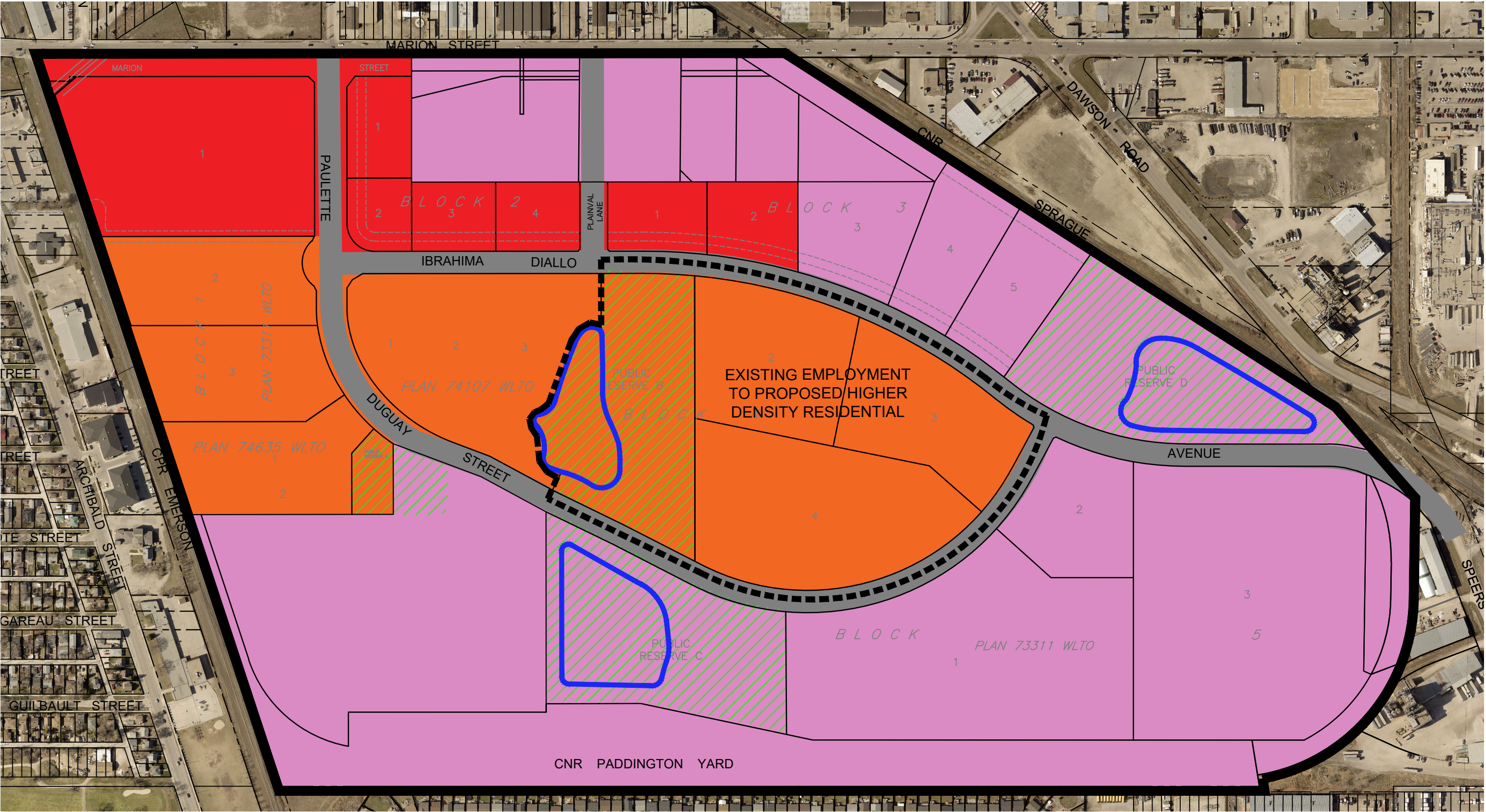


Table 1 - Proposed Policy Amendments

Public Markets Secondary Plan

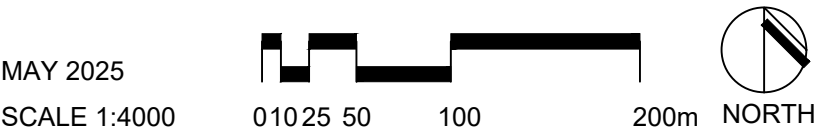
May 5, 2025

Policy	Proposed Amendments
Policy 3.2.2.9	
New residential development shall be setback 300 metres (984.25 feet) from any “M3” Manufacturing Heavy zoning district outside the planning area, except for lands located directly across Marion Street to the north, where new residential development shall be setback 150 metres (492.13 feet) from any other Manufacturing-zoned industrial lands. Setback distances shall be measured from the nearest property line to nearest property line.	New residential development shall be setback 300 metres (984.25 feet) from any “M3” Manufacturing Heavy zoning district outside the planning area. Except for a. lands located directly across Marion Street to the north b. lands located within the area bounded by Sprague line, east property line of 864 Marion Street (WFPS Station No.9), Marion Street and Dawson Road where new residential development shall be setback 150 metres (492.13 feet) from any other Manufacturing-zoned industrial lands. Setback distances shall be measured from the nearest property line to nearest property line.
Policy 3.3.3.13b.	
A 300 metre setback from the Paddington Yard. The setback distance shall be measured from the nearest Paddington Yard property line to the closest location of a habitable room or space within a dwelling.	A 300 150 metre setback from the Paddington Yard . The setback distance shall be measured from the nearest Paddington Yard property line to the closest location of a habitable room or space within a dwelling.
Policy 3.3.2.14	
New Residential zoning districts shall be setback 300 metres (984.25 feet) from any “M3” Manufacturing Heavy zoning district outside the planning area, except for lands located directly across Marion Street to the north, where new Residential zoning districts shall be setback 150 metres (492.13 feet) from any other Manufacturing-zoned industrial lands. Setback distances shall be measured from the nearest property line to nearest property line.	New Residential zoning districts shall be setback 300 metres (984.25 feet) from any “M3” Manufacturing Heavy zoning district outside the planning area. Except for a. lands located directly across Marion Street to the north b. lands located within the area bounded by Sprague line, Marion Street and Dawson Road where new Residential zoning districts shall be setback 150 metres (492.13 feet) from any other Manufacturing-zoned industrial lands. Setback distances shall be measured from the nearest property line to nearest property line.
Policy 8.2.2	
Up to 1,200 dwelling units may be permitted within Phase 1 with collector road access to Marion Street, generally located across from Dupuy Avenue, and access at the northern terminus of and connected to Speers Road. Up to 2,000 dwelling units may be permitted in the planning area following the successful implementation of a predictive rail crossing blockage alert system, or some alternate solution, to the satisfaction of the Chief of the Winnipeg Fire and Paramedic Service, the Director of Public Works and the Director of Planning, Property and Development.	Up to 1,200 dwelling units may be permitted within Phase 1 with collector road access to Marion Street, generally located across from Dupuy Avenue, and access at the northern terminus of and connected to Speers Road. Up to 2,000 2800 dwelling units may be permitted in the planning area following the successful implementation of a predictive rail crossing blockage alert system, or some alternate solution, to the satisfaction of the Chief of the Winnipeg Fire and Paramedic Service, the Director of Public Works and the Director of Planning, Property and Development.



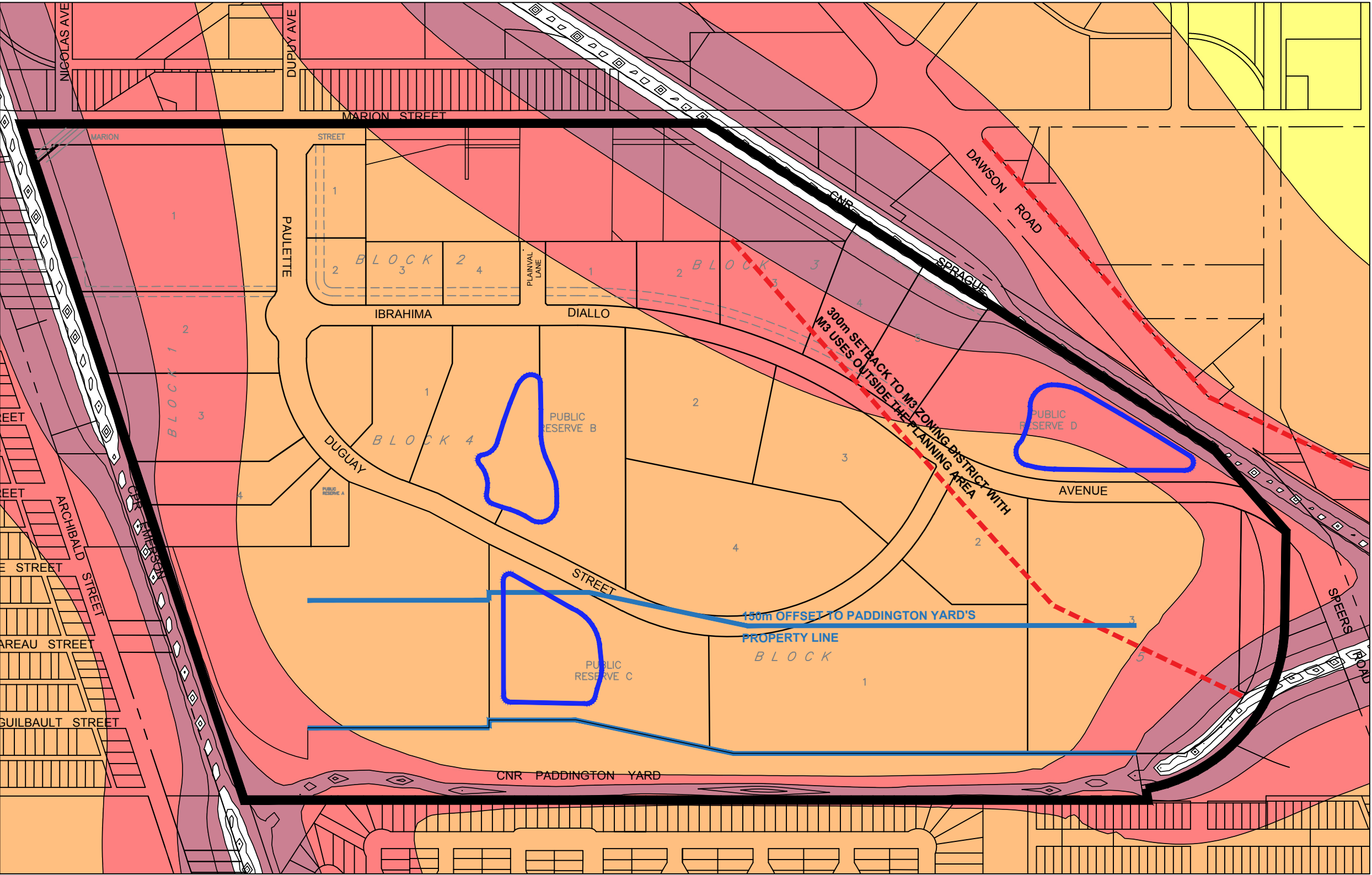
PUBLIC MARKETS MRS D - WATER TOWER DISTRICT

MAP 1 - APPENDIX A - MODIFIED LAND USE AND TRANSPORTATION MAP



LEGEND





- RAIL TRAFFIC NOISE IMPACT AREA
(WORST-CASE DAY TIME LEVELS)
- LEVEL 1 No noise control measures required.
See IOC
 - LEVEL 2 No noise control measures required.
See NCM 6, See IOC
 - LEVEL 3 Noise control measures recommended.
See NCM 1, 3, 4 and 6.
Vibration mitigation measures recommended. See VCM 1, 2, 3, and 4
See IOC
 - LEVEL 4 Noise control measures recommended.
See NCM 2, 3, 4, 5, and 6.
Vibration mitigation measures recommended. See VCM 1, 2, 3 and 4
See IOC

NOISE CONTROL MEASURES (NCM) Apply to residential locations only.

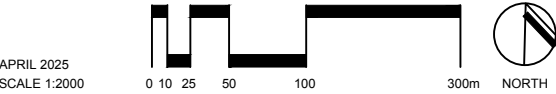
1. Upgraded Glazing Area Level 3 10 Storey highrise, facades with direct line of sight to rail/sleeping quarters STC-31, living/dining rooms STC-30
2. Upgraded Glazing Area Level 4 10 storey high rise, facades with direct line of sight to rail line, sleeping quarters STC-34, living/dining rooms STC-33
3. Non-glazing facade construction requirements acoustical equivalent of STC 54 (Brick veneer or upgraded facade construction)
4. Installation of central air conditioning and Type C warning clause.
5. Acoustical barrier or Type A warning clause for outdoor living areas
6. Inclusion of a CP/CN warning clause regarding the potential for noise and vibration impacts for all residential locations within 300m of the rail line

- VIBRATION MITIGATION MEASURES (VCM)
1. Vibration mitigation measures are required for buildings within 75m of the rail line.
 2. Vibration Mitigation Measures may also be needed outside the 75m setback to meet the applicable criterion of 0.14mm/s maximum.
 3. Vibration mitigation measures such as trenching to isolate source from receiver and isolation pads/isolators for building foundation may be required.
 4. Inclusion of CP/CN warning clause regarding the potential for noise and vibration impacts for all residential locations within 300m of the rail line.

INDUSTRIAL ODOUR CONTROL MEASURES (IOC)

1. Required for all residential location
2. Installation of central air conditioning and inclusion of warning clause regarding the potential for odour emanating from existing industrial land uses outside the planning area

PUBLIC MARKETS (MRS D)
FIGURE 2 - NOISE AND ODOR CONTROL MEASURES



Public Markets Stakeholder Meetings for Proposed SPA February 2025

Two meetings were held to review the proposed secondary plan amendments for the public markets to change the lands in the centre of the development from employment to residential. The presentations included information on:

- The proposed changes
- Review of the existing secondary plan map
- Information on the proposed changes including reducing the setback to M3 along the Sprague line and from the Paddington yards to 150m.
- Supporting reasoning for the changes to the setbacks and the land use
- Supporting reasoning for the increase in density of units

Meeting with Industrial Stakeholders

The meeting for industrial stakeholders was held February 3, 2025 and included 8 people from 5 stakeholders including Enterprises Riel, Star Building, ABC Fire and Safety, Darling Ingredients, and Maple Leaf Foods. The attendees were invited from the list of stakeholders for previous applications on this project through a direct email.

Summary of Questions from the Stakeholders

Q Are there concerns with smells and noise from industrial?

A The policies in the secondary plan for odor and noise mitigation are not changing in the secondary plan. All new residential will need to follow the requirements set out for the existing residential.

Q With residential moving into industrial area does this put industrial land at risk?

A As the site is within a contained area and is adjacent to the central parks we do not feel this will affect the existing industrial any more than the residential already in existence. There are intervening uses in the development of industrial and public reserve to buffer the existing industrial.

Q Will traffic be affected by the increase in residential?

A The project engineers have noted that the residential use will have a reduction of traffic overall from the industrial use and the timing of trips will not be during regular business hours. Also there is no connection to Dawson Road so traffic will not be directed toward those industrial users. On Speers the developer is required to upgrade Speers to Maginot and the Maginot intersection to accommodate the new industrial users. This will not change with this amendment.

Meeting with CN

The meeting with CN was held February 5, 2025 with the CN representative. The same presentation was provided with the addition of the noise and vibration assessment done for the project showing that the area proposed to be residential is no more impacted by noise or vibration than the existing residential in the development.

The comments from the CN representative were focused on CN not accepting the professional noise and vibration study completed by Dillon Consulting that was previously accepted. The representative was generally not in favour of residential development within 300m of any rail facility. Their position is that the Sprague and Emerson lines are actually rail yard lines even though the Rail Association of Canada has classified them as main lines. The meeting was ended with an understanding that CN is not in favour of the proposed amendment.

Conclusions

All information provided by the stakeholders will be taken into consideration. It is understood that there are perceived potential impacts to industrial and rail by residential developments. These are not confirmed impacts but are the perception of the industrial proponents.



MEMO

TO: Oxela Developments
FROM: Eva Kwok, P.Eng. & Ken Wimble, P.Eng. (WSP Canada Inc.)
SUBJECT: Public Markets MRS-D – Updated Trip Generation Analysis for 2025 Site Plan
DATE: March 14, 2025

EXECUTIVE SUMMARY

- The updated site plan for the Public Markets MRS-D development adds 800 multi-family residential units by removing 60,000 sq.ft. of office space and 281,000 sq.ft. of recreational community centre.
- For Phase 1, this results in a change to overall development trip generation of -6% to +8% depending on the time period and direction.
- For Phase 2 (full build-out), this results in a change to overall development trip generation of -23% to +1% depending on the time period and direction.
- The Phase 1 and Phase 2 (full build-out) transportation infrastructure modifications recommended in the 2024 TIS (*Public Markets MRS-D, Traffic Impacts Study Update, Revision 1, May 3, 2024, WSP Canada Inc.*) would be expected to have adequate capacity to accommodate the updated site plan land uses based on the updated trip generation for the overall site.
- **Based on the updated trip generation, no changes are required to the road infrastructure as currently designed.**

1 INTRODUCTION

Oxela Developments retained WSP Canada Inc. (WSP) to update trip generation analysis previously prepared by WSP for the Traffic Impact Study (TIS) report *Public Markets MRS-D, Traffic Impacts Study Update, Revision 1, May 3, 2024* (2024 TIS). The update reflects changes in development land use including replacing the Recreational Community Centre (Block 4 Lots 2, 3 & 4 / TIS Zone 9) and commercial office park (Block 3 Lots 1 & 2 / TIS Zone 13 Specialty Trade Centre) with 800 multi-family units. This results in the development now having a total of 2,800 multi-family units.

This memo outlines the differences in vehicle trips generated in Phase 1 (partial build-out) and Phase 2 (full build-out) based on the updated site plan.

The locations of Zone 9 and Zone 13 on the development site are shown in **Figure 1.1**.

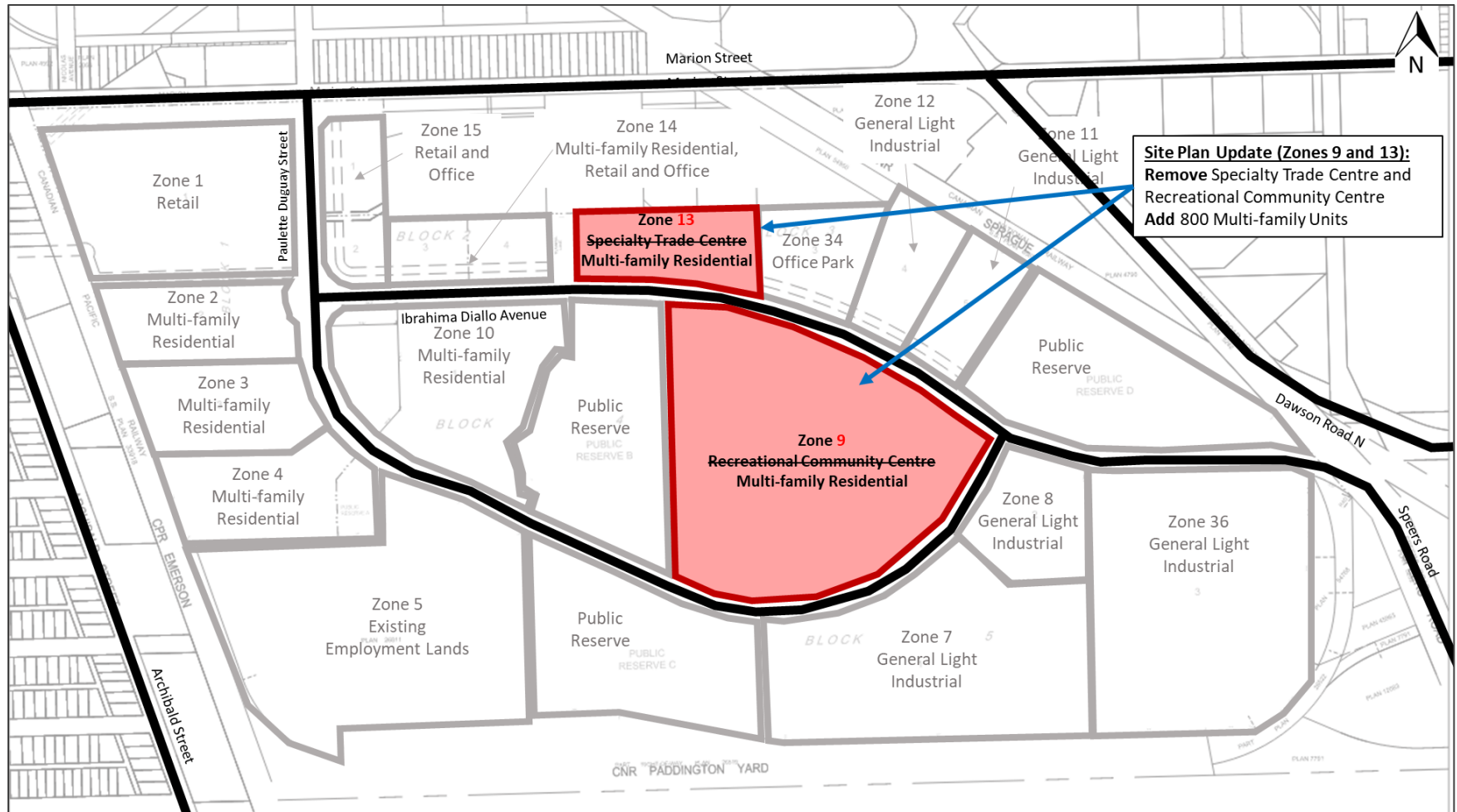


Figure 1.1: Site Plan Changes



2 UPDATED TRIP GENERATION

The difference in vehicular trips generated by the proposed land use changes were estimated for the weekday a.m. and p.m. peak hours and weekday period. The following assumptions were made when calculating the new Phase 1 and 2 site trips, consistent with the 2024 TIS:

- 50% of the residential development would be completed in Phase 1.
- The commercial office park development in Zone 13 (Specialty Trade Centre) is fully built-out for Phase 1.
- The recreational community centre in Zone 9 is not constructed during Phase 1. It is therefore only included in Phase 2 calculations.
- The *Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition* was used to obtain trip generation rates.
 - Rates of 0.32, 0.41 and 5.44 trips / dwelling unit from ITE Land Use 221 Mid-Rise Residential were applied to calculate the increased residential trip generation for the a.m. peak hour, p.m. peak hour and weekday period, respectively. A non-auto mode share of 20% was applied to the new calculated ITE residential trips.
 - Trips generated by the recreational and office park land uses in Zone 9 and Zone 13 were determined in a previous TIS for the Public Markets Development by Stantec Consulting Ltd. (*Development of MRS-D Traffic Impact Study Supporting Phase 1 Development Application and Internal Road Design DRAFT, September 2020*)

Using these assumptions, the site trips were recalculated for the new land uses. The net difference in trips, accounting for the replacement of Zones 9 and 13, is summarized in **Table 2.1** and **Table 2.2** for the a.m. peak, p.m. peak, and weekday periods for Phase 1 and Phase 2, respectively. The total new trips generated for each phase are also summarized in **Table 2.3** and **Table 2.4**.

Table 2.1: Phase 1 Trip Generation – Difference in Auto Trips

ZONE	LAND USE TYPE	UNITS	AM PEAK			PM PEAK			DAILY		
			IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
2024 TIS											
Zone 9	Recreational Community Centre	0 sq.ft.	0	0	0	0	0	0	0	0	0
Zone 13	Specialty Trade Centre	60,000 sq.ft.	73	27	100	38	80	118	307	307	614
Total		60,000 sq.ft.	73	27	100	38	80	118	307	307	614
2025 UPDATED SITE PLAN											
Zone 9 and 13	Multi-Family Residential	400 Dwelling Units	28	74	102	79	52	131	871	871	1742
DIFFERENCE											
Total		-60,000 sq.ft. +400 Dwelling Units	-45	+45	+2	+41	-28	+13	+564	+564	+1128

Table 2.2: Phase 2 Trip Generation – Difference in Auto Trips

ZONE	LAND USE TYPE	UNITS	AM PEAK			PM PEAK			DAILY		
			IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
2024 TIS											
Zone 9	Recreational Community Centre	281,000 sq.ft.	220	120	340	206	232	438	2733	2733	5466
Zone 13	Specialty Trade Centre	60,000 sq.ft.	73	27	100	38	80	118	307	307	614
Total		341,000 sq.ft.	293	147	440	244	312	556	3040	3040	6080
2025 UPDATED SITE PLAN											
Zone 9 and 13	Multi-Family Residential	800 Dwelling Units	55	150	205	157	105	262	1741	1741	3482
DIFFERENCE											
Total		-341,000 sq.ft. +800 Dwelling Units	-238	+3	-235	-87	-207	-294	-1299	-1299	-2598



Table 2.3: Phase 1 Total Site Trip Generation and Difference

LAND USE	2024 TIS			2025 UPDATED SITE PLAN			DIFFERENCE		
	IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
AM PEAK PERIOD									
Residential	73	189	262	101	263	364	28	74	102
Commercial	105	81	186	105	81	186	0	0	0
Recreational	0	0	0	0	0	0	0	0	0
Industrial / Office Park	516	86	602	443	59	502	-73	-27	-100
Total	694	356	1050	649	403	1052	-45 (-6%)	47 (+13%)	2 (+0.1%)
PM PEAK PERIOD									
Residential	200	133	333	279	185	464	79	52	131
Commercial	208	218	426	208	218	426	0	0	0
Recreational	0	0	0	0	0	0	0	0	0
Industrial / Office Park	85	456	541	47	376	423	-38	-80	-118
Total	493	807	1300	534	779	1313	41 (+8%)	-28 (-3%)	13 (+1%)
DAILY									
Residential	2178	2178	4356	3049	3049	6098	871	871	1742
Commercial	3122	3122	6244	3122	3122	6244	0	0	0
Recreational	0	0	0	0	0	0	0	0	0
Industrial / Office Park	2200	2200	4400	1893	1893	3786	-307	-307	-614
Total	7500	7500	15000	8064	8064	16128	564 (+8%)	564 (+8%)	1128 (+8%)



Table 2.4: Phase 2 Total Site Trip Generation and Difference

LAND USE	2024 TIS			2025 UPDATED SITE PLAN			DIFFERENCE		
	IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
AM PEAK PERIOD									
Residential	141	376	517	196	526	722	55	150	205
Commercial	118	89	207	118	89	207	0	0	0
Recreational	220	114	334	0	0	0	-220	-114	-334
Industrial / Office Park	571	94	665	498	67	565	-73	-27	-100
Total	1050	673	1723	812	682	1494	-238 (-23%)	9 (+1%)	-229 (-13%)
PM PEAK PERIOD									
Residential	397	265	662	554	370	924	157	105	262
Commercial	231	243	474	231	243	474	0	0	0
Recreational	206	232	438	0	0	0	-206	-232	-438
Industrial / Office Park	92	505	597	54	425	479	-38	-80	-118
Total	926	1245	2171	839	1038	1877	-87 (-9%)	-207 (-17%)	-294 (-14%)
DAILY									
Residential	4354	4354	8708	6095	6095	12190	1741	1741	3482
Commercial	3356	3356	6712	3356	3356	6712	0	0	0
Recreational	2733	2733	5466	0	0	0	-2733	-2733	-5466
Industrial / Office Park	2423	2423	4846	2116	2116	4232	-307	-307	-614
Total	12866	12866	25732	11567	11567	23134	-1299 (-10%)	-1299 (-10%)	-2598 (-10%)



3 DISCUSSION

Previously in Phase 1 only Zone 13 was fully built out, generating 100 auto trips (73 entering and 27 exiting) during the a.m. peak hour, 118 auto trips (38 entering and 80 exiting) during the p.m. peak hour, and 614 auto trips (307 entering and 307 exiting) during the weekday period. In this update, it is assumed that half of the additional multi-family development (400 units) will be complete in Phase 1, replacing the Zone 13 (specialty trade centre) trips, resulting in 102 auto trips (28 entering and 74 exiting) during the a.m. peak hour, 131 auto trips (79 entering and 52 exiting) during the p.m. peak hour, and 1742 auto trips (871 entering and 871 exiting) during the weekday period. This results in a net **increase** of 2, 13, and 1128 total auto trips in the a.m. peak hour, p.m. peak hour, and weekday periods, respectively.

The only infrastructure modification to be constructed between Phase 1 and Phase 2 is a second northbound left-turn lane at the Lagimodiere Boulevard / Maginot Street intersection. The largest inbound traffic volume increase for the overall site is +41 vehicles during the Phase 1 weekday p.m. peak hour. The trip distribution for the northbound left-turn at Lagimodiere Boulevard / Maginot Street was 9.6% in the 2024 TIS which, based on a total increase of 41 vehicles, equates to an increase of 4 vehicles for this movement during the p.m. peak hour. This is considered a negligible increase, therefore the Phase 1 intersection modifications recommended in the 2024 TIS would be expected to have adequate capacity to accommodate the updated site plan land uses for Phase 2.

Previously in Phase 2 (full build-out), both Zones 9 and 13 were proposed to be fully built out, generating 440 auto trips (293 entering and 147 exiting) during the a.m. peak hour, 556 (244 entering and 312 exiting) during the p.m. peak hour, and 6080 auto trips (3040 entering and 3040 exiting) during the weekday period. In this update, the entire additional multi-family development (800 units) will be complete in Phase 2 (full build-out), replacing the Zone 9 (recreational community centre) and Zone 13 (specialty trade centre) trips, resulting in 205 auto trips (55 entering and 150 exiting) during the a.m. peak hour, 262 auto trips (157 entering and 105 exiting) during the p.m. peak hour, and 3482 auto trips (1741 entering and 1741 exiting) during the weekday period. This results in a net **decrease** of 235, 294, and 2598 total auto trips in the a.m. peak, p.m. peak, and weekday periods, respectively.

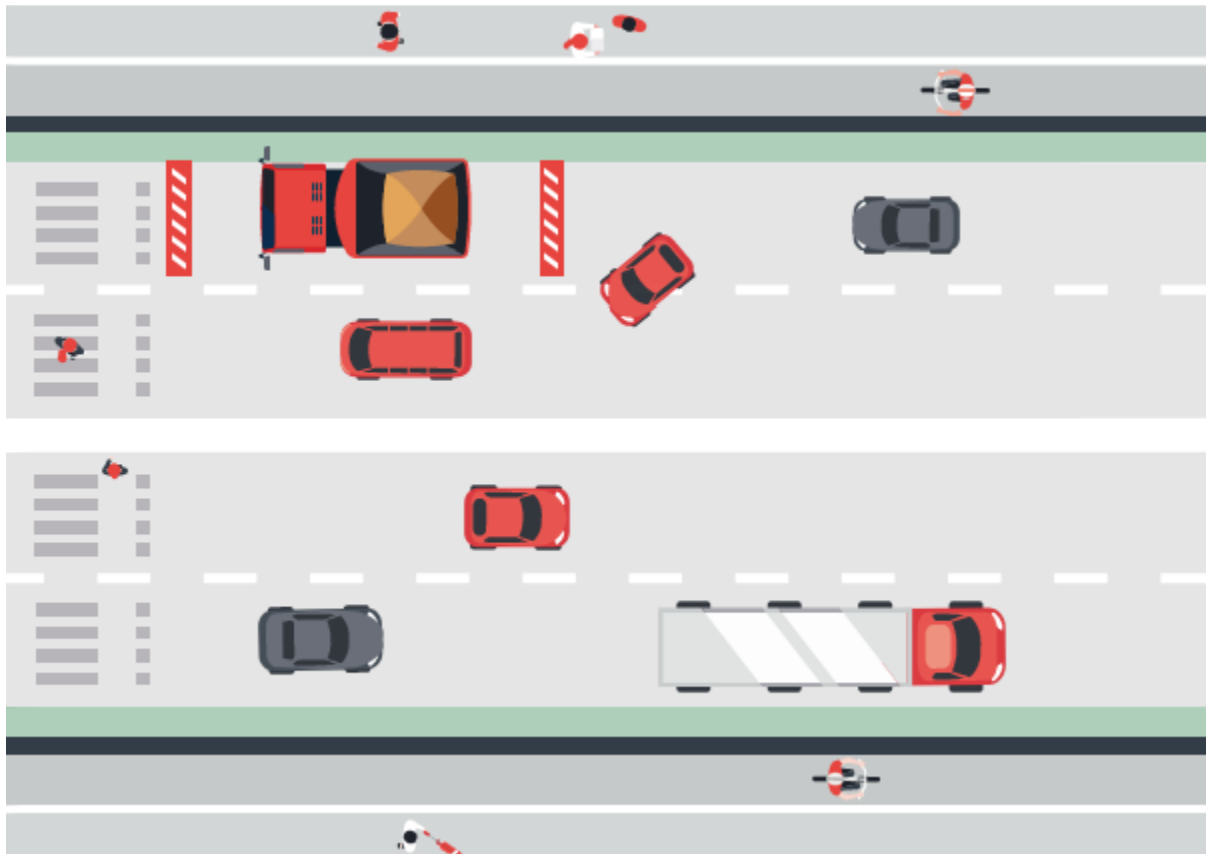
Therefore, the Phase 2 (full build-out) transportation infrastructure modifications recommended in the 2024 TIS would be expected to have adequate capacity to accommodate the updated site plan land uses.

OLEXA DEVELOPMENTS
211-07590-00

PUBLIC MARKETS MRS-D TRAFFIC IMPACT STUDY UPDATE

JUNE 10, 2025

REVISION 2





PUBLIC MARKETS MRS-D TRAFFIC IMPACT STUDY UPDATE

OLEXA DEVELOPMENTS

REVISION 2

PROJECT NO.: 211-07590-00
DATE: JUNE 10, 2025

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REVISION HISTORY

FIRST ISSUE				
March 14, 2024	Submission to City of Winnipeg			
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Eva Kwok Cohen Lussier Vanessa Schmidt	Ken Wimble	Kerra Mruss		
REVISION 1				
May 3, 2024	Resubmission to City of Winnipeg			
Prepared by	Reviewed by	Approved By		
Vanessa Schmidt Ken Wimble	Ken Wimble	Ken Wimble		
REVISION 2				
June 10, 2024	Resubmission to City of Winnipeg (revised development land uses)			
Prepared by	Reviewed by	Approved By		
Eva Kwok	Ken Wimble	Ken Wimble		

SIGNATURES

APPROVED¹ BY *(must be reviewed for technical accuracy prior to approval)*



Ken Wimble, P.Eng.
Senior Project Engineer

June 10, 2025

Date

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1 INTRODUCTION

Oxela Developments retained WSP Canada Inc. (WSP) to conduct an updated Transportation Impact Study (TIS) to assess updated proposed land uses at the proposed Public Markets MRS-D development site. There have been several submissions previously submitted to the City of Winnipeg regarding the proposed development, as shown in **Table 1-1**.

Table 1-1: Previous TIS Submissions to the City of Winnipeg

SUBMISSION TITLE	SUBMISSION DATE	AUTHOR	DESCRIPTION	REFERENCE NAME
<i>Development of MRS-D Traffic Impact Study</i>	February 2020 (revised and re-submitted May 2020)	Stantec Consulting Ltd. (Stantec)	Stantec completed a TIS for the proposed development, which included commercial, mixed commercial/office, mixed office/residential, mid-rise multi-family, recreational, and mixed office/general light industrial land uses.	May 2020 TIS
<i>Development of MRS-D Traffic Impact Study Supporting Phase 1 Development Application and Internal Road Design FINAL</i>	September 2020	Stantec Consulting Ltd.	Stantec updated the original TIS for the proposed development with updated land use, phased build-out and analysis of internal intersections.	September 2020 TIS
<i>Public Markets Development – Marion Street and Private Access Functional Plan Memo</i>	February 2022	WSP	WSP presented a proposed functional design for a new signalized intersection at Marion Street and Dupuy Avenue / Paulette Duguay Street.	Functional Plan Memo
<i>Public Markets Development – Marion Street and Private Access Intersections Review Memo</i>	March 2022	WSP	WSP provided additional traffic analysis of the proposed signalized Marion Street and Dupuy Avenue / Paulette Duguay Street intersection to supplement the Functional Plan Memo.	Intersections Review Memo
<i>Public Markets Development – Traffic Impact Study Update</i>	May 2024	WSP	WSP provided a TIS Update to reassess the transportation impacts of the development based on increased multi-family density and removal of a proposed right-in / right-out on Marion Street east of the future Paulette Duguay Street collector road. The 2023 Design was reassessed to determine if it can accommodate the updated forecast development traffic. The City accepted the proposed design configurations presented in this TIS Update.	May 2024 TIS Update
<i>Public Markets Development – Traffic Analysis of Stop Controlled Paulette Duguay Street / Ibrahima Diallo Avenue Intersection Letter</i>	July 2024	WSP	Public Works identified a concern with site access redundancy due to the proposed single lane roundabout at the Paulette Duguay Street and Ibrahima Diallo Avenue intersection. WSP analyzed whether stop-control could replace the proposed roundabout, and recommended a four-way stop-controlled or three-legged one-way stop-controlled intersection with RRFB pedestrian crossing control.	July 2024 Stop-Control Review Letter

SUBMISSION TITLE	SUBMISSION DATE	AUTHOR	DESCRIPTION	REFERENCE NAME
<i>Public Markets Development – Updated Trip Generation Analysis for 2025 Site Plan</i>	March 2025	WSP	WSP provided an updated trip generation analysis based on changes in development land use, including replacing the Recreational Community Centre and commercial office park with 800 additional multi-family units.	March 2025 Trip Generation Update Memo

The purpose of this 2025 TIS Update is to reassess the transportation impacts of the development based on the most current development proposal, incorporating the design changes and updates in the May 2024 TIS Update, the July 2024 Stop-Control Review Letter, and the March 2025 Trip Generation Update Memo. A detailed design of the main development access at the Marion Street and Dupuy Avenue / Paulette Duguay Street intersection, Paulette Duguay Street and Ibrahim Diallo Avenue intersection has been submitted by WSP to the City's Underground Structures Group for review. Drawings of the detailed design (not yet approved by Underground Structures) are provided in **Appendix A**.

This 2025 TIS Update includes updated calculations of the new, pass-by and internal trips generated by the development using the latest Institute of Transportation Engineers (ITE) data from the 11th Edition of the *Trip Generation Manual* instead of the trip generation originally calculated in the September 2020 TIS and used for all previous reports.

The roadway design currently under review by Underground Structures is also re-evaluated in this report to confirm whether it can accommodate the updated forecasted traffic volumes.

As in the May 2024 TIS Update, the proposed development will be analysed in two phases. The horizon years for this updated study include 2024 as a base year, 2029 (Phase 1 of the development), and 2034 (Phase 2 of the development / full build-out). This updated study will include post-development weekday a.m., p.m. and daily traffic forecasts and analysis, signal warrant analysis, pedestrian crossing analysis, an updated transit review, and a review of truck movements to and from the industrial land uses.

1.1 BACKGROUND

The location and study area of the proposed development is shown in **Figure 1-1**. The following intersections were reviewed in this updated TIS:

- Marion Street / Dupuy Ave / Paulette Duguay Street (signalized)
- Paulette Duguay Street / Commercial Access (unsignalized)
- Paulette Duguay Street / Ibrahima Diallo Avenue (unsignalized)
- Lagimodiere Boulevard / Maginot Street (signalized)
- Maginot Street / Speers Road (roundabout)



Figure 1-1: Proposed Development Area and Study Area Intersections

1.2 PROPOSED DEVELOPMENT

The proposed development is approximately 222 acres (89.8 hectares) and is connected to the existing road network via the Marion Street and Dupuy Avenue intersection and at Speers Road. The previous TIS's divided the proposed development area into trip generation zones for the purpose of assigning site trips to the internal road network. The zone layout of the previous TIS was duplicated for this update, as illustrated in **Figure 1-2**.

In the most recent analysis contained in the May 2024 TIS Update, Zone 9 was designated as a Recreational Community Centre and Zone 13 was designated as a Specialty Trade Centre. These two zones have been updated to multi-family residential land uses. This results in the following overall changes since the May 2024 TIS:

- Subtract 60,000 square feet of Specialty Trade Centre.
- Subtract 281,000 square feet of Recreational Community Centre.
- Add 800 multi-family units, bringing the development total to 2,800 multi-family units.



Figure 1-2: Proposed Development Traffic Zones and Land Uses

2 TRAFFIC VOLUMES

2.1 EXISTING TRAFFIC

WSP conducted a peak hour traffic count at the Lagimodiere Boulevard and Maginot Street intersection on February 6, 2024, using MioVision Scout Video Collection Units.

The existing traffic volumes for the other existing study area intersections were obtained from 2019 counts conducted for the September 2020 TIS. The following growth rates based on the City of Winnipeg Public Works Department 10-year average annual growth rate from 2010 to 2019 were applied to traffic volumes collected in previous years:

- 0.2 percent in the a.m. peak period.
- 0.1 percent in the p.m. peak period.

The weekday a.m. and p.m. peak hours were selected for analysis for this development as these are the most critical times for traffic in the area and are also typical busy periods for the proposed land uses in the development. Existing traffic volumes for the weekday a.m. and p.m. peak hours are shown in **Figure 2-1**. The 2024 traffic counts for the Lagimodiere Boulevard / Maginot Street intersection are provided in **Appendix B**. Truck traffic volumes and peak hour factors were obtained from the counts and the September 2020 TIS and used in the analysis.

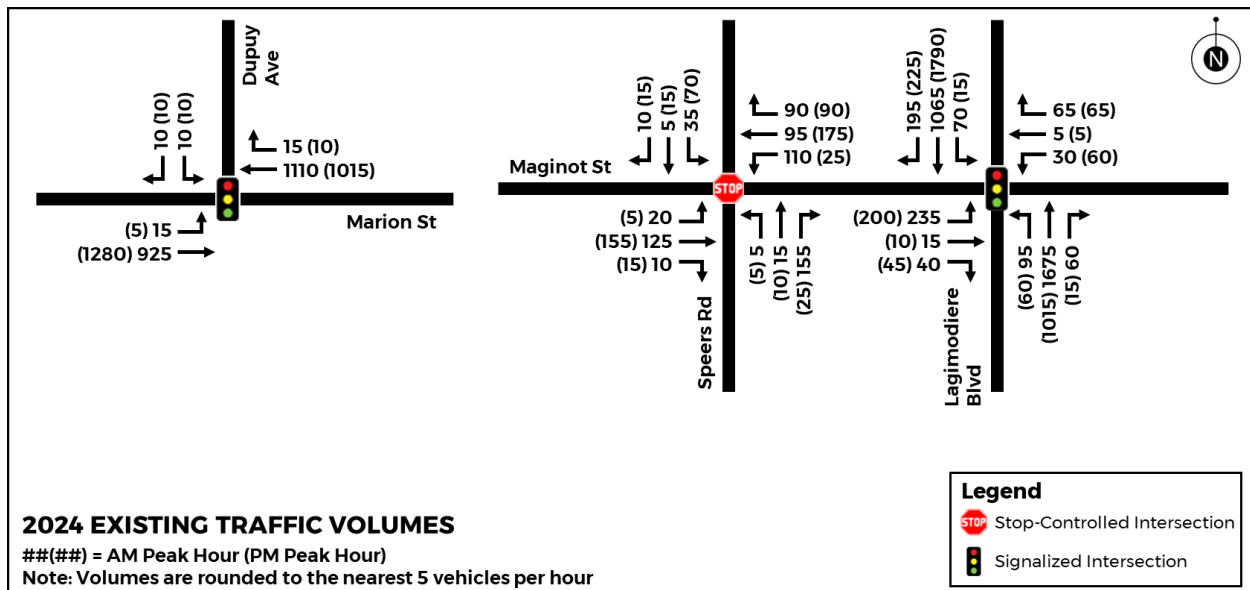


Figure 2-1: Existing 2024 Traffic Volumes

2.2 SITE GENERATED TRAFFIC

2.2.1 TRIP GENERATION

Vehicular trips generated by the proposed development were estimated for the weekday a.m. and p.m. peak hours and weekday using the *ITE Trip Generation Manual, 11th Edition* to obtain trip generation rates for the site. The following assumptions were made when calculating the new Phase 1 and 2 site trips:

- 50% of the residential development would be completed in Phase 1.
- Zone 10 was split into two sub-zones (10A and 10B), as there are two land parcels in Zone 10 that have different land-uses, road network accesses, and trip distribution.
- The mode share split used in the September 2020 TIS was also applied to the new calculated trips for this report.
- Internal trips are trips made within a development without using the major road network. The internal capture rates for the proposed development were calculated for the entire site using the process outlined in Chapter 6 of the *ITE Trip Generation Handbook, 3rd Edition*. Internal capture rates were applied to the office, retail, and residential land-uses. The trips were distributed to the internal study area intersections based on the approximate area of each zone.
- The retail land uses are anticipated to generate pass-by trips, which are vehicular trips made as an intermediate stop along the course of a trip between an origin and primary destination. The *ITE Trip Generation Manual, 11th Edition* indicates vehicle pass-by rates of 34% for the Shopping Centre (Code 820) land use in the PM peak period, and this was used in this study for both PM and daily peak periods. For this study, pass-by trips are defined as trips that divert from Marion Street through traffic to retail land uses located throughout the development, not just the development fronting Marion Street.

Following these assumptions, the total, internal, pass-by and new site trips for each zone were calculated for the entire development. Development trips for the a.m. peak period, p.m. peak period, and weekday periods for Phase 1 and Phase 2 are detailed in **Table 2-1** and **Table 2-2**, respectively and summarized in **Table 2-3**.

In the 2029 Phase 1 scenario, the development is proposed to generate 964 auto trips (580 entering and 384 exiting) during the weekday a.m. peak hour, 1,014 auto trips (382 entering and 632 exiting) during the p.m. peak hour, and 10,166 auto trips (5,083 entering and 5,083 exiting) daily.

In the 2034 Phase 2 / Full Development scenario, the additional residential units are forecast to generate 1,460 auto trips (738 entering and 722 exiting) during the weekday a.m. peak hour, 1,577 auto trips (691 entering and 886 exiting) during the p.m. peak hour, and 16,108 auto trips (8,054 entering and 8,054 exiting) daily.

Table 2-1: Phase 1 Site Trip Generation

ZONE	ITE LAND USE (CODE)	QUANTITY	ITE RATE	TOTAL TRIPS			MODE SPLIT %	INTERNAL TRIPS			PASS-BY TRIPS			NEW TRIPS		
				IN	OUT	TOT.		IN	OUT	TOT.	IN	OUT	TOT.	IN	OUT	TOT.
AM PEAK PERIOD																
1	Shopping Centre (820)	82,500 sq. ft.	0.84	43	26	69	90%	6	6	12				33	17	50
2	Multifamily Housing – Mid-Rise (221)	250 Dwelling Units	0.37	21	72	93	80%	0	1	1				17	57	74
3	Multifamily Housing – Mid-Rise (221)	250 Dwelling Units	0.37	21	72	93	80%	0	1	1				17	57	74
4	Multifamily Housing – Mid-Rise (221)	120 Dwelling Units	0.37	10	34	44	80%	0	1	1				8	26	34
5	High-Cube Transload and Short-Term Storage Warehouse (154)	100,000 sq. ft.	0.08	6	2	8	100%							6	2	8
7	General Light Industrial (110)	0 sq. ft.	0.74	0	0	0	90%							0	0	0
8	General Light Industrial (110)	200,000 sq. ft.	0.74	130	18	148	90%							117	16	133
9	Multifamily Housing – Mid-Rise (221)	300 Dwelling Units	0.37	26	85	111	80%	1	2	3				20	66	86
10	Multifamily Housing – Mid-Rise (221)	175 Dwelling Units	0.37	15	50	65	80%	0	1	1				12	39	51
	Multifamily Housing – High Rise (222)	115 Dwelling Units	0.27	8	23	31	80%	0	0	0				6	18	24
11	General Light Industrial (110)	55,000 sq. ft.	0.74	36	5	41	90%							32	5	37
12	General Light Industrial (110)	55,000 sq. ft.	0.74	36	5	41	90%							32	5	37
13	Multifamily Housing – Mid-Rise (221)	100 Dwelling Units	0.37	9	28	37	80%	0	1	1				7	21	28
14	Shopping Centre (820)	27,000 sq. ft.	0.84	14	9	23	90%	2	2	4				11	6	17
	Multifamily Housing – Mid-Rise (221)	90 Dwelling Units	0.37	8	25	33	80%	0	1	1				6	19	25
	Office Park (750)	60,000 sq. ft.	1.33	71	9	80	80%	5	3	8				52	4	56
15	Shopping Centre (820)	27,000 sq. ft.	0.84	14	9	23	80%	2	2	4				9	5	14
	Office Park (750)	72,000 sq. ft.	1.33	85	11	96	80%	6	3	9				62	6	68
34	Office Park (750)	60,000 sq. ft.	1.33	71	9	80	90%	5	3	8				59	5	64
36	General Light Industrial (110)	125,000 sq. ft.	0.74	82	11	93	90%							74	10	84
Total				706	503	1209		27	27	54				580	384	964
PM PEAK PERIOD																
1	Shopping Centre (820)	82,500 sq. ft.	3.40	135	146	281	90%	11	29	40	41	45	86	70	57	127
2	Multifamily Housing – Mid-Rise (221)	250 Dwelling Units	0.39	60	38	98	80%	8	3	11				40	27	67
3	Multifamily Housing – Mid-Rise (221)	250 Dwelling Units	0.39	60	38	98	80%	8	3	11				40	27	67
4	Multifamily Housing – Mid-Rise (221)	120 Dwelling Units	0.39	29	18	47	80%	4	1	5				19	13	32
5	High-Cube Transload and Short-Term Storage Warehouse (154)	100,000 sq. ft.	0.10	3	7	10	100%	0	0					3	7	10
7	General Light Industrial (110)	0 sq. ft.	0.65	0	0	0	90%	0	0					0	0	0
8	General Light Industrial (110)	200,000 sq. ft.	0.65	18	112	130	90%	0	0					16	101	117
9	Multifamily Housing – Mid-Rise (221)	300 Dwelling Units	0.39	71	46	117	80%	10	5	15				47	32	79
10	Multifamily Housing – Mid-Rise (221)	175 Dwelling Units	0.39	41	27	68	80%	6	2	6				27	20	47
	Multifamily Housing – High Rise (222)	115 Dwelling Units	0.32	23	14	37	80%	3	1	4				15	10	25
11	General Light Industrial (110)	55,000 sq. ft.	0.65	5	31	36	90%	0	0					5	28	33
12	General Light Industrial (110)	55,000 sq. ft.	0.65	5	31	36	90%	0	0					5	28	33
13	Multifamily Housing – Mid-Rise (221)	100 Dwelling Units	0.39	24	15	39	80%	3	1	4				16	11	27
14	Shopping Centre (820)	27,000 sq. ft.	3.40	44	48	92	90%	4	9	13	13	15	28	23	19	42
	Multifamily Housing – Mid-Rise (221)	90 Dwelling Units	0.39	21	14	35	80%	3	1	4				14	10	24
	Office Park (750)	60,000 sq. ft.	1.30	11	67	78	80%	5	5	10				4	49	53
15	Shopping Centre (820)	27,000 sq. ft.	3.40	44	48	92	80%	4	9	13	12	13	25	19	16	35
	Office Park (750)	72,000 sq. ft.	1.30	13	81	94	80%	6	6	12				4	59	63
34	Office Park (750)	60,000 sq. ft.	1.30	11	67	78	90%	5	5	10				5	55	60
36	General Light Industrial (110)	125,000 sq. ft.	0.65	11	70	81	90%	0	0					10	63	73

ZONE	ITE LAND USE (CODE)	QUANTITY	ITE RATE	TOTAL TRIPS			MODE SPLIT %	INTERNAL TRIPS			PASS-BY TRIPS			NEW TRIPS		
				IN	OUT	TOT.		IN	OUT	TOT.	IN	OUT	TOT.	IN	OUT	TOT.
Total				629	918	1547		80	80	160	66	73	139	382	632	1014
DAILY																
1	Shopping Centre (820)	82,500 sq. ft.	37.01	1527	1527	3054	90%	122	291	413	467	467	934	785	616	1401
2	Multifamily Housing – Mid-Rise (221)	250 Dwelling Units	4.54	568	568	1136	80%	85	40	125				369	414	783
3	Multifamily Housing – Mid-Rise (221)	250 Dwelling Units	4.54	568	568	1136	80%	84	40	124				370	414	784
4	Multifamily Housing – Mid-Rise (221)	120 Dwelling Units	4.54	273	273	546	80%	38	20	58				180	198	378
5	High-Cube Transload and Short-Term Storage Warehouse (154)	100,000 sq. ft.	1.4	70	70	140	100%							70	70	140
7	General Light Industrial (110)	0 sq. ft.	4.87	0	0	0	90%							0	0	0
8	General Light Industrial (110)	200,000 sq. ft.	4.87	487	487	974	90%							438	438	876
9	Multifamily Housing – Mid-Rise (221)	300 Dwelling Units	4.54	681	681	1362	80%	95	48	143				450	497	947
10	Multifamily Housing – Mid-Rise (221)	175 Dwelling Units	4.54	398	398	796	80%	56	30	86				172	189	361
	Multifamily Housing – High Rise (222)	115 Dwelling Units	4.54	261	261	522	80%	37	20	57				262	288	550
11	General Light Industrial (110)	55,000 sq. ft.	4.87	134	134	268	90%							121	121	242
12	General Light Industrial (110)	55,000 sq. ft.	4.87	134	134	268	90%							121	121	242
13	Multifamily Housing – Mid-Rise (221)	100 Dwelling Units	4.54	227	227	454	80%	32	16	48				150	166	316
14	Shopping Centre (820)	27,000 sq. ft.	37.01	500	500	1000	90%	54	37	91	153	153	306	243	260	503
	Multifamily Housing – Mid-Rise (221)	90 Dwelling Units	4.54	205	205	410	80%	29	15	44				135	149	284
	Office Park (750)	60,000 sq. ft.	11.07	332	332	664	80%	41	100	141				225	166	391
15	Shopping Centre (820)	27,000 sq. ft.	37.01	500	500	1000	80%	68	44	112	136	136	272	196	220	416
	Office Park (750)	72,000 sq. ft.	11.07	399	399	797	80%	41	100	141				278	219	497
34	Office Park (750)	60,000 sq. ft.	11.07	332	332	664	90%	56	37	93				243	262	505
36	General Light Industrial (110)	125,000 sq. ft.	4.87	305	305	610	90%							275	275	550
Total				7901	7901	15802		838	838	1676	756	756	1512	5083	5083	10166

Table 2-2: Phase 2 Site Trip Generation

ZONE	ITE LAND USE (CODE)	QUANTITY	ITE RATE	TOTAL TRIPS			MODE SPLIT %	INTERNAL TRIPS			PASS-BY TRIPS			NEW TRIPS		
				IN	OUT	TOT.		IN	OUT	TOT.	IN	OUT	TOT.	IN	OUT	TOT.
AM PEAK PERIOD																
1	Shopping Centre (820)	110,000 sq. ft.	0.84	57	35	92	90%	13	11	24				38	21	59
2	Multifamily Housing – Mid-Rise (221)	500 Dwelling Units	0.37	43	142	185	80%	1	3	4				33	111	144
3	Multifamily Housing – Mid-Rise (221)	500 Dwelling Units	0.37	43	142	185	80%	1	3	4				33	111	144
4	Multifamily Housing – Mid-Rise (221)	240 Dwelling Units	0.37	20	69	89	80%	0	1	1				16	54	70
5	High-Cube Transload and Short-Term Storage Warehouse (154)	100,000 sq. ft.	0.08	6	2	8	100%							6	2	8
7	General Light Industrial (110)	100,000 sq. ft.	0.74	65	9	74	90%							59	8	67
8	General Light Industrial (110)	200,000 sq. ft.	0.74	130	18	148	90%							117	16	133
9	Multifamily Housing – Mid-Rise (221)	600 Dwelling Units	0.37	51	171	222	80%	2	3	5				39	134	173
10	Multifamily Housing – Mid-Rise (221)	350 Dwelling Units	0.37	30	100	130	80%	1	2	3				29	98	127
	Multifamily Housing – High Rise (222)	230 Dwelling Units	0.27	16	46	62	80%	0	1	1				13	36	49
11	General Light Industrial (110)	55,000 sq. ft.	0.74	36	5	41	90%							32	5	37
12	General Light Industrial (110)	55,000 sq. ft.	0.74	36	5	41	90%							32	5	37
13	Multifamily Housing – Mid-Rise (221)	200 Dwelling Units	0.37	17	57	74	80%	0	1	1				14	45	59
14	Shopping Centre (820)	27,000 sq. ft.	0.84	14	9	23	90%	3	3	6				10	5	15
	Multifamily Housing – Mid-Rise (221)	180 Dwelling Units	0.37	15	52	67	80%	0	1	1				12	41	53
	Office Park (750)	60,000 sq. ft.	1.33	71	9	80	80%	5	3	8				52	4	56
15	Shopping Centre (820)	27,000 sq. ft.	0.84	14	9	23	80%	3	3	6				8	4	12
	Office Park (750)	72,000 sq. ft.	1.33	85	11	96	80%	6	3	9				62	6	68
34	Office Park (750)	60,000 sq. ft.	1.33	71	9	80	90%	5	2	8				59	6	65
36	General Light Industrial (110)	125,000 sq. ft.	0.74	82	11	93	90%							74	10	84
Total				902	911	1813		40	40	80				738	722	1460
PM PEAK PERIOD																
1	Shopping Centre (820)	110,000 sq. ft.	3.40	180	194	374	90%	10	29	49	55	59	114	97	87	184
2	Multifamily Housing – Mid-Rise (221)	500 Dwelling Units	0.39	119	76	195	80%	8	5	13				87	56	143
3	Multifamily Housing – Mid-Rise (221)	500 Dwelling Units	0.39	119	76	195	80%	8	5	13				87	56	143
4	Multifamily Housing – Mid-Rise (221)	240 Dwelling Units	0.39	57	37	94	80%	4	2	6				42	28	70
5	High-Cube Transload and Short-Term Storage Warehouse (154)	100,000 sq. ft.	0.10	3	7	10	100%							3	7	10
7	General Light Industrial (110)	100,000 sq. ft.	0.65	9	56	65	90%							8	50	58
8	General Light Industrial (110)	200,000 sq. ft.	0.65	18	112	130	90%							16	101	117
9	Multifamily Housing – Mid-Rise (221)	600 Dwelling Units	0.39	143	91	234	80%	10	5	15				104	68	172
10	Multifamily Housing – Mid-Rise (221)	350 Dwelling Units	0.39	84	53	137	80%	6	3	9				78	50	128
	Multifamily Housing – High Rise (222)	230 Dwelling Units	0.32	46	27	73	80%	3	2	5				34	20	54
11	General Light Industrial (110)	55,000 sq. ft.	0.65	5	31	36	90%							5	28	33
12	General Light Industrial (110)	55,000 sq. ft.	0.65	5	31	36	90%							5	28	33
13	Multifamily Housing – Mid-Rise (221)	200 Dwelling Units	0.39	48	30	78	80%	3	2	5				35	22	57
14	Shopping Centre (820)	27,000 sq. ft.	3.40	44	48	92	90%	4	9	13	13	15	28	23	19	42
	Multifamily Housing – Mid-Rise (221)	180 Dwelling Units	0.39	43	27	70	80%	3	2	5				31	20	51
	Office Park (750)	60,000 sq. ft.	1.30	11	67	78	80%	7	4	11				2	50	52
15	Shopping Centre (820)	27,000 sq. ft.	3.40	44	48	92	80%	4	9	13	12	13	25	19	16	35
	Office Park (750)	72,000 sq. ft.	1.30	13	81	94	80%	8	4	12				2	61	63
34	Office Park (750)	60,000 sq. ft.	1.30	11	67	78	90%	7	4	11				3	56	59
36	General Light Industrial (110)	125,000 sq. ft.	0.65	11	70	81	90%							10	63	73

ZONE	ITE LAND USE (CODE)	QUANTITY	ITE RATE	TOTAL TRIPS			MODE SPLIT %	INTERNAL TRIPS			PASS-BY TRIPS			NEW TRIPS		
				IN	OUT	TOT.		IN	OUT	TOT.	IN	OUT	TOT.	IN	OUT	TOT.
Total				1013	1229	2242		85	85	170	80	87	167	691	886	1577
DAILY																
1	Shopping Centre (820)	110,000 sq. ft.	37.01	2036	2036	4072	90%	150	390	540	623	623	1246	819	819	1638
2	Multifamily Housing – Mid-Rise (221)	500 Dwelling Units	4.54	1135	1135	2270	80%	100	68	168				840	840	1680
3	Multifamily Housing – Mid-Rise (221)	500 Dwelling Units	4.54	1135	1135	2270	80%	100	68	168				840	840	1680
4	Multifamily Housing – Mid-Rise (221)	240 Dwelling Units	4.54	545	545	1090	80%	50	33	83				403	403	806
5	High-Cube Transload and Short-Term Storage Warehouse (154)	100,000 sq. ft.	1.4	70	70	140	100%							70	70	140
7	General Light Industrial (110)	100,000 sq. ft.	4.87	244	244	487	90%							220	220	440
8	General Light Industrial (110)	200,000 sq. ft.	4.87	487	487	974	90%							438	438	876
9	Multifamily Housing – Mid-Rise (221)	600 Dwelling Units	4.54	1362	1362	2724	80%	100	78	178				1012	1012	2024
10	Multifamily Housing – Mid-Rise (221)	350 Dwelling Units	4.54	795	795	1590	80%	72	48	120				747	747	1494
	Multifamily Housing – High Rise (222)	230 Dwelling Units	4.54	522	522	1044	80%	45	31	76				387	387	774
11	General Light Industrial (110)	55,000 sq. ft.	4.87	134	134	268	90%							121	121	242
12	General Light Industrial (110)	55,000 sq. ft.	4.87	134	134	268	90%							121	121	242
13	Multifamily Housing – Mid-Rise (221)	200 Dwelling Units	4.54	454	454	908	80%	41	25	66				338	338	676
14	Shopping Centre (820)	27,000 sq. ft.	37.01	500	500	1000	90%	40	100	140	153	153	306	197	197	394
	Multifamily Housing – Mid-Rise (221)	180 Dwelling Units	4.54	409	409	818	80%	37	25	62				302	302	604
	Office Park (750)	60,000 sq. ft.	11.07	332	332	664	80%	95	40	135				226	226	452
15	Shopping Centre (820)	27,000 sq. ft.	37.01	500	500	1000	80%	40	100	140	136	136	272	164	164	328
	Office Park (750)	72,000 sq. ft.	11.07	399	399	798	80%	120	44	164				275	275	550
34	Office Park (750)	60,000 sq. ft.	11.07	332	332	664	90%	100	40	140				259	259	518
36	General Light Industrial (110)	125,000 sq. ft.	4.87	305	305	610	90%							275	275	550
Total				11830	11830	23660		1090	1090	2180	912	912	1824	8054	8054	16108

Table 2-3: New Site Trip Generation

LAND USE	PHASE 1 NEW TRIPS			PHASE 2 / FULL DEVELOPMENT NEW TRIPS		
	IN	OUT	TOTAL	IN	OUT	TOTAL
AM PEAK PERIOD						
Residential	93	303	396	189	630	819
Commercial	53	28	81	56	30	86
Industrial	261	38	299	320	46	366
Office Park	173	15	188	173	16	189
Total	580	384	964	738	722	1460
PM PEAK PERIOD						
Residential	218	150	368	498	320	818
Commercial	112	92	204	139	122	261
Industrial	39	227	266	47	277	324
Office Park	13	163	176	7	167	174
Total	382	632	1014	691	886	1577
DAILY						
Residential	2088	2315	4403	4869	4869	9738
Commercial	1224	1096	2320	1180	1180	2360
Industrial	1025	1025	2050	1245	1245	2490
Office Park	746	647	1393	760	760	1520
Total	5083	5083	10166	8054	8054	16108

2.2.2 TRIP DISTRIBUTION AND ASSIGNMENT

Trip distribution refers to the directional split of traffic entering and exiting the study area, and trip assignment refers to the allocation of distributed vehicle trips to the adjacent road network. The trips generated by the proposed development were assumed to follow the same overall distribution as the September 2020 TIS, with some distributions combined to account for the smaller study area in this TIS update. For the daily trip distribution, the average distribution of the a.m. and p.m. periods was used, and the same distribution was used for both inbound and outbound trips as people generally leave and return to the same place over the course of a day.

The trip distribution for the proposed development is summarized in **Table 2-4**.

Table 2-4: Updated Trip Distribution

NETWORK ACCESS ROADWAY	AM		PM		DAILY
	From (Entering)	To (Exiting)	From (Entering)	To (Exiting)	From / To (Entering / Exiting)
Marion St West	48.5%	59.0%	58.2%	47.0%	53.0%
Marion St East	23.0%	17.0%	13.0%	20.0%	18.5%
Lagimodiere South	9.5%	8.0%	9.6%	11.0%	9.5%
Speers South	9.5%	8.0%	9.6%	11.0%	9.5%
Maginot West	9.5%	8.0%	9.6%	11.0%	9.5%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Figure 2-2 and **Figure 2-3** illustrate the assignment of Phase 1 new development trips and pass-by trips to the study area road network. **Figure 2-4** and **Figure 2-5** illustrate Phase 2 new development trips and pass-by trips.

The total new trips, internal trips, and pass-by trips were assigned to the road network to determine total traffic projections for the combined post-development scenarios. **Figure 2-6** and **Figure 2-7** illustrate the total post-development traffic for the horizon years 2029 (Phase 1) and 2034 (Phase 2, full build-out), respectively. The 2034 daily traffic volumes for the internal road network are shown in **Figure 2-8**.

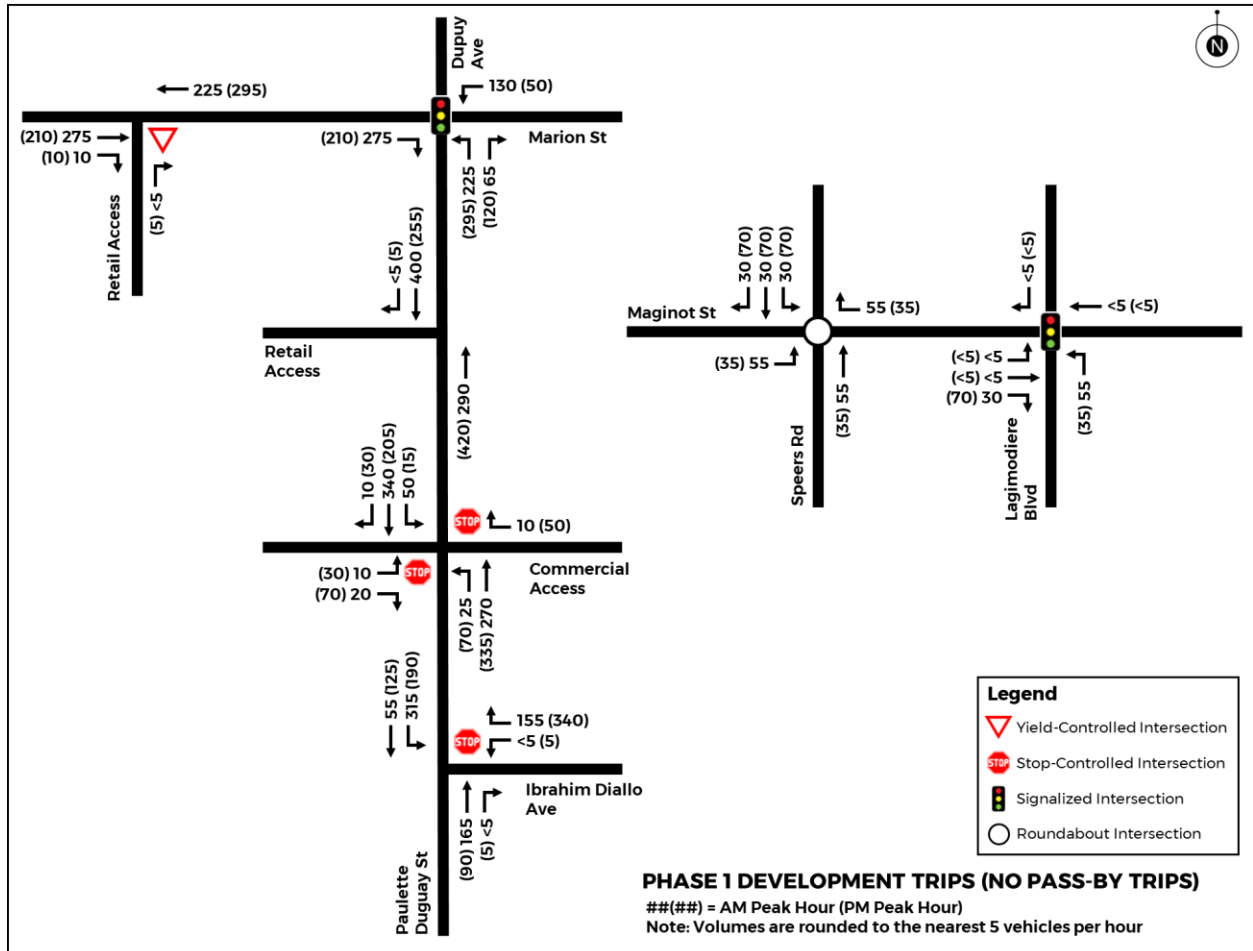


Figure 2-2: Phase 1 New and Internal Development Trips

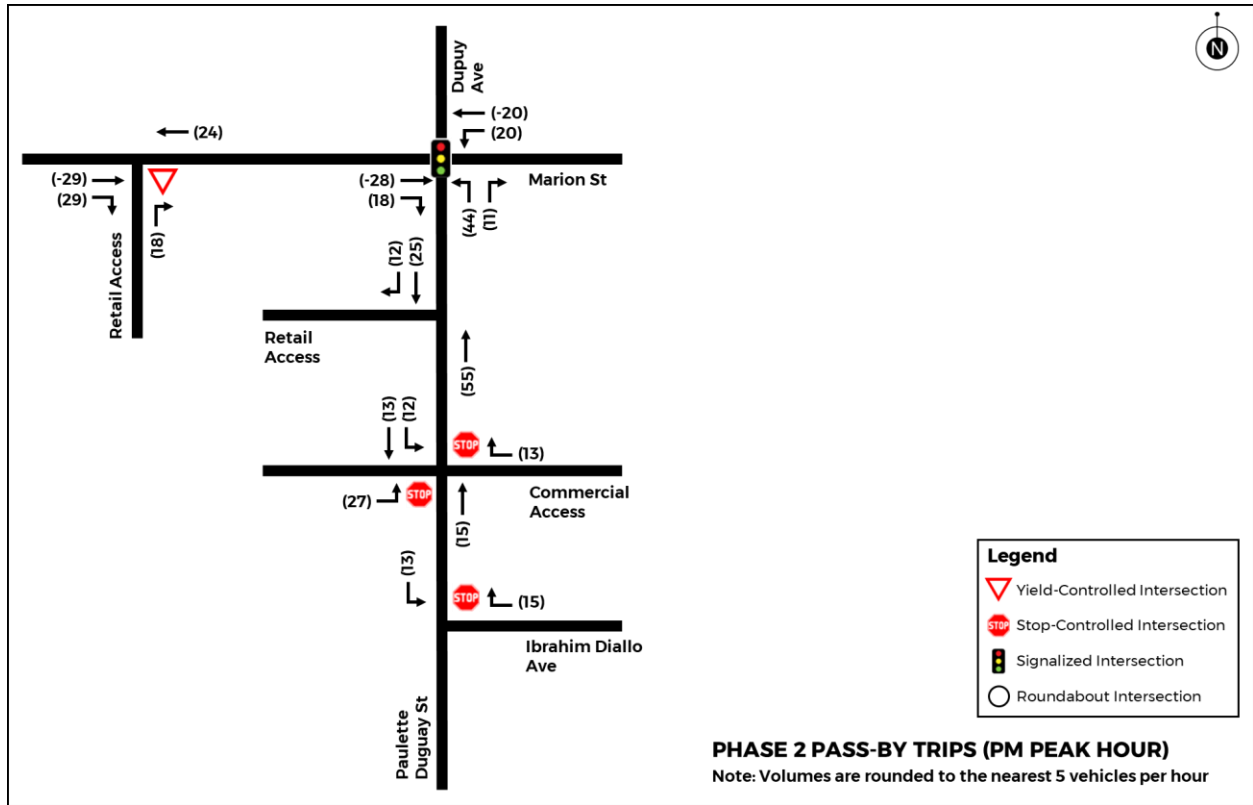


Figure 2-3: Phase 1 Pass-By Trips

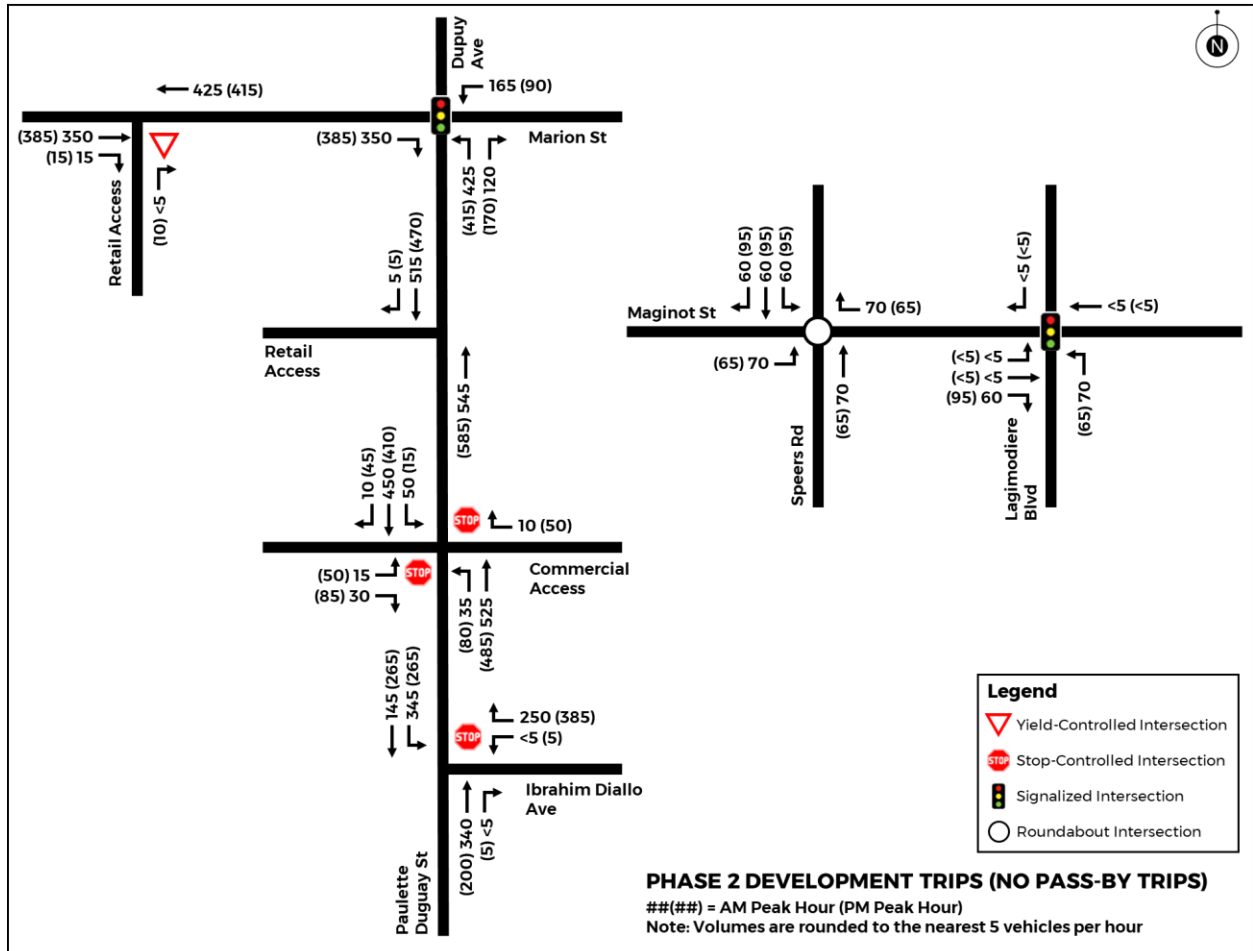


Figure 2-4: Phase 2 / Full Build-Out New and Internal Development Trips

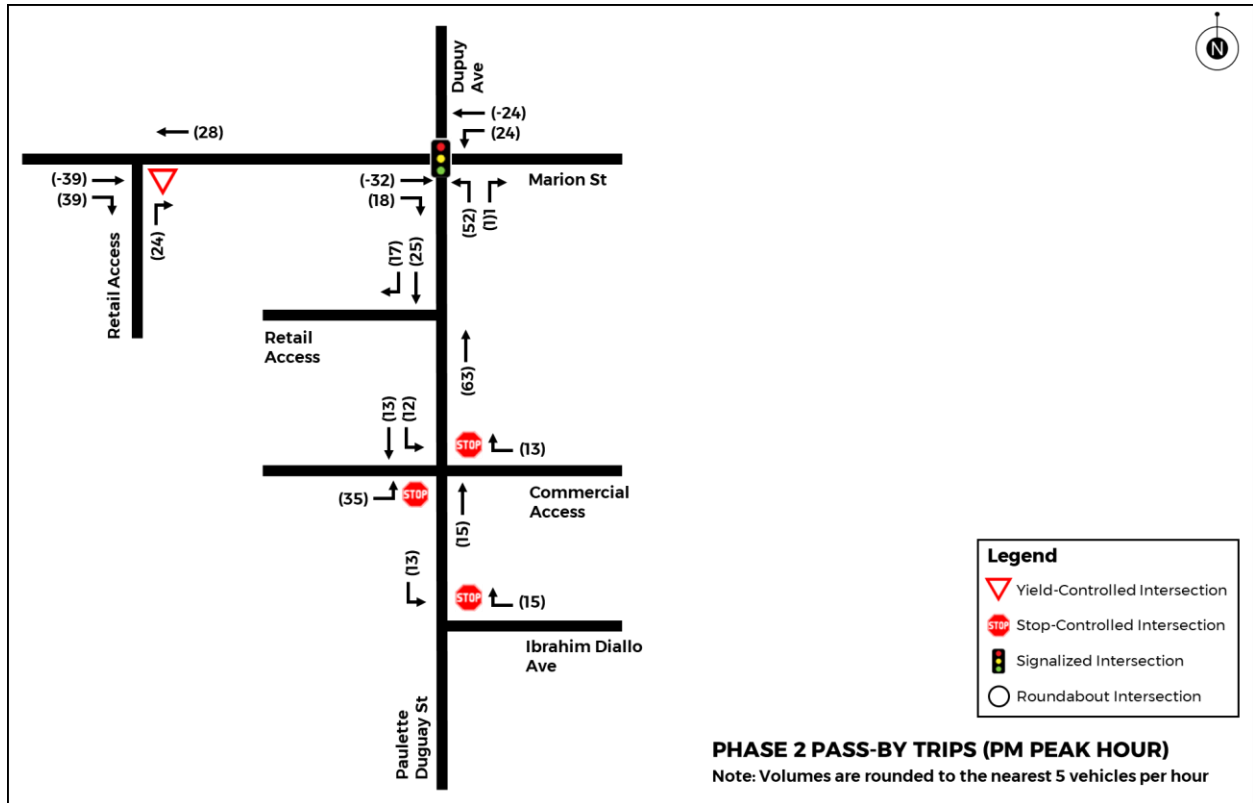


Figure 2-5: Phase 2 (Full Build-Out) Pass-By Trips

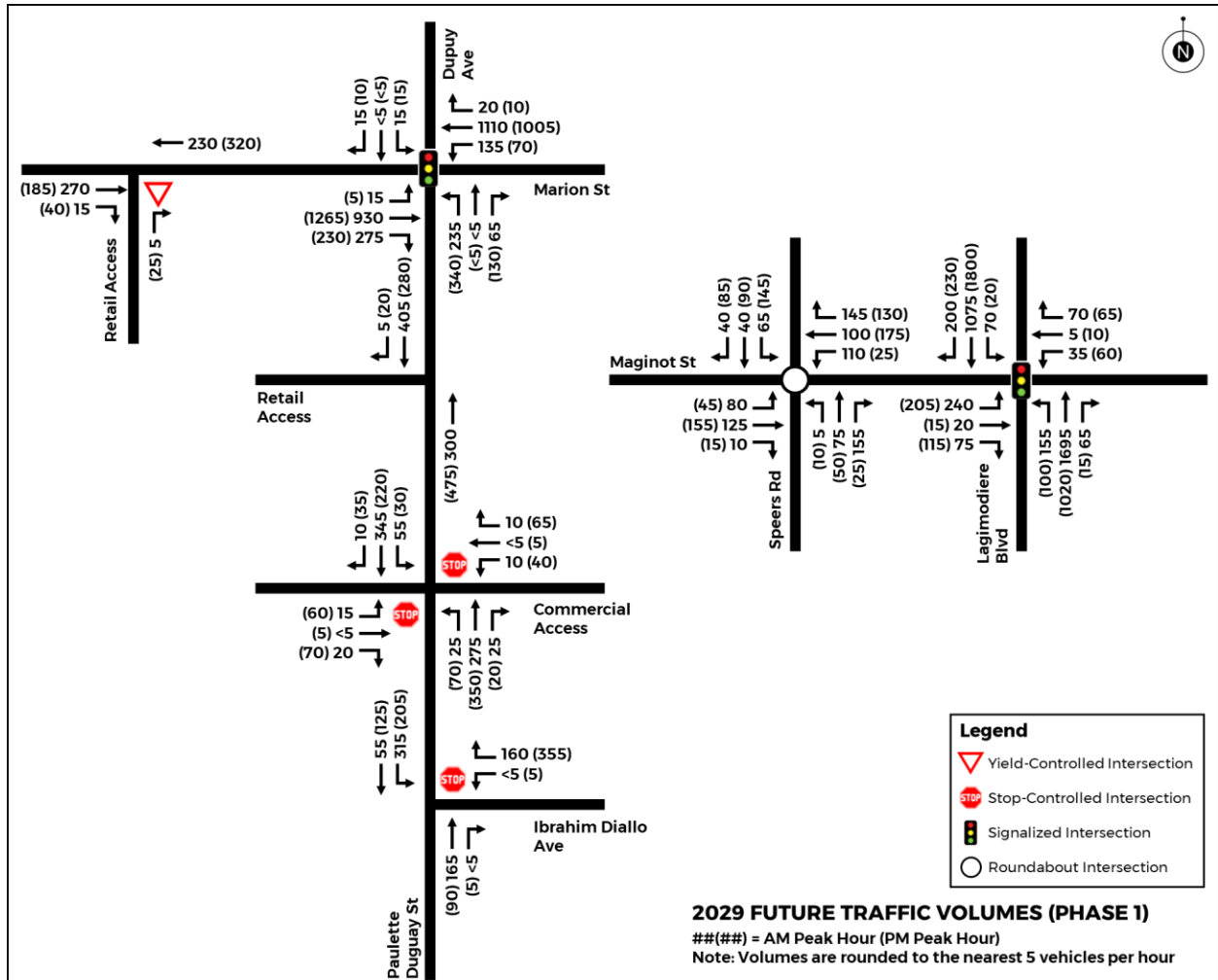


Figure 2-6: 2029 Post-Development Peak Hour Traffic Volumes (Phase 1)

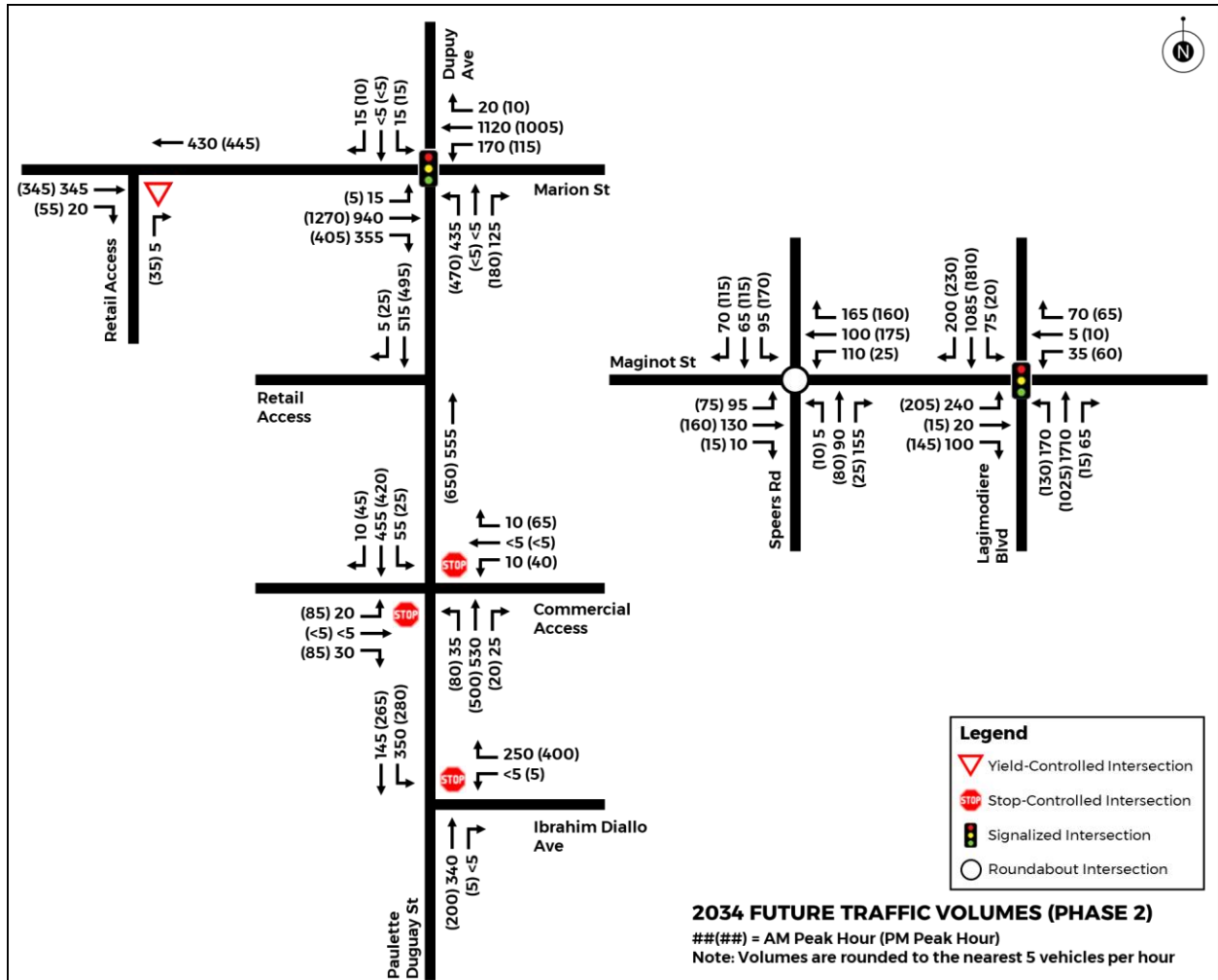


Figure 2-7: 2034 Post-Development Peak Hour Traffic Volumes (Phase 2 / Full Build-Out)

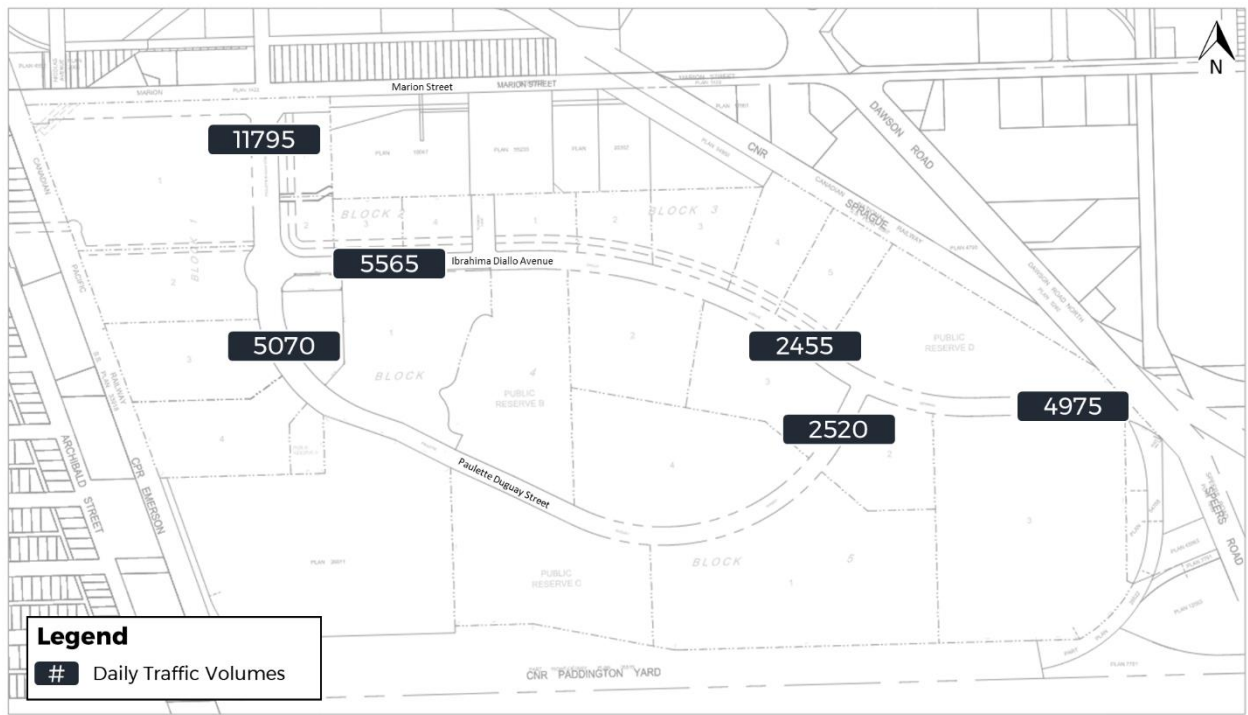


Figure 2-8: 2034 Post-Development Traffic Volumes (Phase 2 / Full Build-out)

3 TRAFFIC ANALYSIS

3.1 SIGNAL WARRANT ANALYSIS

A traffic signal warrant analysis was carried out for the Paulette Duguay Street / Commercial Access intersection and the Paulette Duguay / Ibrahima Diallo intersection using the Transportation Association of Canada's (TAC) *Traffic Signal & Pedestrian Signal Head Warrant Analysis*. The warrant is based on a review of the average six-hour peak turning movements, the distance to upstream traffic signals, median width, and local demographics. The process uses a 100-priority point warrant; where a traffic signal is warranted for consideration when the 100-priority point threshold is exceeded, and there are greater than 75 vehicles per hour approaching on the minor street, not including minor street right-turn volumes as per the City's methodology (Vs).

Future 2034 traffic volumes were estimated using the hourly distribution of entering and exiting vehicle trips by land use outlined in the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition*, as there were no recent traffic volume counts nearby available. The main land use using the commercial access intersection would be the Shopping Center (ITE Code 820). The signal warrant requires the highest six hours of data; therefore, the ratio of the six highest hours for the Shopping Center land use was applied to the site generated traffic determined for this intersection in **Section 2.2**. There is expected to be some demand for pedestrians to cross Paulette Duguay Street at this intersection given it is surrounded by a mix of commercial and retail development, therefore pedestrian volumes were estimated and included in the warrant analysis. The same ratios were used for the Paulette Duguay Street and Ibrahima Diallo Avenue intersection.

The *Traffic Signal & Pedestrian Signal Head Warrant Analysis* worksheets for these intersections are included in **Appendix C**.

3.1.1 PAULETTE DUGUAY STREET AND COMMERCIAL ACCESS

The signal warrant analysis with forecast 2034 traffic volumes at the Paulette Duguay Street and Commercial Access intersection resulted in a total of 77 warrant points (59 vehicle warrant points and 18 pedestrian warrant points), below the threshold of 100 points required in the City of Winnipeg. Therefore, signals are not warranted by full build-out.

3.1.2 PAULETTE DUGUAY STREET AND IBRAHIMA DIALLO AVENUE

The signal warrant analysis with forecast 2034 traffic volumes at the Paulette Duguay Street and Ibrahima Diallo Avenue intersection resulted in a total of 72 warrant points (61 vehicle points and 12 pedestrian warrant points), below the threshold of 100 points required in the City of Winnipeg. Therefore, signals are not warranted by full build-out.

3.2 INTERSECTION ANALYSIS

The intersection analysis for the proposed development was undertaken for all future horizon years using Synchro 11.0 and SIDRA traffic analysis software, and SimTraffic simulation software. The relative performance of an intersection is measured in terms of the level of service (LOS). LOS ranges from A (excellent) to F (beyond capacity). In general, LOS E is considered to be at capacity.

LOS for signalized intersections is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. Delay is a complex measure and is dependent on a

number of variables, including the quality of progression, cycle length, green ratio and ratio for the lane group in question.

LOS criteria for unsignalized intersections are also defined in terms of delay. Delay is the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line. This includes the time required for the vehicle to travel from the last-in-queue position to the first.

Intersection capacity utilization level of service (ICU LOS) provides additional insight into how a signalized intersection is functioning, and how much extra capacity is available to handle traffic fluctuations and incidents. ICU LOS ranges from A (excellent) to H (beyond capacity), with ICU LOS E generally considered to be at practical capacity.

The volume to capacity (v/c) ratio is used to determine the level of congestion for each lane group. If the v/c ratio is greater than or equal to 1.00 that approach is operating above capacity. Public Works defines the ideal maximum v/c ratio for through and shared through / turning lanes as 0.85, and a v/c ratio of 0.90 for turning lanes.

The following assumptions were used in the Synchro and SimTraffic analyses:

- HCM 6th Edition methodology results are reported for stop-controlled intersections;
- Heavy vehicle percentages were assumed to be the same as the September 2020 TIS for all scenarios;
- The peak hour factor used for all scenarios is 0.92;
- Existing speed limits were used for all scenarios;
- A minimum phase length of 13 seconds was used even when minimum splits are less than 13 seconds; and
- 95th percentile queue lengths were obtained by running five consecutive one-hour simulations in SimTraffic and taking an average of the results.
- The maximum signal cycle length for Marion Street is 120 seconds.
- The maximum signal cycle length of Lagimodiere Boulevard is 150 seconds.

SIDRA Intersection 9.0 software was used for the traffic analysis of the roundabouts, which is a preferred software for roundabout analyses. The following parameters were used when modelling the roundabouts in SIDRA:

- Lane width: Lane width: 3.7 metres, 5.0 metre circulating in roundabout;
- Roundabout Island Diameter: 30 metres;
- SIDRA Roundabout Entry Radius / Angle: 20 metres / 30 degrees;
- SIDRA Standard Roundabout Capacity Model; and
- SIDRA Roundabout Level-of-Service Method.

The detailed Synchro, SimTraffic and SIDRA analysis results are included in **Appendix D**.

3.2.1 MARION STREET / DUPUY AVENUE / PAULETTE DUGUAY STREET

The Marion Street / Dupuy Avenue / Paulette Duguay Street intersection is currently an unsignalized T-intersection. A fourth approach on the south side of Marion Street will be added with the construction of the proposed development, and the future intersection was assumed to be signalized as it was signalized in all previous analyses. The 2025 proposed intersection configuration was analysed and is provided in **Appendix A**. A road widening and median had been introduced to accommodate the proposed left-turn lanes on Marion Street. As shown in **Figure 3-1**, the signalized intersection was analyzed with the following geometry:

- The northbound approach on Paulette Duguay Street consists of a left-turn lane and a shared left / through / right-turn lane with a right-turn cut-off;
- The southbound approach on Dupuy Avenue consists of a shared left-turn / through / right-turn lane;
- The eastbound approach on Marion Street consists of a left-turn lane, two through lanes, and a right-turn lane; and
- The westbound approach on Marion Street consists of a left-turn lane, a through lane, and a shared through / right-turn lane.



Figure 3-1: Marion Street and Dupuy Avenue / Paulette Duguay Street Intersection Configuration

Table 3-1 summarizes the results of the signalized intersection Synchro analysis for the Marion Street and Dupuy Avenue / Paulette Duguay Street intersection. It should be noted that the adjacent intersection at Archibald Street was added to the model to ensure the effects of metering and coordination are taken into account at the Dupuy Avenue / Paulette Duguay Street intersection. The Marion Street and Archibald Street traffic volumes from the September 2020 TIS were used and eastbound and westbound volumes were balanced with the Dupuy Avenue / Paulette Duguay Street intersection. The existing timing plan at Archibald Street was used in the model, but when conducting the analysis in Synchro, the signal timing splits and offsets were optimized.

Table 3-1: Marion Street / Dupuy Avenue / Paulette Duguay Street Synchro Analysis Results

SCENARIO	INTERSECTION			CRITICAL MOVEMENT		
	LOS (DELAY)	ICU LOS (%)	MAX V/C	MOVEMENT	LOS (DELAY)	V/C
WEEKDAY A.M. PEAK HOUR						
2029 Forecast Traffic Volumes	B (15 sec)	B (61%)	0.65 (NBL)	NBL	D (47 sec)	0.65
2034 Forecast Traffic Volumes	B (17 sec)	C (71%)	0.83 (NBL)	NBL	E (63 sec)	0.83
WEEKDAY P.M. PEAK HOUR						
2029 Forecast Traffic Volumes	B (17 sec)	C (71%)	0.82 (NBL)	NBL	E (55 sec)	0.82
2034 Forecast Traffic Volumes	B (19 sec)	D (80%)	0.89 (EBT)	NBL	E (56 sec)	0.88

The analysis indicates that all scenarios feature an overall intersection LOS B. The 2029 p.m. peak hour, 2034 a.m. peak hour, and 2034 p.m. peak hour scenarios feature a critical northbound left movement with LOS E, but the maximum v/c ratio for all scenarios are less than 1.0.

3.2.2 PAULETTE DUGUAY STREET / COMMERCIAL ACCESS INTERSECTION

A new four-legged intersection is proposed within the development to provide access to commercial areas. As discussed in **Section 3.1**, a signal is not warranted at this intersection for any scenarios. As shown in **Figure 3-2**, this intersection was analyzed as an unsignalized intersection with the following geometry:

- The northbound approach on Paulette Duguay Street is free flowing and consists of a shared left-turn / through lane and a shared through / right-turn lane.
- The southbound approach on Paulette Duguay Street is free flowing and consists of a left-turn lane, a through lane, and a shared through / right-turn lane.
- The eastbound and westbound approaches on the commercial accesses are stop-controlled and consist of a shared left-turn / through lane and a right-turn lane.



Figure 3-2: Paulette Duguay Street and Commercial Access Intersection Configuration

Table 3-2 summarizes the results of the stop-controlled intersection Synchro analysis for the commercial access intersection.

Table 3-2: Paulette Duguay Street / Commercial Access Synchro Analysis Results (HCM 6th Edition)

SCENARIO	INTERSECTION		CRITICAL MOVEMENT		
	LOS (DELAY)	MAX V/C	MOVEMENT	LOS (DELAY)	V/C
WEEKDAY A.M. PEAK HOUR					
2029 Forecast Traffic Volumes	A (2 sec)	0.05 (SBL)	WBL/T	C (17 sec)	0.06
2034 Forecast Traffic Volumes	A (2 sec)	0.11 (EBL/T)	WBL/T	E (41 sec)	0.099
WEEKDAY P.M. PEAK HOUR					
2029 Forecast Traffic Volumes	A (5 sec)	0.23 (EBL/T)	WBL/T	D (28 sec)	0.23
2034 Forecast Traffic Volumes	A (7 sec)	0.49 (EBL/T)	WBL/T	F (74 sec)	0.47

The analysis indicates that the intersection performs at an acceptable LOS A and the maximum v/c ratio is under 1.0 for all scenarios. The 2034 p.m. peak scenario features a critical shared westbound left / through movement with LOS F; however, the movement features a v/c ratio of 0.47, indicating that the delay is not due to a lack of capacity on the approach but instead due to gaps in Paulette Duguay Street traffic. Lower LOS values are not uncommon for cross-streets at an unsignalized intersection during peak periods.

3.2.3 PAULETTE DUGUAY STREET / IBRAHIMA DIALLO AVENUE

A new three-legged collector intersection is proposed within the development site at Paulette Duguay Street and Ibrahima Diallo Avenue. As discussed in **Section 3.1**, a signal is not warranted at this intersection for any scenarios. As shown in **Figure 3-3**, this intersection was analyzed as an unsignalized intersection with the following geometry:

- The northbound approach on Paulette Duguay Street is free flowing and consists of a through lane and a shared through / right-turn lane.
- The southbound approach on Paulette Duguay Street is free flowing and consists of a left-turn lane and two through lanes.
- The westbound approach on Ibrahima Diallo Avenue is stop-controlled and consists of a shared left-turn / right-turn lane.



Figure 3-3: Paulette Duguay Street and Ibrahima Diallo Avenue Intersection Configuration

Table 3-3 summarizes the results of the stop-controlled intersection Synchro analysis for the Paulette Duguay Street and Ibrahima Diallo Avenue intersection.

Table 3-3: Paulette Duguay Street / Ibrahima Diallo Avenue Synchro Analysis Results (HCM 6th Edition)

SCENARIO	INTERSECTION		CRITICAL MOVEMENT		
	LOS (DELAY)	MAX V/C	MOVEMENT	LOS (DELAY)	V/C
WEEKDAY A.M. PEAK HOUR					
2029 Forecast Traffic Volumes	A (6 sec)	0.25 (SBL)	WBL	A (10 sec)	0.19
2034 Forecast Traffic Volumes	A (6 sec)	0.35 (WBL)	WBL	B (12 sec)	0.35
WEEKDAY P.M. PEAK HOUR					
2029 Forecast Traffic Volumes	A (7 sec)	0.39 (WBL)	WBL	B (11 sec)	0.39
2034 Forecast Traffic Volumes	A (7 sec)	0.50 (WBL)	WBL	B (13 sec)	0.50

The results in **Table 3-3** indicate that the intersection operates at an acceptable overall LOS A with v/c ratios below 0.85 and critical movements operating at LOS B or better in all scenarios.

3.2.4 LAGIMODIERE BOULEVARD / MAGINOT STREET

Lagimodiere Boulevard / Maginot Street is currently a signalized four-legged intersection. As in the previous TISs, the intersection has been analyzed in phases, with a second northbound left-turn lane being added for the Phase 2 analysis. The exiting configuration is shown in **Figure 3-4**, which consists of the following geometry:

- The northbound approach on Lagimodiere Boulevard consists of a left-turn lane, two through lanes, and a right-turn lane.
- The southbound approach on Lagimodiere Boulevard consists of a left-turn lane, two through lanes, and a right-turn lane with a right-turn cut-off.
- The eastbound approach on Maginot Street consists of two left-turn lanes, a through lane, and a shared through / right-turn lane with a right-turn cut-off.
- The westbound approach on Maginot Street consists of a left-turn lane, a through lane, and a right-turn lane.

Phase 2 included analysis of a second northbound left-turn lane meaning the northbound approach on Lagimodiere Boulevard consisted of two left-turn lanes, two through lanes, and a right-turn lane.

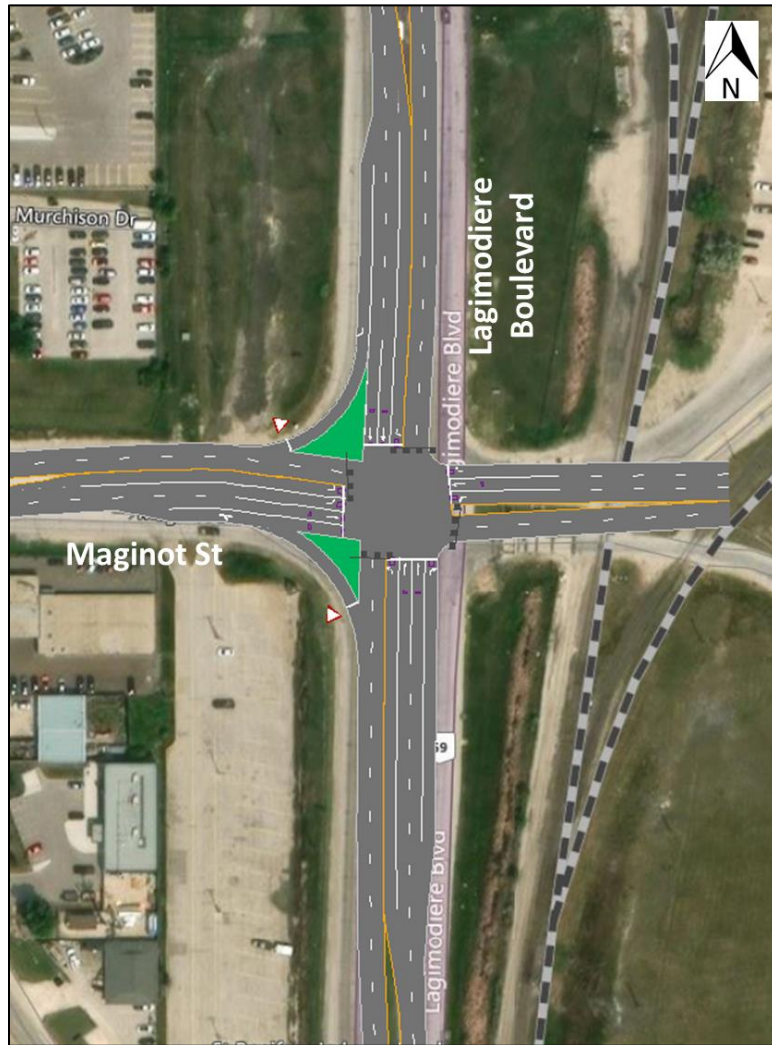


Figure 3-4: Lagimodiere Boulevard and Maginot Street Intersection Configuration

Table 3-4 summarizes the results of the signalized intersection Synchro analysis for the Lagimodiere Boulevard / Maginot Street intersection. The analysis was completed with both one and two northbound left-turn lanes as has been the case for the analysis in the previous TISs.

Table 3-4: Lagimodiere Boulevard / Maginot Street Synchro Analysis Results

SCENARIO	INTERSECTION			CRITICAL MOVEMENT		
	LOS (DELAY)	ICU LOS (%)	MAX V/C	MOVEMENT	LOS (DELAY)	V/C
WEEKDAY A.M. PEAK HOUR						
2029 Future Traffic Volumes	C (25 sec)	D (80%)	0.87 (NBT)	SBL	E (78 sec)	0.67
2034 Future Traffic Volumes (1 northbound left lane)	C (29 sec)	D (81%)	0.82 (NBT)	SBL	E (79 sec)	0.60
2034 Future Traffic Volumes (2 northbound left lanes)	C (25 sec)	D (81%)	0.87 (NBT)	SBL	E (79 sec)	0.68
WEEKDAY P.M. PEAK HOUR						
2029 Future Traffic Volumes	C (23 sec)	D (75%)	0.88 (SBT)	NBL	E (67 sec)	0.58
2034 Future Traffic Volumes (1 northbound left lane)	C (31 sec)	E (88%)	0.93 (SBT)	SBL	E (79 sec)	0.29
2034 Future Traffic Volumes (2 northbound left lanes)	C (24 sec)	D (80%)	0.89 (SBT)	NBL	E (76 sec)	0.73

The analysis indicates that all scenarios feature an overall intersection LOS C and v/c ratios less than 1.0. The intersection approaches capacity (max v/c of 0.93) during the 2034 p.m. peak hour with only one northbound left-turn lane. The second northbound left-turn lane provides additional capacity for the intersection which reduces the max v/c ratio to less than 0.90 and reduces the overall average delay by 7 seconds.

A cantilever lane designation overhead sign structure would be required for the dual northbound left-turn lane and substantial modifications to intersection geometry may be required to ensure all truck movements are accommodated. These are future considerations would be confirmed during detailed design.

3.2.5 MAGINOT STREET / SPEERS ROAD

The existing four-legged unsignalized intersection at Maginot Street / Speers Road is proposed to be upgraded to a roundabout as per the previous TIS studies. As shown in **Figure 3-5**, the roundabout was analyzed with the following geometry:

- The northbound, southbound and eastbound roundabout approaches consist of a shared left-turn / through / right-turn lane.
- The westbound approach consists of a shared left-turn / through lane and a right-turn bypass lane.

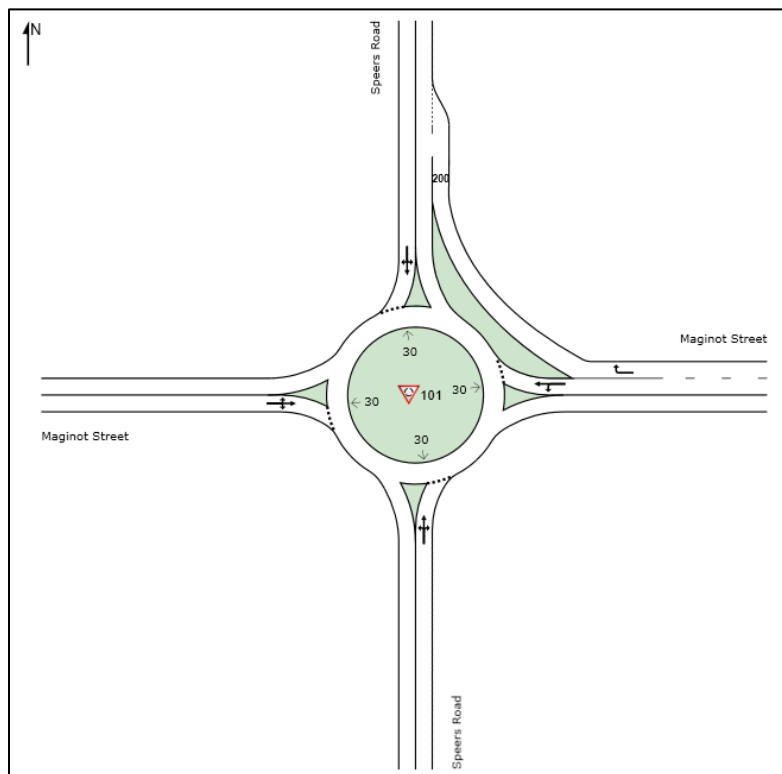


Figure 3-5: Maginot Street and Speers Road Roundabout Configuration

Table 3-5 summarizes the results of the roundabout intersection SIDRA analysis for the Maginot Street / Speers Road intersection.

Table 3-5: Maginot Street / Speers Road SIDRA Roundabout Analysis Results

SCENARIO	INTERSECTION		CRITICAL MOVEMENT	
	LOS (DELAY)	MAX V/C	MOVEMENT	LOS (DELAY)
WEEKDAY A.M. PEAK HOUR				
2029 Future Traffic Volumes	A (5 sec)	0.24 (NB)	SB	A (6 sec)
2034 Future Traffic Volumes	A (5 sec)	0.27 (NB)	EB	A (6 sec)
WEEKDAY P.M. PEAK HOUR				
2029 Future Traffic Volumes	A (5 sec)	0.31 (SB)	SB	A (6 sec)
2034 Future Traffic Volumes	A (5 sec)	0.40 (SB)	SB	A (6 sec)

The results in **Table 3-5** indicate that the collector roundabout would perform at an acceptable overall LOS A with v/c ratios below 0.85 and critical movements operating at LOS A in all scenarios.

It is noted that Maginot Street between Speers Road and Lagimodiere Boulevard will need to be reviewed during detailed design to determine what extent of reconstruction is required to accommodate the roundabout.

3.2.6 QUEUING ANALYSIS

The 95th percentile queue lengths at each intersection were obtained by taking an average from five consecutive one-hour simulations in SimTraffic for the signalized and stop-controlled intersections and using the reported 95th percentile queue lengths in SIDRA for the roundabouts. The forecast 2034 a.m. and p.m. peak hour analysis 95th percentile queues on each approach at each intersection are provided in **Table 3-6**. Queues are considered critical if they may impact adjacent intersections, exceed storage lane lengths, or in the case of eastbound Marion Street, may queue over the rail line.

Table 3-6: 2034 (Phase 2) 95th Percentile Queue Lengths

INTERSECTION	MOVEMENT	STORAGE LENGTH (M)	CRITICAL 95 th PERCENTILE QUEUE (M)	
			WEEKDAY A.M. PEAK	WEEKDAY P.M. PEAK
Marion St. / Dupuy Ave. / Paulette Duguay St.	NBL	105 ¹	70.7	59.4
	NBL/T/R	105 ¹	72.1	85.5
	SBL/T/R	27	24.5	23.1
	EBL	25 ³	12.8	10.1
	EBT	290 ²	33.8	56.6
	EBR	90 ³	39.5	55.3
	WBL	80 ³	45.5	29.2
Paulette Duguay St. / Commercial Access	NBL/T	50 ¹	12.5	16.5
	SBL	20 ³	11.7	8.7
	EBL/T	-	13.1	26.5
	WBL/T	-	9.8	18.6
Paulette Duguay St / Ibrahima Diallo Ave	NBT/R	210 ¹	0	0.9
	SBL	45 ³	23.2	18.8
	WBL/R	135 ¹	24.7	35.1
Maginot St / Speers Rd (Roundabout)	NB	45 ¹	12.3	7.2
	SB	200 ¹	10.8	20.1
	EB	45 ¹	10.5	13.6
	WB	135 ¹	7.2	7.2
Lagimodiere Blvd. / Maginot St. with 1 NBL Lane	NBL	100 ³	53.0	59.9
	SBL	80 ³	40.1	20.1
	EBL #1	60 ³	51.0	44.1
	EBL #2	135 ¹	55.7	47.8
	WBL	35 ¹	24.3	30.7

INTERSECTION	MOVEMENT	STORAGE LENGTH (M)	CRITICAL 95 th PERCENTILE QUEUE (M)	
			WEEKDAY A.M. PEAK	WEEKDAY P.M. PEAK
Lagimodiere Blvd. / Maginot St. with 2 NBL Lanes	NBL #1	-	43.8	28.2
	NBL #2	100 ³	51.1	34.3
	SBL	80 ³	41.7	18.4
	EBL #1	60 ³	41.2	43.0
	EBL #2	135 ¹	44.1	47.1
	WBL	35 ¹	29.4	26.7

1 – Distance to adjacent intersection with public road

2 – Distance to rail line

3 – Length of turning lane

The 2034 a.m. and p.m. peak hour analysis 95th percentile queue lengths presented in **Table 3-6** Error! Reference source not found. indicate that there are no queueing issues.

4 TRANSIT REVIEW

The September 2020 TIS and this TIS update both assume a non-private vehicle driver mode share of up to 20% for the Public Markets MRS-D development, depending on the land use, which was included in the trip generation calculations. The rationale for this mode share was outlined in detail in the September 2020 TIS. It is based on “*expectations developed by the secondary plan approval process where a mode split of 20% to 30% is anticipated by the City*” and “*on experience in other jurisdictions, that new developments located near or serviced by Frequent and Rapid transit services will attract transit mode share in the 20% to 30% range*”.

To achieve this mode share it will be necessary for transportation infrastructure to prioritize Transit service efficiency and reliability, as well as user access and amenities. The City of Winnipeg has designed a new bus network for the City of Winnipeg² that includes provision for future service to the proposed development site. The new network is planned to be in service in late June 2025, with service to the proposed development likely to be phased in as the area is built-out. The new network classifies bus routes into eight different classes, with Class 1 (Rapid Transit) being the most frequent service and Class 8 being the least frequent.

As shown in **Figure 4-1**, Frequent Line F9 will run along Lagimodiere Boulevard and utilize Speers and Maginot Road in the study area vicinity. A frequent bus line has headways of 10 to 15 minutes on weekdays and stops every 350 to 500 metres. This route will run north-south from the University of Manitoba to the Kildonan Place Transit terminal.

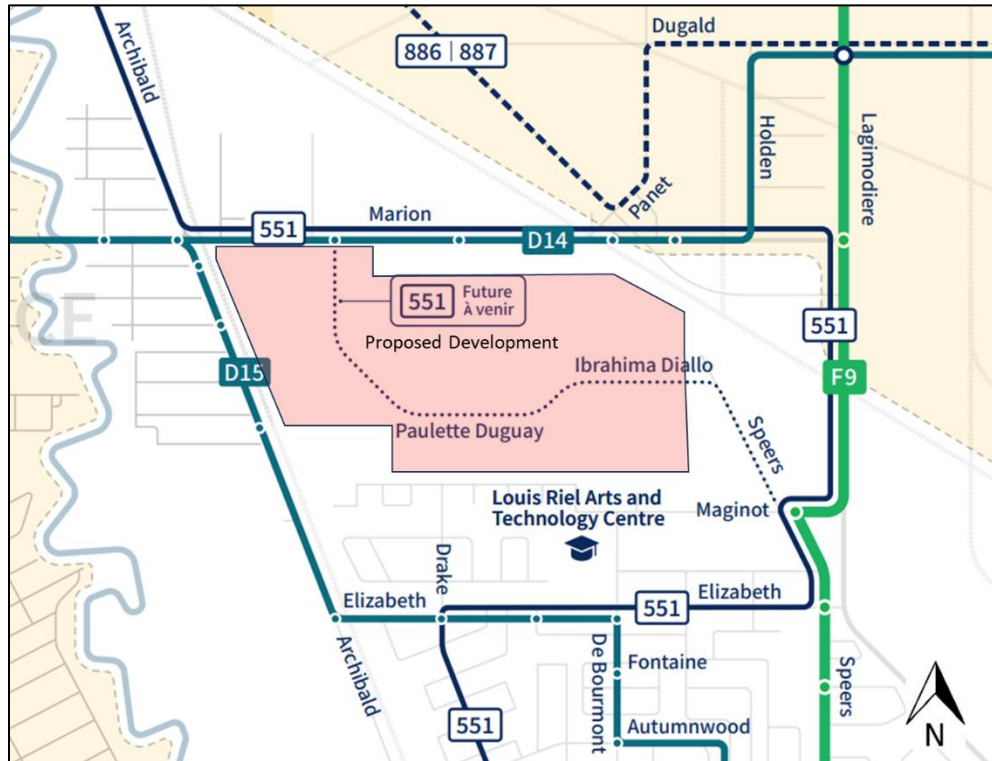
Additionally, Direct Lines D14 and D15 will run alongside the edge of the Public Markets site on Archibald and Marion Streets. A direct bus line is defined as having headways of 10 to 20 minutes on weekdays and stops every 200 to 500 metres. Both D14 and D15 run roughly east-west through the city and provide opportunities to transfer to bus routes with city wide destinations.

Lastly, a new connector route is proposed to service Paulette Duguay Street and Ibrahima Diallo Avenue within the proposed development. Connector Route 551 will run roughly north-south and will service neighbourhoods between its southern terminus in the Sage Creek neighbourhood to its northern terminus in the Rossmere neighbourhood. Connector routes are intended to have stops every 200 to 500 metres and headways of 15 to 30 minutes on weekdays.

The upgrades to Winnipeg’s Transit system planned for June 2025 will provide significant improvements for access to transit in the Public Markets area. Route 551 is of particular importance, as its alignment will run directly through Public Markets and provide transit services to an area that presently has no bus routes that serve it.

Figure 4-2 illustrates the updated proposed bus stop layout at the Marion Street / Dupuy Avenue / Paulette Duguay Street intersection based on discussions with the City’s Public Works and Transit departments.

² City of Winnipeg: The Primary Transit Network and its feeder routes, <https://www.winnipeg.ca/city-governance/strategic-plans-policies/winnipeg-transit-master-plan/primary-transit-network>



Source: Winnipeg Transit

Figure 4-1: Proposed 2025 Transit Service



Figure 4-2: Proposed Bus Stop Layout at Marion Street and Paulette Duguay Street

5 WALKING AND CYCLING REVIEW

This section outlines two walking and cycling considerations requested by the City for review in this TIS update. These include reviewing roundabout pedestrian crossing treatments and school travel planning.

5.1 PEDESTRIAN CROSSING TREATMENTS

Pedestrian crossing warrants were completed using Table 1 of the *TAC Pedestrian Crossing Control Guide, Third Edition*, for two intersections along Paulette Duguay Street and the proposed Maginot Street / Speers Road roundabout to evaluate the need for enhanced pedestrian crossings. Paulette Duguay Street is a free-flowing corridor, and pedestrian access to the adjacent retail developments are an important consideration.

Pedestrians walking along the north side of Ibrahima Diallo Avenue can access the retail area by walking along the east side of Paulette Duguay Street and crossing at the south side of the Commercial Access intersection, while pedestrians on the south side of Ibrahima Diallo Avenue can cross on the south side of the Ibrahima Diallo Avenue intersection. These locations are best suited for pedestrian crossings because the south legs of these intersections feature lower traffic volumes and median refuge. The north legs of these intersections would require pedestrians to cross five traffic lanes without a median refuge, due to the presence of a southbound left-turn.

Table 5-1 summarizes the results of the pedestrian warrant, which recommends Rectangular Rapid Flashing Beacon (RRFB) treatments at both Paulette Duguay Street crossing locations, and crosswalks with ground mounted signage at all roundabout approaches. **Figure 5-1** illustrates the recommended pedestrian crossing paths and treatment locations.

Table 5-1: Pedestrian Crossing Treatments

LOCATION	2034 AADT	SPEED LIMIT (KM/H)	NUMBER OF LANES	MEDIAN REFUGE?	CROSSING TREATMENT ¹
Paulette Duguay Street & Commercial Access					
South Approach	10,300	50	4	Y	RRFB
Paulette Duguay Street & Ibrahima Diallo Avenue					
South Approach	5,100	50	4	Y	RRFB
Maginot Street / Speers Road					
North Approach	6,700	50	3	Y	GM
East Approach	7,400	50	3	Y	GM
South Approach	3,500	50	2	Y	GM
West Approach	4,800	50	2	Y	GM

¹ – GM is a crosswalk with side mounted signs. RRFB is a Rectangular Rapid Flashing Beacon.

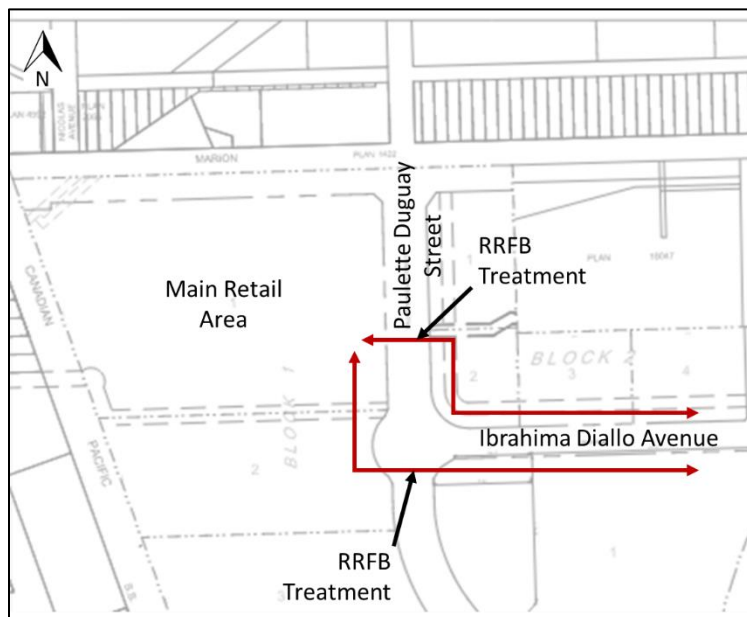


Figure 5-1: Pedestrian Crossing Paths

5.2 SCHOOL TRAVEL PLANNING

Figure 5-2 illustrates the school travel plan for the proposed development which includes walking paths and distances to the nearest elementary school (Archwood School) and high school (Louis Riel Arts and Technology Centre). The developer (Oxela Developments) previously completed a study for a pedestrian bridge over the CPKC Sprague rail line that would improve walking and cycling connections to Archwood School, however, there was no interested from stakeholders at the time and the project did not progress beyond the study.

6 TRUCK ACCESS REVIEW

The proposed development is mixed-use and includes residential, commercial and employment lands. It is anticipated that the employment lands will generate some goods movement commercial truck traffic that will use the collector road network to access the City's surrounding Regional Street and goods movement networks. The future employment lands are located on the east side of the site to mitigate the potential impact of truck traffic on the residential land uses on the west side (refer to proposed development land uses in **Figure 1-2** in **Section 1.2**).

Marion Street and Lagimodiere Boulevard are both designated as Regional Streets and Truck Routes; however, Lagimodiere Boulevard via Speers Road is expected to be a more attractive access for truck movements to/from the proposed employment lands. This is primarily because it provides more efficient access to significant goods movements routes and destinations including:

- The Perimeter Highway, and destinations beyond the Perimeter Highway.
- The Winnipeg Inner Ring Roads, especially Lagimodiere Boulevard, Abinojii Mikanah and Chief Peguis Trail.
- Industrial lands in the north, east and south areas of Winnipeg.

Marion Street provides a shorter route to most industrial lands in central and northwest Winnipeg but may be a less desirable route for goods movement due to requiring truck travel through downtown.

Regardless of the preferred travel route, all development intersections and roundabouts will be designed to accommodate a WB-20 design vehicle. The 2025 draft detailed design of the Marion Street / Dupuy Avenue / Paulette Duguay Street intersection, and Paulette Duguay Street / Ibrahima Diallo Avenue intersection (**Appendix A**) are designed to accommodate WB-20s, and the Maginot Street / Speers Road roundabout will accommodate a WB-20 design vehicle but has not yet been designed in detail.

7 CONCLUSIONS

The following conclusions are made for the proposed development based on the results of the analysis:

- The purpose of this 2025 TIS Update is to reassess the transportation impacts of the development based on the most current development proposal, incorporating the design changes and updates in the May 2024 TIS Update, the July 2024 Stop-Control Review Letter, and the March 2025 Trip Generation Update Memo. The most current development proposal includes the following updates since the previous reports:
 - Remove 60,000 square feet of Specialty Trade Centre.
 - Remove 281,000 square feet of Recreational Community Centre.
 - Add 800 multi-family units, bringing the development total to 2,800 multi-family units.
- In the 2029 Phase 1 scenario, the development is proposed to generate 964 auto trips (580 entering and 384 exiting) during the weekday a.m. peak hour, 1,014 auto trips (382 entering and 632 exiting) during the p.m. peak hour, and 10,166 auto trips (5,083 entering and 5,083 exiting) daily.
- In the 2034 Phase 2 / Full Development scenario, the additional residential units are forecast to generate 1,460 auto trips (738 entering and 722 exiting) during the weekday a.m. peak hour, 1,577 auto trips (691 entering and 886 exiting) during the p.m. peak hour, and 16,108 auto trips (8,054 entering and 8,054 exiting) daily.
- A traffic signal is not warranted for the Paulette Duguay Street / Commercial Access and the Paulette Duguay Street / Ibrahim Diallo Avenue intersections in any of the scenarios.
- Capacity analysis of the Marion Street / Dupuy Avenue / Paulette Duguay Street intersection, Paulette Duguay Street / Commercial Access intersection, Paulette Duguay Street / Ibrahim Diallo intersection and proposed Maginot Street / Speers Road roundabout indicates that these intersections are forecast to operate acceptably during the 2029 and 2034 post development scenarios with the intersection configurations included in the 2025 design (**Appendix A**).
- The Lagimodiere Boulevard / Maginot Street intersection is approaching capacity in the 2034 development full build-out scenario but is forecast to operate acceptably with overall intersection LOS C and max v/c ratio of less than 1. Previous TISs included a second northbound left-turn lane at this intersection for the Phase 2 (full build-out) scenario, and in this updated TIS a second northbound left-turn lane is shown to reduce the max v/c ratio to less than 0.90 and reduce the overall average delay by 7 seconds. A cantilever lane designation overhead sign structure would be required for the dual northbound left-turn lane and substantial modifications to intersection geometry may be required to ensure all truck movements are accommodated. These are future considerations would be confirmed during detailed design.
- Route upgrades to Winnipeg's Transit system planned for 2025 will provide significant improvements for access to transit in the Public Markets area. Some Transit trips to / from the proposed development are expected to transfer between Direct Route D14 and Connector Route 551 at the proposed Marion Street / Dupuy Avenue / Paulette Duguay Street intersection. Direct Route D14 is proposed to be served by stops on far-side eastbound Marion Street and near-side westbound Marion Street, while Connector Route 551 is proposed to be served by stops on northbound and southbound Paulette Duguay Street.
- The majority of truck traffic generated by employment lands in the proposed development is expected to access the area via Speers Road, Maginot Street and Lagimodiere Boulevard.
- RRFB pedestrian crossings are recommended across Paulette Duguay Street south of the Commercial Access and south of Ibrahim Diallo Avenue. All four approaches to the Maginot Street / Speers Road roundabout warrant a painted crosswalk with side mounted signs.
- The nearest elementary school is Archwood School (1,485m) and the nearest high school is Louis Riel Arts and Technology Centre (2,300m).

APPENDIX

A 2025 DESIGN DRAWINGS



THE CITY OF WINNIPEG

FINANCE #

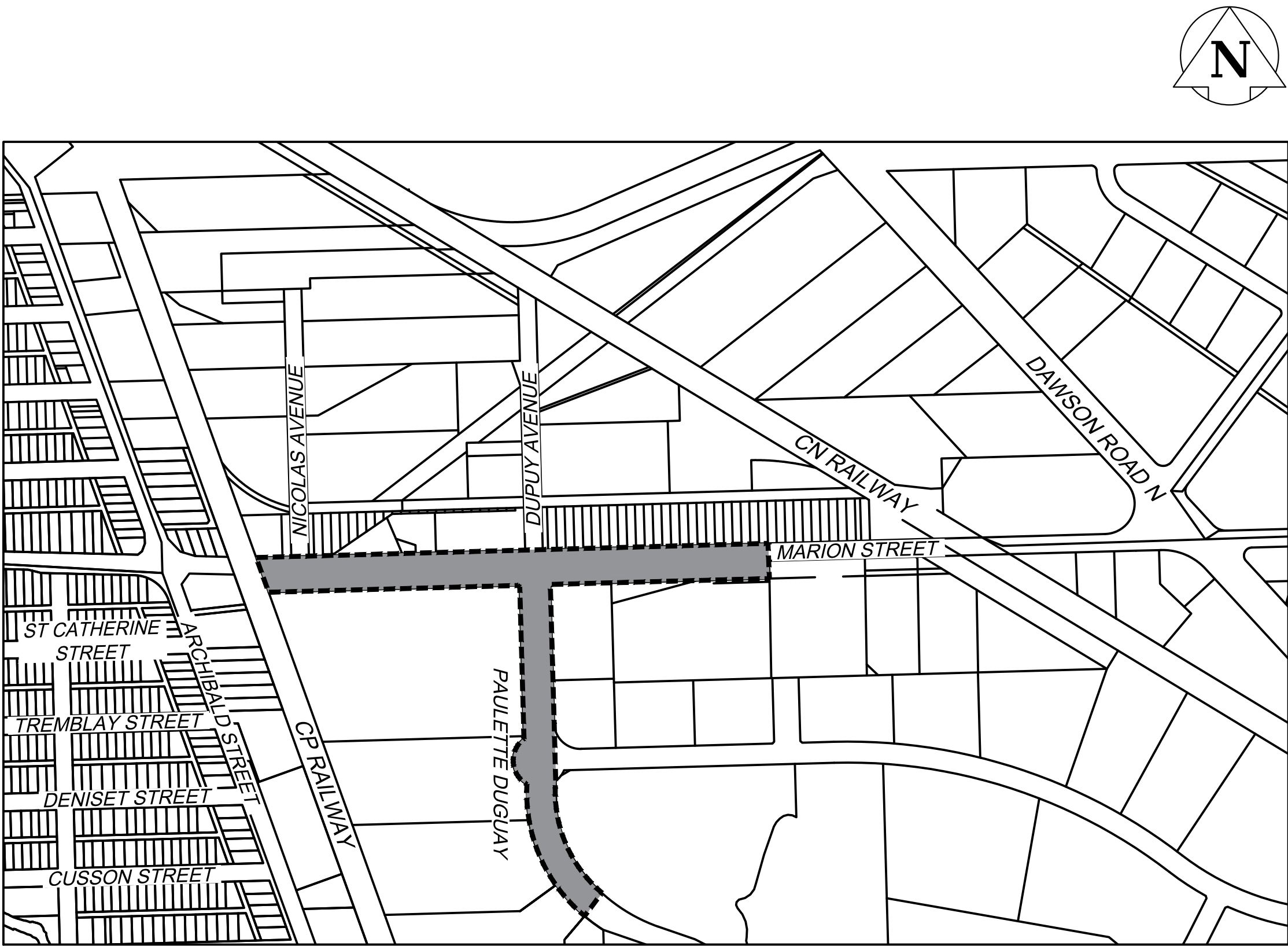
MARCH, 2022

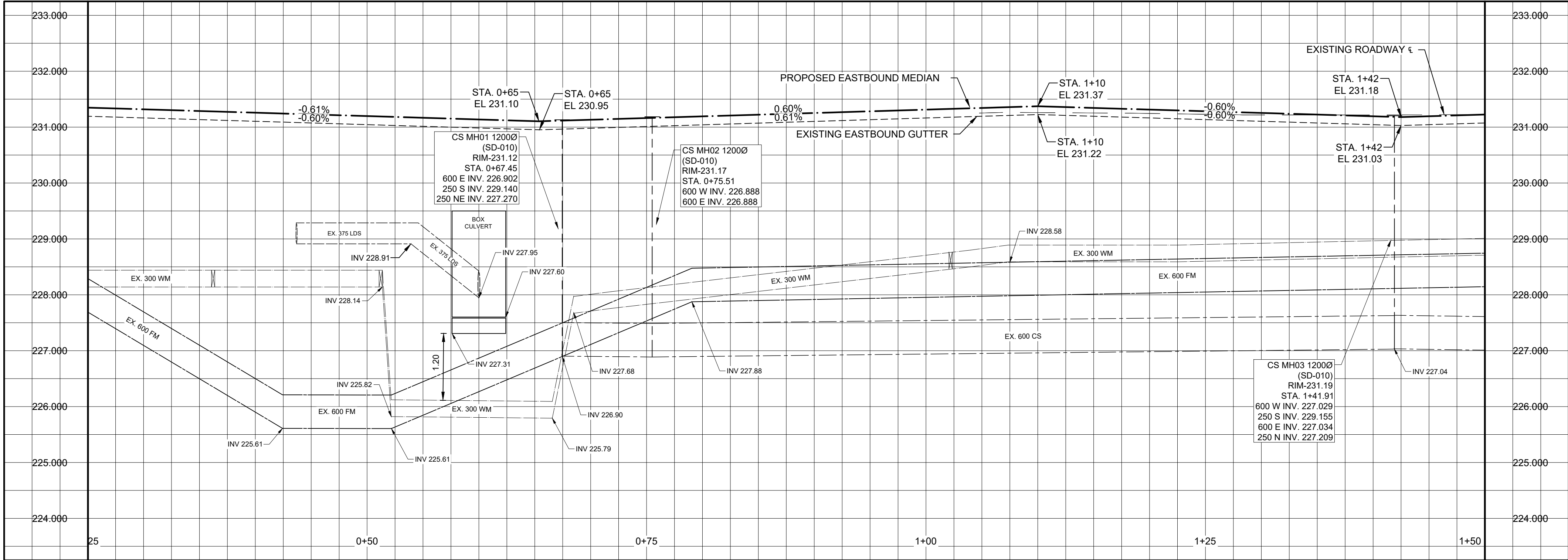
MARION STREET PUBLIC MARKETS

UNDERGROUND SERVICING AND ROADWORK

DASZ 30/2020

CITY DWG #	DRAWING #	SHEET #	DRAWING NAME	DESCRIPTION
-	211-07590-00-C000	1 OF 11	COVER	COVER, LOCATION PLAN AND DRAWING INDEX
-	211-07590-00-C201	2 OF 11	MARION STREET	PLAN, PROFILE AND DETAILS - UNDERGROUND SERVICING AND ROADWORK
-	211-07590-00-C202	3 OF 11	MARION STREET	PLAN, PROFILE AND DETAILS - UNDERGROUND SERVICING AND ROADWORK
-	211-07590-00-C203	4 OF 11	MARION STREET	PLAN, PROFILE AND DETAILS - UNDERGROUND SERVICING AND ROADWORK
-	211-07590-00-C204	5 OF 11	MARION STREET	PLAN, PROFILE AND DETAILS - UNDERGROUND SERVICING AND ROADWORK
-	211-07590-00-C205	6 OF 11	MARION STREET	PLAN, PROFILE AND DETAILS - UNDERGROUND SERVICING AND ROADWORK
-	211-07590-00-C206	7 OF 11	PAULETTE DUGUAY STREET	PLAN, PROFILE AND DETAILS - UNDERGROUND SERVICING AND ROADWORK
-	211-07590-00-C207	8 OF 11	PAULETTE DUGUAY STREET	PLAN, PROFILE AND DETAILS - UNDERGROUND SERVICING AND ROADWORK
-	211-07590-00-C501	9 OF 11	DETAIL PLAN	PLAN - JOINT PLAN
-	211-07590-00-C502	10 OF 11	DETAIL PLAN	PLAN - JOINT PLAN
-	211-07590-00-C503	11 OF 11	DETAIL PLAN	PLAN - JOINT PLAN



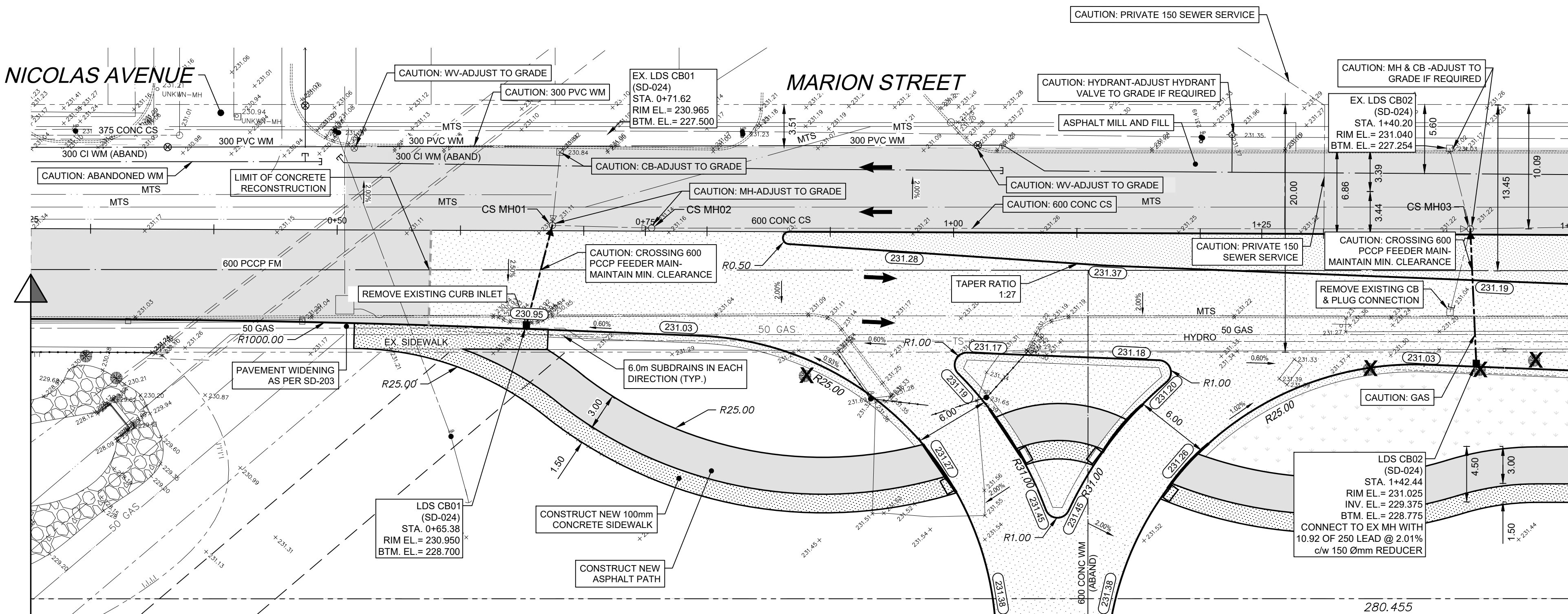
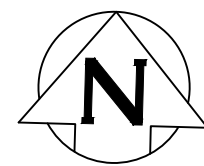


NOTES FOR MARION ST ONLY

- PIPE CLASSES SHOWN FOR L.D.S. ARE FOR CONCRETE PIPE UNLESS OTHERWISE SHOWN.
- ALL PIPES 375 AND SMALLER TO BE CORED, ALL PIPES 450 AND LARGER CLASS 3 BACKFILL AT ALL PROPOSED AND EXISTING PAVEMENT CROSSINGS.
- ALL SIDEWALK/PATHWAY CROSSINGS TO HAVE CURB RAMPS.
- MINIMUM 0.44% GRADE ON 300 C.B. LEADS.
- MINIMUM 0.56% GRADE ON 250 C.B. LEADS.
- ALL WORK TO CONFORM TO THE CITY OF WINNIPEG STANDARD CONSTRUCTION SPECIFICATIONS.
- INSTALL DETECTABLE WARNING TILE AS SHOWN PER CW3328 AT ALL SIDEWALK/PATHWAY CONNECTIONS.
- ADJUST ALL WATER VALVES, MANHOLES, CATCH BASINS, CATCH PITS AND WATER SHUT OFF VALVES TO GRADE.
- ALL RADI 25m OR LESS SHALL BE INTEGRAL MODIFIED BARRIER CURB

CAUTION: AQUEDUCT AND/OR FEEDERMAIN

- DO NOT OPERATE VIBRATORY EQUIPMENT OVER OR WITHIN 3.0 METERS OF THE AQUEDUCT AND/OR FEEDERMAIN CENTRELINE.
- INSTALLATION EQUIPMENT FOR THE PROPOSED WORKS SHALL NOT CROSS OR TRAVEL ALONG EITHER SIDE OF THE AQUEDUCT AND/OR FEEDERMAIN WITHIN A LATERAL DISTANCE OF 5.0 METERS FROM THE CENTRELINE OF THE AQUEDUCT AND/OR FEEDERMAIN.
- CONCRETE DEMOLITION AND REMOVAL WITHIN 3 METERS HORIZONTALLY OF THE AQUEDUCT AND/OR FEEDERMAIN SHALL BE COMPLETED BY SAWCUTTING AND REMOVAL, OR BY THE USE OF THE HAND HELD JACKHAMMERS. USE OF MACHINE MOUNTED CONCRETE BREAKERS ABOVE THE AQUEDUCT AND/OR FEEDERMAIN SHALL NOT BE PERMITTED.



1+50 MATCHLINE
SEE DRAWING C202

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NTS

CB CROSS-SECTION AT STA. 1+42.44
NTS

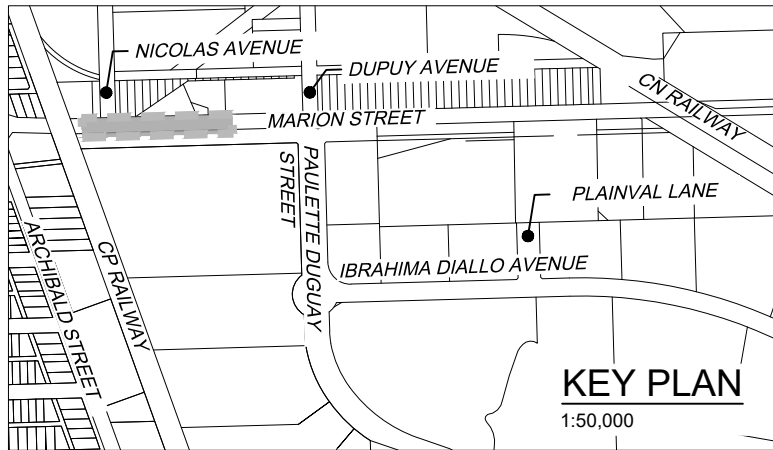
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MATCH EXISTING GRADES

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WHOLE NUMBERS INDICATE MILLIMETRES
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ISSUED FOR CONSTRUCTION



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COMBINED SEWER	---	---	VALVE/PLUG	---	---			
LAND DRAINAGE SEWER	---	---	CATCH BASIN	---	---			
WASTE WATER SEWER	---	---	UTILITIES ADJUSTED	---	---			
PROPERTY LINE	---	---	CURB RAMP	---	---			
EDGE OF ASPHALT	---	---	DETECTABLE WARNING SURFACE TILE	---	---			
EDGE OF CONCRETE	---	---	GROUND GRADE	---	---			
MODIFIED BARRIER CURB	---	---	PAVEMENT GRADE	---	---			
EDGE OF SIDEWALK	---	---	LANDSCAPE	---	---			
M.T.S.	---	---	CONCRETE SLAB	---	---			
BARRIER CURB AND GUTTER	---	---	CONC SIDEWALK	---	---			
GAS	---	---	ASPHALT	---	---			
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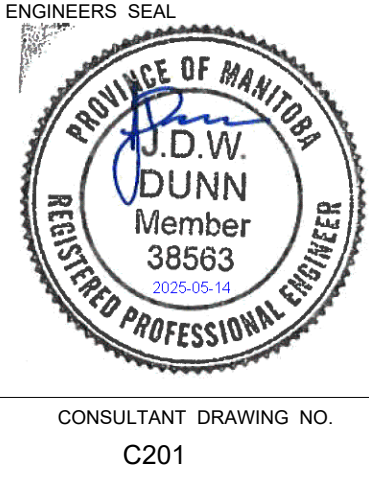
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SUPV. U/G STRUCTURES DATE
COMMITTEE

NOTE:
LOCATION OF UNDERGROUND STRUCTURES AS SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONFIRMATION OF EXISTENCE AND EXACT LOCATION OF ALL SERVICES MUST BE OBTAINED FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.

NO.	REVISIONS	DATE	BY
E	RE-ISSUED FOR UNDERGROUND STRUCTURES	12/05/25	JD
D	RE-ISSUED FOR UNDERGROUND STRUCTURES	02/04/25	AG
C	RE-ISSUED FOR UNDERGROUND STRUCTURES	20/03/25	AG
B	ISSUED FOR UNDERGROUND STRUCTURES	14/03/24	JD
A	ISSUED FOR REVIEW	18/08/22	SS

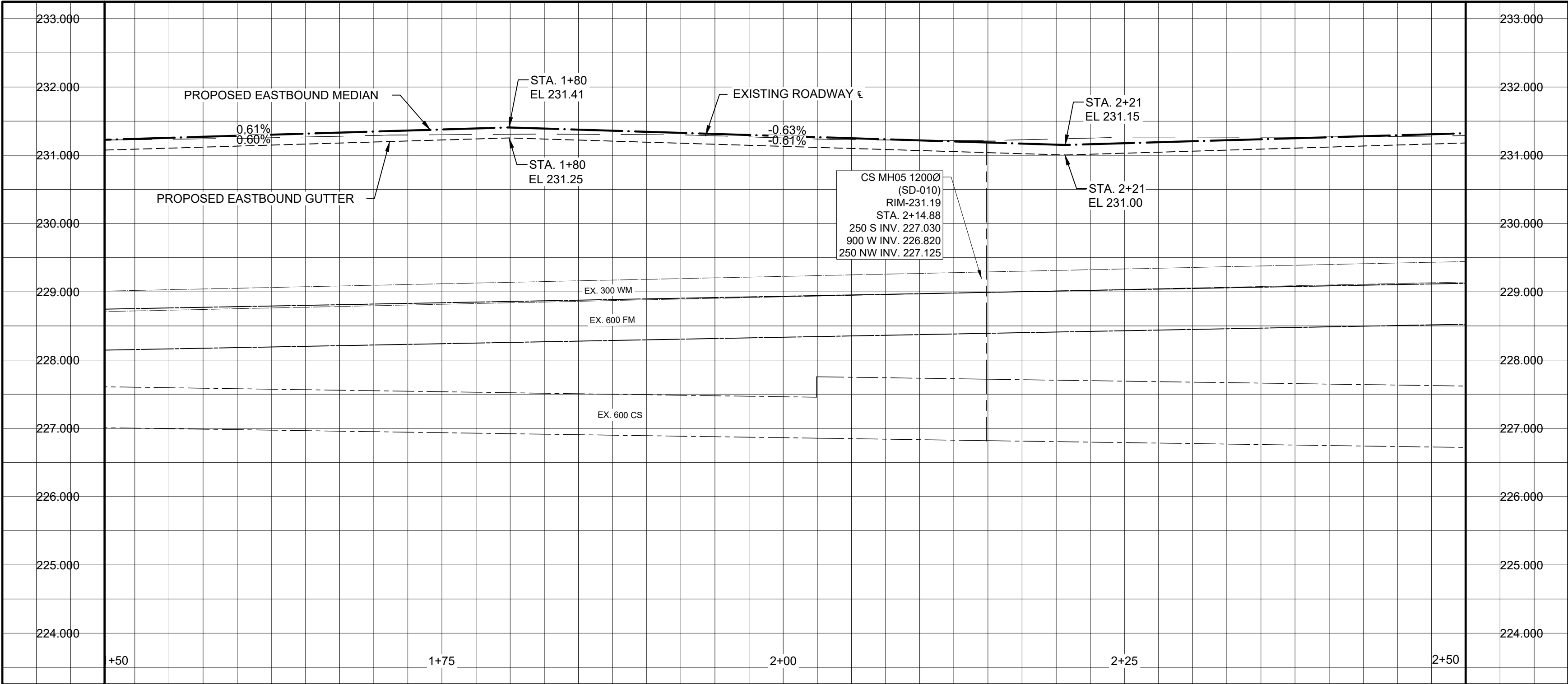
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DRAWN BY	AG	APPROVED BY	JD
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VERT. SCALE:	1:50	DATE:	14-03-2024
DATE:	18-08-2022		



THE CITY OF WINNIPEG

PUBLIC MARKETS
PLAN AND PROFILE
STA. 0+25 TO 1+50
MARION STREET
UNDERGROUND SERVICING AND ROADWORK

SHEET 2 OF 11
CITY DRAWING NO.

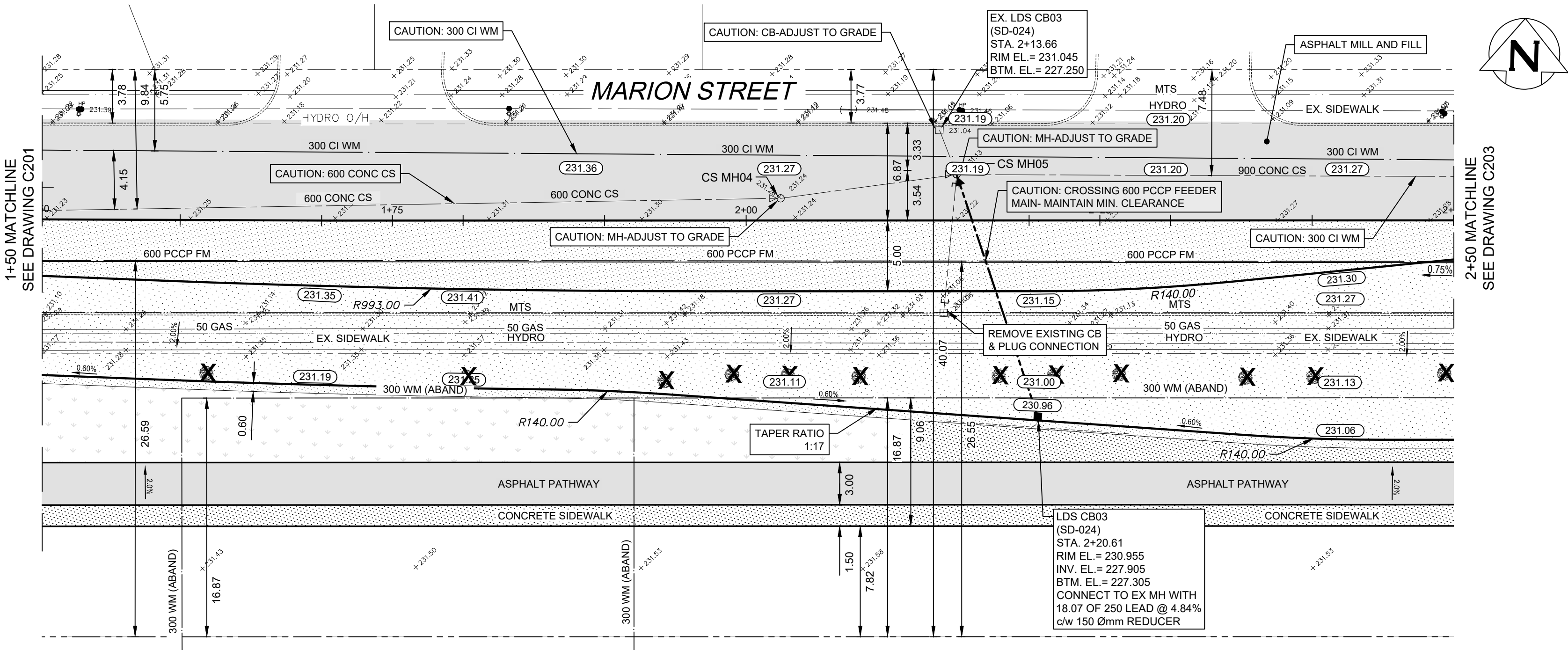
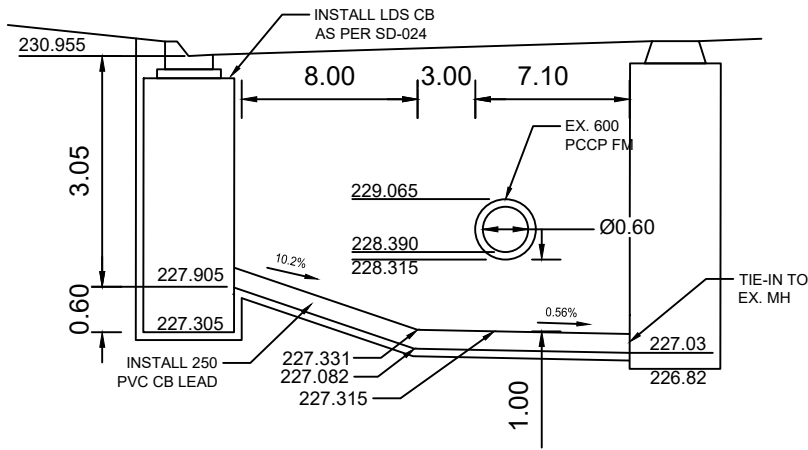


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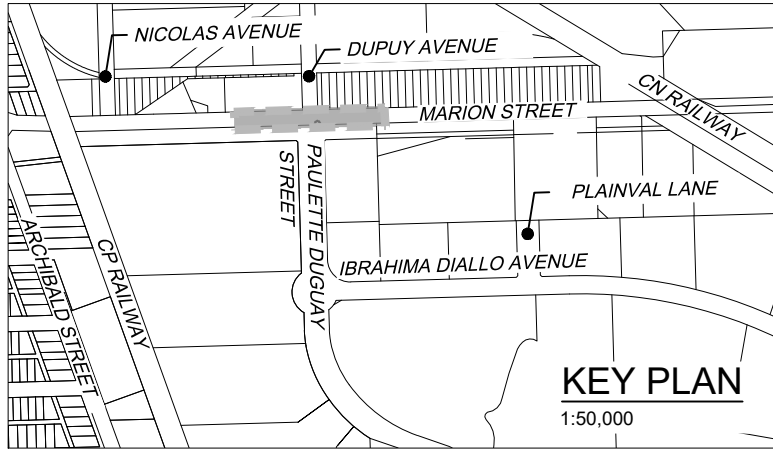


CB CROSS-SECTION AT STA. 2+20.61
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DECIMALIZED NUMBERS INDICATE METRES



ISSUED FOR CONSTRUCTION



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---	COMBINED SEWER	---	⊗	VALVE/PLUG				
---	LAND DRAINAGE SEWER	---	□	CATCH BASIN	■			
---	WASTE WATER SEWER	---	---	UTILITIES ADJUSTED	Δ □ ○			
---	PROPERTY LINE	---	---	CURB RAMP	□			
---	EDGE OF ASPHALT	---	---	DETECTABLE WARNING SURFACE TILE	□			
---	EDGE OF CONCRETE	---	---	GROUND GRADE	---			
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---	GAS	---	---	ASPHALT	---			
---	HYDRO HYDRO POLE	---	---	MILLED SURFACE	---			
EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PROFILE	PROPOSED

LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES DATE
COMMITTEE

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B.M. C1WB 33-006
ELEV. 231.595m

RE-ISSUED FOR UNDERGROUND STRUCTURES	12/05/25	JD
D RE-ISSUED FOR UNDERGROUND STRUCTURES	02/04/25	AG
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A ISSUED FOR REVIEW	18/08/22	SS
NO. REVISIONS	DATE	BY



1600 BUFFALO PLACE
WINNIPEG, MANITOBA, CANADA R3T 6B8
TEL: 204-477-6650 | FAX: 204-474-2864 | WWW.WSP.COM

DESIGNED BY	AG	CHECKED BY	SS
DRAWN BY	AG	APPROVED BY	JD
HOR. SCALE:	1:250	RELEASED FOR CONSTRUCTION	JD
VERT. SCALE:	1:50	DATE:	14-03-2024
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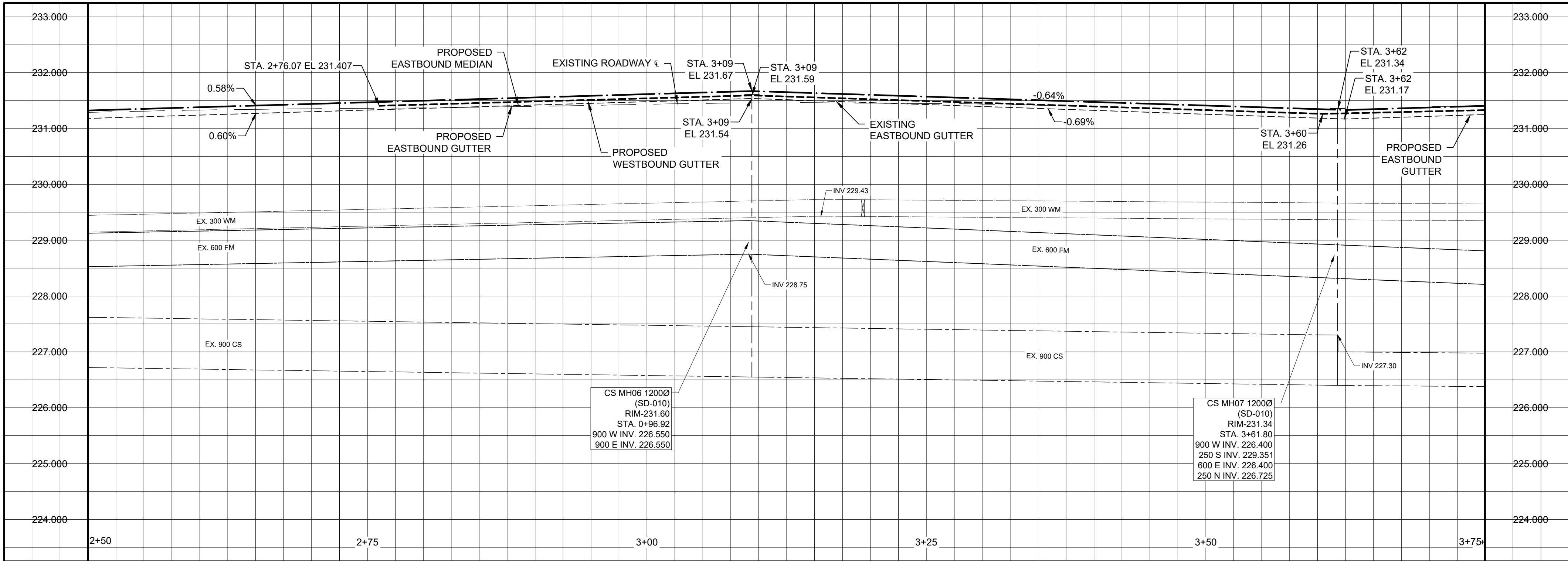
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THE CITY OF WINNIPEG

PUBLIC MARKETS
PLAN AND PROFILE STA. 1+50 TO
2+50
MARION STREET
UNDERGROUND SERVICING AND ROADWORK

SHEET 3 OF 11
CITY DRAWING NO.

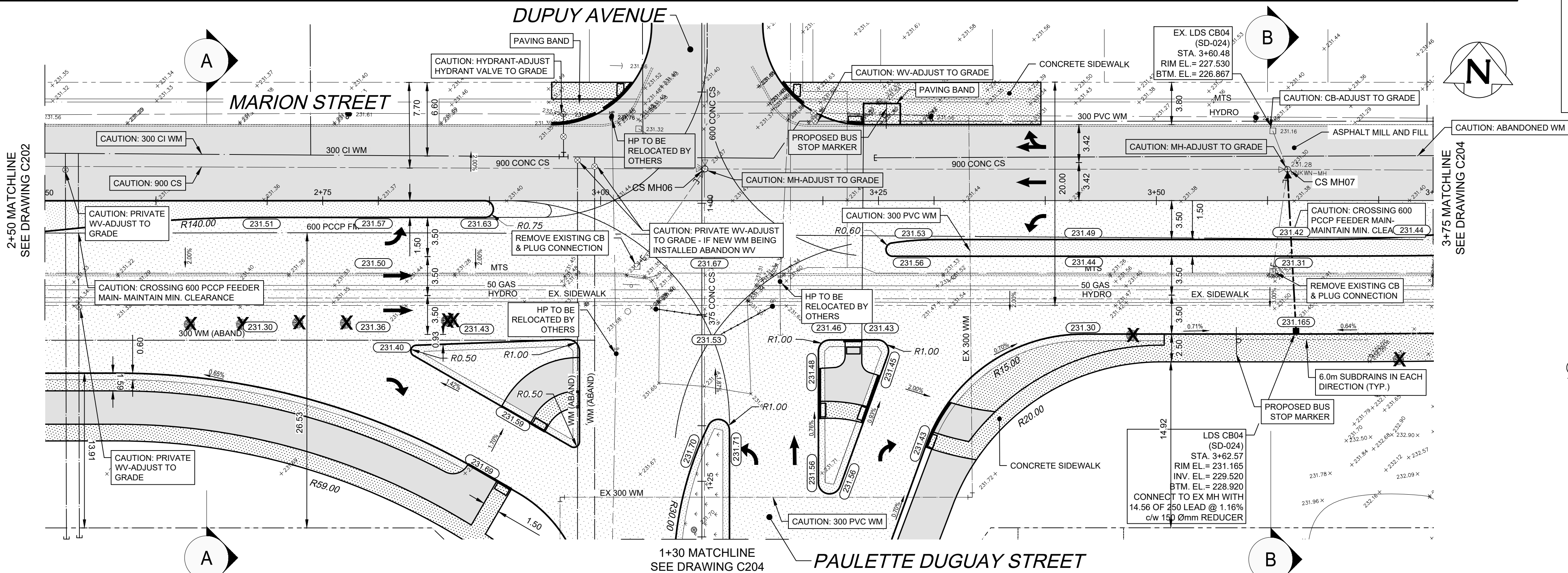


NOTES FOR MARION ST ONLY

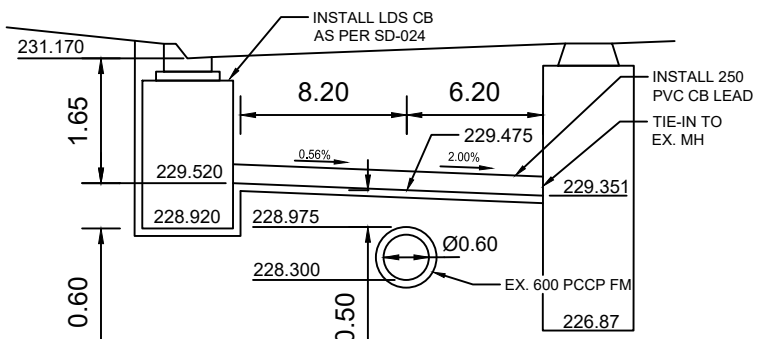
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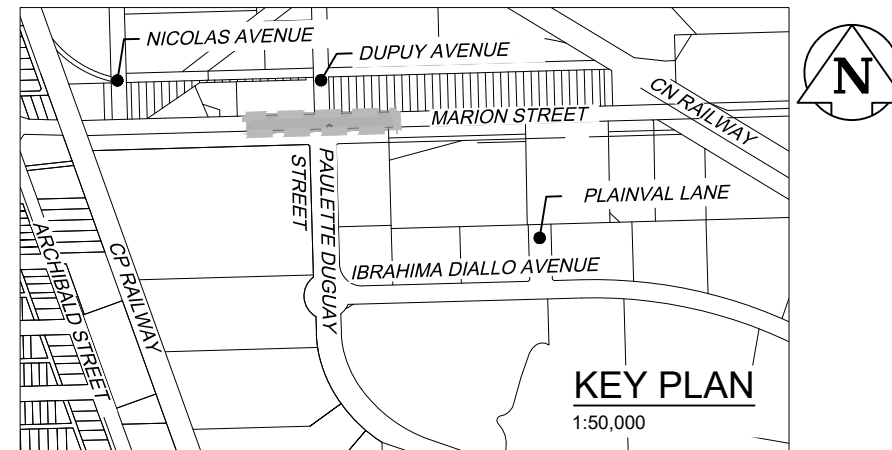
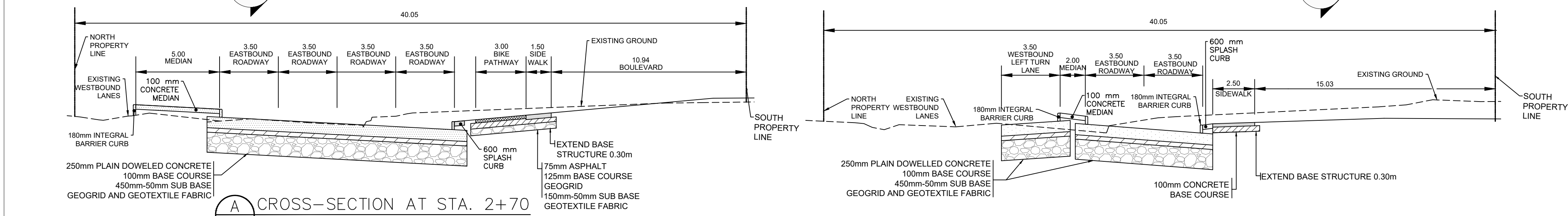
CB CROSS-SECTION AT STA. 3+62.57
NTS



METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES



ISSUED FOR CONSTRUCTION



EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PROFILE	PROPOSED
WATERMAIN	---	---	HYDRANT ASSEMBLY	---	---			
COMBINED SEWER	---	---	VALVE/PLUG	---	---			
LAND DRAINAGE SEWER	---	---	CATCH BASIN	---	---			
WASTE WATER SEWER	---	---	UTILITIES ADJUSTED	---	---			
PROPERTY LINE	---	---	CURB RAMP	---	---			
EDGE OF ASPHALT	---	---	DETECTABLE WARNING SURFACE TILE	---	---			
EDGE OF CONCRETE	---	---	GROUND GRADE	---	---			
MODIFIED BARRIER CURB	---	---	PAVEMENT GRADE	---	---			
EDGE OF SIDEWALK	---	---	LANDSCAPE	---	---			
M.T.S.	---	---	CONCRETE SLAB	---	---			
BARRIER CURB AND GUTTER	---	---	CONC SIDEWALK	---	---			
GAS	---	---	ASPHALT	---	---			
HYDRO HYDRO POLE	---	---	MILLED SURFACE	---	---			

LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES DATE
COMMITTEE

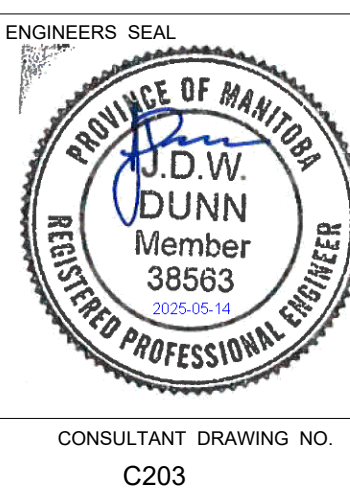
NOTE:
LOCATION OF UNDERGROUND STRUCTURES AS SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONFIRMATION OF EXISTENCE AND EXACT LOCATION OF ALL SERVICES MUST BE OBTAINED FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.

(B) CROSS-SECTION AT STA. 3+60
C202 NTS

NO.	REVISIONS	DATE	BY
E	RE-ISSUED FOR UNDERGROUND STRUCTURES	12/05/25	JD
D	RE-ISSUED FOR UNDERGROUND STRUCTURES	02/04/25	AG
C	RE-ISSUED FOR UNDERGROUND STRUCTURES	20/03/25	AG
B	ISSUED FOR UNDERGROUND STRUCTURES	14/03/24	JD
A	ISSUED FOR REVIEW	18/08/22	SS

WSP
1600 BUFFALO PLACE
WINNIPEG, MANITOBA, CANADA R3T 6B8
TEL: 204-477-6650 | FAX: 204-474-2864 | WWW.WSP.COM

DESIGNED BY	AG	CHECKED BY	SS
DRAWN BY	AG	APPROVED BY	JD
HOR. SCALE:	1:250	RELEASED FOR CONSTRUCTION	JD
VERT. SCALE:	1:50		
DATE:	18-08-2022	DATE:	14-03-2024

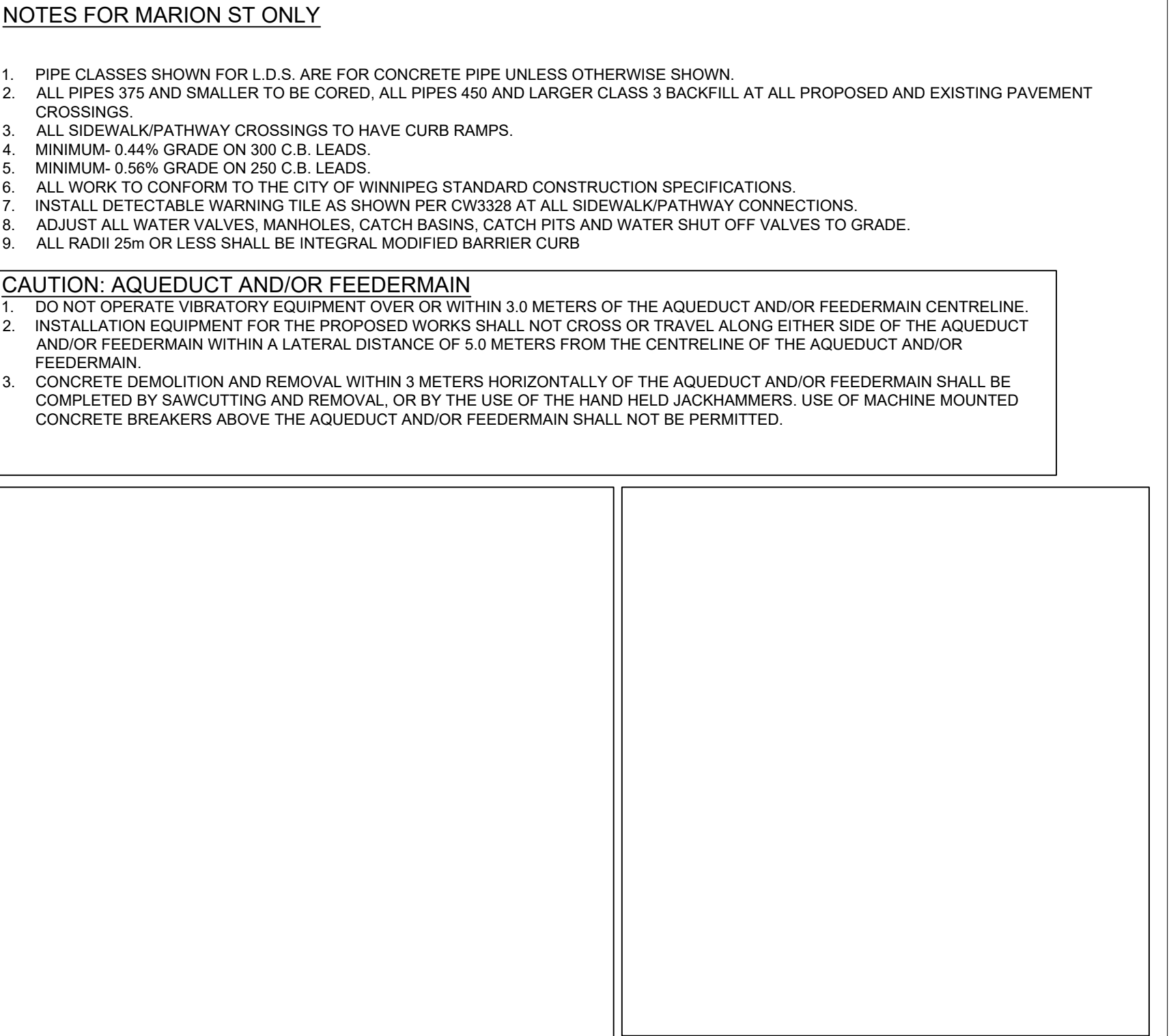
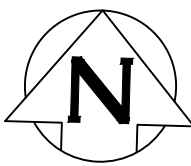


THE CITY OF WINNIPEG

PUBLIC MARKETS
PLAN AND PROFILE
STA. 2+50 TO 3+75
MARION STREET
UNDERGROUND SERVICING AND ROADWORK

SHEET 4 OF 11
CITY DRAWING NO.

ITY DRAWING NO.



LOCATION APPROVED
UNDERGROUND STRUCTURES

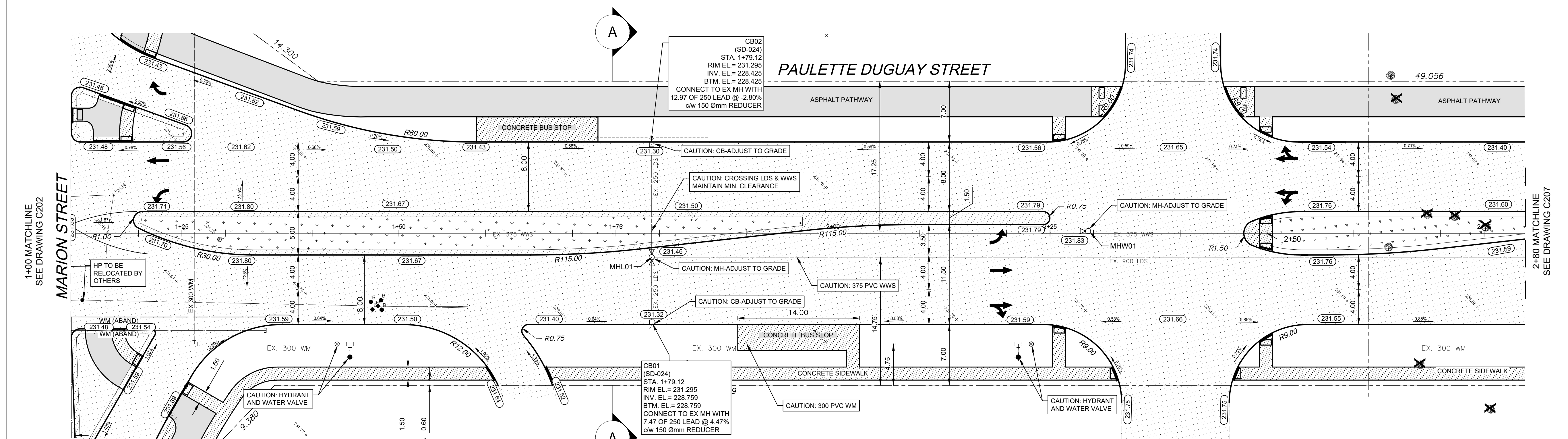
SUPPLY	U/G STRUCTURES	DATE
COMMITTEE		

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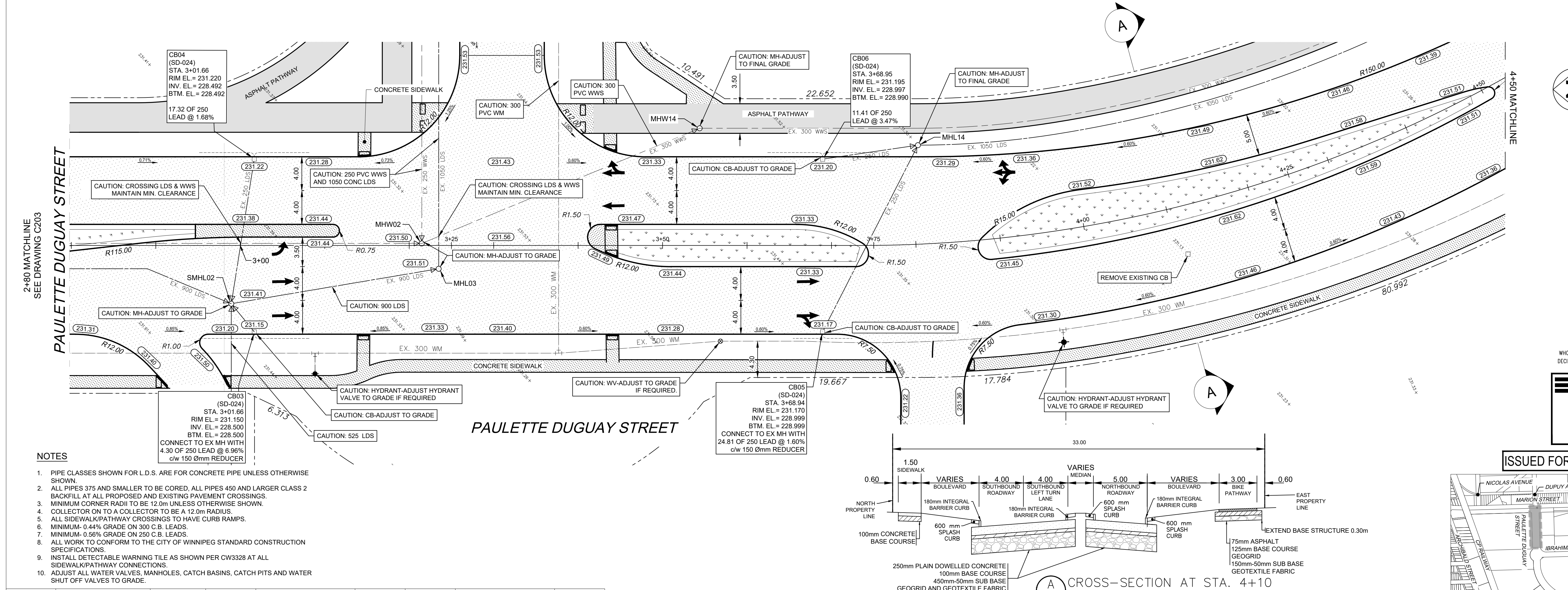
			
1600 BUFFALO PLACE WINNIPEG, MANITOBA, CANADA R3T 6B8 TEL: 204-477-6650 / FAX: 204-474-2694 / WWW.WSP.COM			
DESIGNED BY	AG	CHECKED BY	SS
DRAWN BY	AG	APPROVED BY	JD
HOR. SCALE:	1:250	RELEASED FOR CONSTRUCTION <u>JD</u>	
VERT. SCALE:	1:50		
DATE:	18-08-2022	DATE:	14-03-2024

 <h1>THE CITY OF WINNIPEG</h1>	
<p>PUBLIC MARKETS</p> <p>PLAN AND PROFILE FROM STA.</p> <p>3+90 TO 5+72</p> <p>MARION STREET</p> <p>UNDERGROUND SERVICING AND ROADWORK</p>	<p>SHEET 6 OF 11</p>
	<p>CITY DRAWING NO.</p>

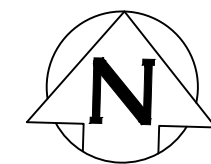


EET 7 OF 11

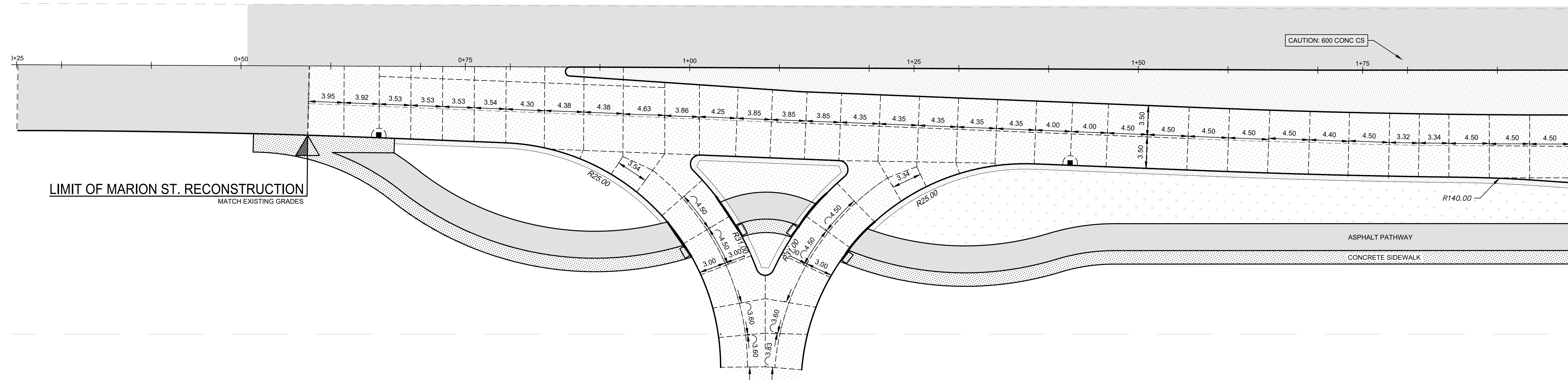
CITY DRAWING NO.



	<h1>THE CITY OF WINNIPEG</h1>	
	<h2>PUBLIC MARKETS PLAN AND PROFILE FROM STA. 2+80 TO 4+50</h2>	
	<h3>PAULETTE DUGUAY STREET UNDERGROUND SERVICING AND ROADWORK</h3>	
	SHEET 8 OF 11	CITY DRAWING NO.



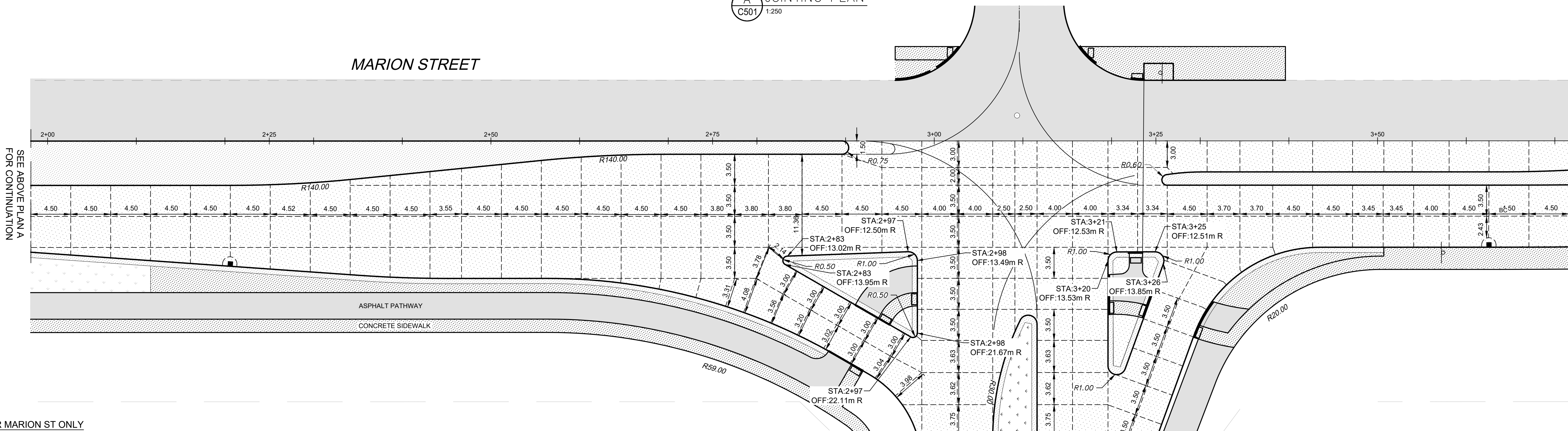
MARION STREET



SEE JOINT PLAN B BELOW
FOR CONTINUATION

A JOINTING PLAN
C501 1:250

MARION STREET



SEE ABOVE PLAN A
FOR CONTINUATION

SEE C502 PLAN C
FOR CONTINUATION

B JOINTING PLAN
C501 1:250

SEE C502 PLAN D
FOR CONTINUATION

NOTES FOR MARION ST ONLY

1. PIPE CLASSES SHOWN FOR L.D.S. ARE FOR CONCRETE PIPE UNLESS OTHERWISE SHOWN.
2. ALL PIPES 375 AND SMALLER TO BE CORED, ALL PIPES 450 AND LARGER CLASS 3 BACKFILL AT ALL PROPOSED AND EXISTING PAVEMENT CROSSINGS.
3. ALL SIDEWALK/PATHWAY CROSSINGS TO HAVE CURB RAMPS.
4. MINIMUM- 0.44% GRADE ON 300 C.B. LEADS.
5. MINIMUM- 0.56% GRADE ON 250 C.B. LEADS.
6. ALL WORK TO CONFORM TO THE CITY OF WINNIPEG STANDARD CONSTRUCTION SPECIFICATIONS.
7. INSTALL DETECTABLE WARNING TILE AS SHOWN PER CW3328 AT ALL SIDEWALK/PATHWAY CONNECTIONS.
8. ADJUST ALL WATER VALVES, MANHOLES, CATCH BASINS, CATCH PITS AND WATER SHUT OFF VALVES TO GRADE.
9. CONTRACTOR TO ALIGN THE PROPOSED LONGITUDINAL JOINT LOCATIONS WITH EXISTING JOINTS ON WESTBOUND MARION ST, WHERE POSSIBLE.

EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PROFILE	PROPOSED
WATERMAIN	---	---	HYDRANT ASSEMBLY	⊕	---			
COMBINED SEWER	---	---	VALVE/PLUG	⊗	---			
LAND DRAINAGE SEWER	---	---	CATCH BASIN	⊠	---			
WASTE WATER SEWER	---	---	UTILITIES ADJUSTED	△ □ ○	---			
PROPERTY LINE	---	---	CURB RAMP	---	---			
EDGE OF ASPHALT	---	---	DETECTABLE WARNING SURFACE TILE	---	---			
EDGE OF CONCRETE	---	---	GROUND GRADE	---	---			
MODIFIED BARRIER CURB	---	---	PAVEMENT GRADE	---	---			
EDGE OF SIDEWALK	---	---	LANDSCAPE	---	---			
M.T.S.	---	---	CONCRETE SLAB	---	---			
BARRIER CURB AND GUTTER	---	---	CONC SIDEWALK	---	---			
GAS	---	---	ASPHALT	---	---			
HYDRO HYDRO POLE	---	---	MILLED SURFACE	---	---			

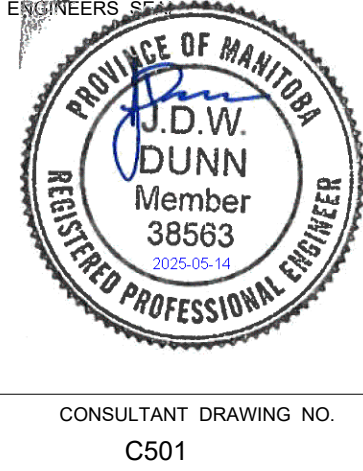
LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES DATE COMMITTEE

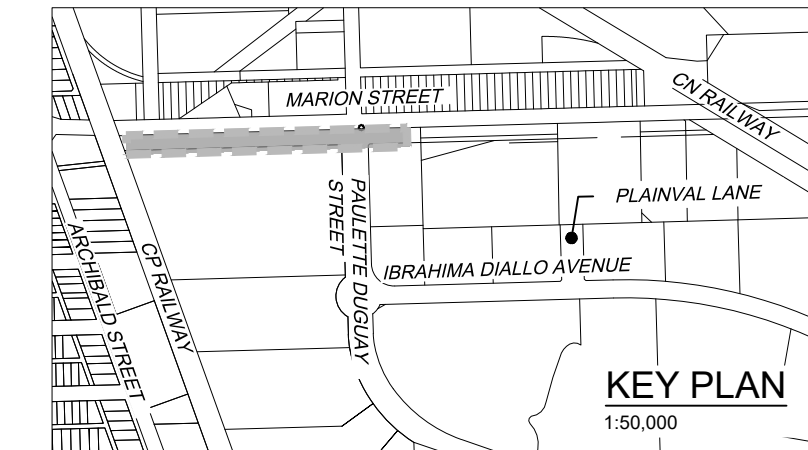
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NO.	REVISIONS	DATE	BY
E	RE-ISSUED FOR UNDERGROUND STRUCTURES	12/05/25	JD
D	RE-ISSUED FOR UNDERGROUND STRUCTURES	02/04/25	AG
C	RE-ISSUED FOR UNDERGROUND STRUCTURES	20/03/25	AG
B	ISSUED FOR UNDERGROUND STRUCTURES	14/03/24	JD
A	ISSUED FOR REVIEW	18/06/22	SS

DESIGNED BY	AG	CHECKED BY	SS
DRAWN BY	AG	APPROVED BY	JD
HOR. SCALE:	1:250	RELEASED FOR CONSTRUCTION	JD
VERT. SCALE:			
DATE:	18-08-2022	DATE:	14-03-2024



CONSULTANT DRAWING NO. C501



ISSUED FOR CONSTRUCTION

METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES



THE CITY OF WINNIPEG

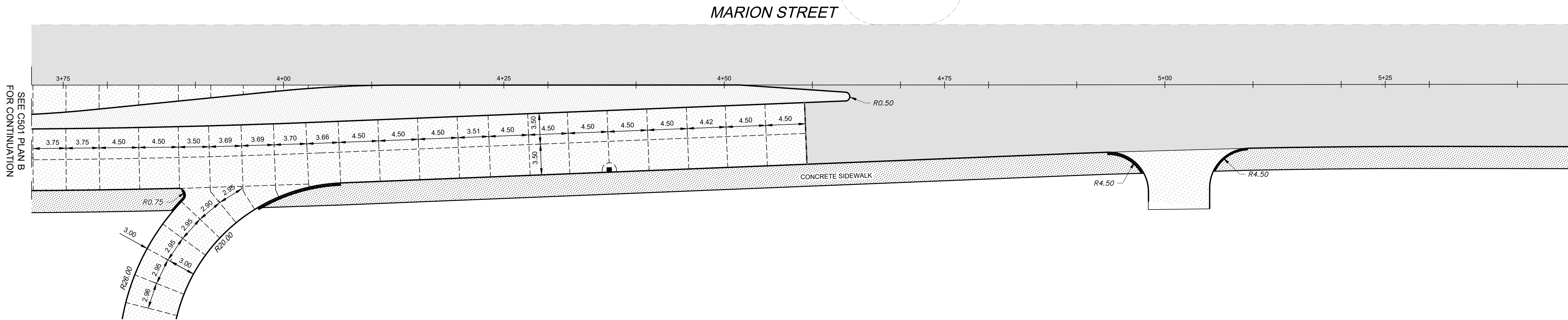


PUBLIC MARKETS
JOINT PLAN
MARION STREET
UNDERGROUND SERVICING AND ROADWORK

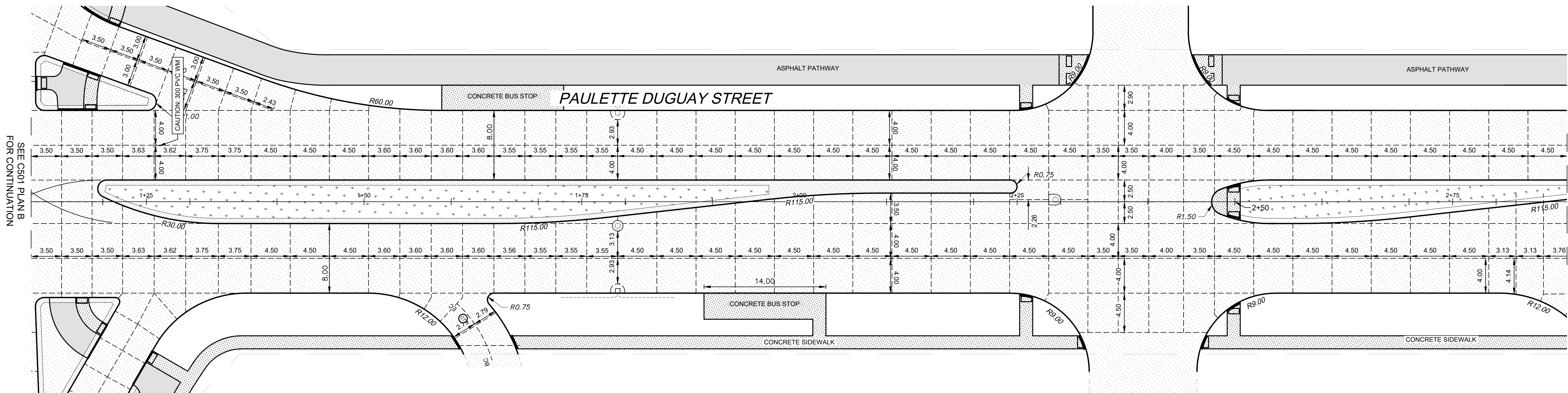
SHEET 9 OF 11

CITY DRAWING NO.

May 14, 2025 - 10:17am
L:\Projects\2021\147590-00 Public Markets\14.04 Tech - Prod Services\14.04 Land_Dev_Min_Eng\14.04.14 CAD\2_Production\07590-C201-C502 Marion Street-Plan & Profile.dwg - abt-C502 JOINT PLAN



C JOINTING PLAN
C502 1:250



D JOINTING PLAN
C502 1:250

NOTES FOR MARION ST ONLY

1. ALL PAVEMENT TO BE 200mm REINFORCED CONCRETE WITH MODIFIED BARRIER CURB, UNLESS OTHERWISE SHOWN.
2. PIPE CLASSES SHOWN FOR L.D.S. ARE FOR CONCRETE PIPE UNLESS OTHERWISE SHOWN.
3. ALL PIPES 375 AND SMALLER TO BE CORED, ALL PIPES 450 AND LARGER CLASS 3 BACKFILL AT ALL PROPOSED AND EXISTING PAVEMENT CROSSINGS.
4. ALL SIDEWALK/PATHWAY CROSSINGS TO HAVE CURB RAMPS.
5. MINIMUM- 0.44% GRADE ON 300 C.B. LEADS.
6. MINIMUM- 0.56% GRADE ON 250 C.B. LEADS.
7. ALL WORK TO CONFORM TO THE CITY OF WINNIPEG STANDARD CONSTRUCTION SPECIFICATIONS.
8. INSTALL DETECTABLE WARNING TILE AS SHOWN PER CW3328 AT ALL SIDEWALK/PATHWAY CONNECTIONS.
9. ADJUST ALL WATER VALVES, MANHOLES, CATCH BASINS, CATCH PITS AND WATER SHUT OFF VALVES TO GRADE.

EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PROFILE	PROPOSED
WATERMAIN	---	---	HYDRANT ASSEMBLY	⊗	---			
COMBINED SEWER	---	---	VALVE/PLUG	⊗	---			
LAND DRAINAGE SEWER	---	---	CATCH BASIN	⊗	---			
WASTE WATER SEWER	---	---	UTILITIES ADJUSTED	⊗	---			
PROPERTY LINE	---	---	CURB RAMP	⊗	---			
EDGE OF ASPHALT	---	---	DETECTABLE WARNING SURFACE TILE	⊗	---			
EDGE OF CONCRETE	---	---	GROUND GRADE	---	---			
MODIFIED BARRIER CURB	---	---	PAVEMENT GRADE	---	---			
EDGE OF SIDEWALK	---	---	LANDSCAPE	---	---			
M.T.S.	---	---	CONCRETE SLAB	---	---			
BARRIER CURB AND GUTTER	---	---	CONC SIDEWALK	---	---			
GAS	---	---	ASPHALT	---	---			
HYDRO HYDRO POLE	---	---	MILLED SURFACE	---	---			

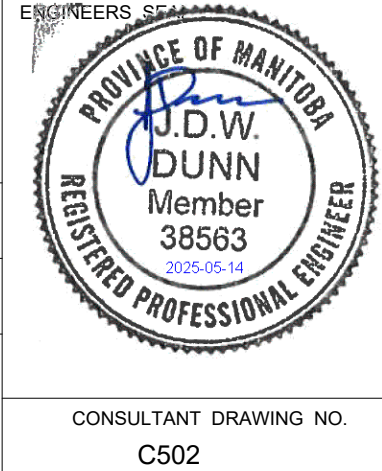
LOCATION APPROVED UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES DATE
COMMITTEE

NOTE:
LOCATION OF UNDERGROUND STRUCTURES AS SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONFIRMATION OF EXISTENCE AND EXACT LOCATION OF ALL SERVICES MUST BE OBTAINED FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.

NO.	REVISIONS	DATE	BY
E	RE-ISSUED FOR UNDERGROUND STRUCTURES	12/05/05	JD
D	RE-ISSUED FOR UNDERGROUND STRUCTURES	02/04/05	AG
C	RE-ISSUED FOR UNDERGROUND STRUCTURES	20/03/04	AG
B	ISSUED FOR UNDERGROUND STRUCTURES	14/03/04	JD
A	ISSUED FOR REVIEW	18/06/02	SS

wsp	
1600 BUFFALO PLACE WINNIPEG, MANITOBA, CANADA R3T 6B8 TEL: 204-477-6650 FAX: 204-474-2864 WWW.WSP.COM	
DESIGNED BY	AG
CHECKED BY	SS
DRAWN BY	AG
APPROVED BY	JD
HOR. SCALE:	1:250
RELEASED FOR CONSTRUCTION	JD
VERT. SCALE:	
DATE:	18-08-2022
DATE:	14-03-2024



CONSULTANT DRAWING NO.
C502

THE CITY OF WINNIPEG

Winnipeg

PUBLIC MARKETS

JOINT PLAN

MARION STREET

UNDERGROUND SERVICING AND ROADWORK

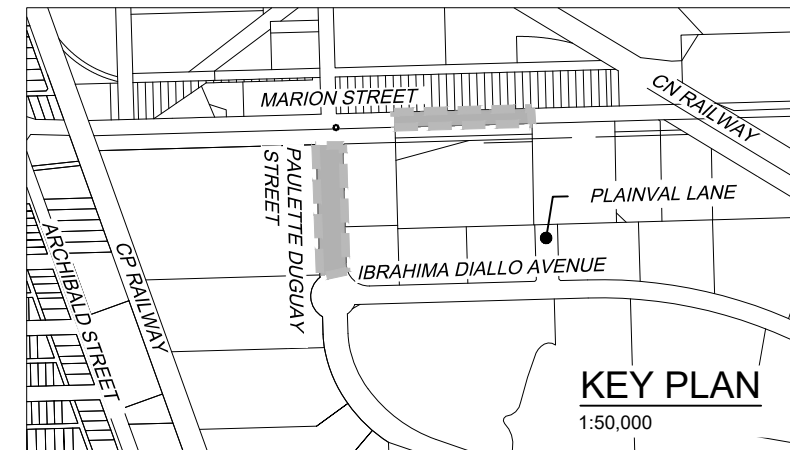
SHEET 10 OF 11

CITY DRAWING NO.

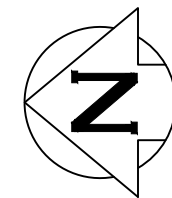
METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES



ISSUED FOR CONSTRUCTION



KEY PLAN
1:50,000



E JOINTING PLAN
C503 1:250

NOTES FOR MARION ST ONLY

1. ALL PAVEMENT TO BE 200mm REINFORCED CONCRETE WITH MODIFIED BARRIER CURB, UNLESS OTHERWISE SHOWN.
2. PIPE CLASSES SHOWN FOR L.D.S. ARE FOR CONCRETE PIPE UNLESS OTHERWISE SHOWN.
3. ALL PIPES 375 AND SMALLER TO BE CORED, ALL PIPES 450 AND LARGER CLASS 3 BACKFILL AT ALL PROPOSED AND EXISTING PAVEMENT CROSSINGS.
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6. MINIMUM - 0.56% GRADE ON 250 C.B. LEADS
7. ALL WORK TO CONFORM TO THE CITY OF WINNIPEG STANDARD CONSTRUCTION SPECIFICATIONS.
8. INSTALL DETECTABLE WARNING LINE AS SHOWN PER CW3328 AT ALL SIDEWALK/PATHWAY CONNECTIONS.
9. ADJUST ALL WATER VALVE MANHOLES, CATCH BASINS, CATCH PITS AND WATER SHUT OFF VALVES TO GRADE.

METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES



ISSUED FOR CONSTRUCTION



	WATERMAIN			HYDRANT ASSEMBLY					
	COMBINED SEWER			VALVE/PLUG					
	LAND DRAINAGE SEWER			CATCH BASIN					
	WASTE WATER SEWER			UTILITIES ADJUSTED					
	PROPERTY LINE			CURB RAMP					
	EDGE OF ASPHALT			DETECTABLE WARNING SURFACE TILE					
	EDGE OF CONCRETE			GROUND GRADE					
	MODIFIED BARRIER CURB			PAVEMENT GRADE					
	EDGE OF SIDEWALK			LANDSCAPE					
	M.T.S.			CONCRETE SLAB					
	BARRIER CURB AND GUTTER			CONC SIDEWALK					
	GAS			ASPHALT					
	HYDRO HYDRO POLE			MILLED SURFACE					
EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PROFILE	PROPOSED	EXISTING

LOCATION APPROVED
UNDERGROUND STRUCTURES

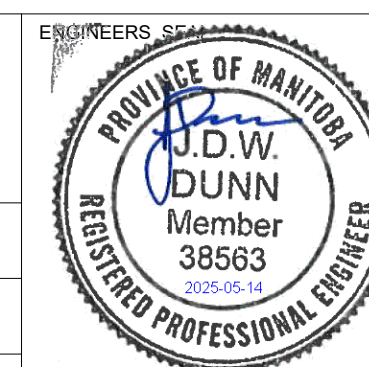
SUPV. U/G STRUCTURES DATE
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B.M. ELEV.	CWM 33-006 231.595m		
E	RE-ASSUED FOR UNDERGROUND STRUCTURES	12/05/05	JE
D	RE-ASSUED FOR UNDERGROUND STRUCTURES	02/04/05	AG
C	RE-ASSUED FOR UNDERGROUND STRUCTURES	20/03/04	AG
B	ISSUED FOR UNDERGROUND STRUCTURES	14/03/04	JE
A	ISSUED FOR REVIEW	18/08/02	SS
NO.	REVISIONS	DATE	BY

<

CONSULTANT DRAWING NO.
C503

PUBLIC MARKETS
JOINT PLAN
MARION STREET
UNDERGROUND ST

THE CITY OF WINNIPEG

SHEET 11 OF 11

CITY DRAWING

CITY DRAWING NO.

UNDERGROUND SERVICING AND ROADWORK

APPENDIX

B TRAFFIC COUNTS

Study Name Public Markets
Start Date 2/6/2024
Start Time 7:00 AM
Site Code PTH 59 / Maginot St
Project 221-07590-00

Type Road
Classification Cars

Start Time	PTH 59 Southbound				Maginot St Westbound				PTH 59 Northbound				Maginot St Eastbound			
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
7:00 AM	24	211	10	0	17	0	7	0	10	361	7	0	1	6	30	0
7:15 AM	25	211	19	0	2	1	2	0	8	393	9	0	4	3	43	0
7:30 AM	33	219	23	0	8	1	1	0	26	427	7	0	6	10	51	0
7:45 AM	59	268	26	0	4	1	2	0	27	458	23	0	4	5	49	0
8:00 AM	54	252	8	0	48	1	26	0	2	389	30	0	3	0	68	0
8:15 AM	34	236	10	0	4	0	0	0	5	355	25	0	14	1	52	0
8:30 AM	25	232	9	0	4	0	1	0	7	341	11	0	8	1	54	0
8:45 AM	37	254	2	0	1	0	1	0	5	327	7	0	5	1	40	0
3:00 PM	40	326	11	0	33	1	18	0	6	228	8	3	9	3	29	0
3:15 PM	39	439	24	0	11	1	7	0	5	224	4	0	7	4	32	0
3:30 PM	47	415	18	0	20	0	12	0	5	249	13	0	4	4	43	0
3:45 PM	56	433	9	0	1	1	3	0	11	277	12	1	13	9	43	0
4:00 PM	40	421	1	0	42	5	28	0	1	231	9	1	10	1	34	0
4:15 PM	62	443	2	0	6	1	16	0	2	249	15	0	4	1	39	0
4:30 PM	57	449	2	1	12	0	12	0	1	211	17	0	12	0	71	0
4:45 PM	51	488	1	1	3	0	3	0	1	251	13	1	10	1	28	0
5:00 PM	49	453	2	0	7	1	8	0	3	235	9	1	13	0	45	0
5:15 PM	47	366	2	0	3	1	5	0	2	222	6	0	1	1	40	0
5:30 PM	42	392	6	0	0	0	3	0	4	213	9	0	8	1	38	0
5:45 PM	19	337	4	0	10	0	5	0	3	210	7	2	2	0	27	0

Study Name Public Markets
Start Date 2/6/2024
Start Time 7:00 AM
Site Code PTH 59 / Maginot St
Project 221-07590-00

Type Road
Classification LightTrucks

	PTH 59 Southbound				Maginot St Westbound				PTH 59 Northbound				Maginot St Eastbound			
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
7:00 AM	2	4	0	0	1	0	0	0	1	4	0	0	0	0	1	0
7:15 AM	1	11	0	0	1	0	0	0	0	4	1	0	0	0	2	0
7:30 AM	2	9	0	0	2	0	0	0	0	6	1	0	0	0	1	0
7:45 AM	0	10	0	0	0	0	0	0	0	5	0	0	2	1	1	0
8:00 AM	1	13	0	0	0	0	1	0	1	8	1	0	0	0	2	0
8:15 AM	0	13	2	0	0	0	2	0	0	11	1	0	1	0	0	0
8:30 AM	1	16	1	0	3	0	0	0	1	13	1	0	0	0	5	0
8:45 AM	1	20	0	0	1	0	0	0	0	7	1	0	1	0	4	0
3:00 PM	0	11	0	0	0	0	0	0	0	7	2	0	1	0	1	0
3:15 PM	0	6	0	0	1	0	0	0	0	6	0	0	1	0	0	0
3:30 PM	1	7	1	0	1	0	0	0	0	12	1	0	0	0	2	0
3:45 PM	0	12	0	0	0	0	0	0	0	6	0	0	0	0	2	0
4:00 PM	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0
4:15 PM	1	6	0	0	0	0	0	0	0	6	0	0	0	0	0	0
4:30 PM	0	7	0	0	0	0	0	0	0	3	0	0	0	0	3	0
4:45 PM	0	1	0	0	0	0	0	0	0	5	0	0	0	0	1	0
5:00 PM	0	7	0	0	0	0	1	0	0	11	0	0	0	0	3	0
5:15 PM	0	6	0	0	0	0	1	0	0	4	0	0	0	0	1	0
5:30 PM	0	1	0	0	1	0	0	0	1	5	0	0	0	0	0	0
5:45 PM	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0

Study Name Public Markets
Start Date 2/6/2024
Start Time 7:00 AM
Site Code PTH 59 / Maginot St
Project 221-07590-00

Type Road
Classification Articulated Trucks

Start Time	PTH 59 Southbound				Maginot St Westbound				PTH 59 Northbound				Maginot St Eastbound			
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
7:00 AM	3	2	1	0	1	0	0	0	0	3	1	0	1	0	1	0
7:15 AM	1	3	0	0	1	0	0	0	0	3	1	0	1	0	1	0
7:30 AM	0	2	0	0	0	0	0	0	0	5	1	0	2	0	2	0
7:45 AM	1	10	1	0	1	0	0	0	0	2	2	0	3	0	1	0
8:00 AM	0	6	0	0	0	0	0	0	0	4	2	0	2	0	2	0
8:15 AM	3	16	0	0	0	0	0	0	0	6	3	0	2	0	0	0
8:30 AM	0	7	1	0	1	0	0	0	1	4	0	0	1	0	3	0
8:45 AM	2	5	0	0	0	0	0	0	0	4	0	0	0	0	0	0
3:00 PM	0	5	0	0	0	0	0	0	1	2	1	0	0	0	1	0
3:15 PM	1	7	0	0	2	0	0	0	0	7	0	0	0	0	0	0
3:30 PM	1	6	0	0	0	0	0	0	0	5	1	0	1	0	0	0
3:45 PM	1	5	1	0	1	0	0	0	0	10	1	0	2	0	1	0
4:00 PM	1	3	0	0	0	0	0	0	0	6	1	0	0	0	0	0
4:15 PM	1	7	1	0	1	0	0	0	0	2	0	0	0	0	0	0
4:30 PM	1	2	1	0	1	0	0	0	0	3	1	0	2	0	0	0
4:45 PM	1	4	0	0	0	0	0	0	0	2	2	0	2	0	1	0
5:00 PM	1	3	0	0	1	0	0	0	0	6	2	0	0	0	0	0
5:15 PM	0	4	0	0	0	0	0	0	0	5	1	0	0	0	0	0
5:30 PM	0	2	0	0	1	0	0	0	1	4	2	0	1	0	0	0
5:45 PM	1	6	1	0	0	0	0	0	0	2	1	0	1	0	0	0

Project 221-07590-00

	PTH 59 Southbound					Meginot St Westbound					PTH 59 Northbound					Meginot St Eastbound				
Start Time	Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn	
7:00 AM	2	0	0	0		0	0	0	0		0	0	0	0		1	0	0	1	
7:15 AM	5	0	0	0		0	0	0	0		0	1	0	0		4	0	1	0	
7:30 AM	3	2	0	0		0	0	0	0		0	0	0	0		2	0	2	0	
7:45 AM	2	4	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
8:00 AM	3	3	0	0		0	0	0	0		0	0	0	0		0	0	2	0	
8:15 AM	2	0	0	0		0	0	0	0		0	0	0	0		0	0	2	0	
8:30 AM	3	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
8:45 AM	2	4	0	0		0	0	0	0		0	1	1	0		0	0	3	0	
3:00 PM	1	0	0	0		0	0	0	0		0	2	0	0		0	0	2	0	
3:15 PM	1	1	0	0		0	0	0	0		0	1	0	0		0	0	6	0	
3:30 PM	1	0	0	0		0	0	0	0		0	0	0	0		0	0	2	0	
3:45 PM	3	1	0	0		0	0	0	0		0	1	1	0		0	0	2	0	
4:00 PM	1	1	0	0		0	0	0	0		0	1	1	0		0	0	1	0	
4:15 PM	1	1	0	0		0	0	0	0		0	1	2	0		0	0	5	0	
4:30 PM	2	1	0	0		0	0	0	0		0	0	0	0		0	0	1	0	
4:45 PM	2	1	0	0		0	0	0	0		0	0	0	0		0	0	2	0	
5:00 PM	1	0	0	0		0	0	0	0		0	1	0	0		0	0	3	0	
5:15 PM	2	0	0	0		0	0	0	0		0	0	0	0		0	0	1	0	
5:30 PM	0	1	0	0		0	0	0	0		0	0	0	0		0	0	1	0	
5:45 PM	1	0	0	0		0	0	0	0		0	0	0	0		0	0	1	0	

Project 221-07590-00

	PTH 59 Southbound					Maginot St Westbound					PTH 59 Northbound					Maginot St Eastbound				
Start Time	Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:00 PM	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Study Name Public Markets
Start Date 2/6/2024
Start Time 7:00 AM
Site Code PTH 59 / Maginot St
Project 221-07590-00

Type Crosswalk
Classification Peds

Start Time	PTH 59 Southbound			Maginot St Westbound			PTH 59 Northbound			Maginot St Eastbound		
	Peds CW	Peds CCW	Peds Combine	Peds CW	Peds CCW	Peds Combine	Peds CW	Peds CCW	Peds Combine	Peds CW	Peds CCW	Peds Combined
7:00 AM	0	0		0	0		0	0		0		0
7:15 AM	0	0		0	0		0	0		0		0
7:30 AM	0	0		1	0		1	0		0		0
7:45 AM	0	0		0	0		0	0		0		0
8:00 AM	0	0		0	0		0	0		0		0
8:15 AM	0	0		0	0		1	0		0		0
8:30 AM	0	0		0	0		0	0		0		0
8:45 AM	0	0		0	0		0	0		0		0
3:00 PM	0	0		0	0		0	0		0		0
3:15 PM	0	0		0	0		0	0		0		0
3:30 PM	0	0		0	0		0	0		0		0
3:45 PM	0	0		0	0		0	0		0		0
4:00 PM	0	0		0	0		0	0		0		0
4:15 PM	0	0		0	0		0	0		0		0
4:30 PM	0	0		0	0		0	0		0		0
4:45 PM	0	0		0	0		0	0		0		0
5:00 PM	0	0		0	0		0	0		0		0
5:15 PM	0	0		0	0		0	0		0		0
5:30 PM	0	0		0	0		0	0		0		0
5:45 PM	0	0		0	0		0	0		0		0

Study Name Public Markets
Start Date 2/6/2024
Start Time 7:00 AM
Site Code PTH 59 / Maginot St
Project 221-07590-00

Type Crosswalk
Classification Bicycles

Start Time	PTH 59 Southbound			Maginot St Westbound			PTH 59 Northbound			Maginot St Eastbound		
	Peds CW	Peds CCW	Peds Combine	Peds CW	Peds CCW	Peds Combine	Peds CW	Peds CCW	Peds Combine	Peds CW	Peds CCW	Peds Combined
7:00 AM	0	0		0	0		0	0		0		0
7:15 AM	0	0		0	0		0	0		0		0
7:30 AM	0	0		0	0		0	0		0		0
7:45 AM	0	0		0	0		0	0		0		0
8:00 AM	0	0		0	0		0	0		0		0
8:15 AM	0	0		0	0		0	0		0		0
8:30 AM	0	0		0	0		0	0		0		0
8:45 AM	0	0		0	0		0	0		0		0
3:00 PM	0	0		0	0		0	0		0		0
3:15 PM	0	0		0	0		0	0		0		0
3:30 PM	0	0		0	0		0	0		0		0
3:45 PM	0	0		0	0		0	0		0		0
4:00 PM	0	0		0	0		1	0		0		0
4:15 PM	0	0		0	0		0	0		0		0
4:30 PM	0	0		0	0		0	0		0		0
4:45 PM	0	0		0	0		0	0		0		0
5:00 PM	0	0		0	0		0	0		0		0
5:15 PM	0	0		0	0		0	0		0		0
5:30 PM	0	0		0	0		0	0		0		0
5:45 PM	0	0		0	0		0	0		0		0

Study Name Public Markets
Start Date 2/6/2024
Start Time 7:00 AM
Site Code PTH 59 / Maginot St
Project 221-07590-00

Type Road
Classification Totals

Start Time	PTH 59 Southbound				Maginot St Westbound				PTH 59 Northbound				Maginot St Eastbound			
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
7:00 AM	31	217	11	0	19	0	7	0	11	368	8	0	3	6	33	0
7:15 AM	32	225	19	0	4	1	2	0	8	401	11	0	9	3	47	0
7:30 AM	38	232	23	0	10	1	1	0	26	438	9	0	10	10	56	0
7:45 AM	62	292	27	0	5	1	2	0	27	465	25	0	9	6	51	0
8:00 AM	58	274	8	0	48	1	27	0	3	401	33	0	5	0	74	0
8:15 AM	39	265	12	0	4	0	2	0	5	372	29	0	17	1	54	0
8:30 AM	29	255	11	0	8	0	1	0	9	358	12	0	9	1	62	0
8:45 AM	42	283	2	0	2	0	1	0	5	339	9	0	6	1	47	0
3:00 PM	41	342	11	0	33	1	18	0	7	239	11	3	10	3	33	0
3:15 PM	41	453	24	0	14	1	7	0	5	238	4	0	8	4	38	0
3:30 PM	50	428	19	0	21	0	12	0	5	266	15	0	5	4	47	0
3:45 PM	60	451	10	0	2	1	3	0	11	294	14	1	15	9	48	0
4:00 PM	42	425	1	0	42	5	28	0	1	245	11	1	10	1	35	0
4:15 PM	65	457	3	0	7	1	16	0	2	258	17	0	4	1	44	0
4:30 PM	60	459	3	1	13	0	12	0	1	217	18	0	14	0	75	0
4:45 PM	54	494	1	1	3	0	3	0	1	258	15	1	12	1	32	0
5:00 PM	51	463	2	0	8	1	9	0	3	253	11	1	13	0	51	0
5:15 PM	49	376	2	0	3	1	6	0	2	231	7	0	1	1	42	0
5:30 PM	42	396	6	0	2	0	3	0	6	222	11	0	9	1	39	0
5:45 PM	21	345	5	0	10	0	5	0	3	213	8	2	3	0	28	0

APPENDIX

C SIGNAL WARRANT ANALYSIS



City of Winnipeg - Traffic Signal & Pedestrian Signal Head Warrant Analysis

1
2
3
4
5
6
7
8
9

Main Street (name)
Side Street (name)
Quadrant / Int #

Paulette Duguay Street
Commercial Access
CHECK SHEET

Direction (EW or NS)
Direction (EW or NS)

NS
EW

Road Authority:
City:
Analysis Date:
Count Date:
Date Entry Format:

City of Winnipeg
Winnipeg, MB
2025 May 07, Wed
2025 May 07, Wed
(yyyy-mm-dd)

Comments
Future 2034 (Phase 2 FBO)

for Warrant Calculation Results, please hit 'Page Down'

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase	Saturation Flow Rates (if not default) (vphpl)	Default Saturation Flow Rates (vphpl)
Paulette Duguay Street	NB	0	1	0	0	1	0	n	2,000	2	perm	y	n	Left Turn	1,650
Paulette Duguay Street	SB	1	0	1	0	1	0	n	100	2	perm	y	n	Through	1,800
Commercial Access	WB	0	1	0	0	0	1	n	2,000	1	perm	y	n	Right Turn	1,500
Commercial Access	EB	0	1	0	0	0	1	n	2,000	1	perm	y	n		

Are the Paulette Duguay Street NB right turns significantly impeded by through movements? (y/n)
Are the Paulette Duguay Street SB right turns significantly impeded by through movements? (y/n)

n
n

Other input

Speed (Km/h)

Truck %

Bus Rt (y/n)

Median (m)

Paulette Duguay Street

Commercial Access

NS

EW

50

50

2.0%

2.0%

n

n

0.0

0.0

Demographics

Elem. School/Mobility Challenged

Senior's Complex

Pathway to School

Metro Area Population

Central Business District

(y/n)

(y/n)

(y/n)

(#)

(y/n)

n

n

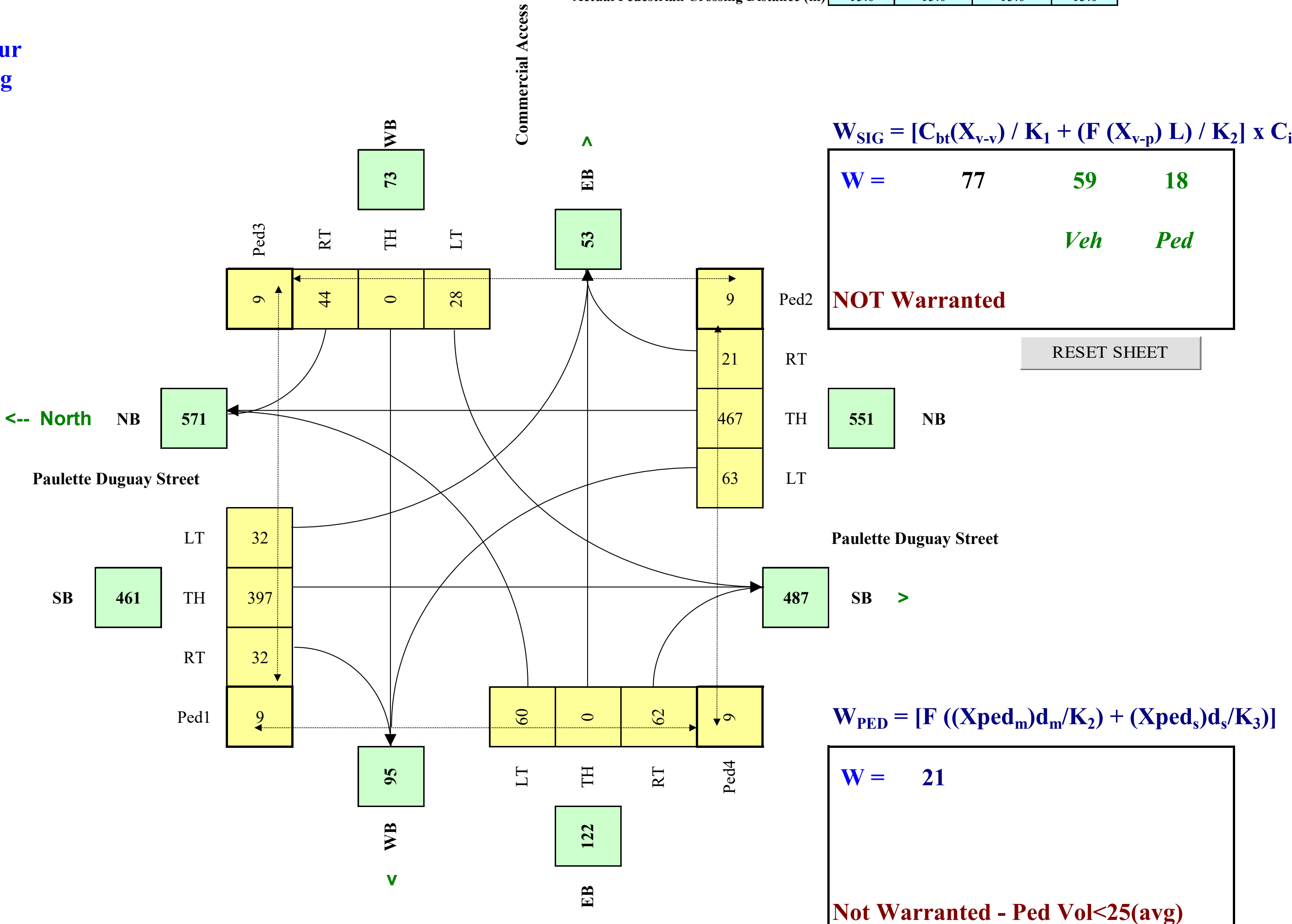
n

780,000

n

Set Peak Hours													Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
Traffic Input	NB			SB			WB			EB			W Side	E Side	N Side	S Side
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT				
	37	528	27	53	454	11	10	0	10	19	0	32	10	10	10	10
	25	354	18	36	304	7	7	0	7	13	0	21	7	7	7	7
	76	464	20	25	392	42	37	0	60	79	0	77	9	9	9	9
	77	469	20	25	396	42	38	0	61	80	0	78	9	9	9	9
	80	489	21	26	413	44	39	0	64	83	0	81	10	10	10	10
	82	499	21	27	421	45	40	0	65	85	0	83	10	10	10	10
Total (6-hour peak)	377	2,803	126	192	2,379	192	171	0	267	359	0	373	55	55	55	55
Average (6-hour peak)	63	467	21	32	397	32	28	0	44	60	0	62	9	9	9	9
Actual Pedestrian Crossing Distance (m)													15.0	15.0	15.0	15.0

Average 6-hour Peak Turning Movements



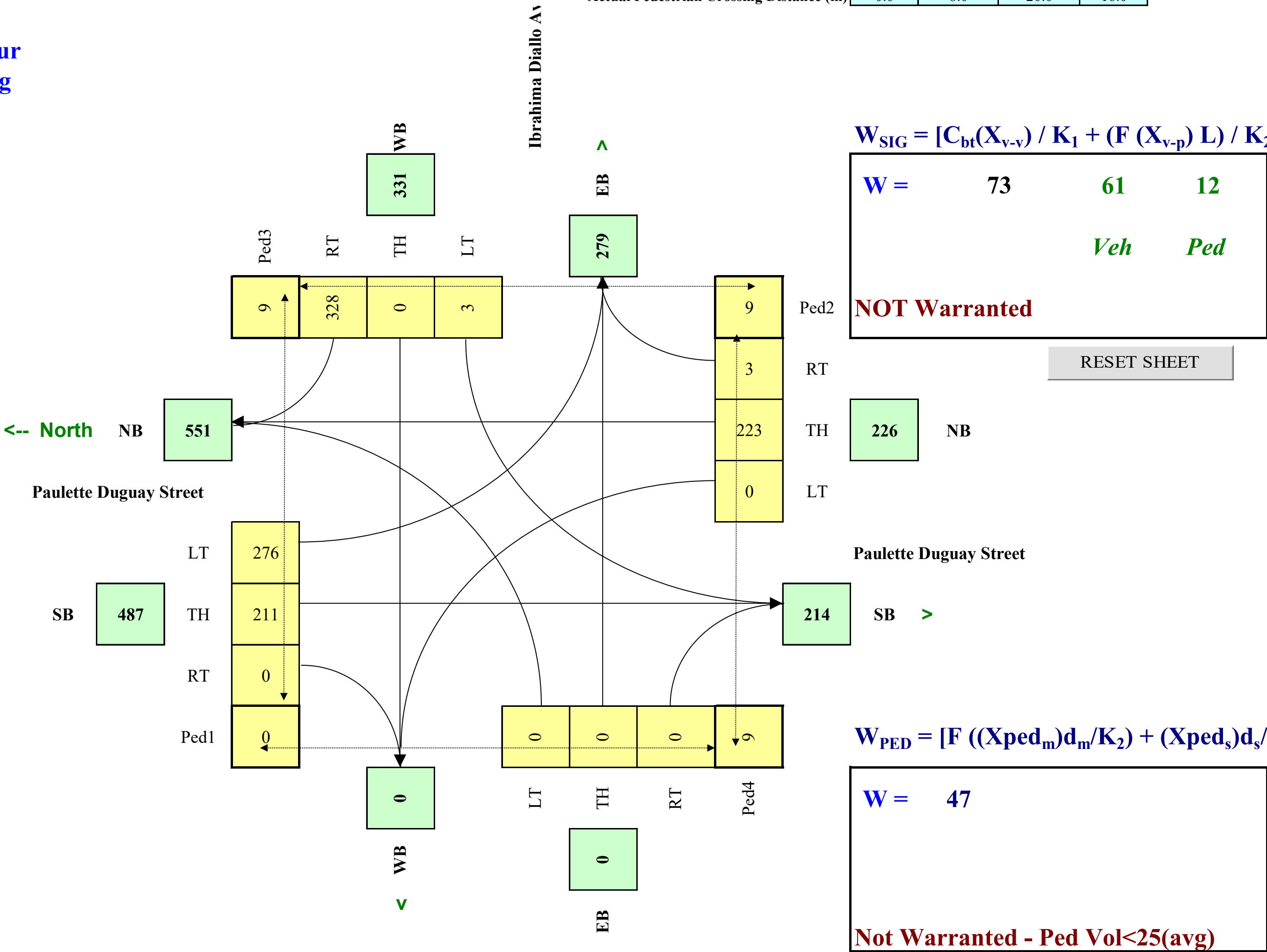


**for Warrant Calculation
Results, please hit 'Page
Down'**

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	780,000
Central Business District	(y/n)	n

Ped1	Ped2	Ped3	Ped4
NS	NS	EW	EW
W Side	E Side	N Side	S Side
0	10	10	10
0	7	7	7
0	9	9	9
0	9	9	9
0	10	10	10
0	10	10	10
0	55	55	55
0	9	9	9
0.0	8.0	20.0	16.0



APPENDIX

D SYNCHRO, SIMTRAFFIC AND SIDRA REPORTS

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	932	276	134	1108	18	235	0	66	13	0	13
Future Volume (vph)	17	932	276	134	1108	18	235	0	66	13	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	26.0		45.0	38.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (m)	45.0			45.0			0.0			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.998			0.932			0.932	
Flt Protected	0.950			0.950			0.950	0.973			0.976	
Satd. Flow (prot)	1437	3544	1601	1789	3478	0	1700	1623	0	0	1037	0
Flt Permitted	0.152			0.195			0.950	0.973			0.976	
Satd. Flow (perm)	230	3544	1601	367	3478	0	1700	1623	0	0	1037	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			208		2			158			158	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		425.9			427.4			116.2			148.9	
Travel Time (s)		25.6			25.6			8.4			10.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	27%	3%	2%	2%	4%	50%	2%	2%	2%	55%	2%	82%
Adj. Flow (vph)	18	1013	300	146	1204	20	255	0	72	14	0	14
Shared Lane Traffic (%)							34%					
Lane Group Flow (vph)	18	1013	300	146	1224	0	168	159	0	0	28	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Split	NA		Split	NA	
Protected Phases		2		1	6		3	3		4	4	
Permitted Phases	2		2	6								
Detector Phase	2	2	2	1	6		3	3		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.5	23.5	23.5	10.5	23.5		23.0	23.0		23.0	23.0	
Total Split (s)	31.0	31.0	31.0	13.0	44.0		23.0	23.0		23.0	23.0	
Total Split (%)	34.4%	34.4%	34.4%	14.4%	48.9%		25.6%	25.6%		25.6%	25.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		5.0	5.0			5.0	
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes		Yes	Yes	
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	
Act Effct Green (s)	43.9	43.9	43.9	56.9	56.9		13.8	13.8			8.0	
Actuated g/C Ratio	0.49	0.49	0.49	0.63	0.63		0.15	0.15			0.09	
v/c Ratio	0.16	0.59	0.34	0.42	0.56		0.65	0.42			0.12	
Control Delay (s/veh)	25.2	21.9	7.9	20.9	13.5		46.9	9.0			1.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay (s/veh)	25.2	21.9	7.9	20.9	13.5		46.9	9.0			1.0	
LOS	C	C	A	C	B		D	A			A	
Approach Delay (s/veh)		18.8			14.3			28.5			1.0	
Approach LOS		B			B			C			A	
Queue Length 50th (m)	1.8	69.8	9.2	10.3	64.2		30.5	0.2			0.0	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	9.6	#142.5	36.1	28.7	129.0		50.2	16.9			0.0	
Internal Link Dist (m)		401.9			403.4			92.2			124.9	
Turn Bay Length (m)	26.0		45.0	38.0								
Base Capacity (vph)	112	1728	887	350	2199		340	451			333	
Starvation Cap Reductn	0	0	0	0	0		0	0			0	
Spillback Cap Reductn	0	0	0	0	0		0	0			0	
Storage Cap Reductn	0	0	0	0	0		0	0			0	
Reduced v/c Ratio	0.16	0.59	0.34	0.42	0.56		0.49	0.35			0.08	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay (s/veh): 17.6

Intersection LOS: B

Intersection Capacity Utilization 61.8%

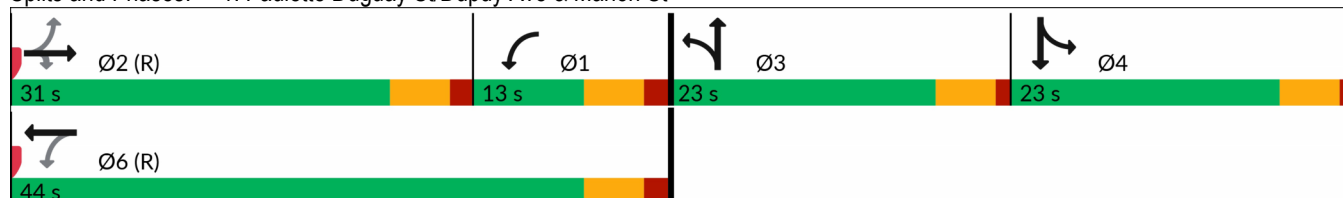
ICU Level of Service B

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Paulette Duguay St/Dupuy Ave & Marion St



Lanes, Volumes, Timings
5: Lagimodiere Blvd & Maginot St

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 					 	 			 	
Traffic Volume (vph)	238	19	74	34	5	69	154	1694	63	72	1075	200
Future Volume (vph)	238	19	74	34	5	69	154	1694	63	72	1075	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		50.0	0.0		0.0	100.0		80.0	90.0		80.0
Storage Lanes	1		1	1		1	2		1	1		1
Taper Length (m)	33.0			7.5			30.0			35.0		
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00	*0.84	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.98		1.00					0.99	1.00		
Frt		0.881				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3309	2466	0	1659	1883	1555	2738	3544	1601	1738	3349	1498
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3309	2466	0	1739	1883	1555	2738	3544	1580	1738	3349	1498
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		80				153			102			217
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		168.0			95.5			349.7			499.8	
Travel Time (s)		12.1			6.9			15.7			22.5	
Confl. Peds. (#/hr)			2	2					1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	6%	34%	10%	2%	5%	12%	3%	2%	5%	9%	9%
Adj. Flow (vph)	259	21	80	37	5	75	167	1841	68	78	1168	217
Shared Lane Traffic (%)												
Lane Group Flow (vph)	259	101	0	37	5	75	167	1841	68	78	1168	217
Turn Type	Prot	NA		pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	3	8		7	4	5	1	6	7	5	2	
Permitted Phases				4		4			6			2
Detector Phase	3	8		7	4	5	1	6	7	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	7.0	5.0	5.0	7.0	7.0
Minimum Split (s)	11.0	11.6		11.0	11.3	11.7	11.7	43.7	11.0	11.7	43.7	43.7
Total Split (s)	13.0	13.3		13.0	13.3	14.0	19.0	69.7	13.0	14.0	64.7	64.7
Total Split (%)	11.8%	12.1%		11.8%	12.1%	12.7%	17.3%	63.4%	11.8%	12.7%	58.8%	58.8%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.7	4.7	4.7	4.0	4.7	4.7	4.7
All-Red Time (s)	2.0	2.6		2.0	2.3	2.0	2.0	1.0	2.0	2.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.6		6.0	6.3	6.7	6.7	5.7	6.0	6.7	5.7	5.7
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	Max
Act Effect Green (s)	14.5	6.4		8.0	6.0	8.4	10.9	64.2	70.5	7.2	60.4	60.4
Actuated g/C Ratio	0.14	0.06		0.07	0.06	0.08	0.10	0.60	0.66	0.07	0.57	0.57
v/c Ratio	0.58	0.45		0.30	0.05	0.28	0.60	0.87	0.06	0.67	0.62	0.23
Control Delay (s/veh)	50.1	23.3		50.7	49.8	2.7	55.7	24.2	0.4	78.0	18.2	2.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	50.1	23.3		50.7	49.8	2.7	55.7	24.2	0.4	78.0	18.2	2.4
LOS	D	C		D	D	A	E	C	A	E	B	A
Approach Delay (s/veh)		42.6			19.9			26.0			19.1	

Lanes, Volumes, Timings
5: Lagimodiere Blvd & Maginot St

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	D			B			C			B		
Queue Length 50th (m)	26.9	2.4		8.1	1.1	0.0	21.5	178.2	0.0	17.5	93.1	0.0
Queue Length 95th (m)	#64.0	11.3		16.6	5.0	0.0	34.8	220.4	0.9	#41.2	117.7	11.1
Internal Link Dist (m)	144.0			71.5			325.7			475.8		
Turn Bay Length (m)	75.0						100.0			90.0		
Base Capacity (vph)	447	230		131	123	266	316	2128	1084	119	1894	941
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.44		0.28	0.04	0.28	0.53	0.87	0.06	0.66	0.62	0.23

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 106.8

Natural Cycle: 90

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.87

Intersection Signal Delay (s/veh): 24.8

Intersection LOS: C

Intersection Capacity Utilization 80.3%

ICU Level of Service D

Analysis Period (min) 15

* User Entered Value

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 5: Lagimodiere Blvd & Maginot St

 Ø1	 Ø2	 Ø3	 Ø4
19 s	64.7 s	13 s	13.3 s
 Ø6	 Ø5	 Ø7	 Ø8
69.7 s	14 s	13 s	13.3 s

Intersection

Int Delay, s/veh 1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱	↱		↱	↱		↱↲		↱	↲	
Traffic Vol, veh/h	16	1	22	8	1	11	27	274	26	53	343	10
Future Vol, veh/h	16	1	22	8	1	11	27	274	26	53	343	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	10	22.1	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	1	24	9	1	12	29	298	28	58	373	11

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	703	879	379	877	870	163	384	0	0	326	0	0
Stage 1	495	495	-	370	370	-	-	-	-	-	-	-
Stage 2	208	384	-	507	500	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.23	7.33	6.53	6.93	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.53	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.53	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	338	285	667	255	289	854	1173	-	-	1232	-	-
Stage 1	555	545	-	623	619	-	-	-	-	-	-	-
Stage 2	775	611	-	547	542	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	313	263	667	231	267	854	1173	-	-	1232	-	-
Mov Cap-2 Maneuver	313	263	-	231	267	-	-	-	-	-	-	-
Stage 1	538	519	-	604	600	-	-	-	-	-	-	-
Stage 2	740	593	-	502	517	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Ctrl Dly, s/v	13.5		14.6		0.8		1.1	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1173	-	-	310	667	235	854	1232	-	-
HCM Lane V/C Ratio	0.025	-	-	0.06	0.036	0.042	0.014	0.047	-	-
HCM Ctrl Dly (s/v)	8.1	0.1	-	17.3	10.6	21	9.3	8.1	-	-
HCM Lane LOS	A	A	-	C	B	C	A	A	-	-
HCM 95th %tile Q (veh)	0.1	-	-	0.2	0.1	0.1	0	0.1	-	-

Intersection

Int Delay, s/veh 6.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	159	167	1	317	56
Future Vol, veh/h	1	159	167	1	317	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	14	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	173	182	1	345	61

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	904	92	0
Stage 1	183	-	-
Stage 2	721	-	-
Critical Hdwy	6.84	6.94	-
Critical Hdwy Stg 1	5.84	-	-
Critical Hdwy Stg 2	5.84	-	-
Follow-up Hdwy	3.52	3.32	-
Pot Cap-1 Maneuver	277	947	-
Stage 1	830	-	-
Stage 2	443	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	208	947	-
Mov Cap-2 Maneuver	208	-	-
Stage 1	830	-	-
Stage 2	333	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	9.8	0	7.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	926	1389
HCM Lane V/C Ratio	-	-	0.188	0.248
HCM Ctrl Dly (s/v)	-	-	9.8	8.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q (veh)	-	-	0.7	1

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1267	229	70	1004	11	341	0	132	14	0	11
Future Volume (vph)	7	1267	229	70	1004	11	341	0	132	14	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	26.0		45.0	38.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (m)	45.0			45.0			0.0			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.998			0.913			0.940	
Flt Protected	0.950			0.950			0.950	0.979			0.973	
Satd. Flow (prot)	1141	3544	1601	1789	3517	0	1700	1599	0	0	1320	0
Flt Permitted	0.177			0.087			0.950	0.979			0.973	
Satd. Flow (perm)	213	3544	1601	164	3517	0	1700	1599	0	0	1320	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			152		1			158			158	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		425.9			427.4			116.2			148.9	
Travel Time (s)		25.6			25.6			8.4			10.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	60%	3%	2%	2%	3%	56%	2%	2%	2%	58%	2%	2%
Adj. Flow (vph)	8	1377	249	76	1091	12	371	0	143	15	0	12
Shared Lane Traffic (%)							28%					
Lane Group Flow (vph)	8	1377	249	76	1103	0	267	247	0	0	27	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Split	NA		Split	NA	
Protected Phases		2		1	6		3	3		4	4	
Permitted Phases	2		2	6								
Detector Phase	2	2	2	1	6		3	3		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.5	23.5	23.5	10.5	23.5		23.0	23.0		23.0	23.0	
Total Split (s)	31.0	31.0	31.0	13.0	44.0		23.0	23.0		23.0	23.0	
Total Split (%)	34.4%	34.4%	34.4%	14.4%	48.9%		25.6%	25.6%		25.6%	25.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		5.0	5.0			5.0	
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes		Yes	Yes	
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	
Act Effct Green (s)	43.4	43.4	43.4	53.8	53.8		16.9	16.9			8.0	
Actuated g/C Ratio	0.48	0.48	0.48	0.60	0.60		0.19	0.19			0.09	
v/c Ratio	0.08	0.81	0.29	0.34	0.52		0.84	0.58			0.10	
Control Delay (s/veh)	23.6	28.6	9.4	26.6	13.9		58.5	18.3			0.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay (s/veh)	23.6	28.6	9.4	26.6	13.9		58.5	18.3			0.8	
LOS	C	C	A	C	B		E	B			A	
Approach Delay (s/veh)		25.7			14.7			39.2			0.8	
Approach LOS		C			B			D			A	
Queue Length 50th (m)	0.9	121.2	10.6	5.8	62.0		48.9	14.5			0.0	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	5.1	#218.3	34.6	16.6	110.2		#89.7	39.7			0.0	
Internal Link Dist (m)		401.9			403.4			92.2			124.9	
Turn Bay Length (m)	26.0		45.0	38.0								
Base Capacity (vph)	102	1709	850	233	2103		340	446			390	
Starvation Cap Reductn	0	0	0	0	0		0	0			0	
Spillback Cap Reductn	0	0	0	0	0		0	0			0	
Storage Cap Reductn	0	0	0	0	0		0	0			0	
Reduced v/c Ratio	0.08	0.81	0.29	0.33	0.52		0.79	0.55			0.07	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay (s/veh): 23.7

Intersection LOS: C

Intersection Capacity Utilization 70.8%

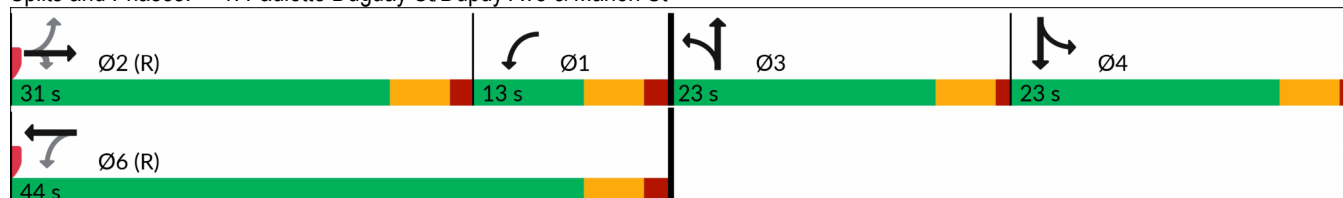
ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Paulette Duguay St/Dupuy Ave & Marion St



Lanes, Volumes, Timings
5: Lagimodiere Blvd & Maginot St

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 					 	 			 	
Traffic Volume (vph)	204	13	115	61	9	66	99	1021	17	19	1802	229
Future Volume (vph)	204	13	115	61	9	66	99	1021	17	19	1802	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		50.0	0.0		0.0	100.0		80.0	90.0		80.0
Storage Lanes	1		1	1		1	2		1	1		1
Taper Length (m)	33.0			7.5			30.0			35.0		
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00	*0.84	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.99										
Frt		0.865				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3278	2852	0	1789	1883	1555	2738	3476	1601	1560	3544	1541
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3278	2852	0	1883	1883	1555	2738	3476	1601	1560	3544	1541
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		125				120			80			185
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		168.0			95.5			349.7			499.8	
Travel Time (s)		12.1			6.9			15.7			22.5	
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	2%	10%	2%	2%	5%	12%	5%	2%	17%	3%	6%
Adj. Flow (vph)	222	14	125	66	10	72	108	1110	18	21	1959	249
Shared Lane Traffic (%)												
Lane Group Flow (vph)	222	139	0	66	10	72	108	1110	18	21	1959	249
Turn Type	Prot	NA		pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	3	8		7	4	5	1	6	7	5	2	
Permitted Phases				4		4			6			2
Detector Phase	3	8		7	4	5	1	6	7	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	7.0	5.0	5.0	7.0	7.0
Minimum Split (s)	11.0	11.6		11.0	11.3	11.7	11.7	43.7	11.0	11.7	43.7	43.7
Total Split (s)	17.3	16.3		14.3	13.3	13.4	15.4	96.0	14.3	13.4	94.0	94.0
Total Split (%)	12.4%	11.6%		10.2%	9.5%	9.6%	11.0%	68.6%	10.2%	9.6%	67.1%	67.1%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.7	4.7	4.7	4.0	4.7	4.7	4.7
All-Red Time (s)	2.0	2.6		2.0	2.3	2.0	2.0	1.0	2.0	2.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.6		6.0	6.3	6.7	6.7	5.7	6.0	6.7	5.7	5.7
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	Max
Act Effect Green (s)	17.2	7.9		9.3	6.2	8.9	8.4	93.1	106.7	6.4	88.4	88.4
Actuated g/C Ratio	0.13	0.06		0.07	0.05	0.07	0.06	0.69	0.79	0.05	0.65	0.65
v/c Ratio	0.53	0.49		0.53	0.12	0.34	0.64	0.46	0.01	0.29	0.84	0.23
Control Delay (s/veh)	60.5	19.6		74.0	66.3	5.2	79.8	11.5	0.0	73.9	23.3	3.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	60.5	19.6		74.0	66.3	5.2	79.8	11.5	0.0	73.9	23.3	3.4
LOS	E	B		E	E	A	E	B	A	E	C	A
Approach Delay (s/veh)		44.8			40.0			17.3			21.5	

Lanes, Volumes, Timings
5: Lagimodiere Blvd & Maginot St

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	D			D			B			C		
Queue Length 50th (m)	29.8	2.0		18.6	2.8	0.0	18.0	76.5	0.0	5.9	215.9	6.3
Queue Length 95th (m)	#55.7	13.2		31.5	9.2	2.3	#32.7	99.6	0.0	15.5	274.0	17.9
Internal Link Dist (m)	144.0			71.5			325.7			475.8		
Turn Bay Length (m)	75.0						100.0			80.0		
Base Capacity (vph)	418	323		129	97	218	176	2398	1287	77	2321	1073
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.43		0.51	0.10	0.33	0.61	0.46	0.01	0.27	0.84	0.23

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 135

Natural Cycle: 90

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.84

Intersection Signal Delay (s/veh): 23.0

Intersection LOS: C

Intersection Capacity Utilization 74.8%

ICU Level of Service D

Analysis Period (min) 15

* User Entered Value

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 5: Lagimodiere Blvd & Maginot St

	Ø2		Ø1		Ø3		Ø4
94 s		15.4 s		17.3 s		13.3 s	
	Ø5		Ø6		Ø7		Ø8
13.4 s	96 s			14.3 s		16.3 s	

Intersection												
Int Delay, s/veh	5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱	↱		↱	↱		↱↲		↱	↲	
Traffic Vol, veh/h	60	4	70	39	4	64	72	350	21	29	221	33
Future Vol, veh/h	60	4	70	39	4	64	72	350	21	29	221	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	10	22.1	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	4	76	42	4	70	78	380	23	32	240	36

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	670	881	258	910	888	202	276	0	0	403	0	0
Stage 1	322	322	-	548	548	-	-	-	-	-	-	-
Stage 2	348	559	-	362	340	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.23	7.33	6.53	6.93	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.53	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.53	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	356	285	780	242	282	806	1285	-	-	1154	-	-
Stage 1	689	650	-	489	516	-	-	-	-	-	-	-
Stage 2	642	510	-	656	639	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	295	255	780	198	253	806	1285	-	-	1154	-	-
Mov Cap-2 Maneuver	295	255	-	198	253	-	-	-	-	-	-	-
Stage 1	635	632	-	451	476	-	-	-	-	-	-	-
Stage 2	536	470	-	572	621	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Ctrl Dly, s/v	15.4		17.2		1.5		0.8	
HCM LOS	C		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1285	-	-	292	780	202	806	1154	-	-
HCM Lane V/C Ratio	0.061	-	-	0.238	0.098	0.231	0.086	0.027	-	-
HCM Ctrl Dly (s/v)	8	0.2	-	21.1	10.1	28.1	9.9	8.2	-	-
HCM Lane LOS	A	A	-	C	B	D	A	A	-	-
HCM 95th %tile Q (veh)	0.2	-	-	0.9	0.3	0.9	0.3	0.1	-	-

Intersection

Int Delay, s/veh 7.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	355	88	3	205	125
Future Vol, veh/h	3	355	88	3	205	125
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	14	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	386	96	3	223	136

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	612	50	0
Stage 1	98	-	-
Stage 2	514	-	-
Critical Hdwy	6.84	6.94	-
Critical Hdwy Stg 1	5.84	-	-
Critical Hdwy Stg 2	5.84	-	-
Follow-up Hdwy	3.52	3.32	-
Pot Cap-1 Maneuver	425	1008	-
Stage 1	915	-	-
Stage 2	565	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	362	1008	-
Mov Cap-2 Maneuver	362	-	-
Stage 1	915	-	-
Stage 2	481	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	10.9	0	4.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	993	1492
HCM Lane V/C Ratio	-	-	0.392	0.149
HCM Ctrl Dly (s/v)	-	-	10.9	7.8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q (veh)	-	-	1.9	0.5

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	941	353	170	1119	18	433	0	123	13	0	13
Future Volume (vph)	17	941	353	170	1119	18	433	0	123	13	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	26.0		45.0	38.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (m)	45.0			45.0			0.0			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.998			0.932			0.932	
Flt Protected	0.950			0.950			0.950	0.974			0.976	
Satd. Flow (prot)	1437	3544	1601	1789	3478	0	1700	1624	0	0	1037	0
Flt Permitted	0.216			0.161			0.950	0.974			0.976	
Satd. Flow (perm)	327	3544	1601	303	3478	0	1700	1624	0	0	1037	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			223		2			118			118	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		425.9			427.4			116.2			148.9	
Travel Time (s)		25.6			25.6			8.4			10.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	27%	3%	2%	2%	4%	50%	2%	2%	2%	55%	2%	82%
Adj. Flow (vph)	18	1023	384	185	1216	20	471	0	134	14	0	14
Shared Lane Traffic (%)							34%					
Lane Group Flow (vph)	18	1023	384	185	1236	0	311	294	0	0	28	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Split	NA		Split	NA	
Protected Phases		2		1	6		3	3		4	4	
Permitted Phases	2		2	6								
Detector Phase	2	2	2	1	6		3	3		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.5	23.5	23.5	10.5	23.5		27.0	27.0		10.0	10.0	
Total Split (s)	49.0	49.0	49.0	21.2	70.2		36.8	36.8		13.0	13.0	
Total Split (%)	40.8%	40.8%	40.8%	17.7%	58.5%		30.7%	30.7%		10.8%	10.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		5.0	5.0			5.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	
Act Effct Green (s)	59.3	59.3	59.3	76.8	76.8		26.4	26.4			5.5	
Actuated g/C Ratio	0.49	0.49	0.49	0.64	0.64		0.22	0.22			0.05	
v/c Ratio	0.11	0.58	0.43	0.54	0.56		0.83	0.65			0.18	
Control Delay (s/veh)	10.4	8.7	1.8	16.7	14.9		63.1	31.5			2.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay (s/veh)	10.4	8.7	1.8	16.7	14.9		63.1	31.5			2.4	
LOS	B	A	A	B	B		E	C			A	
Approach Delay (s/veh)		6.9			15.1			47.7			2.4	
Approach LOS		A			B			D			A	
Queue Length 50th (m)	0.5	14.4	0.7	19.3	94.2		77.3	41.6			0.0	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	m1.3	m60.4	m6.9	34.1	127.8		108.3	70.6			0.0	
Internal Link Dist (m)		401.9			403.4			92.2			124.9	
Turn Bay Length (m)	26.0		45.0	38.0								
Base Capacity (vph)	161	1750	903	394	2225		450	517			179	
Starvation Cap Reductn	0	0	0	0	0		0	0			0	
Spillback Cap Reductn	0	0	0	0	0		0	0			0	
Storage Cap Reductn	0	0	0	0	0		0	0			0	
Reduced v/c Ratio	0.11	0.58	0.43	0.47	0.56		0.69	0.57			0.16	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 56 (47%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay (s/veh): 17.3

Intersection LOS: B

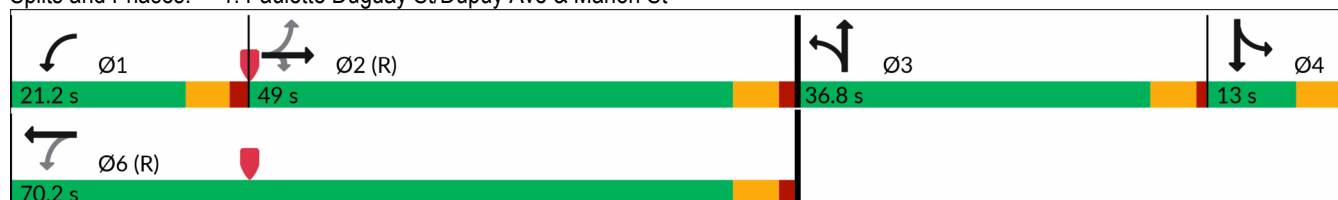
Intersection Capacity Utilization 71.4%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Paulette Duguay St/Dupuy Ave & Marion St



Lanes, Volumes, Timings
5: Lagimodiere Blvd & Maginot St

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	241	19	101	34	5	70	170	1711	64	73	1086	202
Future Volume (vph)	241	19	101	34	5	70	170	1711	64	73	1086	202
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		50.0	0.0		0.0	100.0		80.0	90.0		80.0
Storage Lanes	1		1	1		1	2		1	1		1
Taper Length (m)	33.0			7.5			30.0			35.0		
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00	*0.84	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.98		1.00					0.99	1.00		
Fr't		0.874				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3309	2418	0	1659	1883	1555	2738	3544	1601	1738	3349	1498
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3309	2418	0	1740	1883	1555	2738	3544	1580	1738	3349	1498
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		110				153			102			220
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		168.0			95.5			349.7			499.8	
Travel Time (s)		12.1			6.9			15.7			22.5	
Confl. Peds. (#/hr)			2	2					1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	6%	34%	10%	2%	5%	12%	3%	2%	5%	9%	9%
Adj. Flow (vph)	262	21	110	37	5	76	185	1860	70	79	1180	220
Shared Lane Traffic (%)												
Lane Group Flow (vph)	262	131	0	37	5	76	185	1860	70	79	1180	220
Turn Type	Prot	NA		pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	3	8		7	4	5	1	6	7	5	2	
Permitted Phases				4		4			6			2
Detector Phase	3	8		7	4	5	1	6	7	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	7.0	5.0	5.0	7.0	7.0
Minimum Split (s)	11.0	11.6		11.0	11.3	11.7	11.7	43.7	11.0	11.7	43.7	43.7
Total Split (s)	13.0	13.3		13.0	13.3	14.0	20.2	69.7	13.0	14.0	63.5	63.5
Total Split (%)	11.8%	12.1%		11.8%	12.1%	12.7%	18.4%	63.4%	11.8%	12.7%	57.7%	57.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.7	4.7	4.7	4.0	4.7	4.7	4.7
All-Red Time (s)	2.0	2.6		2.0	2.3	2.0	2.0	1.0	2.0	2.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.6		6.0	6.3	6.7	6.7	5.7	6.0	6.7	5.7	5.7
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	Max
Act Effect Green (s)	14.5	6.4		8.0	6.0	8.5	11.7	64.2	70.5	7.2	59.7	59.7
Actuated g/C Ratio	0.14	0.06		0.07	0.06	0.08	0.11	0.60	0.66	0.07	0.56	0.56
v/c Ratio	0.59	0.53		0.30	0.05	0.29	0.62	0.87	0.06	0.68	0.63	0.24
Control Delay (s/veh)	50.3	22.0		50.7	49.8	2.7	55.2	24.8	0.4	78.5	19.1	2.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	50.3	22.0		50.7	49.8	2.7	55.2	24.8	0.4	78.5	19.1	2.5
LOS	D	C		D	D	A	E	C	A	E	B	A
Approach Delay (s/veh)		40.9			19.8			26.6			19.8	

Lanes, Volumes, Timings
5: Lagimodiere Blvd & Maginot St

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	D			B			C			B		
Queue Length 50th (m)	27.3	2.4		8.1	1.1	0.0	23.9	182.0	0.0	17.7	96.1	0.0
Queue Length 95th (m)	#65.0	12.5		16.6	5.0	0.0	37.6	224.7	1.0	#42.1	122.7	11.5
Internal Link Dist (m)	144.0			71.5			325.7			475.8		
Turn Bay Length (m)	75.0						100.0			90.0		80.0
Base Capacity (vph)	447	254		132	123	266	346	2128	1083	119	1868	933
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.52		0.28	0.04	0.29	0.53	0.87	0.06	0.66	0.63	0.24

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 106.9

Natural Cycle: 90

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.87

Intersection Signal Delay (s/veh): 25.3

Intersection LOS: C

Intersection Capacity Utilization 80.8%

ICU Level of Service D

Analysis Period (min) 15

* User Entered Value

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 5: Lagimodiere Blvd & Maginot St

 Ø1	 Ø2	 Ø3	 Ø4
20.2 s	63.5 s	13 s	13.3 s
 Ø6	 Ø5	 Ø7	 Ø8
69.7 s	14 s	13 s	13.3 s

Intersection

Int Delay, s/veh 1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱	↱		↱	↱		↱↲		↱	↲	
Traffic Vol, veh/h	19	0	32	10	0	10	37	528	27	53	454	11
Future Vol, veh/h	19	0	32	10	0	10	37	528	27	53	454	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	10	22.1	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	0	35	11	0	11	40	574	29	58	493	12

Major/Minor	Minor2		Minor1		Major1		Major2		Major2		Major2	
Conflicting Flow All	982	1298	499	1302	1290	302	505	0	0	603	0	0
Stage 1	615	615	-	669	669	-	-	-	-	-	-	-
Stage 2	367	683	-	633	621	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.23	7.33	6.53	6.93	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.53	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.53	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	215	161	571	128	163	695	1058	-	-	973	-	-
Stage 1	478	481	-	414	455	-	-	-	-	-	-	-
Stage 2	626	448	-	467	478	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	193	143	571	110	144	695	1058	-	-	973	-	-
Mov Cap-2 Maneuver	193	143	-	110	144	-	-	-	-	-	-	-
Stage 1	451	452	-	390	429	-	-	-	-	-	-	-
Stage 2	581	422	-	412	449	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	17	25.8	0.7	0.9
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1058	-	-	193	571	110	695	973	-	-
HCM Lane V/C Ratio	0.038	-	-	0.107	0.061	0.099	0.016	0.059	-	-
HCM Ctrl Dly (s/v)	8.5	0.2	-	25.9	11.7	41.3	10.3	8.9	-	-
HCM Lane LOS	A	A	-	D	B	E	B	A	-	-
HCM 95th %tile Q (veh)	0.1	-	-	0.4	0.2	0.3	0	0.2	-	-

Intersection

Int Delay, s/veh 5.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	252	340	2	348	147
Future Vol, veh/h	2	252	340	2	348	147
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	14	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	274	370	2	378	160

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	1207	186	0
Stage 1	371	-	-
Stage 2	836	-	-
Critical Hdwy	6.84	6.94	-
Critical Hdwy Stg 1	5.84	-	-
Critical Hdwy Stg 2	5.84	-	-
Follow-up Hdwy	3.52	3.32	-
Pot Cap-1 Maneuver	176	824	-
Stage 1	668	-	-
Stage 2	386	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	120	824	-
Mov Cap-2 Maneuver	120	-	-
Stage 1	668	-	-
Stage 2	262	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	12	0	6.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	788	1183
HCM Lane V/C Ratio	-	-	0.35	0.32
HCM Ctrl Dly (s/v)	-	-	12	9.5
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q (veh)	-	-	1.6	1.4

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1276	403	110	1009	11	461	0	180	14	0	11
Future Volume (vph)	7	1276	403	110	1009	11	461	0	180	14	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	26.0		45.0	38.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (m)	45.0			45.0			0.0			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.998			0.912			0.940	
Flt Protected	0.950			0.950			0.950	0.980			0.973	
Satd. Flow (prot)	1141	3544	1601	1789	3517	0	1700	1599	0	0	1320	0
Flt Permitted	0.257			0.094			0.950	0.980			0.973	
Satd. Flow (perm)	309	3544	1601	177	3517	0	1700	1599	0	0	1320	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			241		2			158			158	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		425.9			427.4			116.2			148.9	
Travel Time (s)		25.6			25.6			8.4			10.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	60%	3%	2%	2%	3%	56%	2%	2%	2%	58%	2%	2%
Adj. Flow (vph)	8	1387	438	120	1097	12	501	0	196	15	0	12
Shared Lane Traffic (%)							28%					
Lane Group Flow (vph)	8	1387	438	120	1109	0	361	336	0	0	27	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Split	NA		Split	NA	
Protected Phases		2		1	6		3	3		4	4	
Permitted Phases	2		2	6								
Detector Phase	2	2	2	1	6		3	3		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.5	23.5	23.5	10.5	23.5		27.0	27.0		10.5	10.5	
Total Split (s)	36.0	36.0	36.0	13.0	49.0		27.5	27.5		13.5	13.5	
Total Split (%)	40.0%	40.0%	40.0%	14.4%	54.4%		30.6%	30.6%		15.0%	15.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		5.0	5.0			5.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	
Act Effct Green (s)	40.1	40.1	40.1	53.8	53.8		21.5	21.5			5.5	
Actuated g/C Ratio	0.45	0.45	0.45	0.60	0.60		0.24	0.24			0.06	
v/c Ratio	0.06	0.88	0.52	0.48	0.53		0.89	0.67			0.12	
Control Delay (s/veh)	11.0	17.5	2.5	17.3	12.9		58.2	23.1			1.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay (s/veh)	11.0	17.5	2.5	17.3	12.9		58.2	23.1			1.0	
LOS	B	B	A	B	B		E	C			A	
Approach Delay (s/veh)		13.9			13.3			41.3			1.0	
Approach LOS		B			B			D			A	
Queue Length 50th (m)	0.3	33.7	2.5	7.7	51.1		65.8	29.6			0.0	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	m0.4	m#157.8	m2.8	23.0	91.4		#116.9	61.4			0.0	
Internal Link Dist (m)		401.9			403.4			92.2			124.9	
Turn Bay Length (m)	26.0		45.0	38.0								
Base Capacity (vph)	137	1579	847	259	2103		425	518			267	
Starvation Cap Reductn	0	0	0	0	0		0	0			0	
Spillback Cap Reductn	0	0	0	0	0		0	0			0	
Storage Cap Reductn	0	0	0	0	0		0	0			0	
Reduced v/c Ratio	0.06	0.88	0.52	0.46	0.53		0.85	0.65			0.10	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 80 (89%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay (s/veh): 18.7

Intersection LOS: B

Intersection Capacity Utilization 79.4%

ICU Level of Service D

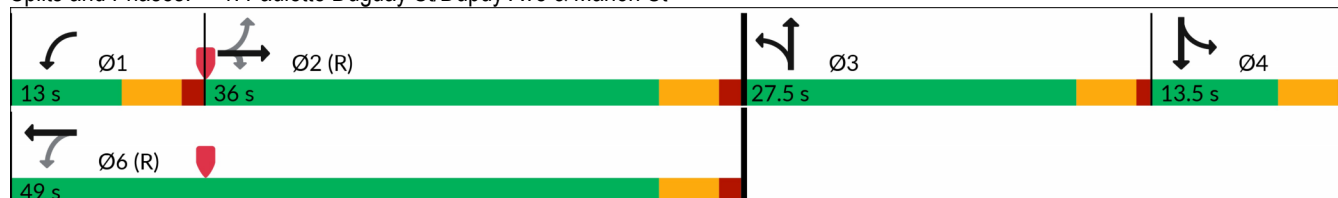
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Paulette Duguay St/Dupuy Ave & Marion St



Lanes, Volumes, Timings
5: Lagimodiere Blvd & Maginot St

PublicMarkets_Synchro_Final Improvements_250429.syn

06/10/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 					 	 			 	
Traffic Volume (vph)	205	13	143	61	9	66	129	1026	17	19	1811	231
Future Volume (vph)	205	13	143	61	9	66	129	1026	17	19	1811	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		50.0	0.0		0.0	100.0		80.0	90.0		80.0
Storage Lanes	1		1	1		1	2		1	1		1
Taper Length (m)	33.0			7.5			30.0			35.0		
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00	*0.84	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.99										
Frt		0.862				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3278	2836	0	1789	1883	1555	2738	3476	1601	1560	3544	1541
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3278	2836	0	1883	1883	1555	2738	3476	1601	1560	3544	1541
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		155				140			94			204
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		168.0			95.5			349.7			499.8	
Travel Time (s)		12.1			6.9			15.7			22.5	
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	2%	10%	2%	2%	5%	12%	5%	2%	17%	3%	6%
Adj. Flow (vph)	223	14	155	66	10	72	140	1115	18	21	1968	251
Shared Lane Traffic (%)												
Lane Group Flow (vph)	223	169	0	66	10	72	140	1115	18	21	1968	251
Turn Type	Prot	NA		pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	3	8		7	4	5	1	6	7	5	2	
Permitted Phases				4		4			6			2
Detector Phase	3	8		7	4	5	1	6	7	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	7.0	5.0	5.0	7.0	7.0
Minimum Split (s)	11.0	11.6		11.0	11.3	11.7	11.7	43.7	11.0	11.7	34.7	34.7
Total Split (s)	13.0	13.3		13.0	13.3	13.1	15.0	80.6	13.0	13.1	78.7	78.7
Total Split (%)	10.8%	11.1%		10.8%	11.1%	10.9%	12.5%	67.2%	10.8%	10.9%	65.6%	65.6%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.7	4.7	4.7	4.0	4.7	4.7	4.7
All-Red Time (s)	2.0	2.6		2.0	2.3	2.0	2.0	1.0	2.0	2.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.6		6.0	6.3	6.7	6.7	5.7	6.0	6.7	5.7	5.7
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	Max
Act Effect Green (s)	14.5	6.3		8.2	6.1	8.7	8.3	77.9	90.4	6.1	73.1	73.1
Actuated g/C Ratio	0.12	0.05		0.07	0.05	0.07	0.07	0.67	0.77	0.05	0.63	0.63
v/c Ratio	0.55	0.57		0.52	0.10	0.29	0.73	0.48	0.01	0.26	0.89	0.24
Control Delay (s/veh)	54.2	18.7		65.8	56.1	3.0	75.7	11.8	0.0	62.6	25.6	3.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	54.2	18.7		65.8	56.1	3.0	75.7	11.8	0.0	62.6	25.6	3.0
LOS	D	B		E	E	A	E	B	A	E	C	A
Approach Delay (s/veh)		38.9			34.6			18.6			23.4	

Lanes, Volumes, Timings
5: Lagimodiere Blvd & Maginot St

PublicMarkets_Synchro_Final Improvements_250429.syn
06/10/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	D			C			B			C		
Queue Length 50th (m)	25.6	1.7		16.2	2.4	0.0	20.5	74.0	0.0	5.1	209.3	4.4
Queue Length 95th (m)	#60.2	13.2		27.9	8.2	0.0	#39.1	92.0	0.0	13.9	256.3	15.3
Internal Link Dist (m)	144.0			71.5			325.7			475.8		
Turn Bay Length (m)	75.0						100.0			80.0		
Base Capacity (vph)	405	308		130	112	249	194	2317	1280	85	2217	1040
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.55		0.51	0.09	0.29	0.72	0.48	0.01	0.25	0.89	0.24

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 116.9

Natural Cycle: 90

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.89

Intersection Signal Delay (s/veh): 23.8

Intersection LOS: C

Intersection Capacity Utilization 80.2%

ICU Level of Service D

Analysis Period (min) 15

* User Entered Value

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 5: Lagimodiere Blvd & Maginot St

	Ø2			Ø1		Ø3		Ø4
78.7 s			15 s		13 s		13.3 s	
	Ø5		Ø6			Ø7		Ø8
13.1 s		80.6 s			13 s		13.3 s	

Intersection												
Int Delay, s/veh	6.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔		↔		↔	↔	
Traffic Vol, veh/h	77	0	83	40	0	65	82	499	21	27	421	45
Future Vol, veh/h	77	0	83	40	0	65	82	499	21	27	421	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	10	22.1	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	84	0	90	43	0	71	89	542	23	29	458	49

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	990	1284	483	1318	1297	283	507	0	0	565	0	0
Stage 1	541	541	-	732	732	-	-	-	-	-	-	-
Stage 2	449	743	-	586	565	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.23	7.33	6.53	6.93	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.53	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.53	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	213	164	583	124	161	715	1056	-	-	1005	-	-
Stage 1	524	520	-	380	426	-	-	-	-	-	-	-
Stage 2	560	421	-	495	507	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	170	140	583	93	137	715	1056	-	-	1005	-	-
Mov Cap-2 Maneuver	170	140	-	93	137	-	-	-	-	-	-	-
Stage 1	460	505	-	333	374	-	-	-	-	-	-	-
Stage 2	443	369	-	406	492	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Ctrl Dly, s/v	28.1		34.7		1.5		0.5	
HCM LOS	D		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1056	-	-	170	583	93	715	1005	-	-
HCM Lane V/C Ratio	0.084	-	-	0.492	0.155	0.468	0.099	0.029	-	-
HCM Ctrl Dly (s/v)	8.7	0.4	-	45.1	12.3	73.9	10.6	8.7	-	-
HCM Lane LOS	A	A	-	E	B	F	B	A	-	-
HCM 95th %tile Q (veh)	0.3	-	-	2.4	0.5	2	0.3	0.1	-	-

Intersection

Int Delay, s/veh 6.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	402	200	4	279	265
Future Vol, veh/h	4	402	200	4	279	265
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	14	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	437	217	4	303	288

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	969	111	0
Stage 1	219	-	-
Stage 2	750	-	-
Critical Hdwy	6.84	6.94	-
Critical Hdwy Stg 1	5.84	-	-
Critical Hdwy Stg 2	5.84	-	-
Follow-up Hdwy	3.52	3.32	-
Pot Cap-1 Maneuver	251	921	-
Stage 1	796	-	-
Stage 2	427	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	195	921	-
Mov Cap-2 Maneuver	195	-	-
Stage 1	796	-	-
Stage 2	331	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	13	0	4.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	888	1345
HCM Lane V/C Ratio	-	-	0.497	0.225
HCM Ctrl Dly (s/v)	-	-	13	8.5
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q (veh)	-	-	2.8	0.9

Intersection: 2: Paulette Duguay St & Commercial West/Commercial East

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	R	LT	TR	L	TR
Maximum Queue (m)	27.0	21.0	21.0	17.9	21.2	7.8	8.9	0.6
Average Queue (m)	11.8	9.5	8.5	9.1	6.5	0.3	2.6	0.1
95th Queue (m)	23.9	16.8	18.2	15.5	15.5	5.1	8.0	0.8
Link Distance (m)	67.6	67.6	62.0	62.0	89.6			85.5
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)						10.0	22.1	
Storage Blk Time (%)					2			
Queuing Penalty (veh)					5			

Intersection: 3: Paulette Duguay St & Ibrahima Diallo Ave

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (m)	42.9	22.4
Average Queue (m)	20.0	10.2
95th Queue (m)	34.5	19.0
Link Distance (m)	347.3	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		14.0
Storage Blk Time (%)		2
Queuing Penalty (veh)		2

Zone Summary

Zone wide Queuing Penalty: 7



March 13, 2025

Confidential

Cover Letter for Servicing Report Revision 3 – Public Markets

To Whom It May Concern:

The following servicing report for the Public Markets subdivision in the City of Winnipeg has been updated according to a proposed increase in density for the Marion Street WWS connection and the Speers Road WWS connection. For the purposes of simplifying your review, the following updates have been made from the Revision 1 version of this report:

- Increase in residential density from 0 units to 60 MF units for Block 3, Lot 1 (Marion Street WWS Connection).
- Decrease in car park unit count from 700 units to 566 units to maintain maximum full flow cap for Marion Street connection.
- Modified the following WWS flows to the Speers Road WWS connection:
 - WWS MH06 to MH07
 - Add 65 MF units – Block 3, Lot 2.
 - Add 190 MF units – Block 4, Lot 2.
 - Modified Commercial, Light Industrial and Wet Industrial areas to be 0 ha
 - Previously, this connection had areas of 0.85ha Commercial, 0.59ha Light Industrial, and 3.35ha Wet Industrial.
 - WWS MH08 to MH09
 - Added 180 MF units – Block 4, Lot 3.
 - Modified Light Industrial areas to be 0.201 ha and Wet Industrial to be 1.139 ha.
 - Previously, this connection had areas of 0.56 ha Light Industrial and 3.16 ha Wet Industrial
 - WWS MH17 to MH18
 - 305 MF units – Block 4, Lot 4
 - Modified Light Industrial and Wet Industrial area to be 0 ha
 - Previously, this connection had areas of 0.61 ha Light Industrial and 3.43 ha Wet Industrial.
- All increases in density impact the wastewater sewer only (specific to this report – transportation impact study is updated separate from this report)
- There are no impacts to the water distribution or land drainage designs. The increase in peak wet weather waste water flows to 37.99 L/s to Speers Road is within the available flow and therefore has no impact on downstream infrastructure.

Please contact the undersigned should you have any questions.

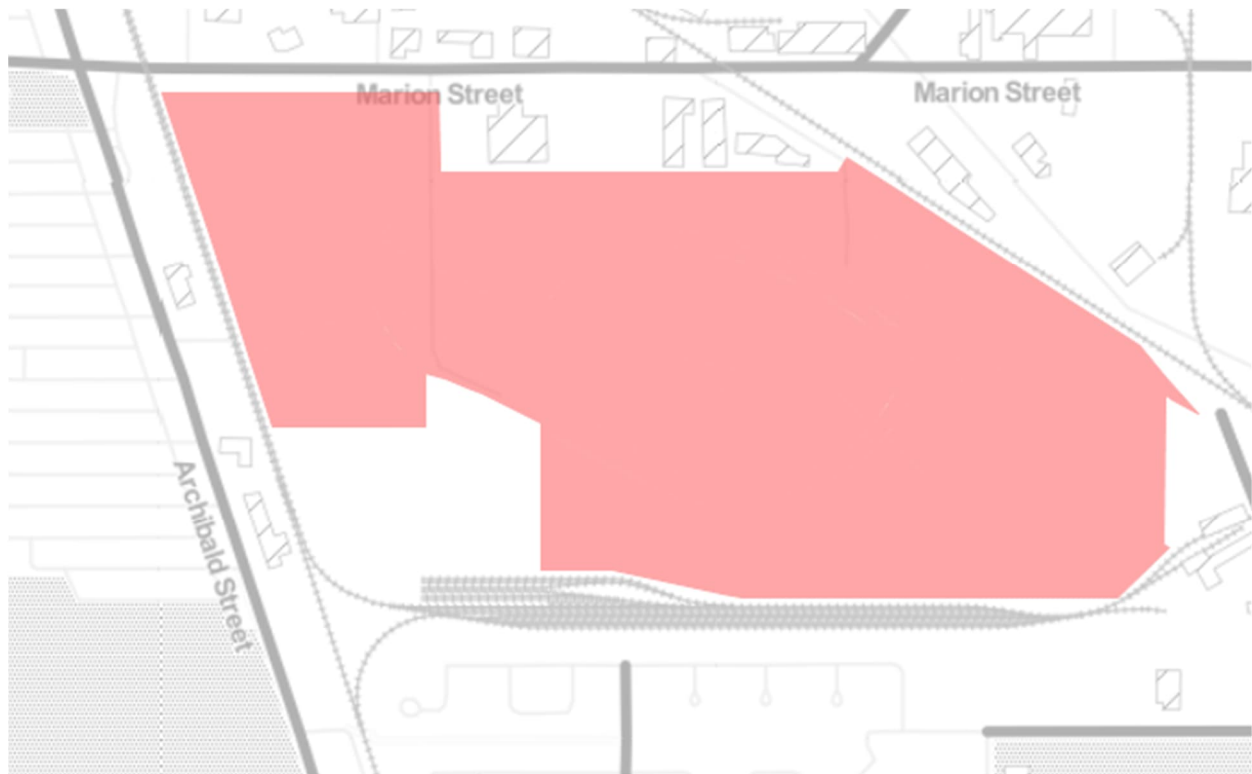
Sincerely,

Jason Dunn, P.Eng., PMP,
Senior Project Engineer
Land Development, Manitoba

OLEXA DEVELOPMENTS

PUBLIC MARKETS SERVICING REPORT

MARCH 13, 2025





PUBLIC MARKETS SERVICING REPORT

OLEXA DEVELOPMENTS

DESIGN REPORT-R3

PROJECT NO.: 211-07590-00

DATE: MARCH 13, 2025

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¹ Approval of this document is an administrative function indicating readiness for release and does not impart legal liability on to the Approver for any technical content contained herein. Technical accuracy and fit-for-purpose of this content is obtained through the review process. The Approver shall ensure the applicable review process has occurred prior to signing the document.

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- A-2** Multi-Family Dwelling Densities
- A-3** Simulated Simultaneous Fire Flow Tests
- A-4** Design Table

B WASTEWATER SEWER DESIGN

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C LAND DRAINAGE SEWER DESIGN

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- C-6** St Catherine Street Hydraulic Profiles

D CITY OF WINNIPEG SERVICING CRITERIA

1 INTRODUCTION

Olexa Developments is developing 67 ha of land within the Stockyards, hereon referred to as Public Markets, for multi-family, commercial, and industrial use. This servicing report details the design for the development's watermain, gravity sewer, and land drainage systems.

Water and sewer works are contained within the development, with connections to those existing along Marion Street and Speers Road. The land drainage system crosses the Canadian Pacific (CP) Railway and Archibald Street to connect to that along St Catherine Street which discharges into the Seine River.

While the area currently being using to offload vehicles from the railway is considered in the water, sewer, and land drainage designs, it is not a part of this development and has only been included as an allowance.

The City of Winnipeg plans to construct a retention pond in the northeastern public reserve and connect to it to the combined sewer on Marion Street by way of an easement parallel to the right-of-way. Neither the retention pond nor piping are a part of this design or the project's construction.

2 WATERMAIN

The proposed watermain shown in **Appendix A-1** follows the development's right-of-ways and has two connections to existing watermains. A WaterCAD model has been developed with the design criteria summarized in *Section 2.1 Watermain Design Criteria* and flow data provided by the City of Winnipeg at the connection points identified in *Section 2.2 Existing Watermain*. The watermain sizing and available flows are presented in *Section 2.3 Proposed Watermain*.

2.1 WATERMAIN DESIGN CRITERIA

The design of the proposed watermain is based on the City of Winnipeg's *Water Demand Estimation and Design Guidelines*. The typical dwelling densities for the multi-family lots originate from the correspondence with the City of Winnipeg in **Appendix A-2**. The following criteria and assumptions were used to estimate the water demand within Public Markets and design the system:

General

- Max day water demand: $1.6 \times \text{average day water demand}$
- Peak hour water demand: $2.5 \times \text{average day water demand}$

Residential Demand

- Average day water demand: $225 \text{ L/cap/day} + 10\%$
- Population/dwelling: 2.30
- Dwelling density (see **Appendix A-2**)
 - Residential Multi-Family – Medium: 106.52 dwellings/ha
 - Residential Multi-Family – Large: 134.78 dwellings/ha

Non-Residential Demand

- Commercial average day water demand: 16,800 L/ha/day
- Light industrial average day water demand: 22,500 L/ha/day
- Wet industrial average day water demand: 33,600 L/ha/day
- 85% of the industrial wastewater generation will be at the wet industry rate
- Non-residential flows occur over 24 hours

Design Criteria

- Hazen-Williams C-value (diameter > 200 mm): 130
- Minimum residual pressure during peak hour: 207 kPa (30 psi)
- Minimum residual pressure during fire flows: 140 kPa (20 psi)
- Allowance for fire hydrant losses: 33 kPa (4.8 psi)
- Fire flows targets are in conjunction with max day water demand
- The following fire flow targets have been used:
 - Residential Multi-family: 200 L/s
 - Commercial: 250 L/s
 - Industrial: 383 L/s

2.2 EXISTING WATERMAIN

The development has access to the watermain along Marion Street and Speers Road:

- 1 300 mm cast iron watermain at the intersection of Marion Street and Dupuy Avenue.
- 2 300 mm asbestos cement watermain extending from Speers Road, south of the Canadian National (CN) Railway crossing.

To aid in the design of the development's watermain, the City of Winnipeg has provided the simultaneous flows and pressures at these two connections points as attached in **Appendix A-3**.

2.3 PROPOSED WATERMAIN

The WaterCAD model shown in **Appendix A-1** has been developed using fire hydrant locations as model junctions, the simulated fire flows attached in **Appendix A-3**, and the water demands calculated in **Appendix A-4**. It generally resembles that proposed in Stantec's *Canada Packers Land – Preliminary Servicing Analysis* (2019) memo, but without the second connection to Marion Street and all pipes being 300 mm.

Water demand within the development is from a combination of multi-family residential, commercial, and industrial land uses. As the specifics of the industrial lots are unknown at this time, it is assumed that 85% by area will be wet industry as defined by the City of Winnipeg. Calculations based on the land use and the demands in *Section 2.1 Watermain Design Criteria*, the average day, peak hour, and maximum day flows have been completed at each junction and are attached in **Appendix A-4**.

2.3.1 MODEL RESULTS

Table 1 shows that the minimum residual pressure during peak hour demand is greater than the minimum 207 kPa required at every junction within the system, and therefore in conformance with the guidelines.

Table 2 shows the maximum day demand and required fire flow for each junction within the system based on adjacent land use. Junctions 18 through 23, highlighted in red, do not achieve the required fire flow at the minimum residual pressure if the full amount is withdrawn at a single point. Note that these nodes are partially adjacent to the public reserves.

An additional analysis has been performed in this area, where the 383 L/s is divided amongst the four worst performing hydrants. Adding an additional 96 L/s ($383 \text{ L/s} \div 4$) to Junctions 19 through 22 results in a minimum residual pressure of 171 kPa as shown in Table 3. While slightly less than the minimum 173 kPa stated in *Section 2.1 Watermain Design Criteria*, it is within the rounding resulting from unit conversions.

Therefore, the proposed 300 mm watermain presented in **Appendix A-1** with connections to the existing watermain along Marion Street and Speers Road can provide the required residual pressure during peak hour demand and during the combination of fire flows and maximum day demand. Water servicing for the development requires the two existing watermain connections and the interconnecting watermain to provide fire flows and system redundancy.

Table 1: Residual pressure during peak hour water demand.

JUNCTION	PEAK HOUR DEMAND (L/S)	PRESSURE (KPA)
J-01	2.55	464
J-02	0.25	464
J-03	0.00	463
J-04	3.48	463
J-05	0.00	463
J-06	0.00	463
J-07	0.80	463
J-08	3.63	463
J-09	1.26	463
J-10	3.46	462
J-11	0.00	462
J-12	0.00	462
J-13	0.00	462
J-14	6.65	462
J-15	0.00	462
J-16	1.50	462
J-17	0.00	462
J-18	5.96	462
J-19	3.73	462
J-20	0.00	462
J-21	0.00	462
J-22	0.00	462
J-23	0.00	462
J-24	9.36	463
J-25	5.68	463
J-26	0.00	463
J-27	1.75	463

Table 2: Total flow available is determined at each junction while maintaining the minimum residual pressure within the system. Junctions highlighted in red do not meet the fire flow requirements from a single fire hydrant.

JUNCTION	MAX. DAY DEMAND (L/S)	FIRE FLOW NEEDED (L/S)	TOTAL FLOW NEEDED (L/S)	TOTAL FLOW AVAILABLE (L/S)	JUNCTION WITH MIN PRESSURE (173 KPA)
J-01	1.63	250	251.63	481.49	J-02
J-02	0.16	250	250.16	460.53	J-27
J-03	—	250	250.00	431.28	J-04
J-04	2.98	250	252.98	410.95	J-05
J-05	—	250	250.00	394.00	J-06
J-06	—	250	250.00	386.02	J-07
J-07	0.51	383	383.51	383.62	J-06
J-08	2.32	383	385.32	386.41	J-07
J-09	0.80	383	383.80	390.36	J-08
J-10	2.21	383	385.21	402.11	J-09
J-11	—	383	383.00	416.99	J-10
J-12	—	383	383.00	438.43	J-16
J-13	—	383	383.00	443.83	J-12
J-14	4.26	383	387.26	456.55	J-13
J-15	—	383	383.00	465.95	J-14
J-16	0.96	383	383.96	410.64	J-17
J-17	—	383	383.00	390.78	J-18
J-18	3.81	383	386.81	381.99	J-19
J-19	2.39	383	385.39	372.91	J-20
J-20	—	383	383.00	366.61	J-21
J-21	—	383	383.00	365.79	J-20
J-22	—	383	383.00	368.15	J-21
J-23	—	383	383.00	374.05	J-22
J-24	6.47	383	389.47	390.50	J-23
J-25	2.32	200	202.32	402.77	J-24
J-26	2.88	200	202.88	427.28	J-25
J-27	2.85	250	252.85	452.68	J-26

Table 3: Results of a fire flow analysis where the industrial fire flow rate is withdrawn from four fire hydrants within the worst performing area of the development.

JUNCTION	MAX. DAY DEMAND (L/S)	FIRE FLOW (L/S)	TOTAL FLOW NEEDED (L/S)	RESIDUAL PRESSURE (KPA)
J-01	1.63	—	1.63	307
J-02	0.16	—	0.16	281
J-03	—	—	—	262
J-04	2.98	—	2.98	262
J-05	—	—	—	262
J-06	—	—	—	261
J-07	0.51	—	0.51	261
J-08	2.32	—	2.32	261
J-09	0.80	—	0.80	260
J-10	2.21	—	2.21	260
J-11	—	—	—	260
J-12	—	—	—	260
J-13	—	—	—	282
J-14	4.26	—	4.26	300
J-15	—	—	—	319
J-16	0.96	—	0.96	239
J-17	—	—	—	218
J-18	3.81	—	3.81	197
J-19	2.39	96.00	98.39	177
J-20	—	96.00	96.00	171
J-21	—	96.00	96.00	171
J-22	—	96.00	96.00	176
J-23	—	—	—	194
J-24	6.47	—	6.47	212
J-25	2.32	—	2.32	231
J-26	2.88	—	2.88	249
J-27	2.85	—	2.85	262

3 WASTEWATER SEWER

Given the orientation and relative flatness of the site, the optimal design for the wastewater sewer is to connect to the existing sewer at the northwestern and eastern edges with high points in the center of the development. This allows for the grade and cover to be maximized and a reduction in the amount of piping as the center area being used for the retention ponds and does not require sewer servicing.

The design of the wastewater sewer system is based on the design criteria in *Section 3.1 Wastewater Sewer Design Criteria* and the connections to the existing sewers detailed in *Section 3.2 Existing Wastewater Sewer*. It is, itself, presented and discussed in *Section 3.3 Proposed Wastewater Sewer*.

3.1 WASTEWATER SEWER DESIGN CRITERIA

The design of the proposed wastewater sewer is based on the City of Winnipeg's *Wastewater Flow Estimation and Servicing Guidelines*. The following criteria and assumptions were used to estimate the wastewater generation within the proposed development and design the system:

General

- Wastewater generation is based on contributing area's land use as shown in **Appendix B-1**
- Pipe sizing is based on peak wet weather flows as property developments will have on-site land drainage systems
- Peak wet weather flows: peak dry weather flow + extraneous flows

Residential Flow

- Population/dwelling: 2.30
- Dwelling density (see **Appendix A-2**)
 - Residential Multi-Family – Medium: 106.52 dwellings/ha
 - Residential Multi-Family – Large: 134.78 dwellings/ha
- Average dry weather flow: 270 L/capita/day
- Peak dry weather flow: Average flow × Harmon's Peaking Factor

Non-Residential Flow

- Commercial peak dry weather flow: 28,100 L/ha/day
- Light industrial peak dry weather flow: 37,600 L/ha/day
- Wet industrial peak dry weather flow: 44,900 L/ha/day
- 85% of the industrial wastewater generation is at the wet industry rate
- Non-residential flows occur over 24 hours

Extraneous Flow

- Groundwater infiltration: 2,200 L/ha/day
- Manhole infiltration: 12 L/min/manhole
- Manhole density: 1.6 manholes/ha
- Undeveloped lots are assumed to have a manhole density of 1.6 manholes/ha. Actual manhole counts are used for the right-of-ways
- No weeping tile flow

Design Criteria

- Manning's n: 0.013

- Minimum pipe slope: as per City of Winnipeg requirements
- Minimum pipe diameter: 0.250 m
- Maximum manhole spacing: 150 m
- Maximum flow depth: 75%
- Minimum full flow velocity: 0.60 m/s

3.2 EXISTING WASTEWATER SEWER

The proposed design splits wastewater discharge between the existing combined sewers along Marion Street and Speers Road. As shown in **Appendix B-1**, the two discharge locations are:

- 1 900 mm combined sewer at the intersection of Marion Street and Dupuy Avenue
- 2 1350 × 2025 mm combined sewer extending from Speers Road, south of the CN Railway crossing

The connections to the existing combined sewer along Marion Street and Speers Road will be completed by coring into the existing manholes.

3.3 PROPOSED WASTEWATER SEWER

The proposed wastewater sewer design consists of a high point generally in the centre of the development and two discharge points as to maximize bury depth.

Wastewater generation within the proposed development is from a combination of multi-family residential, commercial, and industrial land uses as shown in **Appendix B-1**. As the specifics of the industrial lots are unknown at this time, it is assumed that 85% by area will be wet industry and the remainder light industry, as defined by the City of Winnipeg.

Using the criteria in *Section 3.1 Wastewater Sewer Design Criteria*, peak dry weather and extraneous flows are combined to determine each pipe segment's peak wet weather flow. Manning's equation is used to set the pipe diameters such that flow depth does not exceed 75%. The calculations of wastewater generation from each manhole's contributing land use, and the design of the pipe sections to accommodate, are included in **Appendix B-2**. A plan showing the piping is also included in **Appendix B-1**. The total wastewater discharge from the development is summarized in Table 4.

Table 4: Wastewater sewer discharge from the development.

DISCHARGE LOCATION	PEAK WET WEATHER FLOW	PEAK DRY WEATHER FLOW	PIPE SLOPE	PIPE DIAMETER
Marion Street @ Dupuy Avenue	71.23 L/s	63.70 L/s	0.143%	375 mm
Speers Road @ CN Rail	37.99 L/s	29.18 L/s	0.192%	300 mm

4 LAND DRAINAGE SEWER

The Public Markets development is approximately 67 ha and a combination of multi-family residential, commercial, and industrial land use as shown in **Appendix C-1**. It contains three public reserves – two of which are located centrally and will be partially used for the naturalized retention ponds. The third northeastern public reserve will be used by the City of Winnipeg for a retention pond that is not a part of this development or design, nor is the piping to connect it to Marion Street.

The overall drainage plan is based on that proposed in Stantec's *MRS D Drainage Brief* (2019), in that it includes two centrally located naturalized retention ponds which discharge into the Seine River. Although not part of the

development, the catchment area for the retention ponds includes Speers Road's right-of-way from the development to Maginot Street as per City of Winnipeg requirements for this project. To reach the Seine River, the land drainage sewer crosses the CP Railway and Archibald Street west of the development and connects to the existing land drainage sewer along St. Catherine Street. A preliminary evaluation of the existing land drainage sewer along St. Catherine Street was completed in Stantec's brief and found it to have capacity if the most upstream section of pipe is upsized. The City of Winnipeg has identified that the development's land drainage sewer can discharge into that of St. Catherine if an analysis shows that the existing level of service is maintained.

The piping of the land drainage sewer is based on the Rational Method and Manning's equation. A PCSWMM model has been developed to design the retention ponds and determine the temporal characteristics of the system to ensure that they are in accordance with the City of Winnipeg's guidelines. *Section 4.1 Land Drainage Sewer Design Criteria* summarizes the design criteria from the City of Winnipeg and the assumptions used in the design. *Sections 4.2 Pipe Design* and *4.3 Pond Design and System Routing* detail the design of the piping and retention ponds, respectively. Finally, *Section 4.4 Effects on the Existing Land Drainage Sewer* reviews the impacts of the additional stormwater on the existing St. Catherine Street system and what upgrades are required to maintain the pre-development level of service.

4.1 LAND DRAINAGE SEWER DESIGN CRITERIA

The City of Winnipeg's *City-UDI Task Group on Criteria for Stormwater Management* provides the guidelines for the development of the land drainage sewer system, summarized as:

Piped Systems

- Piped systems are to have a hydraulic capacity for a City of Winnipeg 5-year MacLaren design storm
- Hydraulic grade lines are to remain at least 0.15 m below ground level at the upstream end
- Manning's n of 0.013

Retention Pond

- Maximum water level rise (25-year design storm): 1.20 m
- High water level (HWL): Greater of 100-year design storm and May 2010 event
- Freeboard elevation: 0.60 m above HWL
- Drawdown time
 - 5-year design storm: 48 hours
 - 100-year design storm: 120 hours
- Minimum water depth: 2.50 m
- Side slopes: 7:1 from freeboard to 3.00 m horizontal from NWL

4.2 PIPE DESIGN

The land drainage piping design uses the Rational Method to calculate runoff and Manning's equation for conveyance to the retention ponds, assuming the system only drains to the retention ponds and without the piping west of MHL02.

Applying the Rational Method requires the definition of the catchment area, runoff coefficient, and rainfall intensity. Catchments have been defined based on a combination of the grading plan's local high and low points and the lots themselves. The lots are representative of catchments as each lot owner will be responsible for restricting runoff and storing stormwater onsite separately. The catchments and associated areas are shown in **Appendix C-1**. The catchments for Public Markets and Speers Road have been given respective runoff coefficients of 0.80 and 0.60. The rainfall intensity is from a 5-year design storm defined in the *Drainage Criteria Manual for the City of Winnipeg*

and presented in Table 6. The storm duration for a given segment, t_b , is the time of concentration plus the travel time of stormwater upstream.

Referring to the manholes labelled in **Appendix C-1**, **Appendix C-3** details the calculations for the pipe design. Under the surcharged conditions of the 5-year design storm, the hydraulic grade line is at least 0.15 m below ground elevation and all pipes exceed the minimum 0.60 m/s cleansing velocity. The pipe sizes determined in **Appendix C-3** are input into a PCSWMM model for the retention pond design and system routing.

4.3 POND DESIGN AND SYSTEM ROUTING

A PCSWMM model is used to determine the retention pond size, drawdown, and routing. It consists of the pipe design in *Section 4.2 Pipe Design*, and the remaining downstream piping to the Seine River outfall. *Section 4.3.1 Model Parameters* details the parameters used in the PCSWMM model to develop the retention pond design presented in the subsequent sections.

4.3.1 MODEL PARAMETERS

Table 5 summarizes the parameters used to define the catchments which are typical for the associated land use – most notably the increased portion of impervious area for the multifamily, commercial, and industrial lots versus the single-family lots of St. Catherine Street.

Table 5: SWMM parameters used to define the St. Catherine Street and Public Markets catchments.

PARAMETER	ST CATHERINE STREET	PUBLIC MARKETS	SPEERS ROAD
Slope	0.50%	0.65%	0.65%
% Area Impervious	50% ¹	75%	50%
Impervious Manning's n	0.013	0.013	0.013
Impervious Depression Storage	2 mm	2 mm	2 mm
% Impervious Area Without Depressions	25%	25%	25%
Pervious Manning's n	0.25	0.25	0.25
Pervious Depression Storage	5 mm	5 mm	5 mm
Maximum Infiltration Rate	76.2 mm/hr	76.2 mm/hr	76.2 mm/hr
Minimum Infiltration Rate	3 mm/hr	3 mm/hr	3 mm/hr
Decay Constant	4.14 hr ⁻¹	4.14 hr ⁻¹	4.14 hr ⁻¹
Drying Time	7 days	7 days	7 days

¹ The catchment representing Archibald uses an impervious area of 70%.

To assess the land drainage sewer system, the PCSWMM model considers 5 different design storms:

- 1 The **5-year** discretized design storm from Table 3.2 of the *Drainage Criteria Manual for the City of Winnipeg* is used to determine the water level in the ponds, the sizing of the piping, and to check the hydraulic grade line for the piping sized in *Section 4.2 Pipe Design*. The Seine River water level is set at 226.13 m (10-year Summer – FM #940).
- 2 The **5-year (May)** design storm from Figure 2.13 of the *Drainage Criteria Manual for the City of Winnipeg* is considered with the Seine River water level set to 228.19 m (50-year Spring – FM #935). The results are

compared against those from the 5-year storm conditions described above and the higher of the two is used for the design.

- 3 The **25-year** discretized design storm from Table 3.2 of the *Drainage Criteria Manual for the City of Winnipeg* is used in the sizing of the retention ponds.
- 4 The **100-year** design storm is used to size the retention ponds, set the high water level, and set the freeboard elevation. In the absence of a 100-year discretized design storm in the *Drainage Criteria Manual for the City of Winnipeg*, the 100-year design storm derived in the *Seine River Hydrology Study* prepared by Acres is used. Discretized 100-year design storms were developed based on data from Environment and Climate Change Canada (V-3.20) for the Winnipeg A CS and Winnipeg The Forks stations, but were found to be less than those in Acres' report – therefore the latter is used.
- 5 The recorded rainfall from the **May 2010** event provided by the City of Winnipeg is used to set the high water level and freeboard elevation if it is greater than that during the 100-year design storm.

The design storms from the *Drainage Criteria Manual for the City of Winnipeg* are defined by:

$$i \text{ [mm/hr]} = \frac{a}{(t_d + b)^c}$$

Table 6: Design storm parameters for the above equation from the *Drainage Criteria Manual for the City of Winnipeg*.

DESIGN STORM	a	b	c
5-year	1198.88	8	0.828
5-year (May)	302.26	3	0.740
25-year	1841.50	9	0.842

4.3.2 POND SIZING AND CONTROL LEVELS

The model was run with the 5-year, 25-year, 100-year, and May 2010 storm events to evaluate system performance and design the retention ponds. Through an iterative process, the ponds have been sized to accommodate the runoff volume from Public Markets while adhering to the water level rise and drawdown times states in *Section 4.1 Land Drainage Sewer Design Criteria*. The shapes of the retention ponds are shown in **Appendix C-1**. They will consist of a 6.00 m bottom channel connecting the outfalls and a 7:1 slope from 3.00 m below to normal water level to the proposed ground daylight. **Appendix C-4** shows the resulting elevation-area and elevation-volume curves for the north and south retention ponds. The retention ponds are directly connected and therefore have similar water level and drawdown response. Notable water levels are:

- Freeboard: 231.09 m
- High water level: 230.49 m
- Normal water level: 228.60 m

The normal water level is controlled by a weir manhole at the west edge of the development as shown in **Appendix C-1**, which can also allow for a 300 mm drawdown for vegetation maintenance.

4.3.3 WATER LEVEL RISE

The proposed retention ponds are designed as naturalized wetlands with a channel connecting the outfalls. The two ponds are connected and are both governed by the same weir control downstream (see *Section 4.3.2 Pond Sizing and Control Levels*), so they share the same operating levels.

Figure 1 shows the retention ponds' water depth time series during all the design storms. Note that the 5-year design storm results in a greater water level rise than the 5-year (May) design storm, and therefore governs the design. Table 7 summarizes the responses of the retention ponds to the various storms and shows that they are generally within the City of Winnipeg guidelines. The water level rise during a 25-year event is 1.31 m, which is comparable to the guidelines' 1.20 m. Notably, the water level rises 1.89 m during the May 2010 event, and therefore governs the high water level and freeboard.

4.3.4 DRAWDOWN TIMES

Time series of the drawdowns for the various design storms are shown in Figure 1. The model suggests the 5-year drawdown to be 50.5 hours, which is slightly longer than the guideline's suggested 48 hours. Since the retention ponds will be naturalized, this additional drawdown time is not expected to result in any damage to the vegetation. It will also benefit the downstream land drainage system by further attenuating the peak discharge. Table 7 also shows that retention ponds meet the guideline's 100-year drawdown requirement of 120 hours.

4.3.5 DISCHARGE

Stantec's *MRS D Drainage Brief* (2019) demonstrates that a peak discharge of 198 L/s appears to have no negative impacts on the existing system. Peak discharges are summarized below and shown in Figure 2. Only the May 2010 event is greater than 198 L/s, but not by a significant amount. Regardless, the following subsection reviews the changes in the existing land drainage sewer's level of service.

- 5-year (May): 89.33 L/s
- 5-year: 167.67 L/s
- 25-year: 183.61 L/s
- 100-year: 194.75 L/s
- May 2010: 202.88 L/s

Table 7: Retention pond water levels and drawdown times.

	5-YEAR		25-YEAR		100-YEAR		MAY 2010	
	NORTH POND	SOUTH POND	NORTH POND	SOUTH POND	NORTH POND	SOUTH POND	NORTH POND	SOUTH POND
Water Level	229.50 m		229.91 m		230.24 m		230.49 m	
Rise	0.90 m		1.31 m		1.64 m		1.89 m	
Drawdown *	50.5 hours		72.0 hours		90.0 hours		103.5 hours †	
Active Volume Required	9,862 m ³	13,930m ³	15,533 m ³	21,340 m ³	20,082 m ³	27,630 m ³	24,052 m ³	32,830 m ³
Active Volume Available ‡	9,862 m ³	13,930m ³	13,875 m ³	19,309 m ³	20,082 m ³	27,630 m ³	24,052 m ³	32,830 m ³

* Drawdown times are measured to within 0.150 m of NWL

† Measured from the peak depth

‡ 25-year active volume available is measured at a 1.20 m depth

Pond Drawdown

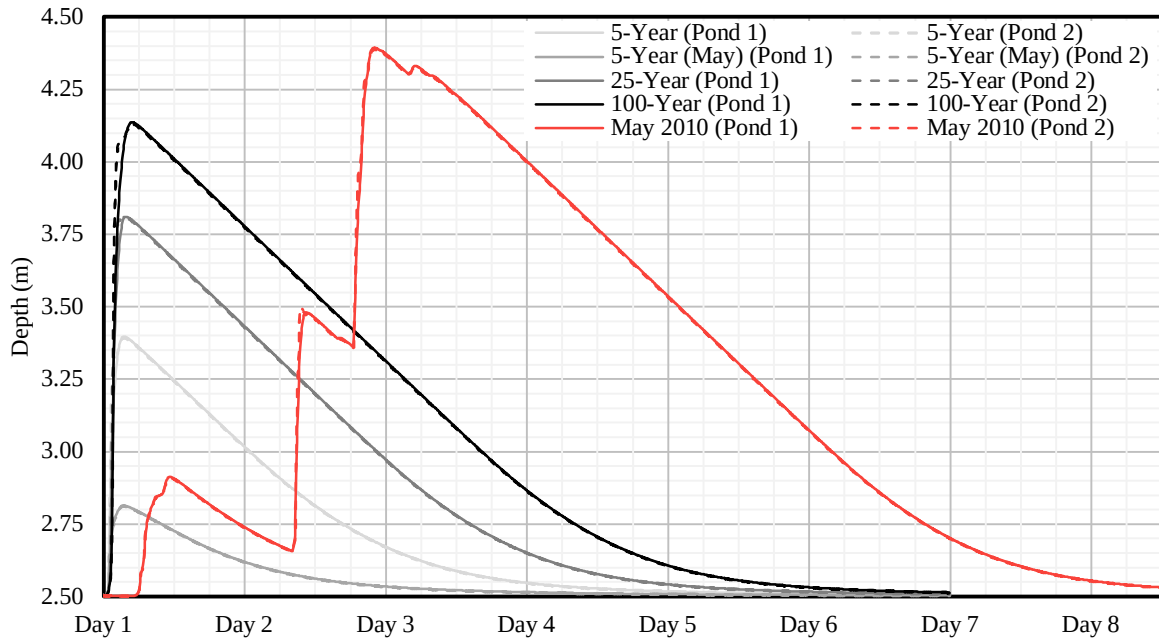


Figure 1: Pond drawdowns for various design storms relative to the beginning of the storm. The normal water level is at a depth of 2.50 m.

Public Markets Land Drainage Sewer Discharge

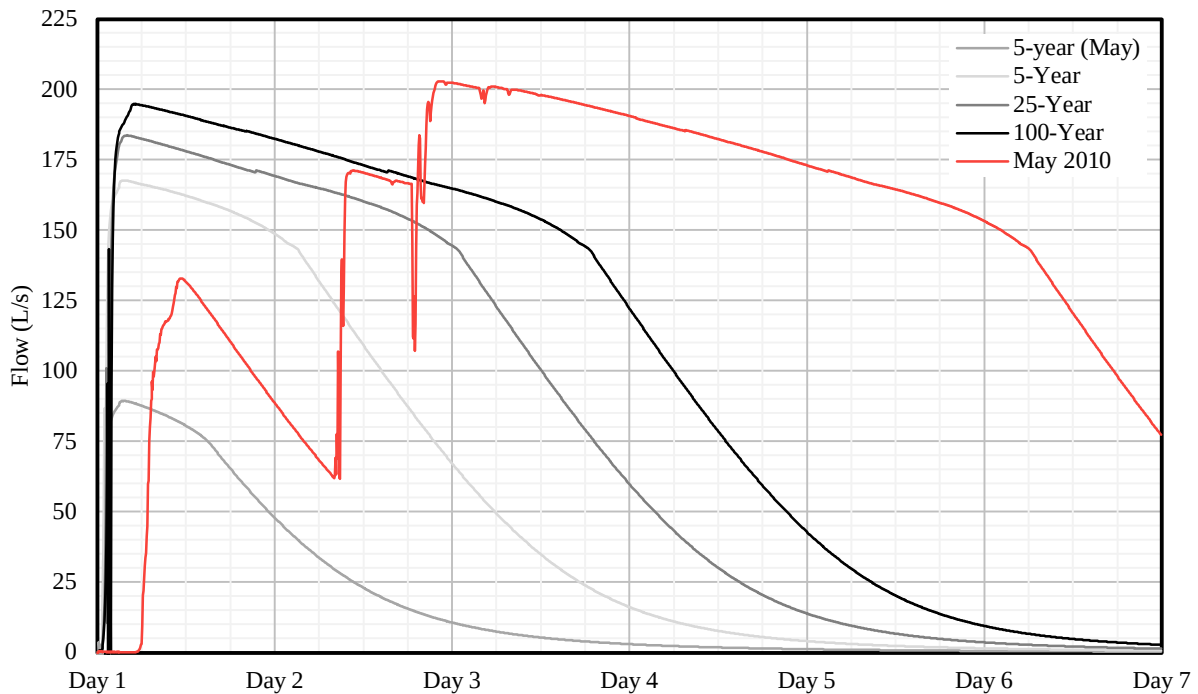


Figure 2: Discharge downstream of the weir manhole during various design storms.

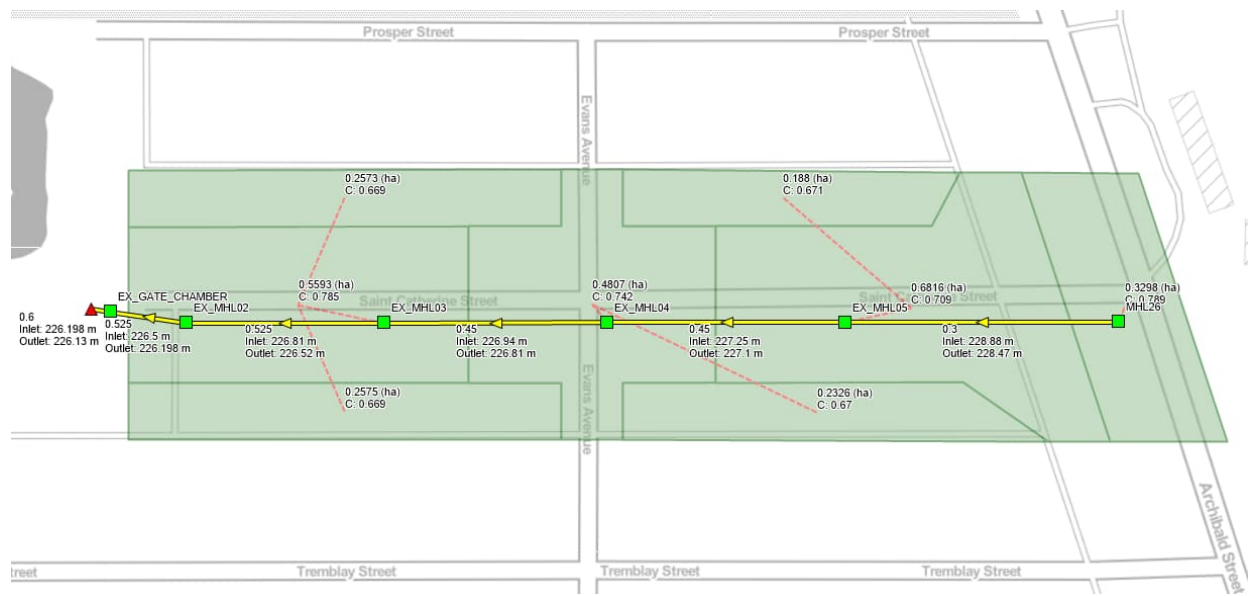


Figure 3: Model of existing conditions for St Catherine Street land drainage sewer.

4.4 EFFECTS ON THE EXISTING LAND DRAINAGE SEWER

To evaluate the effects of the additional stormwater on the existing St Catherine system, 5-year and 25-year design storms have been applied to the pre- and post-development conditions. The pre-development conditions are based on as-builts from the City of Winnipeg and the catchment parameters defined in Table 5. The model of the existing system is shown in Figure 3. The post development conditions upsize the 89 m of pipe between EX_MHL05 and MHL26 from 300 mm to 450 mm and lower it so that it can be extended to the weir manhole and cross the existing works on Archibald Street. The proposed changes have been superimposed on as-builts provided by the City of Winnipeg in **Appendix C-5**. Profiles of the hydraulic grade lines are in **Appendix C-6**.

The profiles show that the system surcharges onto the road during a 5-year storm, but the upsizing of the pipe mitigates this surcharge with the additional stormwater flows from Public Markets. During a 25-year design storm, both the pre- and post-development conditions surcharge above the rim of the catch basins, but do not exceed 0.300 m of depth above the rim.

4.5 SUMMARY

A land drainage sewer system has been proposed for Public Markets in accordance with City of Winnipeg guidelines as it maintains hydraulic capacity during a 5-year design storm. The stormwater flows to two naturalized retention ponds within the development. It has been shown that the water level rise within the ponds is within the City of Winnipeg guidelines for a 25-year storm and that the May 2010 event would be contained within the freeboard. The drawdown following the 5-year design storm slightly exceeds the guideline, however the retention ponds will contain natural vegetation and be more resilient to an increased drawdown time. The 100-year and May 2010 event drawdown times are within the guidelines.

The retention ponds discharge by a pipe crossing the CP Railway and Archibald Street to connect to the existing system on St Catherine Street. An evaluation of the existing system was performed and found that if the last section of existing pipe is upsized and lowered, the effects of the additional storm water on the existing system are mitigated.

APPENDIX

A WATERMAIN DESIGN



APPENDIX

A-1 WATERMAIN LAYOUT

APPENDIX

A-2 *MULTI-FAMILY DWELLING DENSITIES*

Friesen, Bruce

From: Lau, Ho <HLau@winnipeg.ca>
Sent: Friday, August 6, 2021 3:28 PM
To: Friesen, Bruce
Cc: Kulczycki, Gregory
Subject: RE: Public Markets Wastewater Sewer Servicing

Hi Bruce,

We are working on a Wastewater Servicing Standards and this is what we will be proposing:

Dwelling Type	Zoning District ^a	Population Equivalent [ppha] (dwellings/ha)
Single Family	R1, R2, etc.	40 (13.11)
Assisted Living	RMF, RMU, etc.	135 (75)
Residential Multi-Family – Large	RMF-L	310 (134.78)
Residential Multi-Family – Medium	RMF-M	245 (106.52)
Residential Multi-Family – Small	RMF-S	175 (76.09)
Residential Mixed Use	RMU	300 (130.43)

Also, I realize taking each incremental area and adding it to the next one is easiest but this tends to increase the overall design flows. When Harmon Peaking Factor are used on these incremental areas, when added to a downstream area, the PF would decrease the design flows.

Regardless, the flows I calculated is only slightly lower and the sewer mains can handle the proposed flows.

Ho Lau, C.E.T.

Project Coordinator - Wastewater Planning and Project Delivery

Engineering Services

Water and Waste Department

City of Winnipeg

T. 204.986.5418

M. 204.232.0292

E. hlau@winnipeg.ca

winnipeg.ca

From: Friesen, Bruce <Bruce.Friesen@wsp.com>
Sent: Friday, August 6, 2021 12:15 PM
To: Lau, Ho <HLau@winnipeg.ca>
Subject: RE: Public Markets Wastewater Sewer Servicing

**** EXTERNAL EMAIL: USE CAUTION ****

Good afternoon Ho,

What density would you expect to see for RMF-M and RMF-L zoning?



Bruce Friesen, P.Eng.

Project Engineer, Land Development
Transportation and Infrastructure Manitoba

T+ 1 204-259-1659

From: Lau, Ho <HLau@winnipeg.ca>
Sent: Friday, August 6, 2021 11:39 AM
To: Friesen, Bruce <Bruce.Friesen@wsp.com>
Cc: Kulczycki, Gregory <GKulczycki@winnipeg.ca>
Subject: RE: Public Markets Wastewater Sewer Servicing

Good morning Bruce,

I am in the process of reviewing the servicing report (SR). One thing I wanted to bring to your attention right away are the multifamily densities used – 74.13 Dwellings/ha is the minimum we currently use (similar to an RMF-S zoned lot).

To avoid issues down the road, the densities should be reflective of the intended zoning for those properties. Issues arise when multifamily intensification is higher than the designed allotments in the SR (i.e. the properties are zoned RMF-M or RMF-L and designed to an RMF-S equivalent).

I will continue to review the SR but please review the residential densities and confirm if you wish to revise or this could pose future issues.

Thanks.

Ho Lau, C.E.T.

Project Coordinator - Wastewater Planning and Project Delivery

Engineering Services

Water and Waste Department

City of Winnipeg

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M. 204.232.0292

E. hlau@winnipeg.ca

winnipeg.ca

From: Kulczycki, Gregory
Sent: Thursday, August 5, 2021 1:02 PM
To: Lau, Ho <HLau@winnipeg.ca>
Subject: FW: Public Markets Wastewater Sewer Servicing

Hey Ho,

Can you take a look at this and let me know what you find.

Gregory Kulczycki, P.Eng

Wastewater Collections Planning Engineer
City of Winnipeg

M: 204-805-2470

E: GKulczycki@winnipeg.ca

WATER AND WASTE DEPARTMENT
ENGINEERING SERVICES DIVISION
winnipeg.ca

From: Friesen, Bruce <Bruce.Friesen@wsp.com>
Sent: Tuesday, August 3, 2021 11:35 AM
To: Kulczycki, Gregory <GKulczycki@winnipeg.ca>
Subject: Public Markets Wastewater Sewer Servicing

**** EXTERNAL EMAIL: USE CAUTION ****

Good morning Gregory,

Further to a preliminary analysis completed by Stantec in 2019, I am working on the servicing report for development southeast of the intersection of Marion Street and Archibald Street. I have attached the proposed layout, wastewater generation, and pipe design for the development that will be included in the report. The system has discharge points into the existing combined sewer manhole at the intersection of Marion Street and Dupuy Avenue and into the combined sewer between Speers Road and the CN RoW.

Can you have a look at it to confirm that you agree with the wastewater generation, pipe design, discharge locations, and that the combined sewer will have capacity?

Regards,



Bruce Friesen, P.Eng.

Project Engineer, Land Development
Transportation and Infrastructure Manitoba

T+ 1 204-259-1659

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1600 Buffalo Place
Winnipeg, Manitoba
R3T 6B8 Canada

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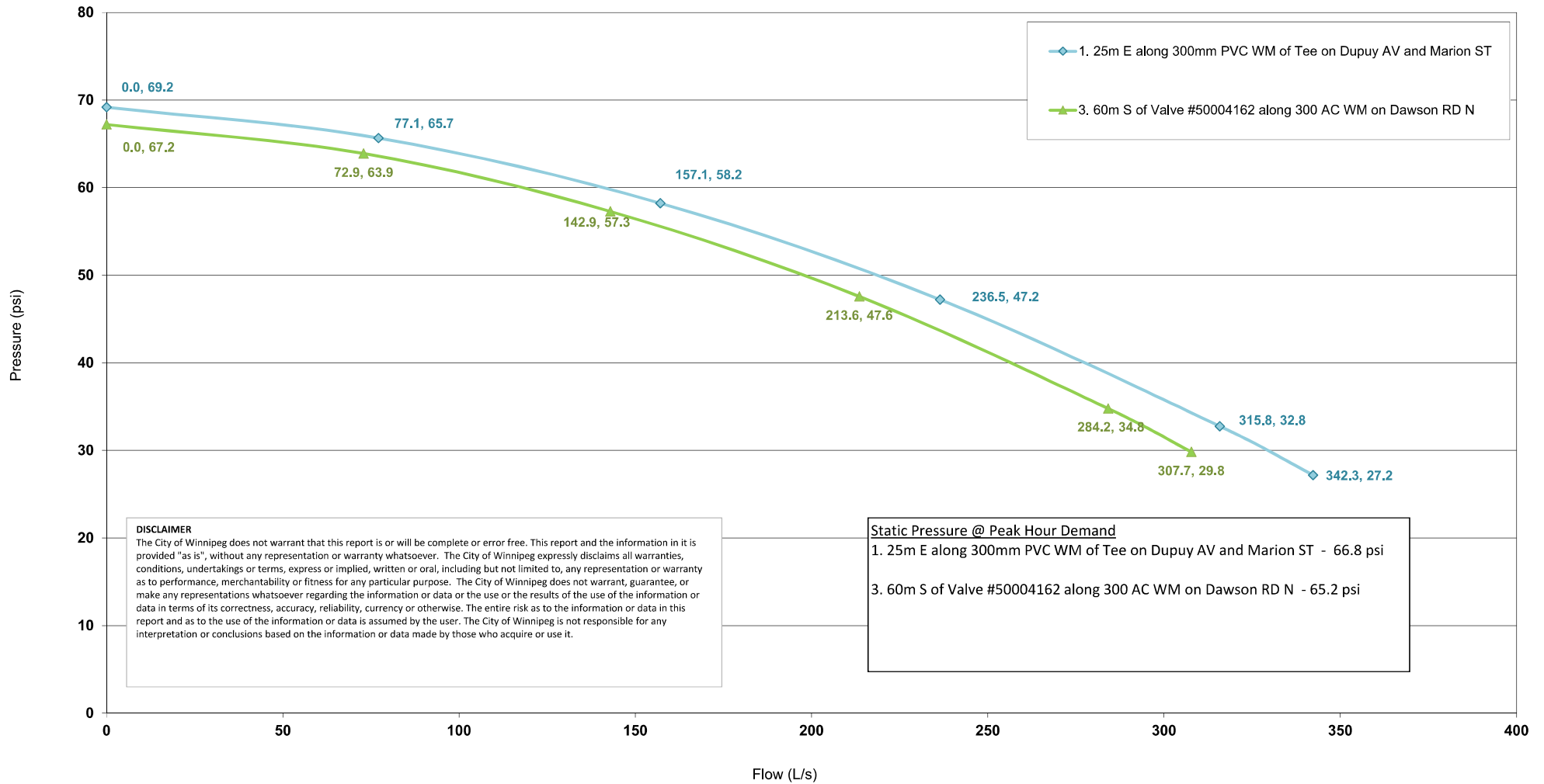
APPENDIX

A-3 *SIMULATED SIMULTANEOUS FIRE FLOW TESTS*



Simulated Available Simultaneous Flows and Pressures for MDD

August 13, 2021



APPENDIX

A-4 DESIGN TABLE

Junction	Residential											
	Single Family				Multi-Family				Summary			
	(1)	(2)	(3)	(1)+(2)+(3) (4)	(5)	(6)	(7)	(5)+(6)+(7) (8)	(4)+(8) (9)	(10)	1.6x(10) (11)	2.5x(10) (12)
	Area	Dwellings / ha	Population / Dwelling	Population	Area	Dwellings / ha	Population / Dwelling	Population	Population	Average Day Water Demand	Max Day Water Demand	Peak Hour Water Demand
Downstream												
J-01												
J-02												
J-03												
J-04					2.27 ha	106.52	2.3	557	557	1.60 L/s	2.56 L/s	4.00 L/s
J-05												
J-06												
J-07												
J-08												
J-09												
J-10												
J-11												
J-12												
J-13												
J-14												
J-15												
J-16												
J-17												
J-18												
J-19												
J-20												
J-21												
J-22												
J-23												
J-24					1.54 ha	106.52	2.3	377	377	1.08 L/s	1.73 L/s	2.70 L/s
J-25					2.06 ha	106.52	2.3	505	505	1.45 L/s	2.32 L/s	3.63 L/s
J-26					2.02 ha	134.78	2.3	627	627	1.80 L/s	2.88 L/s	4.50 L/s
J-27					2.01 ha	134.78	2.3	623	623	1.78 L/s	2.85 L/s	4.45 L/s

Junction	Commercial						Non-Residential Light Industrial					Wet Industrial				
	(13)	(14)	(13)(14) (15)	1.6x(15) (16)	2.5x(15) (17)		(18)	(19)	(18)(19) (20)	1.6x(20) (21)	2.5x(20) (22)	(23)	(24)	(23)(24) (25)	1.6x(25) (26)	2.5x(25) (27)
	Downstream	Area	Typical Rate	Average Day Water Demand	Maximum Day Water Demand		Area	Typical Rate	Average Day Water Demand	Maximum Day Water Demand	Peak Hour Water Demand	Area	Typical Rate	Average Day Water Demand	Maximum Day Water Demand	Peak Hour Water Demand
J-01		5.24 ha	16,800 L/ha/day	1.02 L/s	1.63 L/s											
J-02		0.53 ha	16,800 L/ha/day	0.10 L/s	0.16 L/s											
J-03																
J-04		1.35 ha	16,800 L/ha/day	0.26 L/s	0.42 L/s											
J-05																
J-06																
J-07		1.66 ha	16,800 L/ha/day	0.32 L/s	0.51 L/s											
J-08							0.59 ha	22,500 L/ha/day	0.15 L/s	0.24 L/s	0.38 L/s	3.35 ha	33,600 L/ha/day	1.30 L/s	2.08 L/s	3.25 L/s
J-09							0.20 ha	22,500 L/ha/day	0.05 L/s	0.08 L/s	0.13 L/s	1.14 ha	33,600 L/ha/day	0.45 L/s	0.72 L/s	1.13 L/s
J-10							0.56 ha	22,500 L/ha/day	0.15 L/s	0.24 L/s	0.38 L/s	3.16 ha	33,600 L/ha/day	1.23 L/s	1.97 L/s	3.08 L/s
J-11																
J-12																
J-13																
J-14							1.08 ha	22,500 L/ha/day	0.28 L/s	0.45 L/s	0.70 L/s	6.13 ha	33,600 L/ha/day	2.38 L/s	3.81 L/s	5.95 L/s
J-15																
J-16							0.24 ha	22,500 L/ha/day	0.06 L/s	0.10 L/s	0.15 L/s	1.38 ha	33,600 L/ha/day	0.54 L/s	0.86 L/s	1.35 L/s
J-17																
J-18							0.97 ha	22,500 L/ha/day	0.25 L/s	0.40 L/s	0.63 L/s	5.47 ha	33,600 L/ha/day	2.13 L/s	3.41 L/s	5.33 L/s
J-19							0.61 ha	22,500 L/ha/day	0.16 L/s	0.26 L/s	0.40 L/s	3.43 ha	33,600 L/ha/day	1.33 L/s	2.13 L/s	3.33 L/s
J-20																
J-21																
J-22																
J-23																
J-24							1.20 ha	22,500 L/ha/day	0.31 L/s	0.50 L/s	0.78 L/s	6.82 ha	33,600 L/ha/day	2.65 L/s	4.24 L/s	6.63 L/s
J-25																
J-26																
J-27																

Water Demand Summary			
Junction	(10)+(15)+(20)+(25) (28)	(11)+(16)+(21)+(26) (29)	(12)+(17)+(22)+(27) (30)
Downstream	Total Average Day Water Demand	Total Max Day Water Demand	Total Peak Hour Water Demand
J-01	1.02 L/s	1.63 L/s	2.55 L/s
J-02	0.10 L/s	0.16 L/s	0.25 L/s
J-03			
J-04	1.86 L/s	2.98 L/s	4.65 L/s
J-05			
J-06			
J-07	0.32 L/s	0.51 L/s	0.80 L/s
J-08	1.45 L/s	2.32 L/s	3.63 L/s
J-09	0.50 L/s	0.80 L/s	1.26 L/s
J-10	1.38 L/s	2.21 L/s	3.46 L/s
J-11			
J-12			
J-13			
J-14	2.66 L/s	4.26 L/s	6.65 L/s
J-15			
J-16	0.60 L/s	0.96 L/s	1.50 L/s
J-17			
J-18	2.38 L/s	3.81 L/s	5.96 L/s
J-19	1.49 L/s	2.39 L/s	3.73 L/s
J-20			
J-21			
J-22			
J-23			
J-24	4.04 L/s	6.47 L/s	10.11 L/s
J-25	1.45 L/s	2.32 L/s	3.63 L/s
J-26	1.80 L/s	2.88 L/s	4.50 L/s
J-27	1.78 L/s	2.85 L/s	4.45 L/s
	22.83 L/s	36.55 L/s	57.13 L/s

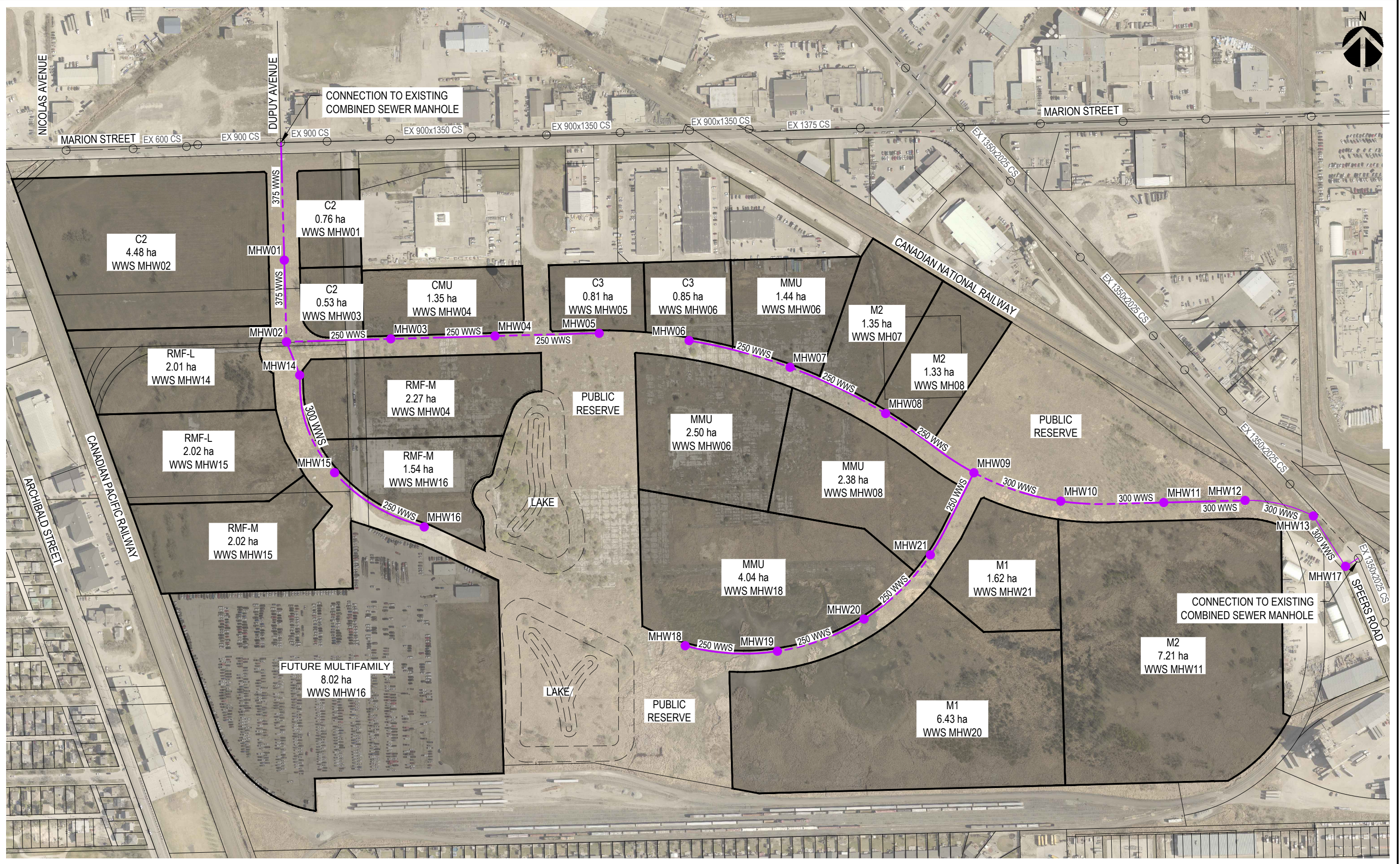
APPENDIX

B WASTEWATER SEWER DESIGN

APPENDIX

B-1 *WASTEWATER SEWER LAYOUT*

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DATE: 2021/12/20

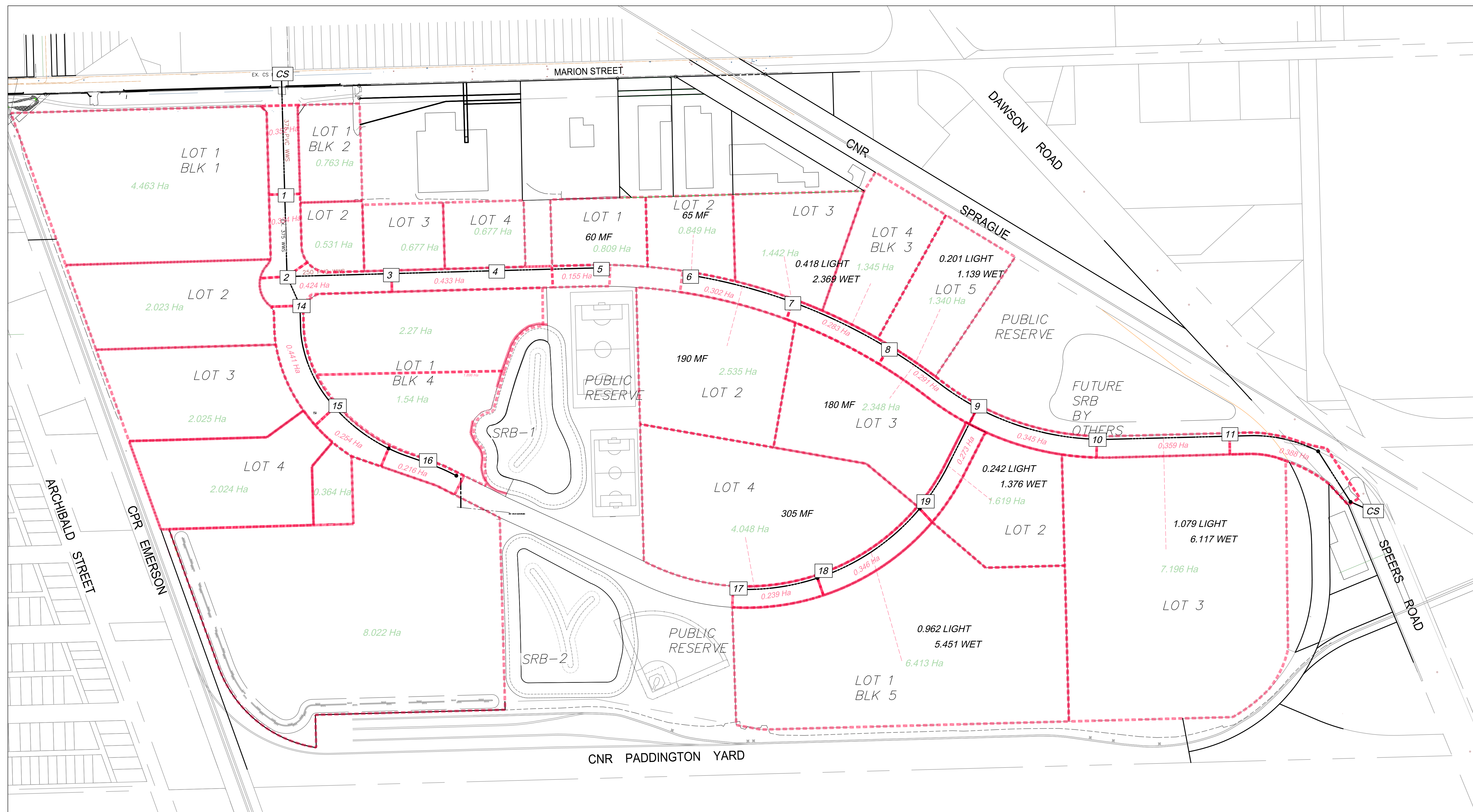
DESIGNED BY: B.F.

DRAWN BY: B.F.

PROJECT: PUBLIC MARKETS SERVICING REPORT

TITLE: WASTEWATER SEWER LAYOUT

DRAWING: B-1



APPENDIX

B-2 *DESIGN TABLE*

Flow to Marion St

Wastewater Sewer Design - Flow Calculation Table

13-Mar-25

Common Factors	Single Family	3.05	/unit	Per Capita Flow	270	lpcd average
		10.85	units/acre	Schools	70	l/day/student average
		26	units/ha			
	Multi-family	2.3	/unit			
			units/acre	Manhole infl	12.0	l/mh/min
		176	units/ha			
		Average	Peak Day			
	Commercial flow	16,800	28,100	l/ha/day	Groundwater	2200 l/ha/day
	Light Industrial/Business Park flow	22,500	37,600	l/ha/day	Manholes	1.6 /ha SF residential
	Wet Industrial flow	33,600	44,900	l/ha/day	1.0	/ha commercial / industrial /MF

		1	2,3	4
		16-15	15-14	14-02
Gross Area (Ha) Residential		8.020	4.440	2.023
Net Area Residential (Ha) net of SRB's and large PR's		8.020	4.440	2.023
Single family (ha)		0.000	0.000	0.000
Multi family (ha)		8.020	4.080	2.010
Total Single Family Lots		0	0	0
Area Total Single Family Population		0	0	0
Accumulated Total Single Family Population		0	0	0
Average flow (l/d) based on 270 lpcd		0	0	0
Total Multi Family Units		566 Units	591 Units	729 Units
Area Total Multi Family Population		1302	1360	1677
Accumulated Total Multi Family Population		1302	2662	4339
Average flow (l/d) based on 270 lpcd		351,540	718,740	1,171,530
Total Average Flow Residential		351,540	718,740	1,171,530
Harmon Peaking Factor		3.72	3.49	3.30
1. Peak Day flow Residential (l/sec)		15.149	28.999	44.766
Commerical / Industrial Peak Day				
Commerical - area (Ha)		0.000	0.000	0.000
Commerical Flow l/sec		0.00 l/s	0.00 l/s	0.00 l/s
Business park - area (Ha)		0.00	0.00	0.00
Business park mix Flow		0.00 l/s	0.00 l/s	0.00 l/s
Light industrial - area (Ha) incl schools		0.00	0.00	0.00
Light industrial Flow incl schools l/sec		0.00 l/s	0.00 l/s	0.00 l/s
Wet industrial - area (Ha)		0.00	0.00	0.00
Wet industrial Flow l/sec		0.00 l/s	0.00 l/s	0.00 l/s
Total Net Area Commerical / Industrial (Ha)		0.00	0.00	0.00
2. Total Peak Dry Weather Flows Commerical / Industrial		0.00	0.00	0.00
3. Total Accumulated Peak Dry Weather Flows Com and Ind		0.00	0.00	0.00
4. Total Peak Day Dry Weather Flows Sub-total 1+3		15.15	29.00	44.77
Additional area for infiltration in commercial/industrial (ROW's)Ha		0.216	0.254	0.441
No. of manholes		8.0	4.0	2.0
Res		0.0	0.0	0.0
Commerical		1.0	1.0	1.0
ROW		9.00	5.00	3.00
Manhole infiltration (l/sec)		1.80	1.00	0.60
Groundwater infiltration (l/sec)		0.210	0.120	0.063
Total infiltration (l/sec)		2.010	1.120	0.663
5. Accumulated Total infiltration (l/sec)		2.010	3.129	3.792
Total peak day wet weather flow (l/sec)		17.158	32.128	48.558

Full Flow cap	@ Min Slope	Pipe Dia	250	300	300	250	250	250	375	375
		Max capacity	29.000	42.000	42.000	29.000	29.000	29.000	66.000	66.000
		@ Asbuilt Slope			59.000				73.000	73.000

Orig Design	12.340	27.260	35.807	0.751	9.524	10.088	49.106	49.822
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5	6,7	8	9	9
5-4	4-3	3-2	2-1	1-exist
0.809	3.810	0.000	0.000	0.000
0.809	3.810	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000
0.809	3.810	0.000	0.000	0.000
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
60 Units	530 Units	230 Units	Units	Units
138	1219	529	0	0
138	1357	1886	6225	6225
37,260	366,390	509,220	1,680,750	1,680,750
37,260	366,390	509,220	1,680,750	1,680,750
4.20	3.71	3.61	3.16	3.16
1.812	15.735	21.250	61.384	61.384
0.000	1.350	0.531	4.463	0.763
0.00 l/s	0.44 l/s	0.17 l/s	1.45 l/s	0.25 l/s
0.00	0.00	0.00	0.00	0.00
0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s
0.00	0.00	0.00	0.00	0.00
0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s
0.00	0.00	0.00	0.00	0.00
0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s
0.00	1.35	0.53	4.46	0.76
0.00	0.44	0.17	1.45	0.25
0.00	0.44	0.61	2.06	2.31
1.81	16.17	21.86	63.45	63.70
0.155	0.433	0.424	0.334	0.352
1.0	4.0	0.0	0.0	0.0
0.0	1.0	1.0	4.0	1.0
1.0	1.0	1.0	1.0	1.0
2.00	6.00	2.00	5.00	2.00
0.40	1.20	0.40	1.00	0.40
0.025	0.142	0.024	0.122	0.028
0.425	1.342	0.424	1.122	0.428
0.425	1.767	2.191	7.105	7.534
2.237	17.941	24.053	70.553	71.230

Totals
0

2706 Units

East to Speers Rd

Wastewater Sewer Design - Flow Calculation Table

25-Jan-25

Common Factors	Single Family	3.05	/unit	Per Capita Flow	270	lpcd average
		10.85	units/acre	Schools	70	l/day/student average
		26	units/ha			
	Multi-family	2.3	/unit			
		176	units/acre	Manhole inflc	12.0	l/mh/min
		176	units/ha			
		Average	Peak Day			
	Commercial flow	16,800	28,100	l/ha/day	Groundwater	2200 l/ha/day
	Light Industrial/Business Park flow	22,500	37,600	l/ha/day	Manholes	1.6 /ha SF residential
	Wet Industrial flow	33,600	44,900	l/ha/day	1.0	/ha commercial / industrial /MF

		17-18	18-19	19-09
Gross Area (Ha) Residential		4.048	0.000	0.000
Net Area Residential (Ha) net of SRB's and large PR's		4.048	0.000	0.000
Single family (ha)		0.000	0.000	0.000
Multi family (ha)		4.048	0.000	0.000
Total Single Family Lots		0	0	0
Area Total Single Family Population		0	0	0
Accumulated Total Single Family Population		0	0	0
Average flow (l/d) based on 270 lpcd		0	0	0
Total Multi Family Units		305 Units		
Area Total Multi Family Population		702	0	0
Accumulated Total Multi Family Population		702	702	702
Average flow (l/d) based on 270 lpcd		189,540	189,540	189,540
Total Average Flow Residential		189,540	189,540	189,540
Harmon Peaking Factor		3.89	3.89	3.89
1. Peak Day flow Residential (l/sec)		8.542	8.542	8.542
Commerical / Industrial Peak Day				
Commerical - area (Ha)	.000 Ha	0.000	0.000	0.000
Commerical Flow l/sec		0.00 l/s	0.00 l/s	0.00 l/s
Business park - area (Ha)	.000 Ha	0.000	0.000	0.000
Business park mix Flow		0.00 l/s	0.00 l/s	0.00 l/s
Light industrial - area (Ha) incl schools	1.204 Ha	0.000	0.962	0.242
Light industrial Flow incl schools l/sec		0.00 l/s	0.42 l/s	0.11 l/s
Wet industrial - area (Ha)	6.827 Ha	0.000	5.451	1.376
Wet industrial Flow l/sec		0.00 l/s	2.83 l/s	0.72 l/s
Total Net Area Commerical / Industrial (Ha)	8.03	0.000	6.413	1.618
2. Total Peak Dry Weather Flows Commerical / Industrial		0.00	3.25	0.82
3. Total Accumulated Peak Dry Weather Flows Com and Ind		0.00	3.25	4.07
4. Total Peak Day Dry Weather Flows Sub-total 1+3		8.54	11.79	12.61
Additional area for infiltration in commercial/industrial (ROW's)Ha		0.239	0.346	0.273
No. of manholes		4.0	0.0	0.0
Res		0.0	6.0	2.0
Commerical		1.0	1.0	1.0
ROW		5.00	7.00	3.00
Total Manholes		1.00	1.40	0.60
Manhole infiltration (l/sec)		0.109	0.172	0.048
Groundwater infiltration (l/sec)		1.109	1.572	0.648
Total infiltration (l/sec)				
5. Accumulated Total infiltration (l/sec)		1.109	2.681	3.329
Total peak day wet weather flow (l/sec)		9.651	14.475	15.943
Pipe Dia		250	250	250
Full Flow cap	@ Min Slope	Max capacity	29.000	29.000
			29.000	29.000

6-7	7-8	8-9	9-10	10-11	11-CS
3.384	0.000	2.348	0.000	0.000	0.000
3.384	0.000	2.348	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000
3.384	0.000	2.348	0.000	0.000	0.000
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
255 Units		180 Units	Units		
587	0	414	0	0	0
587	587	1001	1703	1703	1703
158,490	158,490	270,270	459,810	459,810	459,810
158,490	158,490	270,270	459,810	459,810	459,810
3.94	3.94	3.80	3.64	3.64	3.64
7.223	7.223	11.886	19.366	19.366	19.366
0.000	0.000	0.000	0.000	0.000	0.000
0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s
0.000	0.000	0.000	0.000	0.000	0.000
0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s
0.000	0.418	0.201	0.000	1.079	0.000
0.00 l/s	0.18 l/s	0.09 l/s	0.00 l/s	0.47 l/s	0.00 l/s
0.000	2.369	1.139	0.000	6.117	0.000
0.00 l/s	1.23 l/s	0.59 l/s	0.00 l/s	3.18 l/s	0.00 l/s
0.000	2.787	1.340	0.000	7.196	0.000
0.00	1.41	0.68	0.00	3.65	0.00
0.00	1.41	2.09	6.16	9.81	9.81
7.22	8.64	13.98	25.53	29.18	29.18
0.302	0.283	0.291	0.345	0.359	0.388
4.0	0.0	3.0	0.0	0.0	0.0
0.0	2.0	1.0	0.0	7.0	2.0
1.0	1.0	1.0	1.0	1.0	1.0
5.00	3.00	5.00	1.00	8.00	3.00
1.00	0.60	1.00	0.20	1.60	0.60
0.094	0.078	0.101	0.009	0.192	0.010
1.094	0.678	1.101	0.209	1.792	0.610
1.094	1.772	2.873	6.412	8.204	8.814
8.316	10.408	16.852	31.942	37.383	37.993
250	250	250	300	300	300
29.000	29.000	29.000	42.000	42.000	42.000

APPENDIX

C LAND DRAINAGE SEWER DESIGN

APPENDIX

C-1 LAND DRAINAGE SEWER LAYOUT



APPENDIX

C-2 *ARCHIBALD STREET AS-BUILTS*

APPENDIX

C-3 *DESIGN TABLE*

Pipe Sizing

Job Name:

Public Markets

Job Number:

211-07590-00

Location

Winnipeg, MB

Upstream time of Concentration (min.):

10 min

Total Subdivision Area:

64.7 ha.

Rainfall Intensity Coeff **A**

1198.880

Rainfall Intensity Coeff **C**

0.828

Rainfall Intensity Coeff **B**

8.000

Allowable Runoff Coefficient **C**

0.800

Rainfall Intensity Formula

$R = A \times T_c^{-B}$

Where:

T = Time in hours

A - Area in hectares

Client:

Olexa Developments

Date:

June 8, 2022

Designed By:

Bruce Friesen

HGL Slope =

$$\left[\frac{nV}{R^{2/3}}\right]^2$$

where

$$R = d/4$$

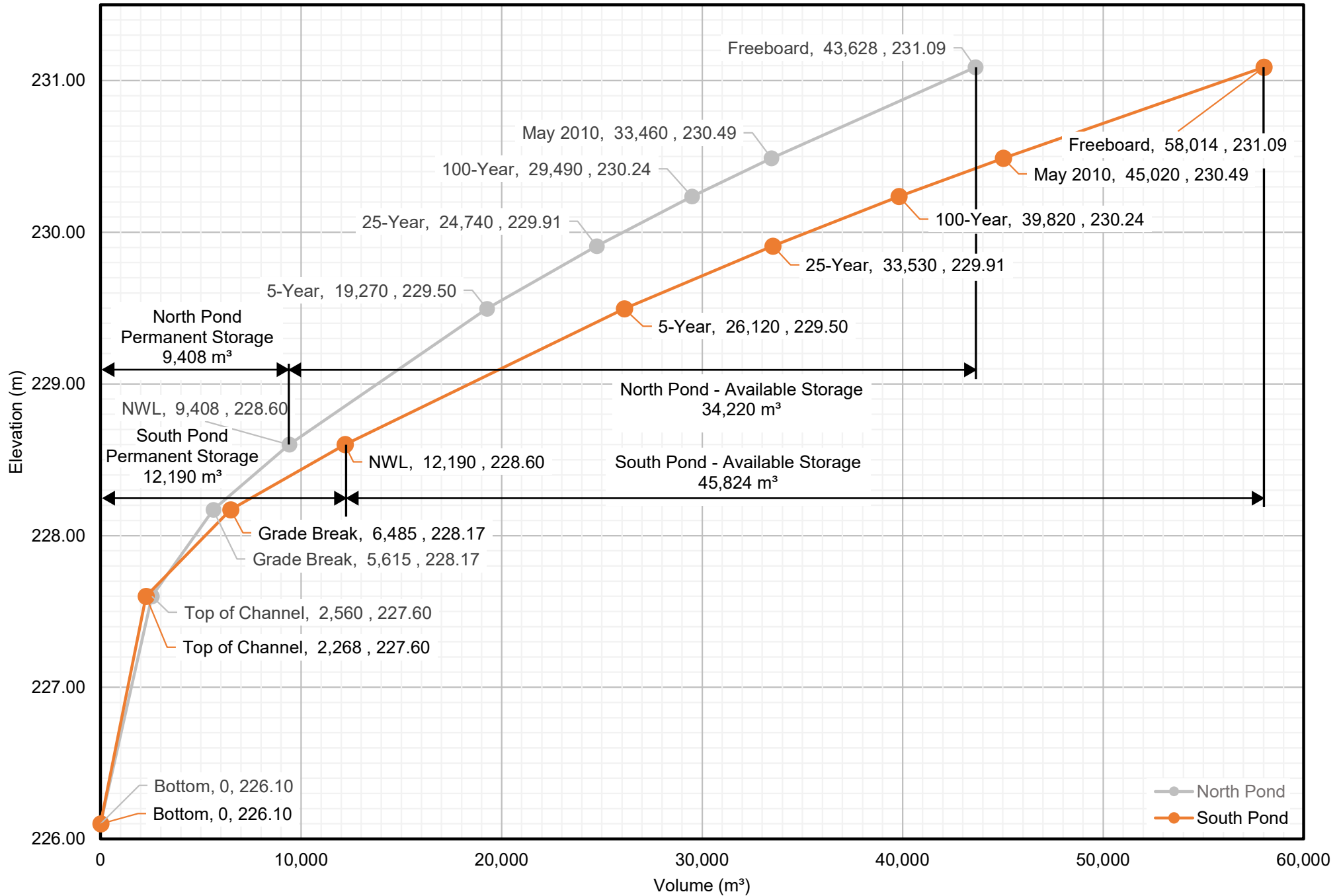
Manhole		Catchment	Area	Runoff Coefficient C	Cx A	U/S Total C x A	Inlet time	Total Time	Intensity (I)	Runoff Flow (Q)	Pipe Selection							Full Flow Travel Time	Pipe Invert		Manhole Drop	Ground Elevation			HGL Elevation		
											Pipe Dia.	Length	Pipe Slope	Manning's "n"	Full Flow Cap.	Velocity	HGL Slope		U/S Invert	D/S Invert		U/S Ground	U/S BD	U/S Cover	U/S HGL	D/S HGL	U/S HGL Cover
From	To		(m ²)		(m ²)	(m ²)	(min)	(min)	(mm/hr)	(m ³ /s)	(mm)	(m)	%		(m ³ /s)	(m/s)	%	(min)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
MHL01	MHL02	S09+S10+S11	40977	0.800	32,782	32782	10.00	10.00	109.50	0.997	900	132.5	0.20%	0.013	0.810	1.57	0.30%	1.41	228.24	227.97	0.00	231.66	3.42	2.52	230.64	230.24	1.02
MHL02	MHL03	S12+S13+S14	29994	0.800	23,995	56777	10.00	11.41	102.88	1.622	900	25.2	0.10%	0.013	0.572	2.55	0.80%	0.16	227.95	227.93	0.02	231.47	3.52	2.62	230.24	230.03	1.23
MHL03	MHL04			0.800	0	56777	10.00	11.57	102.16	1.611	1050	74.4	0.10%	0.013	0.864	1.86	0.35%	0.67	227.93	227.86	0.00	231.98	4.05	3.00	230.03	229.77	1.95
MHL04	MHL05	S15+S16+S53	14370	0.800	11,496	68273	10.00	12.24	99.37	1.884	1200	140.8	0.10%	0.013	1.233	1.67	0.23%	1.41	226.51	226.37	1.34	231.28	4.77	3.57	229.77	229.45	1.51
MHL05	MHL06	S17+S18+S49	20976	0.800	16,781	85054	10.00	13.65	93.99	2.221	1350	96.6	0.15%	0.013	2.067	1.55	0.17%	1.04	226.37	226.23	0.00	231.42	5.05	3.70	229.45	229.28	1.97
MHL27	MHL28	S63	6375	0.600	3,825	3825	10.00	10.00	109.50	0.116	450	118.5	0.26%	0.013	0.145	0.73	0.17%	2.70	229.89	229.59	0.00	232.00	2.11	1.66	231.71	231.51	0.29
MHL28	MHL29	S62	5101	0.600	3,061	6886	10.00	12.70	97.54	0.187	600	147.2	0.17%	0.013	0.256	0.66	0.09%	3.72	229.59	229.34	0.00	232.00	2.41	1.81	231.51	231.37	0.49
MHL29	MHL30	S61	5476	0.600	3,286	10171	10.00	16.42	85.07	0.240	600	143.8	0.17%	0.013	0.256	0.85	0.15%	2.82	229.34	229.09	0.00	232.00	2.66	2.06	231.37	231.15	0.63
MHL30	MHL31	S60	8883	0.600	5,330	15501	10.00	19.24	77.71	0.335	750	107.6	0.13%	0.013	0.400	0.76	0.09%	2.37	229.09	228.95	0.00	232.50	3.41	2.66	231.15	231.05	1.35
MHL31	MHL13					15501	10.00	21.61	72.52	0.312	750	137.3	0.13%	0.013	0.400	0.71	0.08%	3.24	228.95	228.77	0.00	232.50	3.55	2.80	231.05	230.95	1.45
MHL13	MHL12	S29+S28	32439	0.800	25,951	41452	10.00	24.84	66.55	0.766	1050	122.5	0.10%	0.013	0.864	0.89	0.08%	2.31	228.77	228.65	0.00	232.77	4.00	2.95	230.95	230.85	1.82
MHL12	MHL11	S31+S30	45168	0.800	36,134	77587	10.00	27.15	62.92	1.356	1050	116.2	0.10%	0.013	0.864	1.57	0.25%	1.24	228.65	228.53	0.00	233.00	4.35	3.30	230.85	230.56	2.15
MHL11	MHL10	S32	2760	0.800	2,208	79795	10.00	28.39	61.14	1.355	1050	112.8	0.10%	0.013	0.864	1.57	0.25%	1.20	228.53	228.42	0.00	232.87	4.34	3.29	230.56	230.29	2.31
MHL10	MHL09	S26+S27+S37	39623	0.800	31,698	111493	10.00	29.59	59.52	1.843	1200	117.3	1.56%**	0.013	4.868	1.63	0.22%	1.20	228.42	226.59	0.00	232.54	4.12	2.92	230.29	230.02	2.25
MHL09	MHL08	S24+S25	16404	0.800	13,123	124616	10.00	30.79	57.99	2.007	1350	129.6	0.10%	0.013	1.688	1.40	0.14%	1.54	226.59	226.46	0.00	232.11	5.52	4.17	230.02	229.84	2.09
MHL08	MHL07	S21+S22+S23+S39	51358	0.800	41,086	165703	10.00	32.33	56.15	2.585	1350	145.9	0.10%	0.013	1.685	1.81	0.23%	1.35	226.46	226.32	0.00	231.69	5.23	3.88	229.84	229.50	1.85
MHL07	MHL06	S19+S20	14098	0.800	11,278	176981	10.00	33.67	54.64	2.686	1350	86.9	0.10%	0.013	1.688	1.88	0.25%	0.77	226.32	226.23	0.00	231.78	5.46	4.11	229.50	229.28	2.28
MHL06	POND			0.800	0	176981	10.00	34.44	53.82	4.866	1650	63.4	0.20%	0.013	4.126	2.28	0.29%	0.46	226.23	226.10	0.00	232.25	6.02	4.37	229.28	229.10*	2.97
MHL14	MHL15	S54+S58+S59	41318	0.800	33,054	33054	10.00	10.00	109.50	1.005	1050	92.6	0.10%	0.013	0.864	1.16	0.14%	1.33	228.20	228.10	0.00	231.46	3.26	2.21	230.57	230.44	0.89
MHL15	MHL16	S55+S56+S57	34073	0.800	27,258	60313	10.00	11.33	103.23	1.729	1050	106.6	0.33%	0.013	1.569	2.00	0.40%	0.89	228.10	227.75	0.00	231.90	3.80	2.75	230.44	230.01	1.46
MHL16	MHL17	S50+S51+S52	95607	0.800	76,486	136798	10.00	12.22	99.45	3.779	1200	116.3	0.66%	0.013	3.167	3.34	0.94%	0.58	227.75	226.98	0.00	231.35	3.60	2.40	230.01	228.92	1.34
MHL17	POND	S48	3584	0.800	2,867	139666	10.00	12.80	97.15	3.769	1350	88.3	1.00%	0.013	5.337	2.63	0.50%	0.56	226.98	226.10	0.00	231.33	4.35	3.00	228.92*		2.41
MHL22	MHL21	S35+S33	19581	0.800	15,665	15665	10.00	10.00	109.50	0.476	750	146.3	1.02%	0.013	1.124	1.08	0.18%	2.26	229.53	228.04	0.00	232.22	2.69	1.94	230.83	230.56	1.39
MHL21	MHL20	S34+S36+S38	65700	0.800	52,560	68225	10.00	12.26	99.28	1.881	1050	118.0	0.10%	0.013	0.864	2.17	0.47%	0.91	227.74	227.62	0.30	231.93	4.19	3.14	230.56	230.00	1.37
MHL20	MHL19	S40+S41+S42	31647	0.800	25,318	93542	10.00	13.17	95.75	2.488	1200	121.5	0.10%	0.013	1.233	2.20	0.41%	0.92	227.62	227.50	0.00	231.95	4.33	3.13	230.00	229.51	1.95
MHL18	MHL19	S47	3771	0.800	3,017	3017	10.00	10.00	109.50	0.092	450	93.7	0.30%	0.013	0.156	0.58	0.10%	2.71	229.48	229.20	0.00	231.78	2.30	1.85	229.60	229.51	2.18
MHL19	POND	S43+S44	17624	0.800	14,099	110658	10.00	14.09	92.44	2.841	1200	76.9	1.82%	0.013	5.260	2.51	0.53%	0.51	227.50	226.10	1.70	231.96	4.46	3.26	229.51	229.10*	2.45

* HGL at taken from SWMM model at branch's maximum HGL

** Pipe grade subject to minor change based on future Speers Road Design

C-4 *STAGE-AREA AND
STAGE-VOLUME
CURVES*

Elevation-Volume Curves



APPENDIX

C-5 *PROPOSED CHANGES TO ST CATHERINE STREET LAND DRAINAGE SEWER*

APPENDIX

C-6 *ST CATHERINE STREET HYDRAULIC PROFILES*

St Catherine Street - 5-Year (May) Storm without Public Markets

— HGL

Conduit C30
Flow = 211.183 L/s

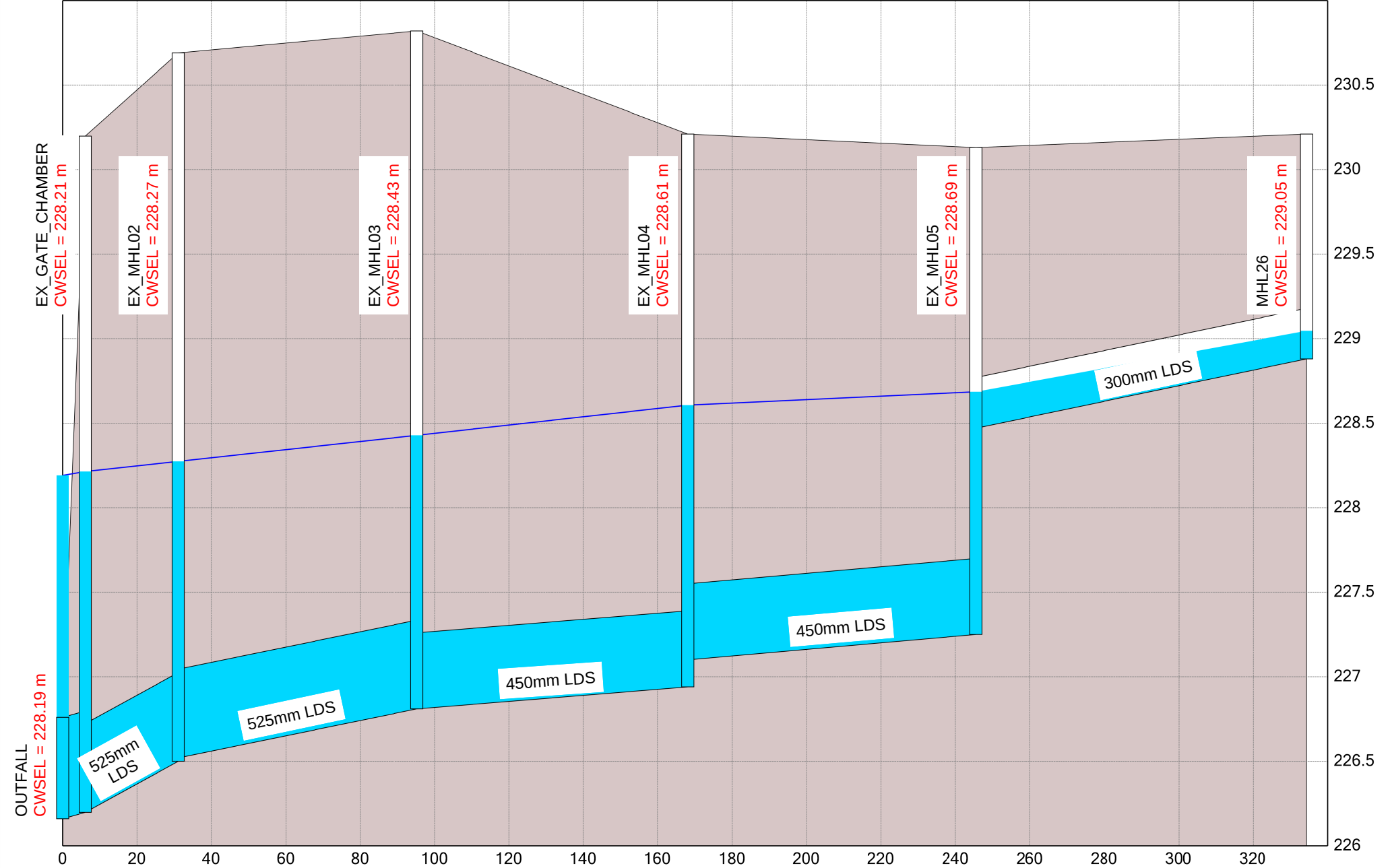
Conduit C22
Flow = 212.058 L/s

Conduit C21
Flow = 212.117 L/s

Conduit C20
Flow = 143.05 L/s

Conduit C26
Flow = 92.43 L/s

Conduit C19
Flow = 38.815 L/s



St Catherine Street - 5-Year (May) Storm with Public Markets

HGL

Conduit C30
Flow = 166.625 L/s

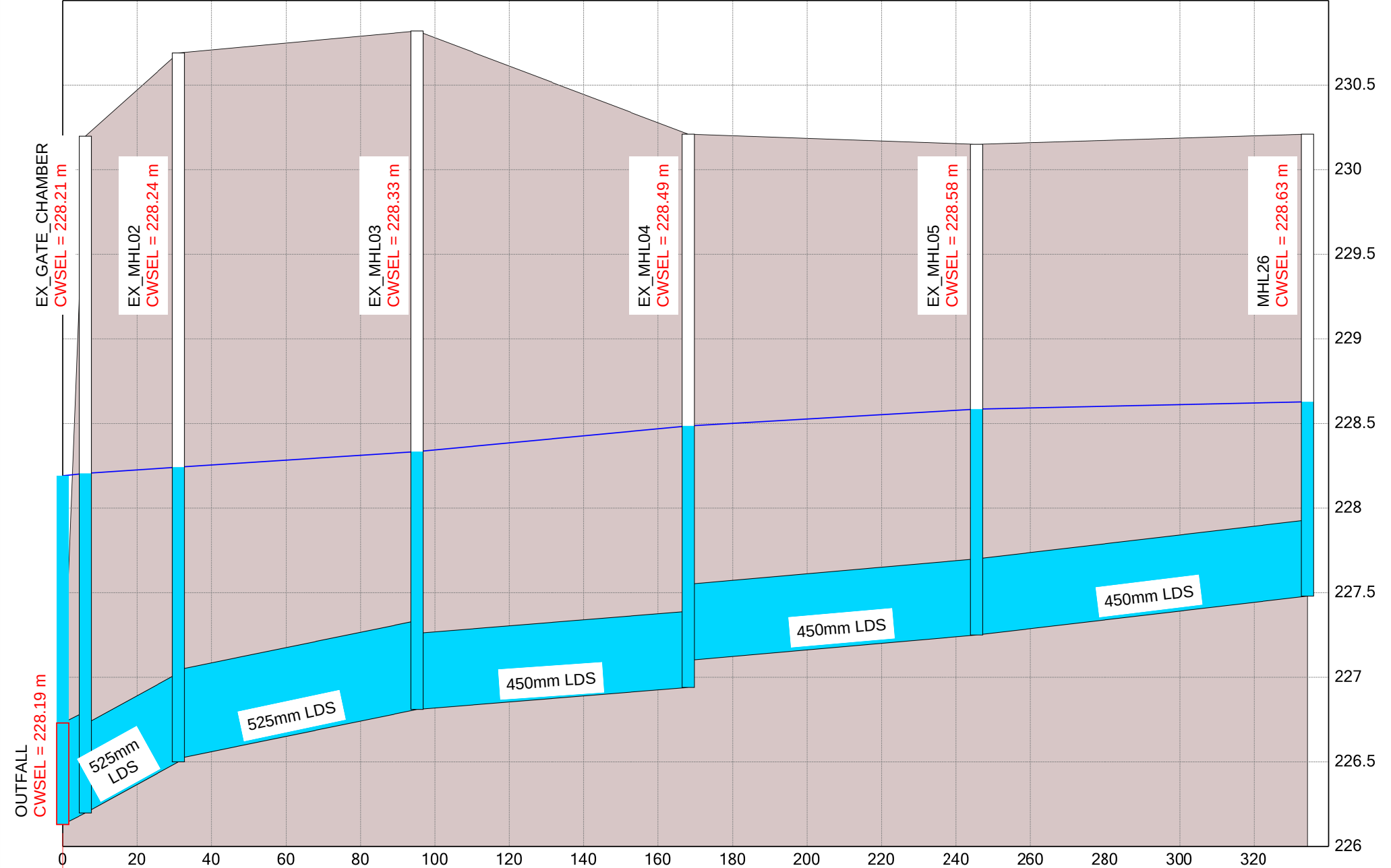
Conduit C22
Flow = 166.555 L/s

Conduit C21
Flow = 165.924 L/s

Conduit C20
Flow = 131.741 L/s

Conduit C26
Flow = 103.821 L/s

Conduit C19
Flow = 65.251 L/s



St Catherine Street - 5-Year Storm without Public Markets

HGL

Conduit C30
Flow = 545.516 L/s

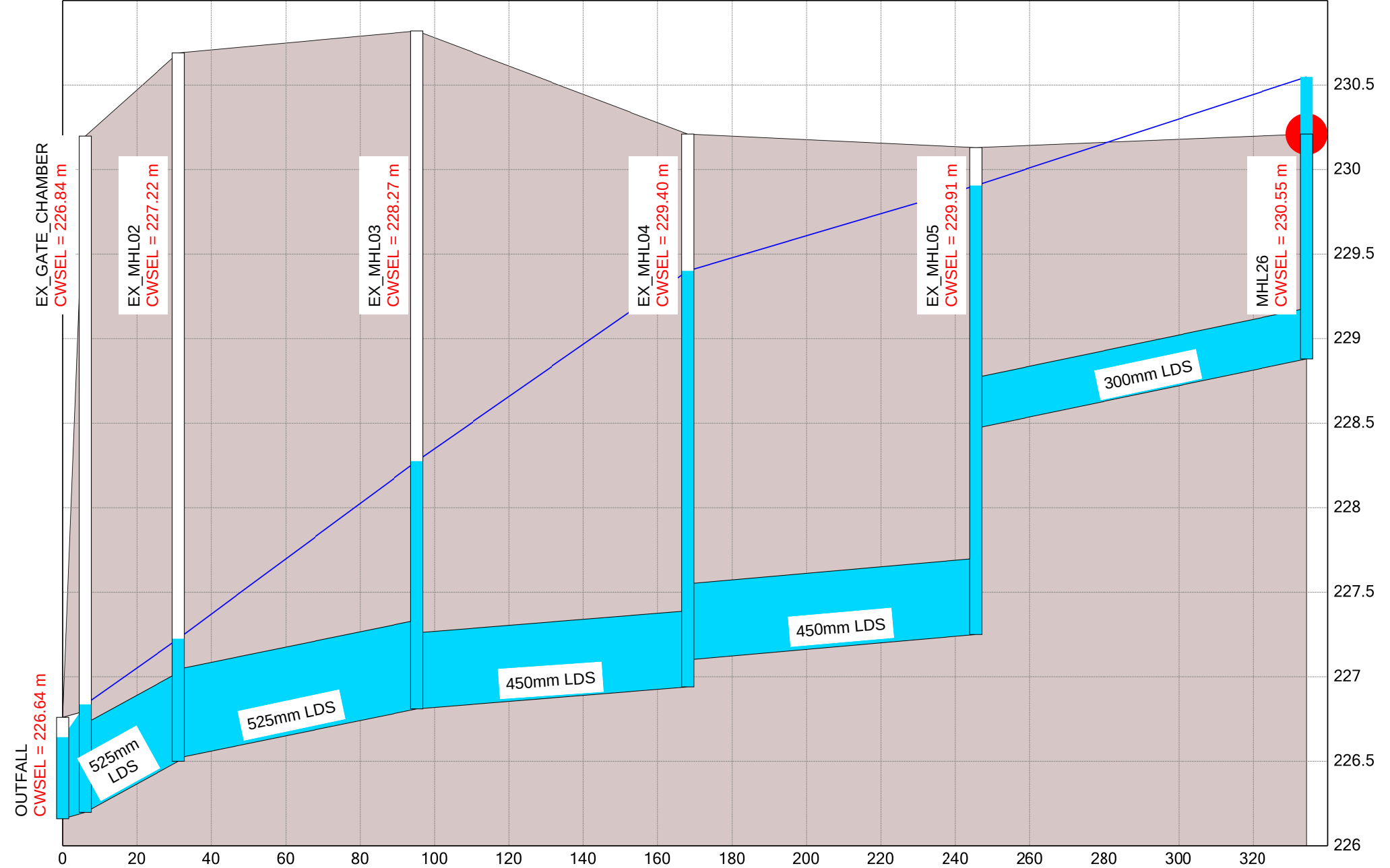
Conduit C22
Flow = 547.319 L/s

Conduit C21
Flow = 551.573 L/s

Conduit C20
Flow = 365.798 L/s

Conduit C26
Flow = 239.902 L/s

Conduit C19
Flow = 85.509 L/s



St Catherine Street - 5-Year Storm with Public Markets

— HGL

Conduit C30
Flow = 464.46 L/s

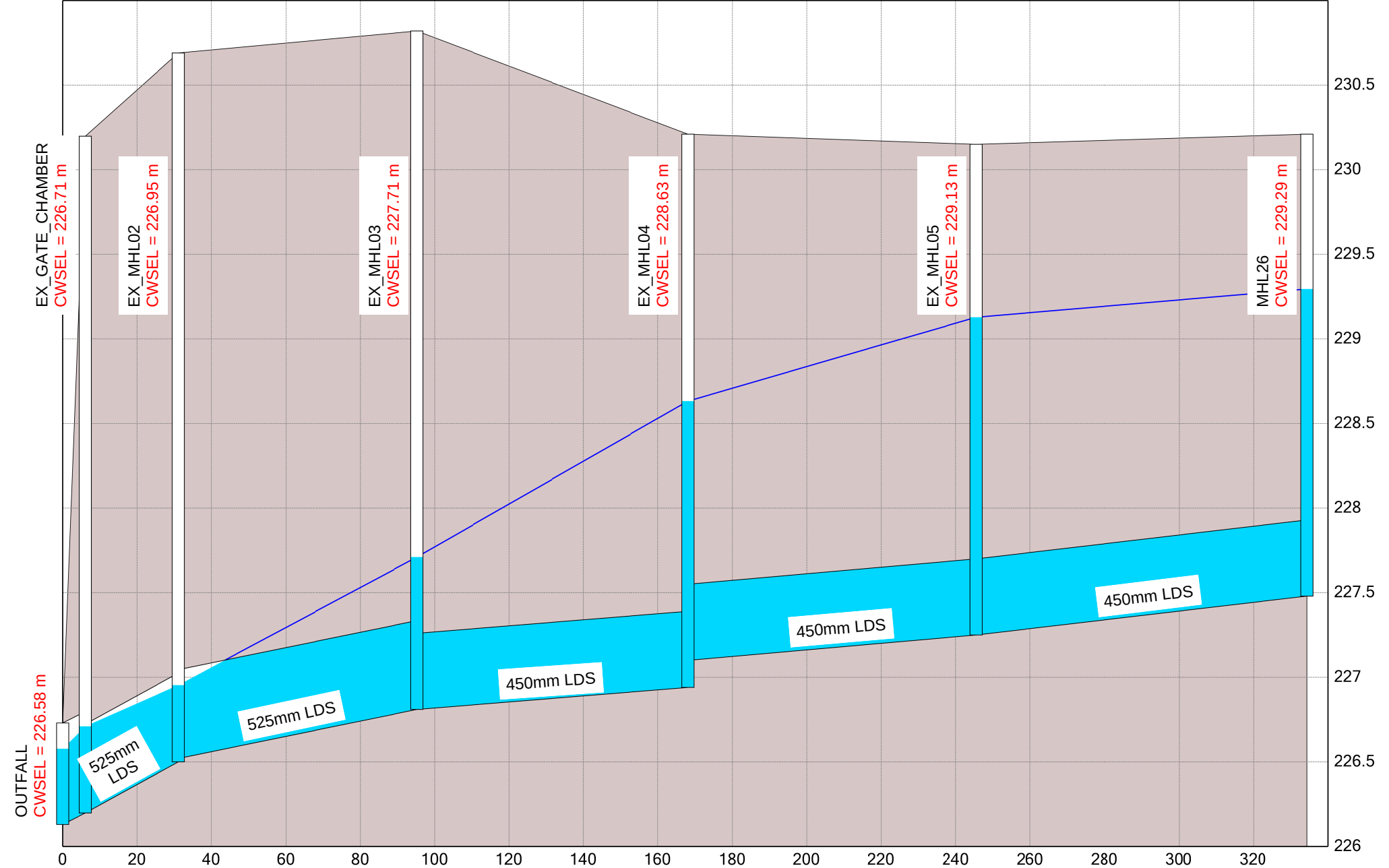
Conduit C22
Flow = 464.856 L/s

Conduit C21
Flow = 465.422 L/s

Conduit C20
Flow = 320.012 L/s

Conduit C26
Flow = 227.813 L/s

Conduit C19
Flow = 124.008 L/s



APPENDIX

D CITY OF WINNIPEG SERVICING CRITERIA

CITY OF WINNIPEG
WATERWORKS, WASTE AND DISPOSAL DIVISION

SERVICING CRITERIA

**TO THE SUBMITTED AS PART OF
APPROVAL PROCESS WITH SERVICING PLANS**

LOCATION: Public Markets

DRAWING REFERENCES: A-1, B-1, C-1

SUBMITTED BY (FIRM): WSP **DATE:** June 2022

WATER

SERVICE AREA: (Maps to be included)

Present: 67 ha (see A-1)

Ultimate: 67 ha (see A-1)

SYSTEM

FEED POINT LOCATION: 1 – Marion Street and Dupuy Avenue
2 – Speers Road and CN Railway Crossing

SYSTEM

FEED POINT DESIGN PRESSURE: 1 – 470 kPa (68 psi) Max Day 466 kPa (68 psi) Peak Hr.
2 – 467 kPa (68 psi) Max Day 462 kPa (67 psi) Peak Hr.

DESIGN FLOW:	<u>Average</u>	<u>Peak Hour</u>	<u>Fire</u>
Residential	<u>225+10% L/c/day</u>	<u>619 L/c/day</u>	<u>200.00 L/sec minimum</u>
Commercial	<u>16,800 L/ha/day</u>	<u>42,000 L/ha/day</u>	<u>250.00 L/sec minimum</u>
Light Industrial	<u>22,500 L/ha/day</u>	<u>56,250 L/ha/day</u>	<u>383.00 L/sec</u>
Wet Industrial	<u>33,600 L/ha/day</u>	<u>84,000 L/ha/day</u>	<u>383.00 L/sec</u>

MINIMUM SYSTEM PRESSURE:

Peak. Hour: 462 kPa (67 psi)

Fire: 171 kPa (25 psi)

SUBMITTED BY: Jason Dunn, P.Eng.

Signed: 

Date: May 2024

WASTEWATER

Marion Street and Dupuy Avenue

SERVICE AREA: (Maps to be included)

Present: 35 ha (see B-1)

Ultimate: 35 ha (see B-1)

DESIGN FLOW:

Average

Peak

Residential 270 L/c/day 1080 L/c/day (Harmon Factor: Max = 4.0)

Commercial 16,800 L/ha/d 28,100 L/ha/d

Light Industrial 22,500 L/ha/d 37,600 L/ha/d

Wet Industrial 33,600 L/ha/d 44,900 L/ha/d

INFILTRATION: 2200 L/ha/day

MANHOLE INFILTRATION: 12 L/MH/min

EXTRANEIOUS FLOW ALLOWANCE: n/a

GENERATED FLOWS FROM TOTAL SYSTEM: (Ultimate)

Average: 1,330,560 L/day

Maximum: 5,164,128 L/day

LIFT STATION: (Supply Details)

SUBMITTED BY: Jason Dunn, P. Eng.

Signed: 

Date: May 2024

WASTEWATER

Speers Road and CN Railway Crossing

SERVICE AREA: (Maps to be included)

Present: 32 ha (see B-1)

Ultimate: 32 ha (see B-1)

DESIGN FLOW:	<u>Average</u>	<u>Peak</u>
Commercial	<u>16,800</u> L/ha/d	<u>28,100</u> L/ha/d
Light Industrial	<u>22,500</u> L/ha/d	<u>37,600</u> L/ha/d
Wet Industrial	<u>33,600</u> L/ha/d	<u>44,900</u> L/ha/d

INFILTRATION: 2200 L/ha/day

MANHOLE INFILTRATION: 12 L/MH/min

EXTRANEIOUS FLOW ALLOWANCE: n/a

GENERATED FLOWS FROM TOTAL SYSTEM: (Ultimate)

Average: 918,432 L/day

Maximum: 2,365,632 L/day

LIFT STATION: (Supply Details)

SUBMITTED BY: Jason Dunn, P.Eng.

Signed: 

Date: May 2024

LAND DRAINAGE

SERVICE AREA: (Map to be included)

Present: 67 ha (see C-1)

Ultimate: 67 ha

PIPE SYSTEM:

Method Used: Rational X Hydrograph _____

Design Storm: (Stated formula used) $i = \frac{1198.88}{(t+8)^{0.828}}$

Design Hydraulic Grade Line – Minimum distance below gutter
(Degree of surcharge): 0.30 m

Describe any runoff retardation devices employed: None

Runoff Coefficients or % Imperviousness:

	<u>Rational Method</u>	<u>Hydrograph Method</u>
	Coefficient Inlet Time	% Imperviousness
Single Family Dwelling		
- conventional	_____	_____
- zero lot line	_____	_____
Multiple Family	<u>0.80</u>	_____
Apartments	_____	_____
Commercial	<u>0.80</u>	_____
Parks	_____	_____
Industrial	<u>0.80</u>	_____

For above rainfall frequency formula Maximum Generated Flow from Total System is:
see C-3 cfs.

RETENTION SYSTEM:

Rainfall Formula: May 2010 timeseries

Normal Water Level: 228.60m

For Selected Rainfall Storms: See results in report.

SUBMITTED BY: Jason Dunn, P.Eng.

Signed: 

Date: May 2024