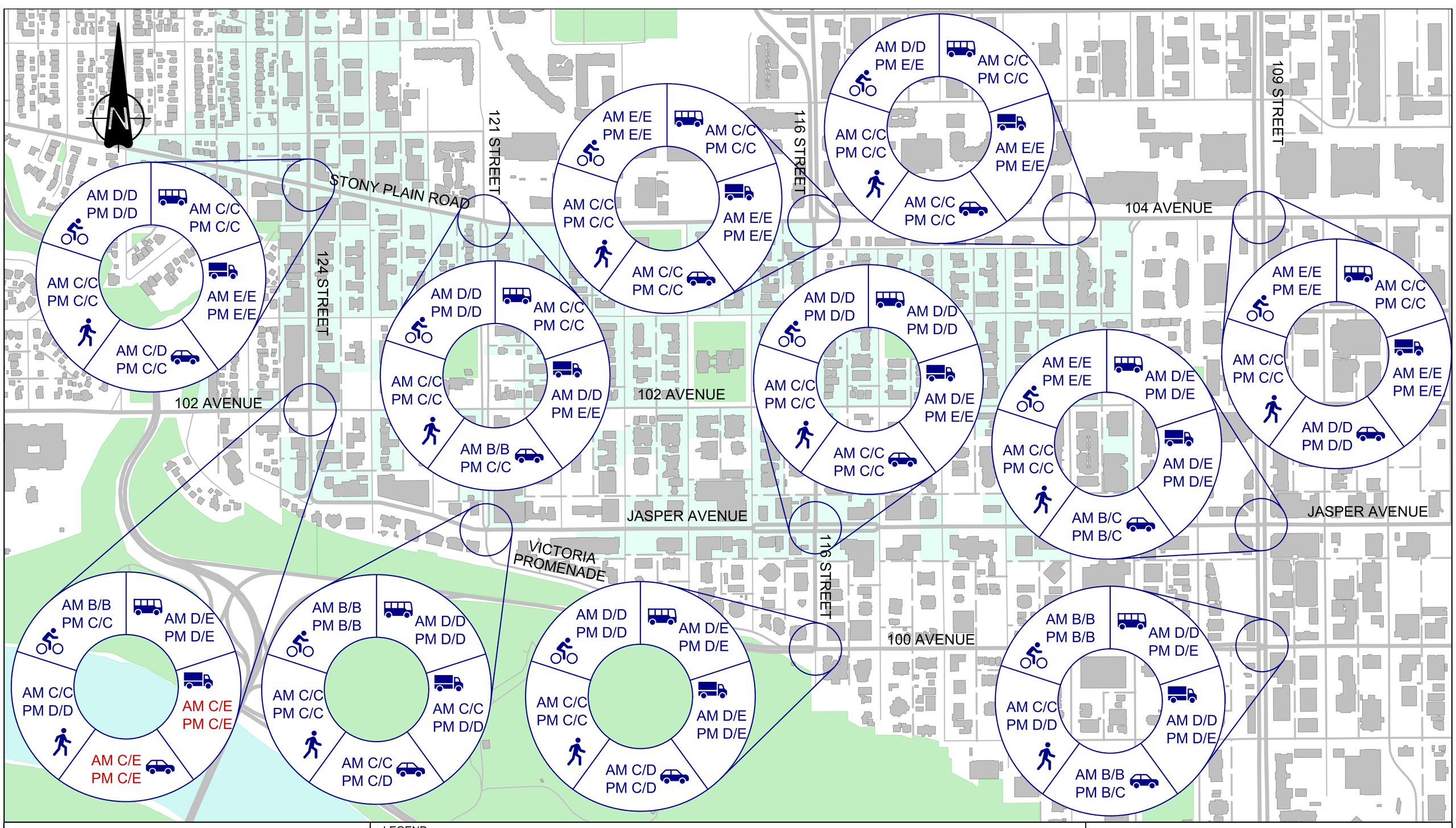


FIGURE 5-3 124 STREET PRIORITY GROWTH AREA POST DEVELOPMENT MMLOS RESULTS



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.

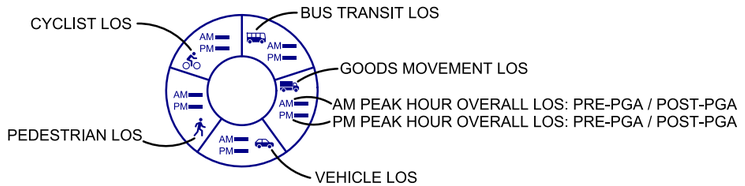


FIGURE 5-4 WîHKWêNTôWIN PRIORITY GROWTH AREA
POST DEVELOPMENT MMLOS RESULTS

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**.

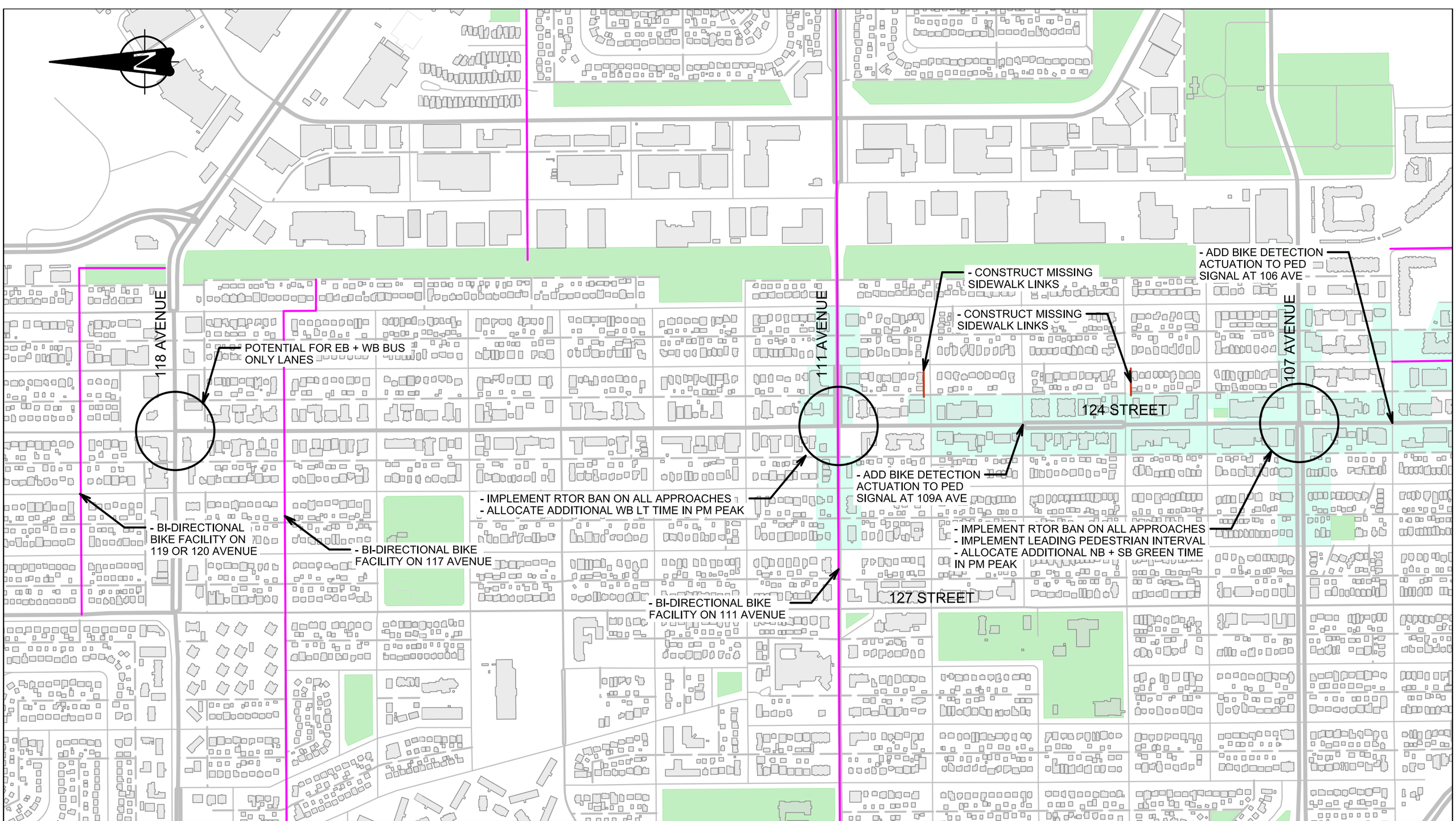
5.1.2 Qualitative Assessment

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**.

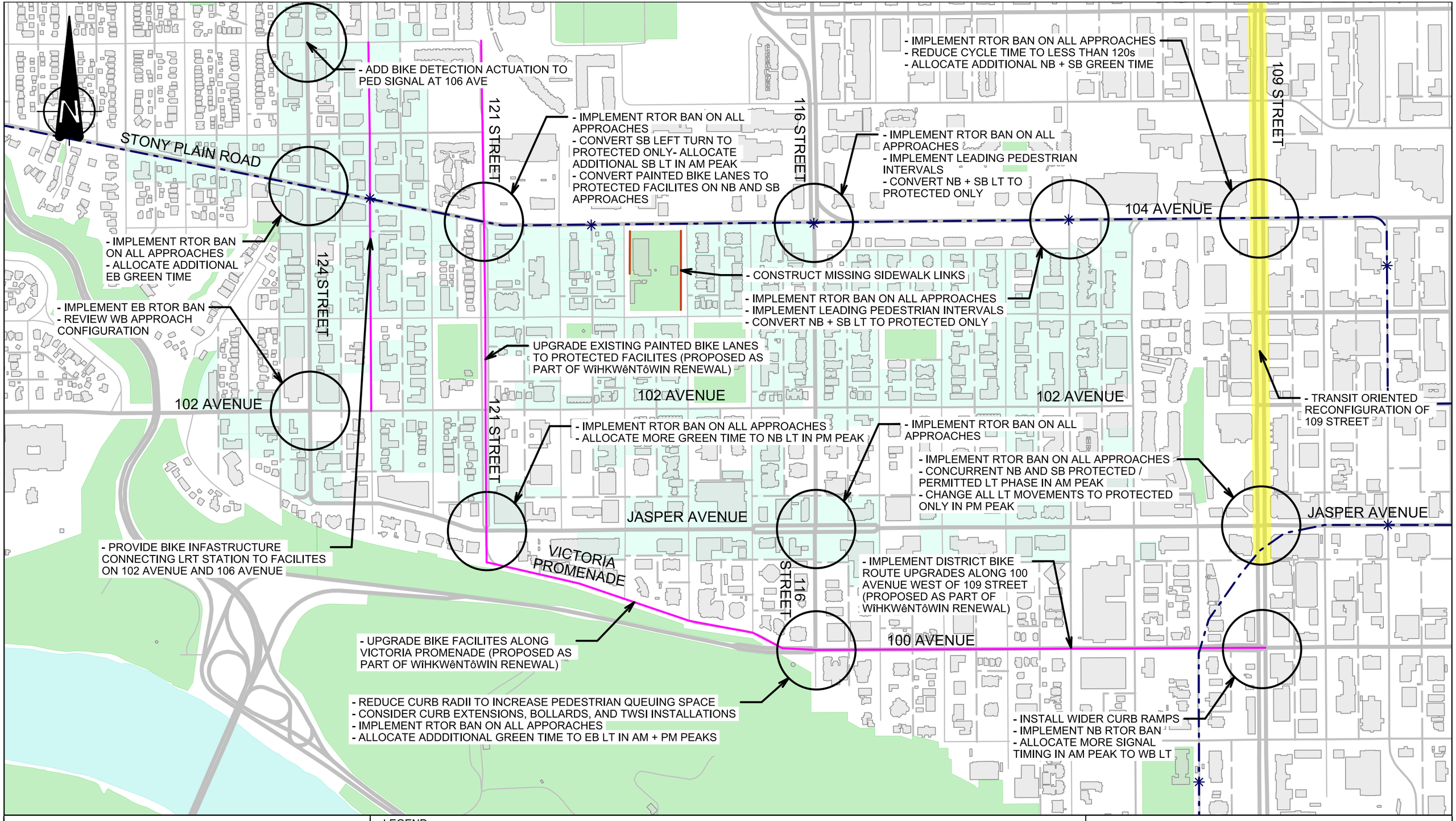
An overview of the AM and PM peak period MMLOS results comparing pre-development operations to post-development forecast operations without improvements illustrated in **Figure 5-3** and **Figure 5-4.**



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**.

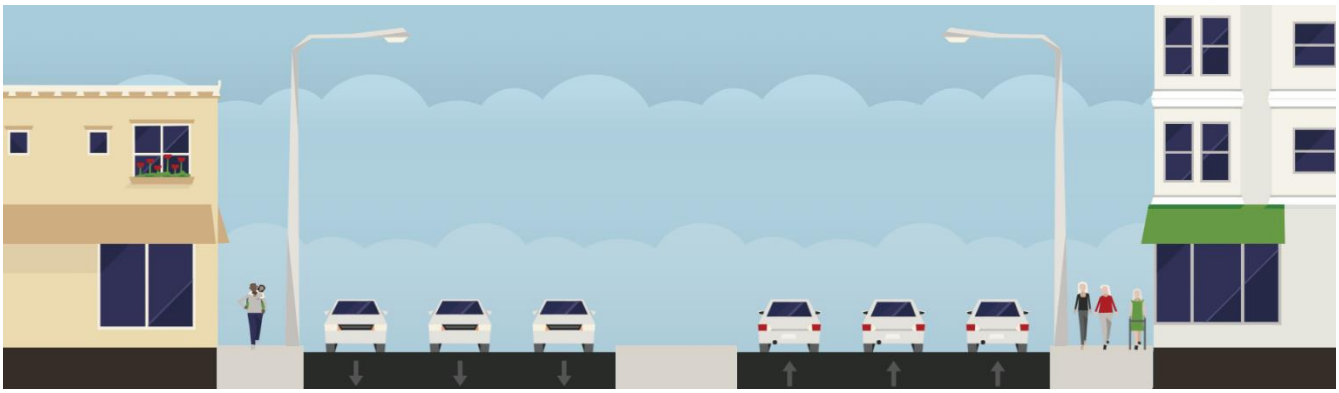


Figure 5-7 109 Street Facing North (South of 100 Avenue)

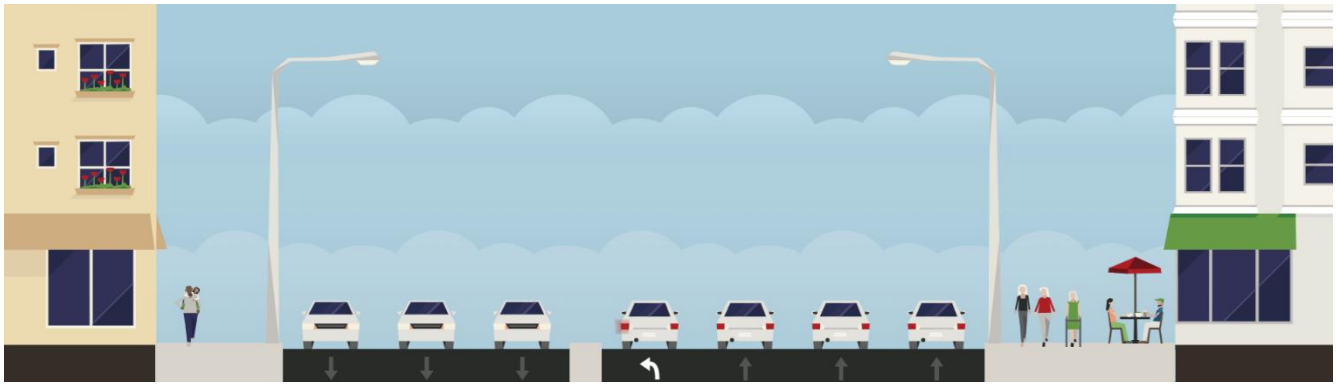


Figure 5-8 109 Street Facing North (South of Jasper Avenue)

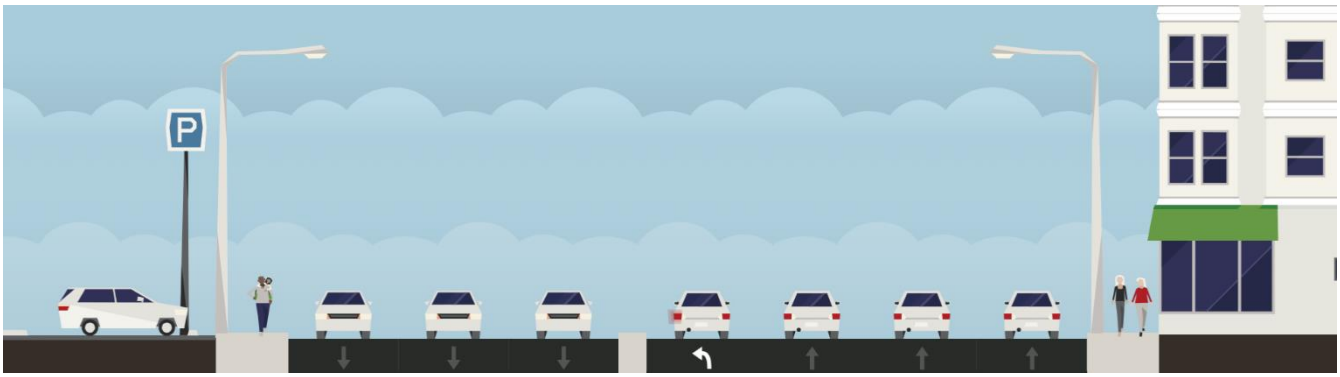


Figure 5-9 109 Street Facing North (South of 104 Avenue)

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.

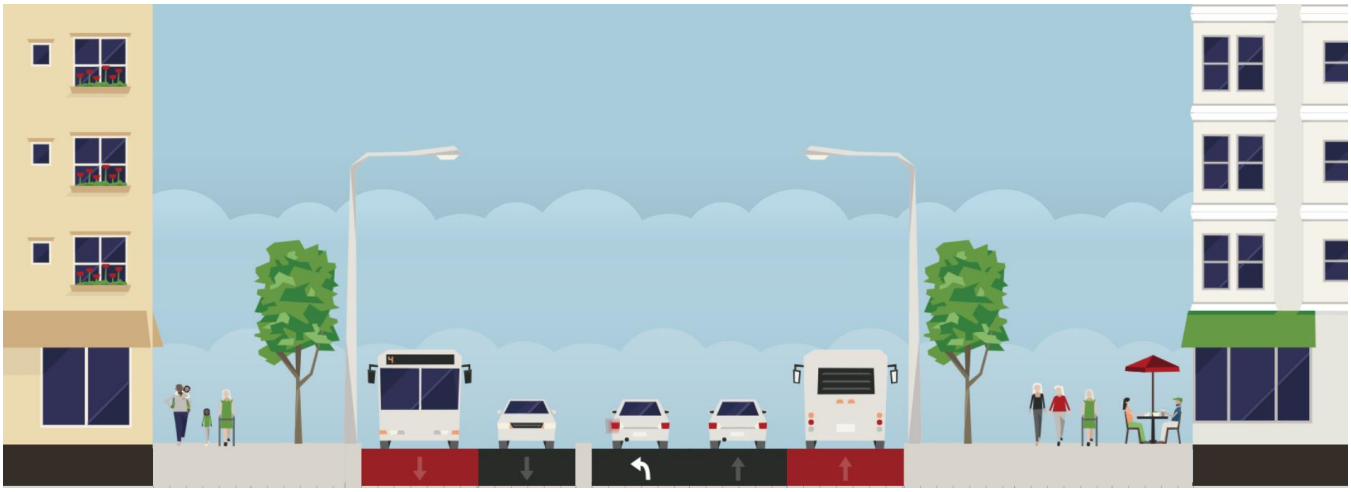


Figure 5-10 Potential 109 Street (Wîhkwêntôwin) Corridor Facing North (Jasper Avenue to 105 Avenue / Beyond)

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.

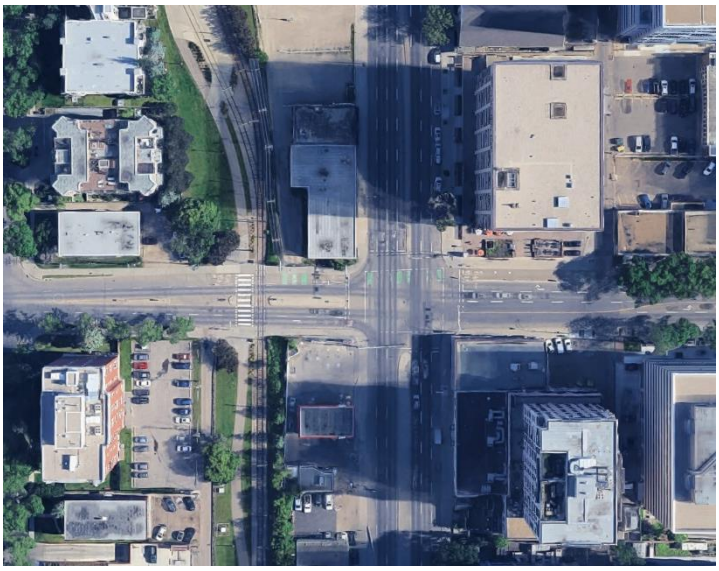


Figure 5-11 109 Street and 100 Avenue

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**.

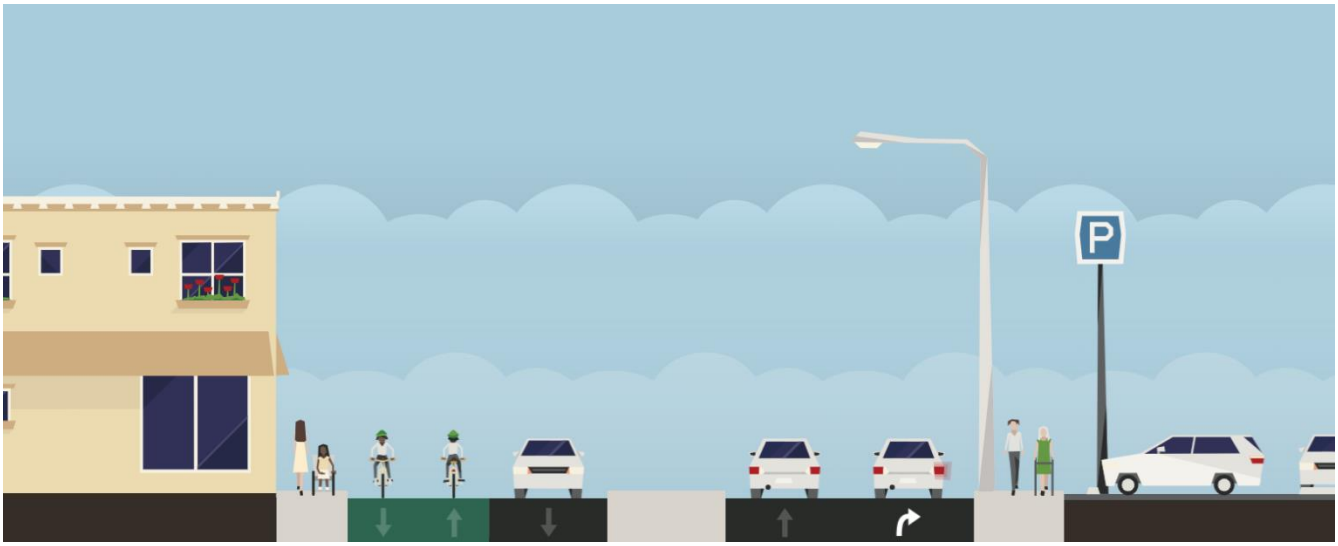


Figure 5-12 100 Avenue Facing East

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

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	✗	✓	n/a	✓
Notes	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.			
Post-Development with Improvements Intersection Performance	✓	✓	n/a	✓
Recommended Treatment	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.			

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**.

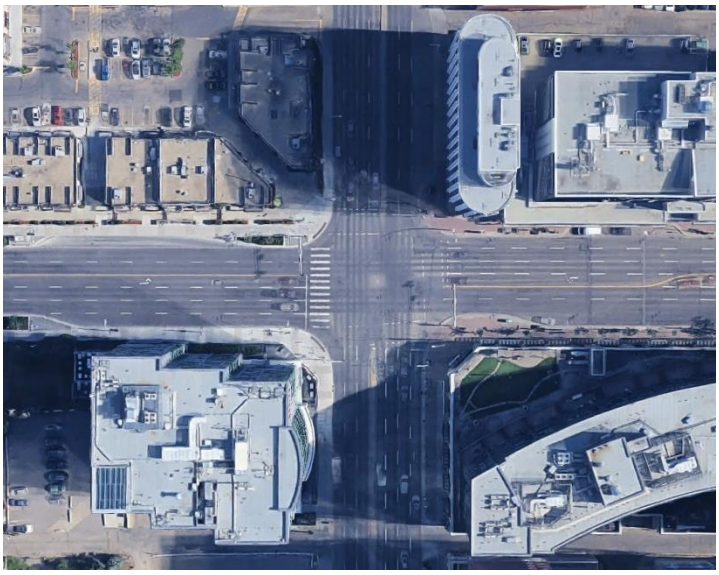


Figure 5-13 109 Street and Jasper Avenue

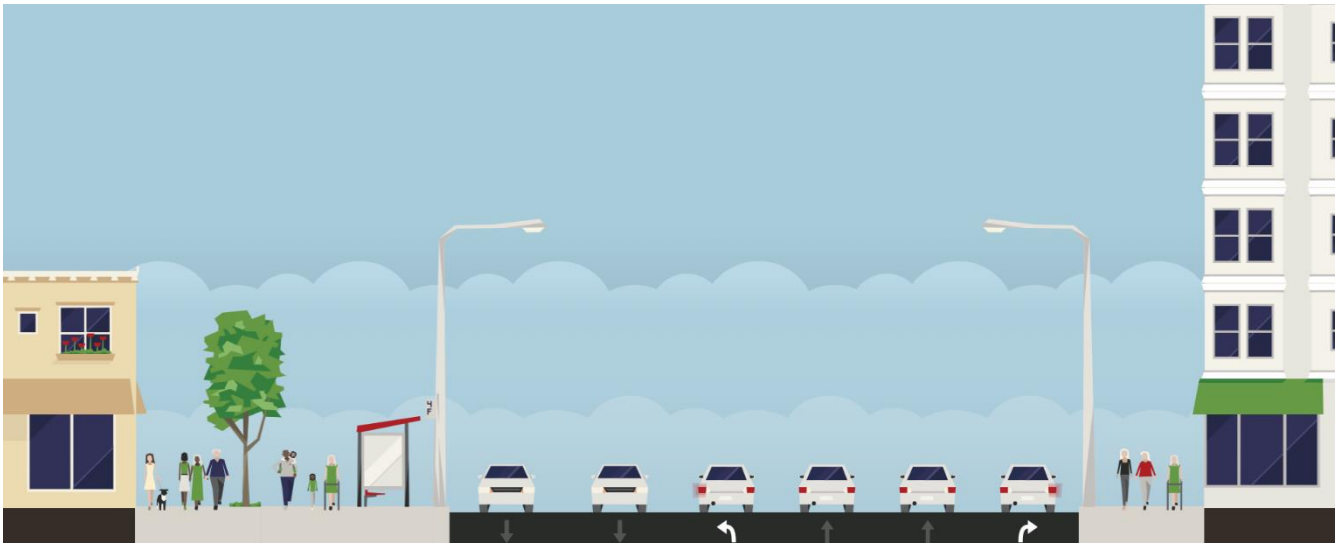


Figure 5-14 Jasper Avenue Facing East

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

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	✗	⚠	✗ (PM only)	✓
Notes	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.			
Post-Development with Improvements Intersection Performance	✓	⚠	✓	✓
Recommended Treatment	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.			

	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.**

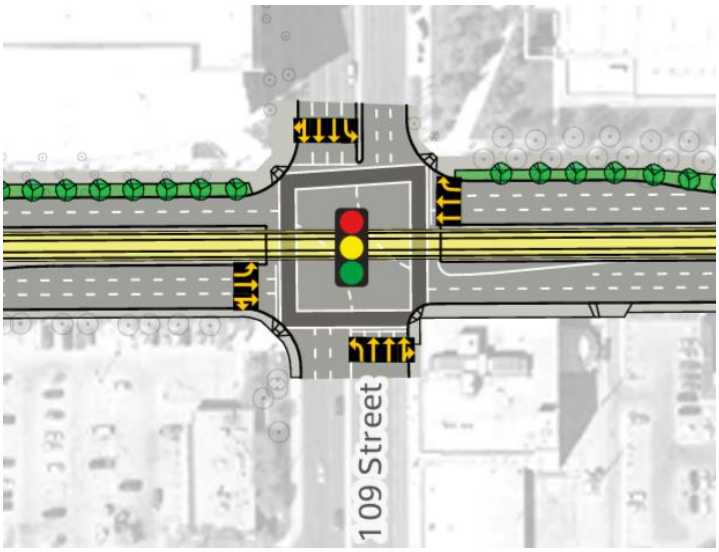


Figure 5-15 109 Street and 104 Avenue

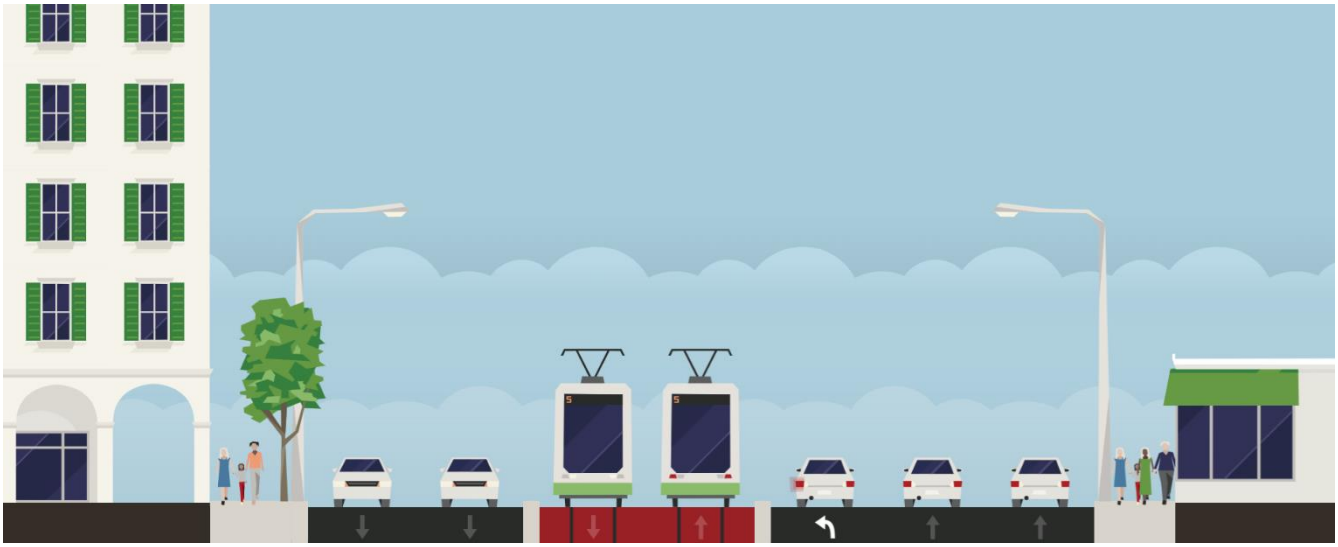


Figure 5-16 104 Avenue Facing East

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 raii, 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)

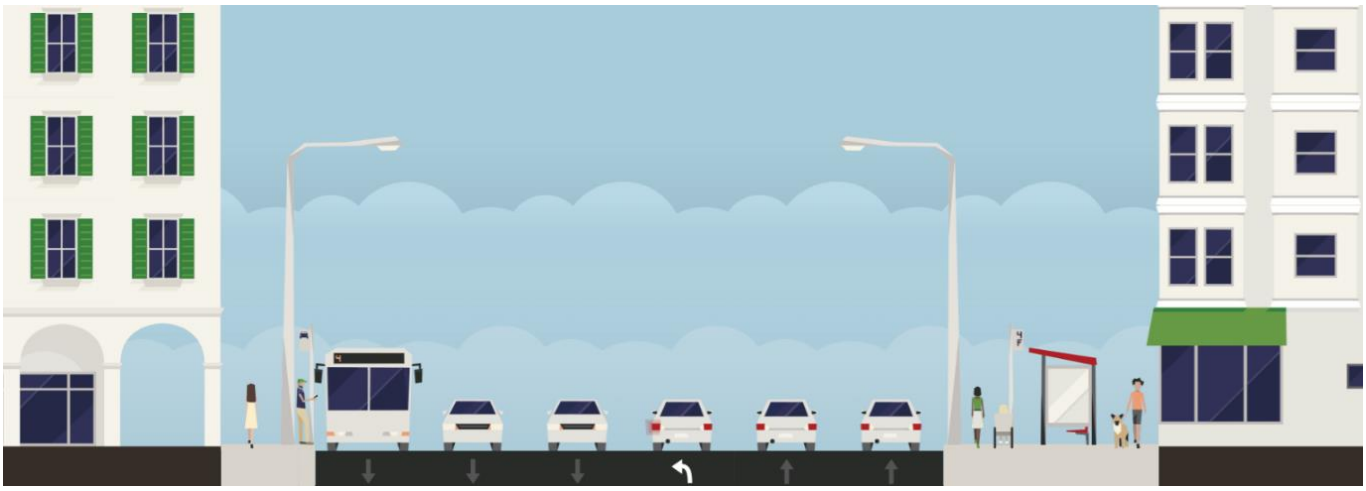


Figure 5-18 124 Street Facing North (South of Stony Plain Road)

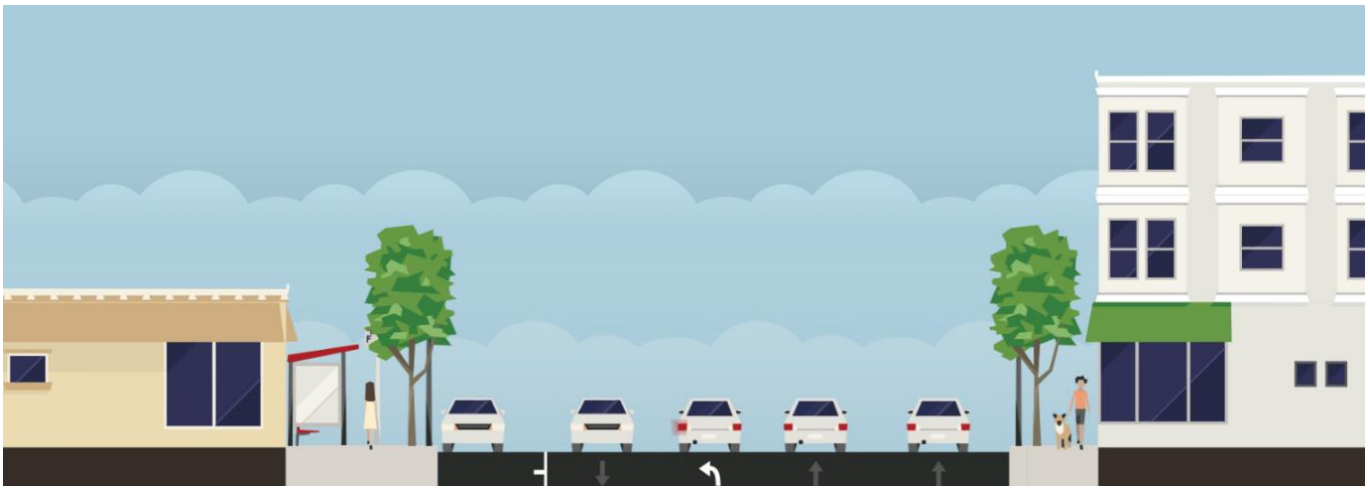


Figure 5-19 124 Street Facing North (South of 107 Avenue)

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

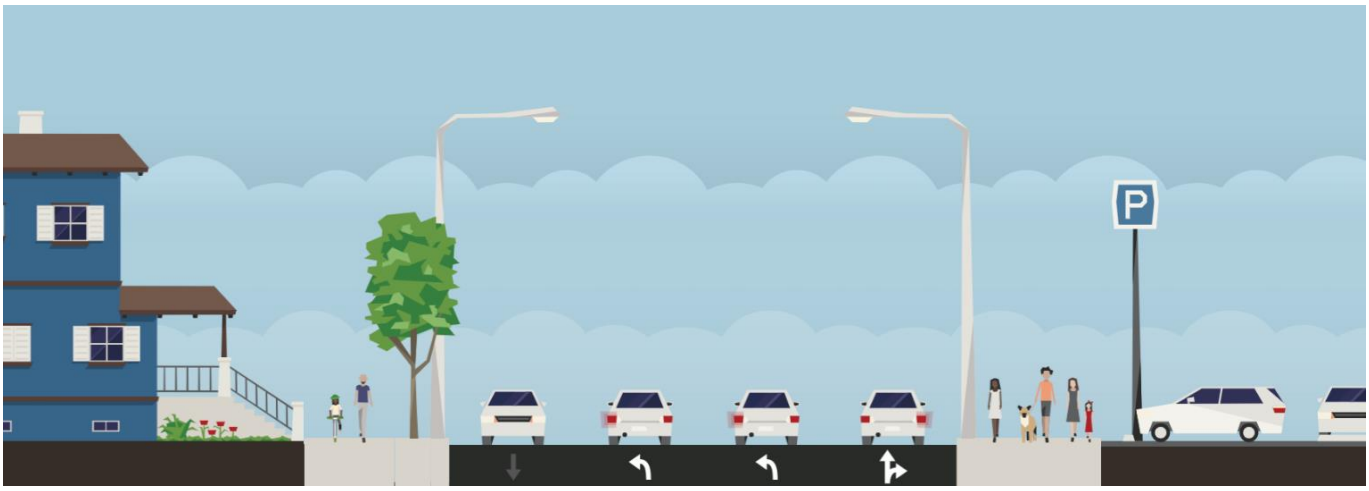


Figure 5-21 124 Street Facing North (South of 118 Avenue)

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.

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 5-22 124 Street and 102 Avenue

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**.

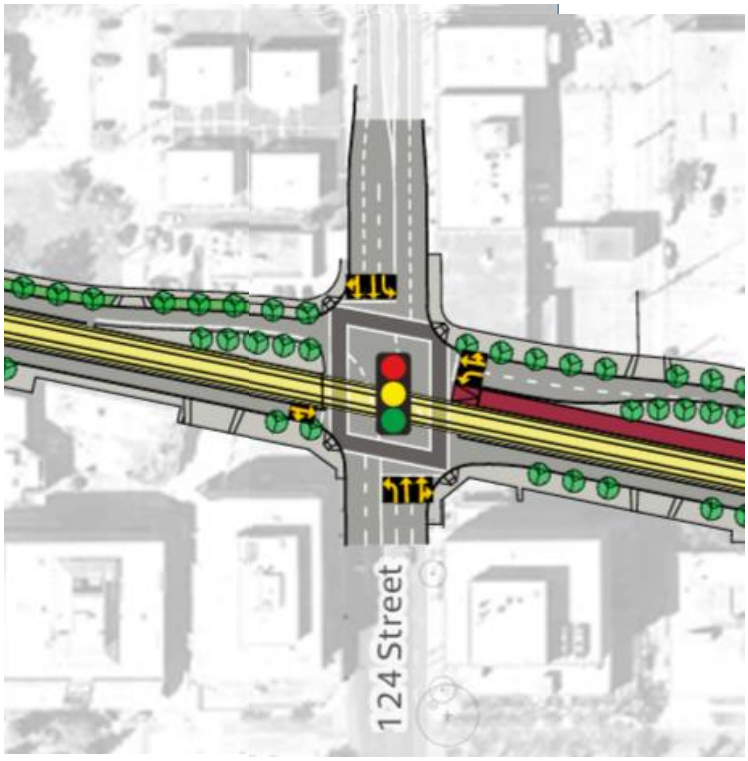


Figure 5-25 124 Street and Stony Plain Road

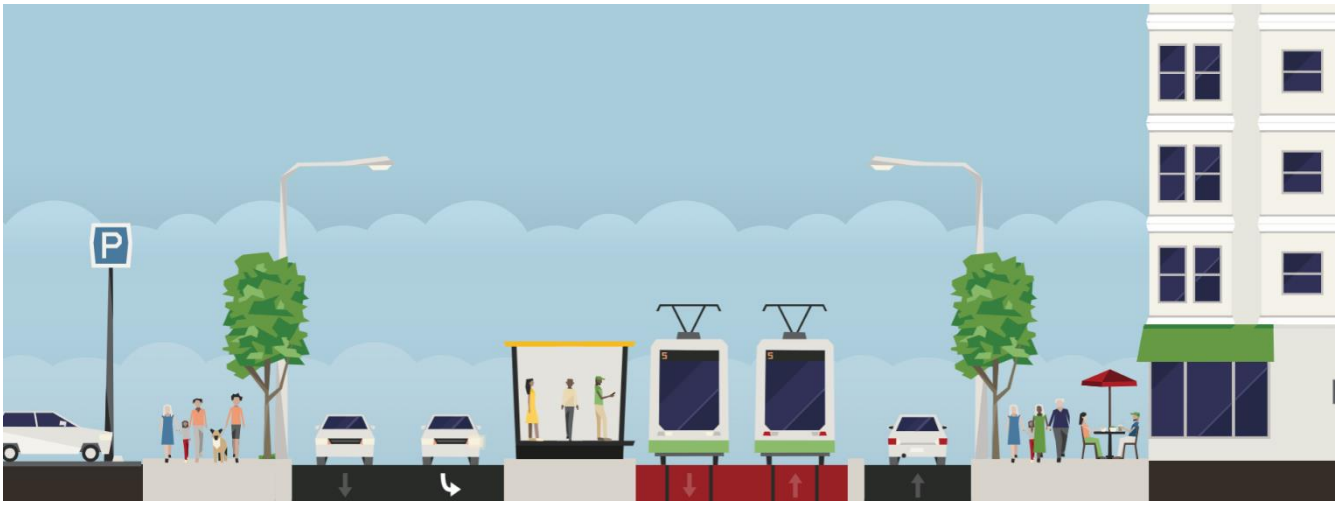


Figure 5-26 Stony Plain Road Facing East

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

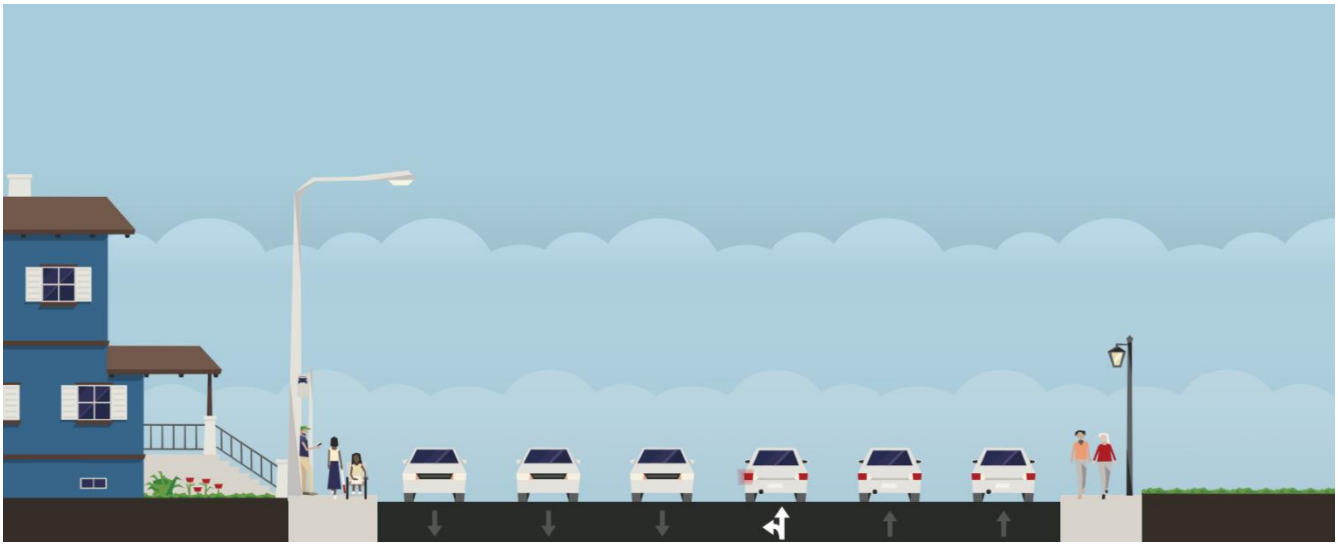


Figure 5-30 111 Avenue Facing East

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

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 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.			
Post-Development with Improvements Intersection Performance	✓	⚠	✓	✓
Recommended Treatment	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.			

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

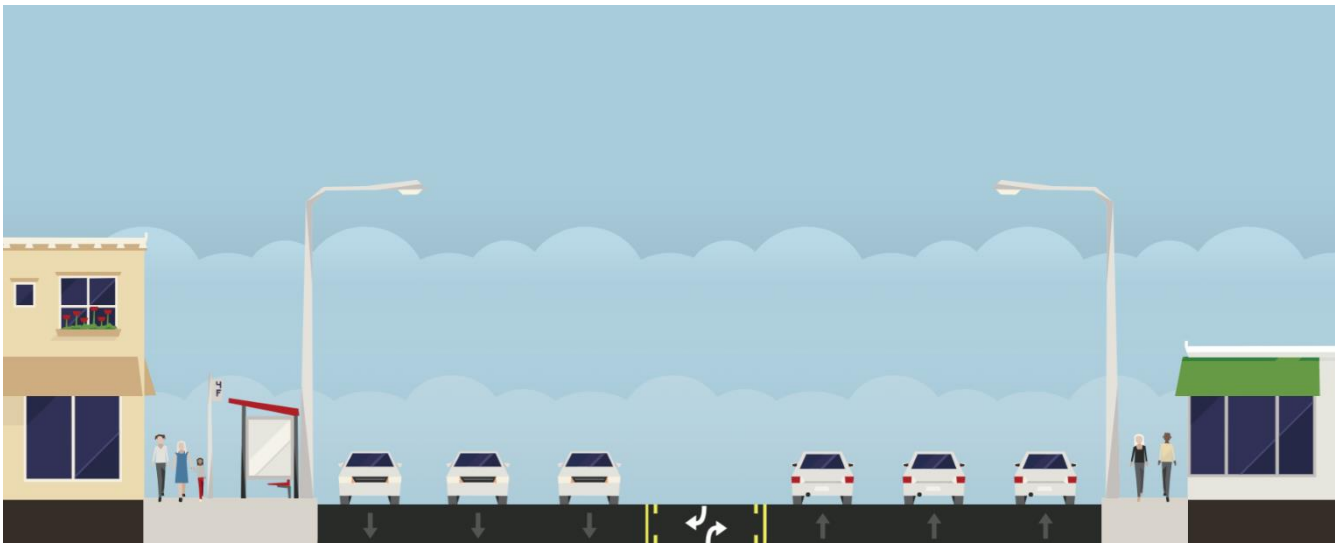


Figure 5-32 118 Avenue Facing East

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

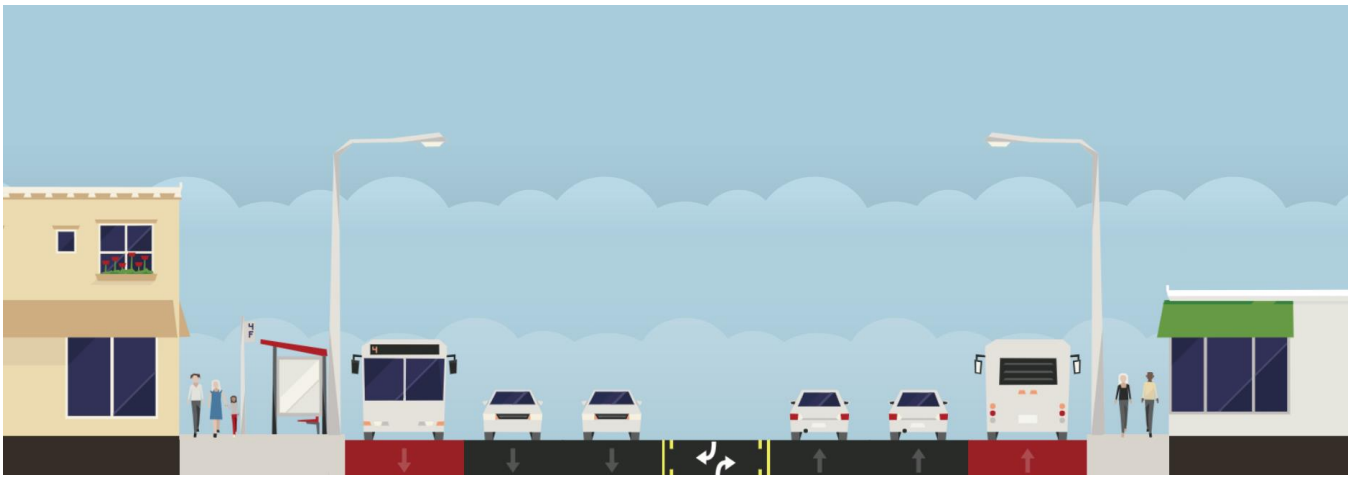


Figure 5-33 Potential 118 Avenue Cross Section (121a Street to 127 Street)

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**.

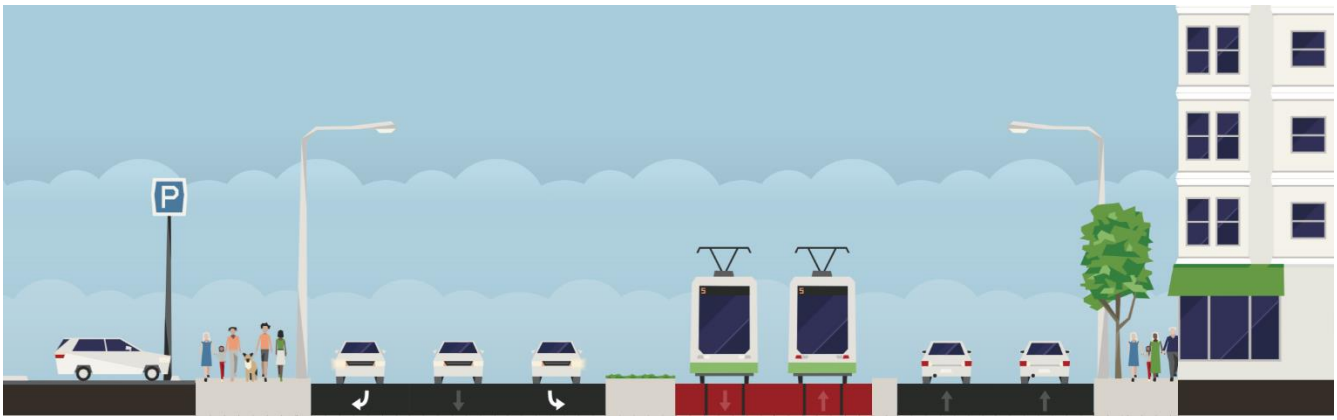


Figure 5-34 104 Avenue Facing East (West of 121 Street)

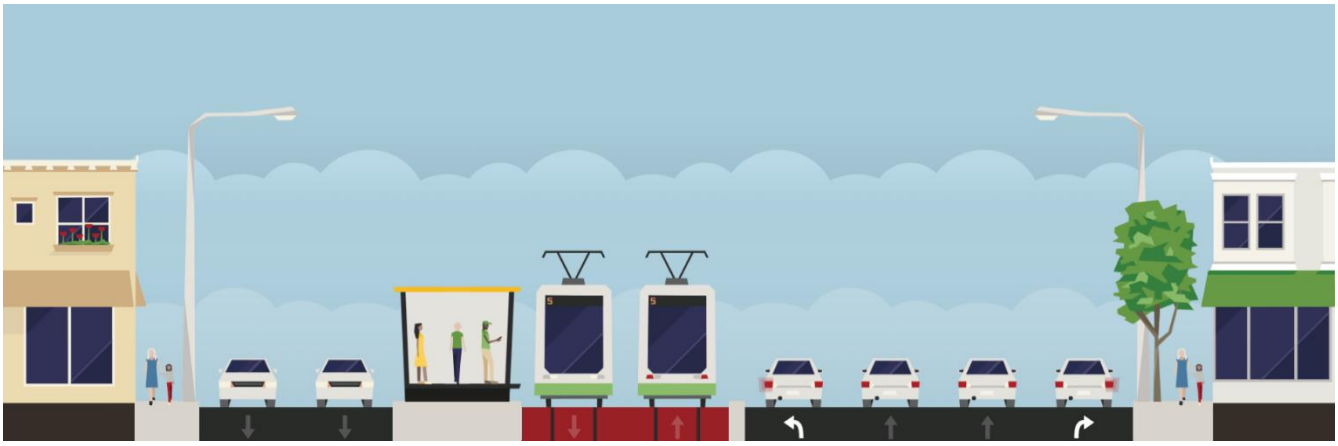


Figure 5-35 104 Avenue Facing East (West of 116 Street)

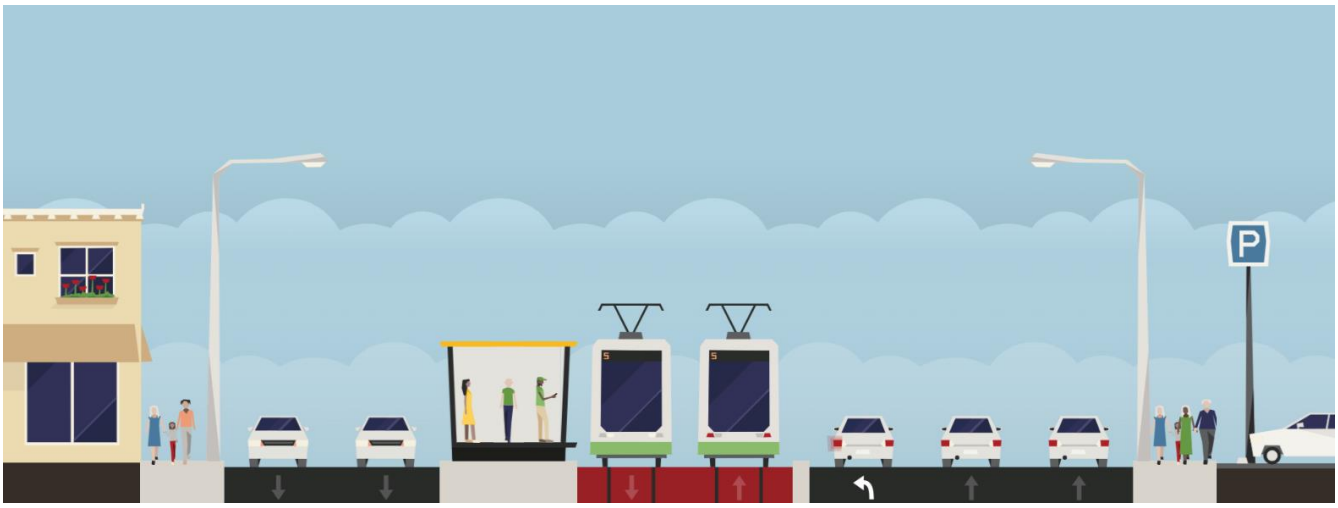


Figure 5-36 104 Avenue Facing East (West of 112 Street)

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.**

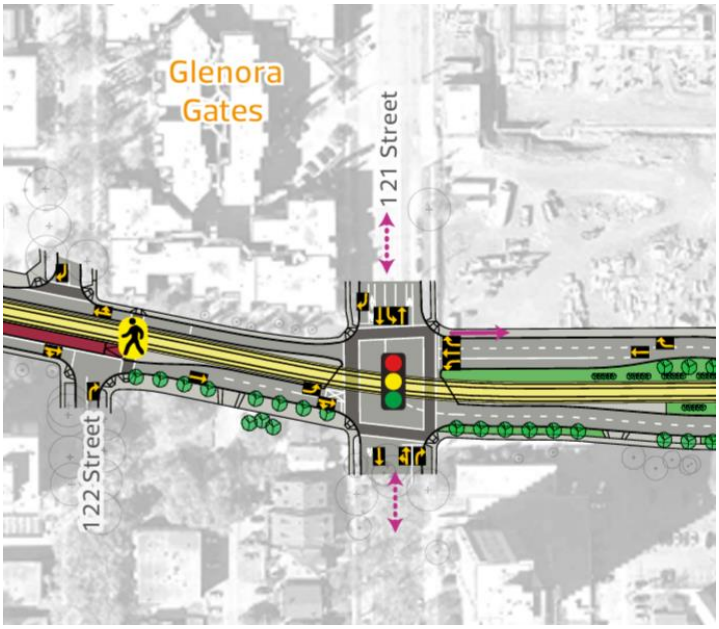


Figure 5-37 121 Street and 104 Avenue

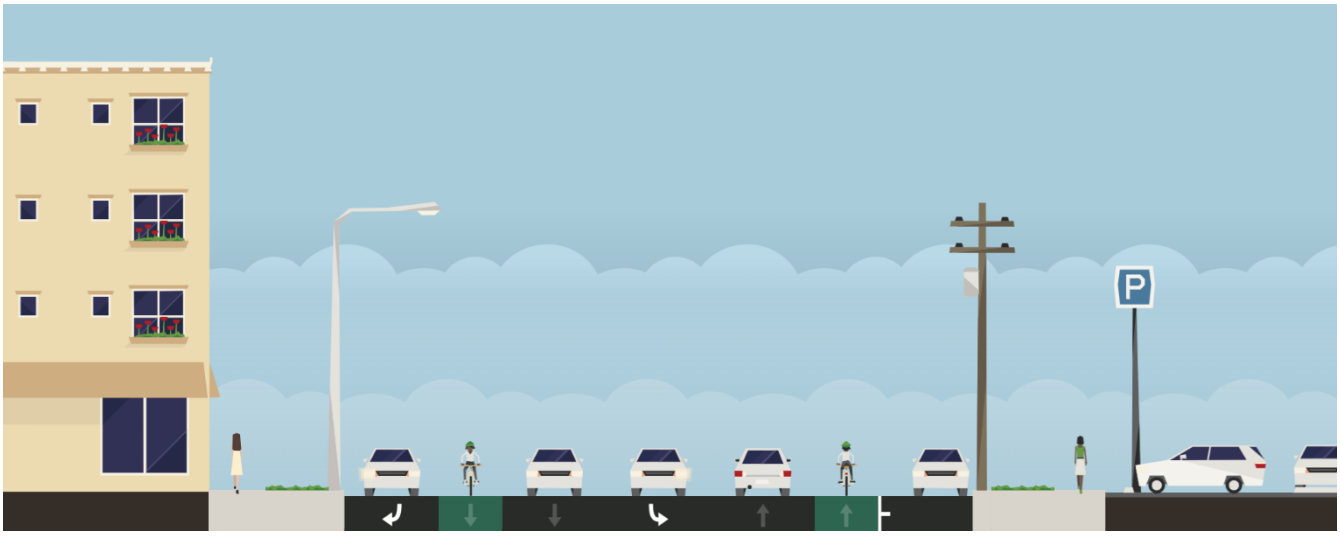


Figure 5-38 121 Street Facing North

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

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 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.			
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.** 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.			

	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.**

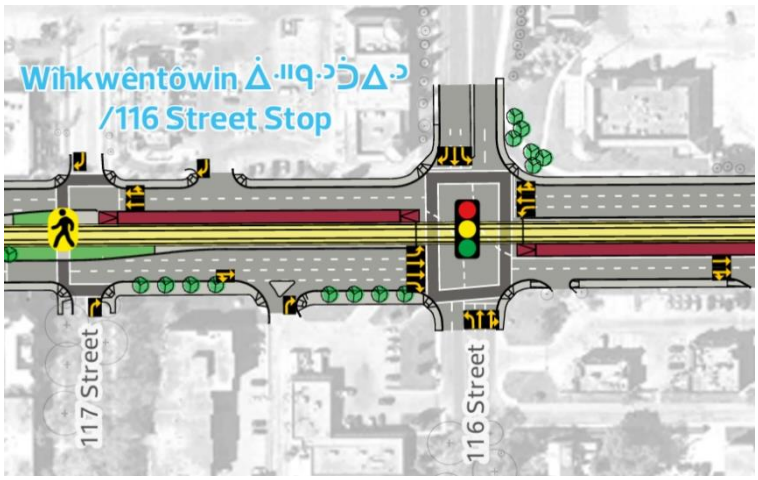


Figure 5-39 116 Street and 104 Avenue

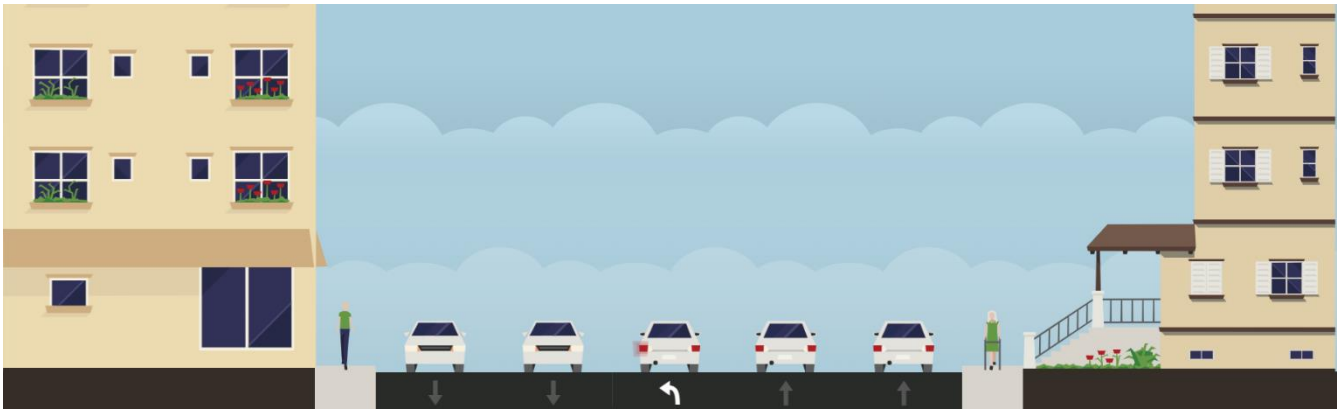


Figure 5-40 116 Street Facing North

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

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. 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	**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.			

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**

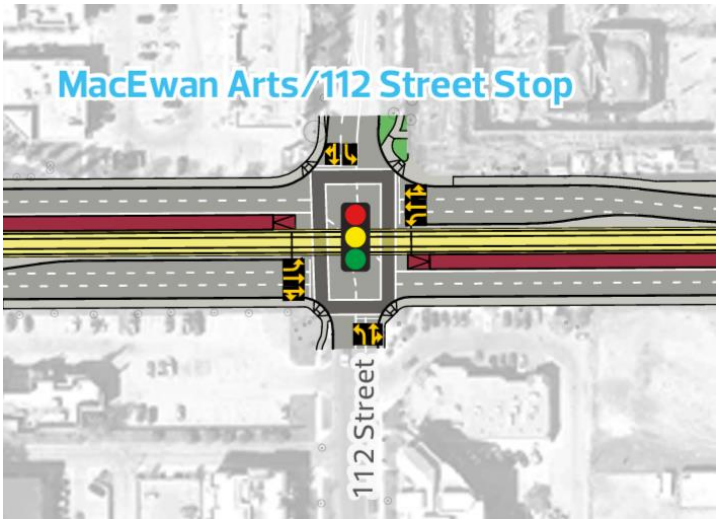


Figure 5-41 112 Street and 104 Avenue

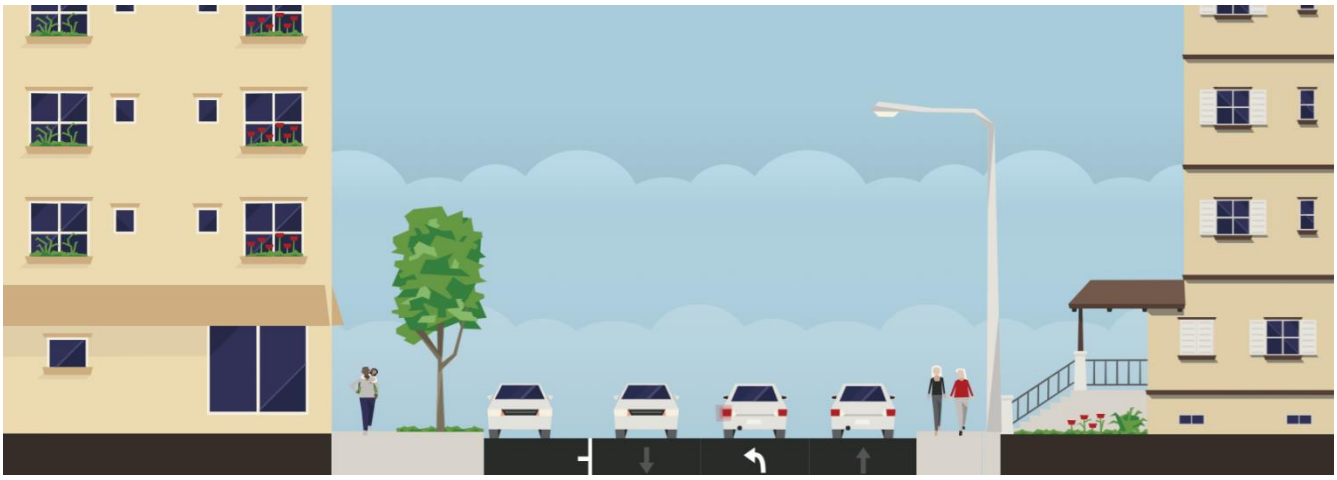


Figure 5-42 112 Street Facing North

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

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. 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.			
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.** 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:			

	• 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**.

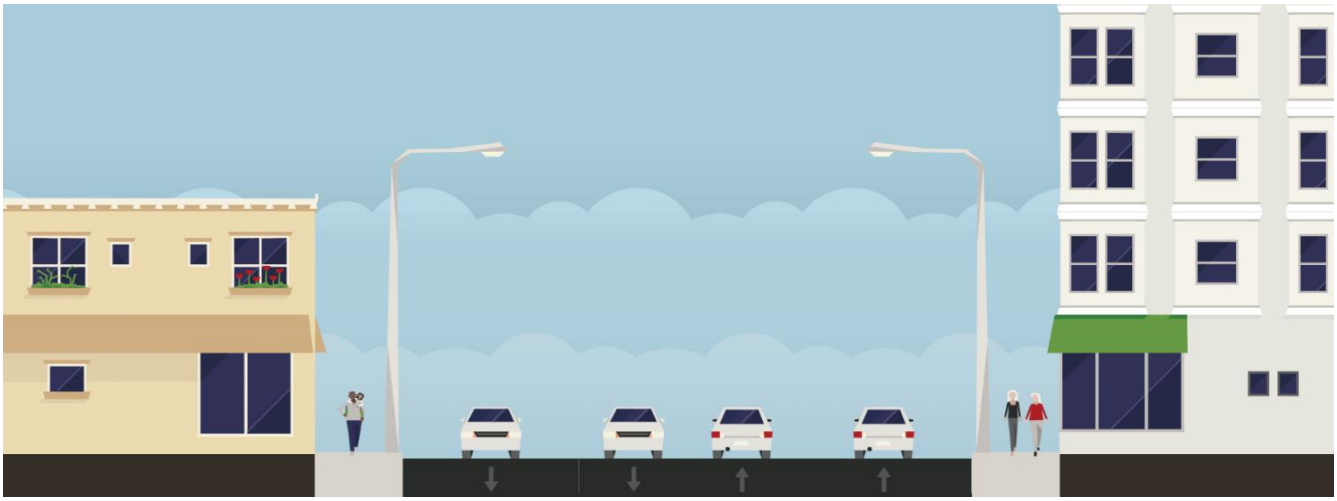


Figure 5-43 Jasper Avenue Facing East (West of 121 Street)

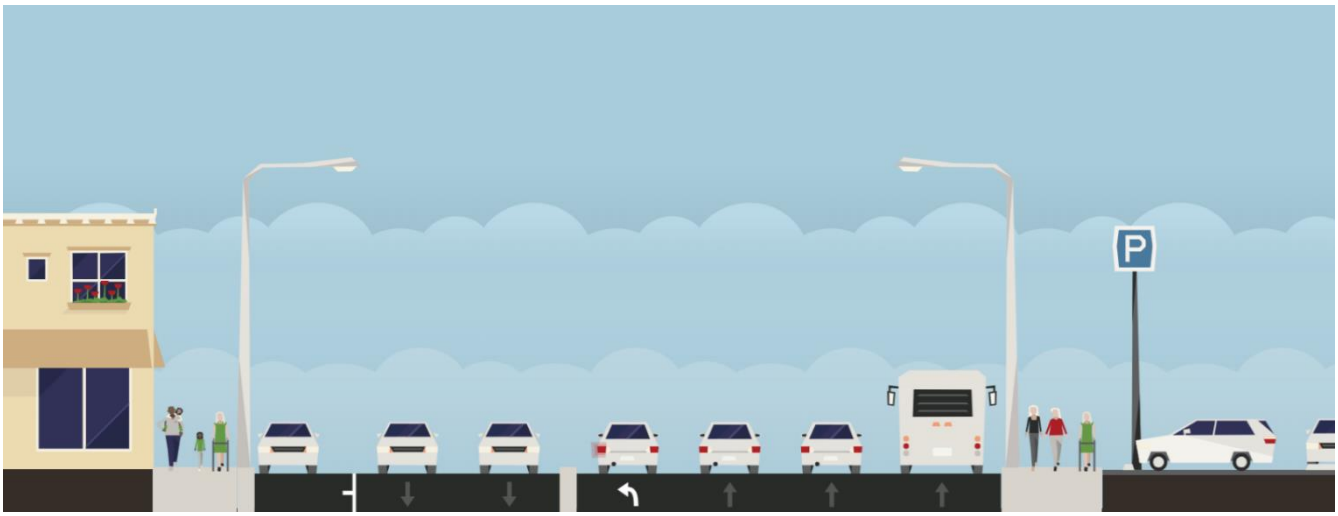


Figure 5-44 Jasper Avenue Facing East (West of 116 Street)

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.**

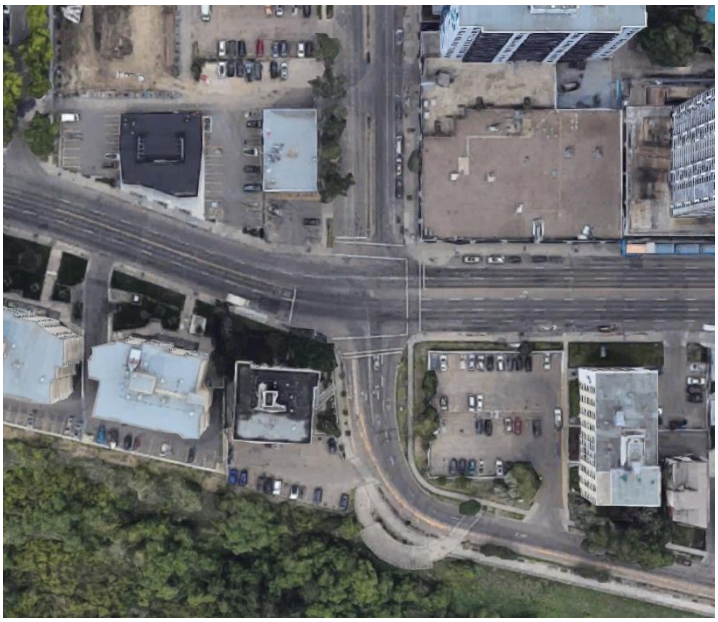


Figure 5-46 121 Street and Jasper Avenue

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

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	✗	✓	✓	✓
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 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.			
Post-Development with Improvements Intersection Performance	✓	✓	✓	✓
Recommended Treatment	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.			

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.**

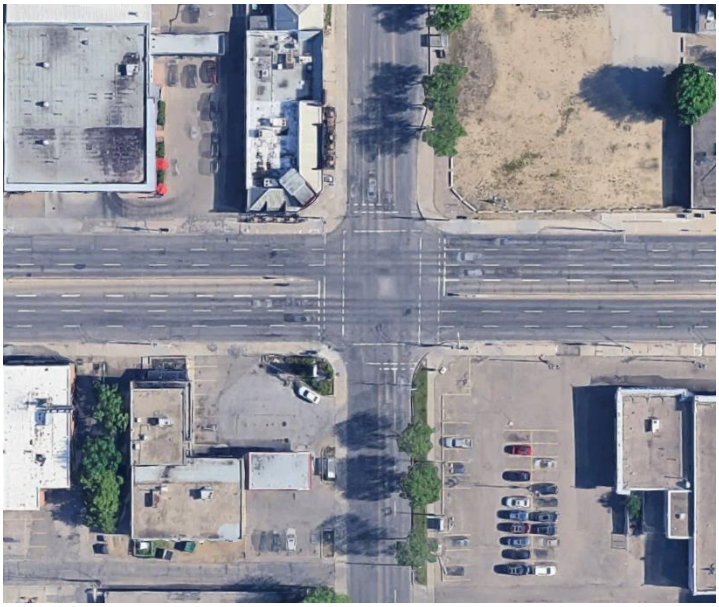


Figure 5-48 116 Street and Jasper Avenue

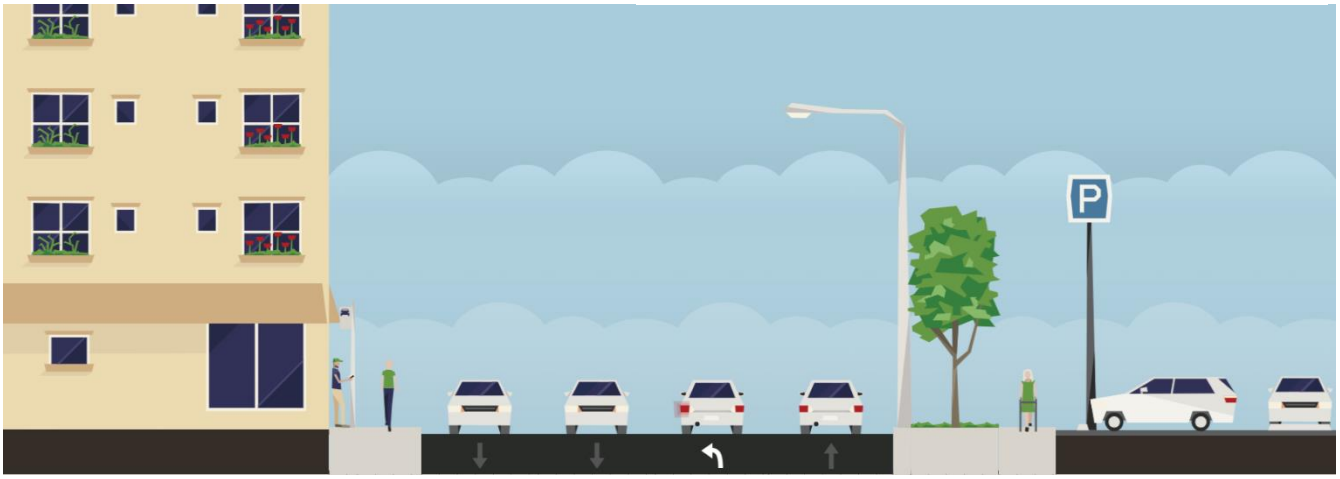


Figure 5-49 116 Street Facing North

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**.

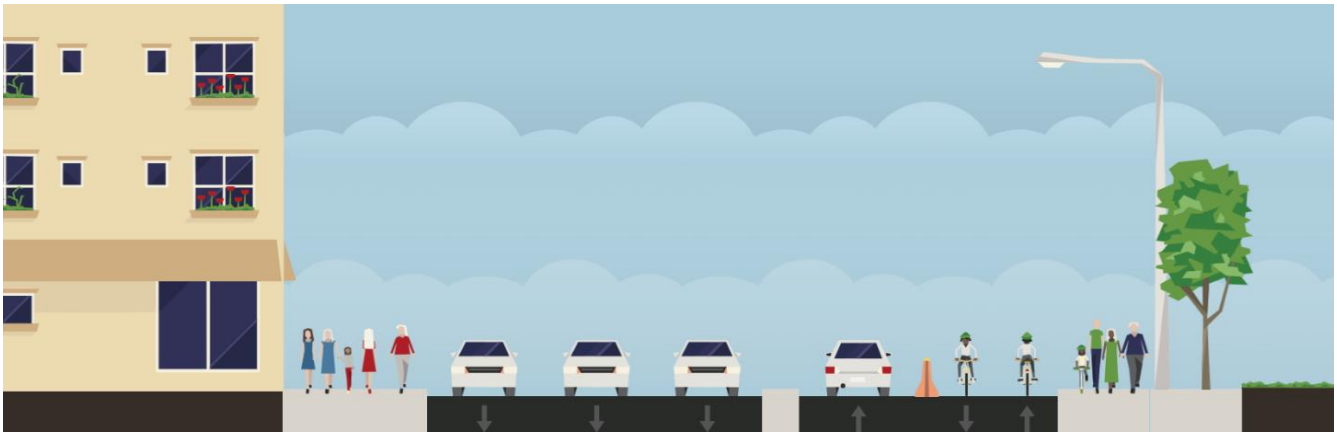


Figure 5-50 100 Avenue Facing East (West of 116 Street)

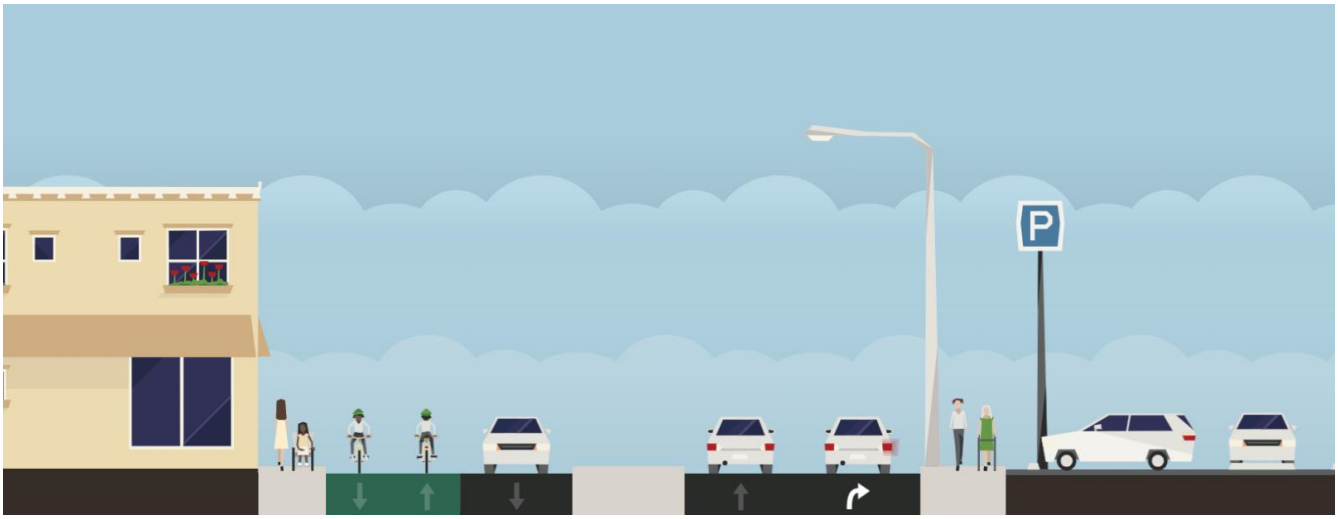


Figure 5-51 100 Avenue Facing East (West of 109 Street)

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.

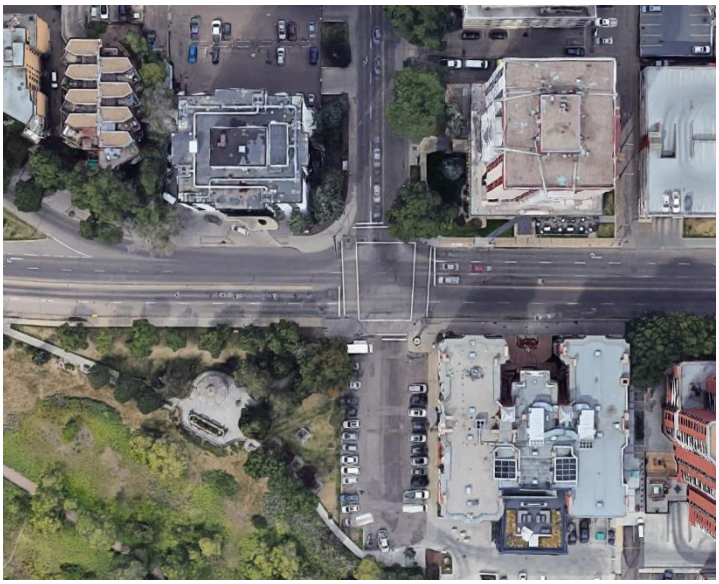


Figure 5-53 116 Street and 100 Avenue

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

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 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 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			
Post-Development with Improvements Intersection Performance	✓	✓	✓	✓
Recommended Treatment	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.			

	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.

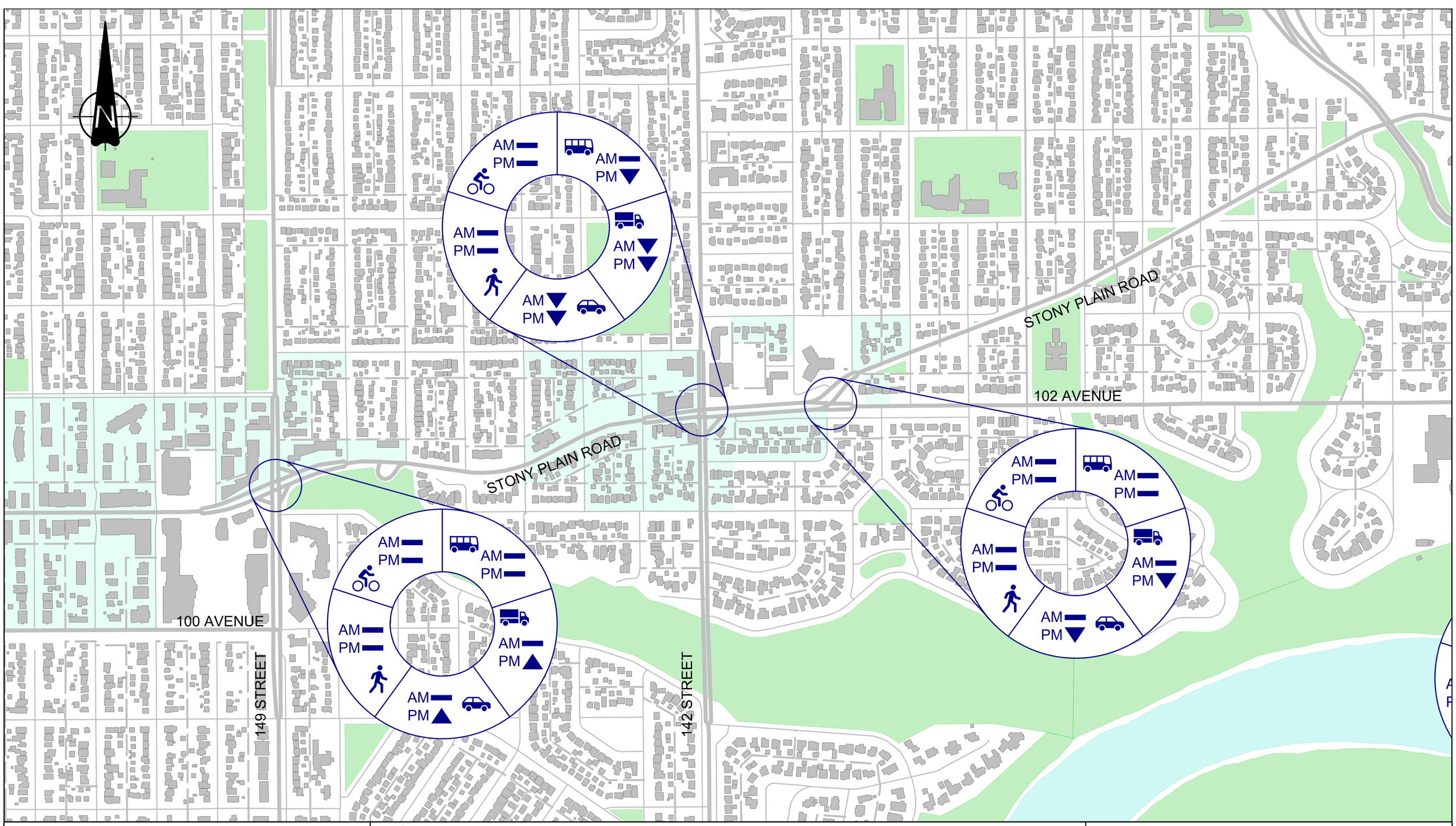
Table 5.33 Traditional LOS 116 Street and 100 Avenue

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.

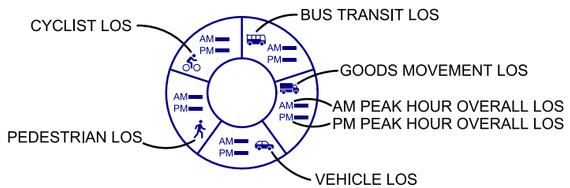
An overview of the AM and PM peak period MMLOS results comparing pre-development operations to post-development forecast operations (without improvements) are illustrated in **Figure 5-55** to **Figure 5-58**.



LEGEND

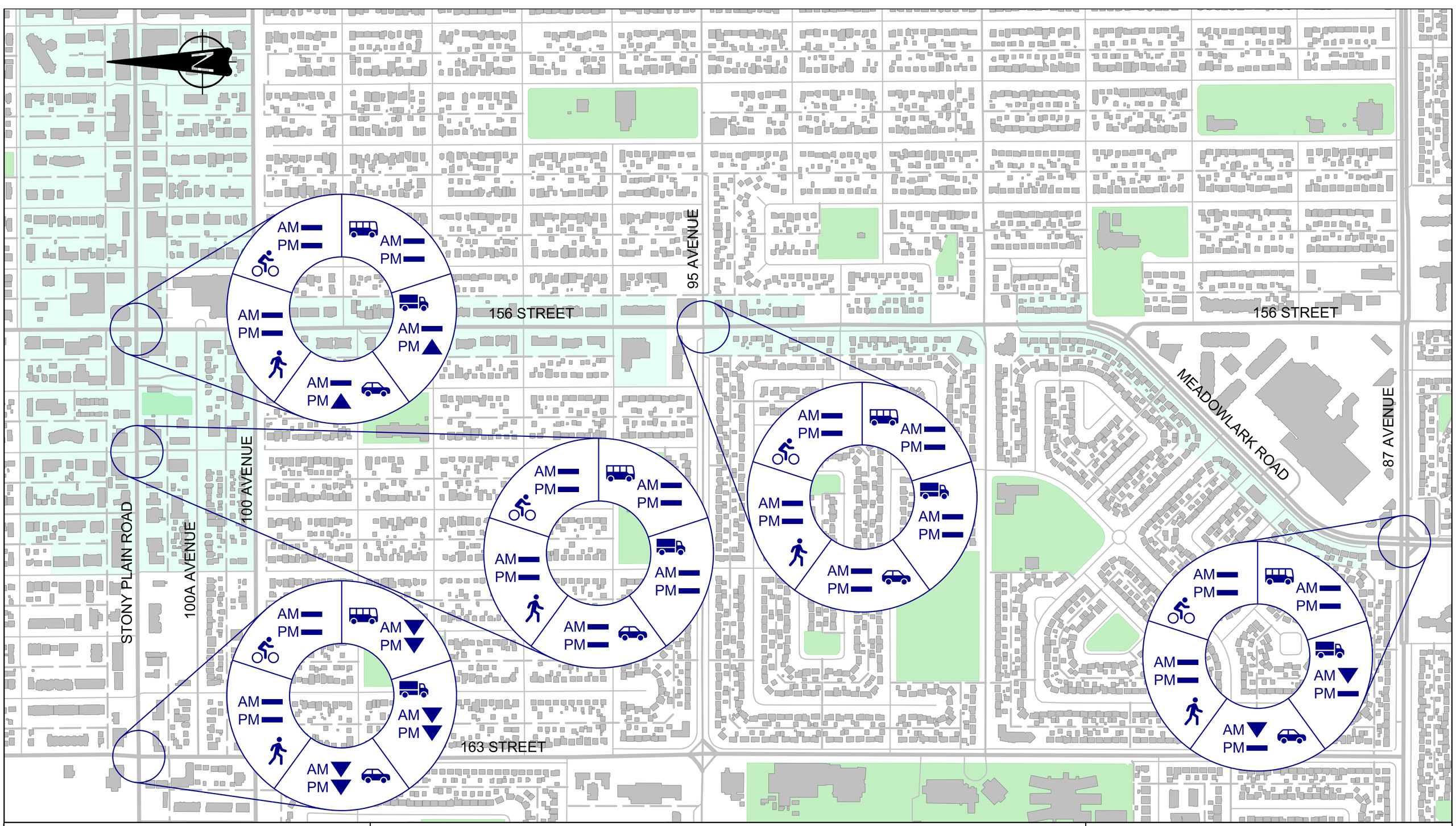
- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER

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)

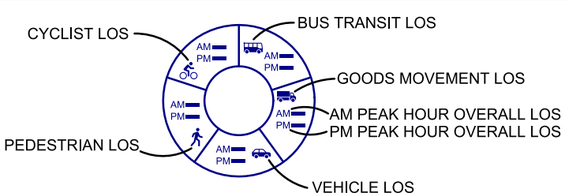
FIGURE 5-55 STONY PLAIN PRIORITY GROWTH AREA POST DEVELOPMENT MMLOS COMPARISON



LEGEND

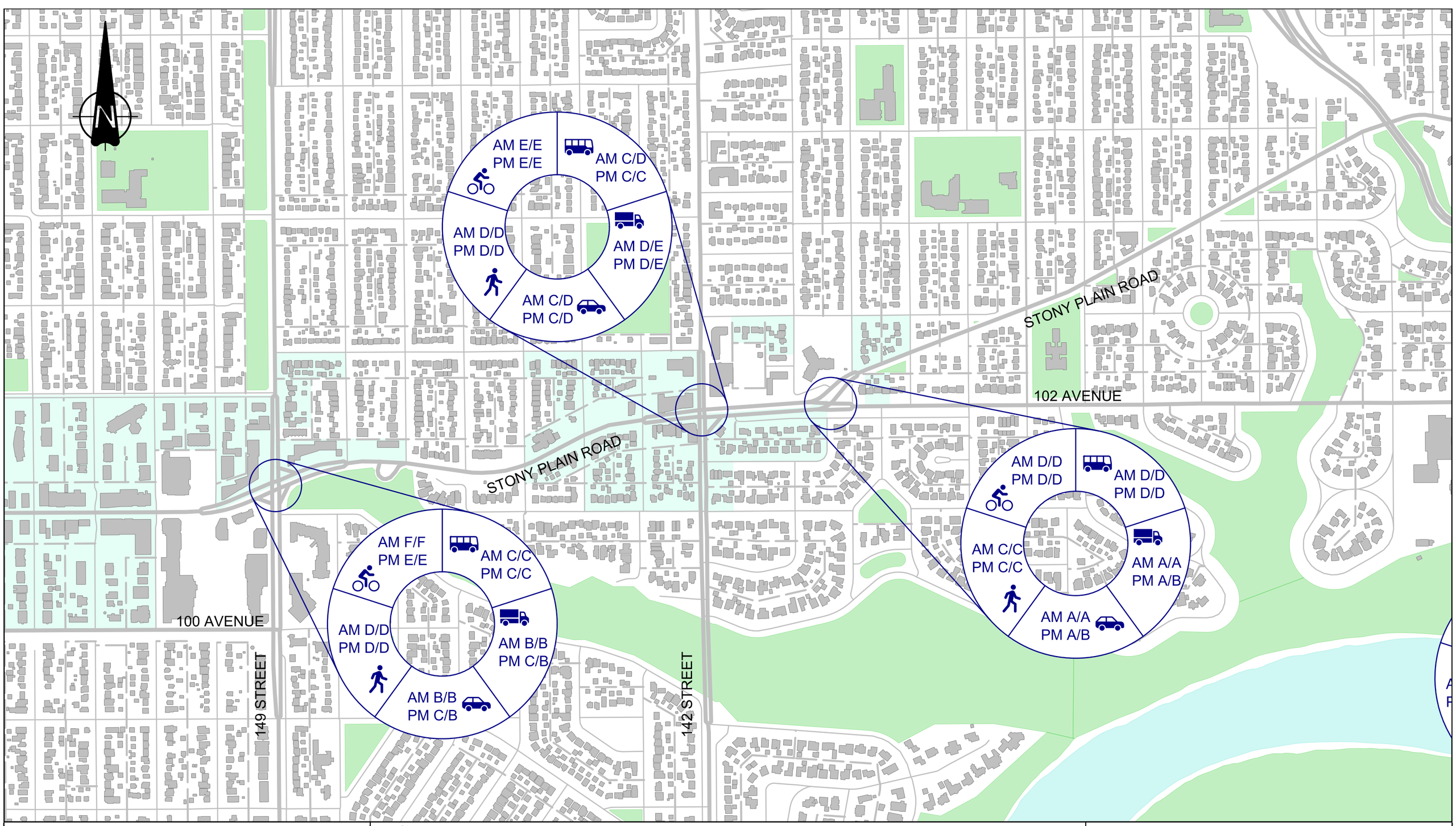
- PGA TARGET AREA
- PARK / OPEN SPACE
- BODY OF WATER / RIVER

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.



- 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.

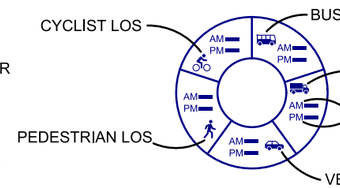
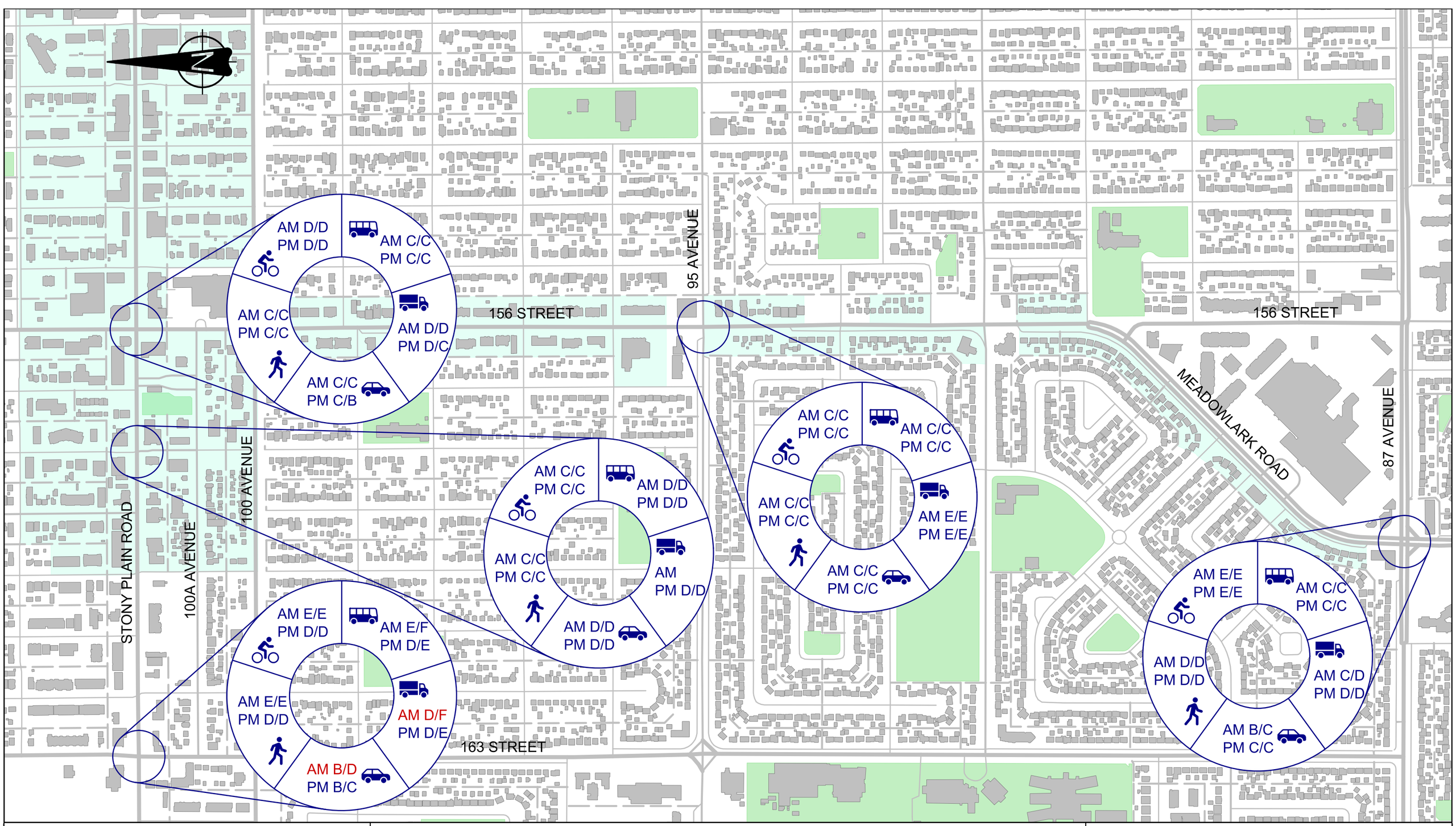


FIGURE 5-57 STONY PLAIN PRIORITY GROWTH AREA POST DEVELOPMENT MMLOS RESULTS



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.

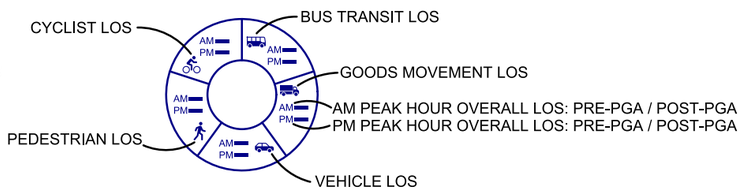


FIGURE 5-58 156 STREET PRIORITY GROWTH AREA POST DEVELOPMENT MMLOS RESULTS

5.2.1 Recommended Mobility Assessment

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

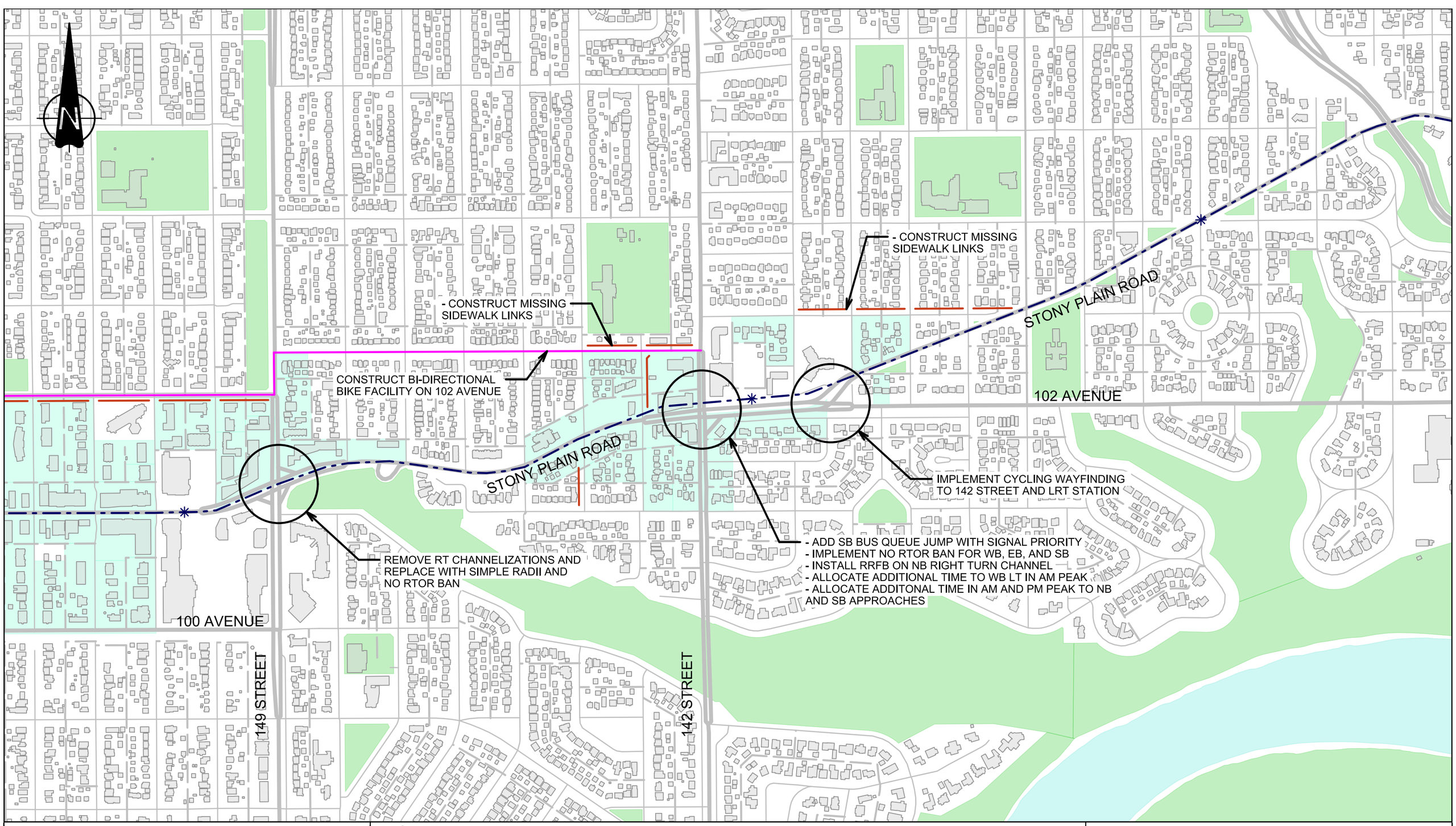
5.2.2 Qualitative Assessment

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**.



Edmonton

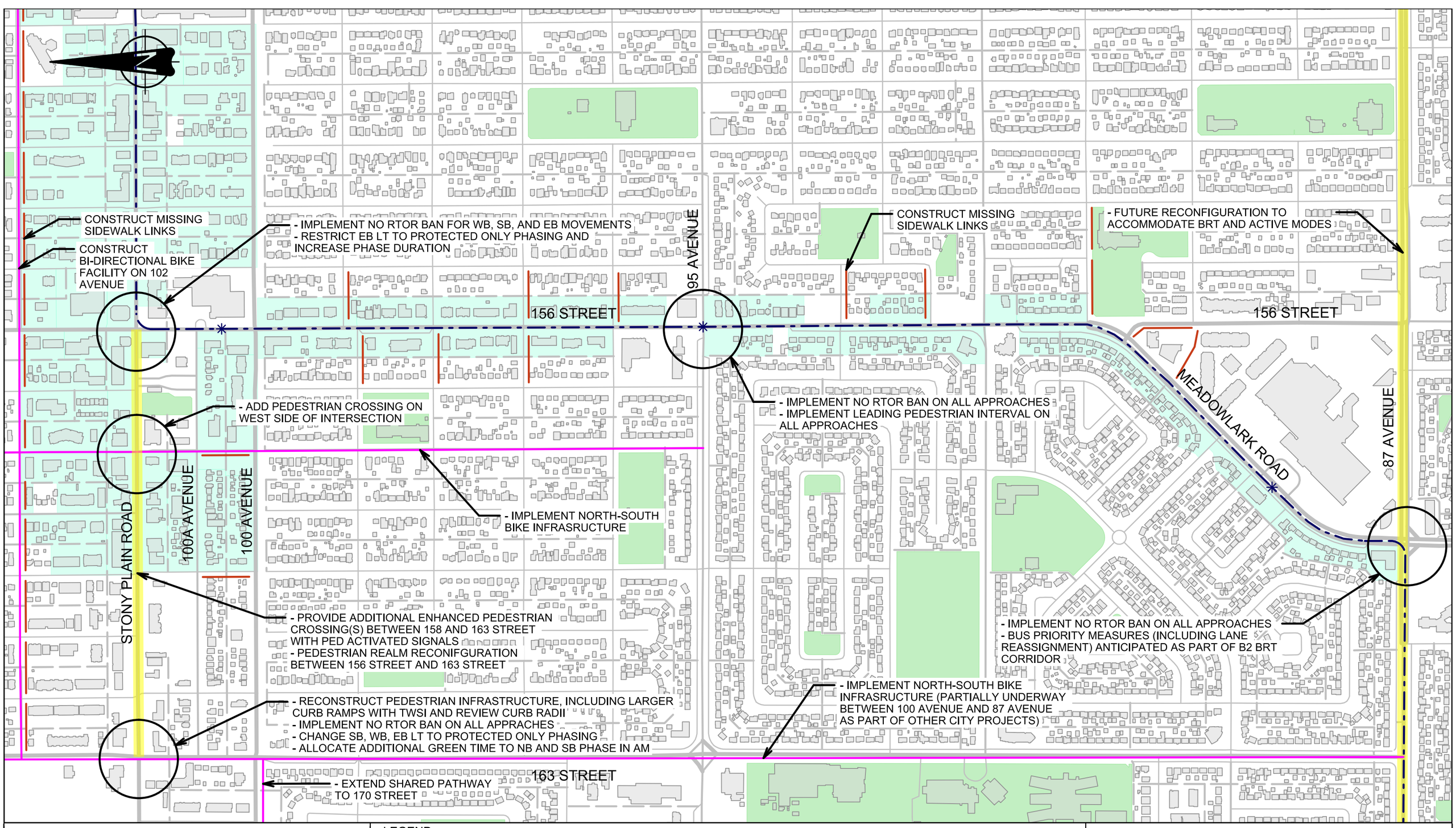
CIMA+

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)

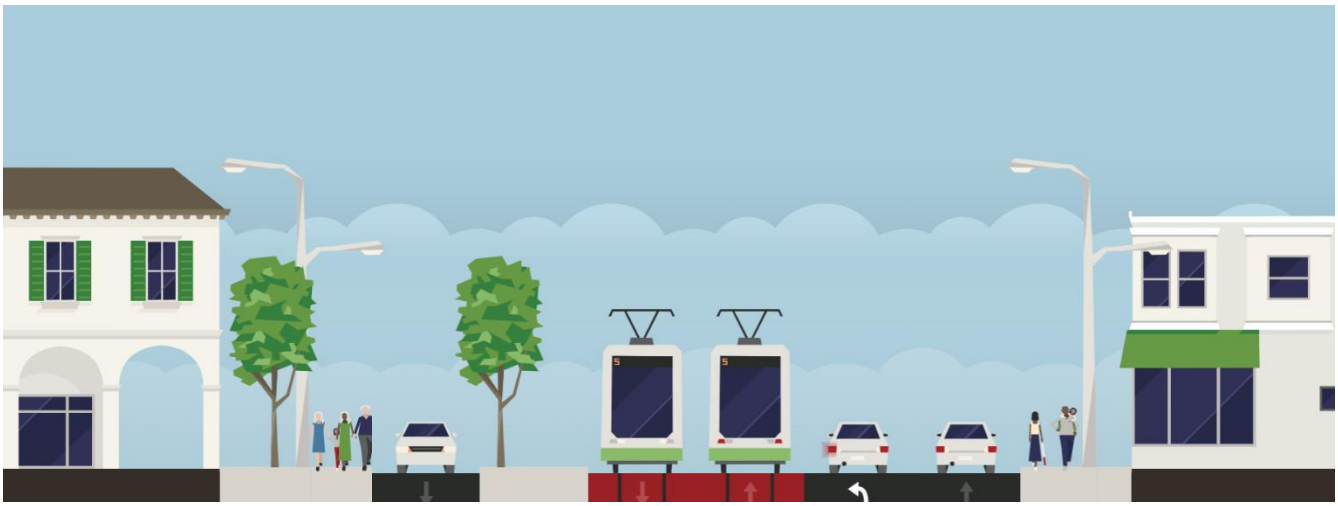


Figure 5-63 Stony Plain Road Facing East (West of 149 Street)

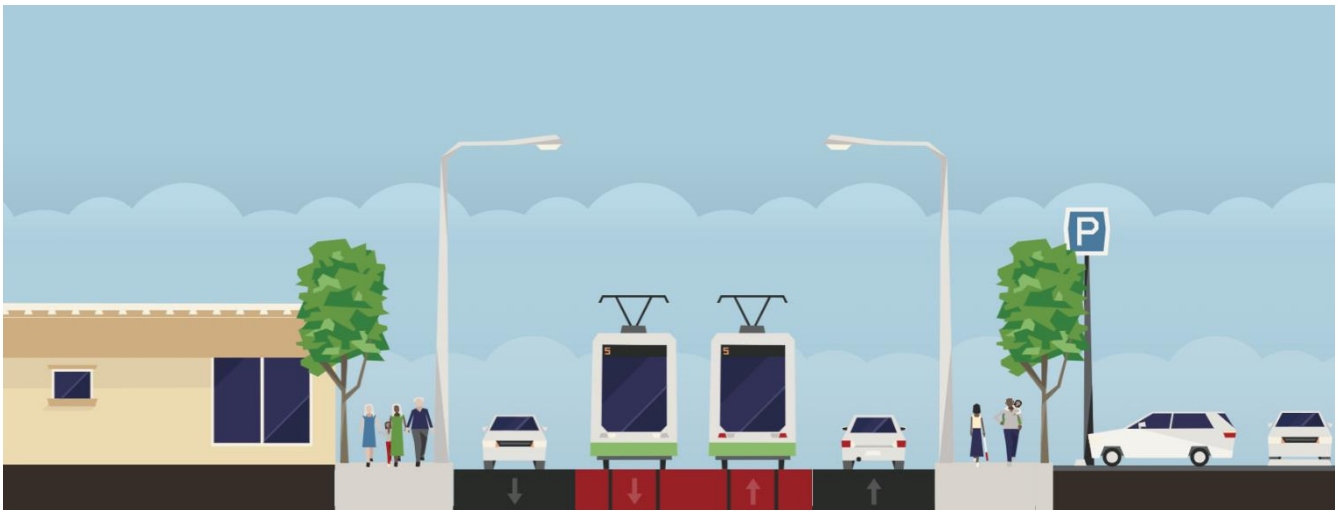


Figure 5-64 Stony Plain Road Facing East (East of 156 Street)

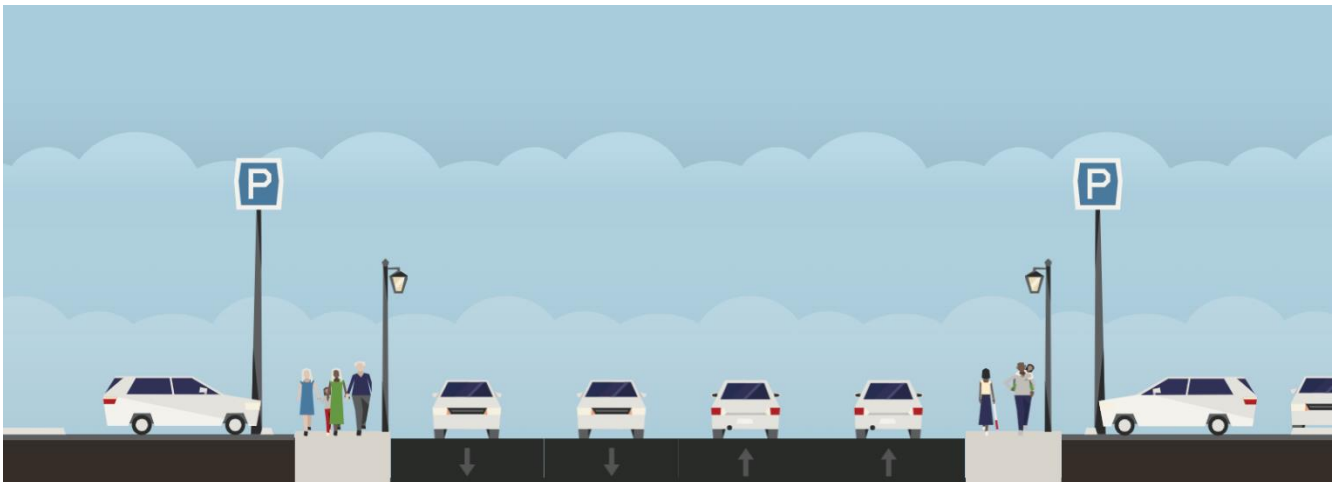


Figure 5-65 Stony Plain Road Facing East (West of 158 Street)

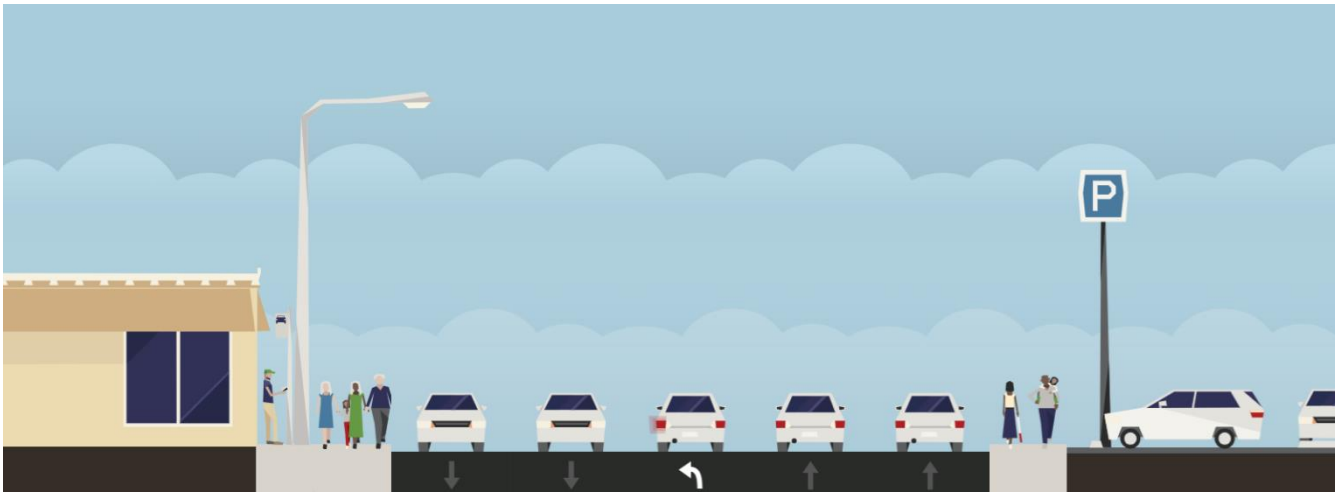


Figure 5-66 Stony Plain Road Facing East (West of 163 Street)

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.**

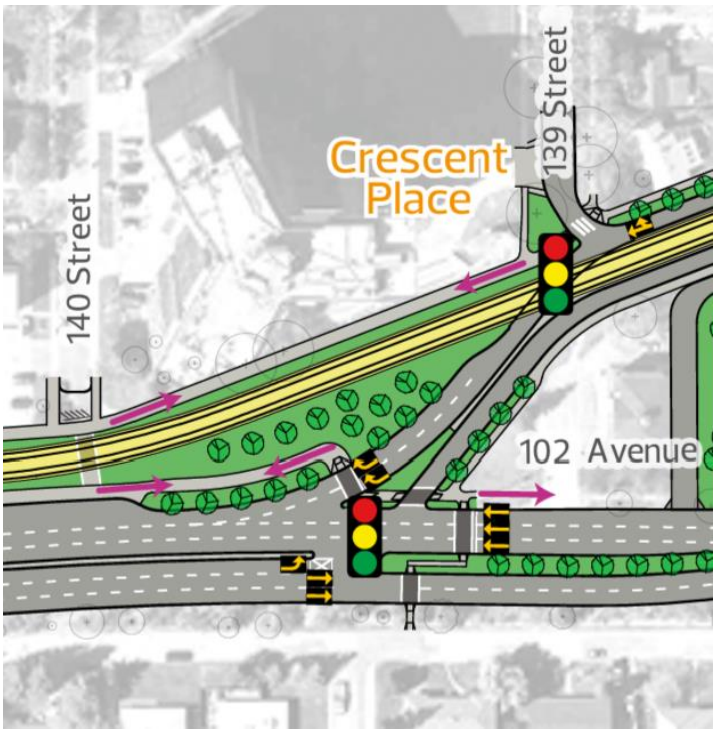


Figure 5-68 Stony Plain Road and 102 Avenue

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.**

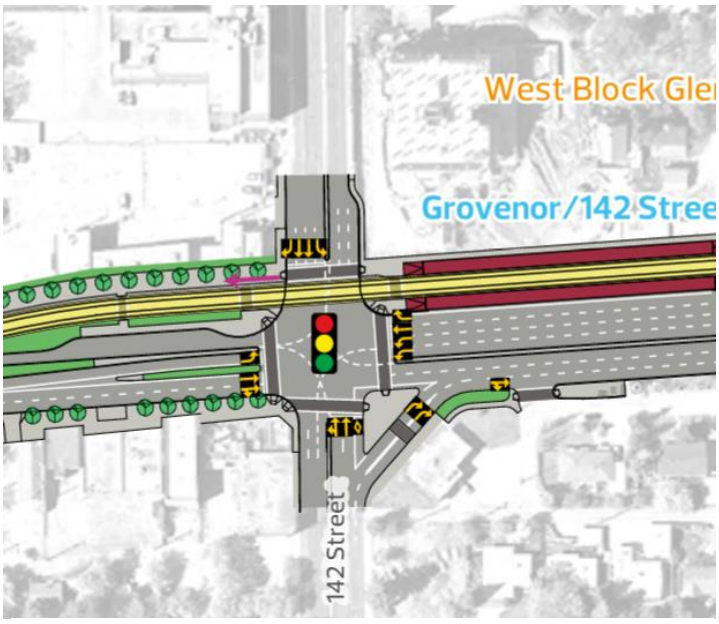


Figure 5-70 Stony Plain Road and 142 Street

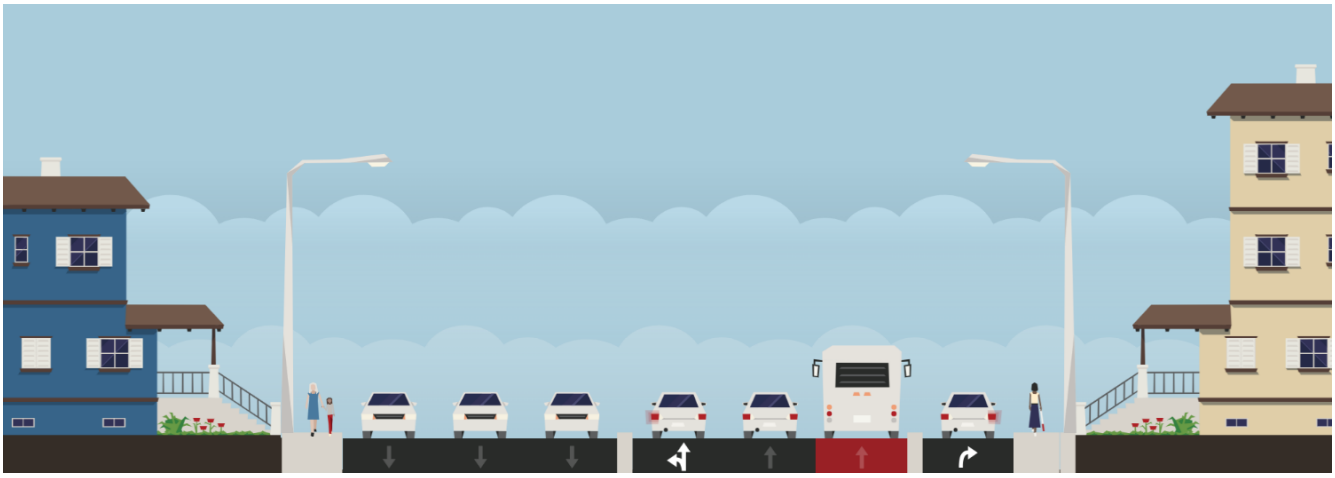


Figure 5-71 142 Street Facing North

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

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 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.			
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 and transit MMLOS, we recommend:			

- 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.

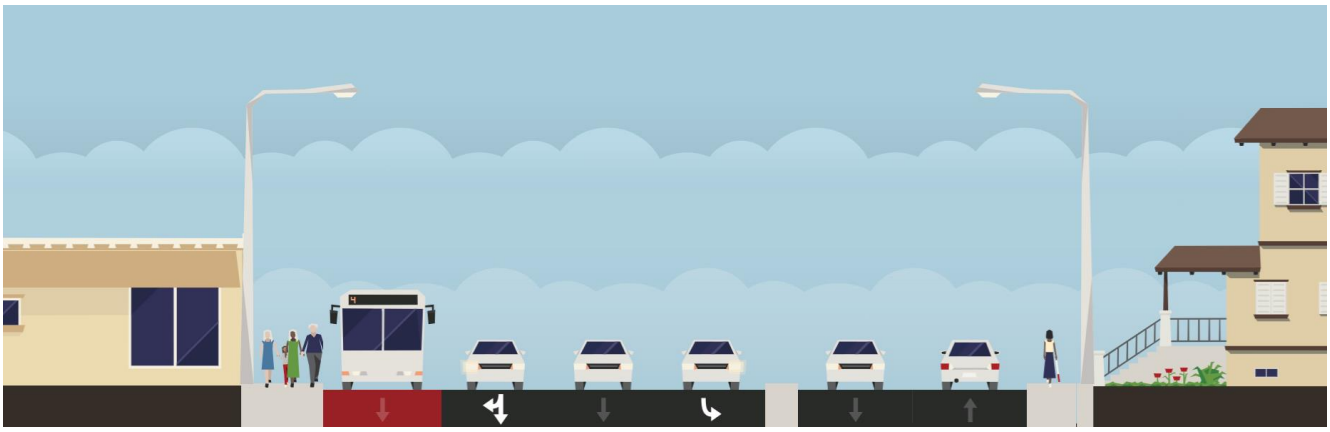


Figure 5-72 Proposed 142 Street Cross Section

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.**

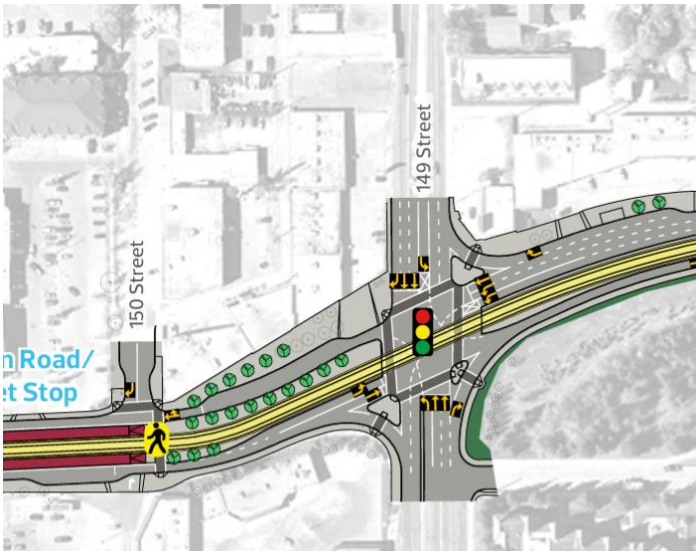


Figure 5-73 Stony Plain Road and 149 Street

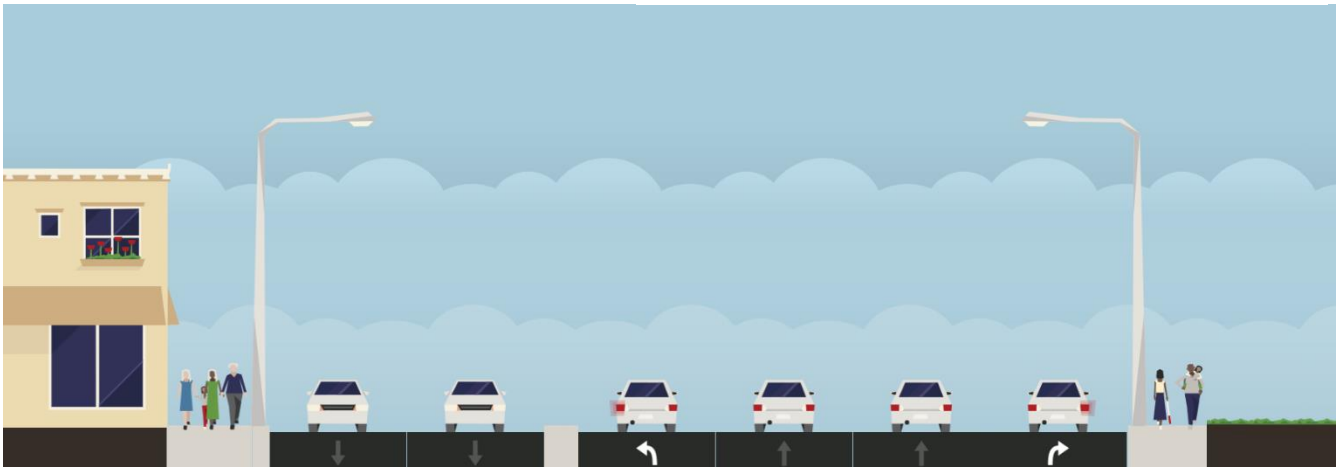


Figure 5-74 149 Street Facing North

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.**

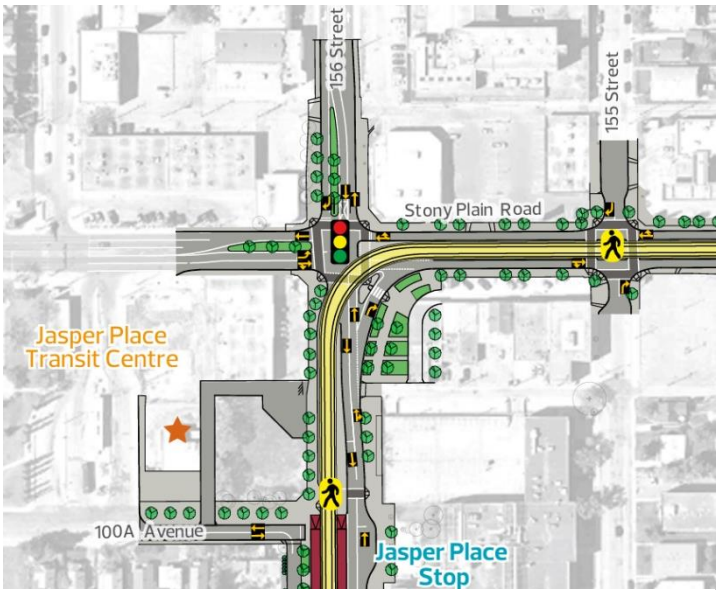


Figure 5-76 Stony Plain Road and 156 Street

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.**

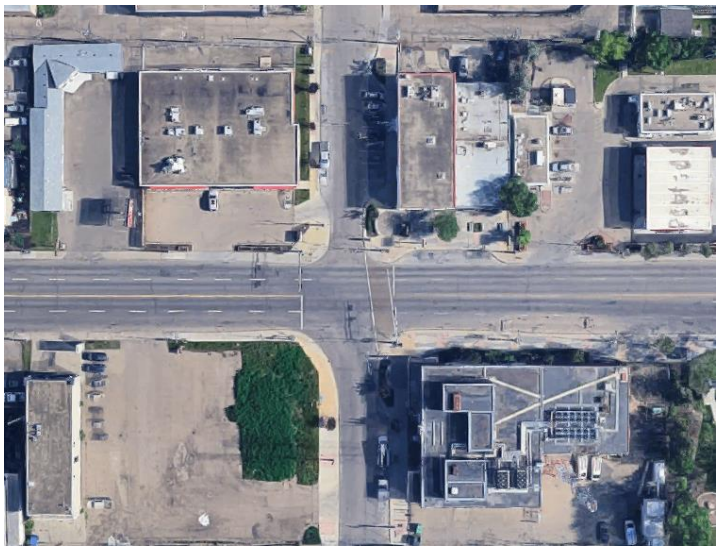


Figure 5-78 Stony Plain Road and 158 Street

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

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 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.			
Post-Development with Improvements Intersection Performance	✓	✓	✓	✓
Recommended Treatment	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.			

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.**

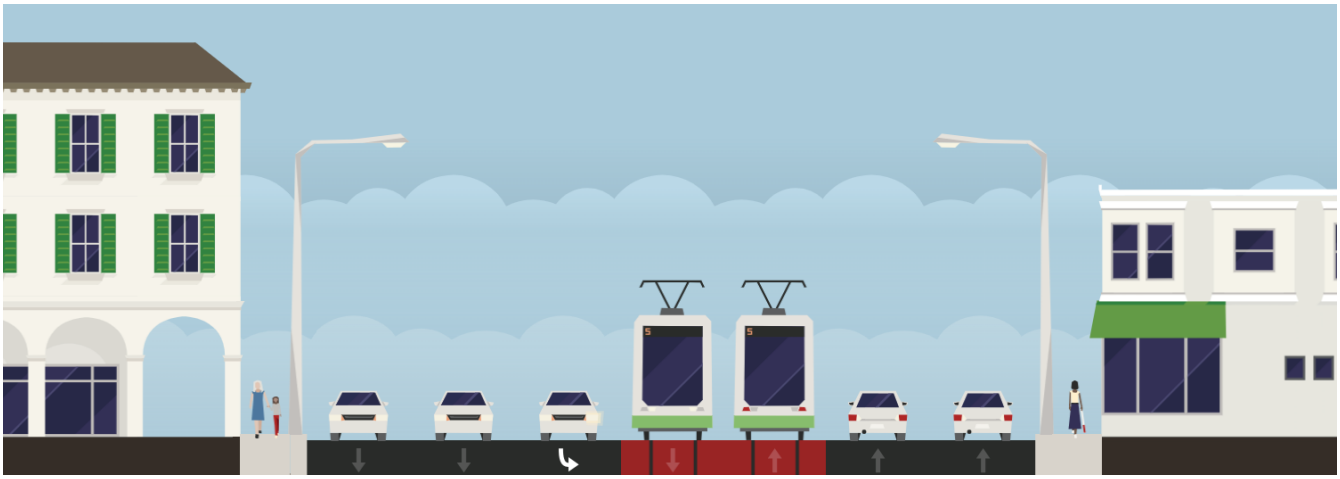


Figure 5-82 Meadowlark Road Facing North (North of 87 Avenue)

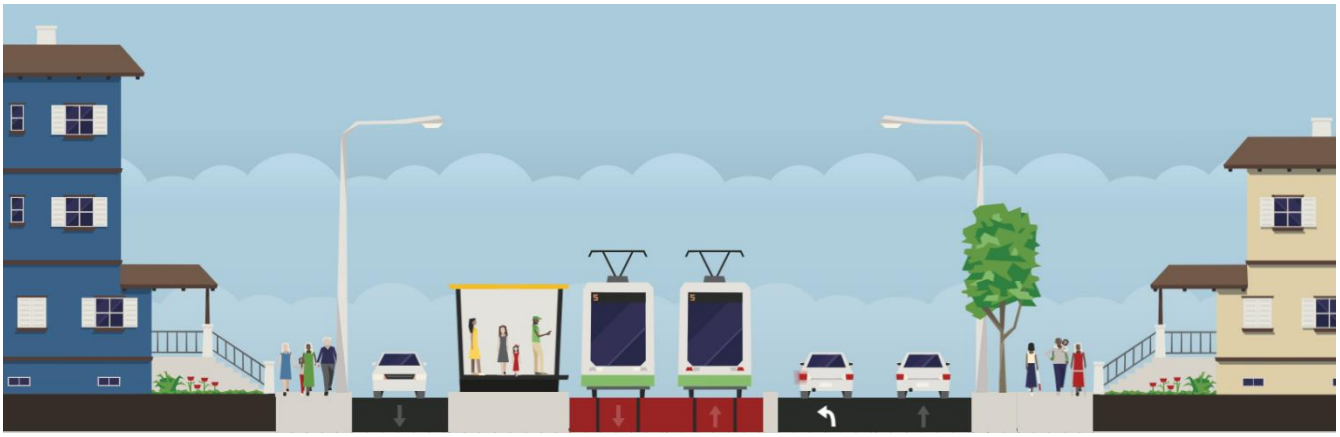


Figure 5-83 156 Street Facing North (South of 95 Avenue)

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.**

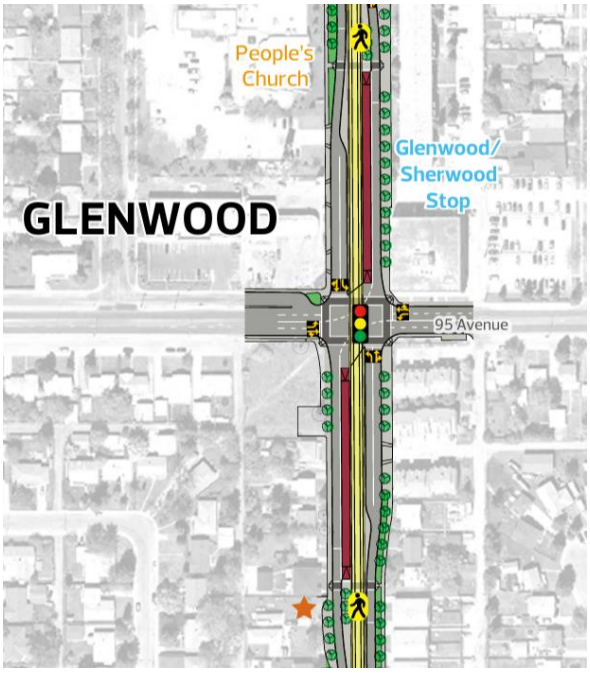


Figure 5-85 156 Street and 95 Avenue

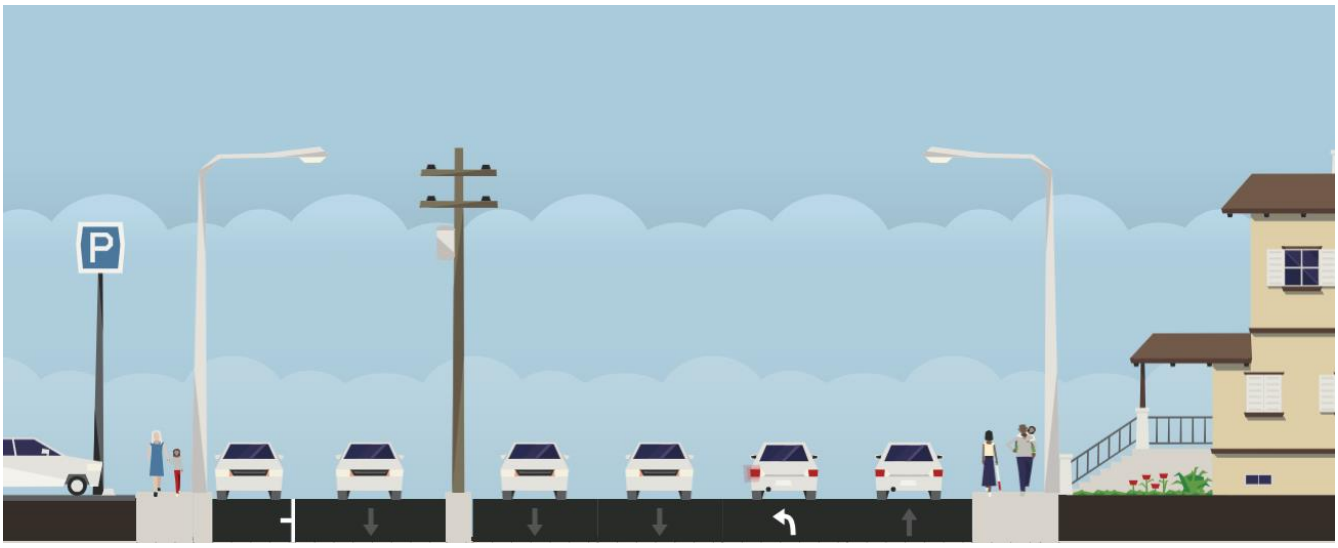


Figure 5-86 95 Avenue Facing East

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

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	✗	✗	✓	✓
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 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.			
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 movements on all approaches. • Implementing LPIs on all pedestrian phases in both peak periods to prioritize pedestrian movement. To address the cycling MMLOS:			

	• 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**.

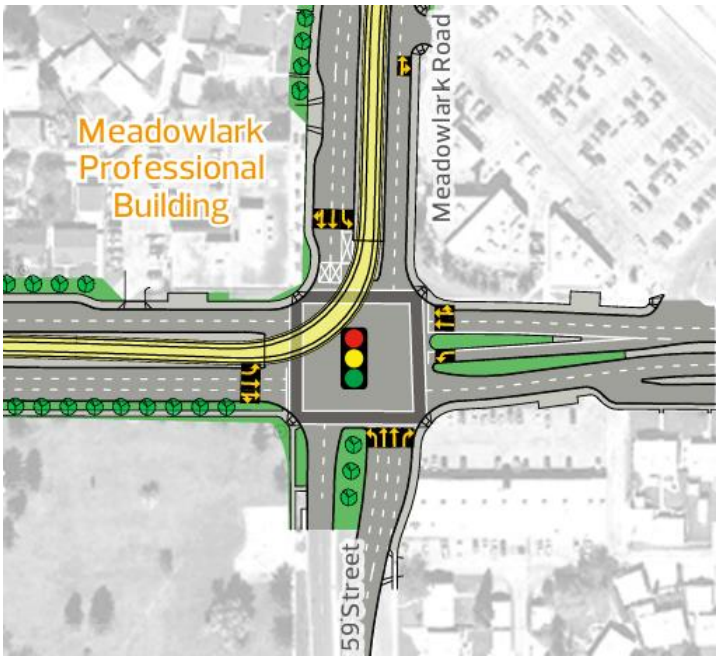


Figure 5-87 110 Street and 87 Avenue

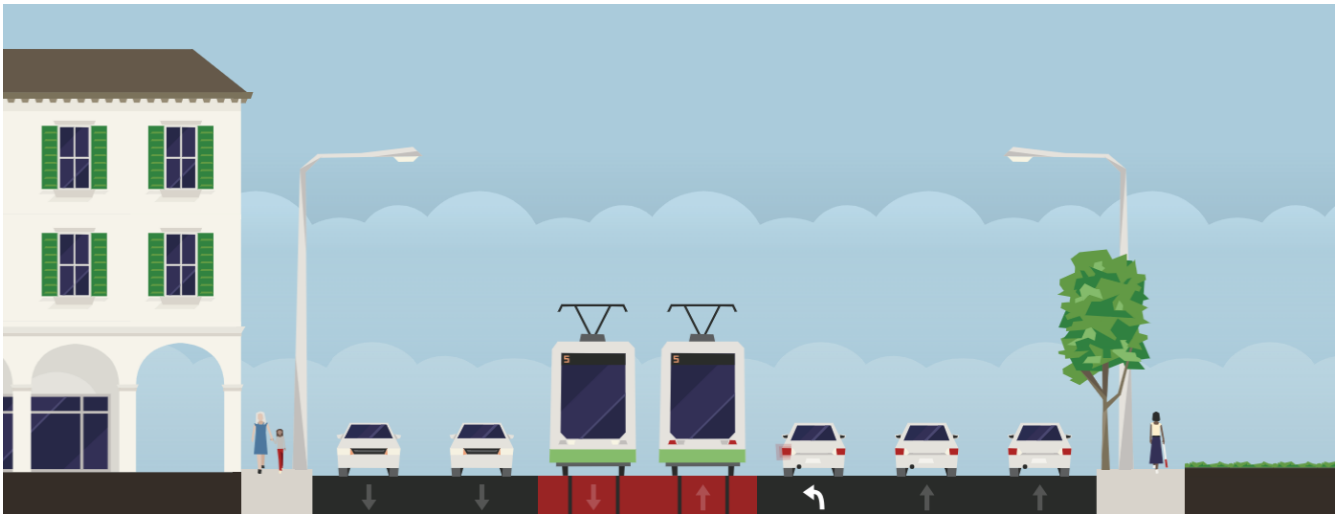


Figure 5-88 87 Avenue Facing East

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.

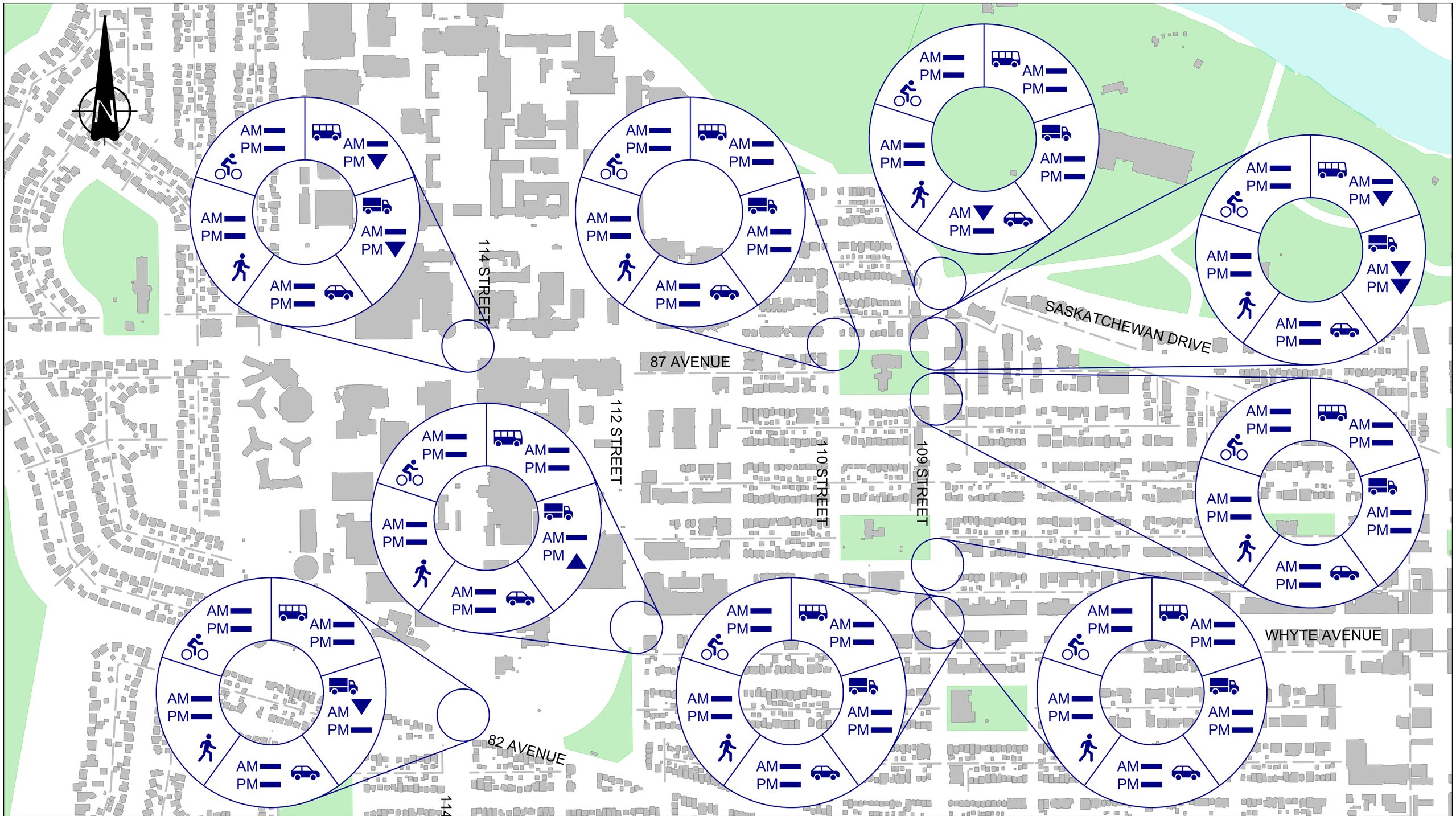
Table 5.51 Traditional LOS 109 Street and 100 Avenue

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

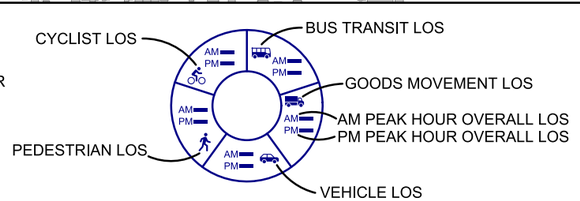
Each intersection within the University-Garneau PGA was assessed in PTV Vistro using HCM 7th Edition, then exported into the OTC MMLOS toolkit to better weight the operations and experiences of vehicle delay against all multimodal travel. Detailed HCM LOS and MMLOS tables are included in **Appendices 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**.



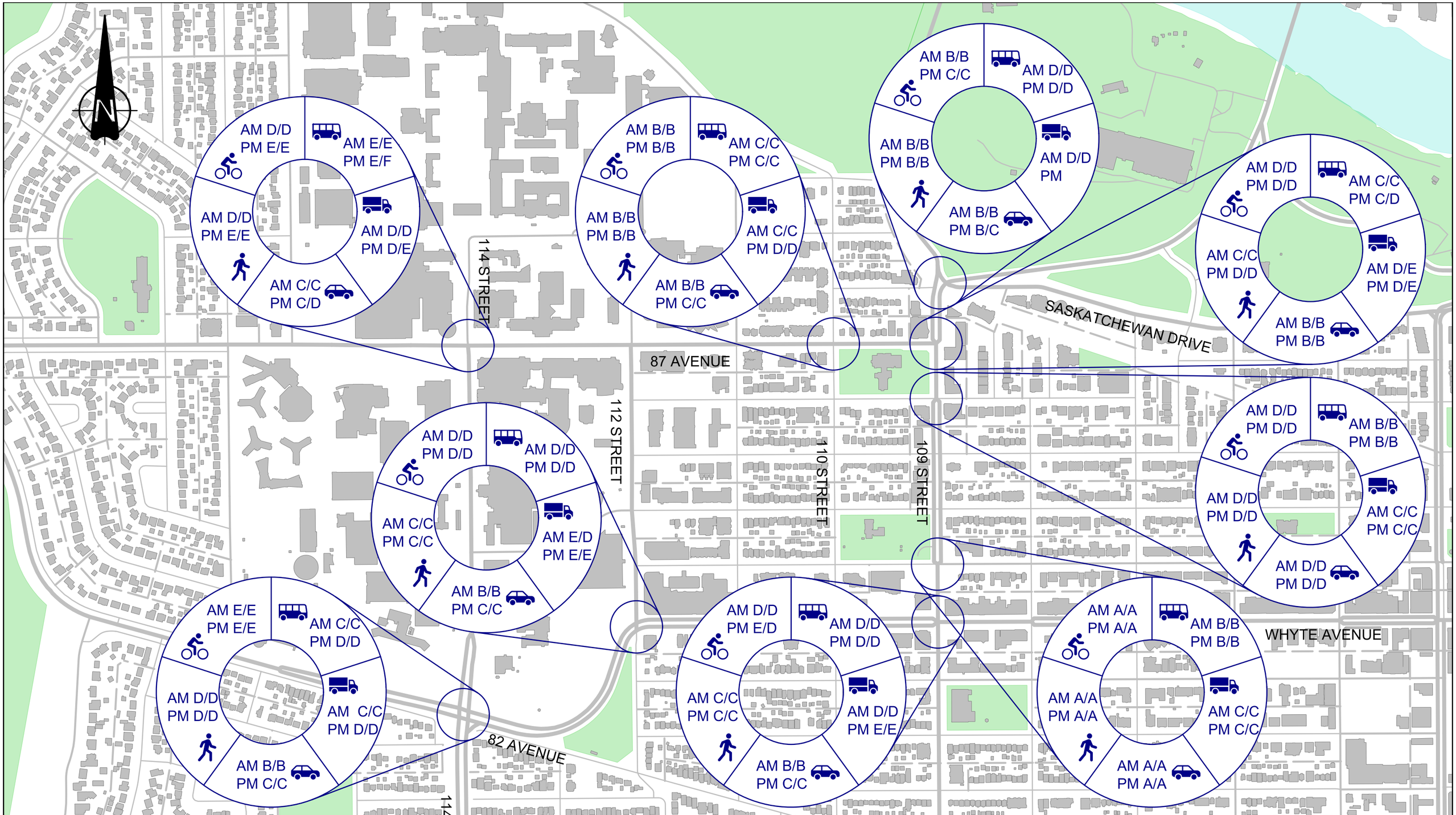
LEGEND

- 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

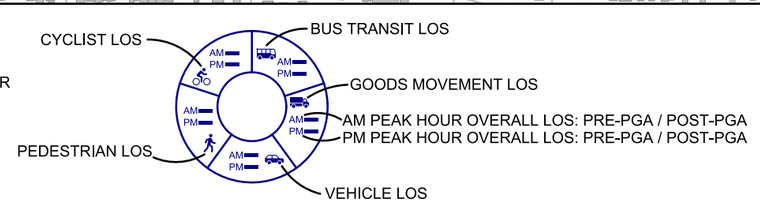


FIGURE 5-90 GARNEAU PRIORITY GROWTH AREA POST DEVELOPMENT MMLOS RESULTS

5.3.1 Recommended Mobility Assessment

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

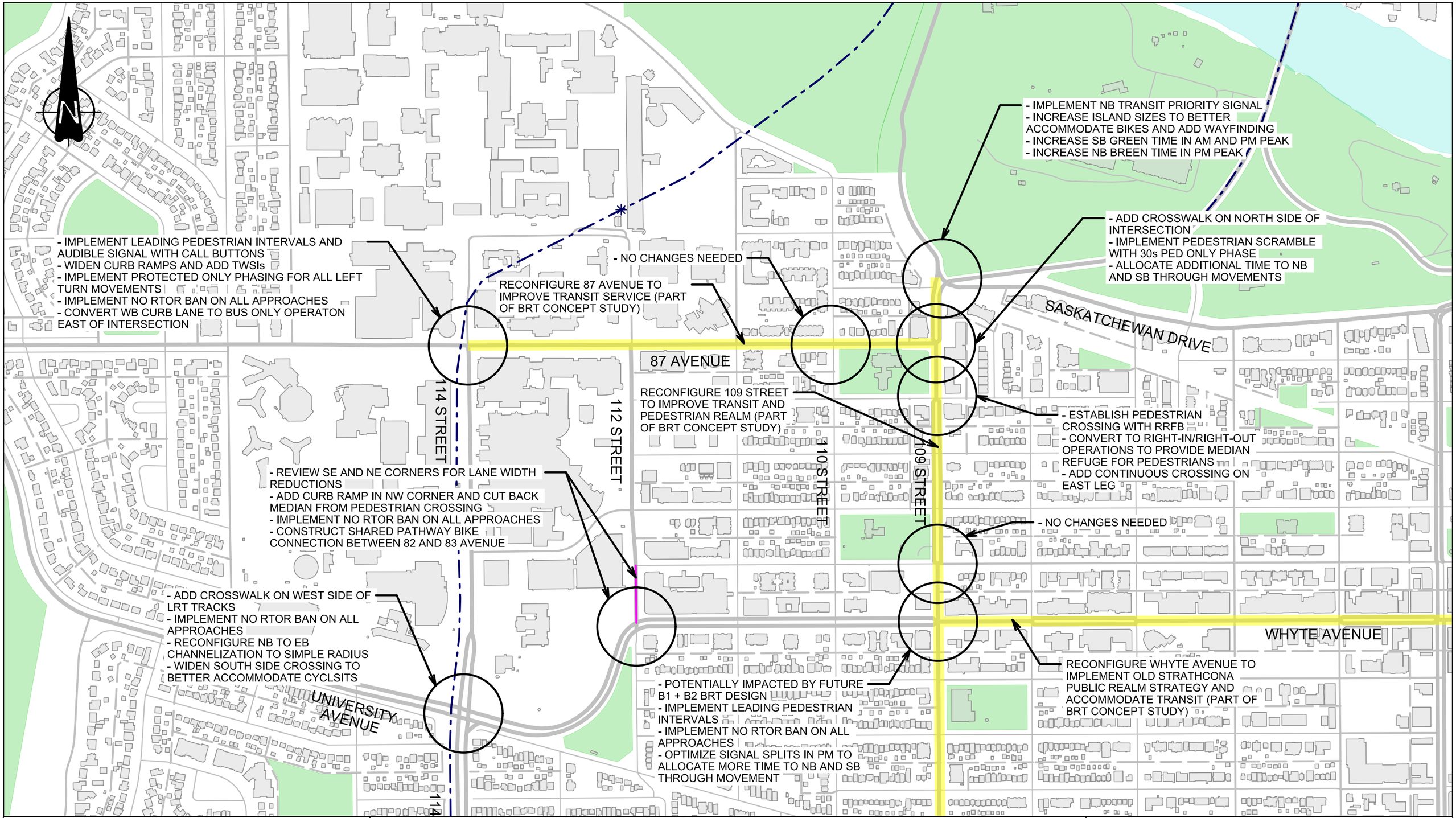
5.3.2 Qualitative Assessment

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**.

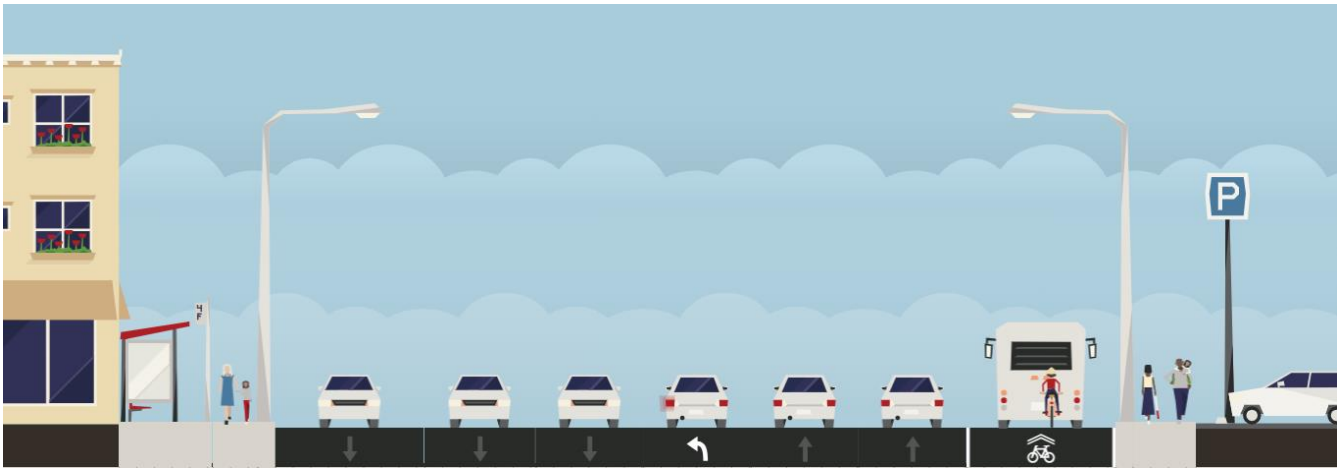


Figure 5-92 109 Street Facing North (South of 82 Avenue)

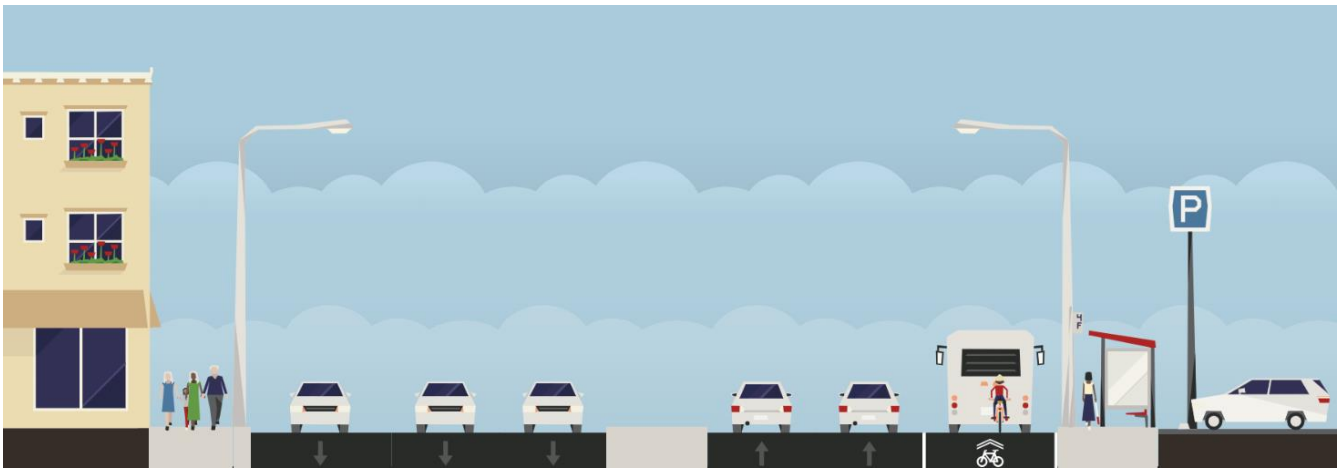


Figure 5-93 109 Street Facing North (South of 83 Avenue)

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

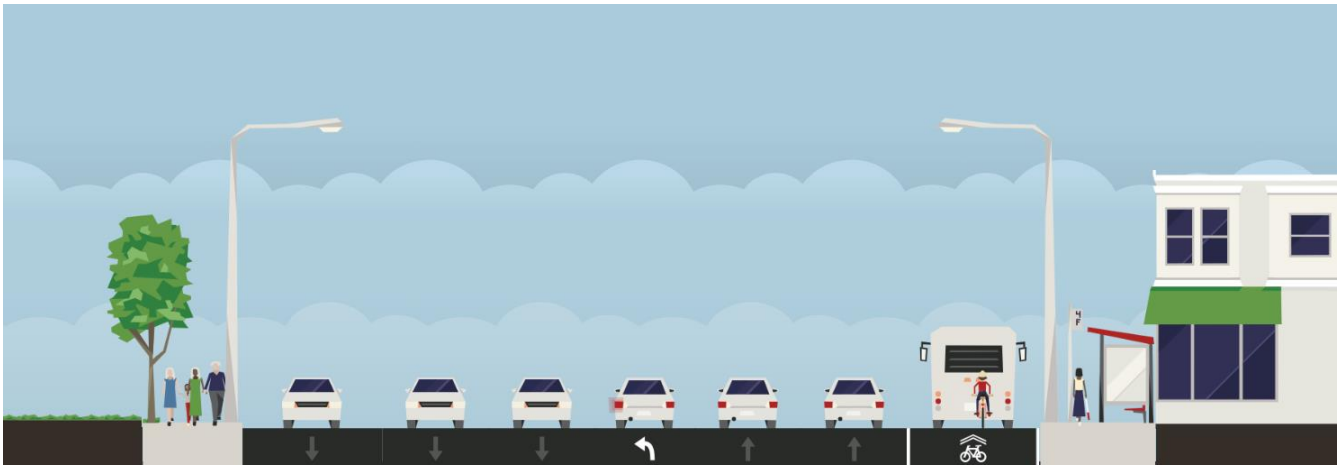


Figure 5-95 109 Street Facing North (South of 87 Avenue)

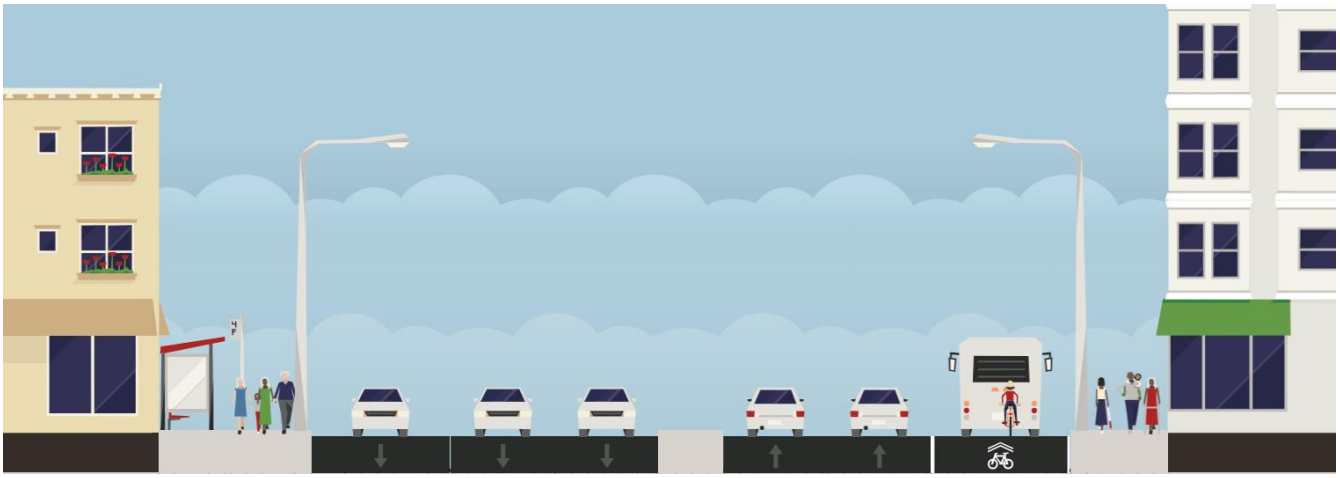


Figure 5-96 109 Street Facing North (South of 88 Avenue)

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)

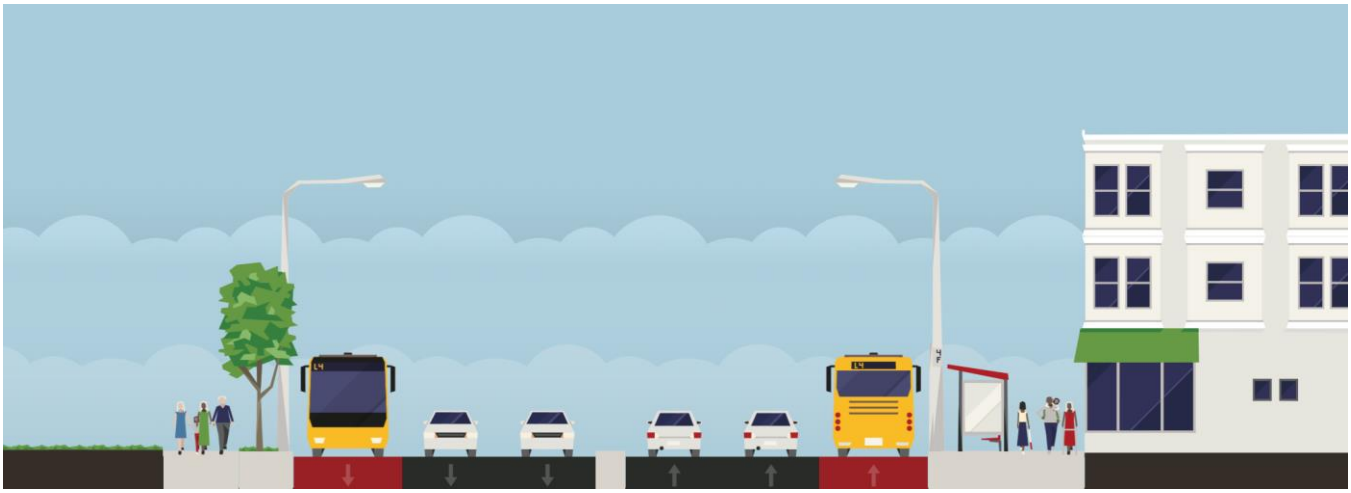


Figure 5-98 Potential 109 Street (Garneau) Corridor with Pedestrian Realm Facing North (82 Avenue to 88 Avenue)

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**.

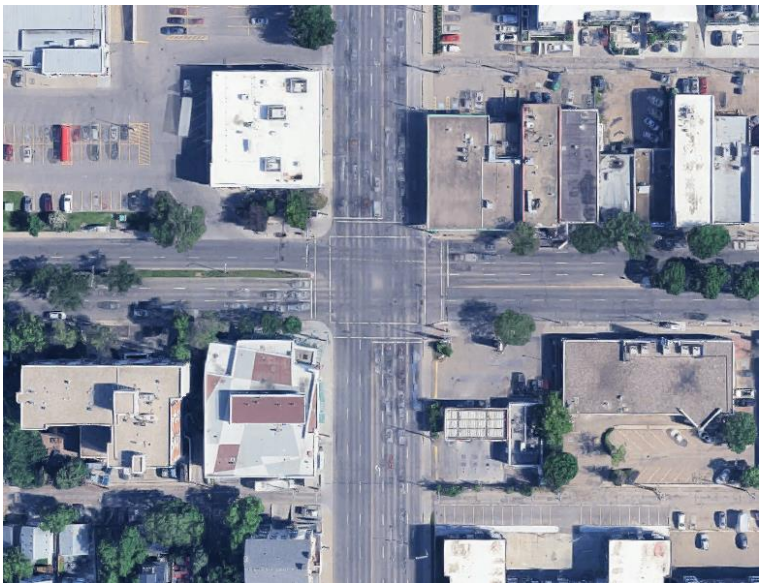


Figure 5-99 109 Street and 82 Avenue

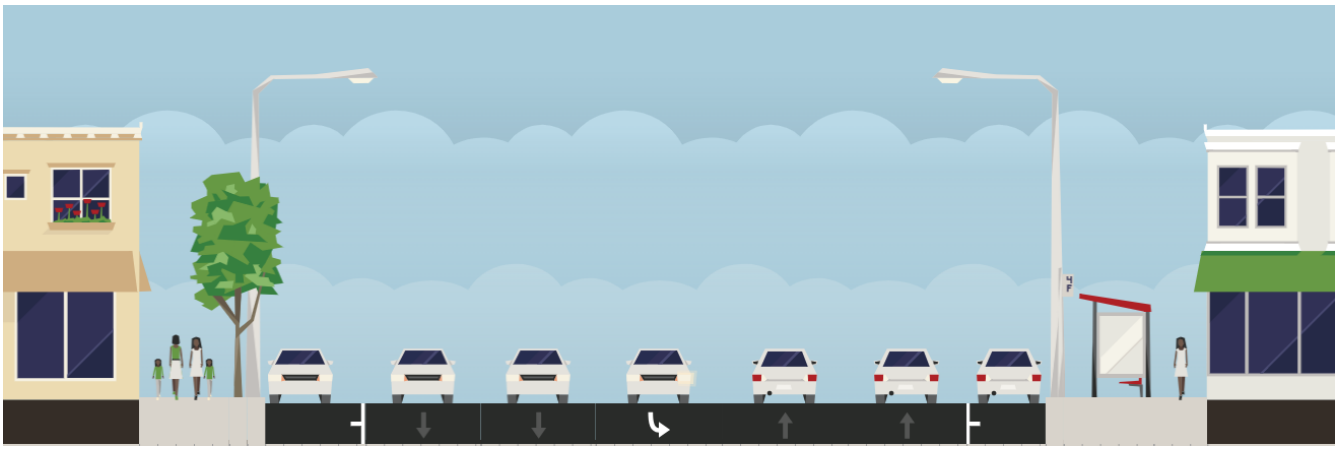


Figure 5-100 82 Avenue Facing East

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

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 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.			
Post-Development with Improvements Intersection Performance	✓	⚠	✓	✓
Recommended Treatment	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.			

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.**

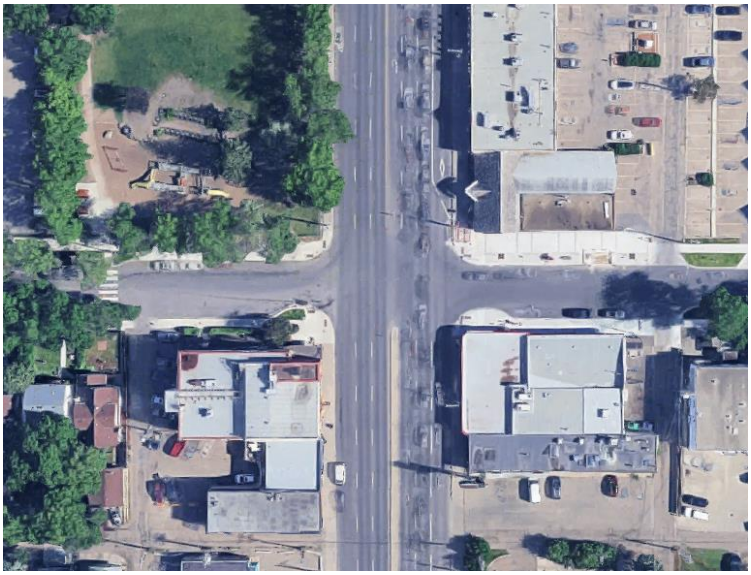


Figure 5-103 109 Street and 86 Avenue

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**.

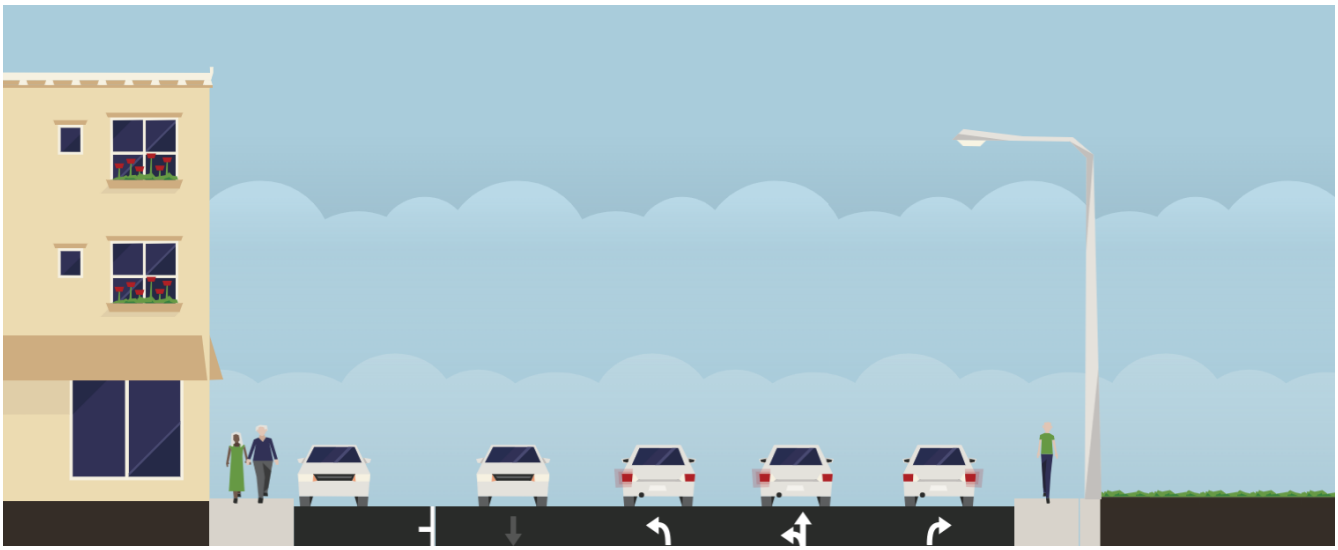


Figure 5-106 87 Avenue Facing East

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**.

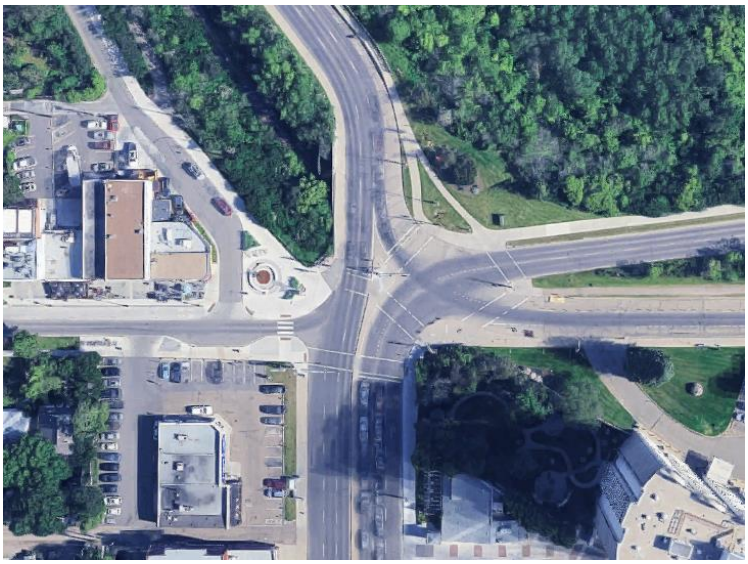


Figure 5-107 109 Street and 88 Avenue

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.

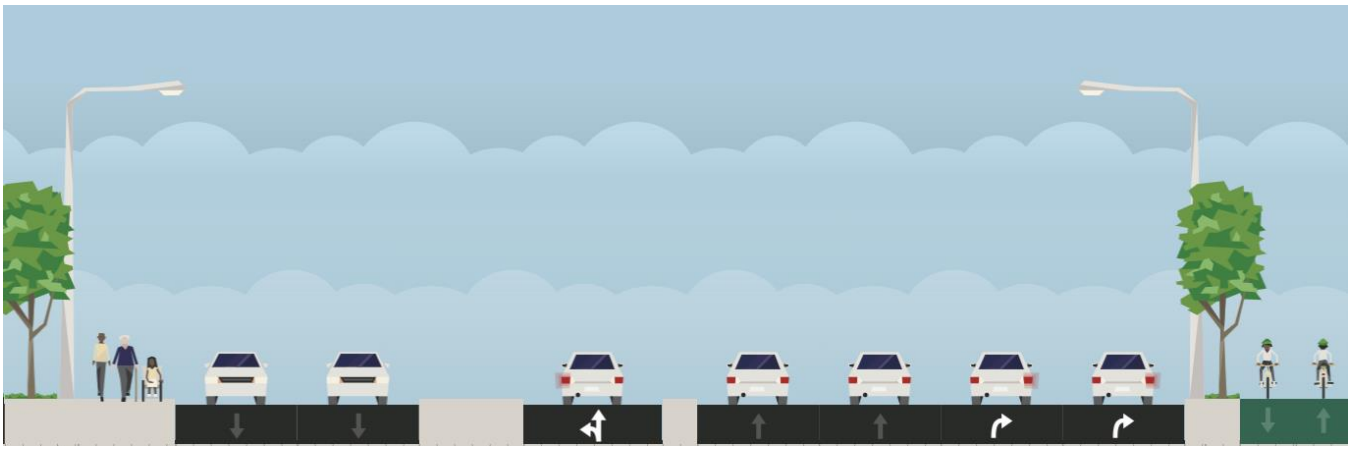


Figure 5-112 University Avenue Facing East

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.**

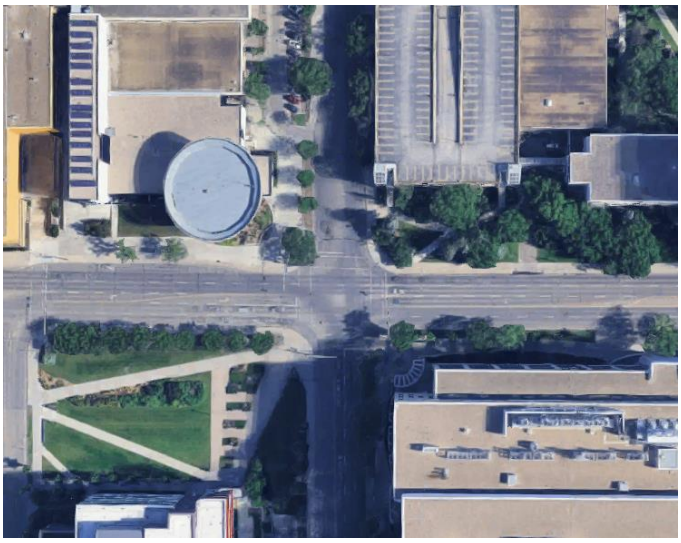


Figure 5-113 114 Street and 87 Avenue

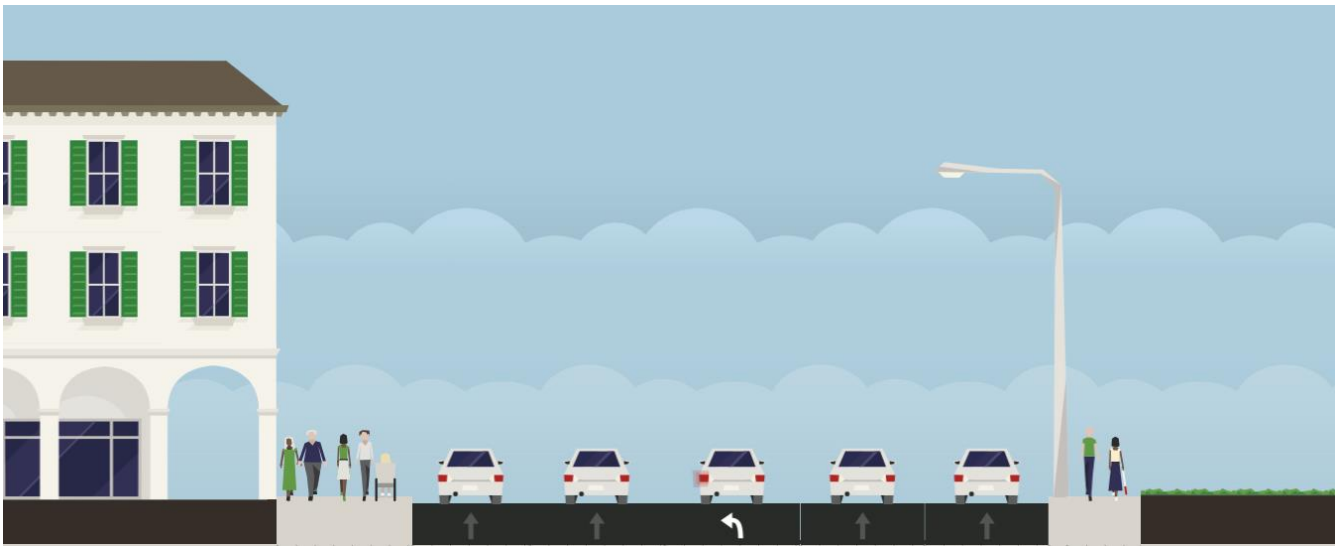


Figure 5-114 87 Avenue Facing East

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

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	✗	⚠	✗	✓
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) 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.			
Post-Development with Improvements Intersection Performance	✓	⚠	✓	✓
Recommended Treatment	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:			

	• 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)

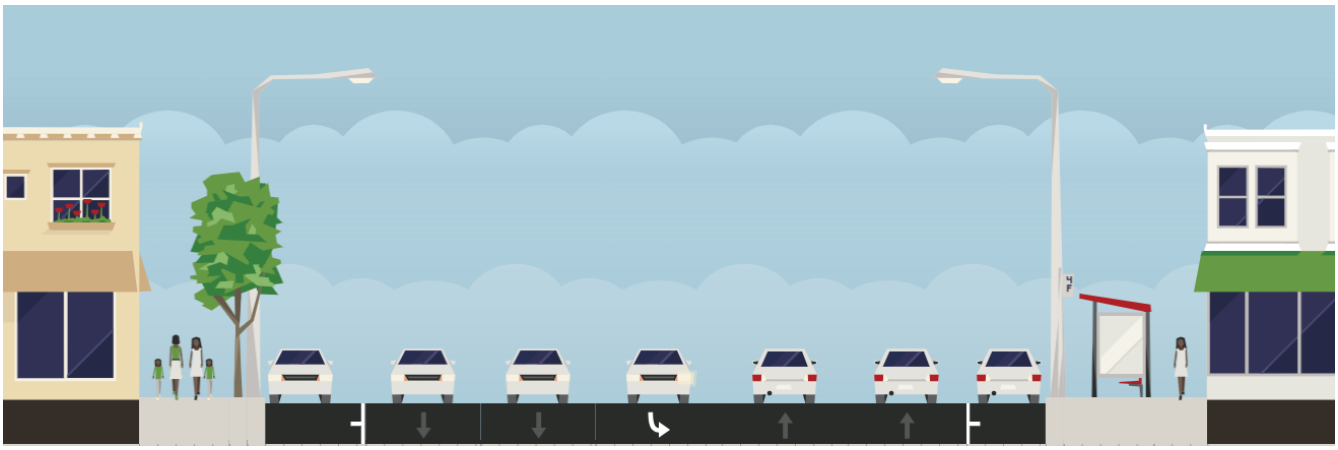


Figure 5-116 82 Avenue Facing East (East of 109 Street)

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.**

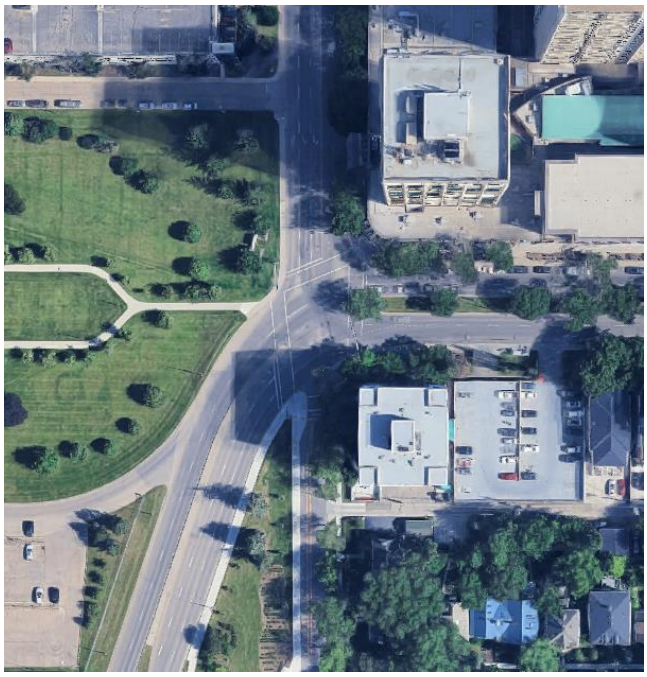


Figure 5-118 112 Street and 82 Avenue

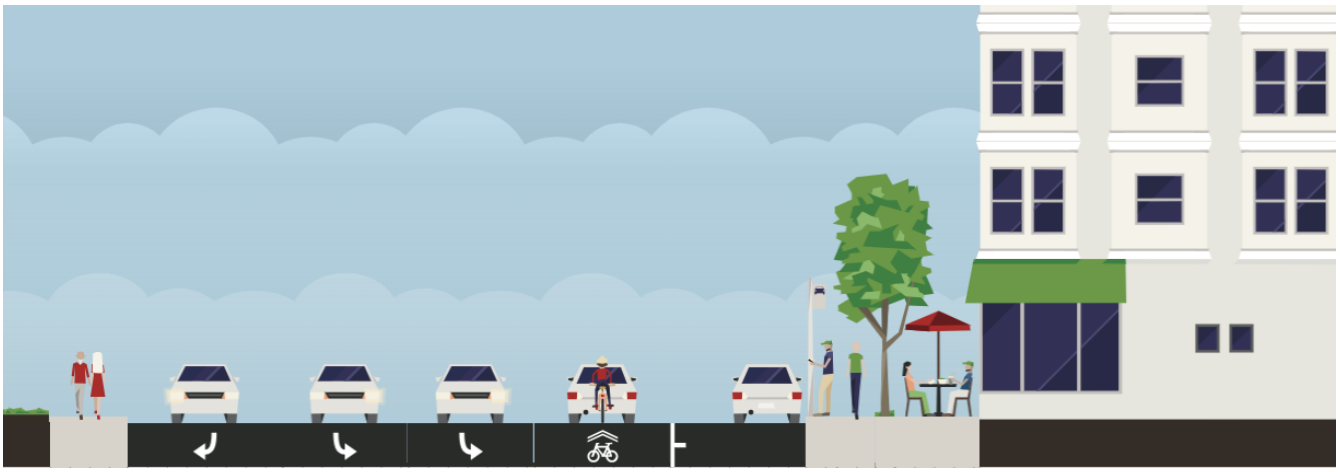


Figure 5-119 112 Street Facing North

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)

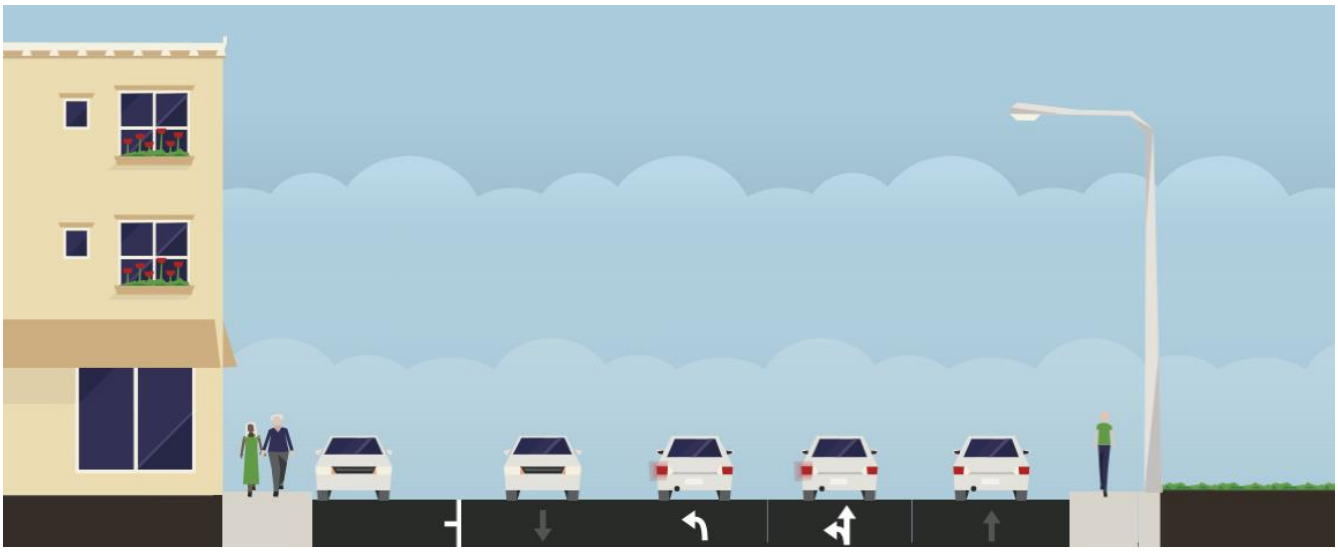


Figure 5-122 87 Avenue Facing East (West of 109 Street)

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

Mode	Pedestrian	Cyclist	Transit	Motor Vehicles
Original Target	LOS C	LOS C	LOS C	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. 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.			

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**.

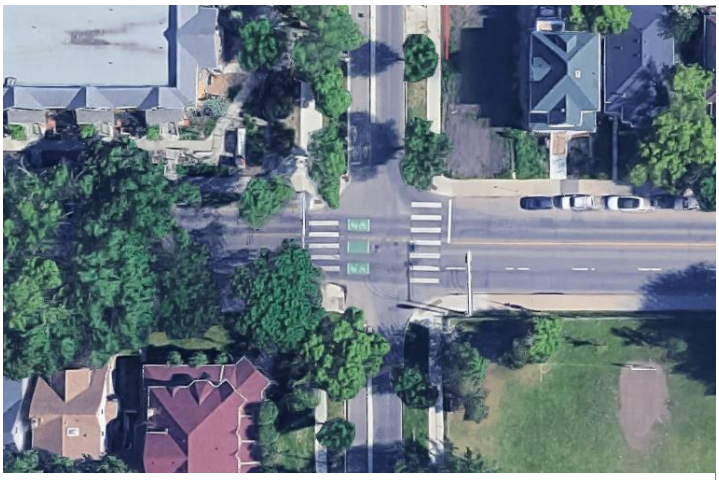


Figure 5-124 110 Street and 87 Avenue

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	**$1,030,000**
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	$1,900,000
Total	**$7,500,000**
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	
		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 (Rounded)	**$60,000**	**Total (Rounded)**	**$150,000**	**Total (Rounded)**	**$840,000**	

***These improvements are anticipated to be explored and potentially constructed with Wîhkwêntôwin neighbourhood renewal and therefore costs have not been estimated.

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
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	Extension of the 100 Avenue Shared Pathway to 170 Street
99 Avenue E 156 Street	$60,000	Stony Plain Road / 163 Street	$145,000	90 Ave E Meadowlark Rd	$55,000	
99 Avenue W 156 Street	$60,000	156 Street / 95 Avenue	$5,000	156 Street S. Meadowlark Rd	$65,000	Extension of cycling facilities on 153 Street and 163 Street
98 Avenue W 156 Street	$60,000	Meadowlark Road / 159 Street / 87 Avenue ** / ****	$5,000			
97 Avenue E 156 Street	$60,000			Intersection Improvements:		Reconfiguration of 87 Avenue to accommodate future BRT and active modes.****
97 Avenue W 156 Street	$60,000			Stony Plain Road / 149 Street**	$3,000,000	
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					
Total	**$760,000**	**Total**	**$500,000**	**Total**	**$6,240,000**	

**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 / 114 Street	$675,000	
		109 Street / 86 Avenue****	$80,000	109 Street / 83 Avenue****	$330,000	Reconfiguration of 109 Street from 61 Avenue to Walterdale Hill Road/Saskatchewan Drive to improve transit and pedestrian realm****
		87 Avenue / 114 Street	$65,000	109 Street / 87 Avenue****	$75,000	
				Saskatchewan Drive / 109 Street / Walterdale Hill Road Intersection****	$350,000	Reconfiguration of 87 Avenue to improve transit service****
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.

A

Appendix A
HCM Analysis: Pre-Development

B

Appendix B
MMLOS Analysis: Pre-Development

C

Appendix C
HCM Analysis: Post Development without Improvements

D

Appendix D
MMLOS Analysis: Post Development without Improvements

E

Appendix E
HCM Analysis: Post Development with Improvements

F

Appendix F
MMLOS Analysis: Post Development with Improvements

G

Appendix G
Existing Corridor MMLOS

H

Appendix H
Recommended Corridor MMLOS

Appendix I
HCM Sensitivity Analysis – AM Peak

J

Appendix J
HCM Sensitivity Analysis – PM Peak

K

Appendix K
Cost Estimates