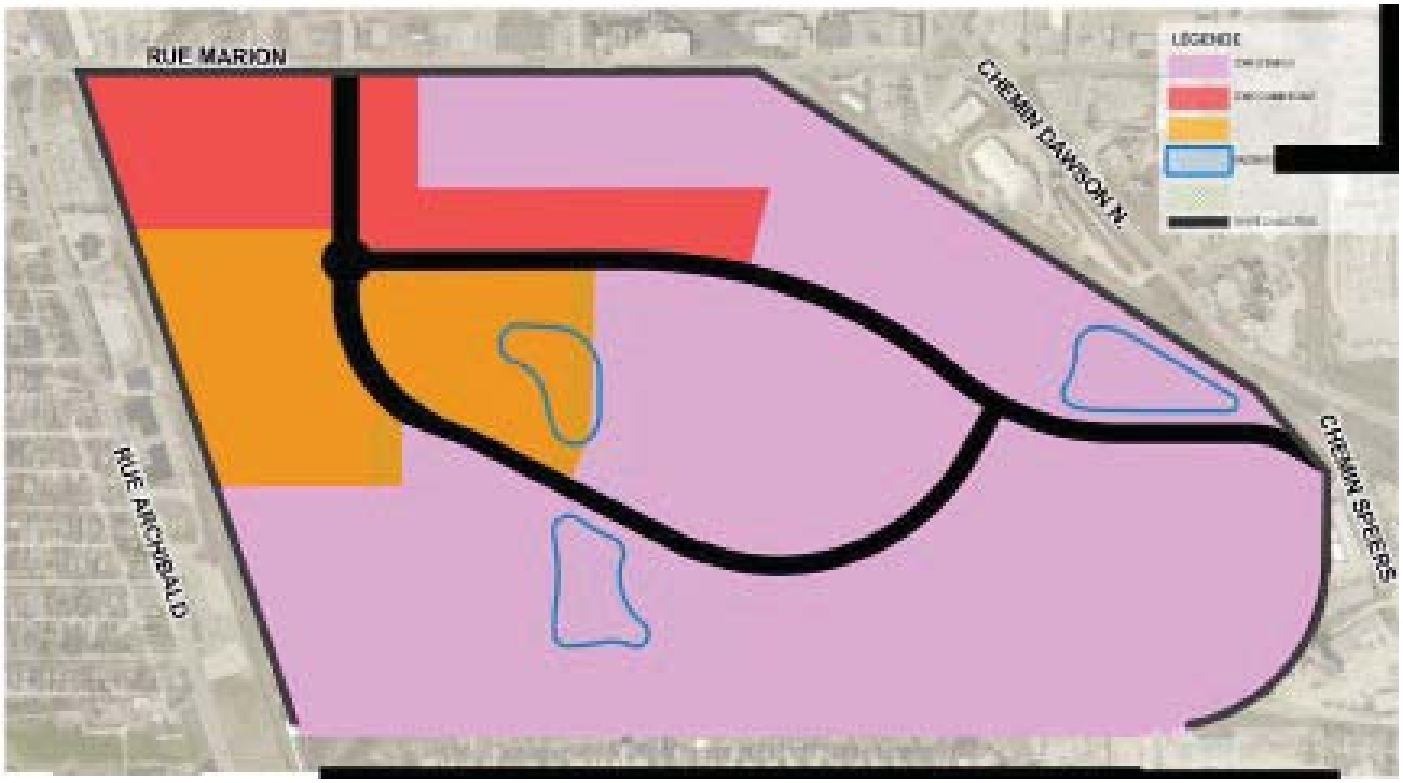
Public Markets

Stakeholder Engagement Summary



Prepared by McGowan Russell Group Inc.

February 2024

1.0 OVERVIEW

The purpose of these virtual stakeholder meetings was to provide updated information on a proposed Secondary Plan Amendment for Public Markets Lands MRS D Site. Virtual meetings were scheduled for four groups of stakeholders previously interested in the project: commercial businesses, residential groups, industrial businesses, and homeowners in the area. The meeting participants were contacted by email from information provided at previous engagements.

Over 125 email invitations were sent out and our team called all participants in the commercial, residents associations and industrial groups, left messages if we did not speak directly to an individual, and provided email contact information. Follow-up emails were sent the week before the events to provide an opportunity for late registration to the webinar.

2.0 FORMAT

The virtual meetings were held via Zoom webinar with two sessions on January 23rd, 2024; commercial group from 2-3:00pm and residents associations from 5-6:30p; two more sessions on January 25th, 2024; industrial group from 2-3pm and area residents from 5-6:30pm.

The virtual meeting included a presentation of the proposed conceptual secondary plan amendment information and a question-and-answer period at the end of the presentation. Members of the team were available to provide information in response to the questions and collect comments that were shared. A survey was also provided to all participants after the sessions.

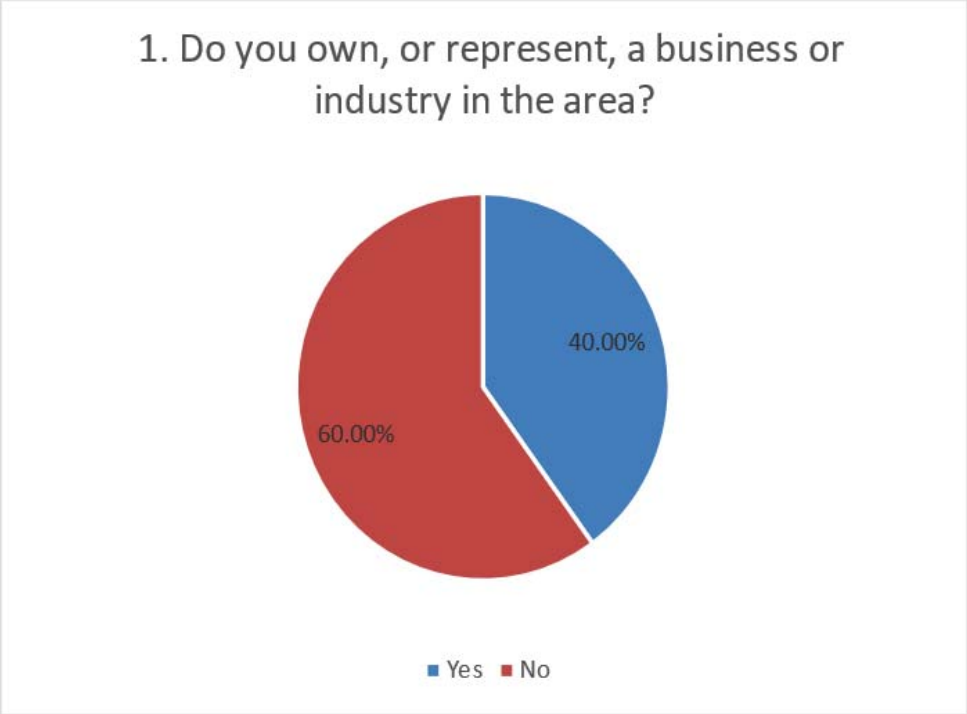
A total of twelve (12) stakeholders attended three (3) virtual meetings. Of the seven (7) commercial stakeholders registered, five (5) attended. From the neighbourhood residents' group stakeholders, we only received one response, and that stakeholder registered and attended the industrial group presentation. Six (6) industrial stakeholders registered and four (4) attended the presentation. Four (4) people registered, and two (2) individuals attended the final session for area residents.

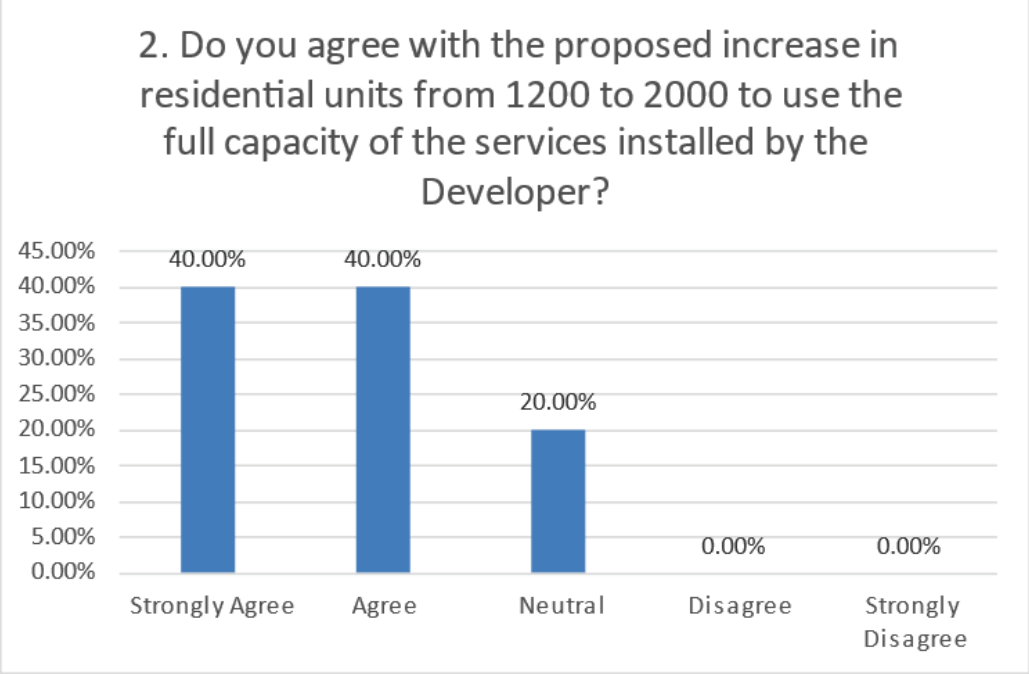
A questionnaire was provided following the virtual meeting to obtain input on the proposed Secondary Plan Amendment. 41.6% of attendees completed the survey after the meetings. The results of the surveys are provided in section 3.1.

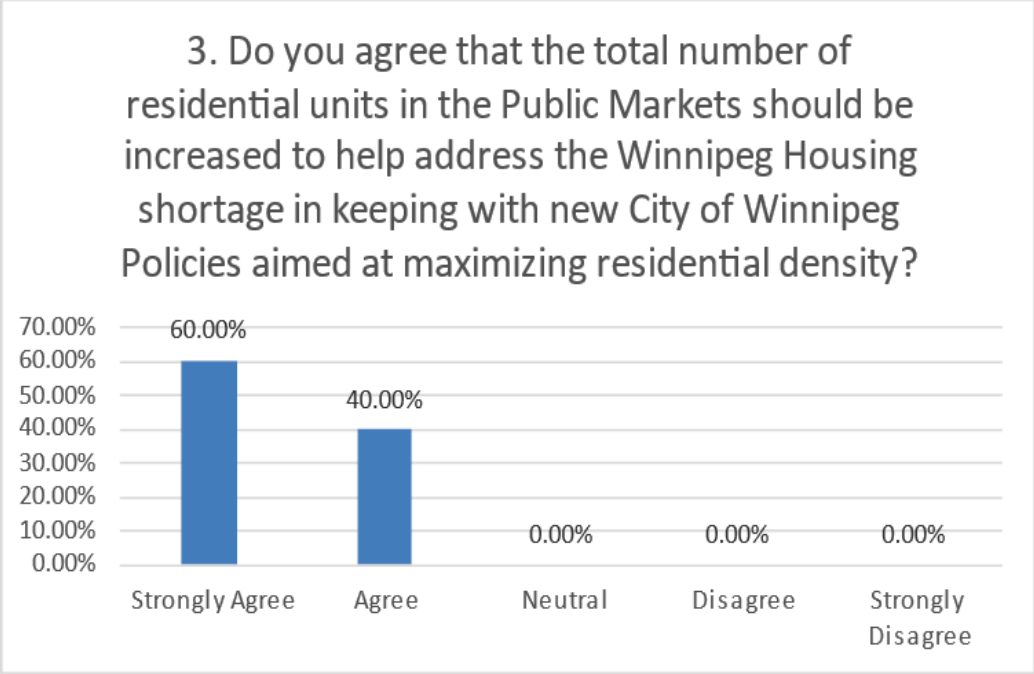
A summary of the question-and-answer portion of the meetings is provided in section 3.2.

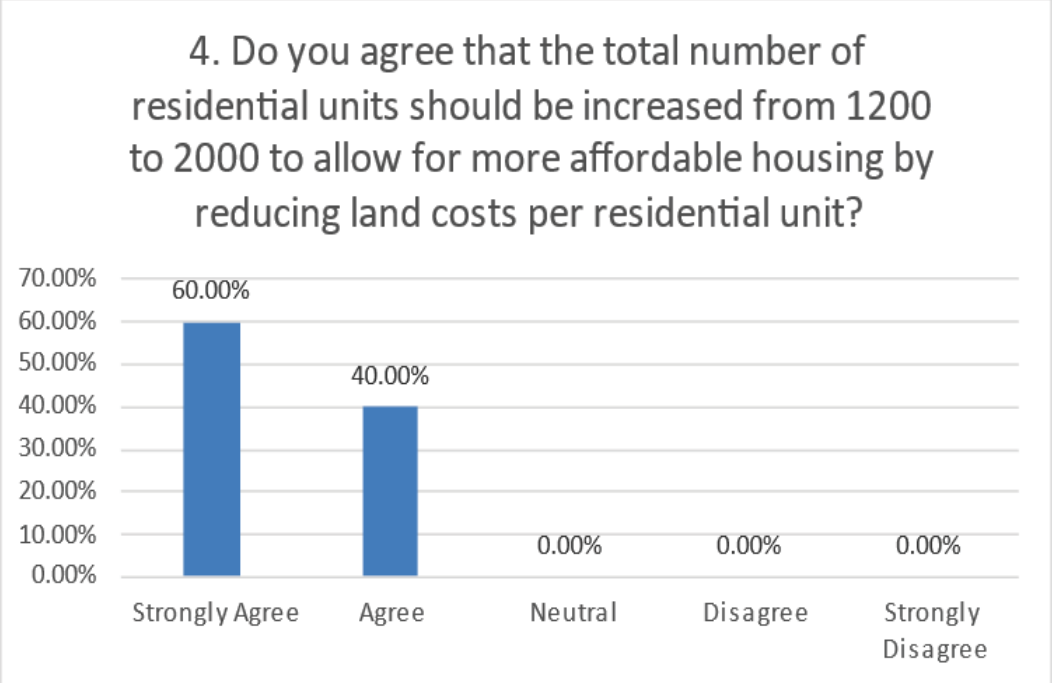
3.0 RESULTS

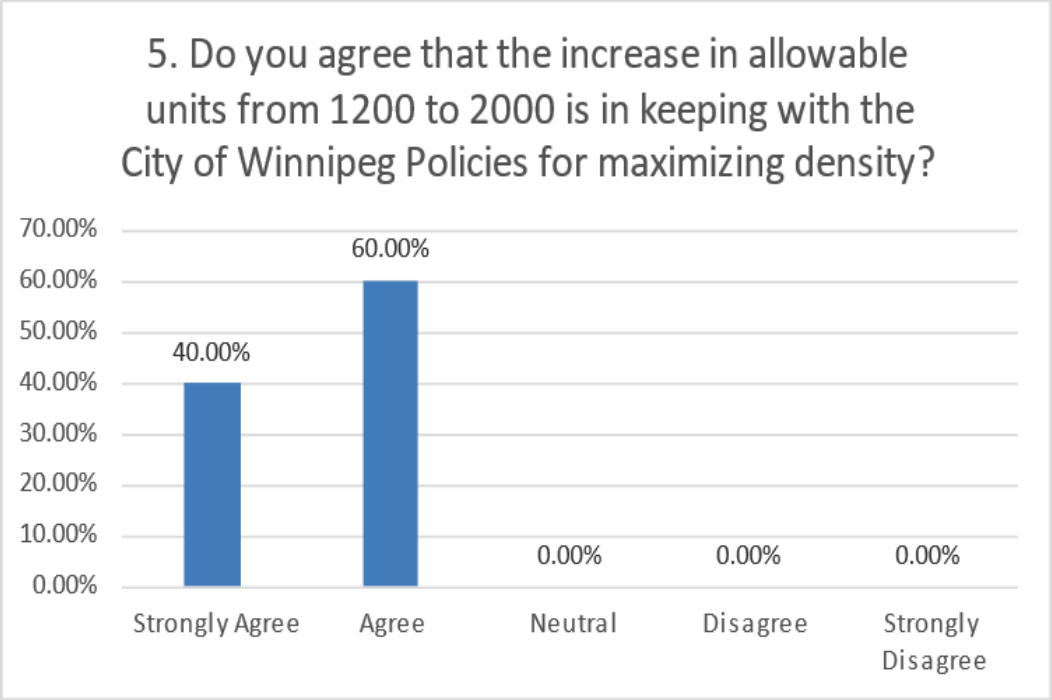
3.1 SURVEY RESULTS

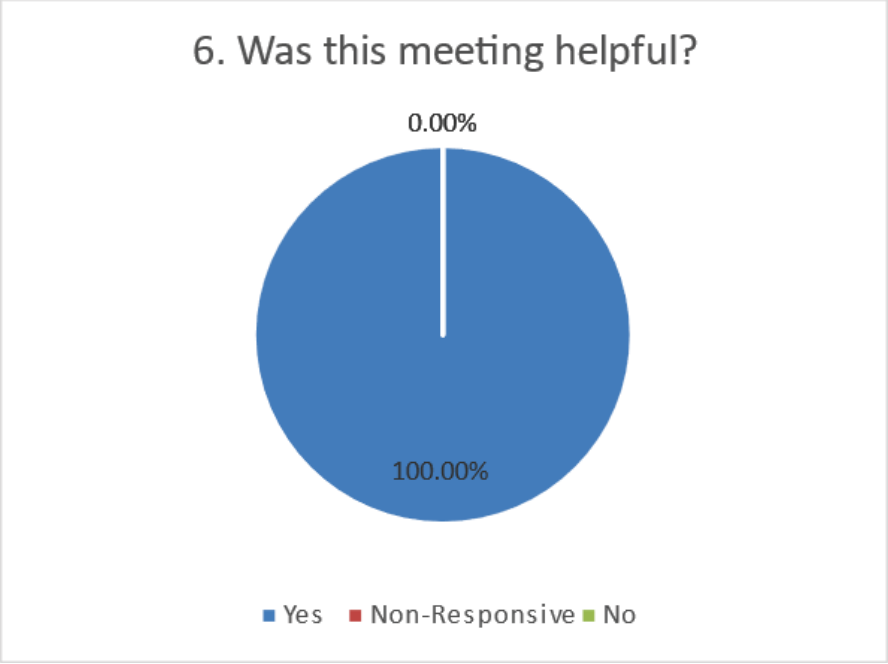





3. Do you agree that the total number of residential units in the Public Markets should be increased to help address the Winnipeg Housing shortage in keeping with new City of Winnipeg Policies aimed at maximizing residential density?
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
60.00%
40.00%
0.00%
0.00%
0.00%
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree


4. Do you agree that the total number of residential units should be increased from 1200 to 2000 to allow for more affordable housing by reducing land costs per residential unit?
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
60.00%
40.00%
0.00%
0.00%
0.00%
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree


5. Do you agree that the increase in allowable units from 1200 to 2000 is in keeping with the City of Winnipeg Policies for maximizing density?
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
40.00%
60.00%
0.00%
0.00%
0.00%
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree


6. Was this meeting helpful?
0.00%
100.00%
Yes
Non-Responsive
No

3.2 MEETING DISCUSSION

During the question-and-answer period discussion centered around the 10 topics summarized below.

1) Traffic and Vehicular Circulation related to the closing of the second road connection to Marion.
   Participants generally agreed with the removal of the second road connection onto Marion, contingent upon the results of the traffic study indicating that it is not required. They agreed that the two collector road connections, one to Marion and the other to Speers, are sufficient. Marion and Paulette Duguay will have signal lights and stacking and turning lanes to allow full turning movements. Speers connects to Maginot and then Lagimodiere with existing signal lights, stacking and turning lanes, allowing full turning movements.
2) Removal of additional emergency access.
   No concerns were expressed by participants. One participant stated, “I totally agree that having all three railroad tracks blocked at the same time and the potential of that is nonexistent.”
3) Additional 800 residential units and Increase in RMF-L Building heights from 100’ to 150.’
   Participants generally agreed with additional units and higher buildings, one stating “I think it’s the perfect spot for it”. It was noted that the maximum 150’ height would only apply to buildings on the existing RMF-L lots and the proposed new RMF-L lot (at the SE corner of Paulette Duguay and Ibraham Diallo). All proposed taller buildings would be more than the required 300m from existing industrial and more than 900m from existing industrial to the east. The taller buildings are also very far removed (approximately 400m) from existing single family south of Paddington Yards and existing single-family west of Archibald.
4) Potential mal odour from existing industrial
   One industrial participant was concerned about potential increase in mal odour complaints with the additional residential units and additional building height. The Developer team explained that the developer is required to install and maintain prominent notification signage in both English and French informing of the potential odour and/or noise nuisance emanating from the existing industrial uses surrounding the land. Statements regarding the potential odour and/or noise nuisance will also be included in all purchase agreements. The developer noted that with the prevailing winds the site rarely gets smells from the east. The most are smells from the northwest (mushroom plant area).
5) Affordable housing and mix of housing types.
   Participants were interested in knowing how affordable housing would be provided and the mix of housing types that would be offered. Minimum 10% affordable housing will be provided through a co-op group (entire building will likely be affordable) and scattered throughout other residential developments. Rental rates are not known at this time. The developers are looking at providing 1,2 and 3 bedroom and possibly 4-bedroom units. Both apartment style and townhomes are planned.
6) Residential setback to CP rail line and Paddington Yards.
   Residential buildings must be minimum 30.5 m (100 feet) from the CP rail line and 300m (984 feet) from Paddington Yards. One participant asked regarding the future of Paddington Yards. The developer advised that the new provincial government re-announced the rail relocation studies that are looking at relocating these yards to outside the City.
7) Park and Ride
   Participant asked if a park and ride is still envisioned. The developer advised that a park and ride is still envisioned. The developer is also looking at Peg City Car Coop.
8) Phasing and Construction Schedule.
   Both phase 1 and phase 2 will include a mix of residential and industrial development. Commercial will likely be in Phase 2. Speers will be completed in Phase 2
   The first residential in phase 1 should commence construction fall of 2024 and be ready for occupancy at the end of 2025. The second portion of phase 1 residential should be complete for occupancy summer/fall 2026.
9) New land drainage sewer to the Seine River
   One participant was concerned that the sewer to the river was a sanitary or combined sewer. The developer team explained that the sewer to the river is a land drainage sewer for rain/storm water

that is actually removing rain/storm water that used to drain to the combined sewer providing a net benefit to the area.

10) Function of the storm water retention ponds
The developers two storm water retention ponds are naturalized (native grasses on the slopes and wetlands within the pond) to hold water to be released slowly to the new land drainage sewer pipe to the Sene River. The third pond is the future City deep pond for the overall Mission Storm Water Control District.

3.3 APPENDICES

Email invitation.
Survey

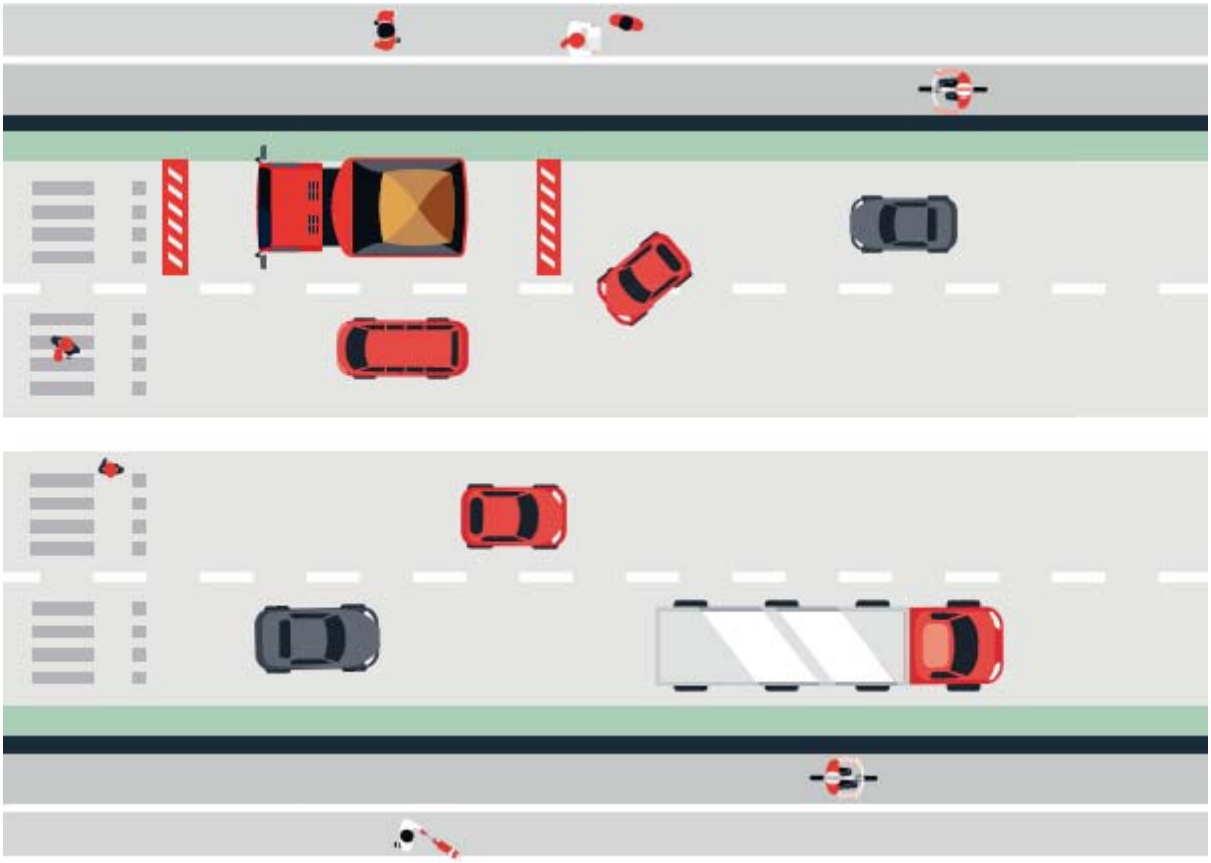
OLEXA DEVELOPMENTS
211-07590-00

PUBLIC MARKETS MRS-D

TRAFFIC IMPACT STUDY UPDATE

MAY 03, 2024

REVISION 1



PUBLIC MARKETS MRS-D

TRAFFIC IMPACT STUDY UPDATE

OLEXA DEVELOPMENTS

REVISION 1

PROJECT NO.: 211-07590-00
DATE: MAY 03, 2024

WSP
1600 BUFFALO PLACE
WINNIPEG, MB
CANADA R3T 6B8

WSP.COM

REVISION HISTORY

FIRST ISSUE				
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Prepared by	Reviewed by	Approved By		
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				
Prepared by	Reviewed by	Approved By		

SIGNATURES

PREPARED BY

May 3, 2024

Vanessa Schmidt, P.Eng.
Project Engineer

Date

APPROVED[1] BY *(must be reviewed for technical accuracy prior to approval)*

May 3, 2024

Ken Wimble, P.Eng.
Senior Project Engineer

Date

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D SYNCHRO, SIMTRAFFIC AND SIDRA REPORTS

1 INTRODUCTION

Oxela Developments retained WSP Canada Inc. (WSP) to conduct an updated Transportation Impact Study (TIS) to assess increased development density 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
Development of MRS-D Traffic Impact Study	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
Development of MRS-D Traffic Impact Study Supporting Phase 1 Development Application and Internal Road Design FINAL	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
Public Markets Development – Marion Street and Private Access Functional Plan Memo	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
Public Markets Development – Marion Street and Private Access Intersections Review Memo	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

A detailed design of the main development access intersection at Marion Street / Dupuy Avenue / Paulette Duguay Street, the Commercial Access intersection Paulette Duguay Street, and a roundabout at Paulette Duguay Street / Ibrahim Diallo Avenue was completed by WSP in 2023 (2023 Design) based on City comments following their review of the Functional Plan Memo and Intersections Review Memo. These drawings are provided in **Appendix A**.

The purpose of this TIS Update is to reassess the transportation impacts of the development based on the most current development proposal which includes 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 is reassessed to determine if it can accommodate the updated forecast development traffic.

The development is now proposed to include a total of 2,000 multi-family dwelling units, which is an increase of 800 units from the September 2020 TIS completed by Stantec and the 2022 memos completed by WSP.

As in the September 2020 TIS, 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, 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 (roundabout)
- 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 Street intersection and at Speers Road. The May 2020 TIS and September 2020 TIS 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**. This TIS will analyze the impact of adding 800 residential units to the development in Zones 2, 3, 4, 10, and 14, as illustrated in **Figure 1-2**.

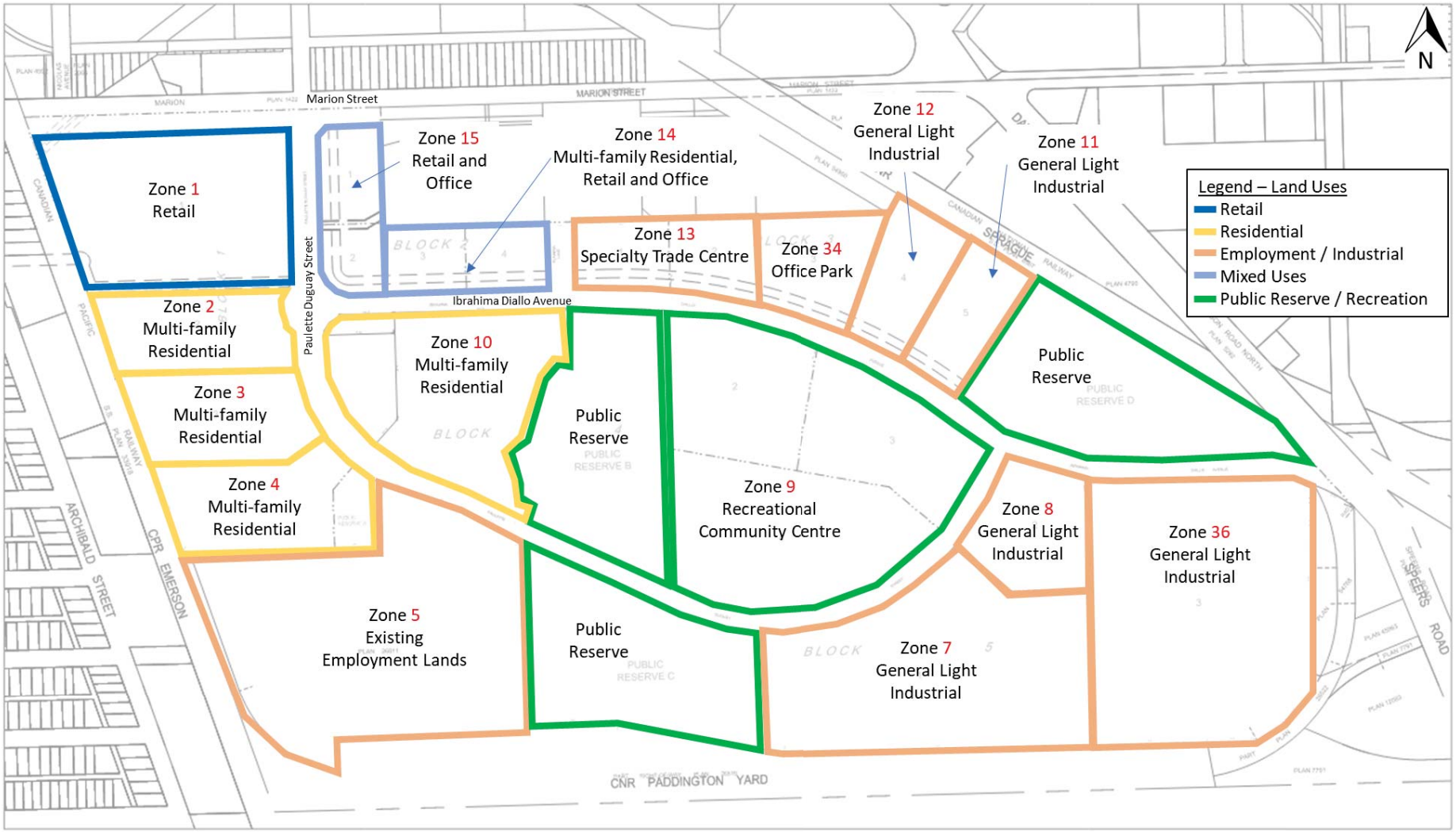


Figure 1-2: Proposed Development Traffic Zones and Land Uses

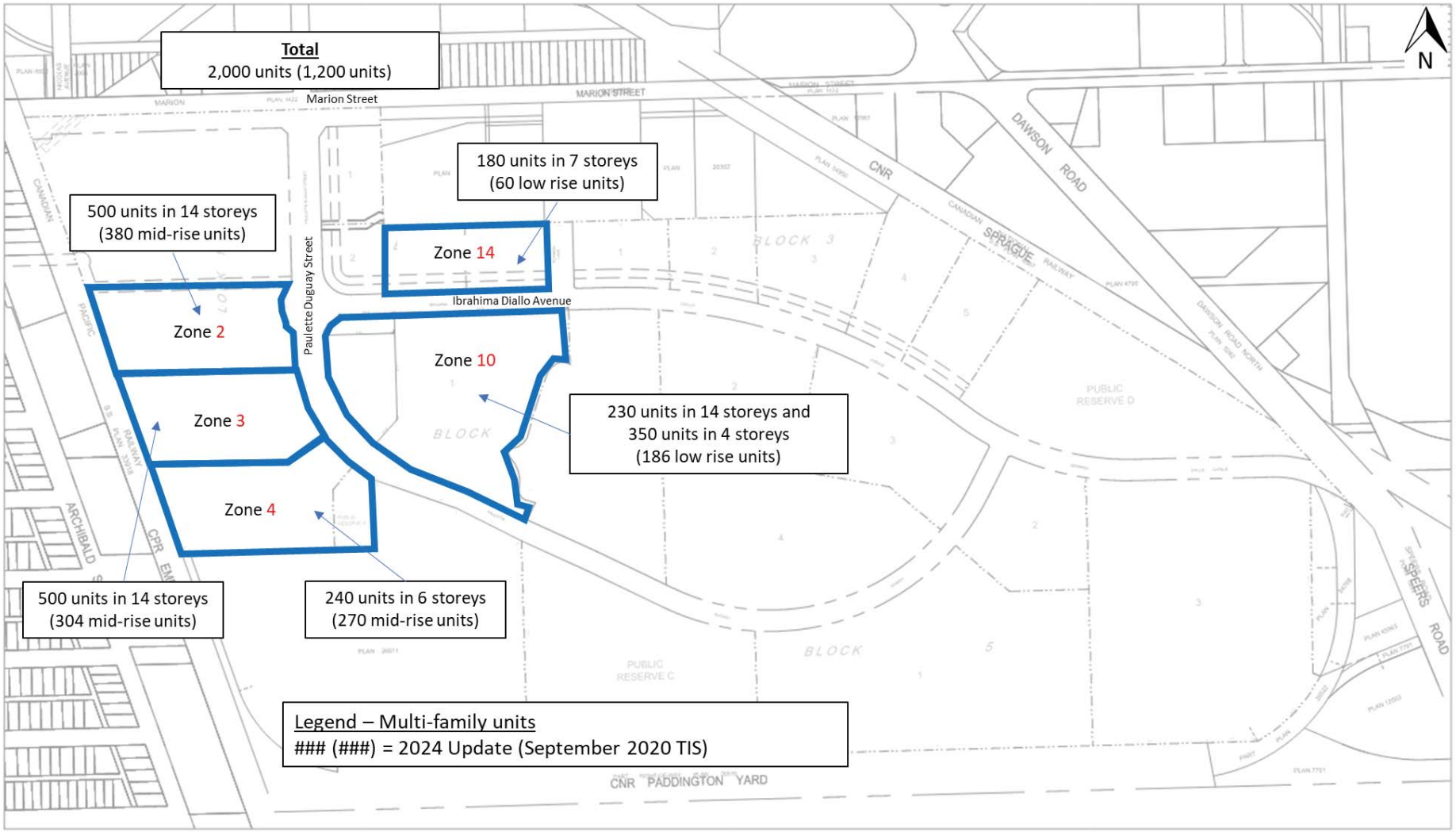


Figure 1-3: Updated Proposed Residential Units

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.

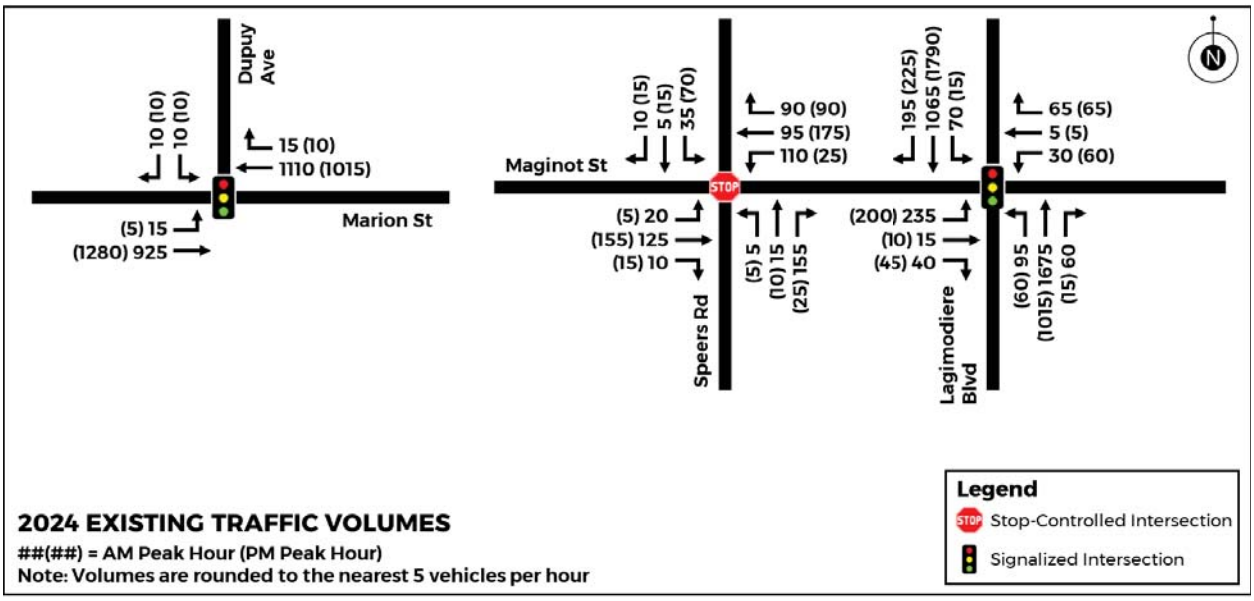


Figure 2-1: Existing 2024 Traffic Volumes

2.2 SITE GENERATED TRAFFIC

2.2.1 TRIP GENERATION

Vehicular trips generated by the proposed additional development were estimated for the weekday a.m. and p.m. peak hours and a weekday by finding the difference between the original site trips in the September 2020 TIS and the updated site trips with the additional residential units. 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.
- Site trips were assigned to the network based on zones defined in the September 2020 TIS (only 2, 3, 4, 10, and 14 were affected).
- The *ITE Trip Generation Manual, 10th Edition* (same manual used in the September 2020 TIS) was reviewed to obtain trip generation rates for the multi-family mid-rise land use. Although some of the proposed residential buildings could be considered as high-rise (14 storeys), almost all the studies for this land use were for dense multi-use urban settings and were not considered suitable for the proposed development. There was one multi-family high-rise study in the ITE manual with a general urban/suburban setting that would be applicable, and the rates were similar to the multi-family mid-rise rates. Therefore, the multi-family mid-rise trip generation rates were used to calculate the multi-family high-rise trips. The ITE trip generation rates for the multi-family mid-rise land use are summarized in **Table 2-1**.
- The mode share split in the September 2020 TIS was assumed to be 20%, and this was also applied to the new calculated trips for this report.
- A reduction for internal residential trips was not applied as this was assumed to be covered in the 20% mode share split (i.e. most internal trips are non-auto).
- Zone 10 was split into two sub-zones (10A and 10B), as there are two land parcels in Zone 10 that would have different road network accesses and trip distribution.

Following these assumptions, the new site trips for each zone were calculated for the additional multi-family units. The difference in trips from the previous TIS and the updated TIS for the a.m. peak period, p.m. peak period, and weekday periods for Phase 1 and Phase 2 are summarized in **Table 2-2** and **Table 2-3**, respectively. **Table 2-4** summarizes the resulting total new trips for the development.

In the 2029 Phase 1 scenario, the additional residential units are forecast to generate 82 more auto trips (24 entering and 58 exiting) during the weekday a.m. peak hour, 103 more auto trips (62 entering and 41 exiting) during the weekday p.m. peak hour, and 1,322 more auto trips (661 entering and 661 exiting) daily.

In the 2034 Phase 2 scenario, the additional residential units are forecast to generate 232 more auto trips (63 entering and 169 exiting) during the weekday a.m. peak hour, 301 more auto trips (181 entering and 120 exiting) during the weekday p.m. peak hour, and 3,944 more auto trips (1972 entering and 1972 exiting) daily.

Table 2-1: ITE Trip Generation Rates for Multi-family Mid-Rise Land Use (also applies for high-rise units)

PERIOD	ITE RATE	NON-AUTO MODE REDUCTION	INBOUND	OUTBOUND
AM PEAK	0.32	20%	27%	73%
PM PEAK	0.41	20%	60%	40%
DAILY	5.44	20%	50%	50%

Table 2-2: Phase 1 Site Trip Generation – Auto Trips by Residential Land Uses

ZONE	MULTI-FAMILY RESIDENTIAL	SEPTEMBER 2020 TIS				2024 UPDATE				DIFFERENCE			
		UNITS	TRIPS			UNITS	TRIPS			UNITS	TRIPS		
			IN	OUT	TOTAL		IN	OUT	TOTAL		IN	OUT	TOTAL
AM PEAK PERIOD													
2	Mid Rise	380	21	57	78	250	18	47	65	-130	-3	-10	-13
3	Mid Rise	120	7	18	25	250	18	47	65	130	11	29	40
4	Mid Rise	270	15	40	55	120	9	23	32	-150	-6	-17	-23
10	Low Rise	0	0	0	0	0	0	0	0	0	0	0	0
	Mid Rise	0	0	0	0	290	21	55	76	290	21	55	76
14	Low Rise	60	6	16	22	0	0	0	0	-60	-6	-16	-22
	Mid Rise	0	0	0	0	90	7	17	24	90	7	17	24
Total		**830**	**49**	**131**	**180**	**1000**	**73**	**189**	**262**	**170**	**24**	**58**	**82**
PM PEAK PERIOD													
2	Mid Rise	380	60	40	100	250	50	33	83	-130	-10	-7	-17
3	Mid Rise	120	19	13	32	250	50	33	83	130	31	20	51
4	Mid Rise	270	43	28	71	120	24	16	40	-150	-19	-12	-31
10	Low Rise	0	0	0	0	0	0	0	0	0	0	0	0
	Mid Rise	0	0	0	0	290	58	39	97	290	58	39	97
14	Low Rise	60	16	11	27	0	0	0	0	-60	-16	-11	-27
	Mid Rise	0	0	0	0	90	18	12	30	90	18	12	30
Total		**830**	**138**	**92**	**230**	**1000**	**200**	**133**	**333**	**170**	**62**	**41**	**103**
DAILY													
2	Mid Rise	380	662	662	1324	250	544	544	1088	-130	-118	-118	-236
3	Mid Rise	120	209	209	418	250	544	544	1088	130	335	335	670
4	Mid Rise	270	470	470	940	120	262	262	524	-150	-208	-208	-416
10	Low Rise	0	0	0	0	0	0	0	0	0	0	0	0
	Mid Rise	0	0	0	0	290	632	632	1264	290	632	632	1264
14	Low Rise	60	176	176	352	0	0	0	0	-60	-176	-176	-352
	Mid Rise	0	0	0	0	90	196	196	392	90	196	196	392
Total		**830**	**1517**	**1517**	**3034**	**1000**	**2178**	**2178**	**4356**	**170**	**661**	**661**	**1322**

Table 2-3: Phase 2 / Full Development Site Trip Generation – Auto Trips by Residential Land Uses

ZONE	MULTI-FAMILY RESIDENTIAL	SEPTEMBER 2020 TIS				2024 UPDATE				DIFFERENCE			
		UNITS	TRIPS			UNITS	TRIPS			UNITS	TRIPS		
			IN	OUT	TOTAL		IN	OUT	TOTAL		IN	OUT	TOTAL
AM PEAK PERIOD													
2	Mid Rise	380	21	57	78	500	35	94	129	120	14	37	51
3	Mid Rise	304	17	45	62	500	35	94	129	196	18	49	67
4	Mid Rise	270	15	40	55	240	17	45	62	-30	2	5	7
10	Low Rise	186	19	49	68	0	0	0	0	-186	-19	-49	-68
	Mid Rise	0	0	0	0	580	41	109	150	580	41	109	150
14	Low Rise	60	6	16	22	0	0	0	0	-60	-6	-16	-22
	Mid Rise	0	0	0	0	180	13	34	47	180	13	34	47
Total		**1200**	**78**	**207**	**285**	**2000**	**141**	**376**	**517**	**800**	**63**	**169**	**232**
PM PEAK PERIOD													
2	Mid Rise	380	60	40	100	500	99	66	165	120	39	26	65
3	Mid Rise	304	48	32	80	500	99	66	165	196	51	34	85
4	Mid Rise	270	43	28	71	240	48	32	80	-30	5	4	9
10	Low Rise	186	49	34	83	0	0	0	0	-186	-49	-34	-83
	Mid Rise	0	0	0	0	580	115	77	192	580	115	77	192
14	Low Rise	60	16	11	27	0	0	0	0	-60	-16	-11	-27
	Mid Rise	0	0	0	0	180	36	24	60	180	36	24	60
Total		**1200**	**216**	**145**	**361**	**2000**	**397**	**265**	**662**	**800**	**181**	**120**	**301**
DAILY													
2	Mid Rise	380	662	662	1324	500	1088	1088	2176	120	426	426	852
3	Mid Rise	304	529	529	1058	500	1088	1088	2176	196	559	559	1118
4	Mid Rise	270	470	470	940	240	523	523	1046	-30	53	53	106
10	Low Rise	186	545	545	1090	0	0	0	0	-186	-545	-545	-1090
	Mid Rise	0	0	0	0	580	1263	1263	2526	580	1263	1263	2526
14	Low Rise	60	176	176	352	0	0	0	0	-60	-176	-176	-352
	Mid Rise	0	0	0	0	180	392	392	784	180	392	392	784
Total		**1200**	**2382**	**2382**	**4764**	**2000**	**4354**	**4354**	**8708**	**800**	**1972**	**1972**	**3944**

Table 2-4: Total Site Trip Generation

LAND USE	PHASE 1 TRIPS			PHASE 2 / FULL DEVELOPMENT TRIPS		
	IN	OUT	TOTAL	IN	OUT	TOTAL
AM PEAK PERIOD						
Residential[1]	73	189	262	141	376	517
Commercial[2]	105	81	186	118	89	207
Recreational[2]	0	0	0	220	114	334
Industrial / Office Park[2]	516	86	602	571	94	665
Total	694	356	1,050	1,050	673	1,723
PM PEAK PERIOD						
Residential[1]	200	133	333	397	265	662
Commercial[2]	208	218	426	231	243	474
Recreational[2]	0	0	0	206	232	438
Industrial / Office Park[2]	85	456	541	92	505	597
Total	493	807	1,300	926	1,245	2,171
DAILY						
Residential[1]	2,178	2,178	4,356	4,354	4,354	8,708
Commercial[2]	3,122	3,122	6,244	3,356	3,356	6,712
Recreational[2]	0	0	0	2,733	2,733	5,466
Industrial / Office Park[2]	2,200	2,200	4,400	2,423	2,423	4,846
Total	7,500	7,500	15,000	12,866	12,866	25,732

1 – Calculated in this TIS Update
2 – Calculated in September 2020 TIS

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 2-5**.

Table 2-5: 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 and Phase 2 total new development trips to the study area road network. This includes new development trips determined in the September 2020 TIS plus the additional new residential development trips calculated for this TIS Update.

The total new trips were assigned to the road network to determine total traffic projections for the combined post-development scenarios. **Figure 2-4** and **Figure 2-5** 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 2-6**.

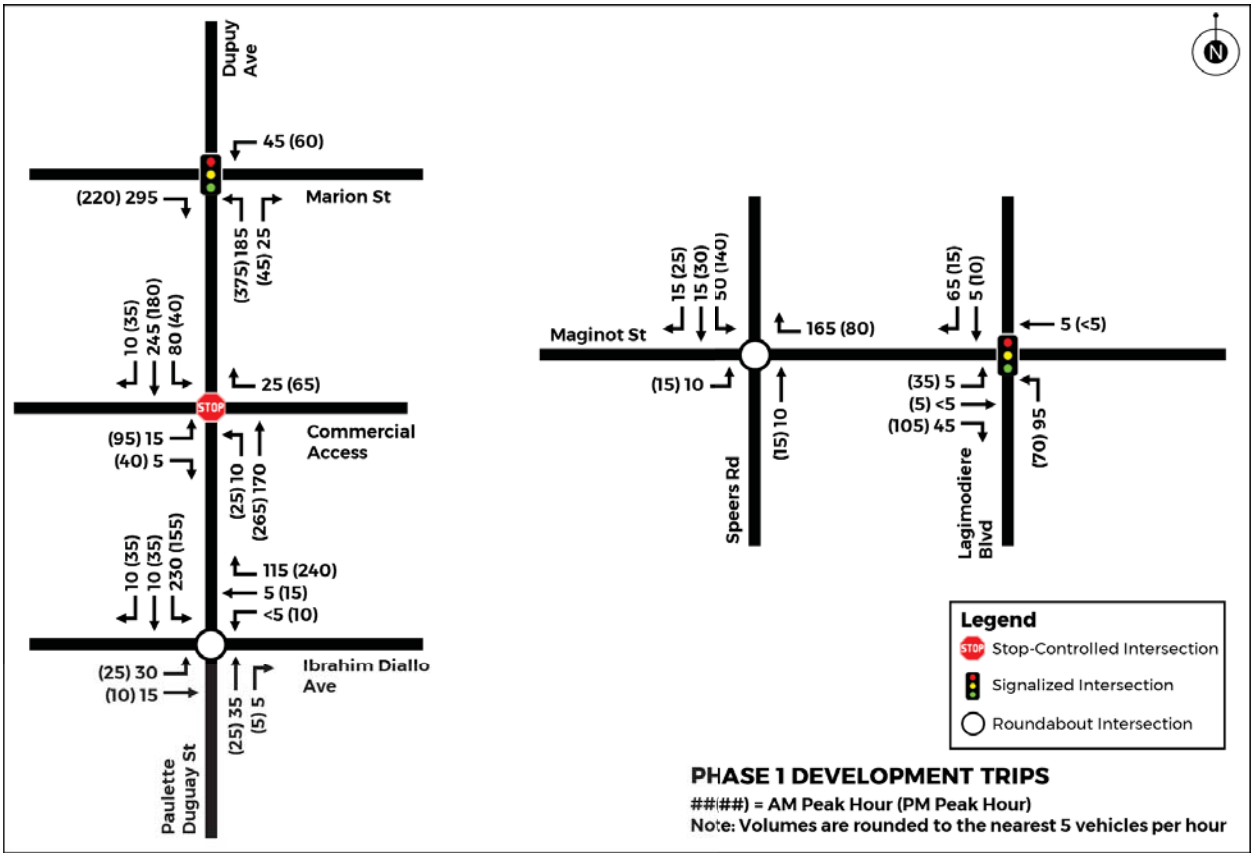


Figure 2-2: Phase 1 Development Trips

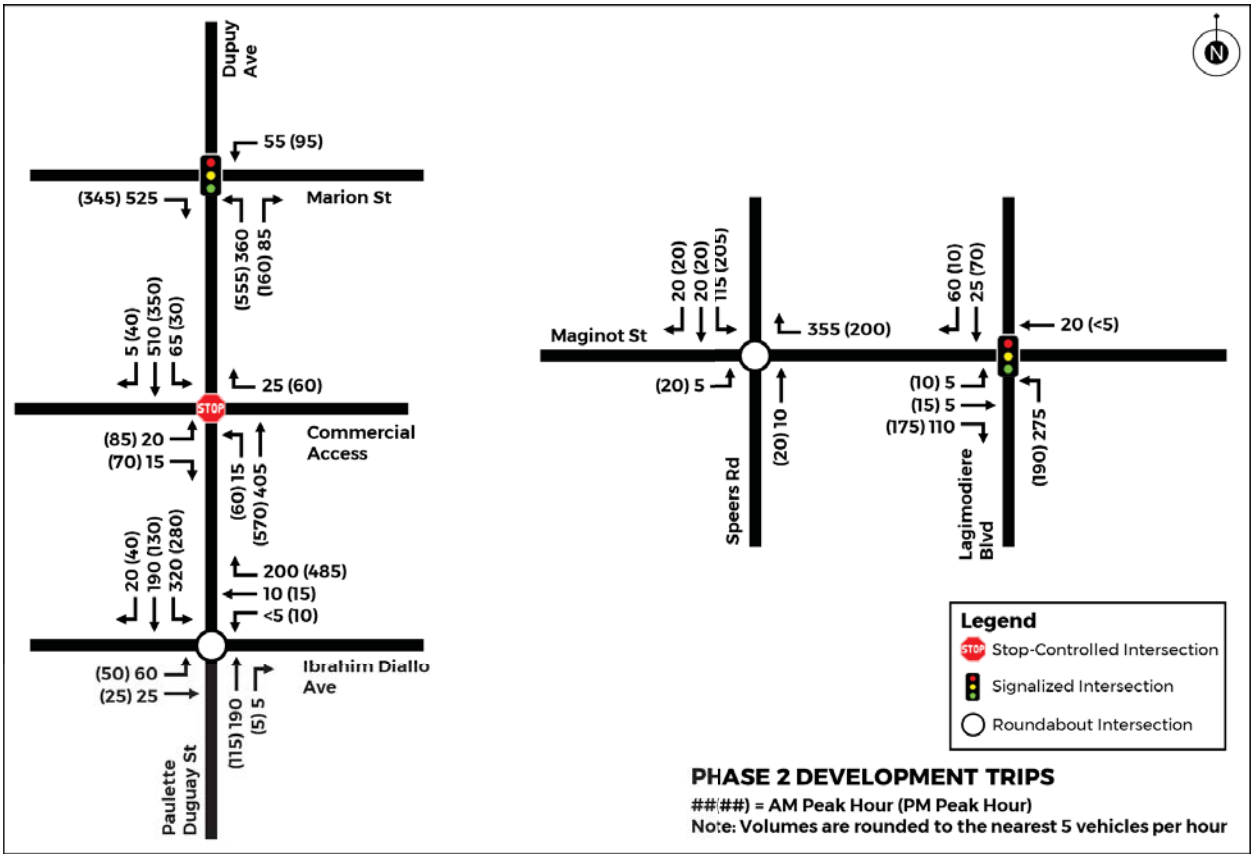


Figure 2-3: Phase 2 / Full Build-out Development Trips

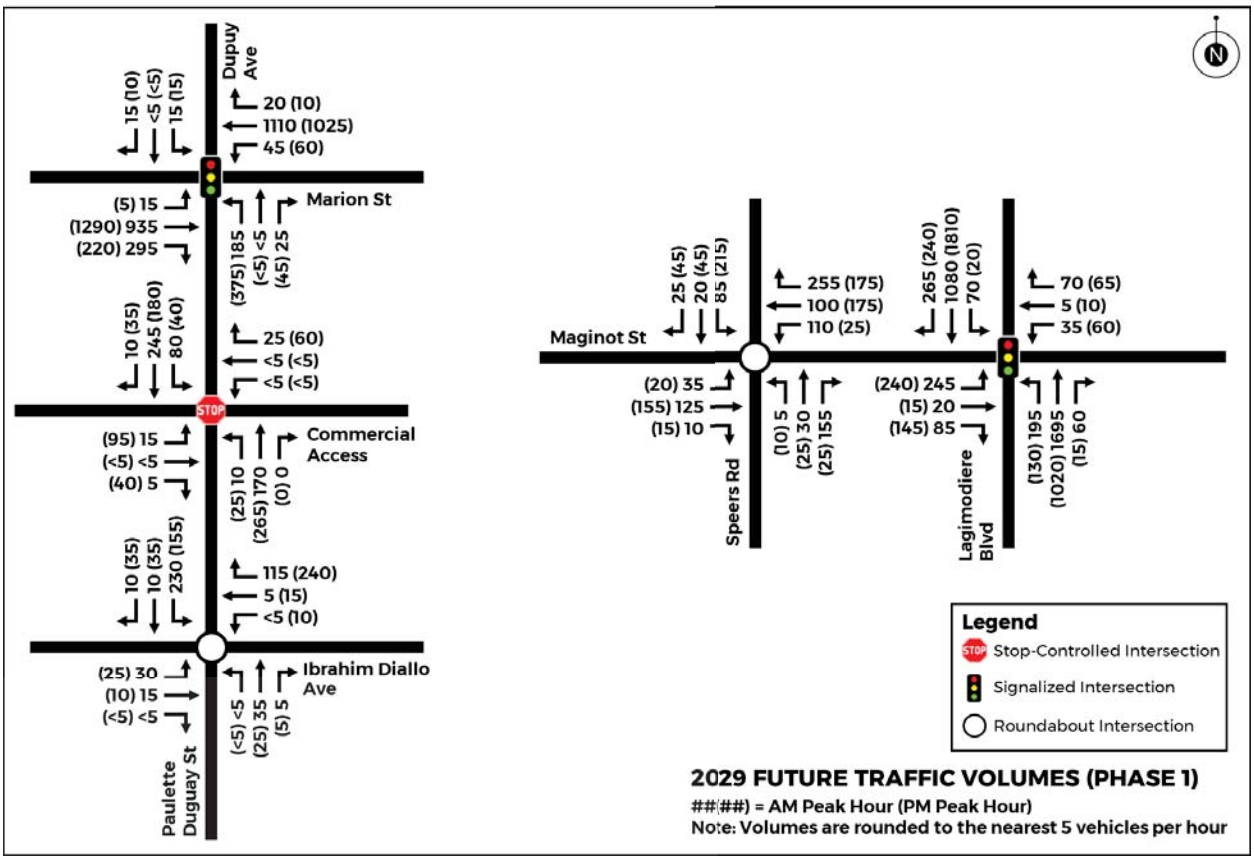


Figure 2-4: 2029 Post-Development Peak Hour Traffic Volumes (Phase 1)

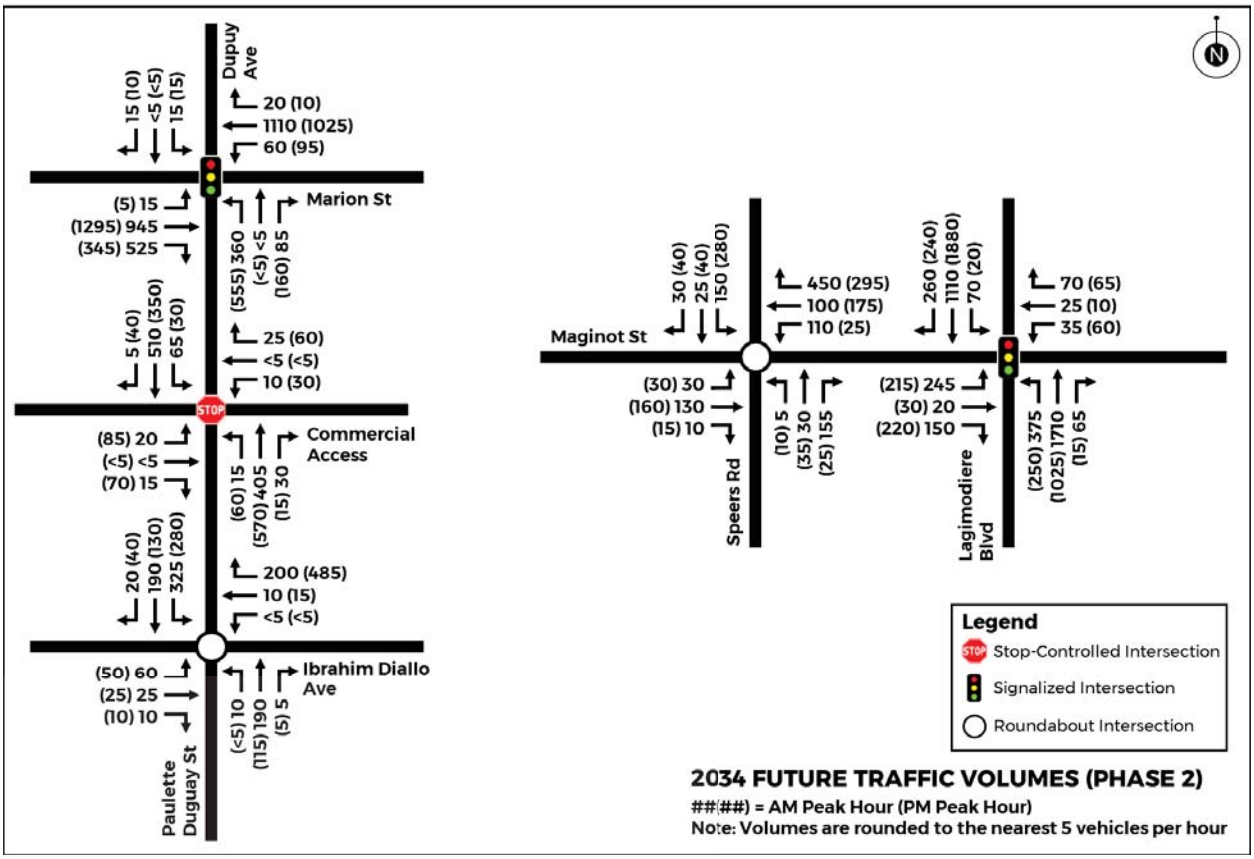


Figure 2-5: 2034 Post-Development Peak Hour Traffic Volumes (Phase 2 / Full Build-out)

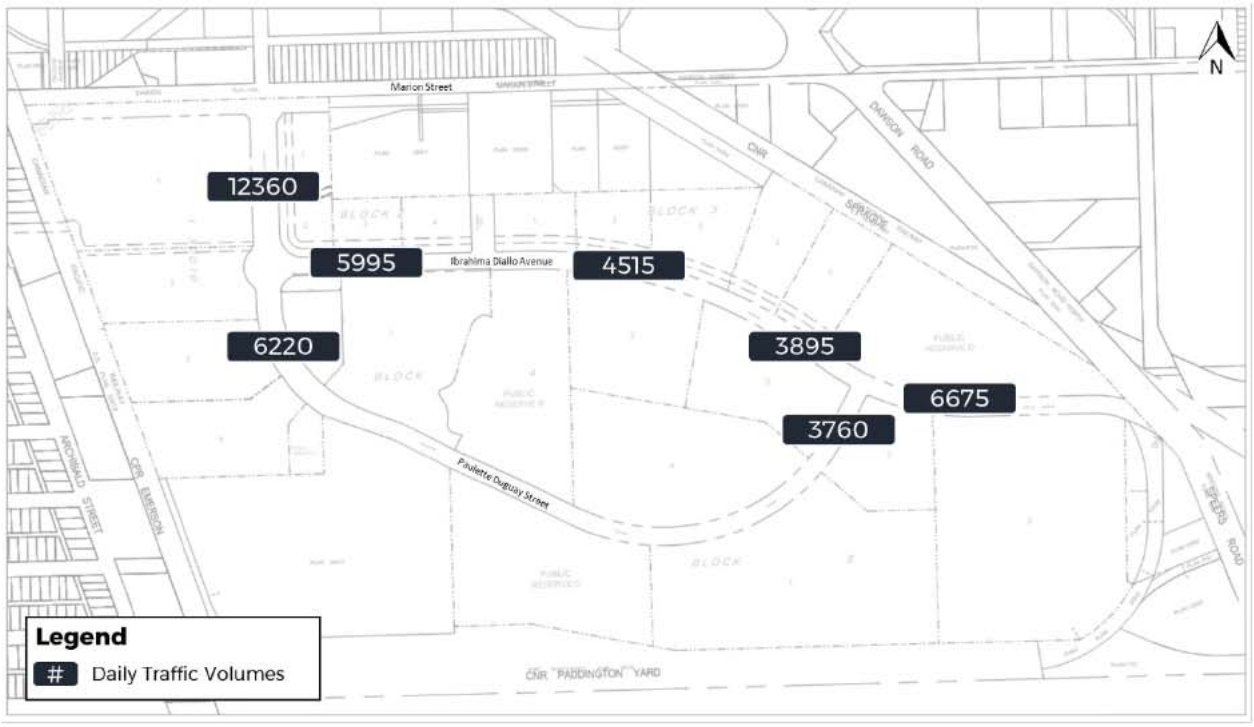


Figure 2-6: 2034 Post-Development Traffic Volumes (Phase 2 / Full Build-out)

3 TRAFFIC ANALYSIS

3.1 SIGNAL WARRANT ANALYSIS

A traffic signal warrant analysis was carried out for the Paulette Duguay Street / Commercial Access intersection 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. 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. Based on the September 2020 TIS, 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 *Traffic Signal & Pedestrian Signal Head Warrant Analysis* is based on 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).

The signal warrant analysis with forecast 2034 traffic volumes at the Paulette Duguay Street and Commercial Access intersection resulted in a total of 72 warrant points (55 vehicle warrant points and 17 pedestrian warrant points), and signals are therefore not warranted by full build-out.

The *Traffic Signal & Pedestrian Signal Head Warrant Analysis* worksheet for this intersection is included in **Appendix C.**

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 movement is operating above capacity. A v/c ratio of 0.85 is considered the maximum acceptable level for through and shared through / turning lanes, and a v/c ratio of 0.90 is considered the maximum acceptable level for turning lanes, as defined by the City of Winnipeg Public Works Department.

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 2022 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. The following intersection lane configuration was included in the analysis:

- 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 Street consists of a shared left-turn / through / right-turn lane;
- The eastbound approach on Marion Street consists of a left-turn lane, a through lane, and a shared through / 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.

Table 3-1 summarizes the results of the signalized intersection Synchro analysis for the Marion Street / Dupuy Street / Paulette Duguay Street intersection.

Table 3-1: Marion Street / Dupuy Street / 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 (20 sec)	B (57%)	0.67 (EBT/R)	NBL	D (47 sec)	0.50
2034 Forecast Traffic Volumes	C (30 sec)	D (76%)	**0.91 (EBT/R)**	NBL	E (56 sec)	0.77
WEEKDAY P.M. PEAK HOUR						
2029 Forecast Traffic Volumes	C (28 sec)	D (76%)	**0.91 (EBT)**	NBL	D (54 sec)	0.74
2034 Forecast Traffic Volumes	**E (68 sec)**	**F (92%)**	**1.14 (EBT)**	**EBT**	**F (100 sec)**	**1.14**

The analysis indicates that the 2034 p.m. peak hour scenario features an overall intersection LOS E, a critical eastbound through movement with LOS F and a maximum v/c ratio greater than 1.0. All other scenarios feature an acceptable LOS C or better for the overall intersection with critical movements at LOS D to E and with v/c ratios below 0.85. It should be noted that the model does not include the adjacent intersection of Marion Street at Archibald Street, as the intersection is not required for analysis and traffic data was therefore not collected.

MITIGATION ANALYSIS

As the intersection of Marion Street and Paulette Duguay Street / Dupuy Avenue features high delays and long queues, an additional mitigation analysis was completed to determine if reasonable mitigation measures could provide acceptable operational results. Additionally, the intersection of Marion Street / Archibald Street was added to the model to ensure the effects of metering and coordination are taken into account at the Marion Street / Dupuy Avenue / Paulette Duguay Street intersection. The Marion Street / Archibald Street traffic volumes from the September 2020 TIS (2019 traffic count) were used and eastbound and westbound volumes were balanced with the Marion Street / Dupuy Avenue / Paulette Duguay Street intersection volumes. The existing signal timing plan at Marion Street / Archibald Street was obtained from the City and entered into the model; however, when tested in SimTraffic westbound traffic queued beyond Dupuy Avenue / Paulette Duguay Street, therefore, splits and offsets were optimized.

WSP met with the City on April 25, 2024 to discuss potential mitigation options for this intersection. The City confirmed that the following mitigation measures should be investigated:

- Add an eastbound right-turn lane with length determined by deceleration requirements. According to the TAC *Geometric Design Guide for Canadian Roads* of deceleration is required, therefore a 45m long lane with 45m taper was provided.
- Remove the west crosswalk and pedestrian phase; and
- Remove the northbound right-turn smart channel. This facilitates provision of a far-side eastbound Marion Street bus stop and a near-side northbound Paulette Duguay Street bus stop in the southeast intersection quadrant. This is required to accommodate the addition of the eastbound right-turn lane and removal of the west crosswalk. Further details on proposed bus stop locations are provided in Section 4.

Figure 3-1 illustrates the updated intersection configuration with mitigation.



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

Table 3-2 provides the 2034 a.m. and p.m. peak hour analysis results with mitigation measures. The results indicate that the overall intersection operates at a LOS B to LOS C, the ICU LOS operates at LOS C to D, the maximum v/c ratio (northbound left) is 0.78 to 0.87, and the critical movement (northbound left) operates at LOS E with a delay of 62 seconds in both peak hours. The results indicate that the intersection is operating well with additional capacity with the forecast 2034 a.m. and p.m. peak hour traffic volumes with mitigation measures.

Table 3-2: Marion Street & Dupuy Street / Paulette Duguay Street Synchro Analysis Results – AM and PM Peak Hour with Mitigation Measures

SCENARIO	INTERSECTION			CRITICAL MOVEMENT		
	LOS (DELAY)	ICU LOS (%)	MAX V/C	MOVEMENT	LOS (DELAY)	V/C
WEEKDAY A.M. PEAK HOUR						
2034 Forecast Traffic Volumes – with mitigation	B (13 sec)	C (68%)	0.78 (NBL)	NBL	E (62 sec)	0.78
WEEKDAY P.M. PEAK HOUR						
2034 Forecast Traffic Volumes – with mitigation	C (22 sec)	D (81%)	0.87 (NBL)	NBL	E (62 sec)	0.87

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. Therefore, 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 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.

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

Table 3-3: Paulette Duguay Street / Commercial Access Synchro Analysis Results

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)	0.06 (SBL)	EBL/T	B (15 sec)	0.05
2034 Forecast Traffic Volumes	A (2 sec)	0.10 (EBL/T)	WBL/T	D (33 sec)	0.09
WEEKDAY P.M. PEAK HOUR					
2029 Forecast Traffic Volumes	A (4 sec)	0.24 (EBL/T)	EBL/T	C (16 sec)	0.24
2034 Forecast Traffic Volumes	A (5 sec)	0.47 (EBL/T)	WBL/T	**F (51 sec)**	0.28

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 less than one minute of delay and a v/c ratio of just 0.28, 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 LAGIMODIERE BOULEVARD / MAGINOT STREET

Lagimodiere Boulevard / Maginot Street is currently a signalized four-legged intersection that consists of the following geometry:

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

Table 3-4 summarizes the results of the signalized intersection Synchro analysis for the Lagimodiere Boulevard / Maginot Street intersection. As a second northbound left-turn lane was analyzed in the September 2020 TIS, the analysis was completed with both one and two northbound left-turn lanes.

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 Forecast Traffic Volumes	C (29 sec)	D (80%)	0.80 (NBT)	**SBL**	**F (81 sec)**	0.59
2034 Forecast Traffic Volumes (1 northbound left lane)	D (36 sec)	E (83%)	0.88 (NBL)	**SBL**	**F (93 sec)**	0.69
2034 Forecast Traffic Volumes (2 northbound left lanes)	C (32 sec)	E (83%)	0.82 (NBT)	**SBL**	**F (89 sec)**	0.66
WEEKDAY P.M. PEAK HOUR						
2029 Forecast Traffic Volumes	C (28 sec)	E (89%)	**0.87 (SBT)**	**NBL**	**F (95 sec)**	0.80
2034 Forecast Traffic Volumes (1 northbound left lane)	D (40 sec)	**F (99%)**	**1.07 (NBL)**	**NBL**	**F (133 sec)**	**1.07**
2034 Forecast Traffic Volumes (2 northbound left lanes)	C (33 sec)	**F (92%)**	**0.93 (SBT)**	**NBL**	**F (91 sec)**	0.87

The analysis indicates that the 2034 p.m. peak hour scenario with a single northbound left-turn lane features a critical northbound left-turn movement with LOS F and a v/c ratio greater than 1.0. The critical movement delay decreases by 34 seconds and the v/c ratio falls to 0.91 when a second northbound left-turn lane is added. During the a.m. peak hour, the intersection operates acceptably with the critical movement operating at LOS F due to the short phase in a long cycle length, and not due to a lack of capacity.

Based on these results the recommendation from the previous reports is unchanged; a second northbound left-turn lane is recommended to be constructed sometime between partial build-out (50%) and full build-out.

The City has informed WSP that a cantilever lane designation overhead sign structure will be required for the dual northbound left-turn lane due to the forecast traffic volumes, vehicle speeds and general intersection characteristics. Additionally, it is noted that substantial modifications to intersection geometry may be required to ensure all truck movements are accommodated after adding the second northbound left-turn lane. These are future considerations to be confirmed during detailed design.

3.2.4 PAULETTE DUGUAY STREET / IBRAHIMA DIALLO AVENUE

A new collector roundabout is proposed at the Paulette Duguay Street / Ibrahima Diallo Avenue intersection within the development site. Each entering roundabout approach consists of a shared left-turn / through / right-turn lane.

Table 3-5 summarizes the results of the roundabout intersection SIDRA analysis for the Paulette Duguay Street / Ibrahima Diallo Avenue intersection.

Table 3-5: Paulette Duguay Street / Ibrahima Diallo Avenue 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)	0.17 (SB)	SB	A (6 sec)
2034 Future Traffic Volumes	A (5 sec)	0.36 (SB)	EB	A (9 sec)
WEEKDAY P.M. PEAK HOUR				
2029 Future Traffic Volumes	A (4 sec)	0.20 (WB)	EB	A (7 sec)
2034 Future Traffic Volumes	A (5 sec)	0.44 (WB)	EB	A (8 sec)

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

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

Table 3-6 summarizes the results of the roundabout intersection SIDRA analysis for the Maginot Street / Speers Road intersection.

Table 3-6: 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 (4 sec)	0.19 (NB)	SB	A (7 sec)
2034 Future Traffic Volumes	A (5 sec)	0.35 (SB)	SB	A (8 sec)
WEEKDAY P.M. PEAK HOUR				
2029 Future Traffic Volumes	A (5 sec)	0.30 (SB)	SB	A (8 sec)
2034 Future Traffic Volumes	A (4 sec)	0.25 (WB)	SB	A (8 sec)

The results in **Table 3-6** 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 analysis 95th percentile queues on each approach at each intersection are provided in **Table 3-7** where queues are considered critical as they may impact adjacent intersections, exceed storage lane lengths, or in the case of eastbound Marion Street, may queue over the rail line. Queues for movements that are not considered critical are not reported. The greater queue between the a.m. and p.m. peak hours is reported. SimTraffic does not refer to the Lane Utilization Factor, Left Turn Factor, and Lost Time Adjustment, so the adjustments analyzed at the Marion Street and Dupuy Street / Paulette Duguay Street intersection cannot be seen in SimTraffic simulations, and only queues from the unadjusted scenario are provided.

Table 3-7: 2034 Analysis 95th Percentile Queue Lengths

INTERSECTION	CRITICAL 95th PERCENTILE QUEUE (M)			
	NB	SB	EB	WB
Marion St. / Dupuy Ave. / Paulette Duguay St. with Mitigation Measures	NBL/T/R: 85m (Storage[1]: 105m)	SBL/T/R: 27m	EBL: 16m (Storage[3]: 25m) EBT: 97m (Storage[2]: 290m) **EBR: 47m (Storage[3]: 45m)**	**WBL: 47m (Storage[3]: 40m)**
Paulette Duguay St. / Commercial Access	NBL/T: 14m (Storage[1]: 50m)	SBL: 11m (Storage[3]: 15m)	EBL/T: 27m EBR: 17m	WBL/T: 18m WBR: 18m
Lagimodiere Blvd. / Maginot St. with 2 NBL Lanes	**NBL Lane 1: 94m NBL Lane 2: 120m (Storage[3]: 100m)**	SBL: 43m (Storage[3]: 80m)	EBL: 57m (Storage[3]: 60m)	WBL: 34m
Paulette Duguay St / Ibrahima Diallo Ave (Roundabout)	10m (Storage[1]): 210m	19m	5m (Storage[1]): 495m	24m (Storage[1]): 135m
Maginot St / Speers Rd (Roundabout)	9m	18m (Storage[1]): 200m	11m	7m

1 – Distance to adjacent intersec ion
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 3-7** indicate that:

- The eastbound right-turn queue at Marion Street and Dupuy Avenue / Paulette Duguay Street is forecast to exceed the proposed storage during the 2034 weekday p.m. peak period. Additional storage lane length is not recommended as the storage is only exceeded by 2m which can be accommodated in the turn lane taper.
- SimTraffic reported a westbound left-turn queue at Marion Street and Dupuy Avenue / Paulette Duguay Street (as an average of five one-hour simulations) of 47m, which exceeds the available storage lane length by 7m. The five one-hour simulations were reviewed and the westbound left-turn queue never spilled beyond the storage lane length. In one of the five simulations, the westbound queue on Marion Street at Archibald Street extended just beyond Paulette Duguay Street / Dupuy Avenue, and westbound left-turning traffic was caught in the westbound queue. The 95th percentile queue only

exceeds storage by 7m which is approximately the length of one vehicle plus spacing, which can be accommodated in the queue storage. Additional storage lane length is not recommended.

- The northbound left-turn lane queue at Maginot Street and Lagimodiere Boulevard is forecast to exceed the available storage during the 2034 weekday a.m. peak period. It is recommended that the turning lane length be extended to 120m when the dual left-turn lane is constructed.

4 TRANSIT REVIEW

The September 2020 TIS and this TIS update both assume a non-private vehicle driver mode share of 20% for the Public Markets MRS-D development 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 is in the final stages of designing a new bus network for the City of Winnipeg[2] 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. Although the planned network is not yet finalized, only minor tweaks are anticipated prior to the initiation of the new network. 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.

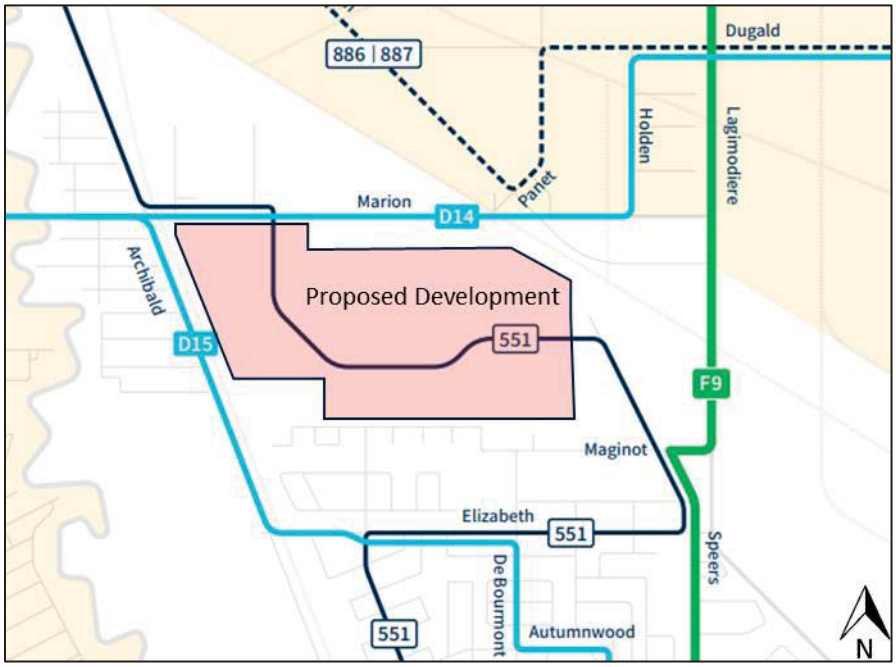
Additionally, Direct Lines D14 and D15 will run alongside the edge of the Public Markets site on Archibald and Marion Streets. A direct bus line is defined as having headways of 10 to 20 minutes on weekdays and stops every 200 to 500 metres. Both D14 and D15 run roughly east-west through the city and 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 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 preliminary discussions with the City's Public Works and Transit departments held on April 25, 2024. This updated layout accommodates the proposed geometric modifications to the 2023 intersection design, which were required to accommodate the forecast traffic volumes. The bus stop layout plan is preliminary and subject to further review by the City.

[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 ROUNDABOUT CROSSING TREATMENTS

Future pedestrian crossings at the proposed roundabouts of Paulette Duguay Street / Ibrahima Diallo Avenue and Maginot Street / Speers Road were reviewed to determine recommended crossing treatments based on Table 1 of the TAC *Pedestrian Crossing Control Guide, Third Edition*. **Table 5-1** summarizes the results of this analysis. The only roundabout location that warrants an RRFB is the east approach of the Maginot Street / Speers Road roundabout, all other locations warrant a crosswalk with side mounted signs.

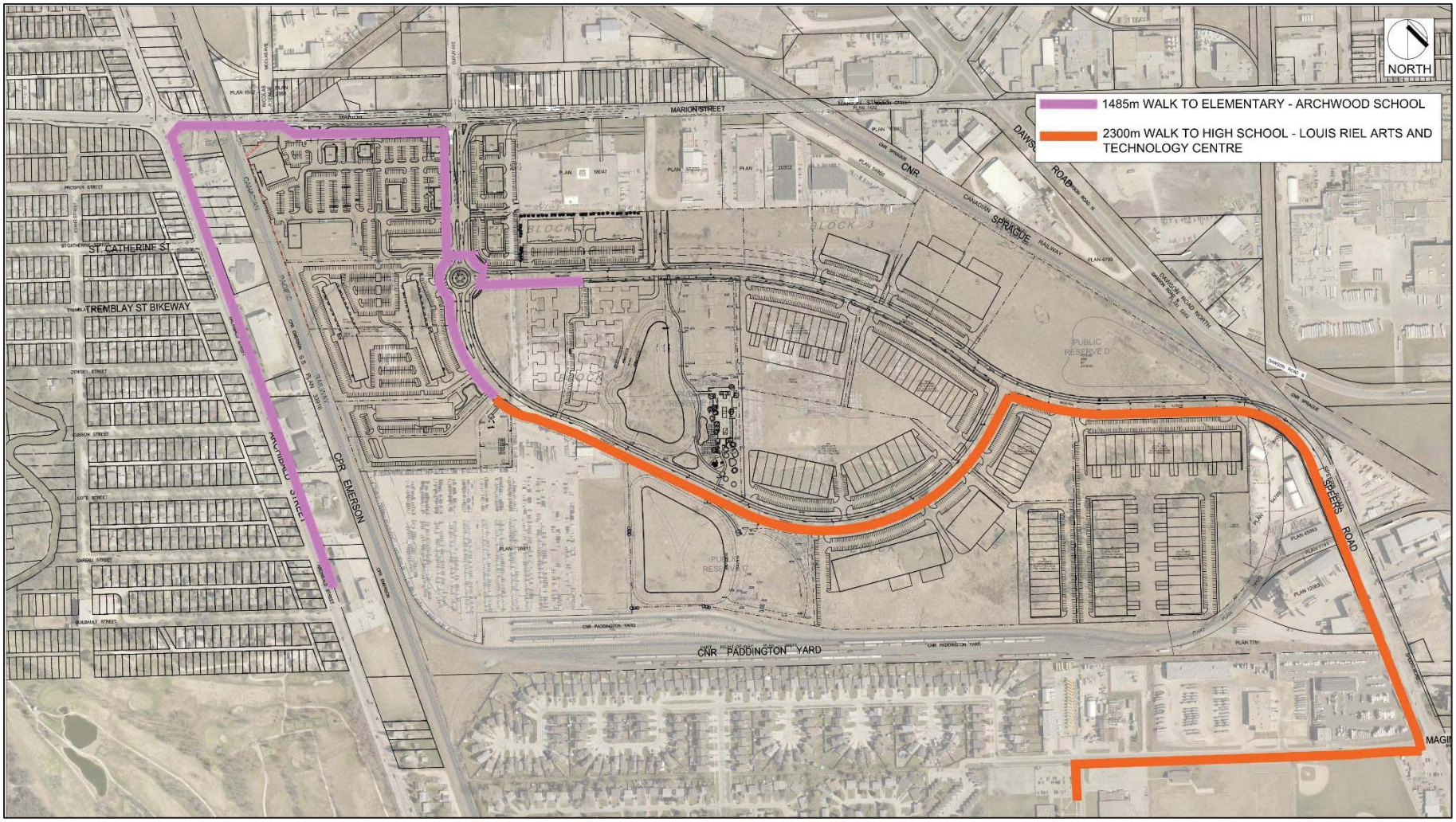
Table 5-1: Roundabout Crossing Treatments

LOCATION	2034 AADT	SPEED LIMIT (KM/H)	NUMBER OF LANES	CROSSING TREATMENT[1]
Paulette Duguay Street / Ibrahima Diallo Avenue				
North Approach	10,500	50	2	GM
East Approach	6,000	50	2	GM
South Approach	6,200	50	2	GM
West Approach	1,400	50	2	GM
Maginot Street / Speers Road				
North Approach	7,200	50	3	GM
East Approach	10,300	50	3	RRFB
South Approach	2,500	50	2	GM
West Approach	3,700	50	2	GM

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

5.2 SCHOOL TRAVEL PLANNING

Figure 5-1 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.



Source: McGowan Russell

Figure 5-1: School Travel Plan

6 TRUCK ACCESS REVIEW

The proposed development is mixed-use and includes residential, recreational, commercial and employments lands. It is anticipated that the employments land 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, Bishop Grandin Boulevard 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 2022/2023 detailed design of the Marion Street / Dupuy Avenue / Paulette Duguay Street intersection, and Paulette Duguay Street / Ibrahima Diallo Avenue roundabout (**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.

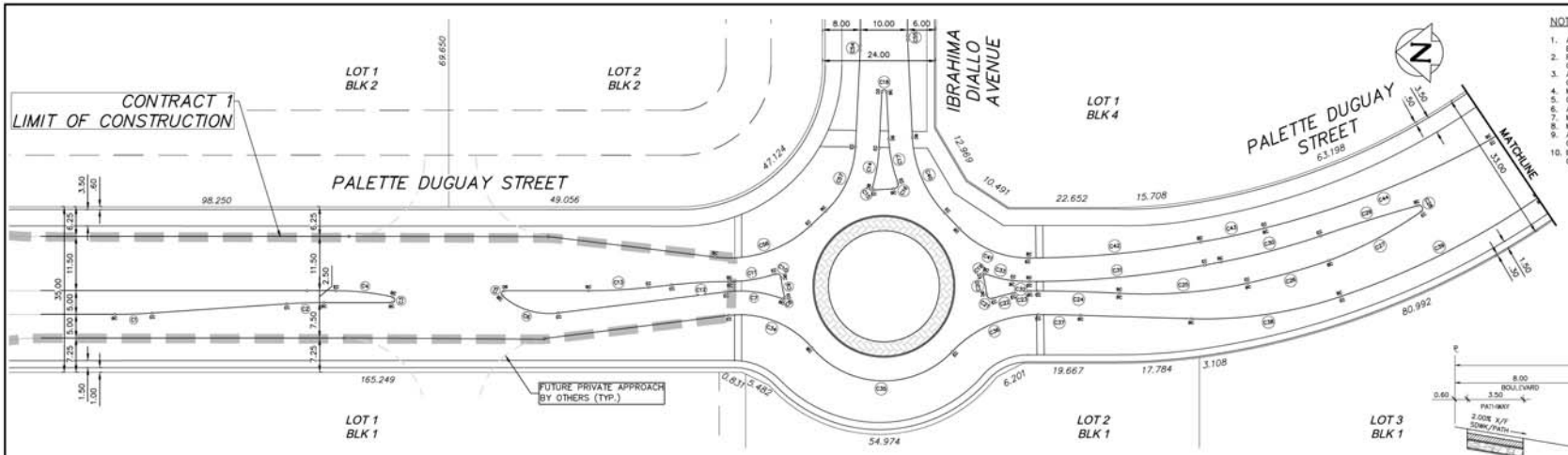
7 CONCLUSIONS

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

- The purpose of this TIS update is to reassess the transportation impacts of the development based on a total of 2,000 multi-family dwelling units, which is an increase of 800 units from the September 2020 TIS completed by Stantec and the 2022 memos completed by WSP.
- In the 2029 Phase 1 scenario, the additional residential units are forecast to generate 82 more auto trips (24 entering and 58 exiting) during the weekday a.m. peak hour, 103 more auto trips (62 entering and 41 exiting) during the weekday p.m. peak hour, and 1,322 more auto trips (661 entering and 661 exiting) daily.
- In the 2034 Phase 2 / Full Development scenario, the additional residential units are forecast to generate 232 more auto trips (63 entering and 169 exiting) during the weekday a.m. peak hour, 301 more auto trips (181 entering and 120 exiting) during the weekday p.m. peak hour, and 3,944 more auto trips (1972 entering and 1972 exiting) daily.
- A traffic signal is not warranted for the Paulette Duguay Street / Commercial Access intersection in any of the scenarios.
- Capacity analysis of the 2023 design of the Marion Street / Dupuy Avenue / Paulette Duguay Street intersection indicates that the intersection is over capacity with the forecast 2034 p.m. peak hour traffic volumes. The following modified intersection configuration is therefore recommended:
  - The northbound approach on Paulette Duguay Street consists of a left turn lane and a shared left-turn / through / right-turn lane.
  - The southbound approach on Dupuy Street 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.
- Revisions to the previously approved intersection configuration of Paulette Duguay Street / Commercial Access and roundabout configurations of Paulette Duguay Street / Ibrahima Diallo Avenue and Maginot Street / Speers Road are not recommended based on the capacity analysis.
- The recommendations from the previous reports for the Lagimodiere Boulevard / Maginot Street intersection are unchanged with a second northbound left-turn lane is recommended for construction sometime between partial (50%) and full build-out. The existing length of this turn-lane should be extended to 120m to accommodate the forecast 95th percentile queue. A cantilever lane designation overhead sign structure will 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 to 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 near-side eastbound Marion Street and near-side northbound 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.
- The only proposed roundabout location that warrants an RRFB is the east approach of the Maginot Street / Speers Road roundabout, all other locations warrant a 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).

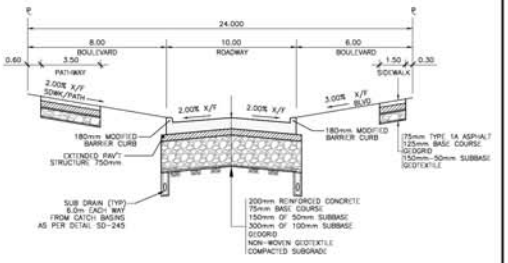
APPENDIX

A 2023 DESIGN DRAWINGS

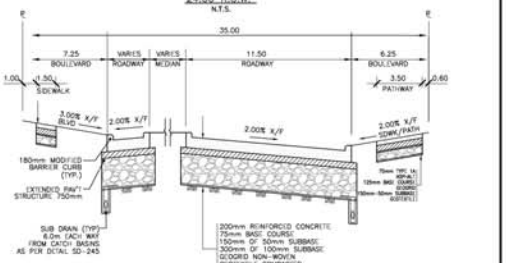


NOTES

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 2 BACKFILL AT ALL PROPOSED AND EXISTING PAVEMENT CROSSINGS.
4. MINIMUM CORNER RADII TO BE 12.0m UNLESS OTHERWISE SHOWN.
5. COLLECTOR ON TO A COLLECTOR TO BE A 12.0m RADIUS.
6. ALL SIDEWALK/PATHWAY CROSSINGS TO HAVE CURB RAMPS.
7. MINIMUM= 0.44% GRADE ON 300 C.B. LEADS.
8. MINIMUM= 0.56% GRADE ON 250 C.B. LEADS.
9. ALL WORK TO CONFORM TO THE CITY OF WINNIPEG STANDARD CONSTRUCTION SPECIFICATIONS.
10. INSTALL DETECTABLE WARNING SURFACE AT ALL SIDEWALK/PATHWAY CONNECTIONS.



TYPICAL ROAD CROSS SECTION
24.00 R.O.W.
N.T.S.



TYPICAL ROAD CROSS SECTION
35.00 R.O.W.
N.T.S.

Curve Table		
Curve #		Length
C1	Δ	3°56'09"
	R	115.000
	T	3.95
	L	7.90
	BC	5528174.299 637003.786
	EC	5528166.416 637004.276
C2	Δ	3°56'09"
	R	115.000
	T	3.95
	L	7.90
	BC	5528130.145 637007.515
	EC	5528138.028 637007.025
C3	Δ	167°26'56"
	R	0.600
	T	5.46
	L	1.75
	BC	5528115.763 637007.915
	EC	5528115.666 637009.104
C4	Δ	12°33'04"
	R	55.000
	T	6.05
	L	12.05
	BC	5528115.666 637009.104
	EC	5528127.649 637010.086
C5	Δ	136°25'35"
	R	0.600
	T	1.58
	L	1.45
	BC	5528092.069 637011.078
	EC	5528092.438 637010.016
C6	Δ	48°44'40"
	R	15.000
	T	6.80
	L	12.76
	BC	5528092.438 637010.016
	EC	5528080.515 637006.685

Curve Table		
Curve #		Length
C7	Δ	28°20'06"
	R	25.000
	T	6.31
	L	12.36
	BC	5528033.079 637010.968
	EC	5528045.262 637012.121
C8	Δ	12°04'35"
	R	0.300
	T	0.60
	L	0.67
	BC	5528033.079 637010.968
	EC	5528032.692 637011.341
C9	Δ	11°01'39"
	R	21.496
	T	2.07
	L	4.14
	BC	5528033.551 637015.382
	EC	5528032.692 637011.341
C10	Δ	103°54'48"
	R	1.000
	T	1.28
	L	1.81
	BC	5528033.551 637015.382
	EC	5528034.893 637016.206
C11	Δ	18°37'06"
	R	30.000
	T	4.92
	L	9.75
	BC	5528044.417 637014.341
	EC	5528034.893 637016.206
C12	Δ	6°09'38"
	R	115.000
	T	6.19
	L	12.36
	BC	5528044.417 637013.295
	EC	5528056.732 637013.295

Curve Table		
Curve #		Length
C13	Δ	6°20'25"
	R	115.000
	T	6.37
	L	12.73
	BC	5528074.179 637011.574
	EC	5528061.504 637012.630
C14	Δ	14°02'42"
	R	35.000
	T	4.31
	L	8.58
	BC	5528014.855 637034.916
	EC	5528013.631 637043.386
C15	Δ	110°24'56"
	R	0.300
	T	0.43
	L	0.58
	BC	5528014.855 637034.916
	EC	5528014.539 637034.539
C16	Δ	107°11'53"
	R	1.000
	T	1.36
	L	1.87
	BC	5528010.287 637034.923
	EC	5528009.453 637036.300
C17	Δ	17°59'45"
	R	30.000
	T	4.75
	L	9.42
	BC	5528011.622 637045.429
	EC	5528009.453 637036.300
C18	Δ	174°25'38"
	R	0.500
	T	10.27
	L	1.52
	BC	5528012.382 637055.389
	EC	5528013.381 637055.342

Curve Table		
Curve #		Length
C19	Δ	127°04'35"
	R	0.300
	T	0.60
	L	0.67
	BC	5527990.502 637017.527
	EC	5527990.889 637017.154
C20	Δ	10°57'15"
	R	21.496
	T	2.06
	L	4.11
	BC	5527990.033 637013.141
	EC	5527990.889 637017.154
C21	Δ	103°40'29"
	R	1.000
	T	1.27
	L	1.81
	BC	5527990.033 637013.141
	EC	5527988.694 637012.317
C22	Δ	8°19'51"
	R	30.000
	T	2.18
	L	4.36
	BC	5527984.506 637013.523
	EC	5527988.694 637012.317
C23	Δ	5°21'43"
	R	38.260
	T	1.79
	L	3.58
	BC	5527980.975 637014.105
	EC	5527984.506 637013.523
C24	Δ	3°17'22"
	R	300.000
	T	8.61
	L	17.22
	BC	5527961.935 637014.140
	EC	5527979.156 637014.155

Curve Table		
Curve #		Length
C25	Δ	15°39'07"
	R	100.000
	T	13.74
	L	27.32
	BC	5527961.935 637014.140
	EC	5527934.858 637017.048
C26	Δ	8°20'05"
	R	161.250
	T	8.92
	L	17.83
	BC	5527934.858 637017.048
	EC	5527917.828 637022.295
C27	Δ	13°48'18"
	R	92.057
	T	11.14
	L	22.18
	BC	5527917.828 637022.295
	EC	5527898.574 637033.198
C28	Δ	168°21'10"
	R	0.750
	T	7.35
	L	2.20
	BC	5527898.574 637033.198
	EC	5527899.377 637034.456
C29	Δ	3°06'16"
	R	397.382
	T	10.77
	L	21.53
	BC	5527899.377 637034.456
	EC	5527919.736 637027.454
C30	Δ	7°59'23"
	R	155.750
	T	10.88
	L	21.72
	BC	5527940.585 637021.364
	EC	5527919.736 637027.454

Curve Table		
Curve #		Length
C31	Δ	10°42'27"
	R	200.000
	T	18.74
	L	37.38
	BC	5527981.031 637016.104
	EC	5527943.983 637020.619
C32	Δ	5°45'47"
	R	35.482
	T	1.79
	L	3.57
	BC	5527984.596 637016.205
	EC	5527981.031 637016.104
C33	Δ	13°54'12"
	R	25.000
	T	3.05
	L	6.07
	BC	5527990.502 637017.527
	EC	5527984.596 637016.205
C34	Δ	56°37'47"
	R	20.000
	T	10.78
	L	19.77
	BC	5528026.622 637000.830
	EC	5528044.501 637007.179
C35	Δ	95°55'00"
	R	20.000
	T	22.18
	L	33.48
	BC	5528026.622 637000.830
	EC	5527996.915 637000.879
C36	Δ	46°27'28"
	R	25.000
	T	10.73
	L	20.27
	BC	5527979.017 637009.157
	EC	5527996.915 637000.879

Curve Table		
Curve #		Length
C37	Δ	1°44'58"
	R	295.000
	T	4.50
	L	9.01
	BC	5527970.010 637009.270
	EC	5527979.017 637009.157
C38	Δ	20°28'48"
	R	90.000
	T	16.23
	L	32.12
	BC	5527946.509 637009.207
	EC	5527915.054 637014.791
C39	Δ	15°49'14"
	R	169.250
	T	23.52
	L	46.73
	BC	5527915.054 637014.791
	EC	5527873.999 637036.806
C40	Δ	40°43'17"
	R	25.000
	T	9.28
	L	17.77
	BC	5528006.844 637045.902
	EC	5527999.366 637030.102
C41	Δ	46°23'33"
	R	20.000
	T	8.57
	L	16.19
	BC	5527996.174 637026.921
	EC	5527981.536 637021.093
C42	Δ	10°42'27"
	R	195.000
	T	18.27
	L	36.44
	BC	5527981.170 637021.102
	EC	5527945.048 637025.504

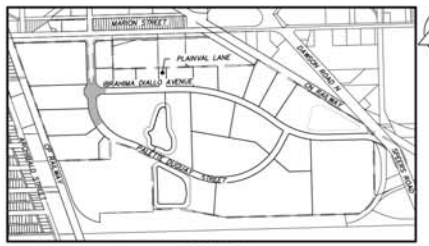
Curve Table		
Curve #		Length
C43	Δ	6°28'55"
	R	123.743
	T	6.97
	L	13.93
	BC	5527945.048 637025.504
	EC	5527931.528 637028.813
C44	Δ	15°01'24"
	R	196.258
	T	25.86
	L	51.46
	BC	5527931.528 637028.813
	EC	5527884.300 637048.876

Curve Table		
Curve #		Length
C54	Δ	2°47'40"
	R	20.000
	T	0.49
	L	0.98
	BC	5528018.201 637063.999
	EC	5528018.204 637064.974
C55	Δ	2°46'42"
	R	20.000
	T	0.49
	L	0.97
	BC	5528008.270 637067.470
	EC	5528008.219 637066.502
C56	Δ	50°30'50"
	R	25.000
	T	11.79
	L	22.04
	BC	5528047.708 637019.436
	EC	5528027.640 637026.677
C57	Δ	43°42'22"
	R	20.000
	T	8.02
	L	15.26
	BC	5528024.459 637029.866
	EC	5528018.629 637043.568

METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
WSP Canada Inc.
No. 5750

ISSUED FOR REVIEW



KEY PLAN
1:10,000

WATERMAIN		CAS		150 WM	WATERMAIN	150 WM		
HYDRANT ASSEMBLY		HYDRO			VALVE			
VALVE		M.T.S.		300 LDS	LAND DRAINAGE SEWER	300 LDS		
COMBINED SEWER		CONCRETE LIP CURB		200 WWS	WASTE WATER SEWER	200 WWS		
LAND DRAINAGE SEWER		180mm MODIFIED BARRIER CURB			CENTERLINE			
WASTE WATER SEWER		PROPERTY LINE			SOUTH & EAST GUTTER			
MANHOLE		SURVEY BAR			NORTH & WEST GUTTER			
CATCH BASIN		CURB STOP						
CURB INLET		CB LEAD						
DITCH		SIDEWALK						
JUNCTIONS		CURB RAMP						
CULVERT		ELEVATIONS	32.000					
EXISTING	LEGEND – PLAN	PROPOSED	EXISTING	LEGEND – PLAN	PROPOSED	EXISTING	LEGEND – PROFILE	PROPOSED

LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES COMMITTEE — DATE

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.

NOTE: ADD 200.00 FOR GEODETIC ELEVATION IN PLAN VIEW

B.M. CMBM 33-006
ELEV. 231.585m

NO.	REVISIONS	DATE	BY
A	ISSUED FOR REVIEW	20/11/03	

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

DESIGNED BY	B.F.	CHECKED BY	
DRAWN BY	K.C.	APPROVED BY	
HOR. SCALE:	1:500	RELEASED FOR CONSTRUCTION	
VERT. SCALE:	1:50		
DATE:		DATE:	

ENGINEERS SEAL
PROVINCE OF MANITOBA
K.K.
XXXXXX
REGISTERED PROFESSIONAL ENGINEER

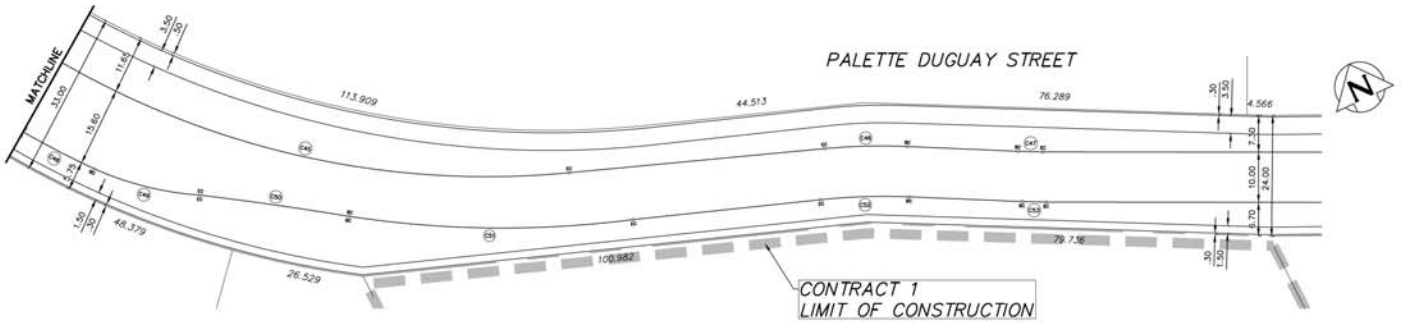
CONSULTANT DRAWING NO.
211-07590-00 -20

Winnipeg
THE CITY OF WINNIPEG
FINANCE NO.

PUBLIC MARKETS
PAVEMENT AND INTERSECTION GEOMETRY DETAILS 1

UNDERGROUND SERVICING AND ROADWORK

SHEET 20 OF 22
CITY DRAWING NO.

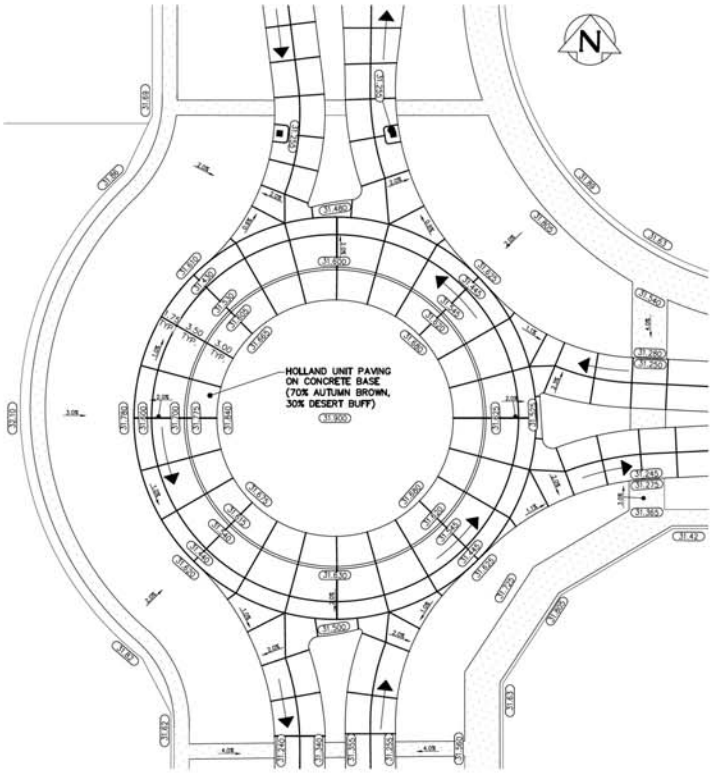


NOTES

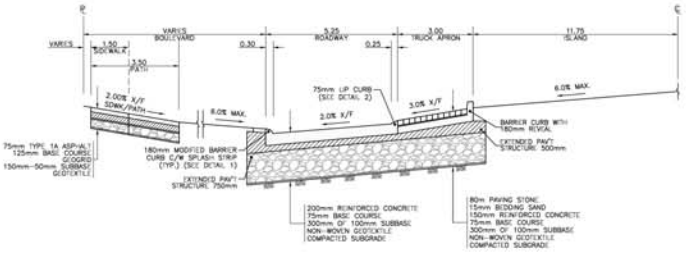
1. ALL PAVEMENT TO BE 200mm REINFORCED CONCRETE WITH MODIFIED BARRIER CURB, UNLESS OTHERWISE SHOWN.
2. PIPE CLASSES SHOWN FOR L.D.S. ARE FOR CONCRETE PIPE UNLESS OTHERWISE SHOWN.
3. ALL PIPES 375 AND SMALLER TO BE CORED, ALL PIPES 450 AND LARGER CLASS 2 BACKFILL AT ALL PROPOSED AND EXISTING PAVEMENT CROSSINGS.
4. MINIMUM CORNER RADII TO BE 12.0m UNLESS OTHERWISE SHOWN.
5. COLLECTOR ON TO A COLLECTOR TO BE A 12.0m RADIUS.
6. ALL SIDEWALK/PATHWAY CROSSINGS TO HAVE CURB RAMPS.
7. MINIMUM= 0.44% GRADE ON 300 C.B. LEADS.
8. MINIMUM= 0.56% GRADE ON 250 C.B. LEADS.
9. ALL WORK TO CONFORM TO THE CITY OF WINNIPEG STANDARD CONSTRUCTION SPECIFICATIONS.
10. INSTALL DETECTABLE WARNING SURFACE AT ALL SIDEWALK/PATHWAY CONNECTIONS.

Curve Table		
Curve #		Length
C45	Δ	36°04'17"
	R	189.004
	T	55.03
	L	106.40
	BC	5527884.300 637048.876
	EC	5527820.586 637131.897
C46	Δ	7°52'34"
	R	120.000
	T	8.26
	L	16.50
	BC	5527796.869 637195.004
	EC	5527803.461 637179.897
C47	Δ	2°22'06"
	R	120.000
	T	2.48
	L	4.96
	BC	5527786.690 637214.549
	EC	5527784.490 637218.995
C48	Δ	4°59'17"
	R	184.250
	T	8.03
	L	16.04
	BC	5527873.999 637036.806
	EC	5527861.282 637046.575
C49	Δ	20°07'37"
	R	61.981
	T	11.00
	L	21.77
	BC	5527861.282 637046.575
	EC	5527847.645 637063.404

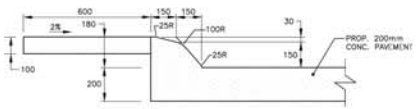
Curve Table		
Curve #		Length
C50	Δ	2°30'47"
	R	684.886
	T	15.02
	L	30.04
	BC	5527831.226 637088.556
	EC	5527847.645 637063.404
C51	Δ	16°04'44"
	R	201.703
	T	28.49
	L	56.60
	BC	5527831.226 637088.556
	EC	5527806.788 637139.407
C52	Δ	8°24'54"
	R	120.000
	T	8.83
	L	17.62
	BC	5527787.647 637191.090
	EC	5527794.580 637174.904
C53	Δ	2°13'46"
	R	120.000
	T	2.33
	L	4.67
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	EC	5527775.189 637215.327



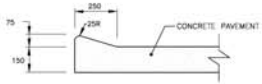
ROUNDABOUT JOINT PLAN DETAIL
1:250



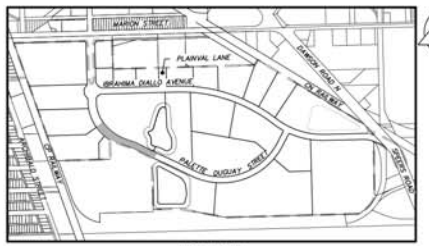
TYPICAL ROUNDABOUT CROSS SECTION
N.T.S.



MODIFIED BARRIER CURB WITH SPLASH STRIP
DETAIL 1
N.T.S.



75mm LIP CURB
DETAIL 2
N.T.S.



KEY PLAN
1:10,000

METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
WSP Canada Inc.
No. 5750

ISSUED FOR REVIEW

	WATERMAIN			CAS		150 VM	WATERMAIN	150 VM
	HYDRANT ASSEMBLY			HYDRO			VALVE	
	VALVE			M.T.S.		300 LDS	LAND DRAINAGE SEWER	300 LDS
	COMBINED SEWER			CONCRETE LIP CURB		200 WWS	WASTE WATER SEWER	200 WWS
	LAND DRAINAGE SEWER			180mm MODIFIED BARRIER CURB			CENTERLINE	
	WASTE WATER SEWER			PROPERTY LINE			SOUTH & EAST GUTTER	
	MANHOLE			SURVEY BAR			NORTH & WEST GUTTER	
	CATCH BASIN			CURB STOP				
	CURB INLET			CB LEAD				
	DITCH			SIDEWALK				
	JUNCTIONS			CURB RAMP				
	CULVERT		32.00	ELEVATIONS	32.000			
EXISTING	LEGEND – PLAN	PROPOSED	EXISTING	LEGEND – PLAN	PROPOSED	EXISTING	LEGEND – PROFILE	PROPOSED

LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES COMMITTEE — DATE

NOTE:
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NOTE: ADD 200.00 FOR GEODETIC ELEVATION IN PLAN VIEW

B.M. CMBM 33-006
ELEV. 231.585m

NO.	REVISIONS	DATE	BY
A	ISSUED FOR REVIEW	20/11/03	

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

DESIGNED BY	B.F.	CHECKED BY	
DRAWN BY	K.C.	APPROVED BY	
HOR. SCALE:	1:500	RELEASED FOR CONSTRUCTION	
VERT. SCALE:	1:50		
DATE:		DATE:	

ENGINEERS SEAL
PROVINCE OF MANITOBA
X.X.
XXXXXXX
REGISTERED PROFESSIONAL ENGINEER

CONSULTANT DRAWING NO.
211-07590-00 -21

Winnipeg

THE CITY OF WINNIPEG

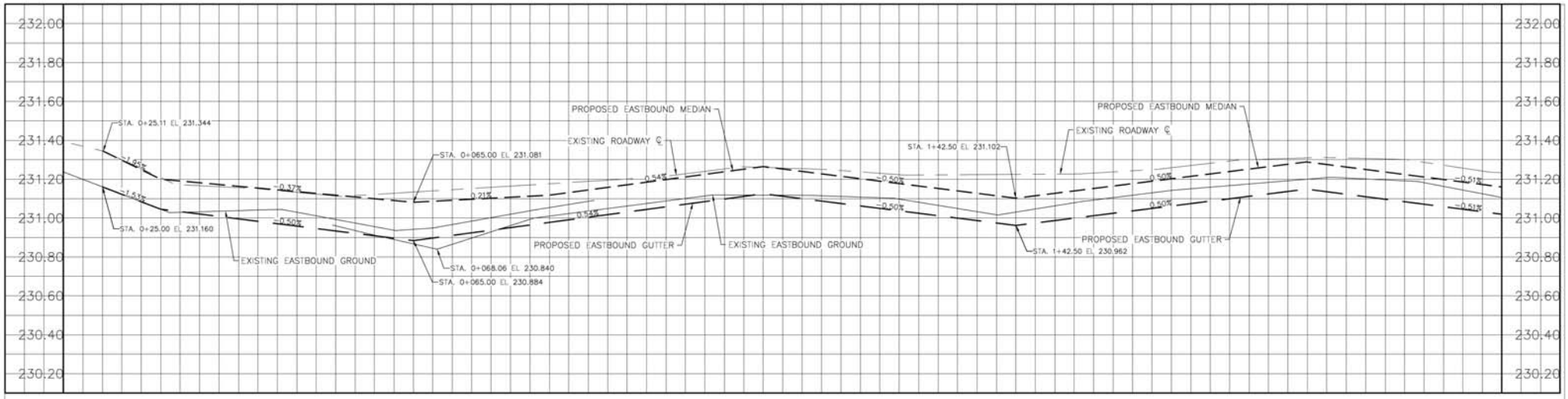
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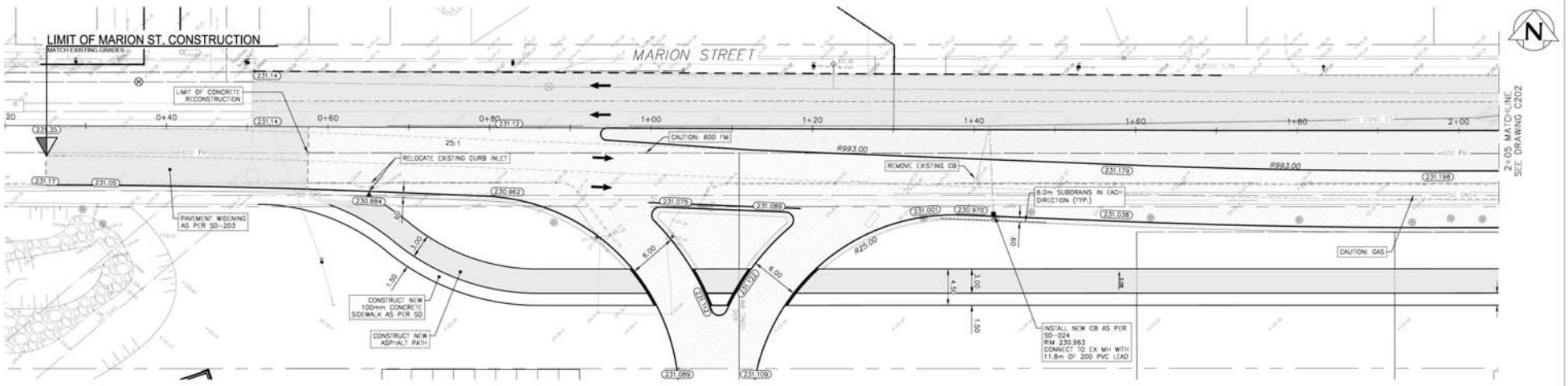
PUBLIC MARKETS
PAVEMENT AND INTERSECTION GEOMETRY DETAILS 2

SHEET 21 OF 22

CITY DRAWING NO.

UNDERGROUND SERVICING AND ROADWORK





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.
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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 SURFACE AT ALL SIDEWALK/PATHWAY CONNECTIONS.

	WATERMAIN			GAS			WATERMAIN	150 MW
	HYDRANT ASSEMBLY			HYDRO			VALVE	
	VALVE			M.T.S.			LAND DRAINAGE SEWER	300 LDS
	COMBINED SEWER			CONCRETE LIP CURB			WASTE WATER SEWER	250 WWS
	LAND DRAINAGE SEWER			150mm MODIFIED BARRIER CURB			ROAD CENTERLINE	
	WASTE WATER SEWER			PROPERTY LINE			SOUTH & EAST GUTTER	
	MANHOLE			SURVEY BAR			NORTH & WEST GUTTER	
	CATCH BASIN			CURB STOP			SOUTH & EAST MEDIAN	
	CURB INLET			CB LEAD			NORTH & WEST MEDIAN	
	DITCH			SIDEWALK			SIDEWALK	
	JUNCTIONS			CURB RAMP			GROUND	
	CULVERT		32.000	ELEVATIONS	32.000			
EXISTING	LEGEND – PLAN	PROPOSED	EXISTING	LEGEND – PLAN	PROPOSED	EXISTING	LEGEND – PROFILE	PROPOSED

LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPV. UGS STRUCTURES — DATE
COMMITTEE

NOTE:

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METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

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

B	ISSUED FOR UNDERGROUND STRUCTURES	26/09/22	SS
A	ISSUED FOR REVIEW	26/08/22	SS
NO.	REVISIONS	DATE	BY

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

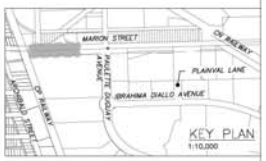
DESIGNED BY	MV	CHECKED BY	SS
DRAWN BY	TW	APPROVED BY	BH
HOR. SCALE	1:250	RELEASED FOR CONSTRUCTION	
VERT. SCALE	1:25		
DATE	18-08-2022	DATE	

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
WSP Canada Inc.
No. 5750

NOT FOR CONSTRUCTION
ISSUED FOR REVIEW

ENGINEER'S SEAL
PROVINCE OF MANITOBA
X.X. XXXXXXX
REGISTERED PROFESSIONAL ENGINEER

CONSULTANT DRAWING NO.
C201



Winnipeg

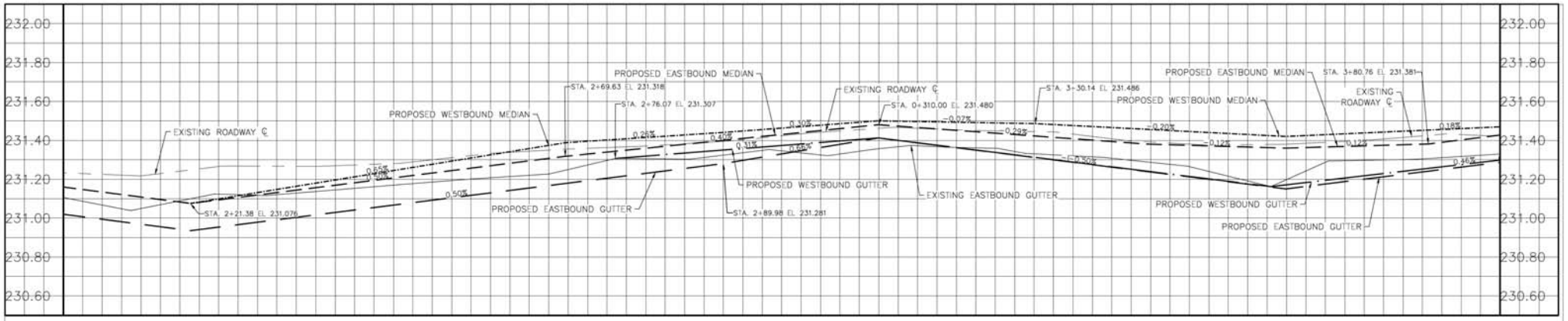
THE CITY OF WINNIPEG

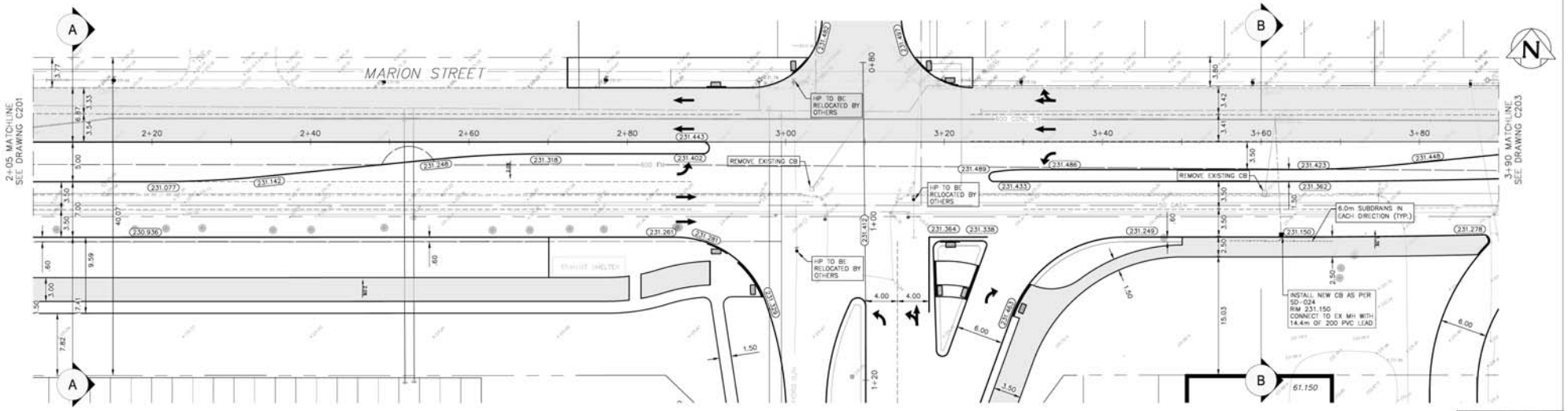
FINANCE NO.

PUBLIC MARKETS
PLAN AND PROFILE
STA. 0+20 TO 2+25
MARION STREET
UNDERGROUND SERVICING AND ROADWORK

SHEET 1 OF 4

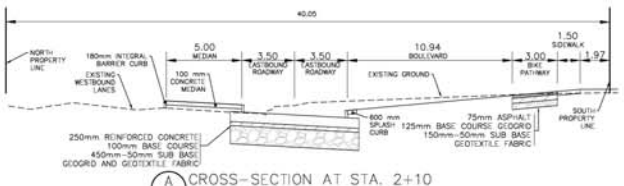
CITY DRAWING NO.



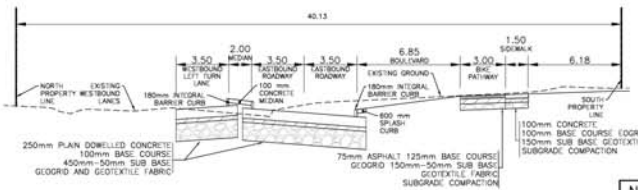


NOTES FOR MARION ST ONLY

1. ALL PAVEMENT TO BE 200mm REINFORCED CONCRETE WITH MODIFIED BARRIER CURB, UNLESS OTHERWISE SHOWN.
2. PIPE CLASSES SHOWN FOR I.D.S. ARE FOR CONCRETE PIPE UNLESS OTHERWISE SHOWN.
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6. MINIMUM- 0.56% GRADE ON 250 C.B. LEADS.
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8. INSTALL DETECTABLE WARNING SURFACE AT ALL SIDEWALK/PATHWAY CONNECTIONS.



A CROSS-SECTION AT STA. 2+10
NTS



B CROSS-SECTION AT STA. 3+60
NTS

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
WSP Canada Inc.
No. 5750

METRIC
(HARD NUMBERS INDICATE MILLIMETRES)
(SCRIBBLED NUMBERS INDICATE METRES)

NOT FOR CONSTRUCTION

ISSUED FOR REVIEW



	WATERMAIN			GAS			WATERMAIN	150 MM
	HYDRANT ASSEMBLY			HYDRO			VALVE	
	VALVE			M.T.S.			LAND DRAINAGE SEWER	300 LDS
	COMBINED SEWER			CONCRETE LIP CURB			WASTE WATER SEWER	250 WWS
	LAND DRAINAGE SEWER			150mm MODIFIED BARRIER CURB			ROAD CENTERLINE	
	WASTE WATER SEWER			PROPERTY LINE			SOUTH & EAST GUTTER	
	MANHOLE			SURVEY BAR			NORTH & WEST GUTTER	
	CATCH BASIN			CURB STOP			SOUTH & EAST MEDIAN	
	CURB INLET			CB LEAD			NORTH & WEST MEDIAN	
	DITCH			SIDEWALK			SIDEWALK	
	JUNCTIONS			CURB RAMP			GROUND	
	CULVERT			ELEVATIONS	(32.000)			
EXISTING	LEGEND – PLAN	PROPOSED	EXISTING	LEGEND – PROFILE	PROPOSED	EXISTING	LEGEND – PROFILE	PROPOSED

LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPV. MUN. STRUCTURES COMMITTEE — DATE

NOTE:
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B.M. CMSM. 33-006
ELEV. 231.595m

NO.	REVISIONS	DATE	BY
B	ISSUED FOR UNDERGROUND STRUCTURES	24/05/22	SS
A	ISSUED FOR REVIEW	06/05/22	SS

wsp
1600 BUFFALO PLACE
WINNIPEG, MANITOBA, CANADA R3T 6B8
TEL: 204.477.6650 | FAX: 204.474.2864 | WWW.WSP.COM

DESIGNED BY	CHECKED BY
MV	SS
DRAWN BY	APPROVED BY
TW	BH
HOR. SCALE: 1:250	RELEASED FOR CONSTRUCTION
VERT. SCALE: 1:25	DATE

ENGINEERS SEAL
PROVINCE OF MANITOBA
X.X.
XXXXXXX
REGISTERED PROFESSIONAL ENGINEER

CONSULTANT DRAWING NO.
C202

Winnipeg

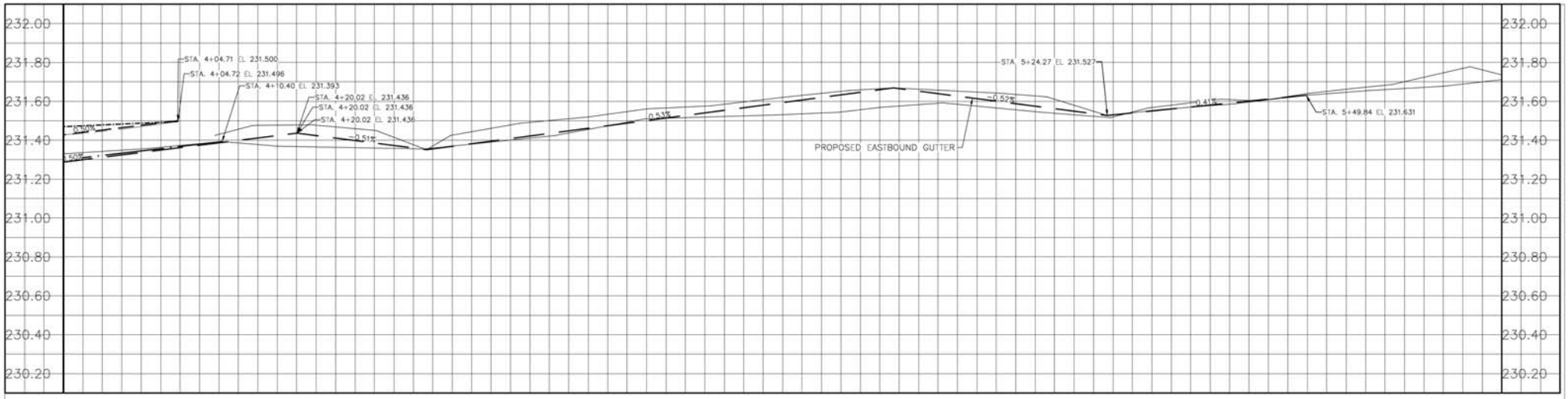
THE CITY OF WINNIPEG

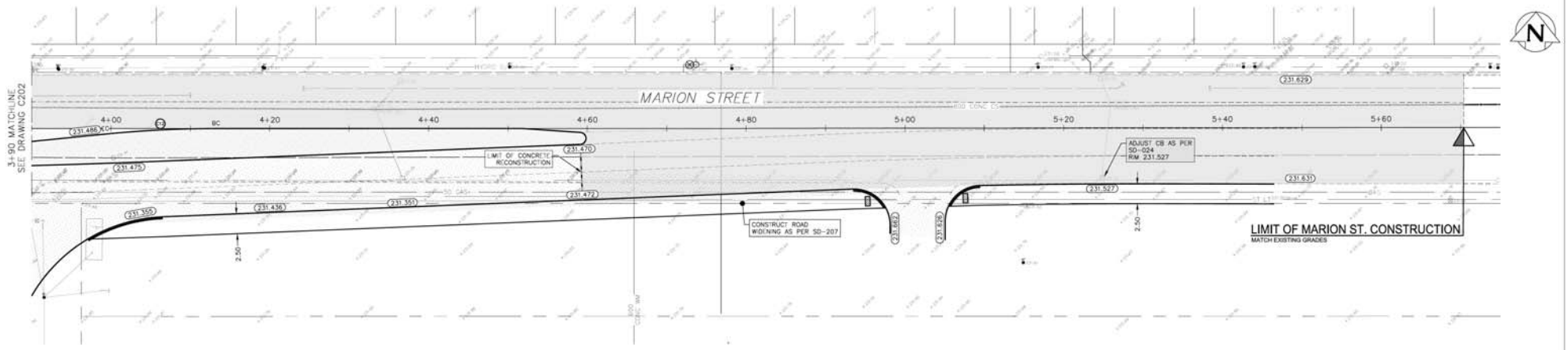
FINANCE NO.

PUBLIC MARKETS
PLAN AND PROFILE
STA. 2+05 TO 3+90
MARION STREET
UNDERGROUND SERVICING AND ROADWORK

SHEET 2 OF 4

CITY DRAWING NO.





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 CORD., 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 SURFACE AT ALL SIDEWALK/PATHWAY CONNECTIONS.

METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
WSP Canada Inc.
No. 5750

NOT FOR CONSTRUCTION

ISSUED FOR REVIEW



	WATERMAIN			GAS			WATERMAIN	150 MM
	HYDRANT ASSEMBLY			HYDRO			VALVE	
	VALVE			M.T.S.			LAND DRAINAGE SEWER	300 LDS
	COMBINED SEWER			CONCRETE LIP CURB			WASTE WATER SEWER	250 WWS
	LAND DRAINAGE SEWER			150mm MODIFIED BARRIER CURB			ROAD CENTERLINE	
	WASTE WATER SEWER			PROPERTY LINE			SOUTH & EAST GUTTER	
	MANHOLE			SURVEY BAR			NORTH & WEST GUTTER	
	CATCH BASIN			CURB STOP			SOUTH & EAST MEDIAN	
	CURB INLET			CB LEAD			NORTH & WEST MEDIAN	
	DITCH			SIDEWALK			SIDEWALK	
	JUNCTIONS			CURB RAMP			GROUND	
	CULVERT			ELEVATIONS	32.000			
EXISTING	LEGEND – PLAN	PROPOSED	EXISTING	LEGEND – PLAN	PROPOSED	EXISTING	LEGEND – PROFILE	PROPOSED

LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPV. UGS STRUCTURES — DATE
COMMITTEE

NOTE:

LOCATION OF UNDERGROUND STRUCTURES AS SHOWN ARE NOTED ON THE BEST INFORMATION AVAILABLE (NOTES, DRAWINGS, ETC.) WHEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE CURB LOCATIONS ARE EXACT. COMPARISON OF EXISTING & ACCURATE LOCATION OF ALL DEVICES MUST BE OBTAINED FROM THE APPROPRIATE UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.

B.M. CMRM 33-006
ELEV. 231.565m

NO.	REVISIONS	DATE	BY
B	ISSUED FOR UNDERGROUND STRUCTURES	24/05/22	SS
A	ISSUED FOR REVIEW	24/05/22	SS

wsp
1600 BUFFALO PLACE
WINNIPEG, MANITOBA, CANADA R3T 6B8
TEL: 204.477.6650 | FAX: 204.474.2864 | WWW.WSP.COM

DESIGNED BY	MV	CHECKED BY	SS
DRAWN BY	TW	APPROVED BY	BH
HOR. SCALE	1:250	RELEASED FOR CONSTRUCTION	
VERT. SCALE	1:25		
DATE		DATE	

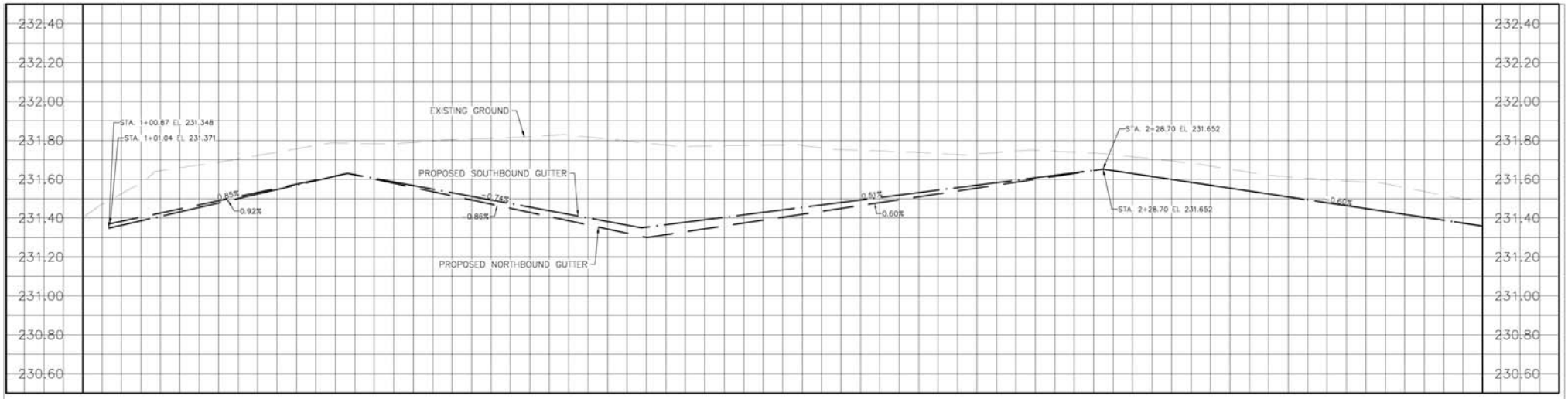
ENGINEERS SEAL
PROVINCE OF MANITOBA
X.X.
XXXXXXX
REGISTERED PROFESSIONAL ENGINEER

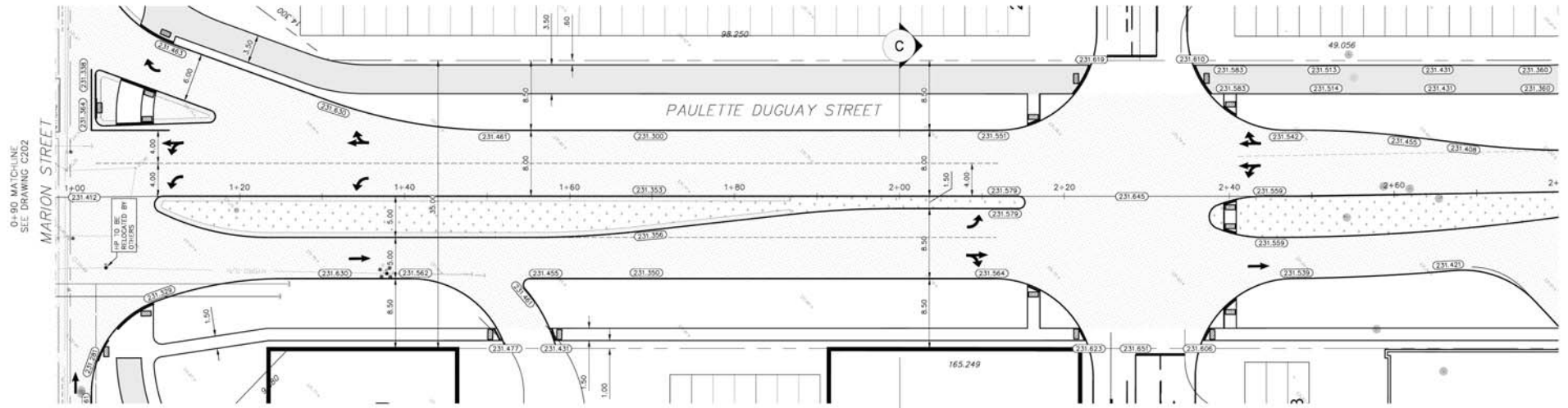
CONSULTANT DRAWING NO.
C203

Winnipeg
THE CITY OF WINNIPEG
FINANCE NO.

PUBLIC MARKETS
PLAN AND PROFILE FROM STA. 3+90 TO 5+72
MARION STREET
UNDERGROUND SERVICING AND ROADWORK

SHEET 3 OF 4
CITY DRAWING NO.





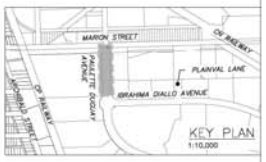
NOTES

1. ALL PAVEMENT TO BE 200mm REINFORCED CONCRETE WITH MODIFIED BARRIER CURB, UNLESS OTHERWISE SHOWN.
2. PIPE CLASSES SHOWN FOR I.D.S. ARE FOR CONCRETE PIPE UNLESS OTHERWISE SHOWN.
3. ALL PIPES 375 AND SMALLER TO BE CORED, ALL PIPES 450 AND LARGER CLASS 2 BACKFILL AT ALL PROPOSED AND EXISTING PAVEMENT CROSSINGS.
4. MINIMUM CORNER RADII TO BE 12.0m UNLESS OTHERWISE SHOWN.
5. COLLECTOR ON TO A COLLECTOR TO BE A 12.0m RADIUS.
6. ALL SIDEWALK/PATHWAY CROSSINGS TO HAVE CURB RAMPS.
7. MINIMUM- 0.44% GRADE ON 300 C.B. LEADS.
8. MINIMUM- 0.56% GRADE ON 250 C.B. LEADS.
9. ALL WORK TO CONFORM TO THE CITY OF WINNIPEG STANDARD CONSTRUCTION SPECIFICATIONS.
10. INSTALL DETECTABLE WARNING SURFACE AT ALL SIDEWALK/PATHWAY CONNECTIONS.

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
WSP Canada Inc.
No. 5750

NOT FOR CONSTRUCTION

ISSUED FOR REVIEW



METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

	WATERMAIN			GAS			WATERMAIN	150 MM
	HYDRANT ASSEMBLY			HYDRO			VALVE	
	VALVE			M.T.S.			LAND DRAINAGE SEWER	300 LDS
	COMBINED SEWER			CONCRETE LIP CURB			WASTE WATER SEWER	250 WWS
	LAND DRAINAGE SEWER			150mm MODIFIED BARRIER CURB			ROAD CENTERLINE	
	WASTE WATER SEWER			PROPERTY LINE			SOUTH & EAST GUTTER	
	MANHOLE			SURVEY BAR			NORTH & WEST GUTTER	
	CATCH BASIN			CURB STOP			SOUTH & EAST MEDIAN	
	CURB INLET			CB LEAD			NORTH & WEST MEDIAN	
	DITCH			SIDEWALK			SIDEWALK	
	JUNCTIONS			CURB RAMP			GROUND	
	CULVERT		32.000	ELEVATIONS	32.000			
EXISTING	LEGEND – PLAN	PROPOSED	EXISTING	LEGEND – PLAN	PROPOSED	EXISTING	LEGEND – PROFILE	PROPOSED

LOCATION APPROVED
UNDERGROUND STRUCTURES

TRAFFIC AUTH. STRUCTURES COMMITTEE — DATE

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

B.M. CMRM 33-006
ELEV. 231.565m

	REVISIONS	DATE	BY
B	ISSUED FOR UNDERGROUND STRUCTURES	24/05/23	SS
A	ISSUED FOR REVIEW	24/05/23	SS

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

DESIGNED BY	MV	CHECKED BY	SS
DRAWN BY	TW	APPROVED BY	BH
HOR. SCALE	1:250	RELEASED FOR CONSTRUCTION	
VERT. SCALE	1:25		
DATE		DATE	

ENGINEERS SEAL
PROVINCE OF MANITOBA
X.X.
XXXXXXX
REGISTERED PROFESSIONAL ENGINEER

CONSULTANT DRAWING NO.
C204

Winnipeg

THE CITY OF WINNIPEG

FINANCE NO.

PUBLIC MARKETS
PLAN AND PROFILE FROM
STA. 0+90 TO 2+80
MARION STREET
UNDERGROUND SERVICING AND ROADWORK

SHEET 4 OF 4

CITY DRAWING NO.

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

	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	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 ArticulatedTrucks

	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	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

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 Buses

	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	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
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

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 Bikes

	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
7:15 AM	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
7:45 AM	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
8:15 AM	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	1	0
8:45 AM	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
3:15 PM	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
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	1	0	0	0	0	1	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
4:30 PM	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
5:00 PM	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
5:30 PM	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

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

	PTH 59 Southbound			Maginot St Westbound			PTH 59 Northbound			Maginot St Eastbound		
Start Time	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

	PTH 59 Southbound			Maginot St Westbound			PTH 59 Northbound			Maginot St Eastbound		
Start Time	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

	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	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

Main Street (name)	Paulette Duguay Street
Side Street (name)	Commercial Access
Quadrant / Int #	
Direction (EW or NS)	NS
Direction (EW or NS)	EW
Comments	Future 2034 (Phase 2 FBO)
Road Authority:	City of Winnipeg
City:	Winnipeg, MB
Analysis Date:	2024 Feb 29, Thu
Count Date:	2024 Feb 29, Thu
Date Entry Format:	(yyyy-mm-dd)

CHECK SHEET

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
Paulette Duguay Street	NB	0	1	0	0	1	0	n	2,000	2	perm	y	n
Paulette Duguay Street	SB	1	0	0	0	1	0	n	100	1	perm	y	n
Commercial Access	WB	0	1	0	0	0	1	n	2 000	1	perm	y	n
Commercial Access	EB	0	1	0	0	0	1	n	2,000	1	perm	y	n

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

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

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

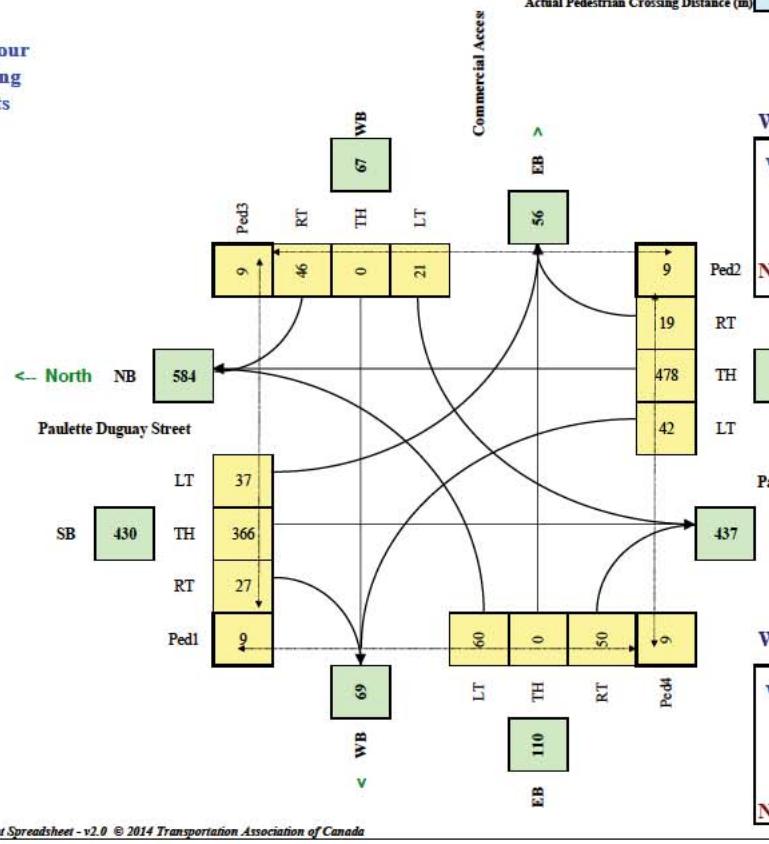
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	780,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Paulette Duguay Street	NS	50	2.0%	n	0.0
Commercial Access	EW	50	2.0%	n	0.0

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
	14	405	31	64	508	7	11	0	23	18	0	15	10	10	10	10
	9	272	21	43	340	5	7	0	15	12	0	10	7	7	7	7
	56	530	15	28	326	36	26	0	57	80	0	66	9	9	9	9
	56	536	15	28	329	37	26	0	57	81	0	67	9	9	9	9
	59	558	16	29	343	38	27	0	60	84	0	70	10	10	10	10
	60	570	16	30	350	39	28	0	61	86	0	71	10	10	10	10
Total (6-hour peak)	**254**	**2,871**	**113**	**222**	**2,197**	**162**	**126**	**0**	**273**	**361**	**0**	**298**	**55**	**55**	**55**	**55**
Average (6-hour peak)	**42**	**478**	**19**	**37**	**366**	**27**	**21**	**0**	**46**	**60**	**0**	**50**	**9**	**9**	**9**	**9**
													Actual Pedestrian Crossing Distance (m)	15.0	15.0	15.0	15.0

Average 6-hour Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F (X_{v-p}) L) / K_2] \times C_i$

W = 72 55 17

Veh *Ped*

NOT Warranted

RESET SHEET

$W_{PED} = [F ((Xped_m)d_m/K_2) + (Xped_s)d_s/K_3)]$

W = 19

Not Warranted - Ped Vol<25(avg)

Traffic Signal Warrant Spreadsheet - v2.0 © 2014 Transportation Association of Canada

APPENDIX

D SYNCHRO, SIMTRAFFIC AND SIDRA REPORTS



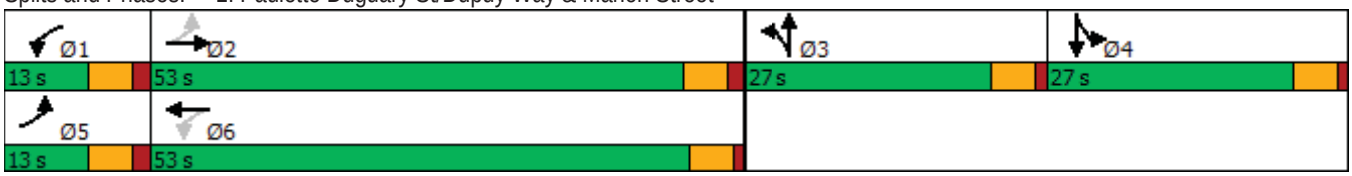
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	935	296	47	1111	18	183	0	27	13	1	13
Future Volume (vph)	17	935	296	47	1111	18	183	0	27	13	1	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	26.0		0.0	38.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (m)	45.0			45.0			0.0			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt		0.964			0.998			0.962			0.935	
Flt Protected	0.950			0.950			0.950	0.964			0.976	
Satd. Flow (prot)	1437	3424	0	1789	3478	0	1700	1659	0	0	1055	0
Flt Permitted	0.157			0.117			0.950	0.964			0.976	
Satd. Flow (perm)	237	3424	0	220	3478	0	1700	1659	0	0	1055	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42			2			118			14	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		330.1			427.4			116.2			148.9	
Travel Time (s)		19.8			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	1016	322	51	1208	20	199	0	29	14	1	14
Shared Lane Traffic (%)							42%					
Lane Group Flow (vph)	18	1338	0	51	1228	0	115	113	0	0	29	0
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases	2			6								
Detector Phase	5	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	
Minimum Split (s)	10.5	23.5		10.5	23.0		27.0	27.0		27.0	27.0	
Total Split (s)	13.0	53.0		13.0	53.0		27.0	27.0		27.0	27.0	
Total Split (%)	10.8%	44.2%		10.8%	44.2%		22.5%	22.5%		22.5%	22.5%	
Yellow Time (s)	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	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.0		5.0	5.0			5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	Max		None	Max		None	None		None	None	
Act Effct Green (s)	56.3	52.8		57.8	55.8		12.4	12.4			9.0	
Actuated g/C Ratio	0.61	0.58		0.63	0.61		0.14	0.14			0.10	
v/c Ratio	0.08	0.67		0.20	0.58		0.50	0.35			0.25	
Control Delay	11.7	20.6		12.0	17.5		46.8	10.3			33.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	11.7	20.6		12.0	17.5		46.8	10.3			33.1	
LOS	B	C		B	B		D	B			C	
Approach Delay		20.5			17.3			28.7			33.1	
Approach LOS		C			B			C			C	
Queue Length 50th (m)	1.1	98.9		3.3	60.7		21.8	0.0			2.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	6.2	#217.0		13.1	178.4		46.3	15.6			12.1	
Internal Link Dist (m)		306.1			403.4			92.2			124.9	
Turn Bay Length (m)	26.0			38.0								
Base Capacity (vph)	248	1988		271	2117		423	501			273	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.07	0.67		0.19	0.58		0.27	0.23			0.11	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 91.7			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 19.8		Intersection LOS: B	
Intersection Capacity Utilization 57.3%		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 Duguary St/Dupuy Way & Marion Street

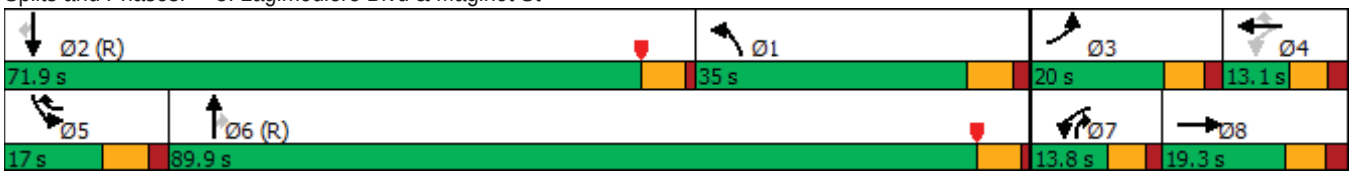


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	244	18	86	33	7	68	195	1693	62	71	1080	263
Future Volume (vph)	244	18	86	33	7	68	195	1693	62	71	1080	263
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		50.0	0.0		0.0	100.0		80.0	90.0		80.0
Storage Lanes	1		1	1		1	1		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	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.98		1.00					0.99	1.00		
Frt		0.877				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3309	2427	0	1659	1921	1555	1630	3544	1601	1738	3349	1498
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3309	2427	0	1738	1921	1555	1630	3544	1580	1738	3349	1498
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		93				167			127			248
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%	35%	10%	0%	5%	12%	3%	2%	5%	9%	9%
Adj. Flow (vph)	265	20	93	36	8	74	212	1840	67	77	1174	286
Shared Lane Traffic (%)												
Lane Group Flow (vph)	265	113	0	36	8	74	212	1840	67	77	1174	286
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)	20.0	19.3		13.8	13.1	17.0	35.0	89.9	13.8	17.0	71.9	71.9
Total Split (%)	14.3%	13.8%		9.9%	9.4%	12.1%	25.0%	64.2%	9.9%	12.1%	51.4%	51.4%
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	C-Max	None	None	C-Max	C-Max
Act Effct Green (s)	17.9	9.0		8.6	6.1	13.1	28.3	90.6	97.5	10.5	72.8	72.8
Actuated g/C Ratio	0.13	0.06		0.06	0.04	0.09	0.20	0.65	0.70	0.08	0.52	0.52
v/c Ratio	0.63	0.47		0.35	0.10	0.25	0.64	0.80	0.06	0.59	0.67	0.32
Control Delay	64.7	23.4		66.8	66.6	2.0	61.4	22.9	0.1	80.9	28.1	4.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.7	23.4		66.8	66.6	2.0	61.4	22.9	0.1	80.9	28.1	4.7
LOS	E	C		E	E	A	E	C	A	F	C	A
Approach Delay		52.4			26.1			26.0			26.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			C			C			C	
Queue Length 50th (m)	37.3	3.0		10.3	2.3	0.0	57.2	202.0	0.0	21.9	130.5	5.4
Queue Length 95th (m)	#60.9	13.1		19.1	8.3	0.0	86.4	260.6	0.0	#43.0	171.5	23.2
Internal Link Dist (m)		144.0			71.5			325.7			475.8	
Turn Bay Length (m)	75.0						100.0		80.0	90.0		80.0
Base Capacity (vph)	429	304		110	93	304	329	2292	1146	139	1741	898
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	0.62	0.37		0.33	0.09	0.24	0.64	0.80	0.06	0.55	0.67	0.32

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 28.6		Intersection LOS: C	
Intersection Capacity Utilization 80.4%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: Lagimodiere Blvd & Maginot St



Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	0	6	0	0	23	9	170	0	81	244	12
Future Vol, veh/h	17	0	6	0	0	23	9	170	0	81	244	12
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	18	0	7	0	0	25	10	185	0	88	265	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	561	653	272	656	659	93	278	0	0	185	0	0
Stage 1	448	448	-	205	205	-	-	-	-	-	-	-
Stage 2	113	205	-	451	454	-	-	-	-	-	-	-
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	424	386	766	364	383	946	1283	-	-	1388	-	-
Stage 1	589	572	-	778	731	-	-	-	-	-	-	-
Stage 2	880	731	-	587	568	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	390	359	766	341	356	946	1283	-	-	1388	-	-
Mov Cap-2 Maneuver	390	359	-	341	356	-	-	-	-	-	-	-
Stage 1	584	536	-	771	724	-	-	-	-	-	-	-
Stage 2	849	724	-	545	532	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.4	8.9	0.4	1.9
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1283	-	-	390	766	-	946	1388	-	-
HCM Lane V/C Ratio	0.008	-	-	0.047	0.009	-	0.026	0.063	-	-
HCM Control Delay (s)	7.8	0	-	14.7	9.7	0	8.9	7.8	-	-
HCM Lane LOS	A	A	-	B	A	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	-	0.1	0.2	-	-



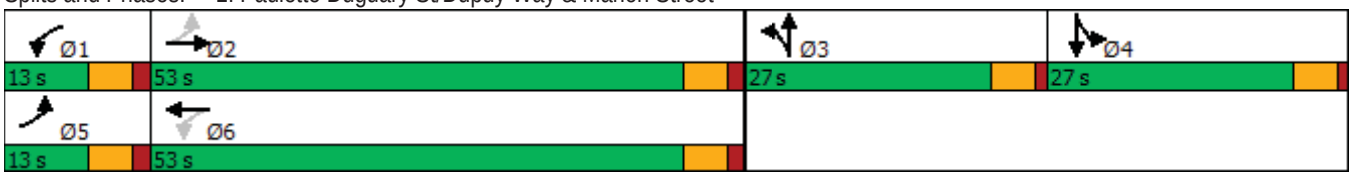
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1289	218	59	1023	11	377	0	44	14	0	11
Future Volume (vph)	7	1289	218	59	1023	11	377	0	44	14	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	26.0		0.0	38.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (m)	45.0			45.0			0.0			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt		0.978			0.998			0.968			0.940	
Flt Protected	0.950			0.950			0.950	0.962			0.973	
Satd. Flow (prot)	1141	3481	0	1789	3517	0	1700	1666	0	0	1320	0
Flt Permitted	0.193			0.071			0.950	0.962			0.973	
Satd. Flow (perm)	232	3481	0	134	3517	0	1700	1666	0	0	1320	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			1			118			118	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		330.1			427.4			116.2			148.9	
Travel Time (s)		19.8			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%	0%	2%	3%	56%	2%	2%	2%	58%	2%	2%
Adj. Flow (vph)	8	1401	237	64	1112	12	410	0	48	15	0	12
Shared Lane Traffic (%)							43%					
Lane Group Flow (vph)	8	1638	0	64	1124	0	234	224	0	0	27	0
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases	2			6								
Detector Phase	5	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	
Minimum Split (s)	10.5	23.5		10.5	23.5		27.0	27.0		27.0	27.0	
Total Split (s)	13.0	53.0		13.0	53.0		27.0	27.0		27.0	27.0	
Total Split (%)	10.8%	44.2%		10.8%	44.2%		22.5%	22.5%		22.5%	22.5%	
Yellow Time (s)	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		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		5.0	5.0			5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	Max		None	Max		None	None		None	None	
Act Effct Green (s)	53.8	49.2		57.9	56.7		17.7	17.7			8.3	
Actuated g/C Ratio	0.56	0.52		0.61	0.59		0.19	0.19			0.09	
v/c Ratio	0.04	0.91		0.32	0.54		0.74	0.55			0.12	
Control Delay	12.7	33.7		15.6	16.7		54.4	24.3			1.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	12.7	33.7		15.6	16.7		54.4	24.3			1.1	
LOS	B	C		B	B		D	C			A	
Approach Delay		33.6			16.7			39.7			1.1	
Approach LOS		C			B			D			A	
Queue Length 50th (m)	0.6	167.8		5.1	66.6		47.6	19.8			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	3.7	#301.1		15.6	155.6		#97.2	52.7			0.0	
Internal Link Dist (m)		306.1			403.4			92.2			124.9	
Turn Bay Length (m)	26.0			38.0								
Base Capacity (vph)	207	1803		215	2088		405	487			404	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.04	0.91		0.30	0.54		0.58	0.46			0.07	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 95.5			
Natural Cycle: 130			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 28.1		Intersection LOS: C	
Intersection Capacity Utilization 75.5%		ICU Level of Service D	
Analysis Period (min) 15			

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

Splits and Phases: 1: Paulette Duguary St/Dupuy Way & Marion Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	239	15	147	60	8	65	130	1020	16	18	1812	242
Future Volume (vph)	239	15	147	60	8	65	130	1020	16	18	1812	242
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	1		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	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.99										
Frt		0.864				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3278	2851	0	1825	1921	1555	1630	3476	1633	1547	3544	1541
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3278	2851	0	1921	1921	1555	1630	3476	1633	1547	3544	1541
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		160				112			75			170
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%	0%	10%	0%	0%	5%	12%	5%	0%	18%	3%	6%
Adj. Flow (vph)	260	16	160	65	9	71	141	1109	17	20	1970	263
Shared Lane Traffic (%)												
Lane Group Flow (vph)	260	176	0	65	9	71	141	1109	17	20	1970	263
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)	17.0	17.3		13.0	13.3	13.4	23.0	106.3	13.0	13.4	96.7	96.7
Total Split (%)	11.3%	11.5%		8.7%	8.9%	8.9%	15.3%	70.9%	8.7%	8.9%	64.5%	64.5%
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	C-Max	C-Max
Act Effct Green (s)	16.6	8.2		8.4	6.2	9.5	16.3	105.5	118.1	6.9	96.1	96.1
Actuated g/C Ratio	0.11	0.05		0.06	0.04	0.06	0.11	0.70	0.79	0.05	0.64	0.64
v/c Ratio	0.72	0.57		0.63	0.11	0.35	0.80	0.45	0.01	0.29	0.87	0.25
Control Delay	74.9	20.3		92.4	72.1	6.6	95.2	10.9	0.0	79.3	27.9	4.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.9	20.3		92.4	72.1	6.6	95.2	10.9	0.0	79.3	27.9	4.9
LOS	E	C		F	E	A	F	B	A	E	C	A
Approach Delay		52.8			49.1			20.1			25.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			C			C	
Queue Length 50th (m)	40.1	2.5		20.5	2.8	0.0	43.8	75.6	0.0	6.2	252.4	10.7
Queue Length 95th (m)	#77.2	15.3		33.1	9.3	3.6	#80.8	97.7	0.0	15.8	317.9	25.4
Internal Link Dist (m)		144.0			71.5			325.7			475.8	
Turn Bay Length (m)	75.0						100.0		80.0	90.0		80.0
Base Capacity (vph)	361	351		104	89	206	177	2445	1303	74	2270	1048
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	0.72	0.50		0.63	0.10	0.34	0.80	0.45	0.01	0.27	0.87	0.25

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 0 (0%), Referenced to phase 2:SBT, Start of Yellow			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 27.7		Intersection LOS: C	
Intersection Capacity Utilization 88.9%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: Lagimodiere Blvd & Maginot St



Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	93	0	40	0	0	63	23	264	0	39	181	37
Future Vol, veh/h	93	0	40	0	0	63	23	264	0	39	181	37
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	101	0	43	0	0	68	25	287	0	42	197	40

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	495	638	217	660	658	144	237	0	0	287	0	0
Stage 1	301	301	-	337	337	-	-	-	-	-	-	-
Stage 2	194	337	-	323	321	-	-	-	-	-	-	-
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	471	394	822	362	383	878	1329	-	-	1274	-	-
Stage 1	707	664	-	652	640	-	-	-	-	-	-	-
Stage 2	790	640	-	688	651	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	416	373	822	329	362	878	1329	-	-	1274	-	-
Mov Cap-2 Maneuver	416	373	-	329	362	-	-	-	-	-	-	-
Stage 1	691	642	-	638	626	-	-	-	-	-	-	-
Stage 2	712	626	-	630	630	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.4	9.4	0.7	1.2
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1329	-	-	416	822	-	878	1274	-	-
HCM Lane V/C Ratio	0.019	-	-	0.243	0.053	-	0.078	0.033	-	-
HCM Control Delay (s)	7.8	0.1	-	16.4	9.6	0	9.4	7.9	-	-
HCM Lane LOS	A	A	-	C	A	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.9	0.2	-	0.3	0.1	-	-



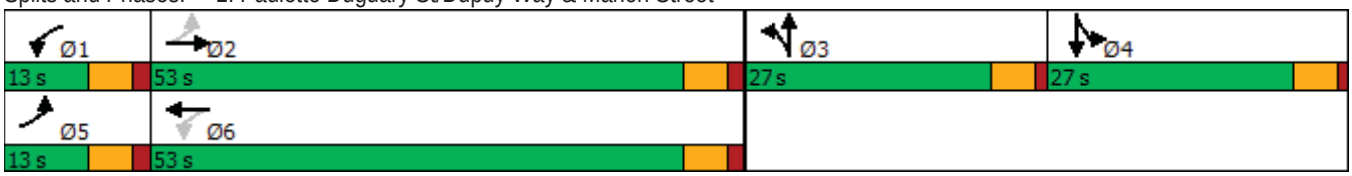
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	944	525	58	1122	18	362	0	85	13	1	13
Future Volume (vph)	17	944	525	58	1122	18	362	0	85	13	1	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	26.0		0.0	38.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (m)	45.0			45.0			0.0			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt		0.946			0.998			0.942			0.935	
Flt Protected	0.950			0.950			0.950	0.970			0.976	
Satd. Flow (prot)	1437	3364	0	1789	3478	0	1700	1635	0	0	1055	0
Flt Permitted	0.142			0.074			0.950	0.970			0.976	
Satd. Flow (perm)	215	3364	0	139	3478	0	1700	1635	0	0	1055	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		105			2			118			14	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		330.1			427.4			116.2			148.9	
Travel Time (s)		19.8			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	1026	571	63	1220	20	393	0	92	14	1	14
Shared Lane Traffic (%)							37%					
Lane Group Flow (vph)	18	1597	0	63	1240	0	248	237	0	0	29	0
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases	2			6								
Detector Phase	5	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	
Minimum Split (s)	10.5	23.5		10.5	23.5		27.0	27.0		27.0	27.0	
Total Split (s)	13.0	53.0		13.0	53.0		27.0	27.0		27.0	27.0	
Total Split (%)	10.8%	44.2%		10.8%	44.2%		22.5%	22.5%		22.5%	22.5%	
Yellow Time (s)	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		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		5.0	5.0			5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	Max		None	Max		None	None		None	None	
Act Effct Green (s)	54.0	49.2		57.0	54.4		18.5	18.5			9.2	
Actuated g/C Ratio	0.56	0.51		0.59	0.56		0.19	0.19			0.09	
v/c Ratio	0.09	0.91		0.32	0.64		0.77	0.58			0.26	
Control Delay	13.3	33.3		16.2	21.2		56.4	26.2			34.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	13.3	33.3		16.2	21.2		56.4	26.2			34.2	
LOS	B	C		B	C		E	C			C	
Approach Delay		33.1			20.9			41.7			34.2	
Approach LOS		C			C			D			C	
Queue Length 50th (m)	1.5	164.8		5.4	84.2		52.0	23.0			3.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	6.2	#281.4		15.6	#187.8		#106.0	57.5			12.1	
Internal Link Dist (m)		306.1			403.4			92.2			124.9	
Turn Bay Length (m)	26.0			38.0								
Base Capacity (vph)	219	1757		213	1950		399	474			258	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.08	0.91		0.30	0.64		0.62	0.50			0.11	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 97.1			
Natural Cycle: 120			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 29.7		Intersection LOS: C	
Intersection Capacity Utilization 76.2%		ICU Level of Service D	
Analysis Period (min) 15			

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

Splits and Phases: 1: Paulette Duguary St/Dupuy Way & Marion Street



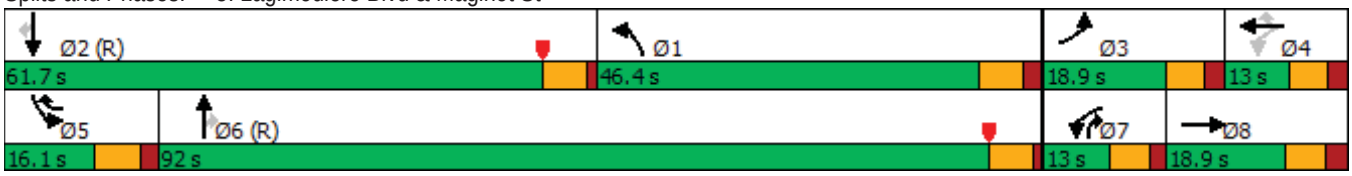


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	245	21	150	33	25	69	374	1710	63	72	1111	260
Future Volume (vph)	245	21	150	33	25	69	374	1710	63	72	1111	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		50.0	0.0		0.0	100.0		80.0	90.0		80.0
Storage Lanes	1		1	1		1	1		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	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.98		1.00					0.99	1.00		
Frt		0.869				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3309	2374	0	1659	1883	1555	1630	3544	1601	1738	3349	1498
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3309	2374	0	1738	1883	1555	1630	3544	1580	1738	3349	1498
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		163				120			80			210
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%	35%	10%	2%	5%	12%	3%	2%	5%	9%	9%
Adj. Flow (vph)	266	23	163	36	27	75	407	1859	68	78	1208	283
Shared Lane Traffic (%)												
Lane Group Flow (vph)	266	186	0	36	27	75	407	1859	68	78	1208	283
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)	18.9	18.9		13.0	13.0	16.1	46.4	92.0	13.0	16.1	61.7	61.7
Total Split (%)	13.5%	13.5%		9.3%	9.3%	11.5%	33.1%	65.7%	9.3%	11.5%	44.1%	44.1%
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	C-Max	None	None	C-Max	C-Max
Act Effct Green (s)	14.1	10.9		10.9	6.4	17.0	39.7	90.5	96.9	9.2	60.0	60.0
Actuated g/C Ratio	0.10	0.08		0.08	0.05	0.12	0.28	0.65	0.69	0.07	0.43	0.43
v/c Ratio	0.80	0.56		0.27	0.31	0.26	0.88	0.81	0.06	0.69	0.84	0.37
Control Delay	79.4	19.1		55.5	74.4	3.6	69.1	23.1	1.1	93.2	43.2	9.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.4	19.1		55.5	74.4	3.6	69.1	23.1	1.1	93.2	43.2	9.3
LOS	E	B		E	E	A	E	C	A	F	D	A
Approach Delay		54.6			31.0			30.5			39.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			C			C			D	
Queue Length 50th (m)	40.1	3.3		8.9	7.8	0.0	113.7	218.4	0.0	22.6	172.4	13.3
Queue Length 95th (m)	#65.3	15.9		19.3	18.5	3.0	#173.5	255.4	3.4	#47.6	#208.0	36.0
Internal Link Dist (m)		144.0			71.5			325.7			475.8	
Turn Bay Length (m)	75.0						100.0		80.0	90.0		80.0
Base Capacity (vph)	333	357		134	90	297	462	2290	1122	118	1434	761
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.52		0.27	0.30	0.25	0.88	0.81	0.06	0.66	0.84	0.37

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 36.1		Intersection LOS: D	
Intersection Capacity Utilization 83.2%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: Lagimodiere Blvd & Maginot St



Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	0	15	11	0	23	14	406	31	64	509	7
Future Vol, veh/h	18	0	15	11	0	23	14	406	31	64	509	7
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	20	0	16	12	0	25	15	441	34	70	553	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	948	1202	557	1193	1189	238	561	0	0	475	0	0
Stage 1	697	697	-	488	488	-	-	-	-	-	-	-
Stage 2	251	505	-	705	701	-	-	-	-	-	-	-
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	228	184	529	153	187	764	1008	-	-	1085	-	-
Stage 1	431	442	-	531	549	-	-	-	-	-	-	-
Stage 2	732	539	-	426	440	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	207	169	529	139	171	764	1008	-	-	1085	-	-
Mov Cap-2 Maneuver	207	169	-	139	171	-	-	-	-	-	-	-
Stage 1	422	413	-	520	538	-	-	-	-	-	-	-
Stage 2	694	528	-	386	411	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.7	17.5	0.4	0.9
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1008	-	-	207	529	139	764	1085	-	-
HCM Lane V/C Ratio	0.015	-	-	0.095	0.031	0.086	0.033	0.064	-	-
HCM Control Delay (s)	8.6	0.1	-	24.2	12	33.3	9.9	8.5	-	-
HCM Lane LOS	A	A	-	C	B	D	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.1	0.3	0.1	0.2	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1295	345	93	1028	11	554	1	162	14	0	11
Future Volume (vph)	7	1295	345	93	1028	11	554	1	162	14	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	26.0		0.0	38.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (m)	45.0			45.0			0.0			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt		0.968			0.998			0.931			0.940	
Flt Protected	0.950			0.950			0.950	0.974			0.973	
Satd. Flow (prot)	1141	3437	0	1789	3517	0	1700	1622	0	0	1320	0
Flt Permitted	0.180			0.071			0.950	0.974			0.973	
Satd. Flow (perm)	216	3437	0	134	3517	0	1700	1622	0	0	1320	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32			1			32			118	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		330.1			427.4			116.2			148.9	
Travel Time (s)		19.8			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	1408	375	101	1117	12	602	1	176	15	0	12
Shared Lane Traffic (%)							34%					
Lane Group Flow (vph)	8	1783	0	101	1129	0	397	382	0	0	27	0
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases	2			6								
Detector Phase	5	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	
Minimum Split (s)	10.5	23.5		10.5	23.5		27.0	27.0		27.0	27.0	
Total Split (s)	13.0	51.0		13.0	51.0		29.0	29.0		27.0	27.0	
Total Split (%)	10.8%	42.5%		10.8%	42.5%		24.2%	24.2%		22.5%	22.5%	
Yellow Time (s)	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		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		5.0	5.0			5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	Max		None	Max		None	None		None	None	
Act Effct Green (s)	51.9	46.0		57.8	56.5		24.2	24.2			8.4	
Actuated g/C Ratio	0.51	0.45		0.57	0.55		0.24	0.24			0.08	
v/c Ratio	0.05	1.14		0.53	0.58		0.99	0.93			0.12	
Control Delay	14.0	99.7		26.8	19.5		82.6	68.2			1.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	14.0	99.7		26.8	19.5		82.6	68.2			1.2	
LOS	B	F		C	B		F	E			A	
Approach Delay		99.4			20.1			75.5			1.2	
Approach LOS		F			C			E			A	
Queue Length 50th (m)	0.7	~236.2		9.3	75.8		~89.8	78.2			0.0	

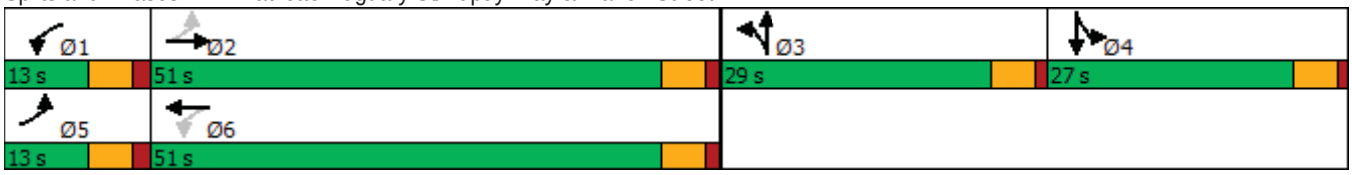
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	3.8	#349.0		#33.5	161.7		#189.4	#171.7			0.0	
Internal Link Dist (m)		306.1			403.4			92.2			124.9	
Turn Bay Length (m)	26.0			38.0								
Base Capacity (vph)	181	1562		198	1944		403	409			379	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.04	1.14		0.51	0.58		0.99	0.93			0.07	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 102.2			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.14			
Intersection Signal Delay: 68.3		Intersection LOS: E	
Intersection Capacity Utilization 92.3%		ICU Level of Service F	
Analysis Period (min) 15			

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

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

Splits and Phases: 1: Paulette Duguary St/Dupuy Way & Marion Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	216	28	222	60	9	65	251	1025	16	18	1880	242
Future Volume (vph)	216	28	222	60	9	65	251	1025	16	18	1880	242
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	1		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	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.99										
Frt		0.867				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3278	2861	0	1789	1883	1555	1630	3476	1601	1547	3544	1541
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3278	2861	0	1883	1883	1555	1630	3476	1601	1547	3544	1541
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		241				112			75			148
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%	18%	3%	6%
Adj. Flow (vph)	235	30	241	65	10	71	273	1114	17	20	2043	263
Shared Lane Traffic (%)												
Lane Group Flow (vph)	235	271	0	65	10	71	273	1114	17	20	2043	263
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)	16.6	16.6		13.0	13.0	13.4	30.3	107.0	13.0	13.4	90.1	90.1
Total Split (%)	11.1%	11.1%		8.7%	8.7%	8.9%	20.2%	71.3%	8.7%	8.9%	60.1%	60.1%
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	C-Max	None	None	C-Max	C-Max
Act Effct Green (s)	14.3	8.5		9.7	6.1	11.7	23.6	105.6	118.2	6.5	88.5	88.5
Actuated g/C Ratio	0.10	0.06		0.06	0.04	0.08	0.16	0.70	0.79	0.04	0.59	0.59
v/c Ratio	0.75	0.70		0.56	0.13	0.32	1.07	0.46	0.01	0.30	0.98	0.27
Control Delay	80.2	21.7		80.1	72.8	5.6	133.1	10.9	0.0	81.1	45.2	7.5
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	80.2	21.7		80.1	72.8	5.6	133.1	10.9	0.0	81.1	45.2	7.5
LOS	F	C		F	E	A	F	B	A	F	D	A
Approach Delay		48.9			43.4			34.5			41.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			C			D	
Queue Length 50th (m)	35.7	4.8		20.6	3.1	0.0	~94.0	77.7	0.0	6.2	320.0	15.7
Queue Length 95th (m)	#69.3	20.1		33.4	9.9	3.6	#153.7	96.8	0.0	15.8	#399.3	33.1
Internal Link Dist (m)		144.0			71.5			325.7			475.8	
Turn Bay Length (m)	75.0						100.0		80.0	90.0		80.0
Base Capacity (vph)	312	415		118	84	227	256	2446	1278	70	2090	969
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	0.75	0.65		0.55	0.12	0.31	1.07	0.46	0.01	0.29	0.98	0.27

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.07
Intersection Signal Delay: 40.1 Intersection LOS: D
Intersection Capacity Utilization 98.8% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Lagimodiere Blvd & Maginot St



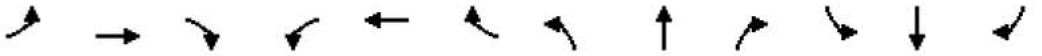
Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	86	0	71	28	0	61	60	570	16	30	351	39
Future Vol, veh/h	86	0	71	28	0	61	60	570	16	30	351	39
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	93	0	77	30	0	66	65	620	17	33	382	42

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	909	1236	403	1267	1249	319	424	0	0	637	0	0
Stage 1	469	469	-	759	759	-	-	-	-	-	-	-
Stage 2	440	767	-	508	490	-	-	-	-	-	-	-
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	243	175	647	135	172	677	1133	-	-	945	-	-
Stage 1	574	560	-	366	414	-	-	-	-	-	-	-
Stage 2	567	410	-	546	548	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	199	154	647	108	151	677	1133	-	-	945	-	-
Mov Cap-2 Maneuver	199	154	-	108	151	-	-	-	-	-	-	-
Stage 1	523	540	-	333	377	-	-	-	-	-	-	-
Stage 2	466	374	-	464	529	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26	23.5	1	0.6
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1133	-	-	199	647	108	677	945	-	-
HCM Lane V/C Ratio	0.058	-	-	0.47	0.119	0.282	0.098	0.035	-	-
HCM Control Delay (s)	8.4	0.3	-	38.2	11.3	50.9	10.9	8.9	-	-
HCM Lane LOS	A	A	-	E	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	2.3	0.4	1.1	0.3	0.1	-	-

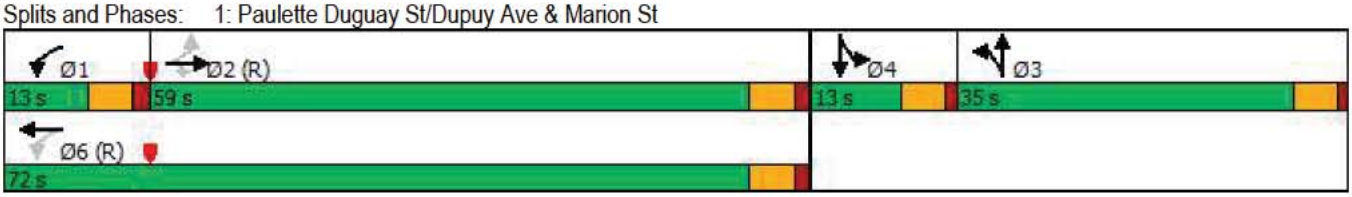


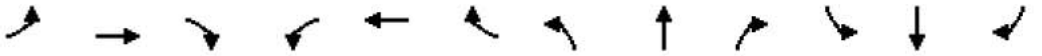
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	944	525	58	1122	18	362	0	85	13	1	13
Future Volume (vph)	17	944	525	58	1122	18	362	0	85	13	1	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (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		
Satd. Flow (prot)	1437	3544	1601	1789	3478	0	1700	1635	0	0	1055	0
Flt Permitted	0.200			0.189			0.950	0.970			0.976	
Satd. Flow (perm)	303	3544	1601	356	3478	0	1700	1635	0	0	1055	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			379		2			118			14	
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%
Shared Lane Traffic (%)							37%					
Lane Group Flow (vph)	18	1026	571	63	1240	0	248	237	0	0	29	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)	59.0	59.0	59.0	13.0	72.0		35.0	35.0		13.0	13.0	
Total Split (%)	49.2%	49.2%	49.2%	10.8%	60.0%		29.2%	29.2%		10.8%	10.8%	
Maximum Green (s)	53.5	53.5	53.5	7.5	66.5		30.0	30.0		8.0	8.0	
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			Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0	7.0		7.0		7.0	7.0				
Flash Dont Walk (s)	11.0	11.0	11.0		11.0		15.0	15.0				
Pedestrian Calls (#/hr)	5	5	5		5		5	5				
Act Effct Green (s)	69.1	69.1	69.1	79.2	79.2		22.6	22.6			6.8	
Actuated g/C Ratio	0.58	0.58	0.58	0.66	0.66		0.19	0.19			0.06	
v/c Ratio	0.10	0.50	0.53	0.20	0.54		0.78	0.59			0.40	
Control Delay	2.4	1.8	0.6	11.5	13.8		62.0	26.9			50.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	2.4	1.8	0.6	11.5	13.8		62.0	26.9			50.3	
LOS	A	A	A	B	B		E	C			D	
Approach Delay		1.4			13.6			44.9			50.3	
Approach LOS		A			B			D			D	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	53.5	53.5	53.5	7.5	66.5		30.0	30.0		8.0	8.0	
90th %ile Term Code	Coord	Coord	Coord	Max	Coord		Max	Max		Max	Max	
70th %ile Green (s)	57.3	57.3	57.3	7.9	70.7		25.8	25.8		8.0	8.0	
70th %ile Term Code	Coord	Coord	Coord	Gap	Coord		Gap	Gap		Max	Max	
50th %ile Green (s)	62.0	62.0	62.0	7.1	74.6		22.8	22.8		7.1	7.1	
50th %ile Term Code	Coord	Coord	Coord	Gap	Coord		Gap	Gap		Gap	Gap	
30th %ile Green (s)	78.3	78.3	78.3	6.1	89.9		19.6	19.6		0.0	0.0	
30th %ile Term Code	Coord	Coord	Coord	Gap	Coord		Gap	Gap		Skip	Skip	
10th %ile Green (s)	94.5	94.5	94.5	0.0	94.5		15.0	15.0		0.0	0.0	
10th %ile Term Code	Coord	Coord	Coord	Skip	Coord		Gap	Gap		Skip	Skip	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 50 (42%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 12.6		Intersection LOS: B	
Intersection Capacity Utilization 68.4%		ICU Level of Service C	
Analysis Period (min) 15			

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



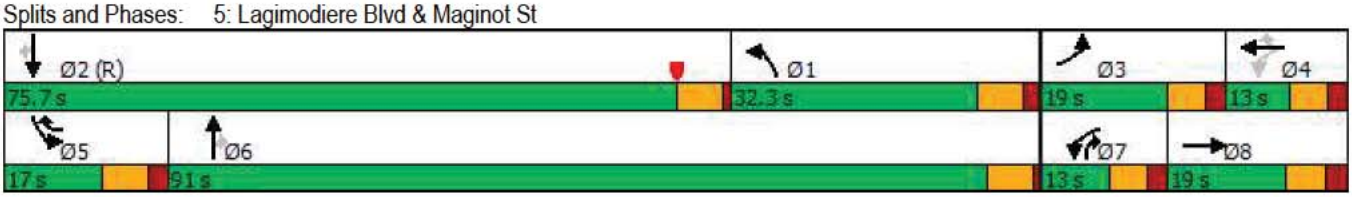


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	245	21	150	33	25	69	374	1710	63	72	1111	260
Future Volume (vph)	245	21	150	33	25	69	374	1710	63	72	1111	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage 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		
Satd. Flow (prot)	3309	2374	0	1659	1883	1555	2738	3544	1601	1738	3349	1498
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3309	2374	0	1738	1883	1555	2738	3544	1580	1738	3349	1498
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		163				120			80			252
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%	35%	10%	2%	5%	12%	3%	2%	5%	9%	9%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	266	186	0	36	27	75	407	1859	68	78	1208	283
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)	19.0	19.0		13.0	13.0	17.0	32.3	91.0	13.0	17.0	75.7	75.7
Total Split (%)	13.6%	13.6%		9.3%	9.3%	12.1%	23.1%	65.0%	9.3%	12.1%	54.1%	54.1%
Maximum Green (s)	13.0	12.4		7.0	6.7	10.3	25.6	85.3	7.0	10.3	70.0	70.0
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
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max	None	None	C-Max	C-Max
Walk Time (s)								7.0			7.0	7.0
Flash Dont Walk (s)								31.0			31.0	31.0
Pedestrian Calls (#/hr)								0			5	5
Act Effct Green (s)	14.2	11.0		10.9	6.4	17.4	25.6	90.0	96.4	9.6	74.0	74.0
Actuated g/C Ratio	0.10	0.08		0.08	0.05	0.12	0.18	0.64	0.69	0.07	0.53	0.53
v/c Ratio	0.79	0.55		0.27	0.31	0.25	0.81	0.82	0.06	0.66	0.68	0.31
Control Delay	78.8	19.0		55.5	74.4	3.5	68.8	23.8	1.1	88.7	27.7	4.2
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	78.8	19.0		55.5	74.4	3.5	68.8	23.8	1.1	88.7	27.7	4.2
LOS	E	B		E	E	A	E	C	A	F	C	A
Approach Delay		54.2			30.9			31.0			26.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			C			C			C	
90th %ile Green (s)	13.0	12.4		7.0	6.7	10.3	25.6	85.3	7.0	10.3	70.0	70.0
90th %ile Term Code	Max	Max		Max	Max	Max	Max	Coord	Max	Max	Coord	Coord
70th %ile Green (s)	13.0	12.4		7.0	6.7	10.3	25.6	85.3	7.0	10.3	70.0	70.0
70th %ile Term Code	Max	Hold		Max	Max	Max	Max	Coord	Max	Max	Coord	Coord
50th %ile Green (s)	13.0	12.4		7.0	6.7	10.3	25.6	85.3	7.0	10.3	70.0	70.0
50th %ile Term Code	Max	Hold		Max	Max	Max	Max	Coord	Max	Max	Coord	Coord
30th %ile Green (s)	19.1	5.5		7.0	0.0	9.9	25.6	92.6	7.0	9.9	76.9	76.9
30th %ile Term Code	Hold	Gap		Max	Skip	Gap	Hold	Coord	Max	Gap	Coord	Coord
10th %ile Green (s)	13.0	12.4		0.0	0.0	7.3	25.6	101.3	0.0	7.3	83.0	83.0
10th %ile Term Code	Max	Hold		Skip	Skip	Gap	Hold	Coord	Skip	Gap	Coord	Coord

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 0 (0%), Referenced to phase 2:SBT, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 31.7	Intersection LOS: C
Intersection Capacity Utilization 83.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Lagimodiere Blvd & Maginot St



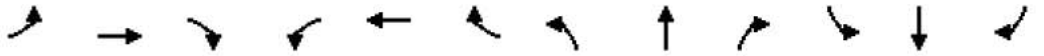
Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	0	15	11	0	23	14	406	31	64	509	7
Future Vol, veh/h	18	0	15	11	0	23	14	406	31	64	509	7
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	20	0	16	12	0	25	15	441	34	70	553	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	948	1202	557	1193	1189	238	561	0	0	475	0	0
Stage 1	697	697	-	488	488	-	-	-	-	-	-	-
Stage 2	251	505	-	705	701	-	-	-	-	-	-	-
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	228	184	529	153	187	764	1008	-	-	1085	-	-
Stage 1	431	442	-	531	549	-	-	-	-	-	-	-
Stage 2	732	539	-	426	440	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	207	169	529	139	171	764	1008	-	-	1085	-	-
Mov Cap-2 Maneuver	207	169	-	139	171	-	-	-	-	-	-	-
Stage 1	422	413	-	520	538	-	-	-	-	-	-	-
Stage 2	694	528	-	386	411	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.7	17.5	0.4	0.9
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1008	-	-	207	529	139	764	1085	-	-
HCM Lane V/C Ratio	0.015	-	-	0.095	0.031	0.086	0.033	0.064	-	-
HCM Control Delay (s)	8.6	0.1	-	24.2	12	33.3	9.9	8.5	-	-
HCM Lane LOS	A	A	-	C	B	D	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.1	0.3	0.1	0.2	-	-



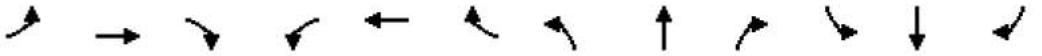
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1295	345	93	1028	11	554	1	162	14	0	11
Future Volume (vph)	7	1295	345	93	1028	11	554	1	162	14	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (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		
Satd. Flow (prot)	1141	3544	1601	1789	3517	0	1700	1622	0	0	1320	0
Flt Permitted	0.221			0.065			0.950	0.974			0.973	
Satd. Flow (perm)	265	3544	1601	122	3517	0	1700	1622	0	0	1320	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			174		1			35			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 (%)	60%	3%	2%	2%	3%	56%	2%	2%	2%	58%	2%	2%
Shared Lane Traffic (%)							34%					
Lane Group Flow (vph)	8	1408	375	101	1129	0	397	382	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		10.0	10.0	
Total Split (s)	56.0	56.0	56.0	13.0	69.0		38.0	38.0		13.0	13.0	
Total Split (%)	46.7%	46.7%	46.7%	10.8%	57.5%		31.7%	31.7%		10.8%	10.8%	
Maximum Green (s)	50.5	50.5	50.5	7.5	63.5		33.0	33.0		8.0	8.0	
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			Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0	7.0		7.0		7.0	7.0				
Flash Dont Walk (s)	11.0	11.0	11.0		11.0		15.0	15.0				
Pedestrian Calls (#/hr)	5	5	5		5		5	5				
Act Effct Green (s)	58.2	58.2	58.2	71.0	71.0		32.2	32.2			5.5	
Actuated g/C Ratio	0.48	0.48	0.48	0.59	0.59		0.27	0.27			0.05	
v/c Ratio	0.06	0.82	0.43	0.58	0.54		0.87	0.83			0.16	
Control Delay	8.9	12.3	1.6	31.2	17.4		61.8	53.2			1.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	8.9	12.3	1.6	31.2	17.4		61.8	53.2			1.9	
LOS	A	B	A	C	B		E	D			A	
Approach Delay		10.1			18.5			57.6			1.9	
Approach LOS		B			B			E			A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	50.5	50.5	50.5	7.5	63.5		35.5	35.5		5.5	5.5	
90th %ile Term Code	Coord	Coord	Coord	Max	Coord		Max	Max		Gap	Gap	
70th %ile Green (s)	50.5	50.5	50.5	7.5	63.5		35.5	35.5		5.5	5.5	
70th %ile Term Code	Coord	Coord	Coord	Max	Coord		Max	Max		Gap	Gap	
50th %ile Green (s)	50.5	50.5	50.5	8.3	64.3		34.7	34.7		5.5	5.5	
50th %ile Term Code	Coord	Coord	Coord	Max	Coord		Gap	Gap		Gap	Gap	
30th %ile Green (s)	66.4	66.4	66.4	7.2	79.1		30.4	30.4		0.0	0.0	
30th %ile Term Code	Coord	Coord	Coord	Gap	Coord		Gap	Gap		Skip	Skip	
10th %ile Green (s)	73.1	73.1	73.1	6.1	84.7		24.8	24.8		0.0	0.0	
10th %ile Term Code	Coord	Coord	Coord	Gap	Coord		Gap	Gap		Skip	Skip	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 47 (39%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 22.4	Intersection LOS: C
Intersection Capacity Utilization 81.3%	ICU Level of Service D
Analysis Period (min) 15	

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



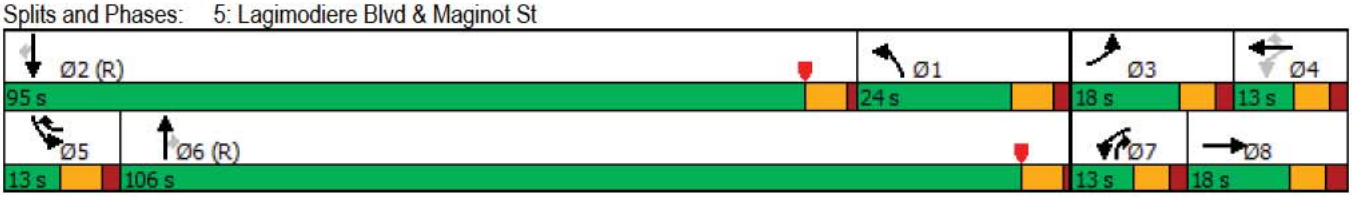


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	216	28	222	60	9	65	251	1025	16	18	1880	242
Future Volume (vph)	216	28	222	60	9	65	251	1025	16	18	1880	242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage 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		
Satd. Flow (prot)	3278	2862	0	1789	1883	1555	2738	3476	1601	1547	3544	1541
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3278	2862	0	1883	1883	1555	2738	3476	1601	1547	3544	1541
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		214				112			75			160
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%	18%	3%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	235	271	0	65	10	71	273	1114	17	20	2043	263
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)	18.0	18.0		13.0	13.0	13.0	24.0	106.0	13.0	13.0	95.0	95.0
Total Split (%)	12.0%	12.0%		8.7%	8.7%	8.7%	16.0%	70.7%	8.7%	8.7%	63.3%	63.3%
Maximum Green (s)	12.0	11.4		7.0	6.7	6.3	17.3	100.3	7.0	6.3	89.3	89.3
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
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	C-Max	None	None	C-Max	C-Max
Walk Time (s)								7.0			7.0	7.0
Flash Dont Walk (s)								31.0			22.0	22.0
Pedestrian Calls (#/hr)								0			5	5
Act Effct Green (s)	15.8	10.0		9.7	6.1	11.5	17.3	104.3	116.9	6.3	93.3	93.3
Actuated g/C Ratio	0.11	0.07		0.06	0.04	0.08	0.12	0.70	0.78	0.04	0.62	0.62
v/c Ratio	0.68	0.69		0.56	0.13	0.32	0.87	0.46	0.01	0.31	0.93	0.26
Control Delay	74.8	26.3		79.5	72.8	5.7	90.9	11.5	0.0	82.3	34.6	5.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.8	26.3		79.5	72.8	5.7	90.9	11.5	0.0	82.3	34.6	5.8
LOS	E	C		E	E	A	F	B	A	F	C	A
Approach Delay		48.8			43.1			26.8			31.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			C			C	
90th %ile Green (s)	12.0	11.4		7.0	6.7	6.3	17.3	100.3	7.0	6.3	89.3	89.3
90th %ile Term Code	Max	Max		Max	Max	Max	Max	Coord	Max	Max	Coord	Coord
70th %ile Green (s)	12.0	11.4		7.0	6.7	6.3	17.3	100.3	7.0	6.3	89.3	89.3
70th %ile Term Code	Max	Hold		Max	Max	Max	Max	Coord	Max	Max	Coord	Coord
50th %ile Green (s)	22.6	9.0		7.0	0.0	7.4	17.3	101.6	7.0	7.4	91.7	91.7
50th %ile Term Code	Hold	Gap		Max	Skip	Gap	Max	Coord	Max	Gap	Coord	Coord
30th %ile Green (s)	20.3	6.7		7.0	0.0	6.2	17.3	105.1	7.0	6.2	94.0	94.0
30th %ile Term Code	Hold	Gap		Max	Skip	Gap	Max	Coord	Max	Gap	Coord	Coord
10th %ile Green (s)	12.0	11.4		0.0	0.0	5.5	17.3	114.1	0.0	5.5	102.3	102.3
10th %ile Term Code	Max	Hold		Skip	Skip	Gap	Hold	Coord	Skip	Gap	Coord	Coord

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 137 (91%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 32.5	Intersection LOS: C
Intersection Capacity Utilization 92.1%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 5: Lagimodiere Blvd & Maginot St



Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	86	0	71	28	0	61	60	570	16	30	351	39
Future Vol, veh/h	86	0	71	28	0	61	60	570	16	30	351	39
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	93	0	77	30	0	66	65	620	17	33	382	42

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	909	1236	403	1267	1249	319	424	0	0	637	0	0
Stage 1	469	469	-	759	759	-	-	-	-	-	-	-
Stage 2	440	767	-	508	490	-	-	-	-	-	-	-
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	243	175	647	135	172	677	1133	-	-	945	-	-
Stage 1	574	560	-	366	414	-	-	-	-	-	-	-
Stage 2	567	410	-	546	548	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	199	154	647	108	151	677	1133	-	-	945	-	-
Mov Cap-2 Maneuver	199	154	-	108	151	-	-	-	-	-	-	-
Stage 1	523	540	-	333	377	-	-	-	-	-	-	-
Stage 2	466	374	-	464	529	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26	23.5	1	0.6
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1133	-	-	199	647	108	677	945	-	-
HCM Lane V/C Ratio	0.058	-	-	0.47	0.119	0.282	0.098	0.035	-	-
HCM Control Delay (s)	8.4	0.3	-	38.2	11.3	50.9	10.9	8.9	-	-
HCM Lane LOS	A	A	-	E	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	2.3	0.4	1.1	0.3	0.1	-	-

Intersection: 1: Paulette Duguary St/Dupuy Ave & Marion St

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	T	R	L	T	TR	L	LTR	LTR
Maximum Queue (m)	24.2	33.0	36.0	51.0	40.1	84.1	87.2	70.6	70.5	29.8
Average Queue (m)	4.3	10.9	12.3	23.9	11.0	43.4	40.1	39.1	40.0	11.3
95th Queue (m)	15.8	27.3	28.8	46.6	25.4	72.5	73.6	62.3	62.1	26.3
Link Distance (m)		399.2	399.2			415.3	415.3	85.5	85.5	134.6
Upstream Blk Time (%)								0	0	
Queuing Penalty (veh)								0	0	
Storage Bay Dist (m)	26.0			45.0	38.0					
Storage Blk Time (%)	0	1	0	1	0	8				
Queuing Penalty (veh)	1	0	0	3	0	5				

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

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	R	LT	R	LT	TR	L
Maximum Queue (m)	18.4	9.2	17.0	13.2	19.0	9.8	16.5
Average Queue (m)	4.4	3.6	3.5	4.9	2.3	0.4	4.2
95th Queue (m)	13.2	10.7	12.2	12.5	11.0	5.4	10.8
Link Distance (m)	71.5	71.5	62.0	62.0	81.2		
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)						10.0	22.1
Storage Blk Time (%)					1	0	0
Queuing Penalty (veh)					2	0	0

Zone Summary

Zone wide Queuing Penalty: 12

Intersection: 1: Paulette Duguary St/Dupuy Ave & Marion St

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	T	R	L	T	TR	L	LTR	LTR
Maximum Queue (m)	19.5	69.2	137.1	44.1	46.3	105.2	113.2	85.4	88.5	36.7
Average Queue (m)	2.5	39.4	42.7	18.9	19.1	55.0	52.7	55.2	59.9	10.0
95th Queue (m)	11.8	63.7	97.1	34.8	46.5	102.0	101.7	81.5	84.7	27.1
Link Distance (m)		399.2	399.2			415.3	415.3	85.5	85.5	134.6
Upstream Blk Time (%)			0					0	1	
Queuing Penalty (veh)			0					2	2	
Storage Bay Dist (m)	26.0			45.0	38.0					
Storage Blk Time (%)	1	29	9	0	1	17				
Queuing Penalty (veh)	4	2	30	1	5	16				

Intersection: 2: Paulette Duguary 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)	34.1	19.8	24.6	21.8	21.1	19.0	11.5	0.6
Average Queue (m)	14.3	9.8	7.6	9.3	5.2	0.7	2.3	0.0
95th Queue (m)	26.7	17.3	17.8	17.5	14.2	8.2	8.0	0.6
Link Distance (m)	71.5	71.5	62.0	62.0	81.2			85.5
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)						10.0	22.1	
Storage Blk Time (%)					2	0	0	
Queuing Penalty (veh)					5	0	0	

Zone Summary

Zone wide Queuing Penalty: 68

Intersection: 5: Lagimodiere Blvd & Maginot St

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB
Directions Served	L	L	T	TR	L	T	R	L	L	T	T	R
Maximum Queue (m)	58.8	64.9	29.8	29.0	29.4	21.8	32.4	109.2	129.7	229.2	226.5	95.1
Average Queue (m)	33.8	37.4	4.9	2.5	10.2	7.0	13.3	51.2	70.5	100.2	94.6	8.2
95th Queue (m)	55.2	57.4	17.0	17.3	23.4	17.3	26.6	93.8	120.4	188.1	188.6	47.6
Link Distance (m)		124.4	124.4		76.4	76.4	76.4			334.7	334.7	
Upstream Blk Time (%)										0	0	
Queuing Penalty (veh)										0	0	
Storage Bay Dist (m)	75.0			50.0				100.0	100.0			80.0
Storage Blk Time (%)		0		0				0	2	8	9	
Queuing Penalty (veh)		0		0				4	16	28	6	

Intersection: 5: Lagimodiere Blvd & Maginot St

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (m)	54.0	125.6	115.0	95.0
Average Queue (m)	20.0	79.5	71.0	8.9
95th Queue (m)	39.9	113.1	107.4	52.6
Link Distance (m)		482.8	482.8	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	90.0			80.0
Storage Blk Time (%)		3	3	0
Queuing Penalty (veh)		2	8	0

Intersection: 5: Lagimodiere Blvd & Maginot St

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB
Directions Served	L	L	T	TR	L	T	R	L	L	T	T	R
Maximum Queue (m)	51.9	64.9	68.5	59.4	43.4	11.3	23.4	74.8	94.6	109.7	99.1	9.5
Average Queue (m)	28.1	33.6	11.1	10.7	17.4	2.6	9.7	33.9	47.0	38.9	32.9	0.7
95th Queue (m)	47.0	52.2	44.6	44.2	34.0	8.8	19.6	64.0	78.2	83.4	71.3	4.6
Link Distance (m)		124.4	124.4		76.4	76.4	76.4			334.7	334.7	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	75.0			50.0				100.0	100.0			80.0
Storage Blk Time (%)		0	0	3				0	0	0	0	
Queuing Penalty (veh)		0	0	0				0	1	1	0	

Intersection: 5: Lagimodiere Blvd & Maginot St

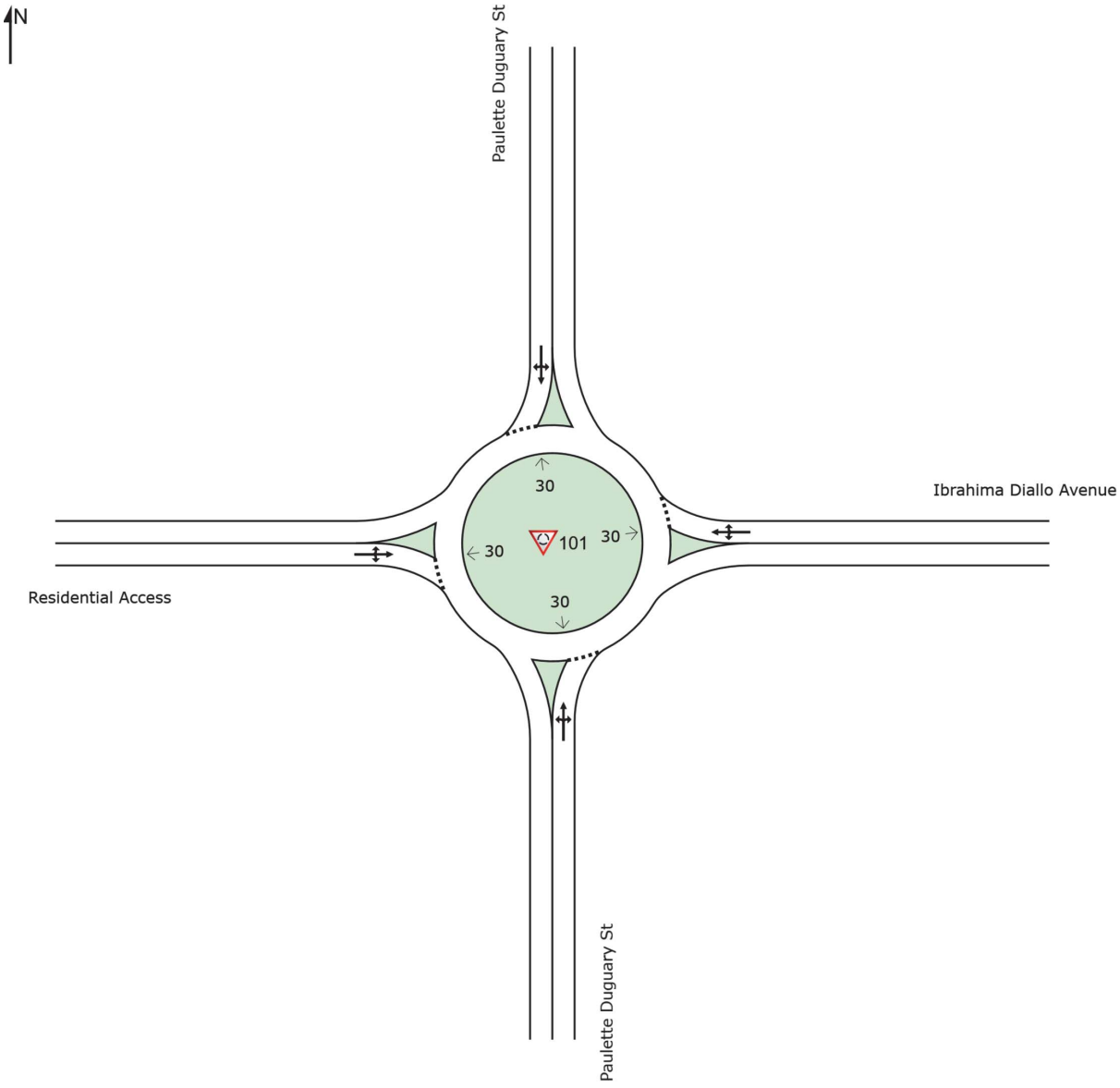
Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (m)	86.8	248.7	241.8	95.0
Average Queue (m)	9.3	150.6	147.6	34.0
95th Queue (m)	43.3	261.9	265.0	108.8
Link Distance (m)		482.8	482.8	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	90.0			80.0
Storage Blk Time (%)		20	18	0
Queuing Penalty (veh)		4	44	0

SITE LAYOUT

Site: 101 [Collector Roundabout - 2029 AM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2029 AM
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [Collector Roundabout - 2029 AM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2029 AM
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Paulette Duguary St														
1	L2	1	0.0	1	0.0	0.044	8.9	LOS A	0.2	1.6	0.44	0.41	0.44	49.3
2	T1	35	2.0	37	2.0	0.044	3.2	LOS A	0.2	1.6	0.44	0.41	0.44	48.7
3	R2	7	2.0	7	2.0	0.044	3.8	LOS A	0.2	1.6	0.44	0.41	0.44	47.4
Approach		43	2.0	45	2.0	0.044	3.5	LOS A	0.2	1.6	0.44	0.41	0.44	48.5
East: Ibrahima Diallo Avenue														
4	L2	1	2.0	1	2.0	0.099	7.8	LOS A	0.5	3.8	0.23	0.36	0.23	50.1
5	T1	6	2.0	6	2.0	0.099	2.1	LOS A	0.5	3.8	0.23	0.36	0.23	49.5
6	R2	114	2.0	120	2.0	0.099	2.7	LOS A	0.5	3.8	0.23	0.36	0.23	48.1
Approach		121	2.0	127	2.0	0.099	2.7	LOS A	0.5	3.8	0.23	0.36	0.23	48.2
North: Paulette Duguary St														
7	L2	229	2.0	241	2.0	0.165	7.5	LOS A	1.0	6.8	0.06	0.57	0.06	47.6
8	T1	10	2.0	11	2.0	0.165	1.8	LOS A	1.0	6.8	0.06	0.57	0.06	47.1
9	R2	11	2.0	12	2.0	0.165	2.3	LOS A	1.0	6.8	0.06	0.57	0.06	45.9
Approach		250	2.0	263	2.0	0.165	7.0	LOS A	1.0	6.8	0.06	0.57	0.06	47.5
West: Residential Access														
10	L2	31	2.0	33	2.0	0.047	8.8	LOS A	0.2	1.7	0.41	0.54	0.41	47.6
11	T1	16	2.0	17	2.0	0.047	3.0	LOS A	0.2	1.7	0.41	0.54	0.41	47.1
12	R2	1	0.0	1	0.0	0.047	3.6	LOS A	0.2	1.7	0.41	0.54	0.41	45.9
Approach		48	2.0	51	2.0	0.047	6.7	LOS A	0.2	1.7	0.41	0.54	0.41	47.4
All Vehicles		462	2.0	486	2.0	0.165	5.5	LOS A	1.0	6.8	0.18	0.49	0.18	47.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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ROUNDABOUT ANALYSIS

Site: 101 [Collector Roundabout - 2029 AM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2029 AM
Roundabout

Roundabout Basic Parameters

Location	Name	Central Island Diam	Circ Width	Insc Diam	Entry Radius	Entry Angle	Circ Lanes	Entry Lanes	Av.Entry Lane Width	App. Dist	Prop Queued Upstr Signal	Extra Bunching
		m	m	m	m	°			m	m		%
South	Paulette	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
East	Duguary St Ibrahima Diallo Avenue	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
North	Paulette Duguary St	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
West	Residential Access	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

5 Not Applicable (single Site analysis or unconnected Site in Network analysis).

Roundabout Entry and Circulating / Exiting Stream Parameters

To Approach	Turn	Lane No	Lane Type	Opng Flow	Opng Flow	In-Bunch Hdwy	Prop. Bunched	Cap Const Effect	Priority Sharing	OD Factor	HVE for Entry	Critical Gap [Hdwy	Dist]	Follow-up Hdwy
				veh/h	pcu/h	sec						sec	m	sec
South: Paulette Duguary St Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
West	L2	1	Dominant	291	293	2.00	0.300	No	No	0.995	1.00	4.96	35.2	2.53
North	T1	1	Dominant	291	293	2.00	0.300	No	No	0.995	1.01	5.01	35.5	2.56
East	R2	1	Dominant	291	293	2.00	0.300	No	No	0.995	1.01	5.01	35.5	2.56
East: Ibrahima Diallo Avenue Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
South	L2	1	Dominant	71	71	2.00	0.083	No	No	0.995	1.01	5.25	47.5	2.58
West	T1	1	Dominant	71	71	2.00	0.083	No	No	0.995	1.01	5.25	47.5	2.58
North	R2	1	Dominant	71	71	2.00	0.083	No	No	0.995	1.01	5.25	47.5	2.58
North: Paulette Duguary St Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
East	L2	1	Dominant	8	8	2.00	0.010	No	No	0.999	1.01	4.59	45.9	2.23
South	T1	1	Dominant	8	8	2.00	0.010	No	No	0.999	1.01	4.59	45.9	2.23
West	R2	1	Dominant	8	8	2.00	0.010	No	No	0.999	1.01	4.59	45.9	2.23
West: Residential Access Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
North	L2	1	Dominant	253	255	2.00	0.267	No	No	0.996	1.01	5.07	35.6	2.57
East	T1	1	Dominant	253	255	2.00	0.267	No	No	0.996	1.01	5.07	35.6	2.57
South	R2	1	Dominant	253	255	2.00	0.267	No	No	0.996	1.00	5.02	35.3	2.54

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

Circulating Lane Flow Rates

Circ. Lane No	Circulating Flow Rate		
	veh/h	pcu/h	Percent
South: Paulette Duguary St			

Lane 1	291	293	100.0
Approach	291	293	
East: Ibrahima Diallo Avenue			
Lane 1	71	71	100.0
Approach	71	71	
North: Paulette Duguary St			
Lane 1	8	8	100.0
Approach	8	8	
West: Residential Access			
Lane 1	253	255	100.0
Approach	253	255	

Roundabout Capacity Model: The SIDRA Standard roundabout capacity model option is in use. This model takes into account the total circulating flow as well as the effect of flow distribution in circulating lanes on the entry capacity results.

Gap Acceptance Cycle Parameters (Lanes)

Opposed Lane	Cycle Time sec	Blocked Time sec	Unblocked Time sec	Unblocked Time Ratio	Minimum Delay sec
South: Paulette Duguary St					
1	21.62	5.67	15.95	0.738	1.3
East: Ibrahima Diallo Avenue					
1	58.93	4.69	54.24	0.920	0.3
North: Paulette Duguary St					
1	431.08	3.77	427.31	0.991	0.0
West: Residential Access					
1	23.25	5.46	17.79	0.765	1.1

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

Gap Acceptance Cycle Parameters (Movements)

To Approach	Turn	Opsd Lane No	Cycle Time sec	Blocked Time sec	Unblocked Time sec	Unblocked Time Ratio	Minimum Delay sec
South: Paulette Duguary St							
West	L2	1	21.55	5.62	15.93	0.739	1.3
North	T1	1	21.62	5.68	15.95	0.737	1.3
East	R2	1	21.62	5.68	15.95	0.737	1.3
East: Ibrahima Diallo Avenue							
South	L2	1	58.93	4.69	54.24	0.920	0.3
West	T1	1	58.93	4.69	54.24	0.920	0.3
North	R2	1	58.93	4.69	54.24	0.920	0.3
North: Paulette Duguary St							
East	L2	1	431.08	3.77	427.31	0.991	0.0
South	T1	1	431.08	3.77	427.31	0.991	0.0
West	R2	1	431.08	3.77	427.31	0.991	0.0
West: Residential Access							
North	L2	1	23.25	5.46	17.79	0.765	1.1
East	T1	1	23.25	5.46	17.79	0.765	1.1
South	R2	1	23.18	5.40	17.78	0.767	1.1

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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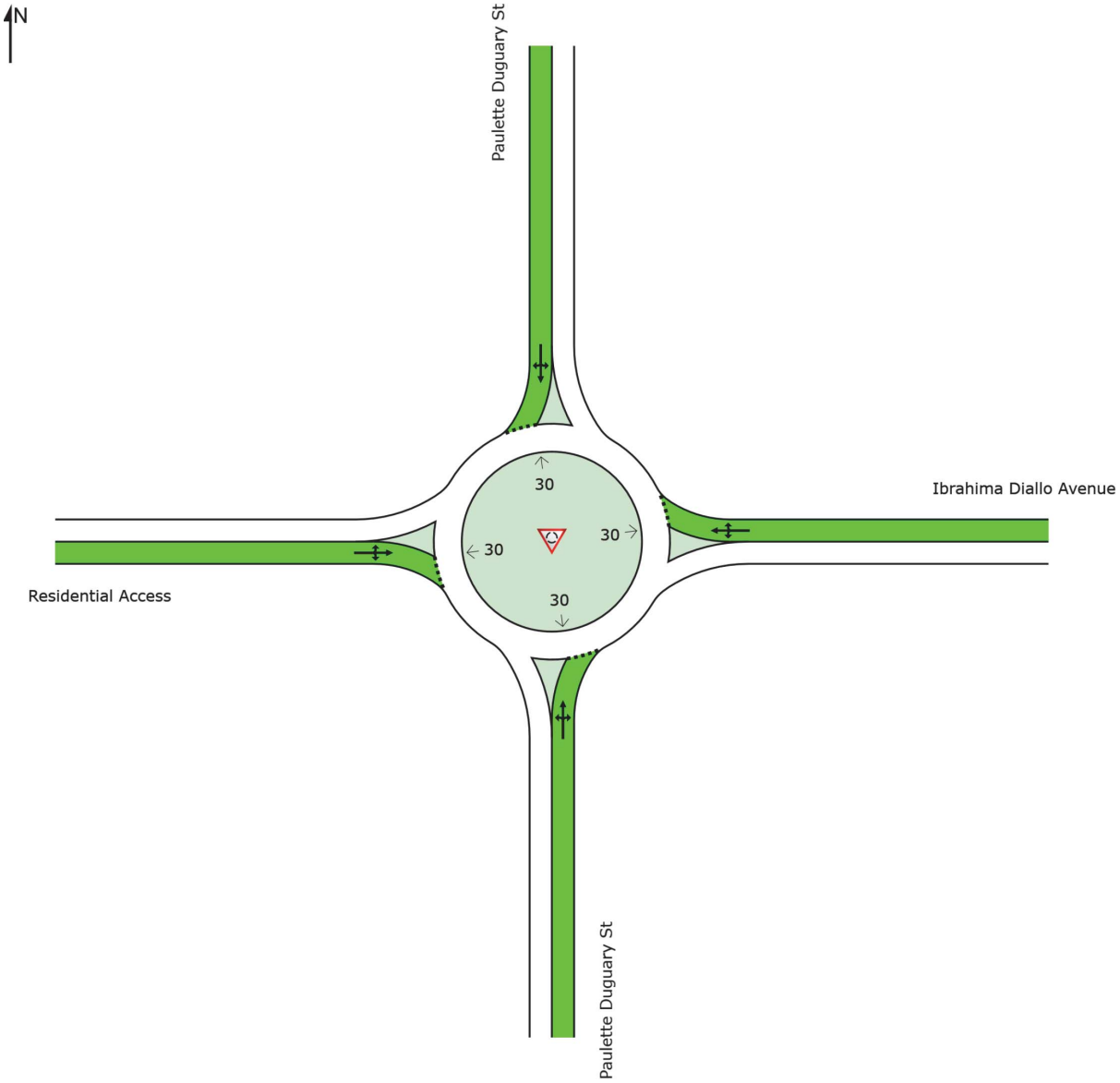
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

Site: 101 [Collector Roundabout - 2029 AM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2029 AM
Roundabout

	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.04	0.10	0.16	0.05	0.16



Colour code based on Degree of Saturation

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

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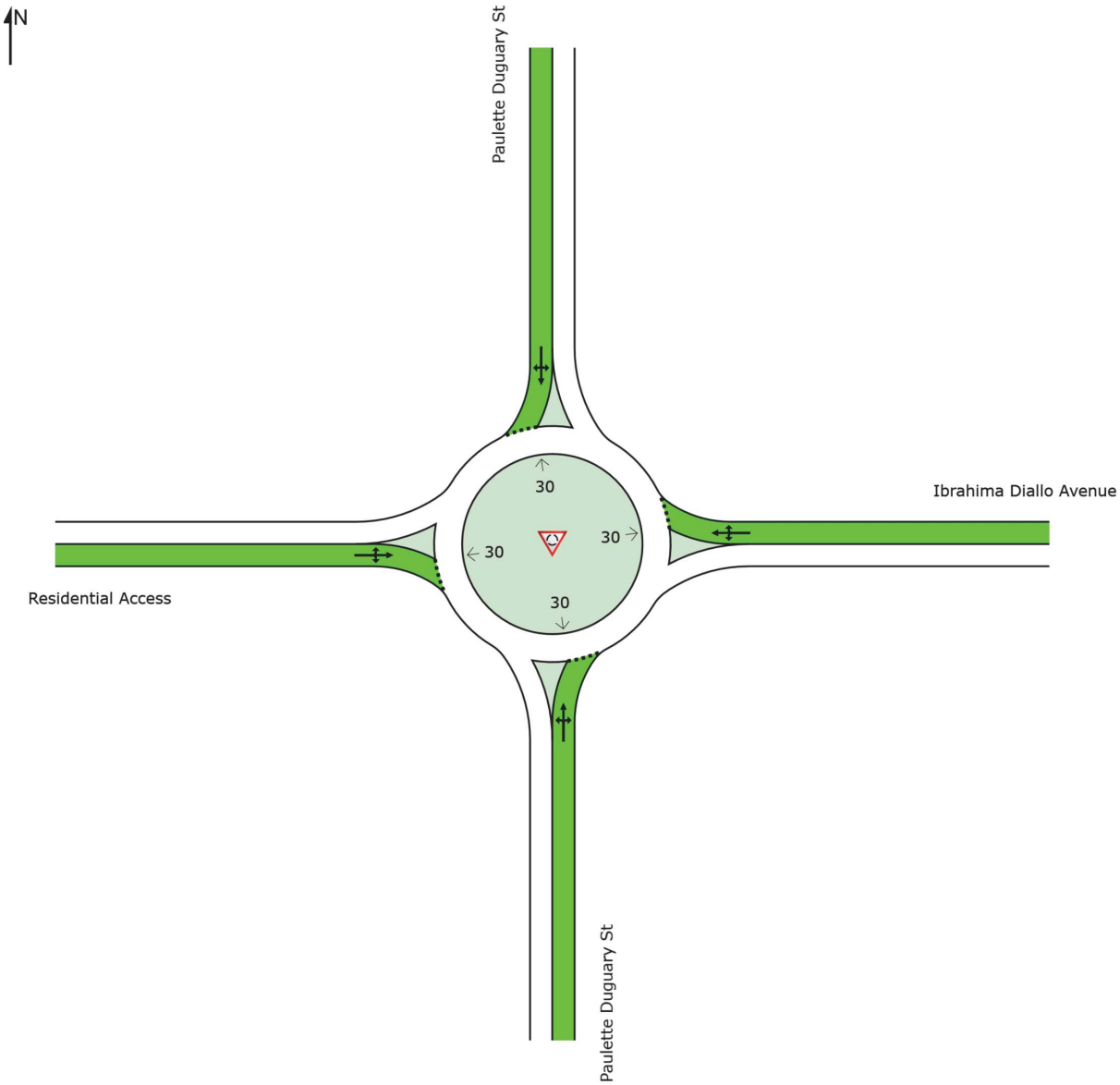
LEVEL OF SERVICE

Lane Level of Service

Site: 101 [Collector Roundabout - 2029 AM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2029 AM
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	A	A



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: SIDRA Roundabout LOS
Delay Model: SIDRA Standard (Geometric Delay is included).

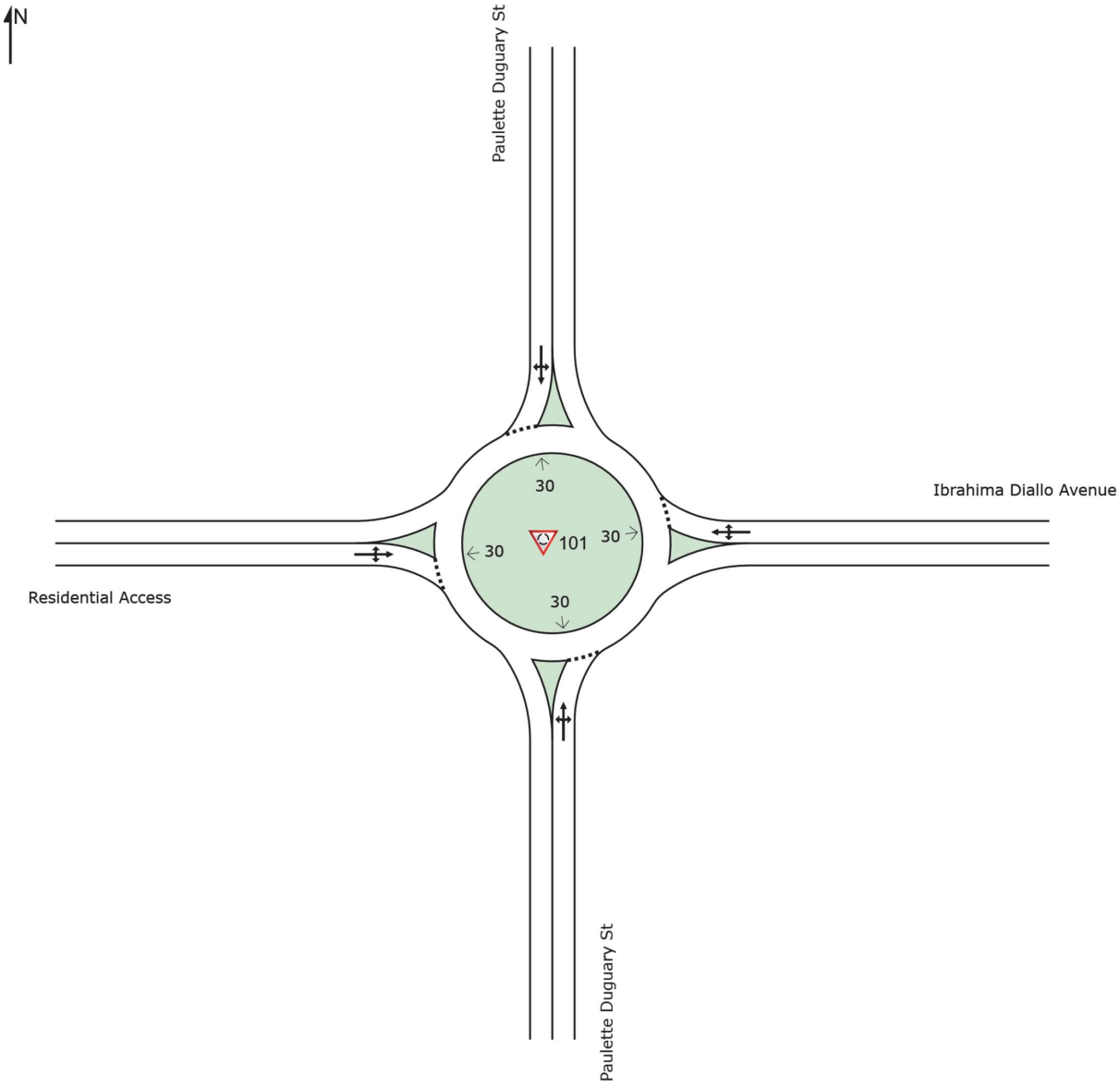
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SITE LAYOUT

Site: 101 [Collector Roundabout - 2029 PM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2029 PM
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [Collector Roundabout - 2029 PM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2029 PM
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Paulette Duguary St														
1	L2	1	0.0	1	0.0	0.030	8.4	LOS A	0.1	1.1	0.36	0.36	0.36	49.6
2	T1	24	2.0	25	2.0	0.030	2.7	LOS A	0.1	1.1	0.36	0.36	0.36	49.0
3	R2	7	2.0	7	2.0	0.030	3.3	LOS A	0.1	1.1	0.36	0.36	0.36	47.7
Approach		32	1.9	34	1.9	0.030	3.0	LOS A	0.1	1.1	0.36	0.36	0.36	48.7
East: Ibrahima Diallo Avenue														
4	L2	9	2.0	9	2.0	0.201	7.7	LOS A	1.2	8.5	0.20	0.36	0.20	50.1
5	T1	17	2.0	18	2.0	0.201	2.0	LOS A	1.2	8.5	0.20	0.36	0.20	49.5
6	R2	240	2.0	253	2.0	0.201	2.6	LOS A	1.2	8.5	0.20	0.36	0.20	48.1
Approach		266	2.0	280	2.0	0.201	2.7	LOS A	1.2	8.5	0.20	0.36	0.20	48.3
North: Paulette Duguary St														
7	L2	155	2.0	163	2.0	0.160	7.6	LOS A	0.9	6.6	0.14	0.51	0.14	48.1
8	T1	34	2.0	36	2.0	0.160	1.9	LOS A	0.9	6.6	0.14	0.51	0.14	47.6
9	R2	33	2.0	35	2.0	0.160	2.4	LOS A	0.9	6.6	0.14	0.51	0.14	46.4
Approach		222	2.0	234	2.0	0.160	5.9	LOS A	0.9	6.6	0.14	0.51	0.14	47.8
West: Residential Access														
10	L2	24	2.0	25	2.0	0.033	8.5	LOS A	0.2	1.2	0.37	0.53	0.37	47.6
11	T1	10	2.0	11	2.0	0.033	2.8	LOS A	0.2	1.2	0.37	0.53	0.37	47.1
12	R2	1	0.0	1	0.0	0.033	3.3	LOS A	0.2	1.2	0.37	0.53	0.37	45.9
Approach		35	1.9	37	1.9	0.033	6.7	LOS A	0.2	1.2	0.37	0.53	0.37	47.4
All Vehicles		555	2.0	584	2.0	0.201	4.3	LOS A	1.2	8.5	0.20	0.43	0.20	48.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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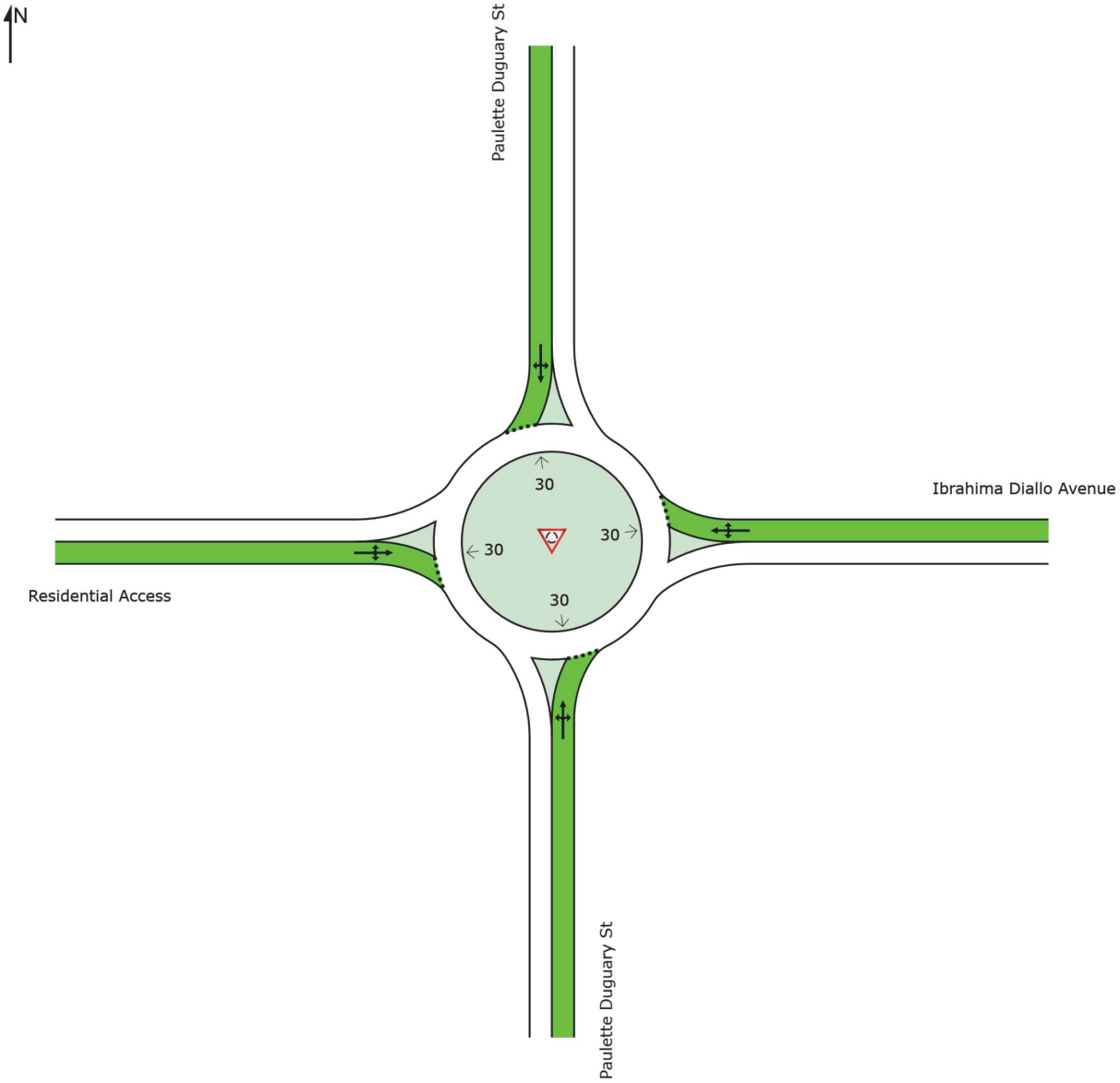
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

Site: 101 [Collector Roundabout - 2029 PM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2029 PM
Roundabout

	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.03	0.20	0.16	0.03	0.20



Colour code based on Degree of Saturation

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

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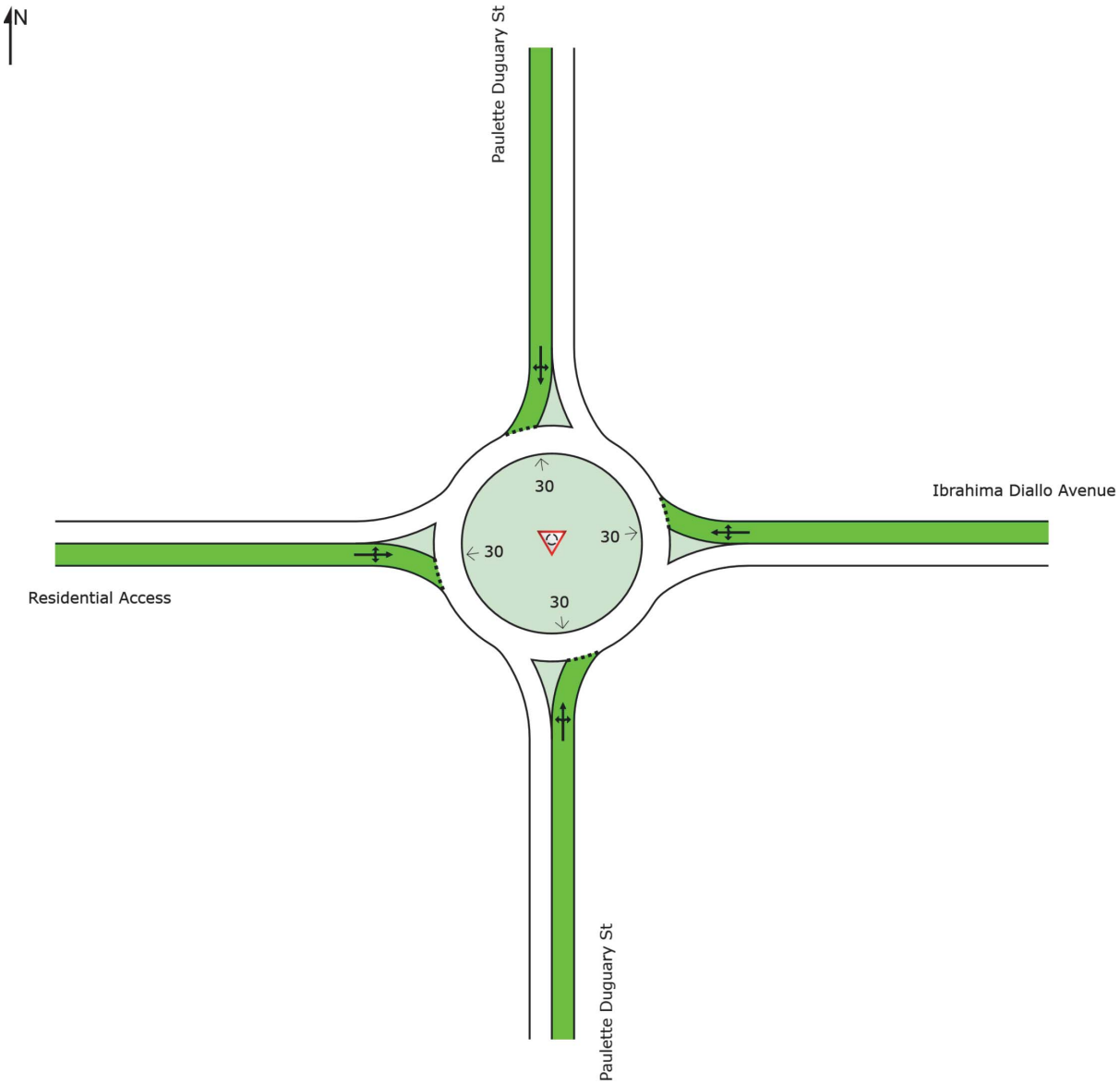
LEVEL OF SERVICE

Lane Level of Service

Site: 101 [Collector Roundabout - 2029 PM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2029 PM
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	A	A



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: SIDRA Roundabout LOS
Delay Model: SIDRA Standard (Geometric Delay is included).

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ROUNDABOUT ANALYSIS

Site: 101 [Collector Roundabout - 2029 PM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2029 PM
Roundabout

Roundabout Basic Parameters

Location	Name	Central Island Diam	Circ Width	Insc Diam	Entry Radius	Entry Angle	Circ Lanes	Entry Lanes	Av.Entry Lane Width	App. Dist	Prop Queued Upstr Signal	Extra Bunching
		m	m	m	m	°			m	m		%
South	Paulette	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
East	Duguary St Ibrahima	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
North	Diallo Avenue Paulette	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
West	Duguary St Residential Access	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

5 Not Applicable (single Site analysis or unconnected Site in Network analysis).

Roundabout Entry and Circulating / Exiting Stream Parameters

To Approach	Turn	Lane No	Lane Type	Opng Flow	Opng Flow	In-Bunch Hdwy	Prop. Bunched	Cap Const Effect	Priority Sharing	OD Factor	HVE for Entry	Critical Gap [Hdwy	Dist]	Follow-up Hdwy
				veh/h	pcu/h	sec						sec	m	sec
South: Paulette Duguary St Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
West	L2	1	Dominant	199	201	2.00	0.217	No	No	0.994	1.00	5.10	36.1	2.57
North	T1	1	Dominant	199	201	2.00	0.217	No	No	0.994	1.01	5.15	36.5	2.59
East	R2	1	Dominant	199	201	2.00	0.217	No	No	0.994	1.01	5.15	36.5	2.59
East: Ibrahima Diallo Avenue Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
South	L2	1	Dominant	52	52	2.00	0.062	No	No	0.997	1.01	4.98	44.4	2.44
West	T1	1	Dominant	52	52	2.00	0.062	No	No	0.997	1.01	4.98	44.4	2.44
North	R2	1	Dominant	52	52	2.00	0.062	No	No	0.997	1.01	4.98	44.4	2.44
North: Paulette Duguary St Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
East	L2	1	Dominant	28	29	2.00	0.034	No	No	0.998	1.01	4.90	46.5	2.39
South	T1	1	Dominant	28	29	2.00	0.034	No	No	0.998	1.01	4.90	46.5	2.39
West	R2	1	Dominant	28	29	2.00	0.034	No	No	0.998	1.01	4.90	46.5	2.39
West: Residential Access Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
North	L2	1	Dominant	208	211	2.00	0.226	No	No	0.993	1.01	5.14	38.9	2.59
East	T1	1	Dominant	208	211	2.00	0.226	No	No	0.993	1.01	5.14	38.9	2.59
South	R2	1	Dominant	208	211	2.00	0.226	No	No	0.993	1.00	5.09	38.5	2.56

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

Circulating Lane Flow Rates

Circ. Lane No	Circulating Flow Rate		
	veh/h	pcu/h	Percent
South: Paulette Duguary St			

Lane 1	199	201	100.0
Approach	199	201	
East: Ibrahima Diallo Avenue			
Lane 1	52	52	100.0
Approach	52	52	
North: Paulette Duguary St			
Lane 1	28	29	100.0
Approach	28	29	
West: Residential Access			
Lane 1	208	211	100.0
Approach	208	211	

Roundabout Capacity Model: The SIDRA Standard roundabout capacity model option is in use. This model takes into account the total circulating flow as well as the effect of flow distribution in circulating lanes on the entry capacity results.

Gap Acceptance Cycle Parameters (Lanes)

Opposed Lane	Cycle Time sec	Blocked Time sec	Unblocked Time sec	Unblocked Time Ratio	Minimum Delay sec
South: Paulette Duguary St					
1	26.86	5.25	21.61	0.805	0.9
East: Ibrahima Diallo Avenue					
1	77.02	4.29	72.74	0.944	0.2
North: Paulette Duguary St					
1	133.15	4.10	129.05	0.969	0.1
West: Residential Access					
1	26.11	5.32	20.79	0.796	0.9

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

Gap Acceptance Cycle Parameters (Movements)

To Approach	Turn	Opsd Lane No	Cycle Time sec	Blocked Time sec	Unblocked Time sec	Unblocked Time Ratio	Minimum Delay sec
South: Paulette Duguary St							
West	L2	1	26.79	5.19	21.60	0.806	0.8
North	T1	1	26.86	5.25	21.61	0.805	0.9
East	R2	1	26.86	5.25	21.61	0.805	0.9
East: Ibrahima Diallo Avenue							
South	L2	1	77.02	4.29	72.74	0.944	0.2
West	T1	1	77.02	4.29	72.74	0.944	0.2
North	R2	1	77.02	4.29	72.74	0.944	0.2
North: Paulette Duguary St							
East	L2	1	133.15	4.10	129.05	0.969	0.1
South	T1	1	133.15	4.10	129.05	0.969	0.1
West	R2	1	133.15	4.10	129.05	0.969	0.1
West: Residential Access							
North	L2	1	26.12	5.32	20.80	0.796	0.9
East	T1	1	26.12	5.32	20.80	0.796	0.9
South	R2	1	26.05	5.27	20.78	0.798	0.9

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

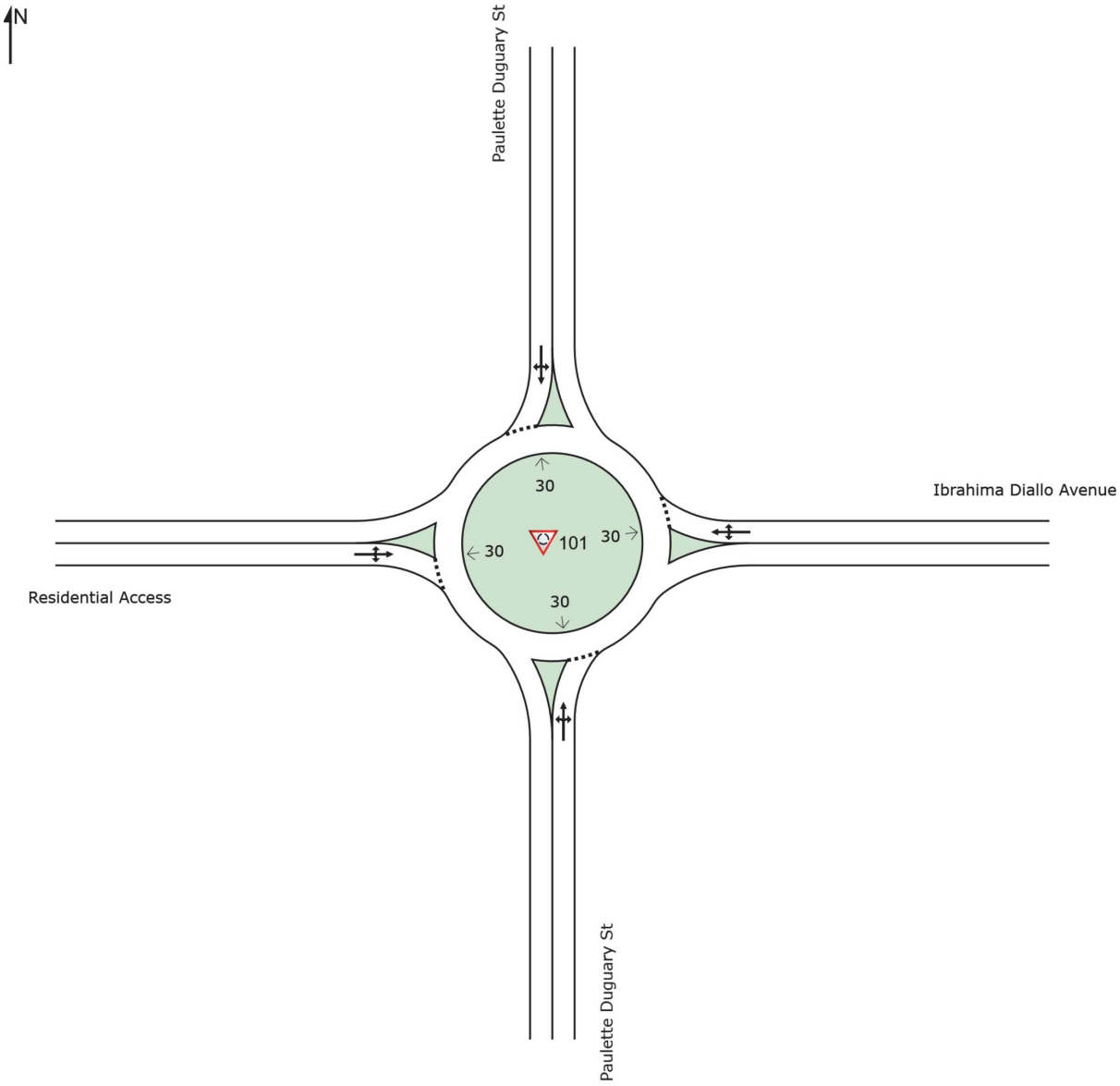
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SITE LAYOUT

Site: 101 [Collector Roundabout - 2034 AM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2034 AM
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [Collector Roundabout - 2034 AM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2034 AM
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Paulette Duguary St														
1	L2	8	2.0	8	2.0	0.228	10.2	LOS B	1.3	9.5	0.60	0.57	0.60	48.6
2	T1	192	2.0	202	2.0	0.228	4.5	LOS A	1.3	9.5	0.60	0.57	0.60	48.1
3	R2	1	2.0	1	2.0	0.228	5.1	LOS A	1.3	9.5	0.60	0.57	0.60	46.8
Approach		201	2.0	212	2.0	0.228	4.8	LOS A	1.3	9.5	0.60	0.57	0.60	48.1
East: Ibrahima Diallo Avenue														
4	L2	1	2.0	1	2.0	0.213	9.2	LOS A	1.3	9.4	0.52	0.53	0.52	49.2
5	T1	8	2.0	8	2.0	0.213	3.4	LOS A	1.3	9.4	0.52	0.53	0.52	48.6
6	R2	200	2.0	211	2.0	0.213	4.0	LOS A	1.3	9.4	0.52	0.53	0.52	47.3
Approach		209	2.0	220	2.0	0.213	4.0	LOS A	1.3	9.4	0.52	0.53	0.52	47.4
North: Paulette Duguary St														
7	L2	323	2.0	340	2.0	0.356	7.5	LOS A	2.7	18.9	0.13	0.47	0.13	48.5
8	T1	191	2.0	201	2.0	0.356	1.8	LOS A	2.7	18.9	0.13	0.47	0.13	48.0
9	R2	22	2.0	23	2.0	0.356	2.4	LOS A	2.7	18.9	0.13	0.47	0.13	46.7
Approach		536	2.0	564	2.0	0.356	5.3	LOS A	2.7	18.9	0.13	0.47	0.13	48.2
West: Residential Access														
10	L2	60	2.0	63	2.0	0.117	10.8	LOS B	0.6	4.6	0.62	0.68	0.62	46.6
11	T1	25	2.0	26	2.0	0.117	5.1	LOS A	0.6	4.6	0.62	0.68	0.62	46.1
12	R2	9	2.0	9	2.0	0.117	5.6	LOS A	0.6	4.6	0.62	0.68	0.62	45.0
Approach		94	2.0	99	2.0	0.117	8.8	LOS A	0.6	4.6	0.62	0.68	0.62	46.3
All Vehicles		1040	2.0	1095	2.0	0.356	5.2	LOS A	2.7	18.9	0.34	0.52	0.34	47.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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ROUNDABOUT ANALYSIS

Site: 101 [Collector Roundabout - 2034 AM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2034 AM
Roundabout

Roundabout Basic Parameters

Location	Name	Central Island Diam	Circ Width	Insc Diam	Entry Radius	Entry Angle	Circ Lanes	Entry Lanes	Av.Entry Lane Width	App. Dist	Prop Queued Upstr Signal	Extra Bunching
		m	m	m	m	°			m	m		%
South	Paulette	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
East	Duguary St Ibrahima	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
North	Diallo Avenue Paulette	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
West	Duguary St Residential Access	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

5 Not Applicable (single Site analysis or unconnected Site in Network analysis).

Roundabout Entry and Circulating / Exiting Stream Parameters

To Approach	Turn	Lane No	Lane Type	Opng Flow	Opng Flow	In-Bunch Hdwy	Prop. Bunched	Cap Const Effect	Priority Sharing	OD Factor	HVE for Entry	Critical Gap [Hdwy	Dist]	Follow-up Hdwy
				veh/h	pcu/h	sec						sec	m	sec
South: Paulette Duguary St Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
West	L2	1	Dominant	429	434	2.00	0.411	No	No	0.986	1.01	4.80	34.1	2.50
North	T1	1	Dominant	429	434	2.00	0.411	No	No	0.986	1.01	4.80	34.1	2.50
East	R2	1	Dominant	429	434	2.00	0.411	No	No	0.986	1.01	4.80	34.1	2.50
East: Ibrahima Diallo Avenue Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
South	L2	1	Dominant	274	276	2.00	0.285	No	No	0.968	1.01	5.03	50.1	2.56
West	T1	1	Dominant	274	276	2.00	0.285	No	No	0.968	1.01	5.03	50.1	2.56
North	R2	1	Dominant	274	276	2.00	0.285	No	No	0.968	1.01	5.03	50.1	2.56
North: Paulette Duguary St Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
East	L2	1	Dominant	18	18	2.00	0.022	No	No	0.998	1.01	4.58	40.4	2.23
South	T1	1	Dominant	18	18	2.00	0.022	No	No	0.998	1.01	4.58	40.4	2.23
West	R2	1	Dominant	18	18	2.00	0.022	No	No	0.998	1.01	4.58	40.4	2.23
West: Residential Access Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
North	L2	1	Dominant	542	548	2.00	0.490	No	No	0.980	1.01	4.63	39.0	2.46
East	T1	1	Dominant	542	548	2.00	0.490	No	No	0.980	1.01	4.63	39.0	2.46
South	R2	1	Dominant	542	548	2.00	0.490	No	No	0.980	1.01	4.63	39.0	2.46

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

Circulating Lane Flow Rates

Circ. Lane No	Circulating Flow Rate		
	veh/h	pcu/h	Percent
South: Paulette Duguary St			

Lane 1	429	434	100.0
Approach	429	434	
East: Ibrahima Diallo Avenue			
Lane 1	274	276	100.0
Approach	274	276	
North: Paulette Duguary St			
Lane 1	18	18	100.0
Approach	18	18	
West: Residential Access			
Lane 1	542	548	100.0
Approach	542	548	

Roundabout Capacity Model: The SIDRA Standard roundabout capacity model option is in use. This model takes into account the total circulating flow as well as the effect of flow distribution in circulating lanes on the entry capacity results.

Gap Acceptance Cycle Parameters (Lanes)

Opposed Lane	Cycle Time sec	Blocked Time sec	Unblocked Time sec	Unblocked Time Ratio	Minimum Delay sec
South: Paulette Duguary St					
1	18.57	6.62	11.95	0.643	2.0
East: Ibrahima Diallo Avenue					
1	22.91	6.21	16.70	0.729	1.2
North: Paulette Duguary St					
1	206.63	3.93	202.70	0.981	0.1
West: Residential Access					
1	17.65	7.44	10.20	0.578	2.7

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

Gap Acceptance Cycle Parameters (Movements)

To Approach	Turn	Opsd Lane No	Cycle Time sec	Blocked Time sec	Unblocked Time sec	Unblocked Time Ratio	Minimum Delay sec
South: Paulette Duguary St							
West	L2	1	18.57	6.62	11.95	0.643	2.0
North	T1	1	18.57	6.62	11.95	0.643	2.0
East	R2	1	18.57	6.62	11.95	0.643	2.0
East: Ibrahima Diallo Avenue							
South	L2	1	22.91	6.21	16.70	0.729	1.2
West	T1	1	22.91	6.21	16.70	0.729	1.2
North	R2	1	22.91	6.21	16.70	0.729	1.2
North: Paulette Duguary St							
East	L2	1	206.63	3.93	202.70	0.981	0.1
South	T1	1	206.63	3.93	202.70	0.981	0.1
West	R2	1	206.63	3.93	202.70	0.981	0.1
West: Residential Access							
North	L2	1	17.65	7.44	10.20	0.578	2.7
East	T1	1	17.65	7.44	10.20	0.578	2.7
South	R2	1	17.65	7.44	10.20	0.578	2.7

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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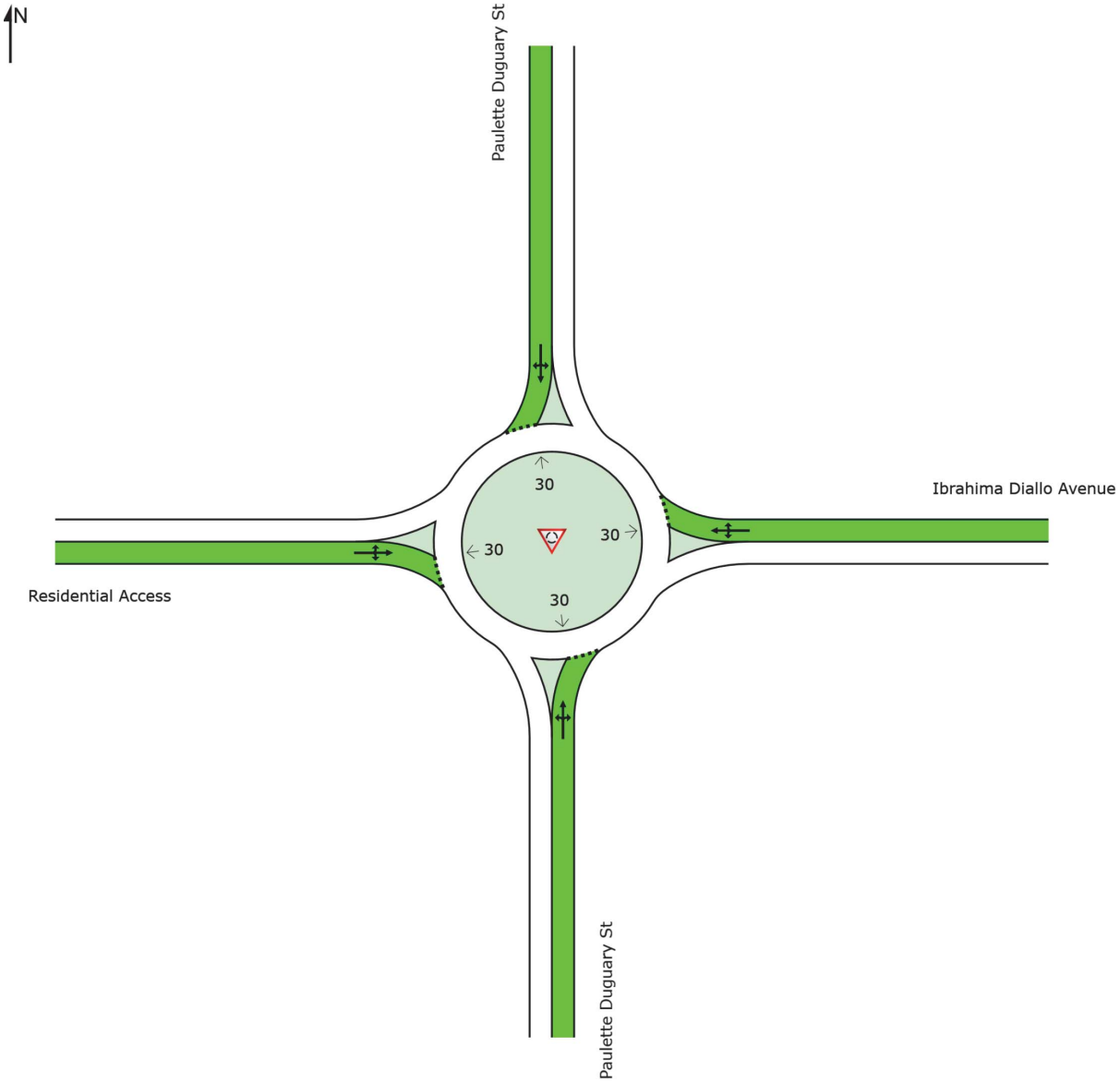
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

Site: 101 [Collector Roundabout - 2034 AM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2034 AM
Roundabout

	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.23	0.21	0.36	0.12	0.36



Colour code based on Degree of Saturation

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

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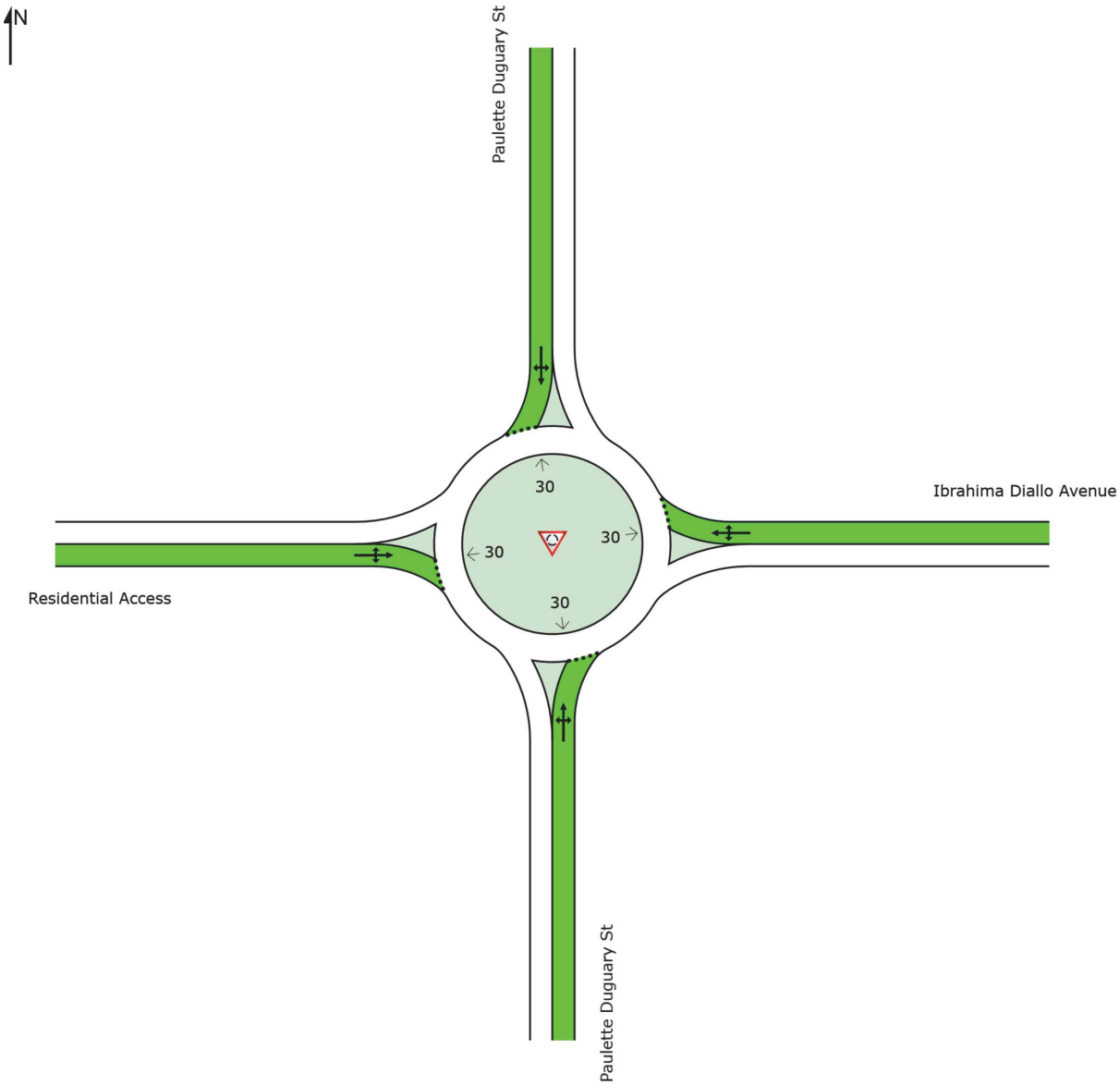
LEVEL OF SERVICE

Lane Level of Service

Site: 101 [Collector Roundabout - 2034 AM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2034 AM
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	A	A



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: SIDRA Roundabout LOS
Delay Model: SIDRA Standard (Geometric Delay is included).

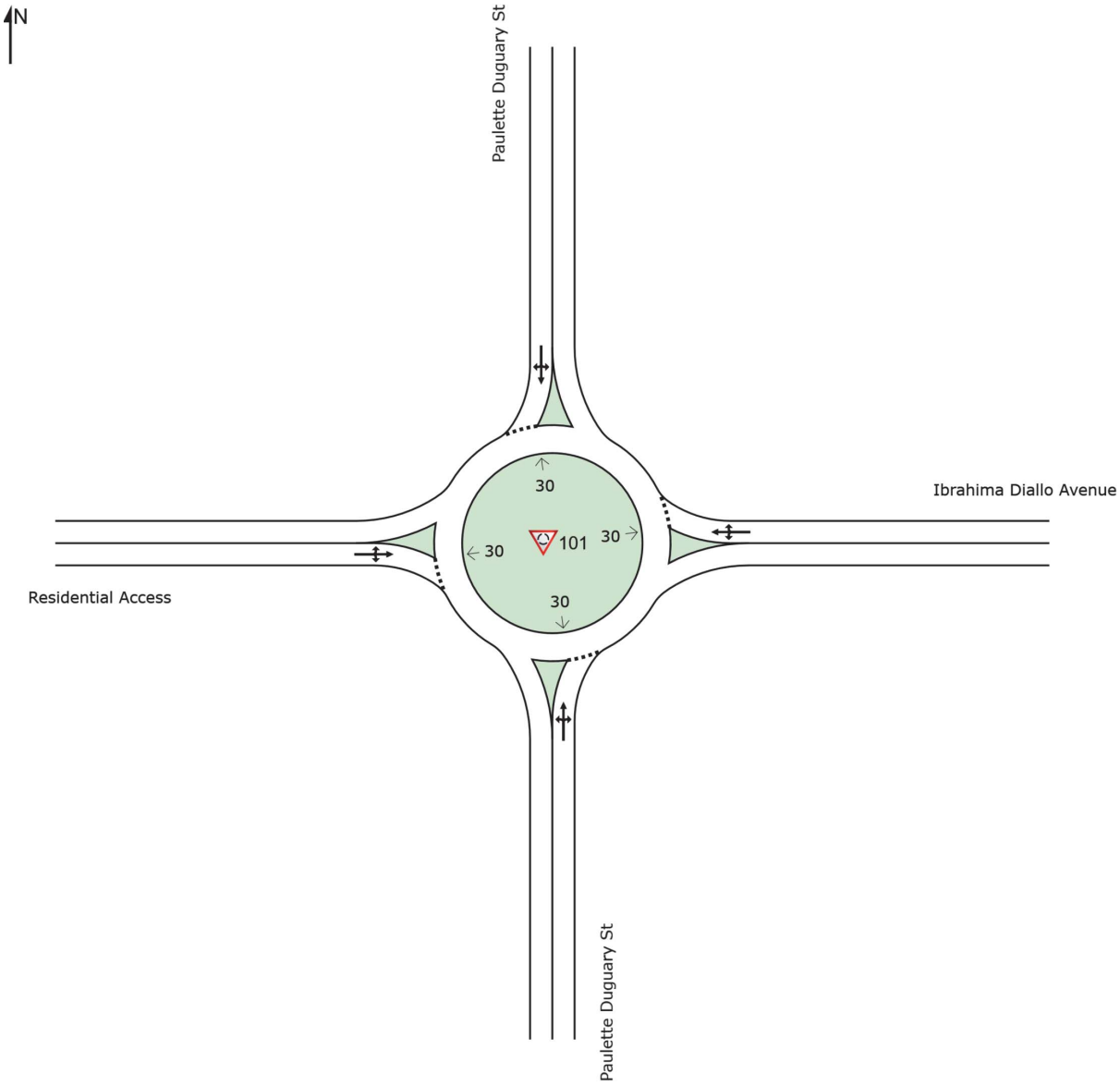
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SITE LAYOUT

Site: 101 [Collector Roundabout - 2034 PM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2034 PM
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [Collector Roundabout - 2034 PM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2034 PM
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Paulette Duguary St														
1	L2	2	2.0	2	2.0	0.127	9.6	LOS A	0.7	4.9	0.52	0.49	0.52	49.0
2	T1	115	2.0	121	2.0	0.127	3.9	LOS A	0.7	4.9	0.52	0.49	0.52	48.4
3	R2	1	2.0	1	2.0	0.127	4.5	LOS A	0.7	4.9	0.52	0.49	0.52	47.1
Approach		118	2.0	124	2.0	0.127	4.0	LOS A	0.7	4.9	0.52	0.49	0.52	48.4
East: Ibrahima Diallo Avenue														
4	L2	1	2.0	1	2.0	0.439	8.8	LOS A	3.4	24.2	0.51	0.49	0.51	49.3
5	T1	16	2.0	17	2.0	0.439	3.1	LOS A	3.4	24.2	0.51	0.49	0.51	48.7
6	R2	484	2.0	509	2.0	0.439	3.6	LOS A	3.4	24.2	0.51	0.49	0.51	47.4
Approach		501	2.0	527	2.0	0.439	3.6	LOS A	3.4	24.2	0.51	0.49	0.51	47.4
North: Paulette Duguary St														
7	L2	278	2.0	293	2.0	0.304	7.5	LOS A	2.2	15.8	0.14	0.48	0.14	48.4
8	T1	131	2.0	138	2.0	0.304	1.8	LOS A	2.2	15.8	0.14	0.48	0.14	47.9
9	R2	41	2.0	43	2.0	0.304	2.4	LOS A	2.2	15.8	0.14	0.48	0.14	46.6
Approach		450	2.0	474	2.0	0.304	5.4	LOS A	2.2	15.8	0.14	0.48	0.14	48.1
West: Residential Access														
10	L2	49	2.0	52	2.0	0.094	9.9	LOS A	0.5	3.6	0.55	0.63	0.55	47.2
11	T1	25	2.0	26	2.0	0.094	4.2	LOS A	0.5	3.6	0.55	0.63	0.55	46.7
12	R2	9	2.0	9	2.0	0.094	4.8	LOS A	0.5	3.6	0.55	0.63	0.55	45.5
Approach		83	2.0	87	2.0	0.094	7.7	LOS A	0.5	3.6	0.55	0.63	0.55	46.9
All Vehicles		1152	2.0	1213	2.0	0.439	4.7	LOS A	3.4	24.2	0.37	0.50	0.37	47.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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ROUNDABOUT ANALYSIS

Site: 101 [Collector Roundabout - 2034 PM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2034 PM
Roundabout

Roundabout Basic Parameters

Location	Name	Central Island Diam	Circ Width	Insc Diam	Entry Radius	Entry Angle	Circ Lanes	Entry Lanes	Av.Entry Lane Width	App. Dist	Prop Queued Upstr Signal	Extra Bunching
		m	m	m	m	°			m	m		%
South	Paulette	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
East	Duguary St Ibrahima	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
North	Diallo Avenue Paulette	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
West	Duguary St Residential Access	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

5 Not Applicable (single Site analysis or unconnected Site in Network analysis).

Roundabout Entry and Circulating / Exiting Stream Parameters

To Approach	Turn	Lane No	Lane Type	Opng Flow	Opng Flow	In-Bunch Hdwy	Prop. Bunched	Cap Const Effect	Priority Sharing	OD Factor	HVE for Entry	Critical Gap [Hdwy	Dist]	Follow-up Hdwy
				veh/h	pcu/h	sec						sec	m	sec
South: Paulette Duguary St Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
West	L2	1	Dominant	371	374	2.00	0.366	No	No	0.989	1.01	4.88	34.9	2.53
North	T1	1	Dominant	371	374	2.00	0.366	No	No	0.989	1.01	4.88	34.9	2.53
East	R2	1	Dominant	371	374	2.00	0.366	No	No	0.989	1.01	4.88	34.9	2.53
East: Ibrahima Diallo Avenue Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
South	L2	1	Dominant	175	176	2.00	0.193	No	No	0.983	1.01	4.95	48.4	2.48
West	T1	1	Dominant	175	176	2.00	0.193	No	No	0.983	1.01	4.95	48.4	2.48
North	R2	1	Dominant	175	176	2.00	0.193	No	No	0.983	1.01	4.95	48.4	2.48
North: Paulette Duguary St Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
East	L2	1	Dominant	20	20	2.00	0.024	No	No	0.997	1.01	4.64	48.2	2.26
South	T1	1	Dominant	20	20	2.00	0.024	No	No	0.997	1.01	4.64	48.2	2.26
West	R2	1	Dominant	20	20	2.00	0.024	No	No	0.997	1.01	4.64	48.2	2.26
West: Residential Access Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
North	L2	1	Dominant	432	436	2.00	0.413	No	No	0.987	1.01	4.79	39.3	2.50
East	T1	1	Dominant	432	436	2.00	0.413	No	No	0.987	1.01	4.79	39.3	2.50
South	R2	1	Dominant	432	436	2.00	0.413	No	No	0.987	1.01	4.79	39.3	2.50

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

Circulating Lane Flow Rates

Circ. Lane No	Circulating Flow Rate		
	veh/h	pcu/h	Percent
South: Paulette Duguary St			

Lane 1	371	374	100.0
Approach	371	374	
East: Ibrahima Diallo Avenue			
Lane 1	175	176	100.0
Approach	175	176	
North: Paulette Duguary St			
Lane 1	20	20	100.0
Approach	20	20	
West: Residential Access			
Lane 1	432	436	100.0
Approach	432	436	

Roundabout Capacity Model: The SIDRA Standard roundabout capacity model option is in use. This model takes into account the total circulating flow as well as the effect of flow distribution in circulating lanes on the entry capacity results.

Gap Acceptance Cycle Parameters (Lanes)

Opposed Lane	Cycle Time sec	Blocked Time sec	Unblocked Time sec	Unblocked Time Ratio	Minimum Delay sec
South: Paulette Duguary St					
1	19.50	6.21	13.28	0.681	1.7
East: Ibrahima Diallo Avenue					
1	29.27	5.23	24.04	0.821	0.7
North: Paulette Duguary St					
1	185.92	4.17	181.75	0.978	0.1
West: Residential Access					
1	18.52	6.61	11.91	0.643	2.0

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

Gap Acceptance Cycle Parameters (Movements)

To Approach	Turn	Opsd Lane No	Cycle Time sec	Blocked Time sec	Unblocked Time sec	Unblocked Time Ratio	Minimum Delay sec
South: Paulette Duguary St							
West	L2	1	19.50	6.21	13.28	0.681	1.7
North	T1	1	19.50	6.21	13.28	0.681	1.7
East	R2	1	19.50	6.21	13.28	0.681	1.7
East: Ibrahima Diallo Avenue							
South	L2	1	29.27	5.23	24.04	0.821	0.7
West	T1	1	29.27	5.23	24.04	0.821	0.7
North	R2	1	29.27	5.23	24.04	0.821	0.7
North: Paulette Duguary St							
East	L2	1	185.92	4.17	181.75	0.978	0.1
South	T1	1	185.92	4.17	181.75	0.978	0.1
West	R2	1	185.92	4.17	181.75	0.978	0.1
West: Residential Access							
North	L2	1	18.52	6.61	11.91	0.643	2.0
East	T1	1	18.52	6.61	11.91	0.643	2.0
South	R2	1	18.52	6.61	11.91	0.643	2.0

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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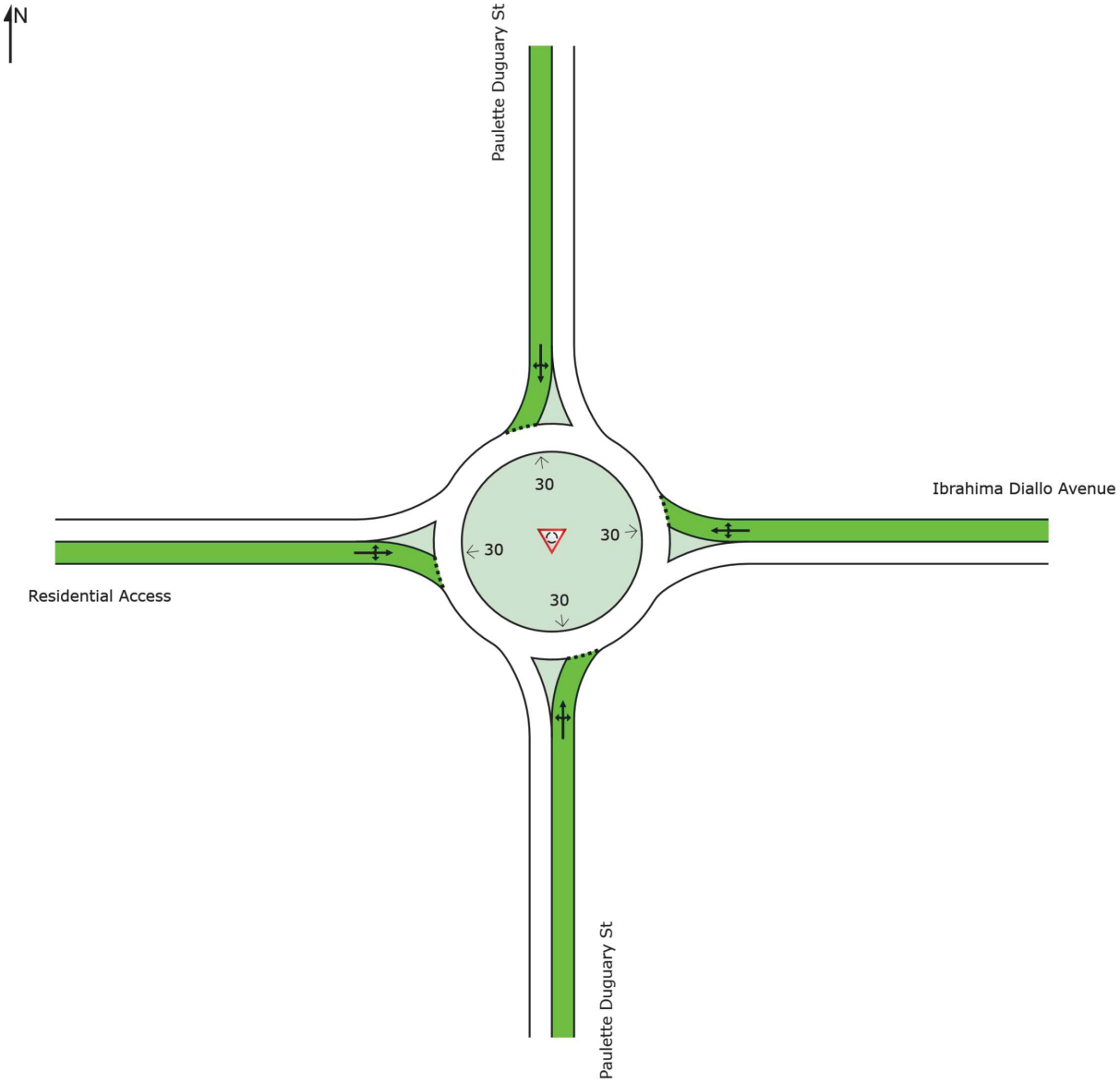
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

Site: 101 [Collector Roundabout - 2034 PM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2034 PM
Roundabout

	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.13	0.44	0.30	0.09	0.44



Colour code based on Degree of Saturation

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

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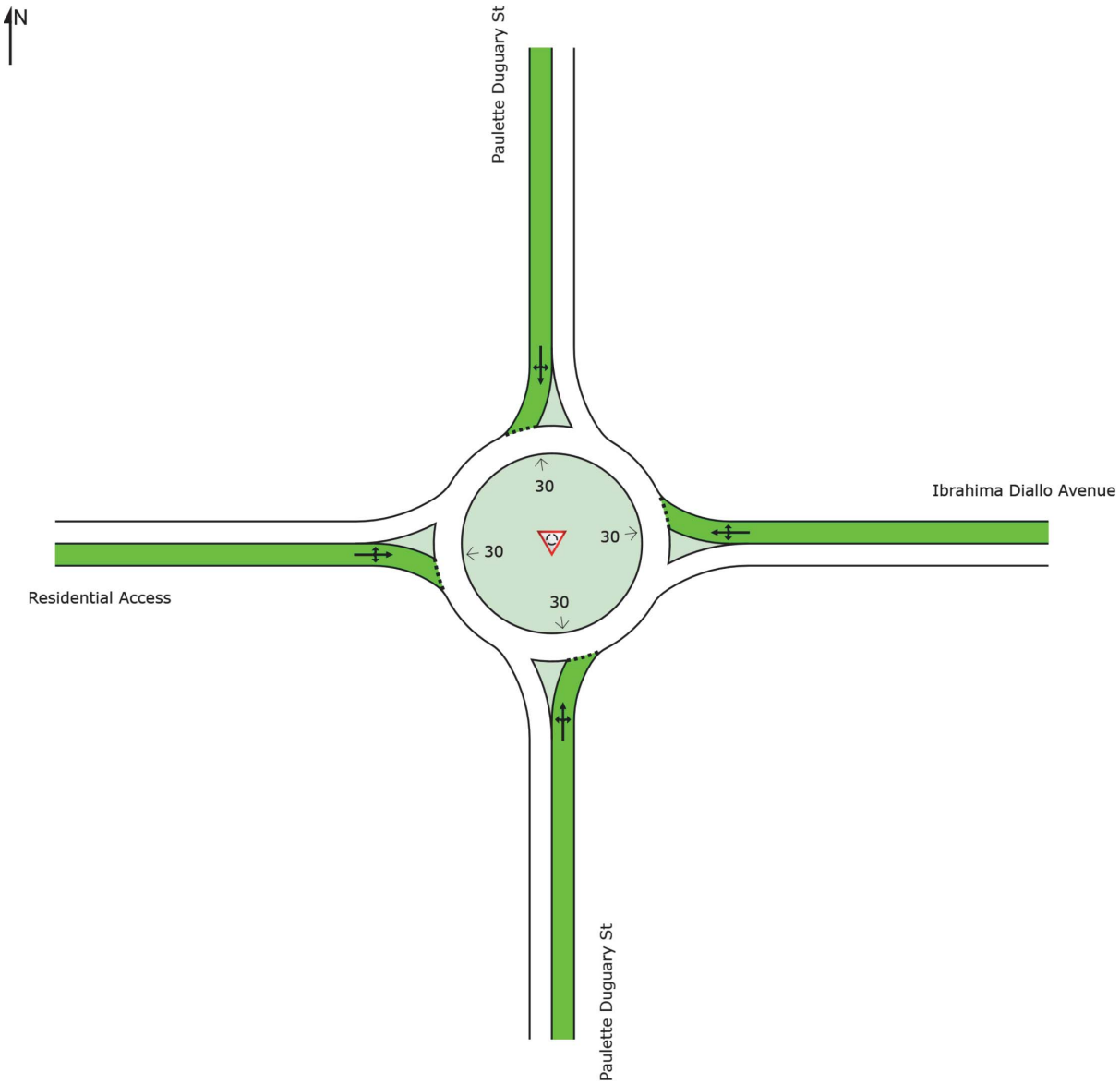
LEVEL OF SERVICE

Lane Level of Service

Site: 101 [Collector Roundabout - 2034 PM (Site Folder: Collector Roundabout)]

New Collector Roundabout
Site Category: 2034 PM
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	A	A



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: SIDRA Roundabout LOS
Delay Model: SIDRA Standard (Geometric Delay is included).

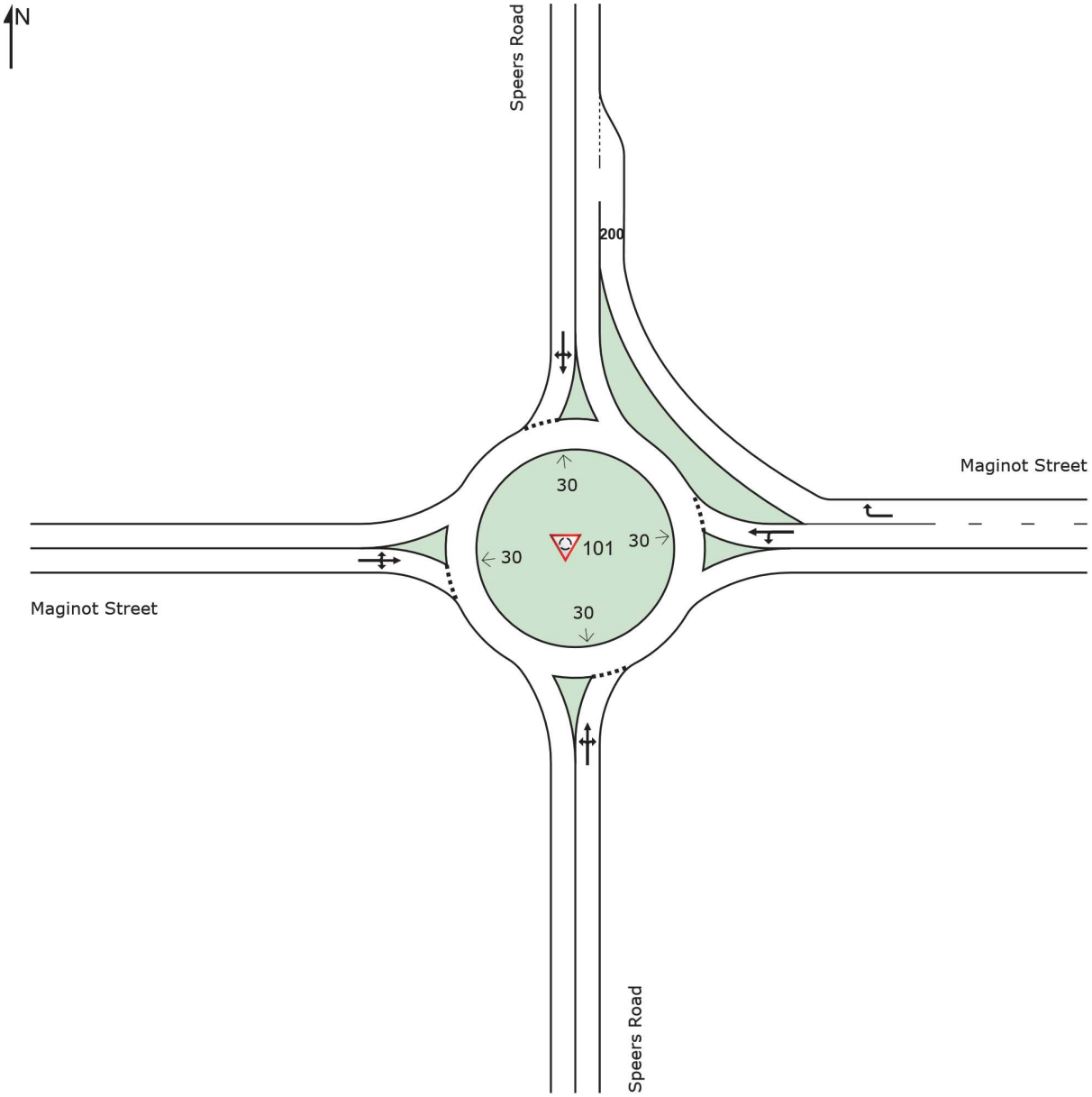
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SITE LAYOUT

Site: 101 [Maginot Street & Speers Road - 2029 AM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2029 AM
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [Maginot Street & Speers Road - 2029 AM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2029 AM
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Speers Road														
1	L2	6	1.0	6	1.0	0.191	9.1	LOS A	1.1	8.0	0.49	0.51	0.49	49.2
2	T1	30	6.0	32	6.0	0.191	3.5	LOS A	1.1	8.0	0.49	0.51	0.49	48.6
3	R2	155	1.0	163	1.0	0.191	3.9	LOS A	1.1	8.0	0.49	0.51	0.49	45.7
Approach		191	1.8	201	1.8	0.191	4.0	LOS A	1.1	8.0	0.49	0.51	0.49	46.5
East: Maginot Street														
4	L2	110	1.0	116	1.0	0.145	7.7	LOS A	0.8	6.1	0.23	0.46	0.23	47.5
5	T1	98	8.0	103	8.0	0.145	2.1	LOS A	0.8	6.1	0.23	0.46	0.23	46.7
6	R2	256	1.0	269	1.0	0.143	2.1	LOS A	0.0	0.0	0.00	0.31	0.00	48.4
Approach		464	2.5	488	2.5	0.145	3.4	LOS A	0.8	6.1	0.10	0.38	0.10	47.8
North: Speers Road														
7	L2	85	15.0	89	15.0	0.131	9.0	LOS A	0.7	5.6	0.44	0.57	0.44	28.2
8	T1	20	1.0	21	1.0	0.131	3.0	LOS A	0.7	5.6	0.44	0.57	0.44	47.0
9	R2	23	13.0	24	13.0	0.131	3.8	LOS A	0.7	5.6	0.44	0.57	0.44	45.7
Approach		128	12.5	135	12.5	0.131	7.1	LOS A	0.7	5.6	0.44	0.57	0.44	34.2
West: Maginot Street														
10	L2	36	1.0	38	1.0	0.170	8.8	LOS A	1.0	7.0	0.45	0.47	0.45	48.7
11	T1	127	6.0	134	6.0	0.170	3.2	LOS A	1.0	7.0	0.45	0.47	0.45	46.8
12	R2	10	1.0	11	1.0	0.170	3.7	LOS A	1.0	7.0	0.45	0.47	0.45	46.9
Approach		173	4.7	182	4.7	0.170	4.4	LOS A	1.0	7.0	0.45	0.47	0.45	47.4
All Vehicles		956	4.1	1006	4.1	0.191	4.2	LOS A	1.1	8.0	0.29	0.45	0.29	44.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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ROUNDABOUT ANALYSIS

Site: 101 [Maginot Street & Speers Road - 2029 AM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2029 AM
Roundabout

Roundabout Basic Parameters

Location	Name	Central Island Diam	Circ Width	Insc Diam	Entry Radius	Entry Angle	Circ Lanes	Entry Lanes	Av.Entry Lane Width	App. Dist	Prop Queued Upstr Signal	Extra Bunching
		m	m	m	m	°			m	m		%
South	Speers Road	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
East	Maginot Street	30.00	5.00	40.0	20.0	30.0	1	2[18]	3.70	100.0	NA[5]	0.0
North	Speers Road	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
West	Maginot Street	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

5 Not Applicable (single Site analysis or unconnected Site in Network analysis).
18 Exclusive slip/bypass lane is included in Entry Lanes count.

Roundabout Entry and Circulating / Exiting Stream Parameters

To Approach	Turn	Lane No	Lane Type	Opng Flow	Opng Flow	In-Bunch Hdwy	Prop. Bunched	Cap Const Effect	Priority Sharing	OD Factor	HVE for Entry	Critical Gap [Hdwy	Dist]	Follow-up Hdwy
				veh/h	pcu/h	sec						sec	m	sec
South: Speers Road Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
West	L2	1	Dominant	261	272	2.00	0.281	No	No	0.981	1.01	5.02	45.2	2.55
North	T1	1	Dominant	261	272	2.00	0.281	No	No	0.981	1.03	5.14	46.3	2.61
East	R2	1	Dominant	261	272	2.00	0.281	No	No	0.981	1.01	5.02	45.2	2.55
East: Maginot Street Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
South	L2	1	Dominant	76	77	2.00	0.089	No	No	0.994	1.01	4.41	38.0	2.17
West	T1	1	Dominant	76	77	2.00	0.089	No	No	0.994	1.04	4.57	39.3	2.25
North	R2	2	Continuous											
North: Speers Road Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
East	L2	1	Dominant	225	230	2.00	0.244	No	No	0.988	1.08	5.44	47.7	2.75
South	T1	1	Dominant	225	230	2.00	0.244	No	No	0.988	1.01	5.08	44.6	2.57
West	R2	1	Dominant	225	230	2.00	0.244	No	No	0.988	1.07	5.39	47.3	2.72
West: Maginot Street Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
North	L2	1	Dominant	226	234	2.00	0.247	No	No	0.987	1.01	5.08	36.8	2.57
East	T1	1	Dominant	226	234	2.00	0.247	No	No	0.987	1.03	5.20	37.7	2.63
South	R2	1	Dominant	226	234	2.00	0.247	No	No	0.987	1.01	5.08	36.8	2.57

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

Circulating Lane Flow Rates

Circ. Lane No	Circulating Flow Rate		
	veh/h	pcu/h	Percent

South: Speers Road			
Lane 1	261	272	100.0
Approach	261	272	
East: Maginot Street			
Lane 1	76	77	100.0
Approach	76	77	
North: Speers Road			
Lane 1	225	230	100.0
Approach	225	230	
West: Maginot Street			
Lane 1	226	234	100.0
Approach	226	234	

Roundabout Capacity Model: The SIDRA Standard roundabout capacity model option is in use. This model takes into account the total circulating flow as well as the effect of flow distribution in circulating lanes on the entry capacity results.

Gap Acceptance Cycle Parameters (Lanes)

Opposed Lane	Cycle Time sec	Blocked Time sec	Unblocked Time sec	Unblocked Time Ratio	Minimum Delay sec
South: Speers Road					
1	22.80	5.88	16.92	0.742	1.2
East: Maginot Street					
1	54.34	4.06	50.28	0.925	0.2
North: Speers Road					
1	25.26	5.85	19.41	0.768	1.1
West: Maginot Street					
1	24.76	5.65	19.11	0.772	1.0

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

Gap Acceptance Cycle Parameters (Movements)

To Approach	Turn	Opsd Lane No	Cycle Time sec	Blocked Time sec	Unblocked Time sec	Unblocked Time Ratio	Minimum Delay sec
South: Speers Road							
West	L2	1	22.77	5.86	16.91	0.743	1.2
North	T1	1	22.95	6.01	16.94	0.738	1.2
East	R2	1	22.77	5.86	16.91	0.743	1.2
East: Maginot Street							
South	L2	1	54.26	4.00	50.26	0.926	0.2
West	T1	1	54.43	4.13	50.30	0.924	0.2
North: Speers Road							
East	L2	1	25.35	5.92	19.43	0.766	1.1
South	T1	1	24.85	5.52	19.34	0.778	1.0
West	R2	1	25.28	5.86	19.41	0.768	1.1
West: Maginot Street							
North	L2	1	24.63	5.54	19.09	0.775	1.0
East	T1	1	24.80	5.69	19.12	0.771	1.0
South	R2	1	24.63	5.54	19.09	0.775	1.0

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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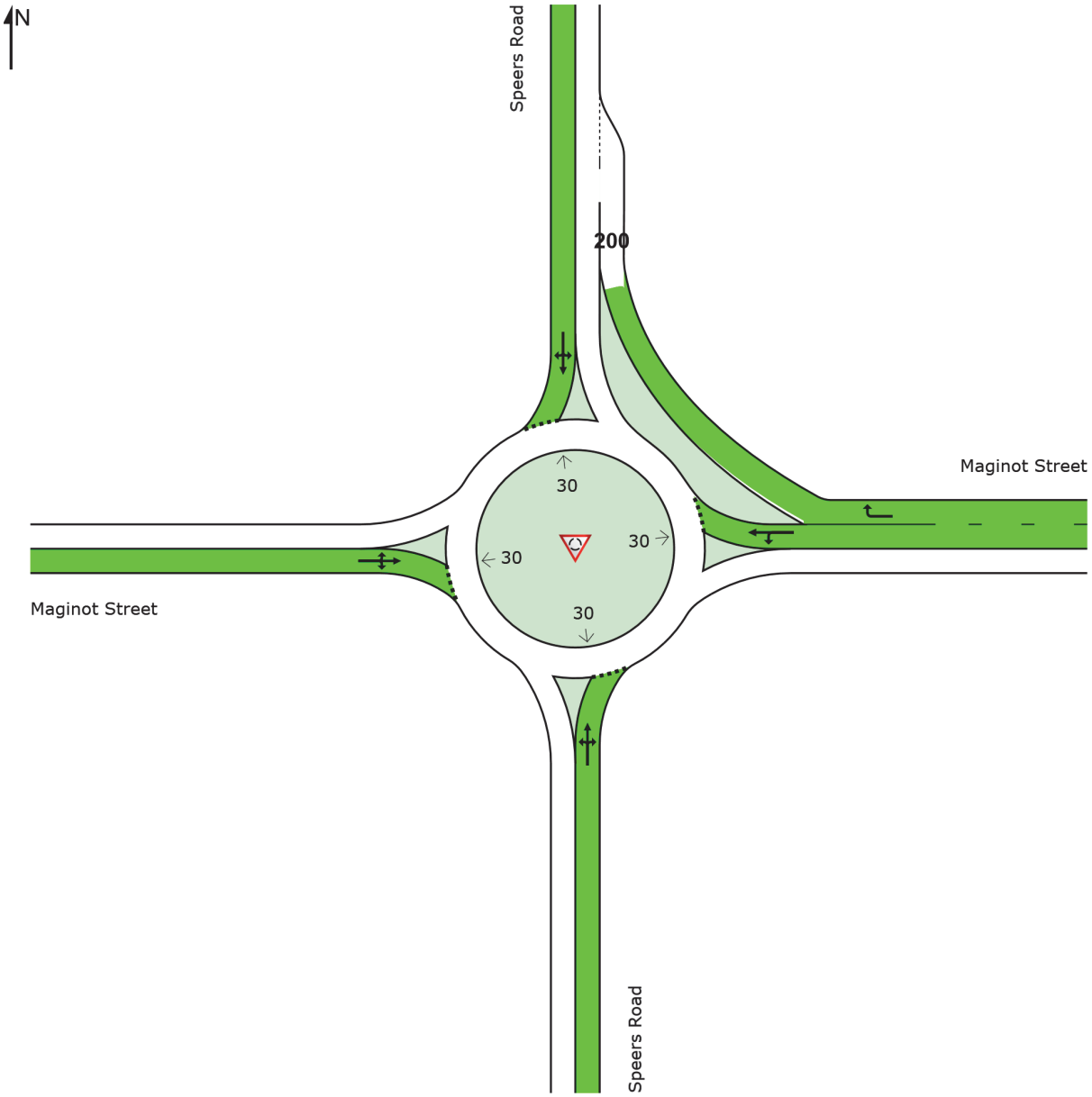
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

Site: 101 [Maginot Street & Speers Road - 2029 AM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2029 AM
Roundabout

	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.19	0.14	0.13	0.17	0.19



Colour code based on Degree of Saturation

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

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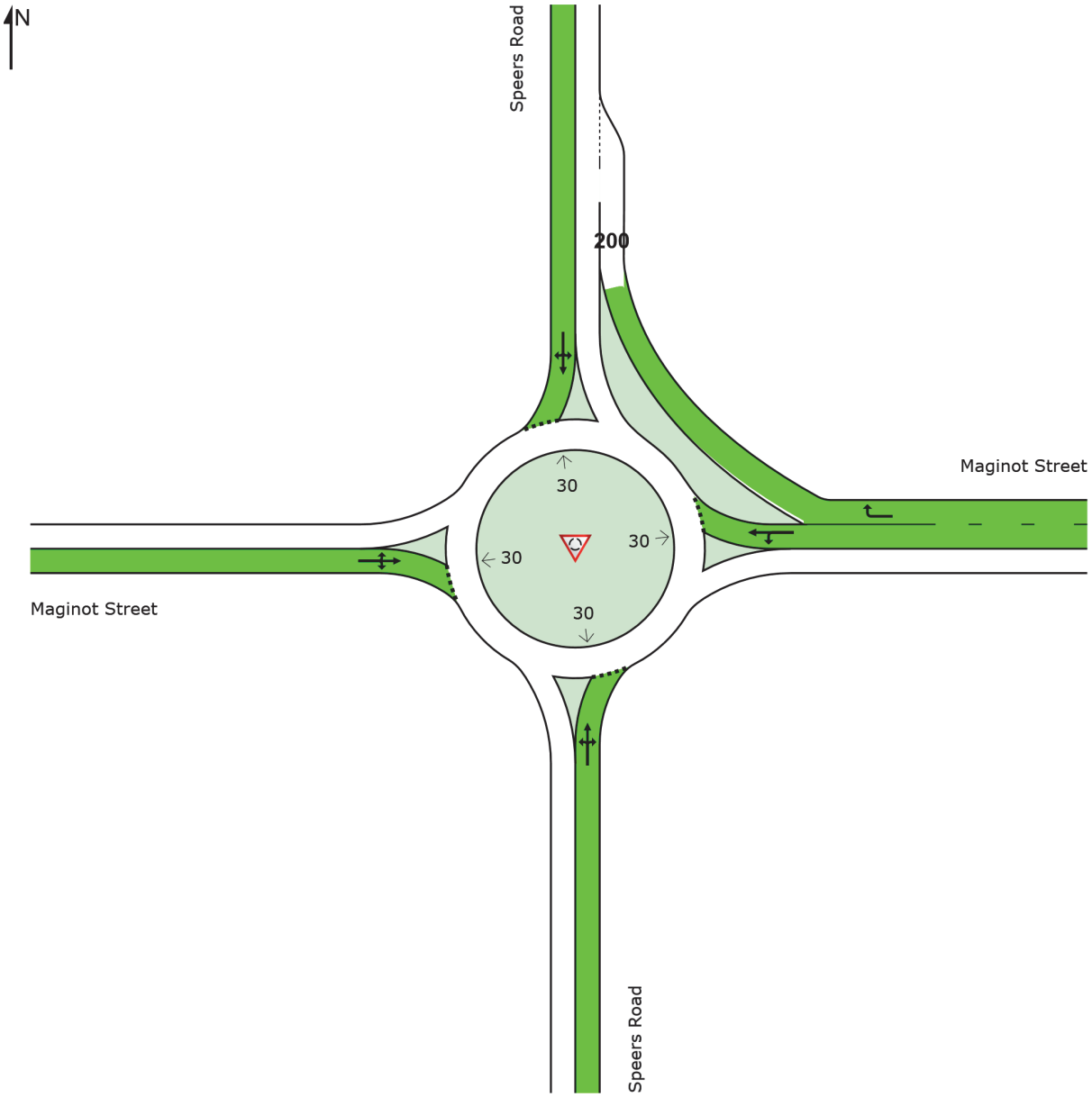
LEVEL OF SERVICE

Lane Level of Service

Site: 101 [Maginot Street & Speers Road - 2029 AM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2029 AM
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	A	A



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: SIDRA Roundabout LOS
Delay Model: SIDRA Standard (Geometric Delay is included).

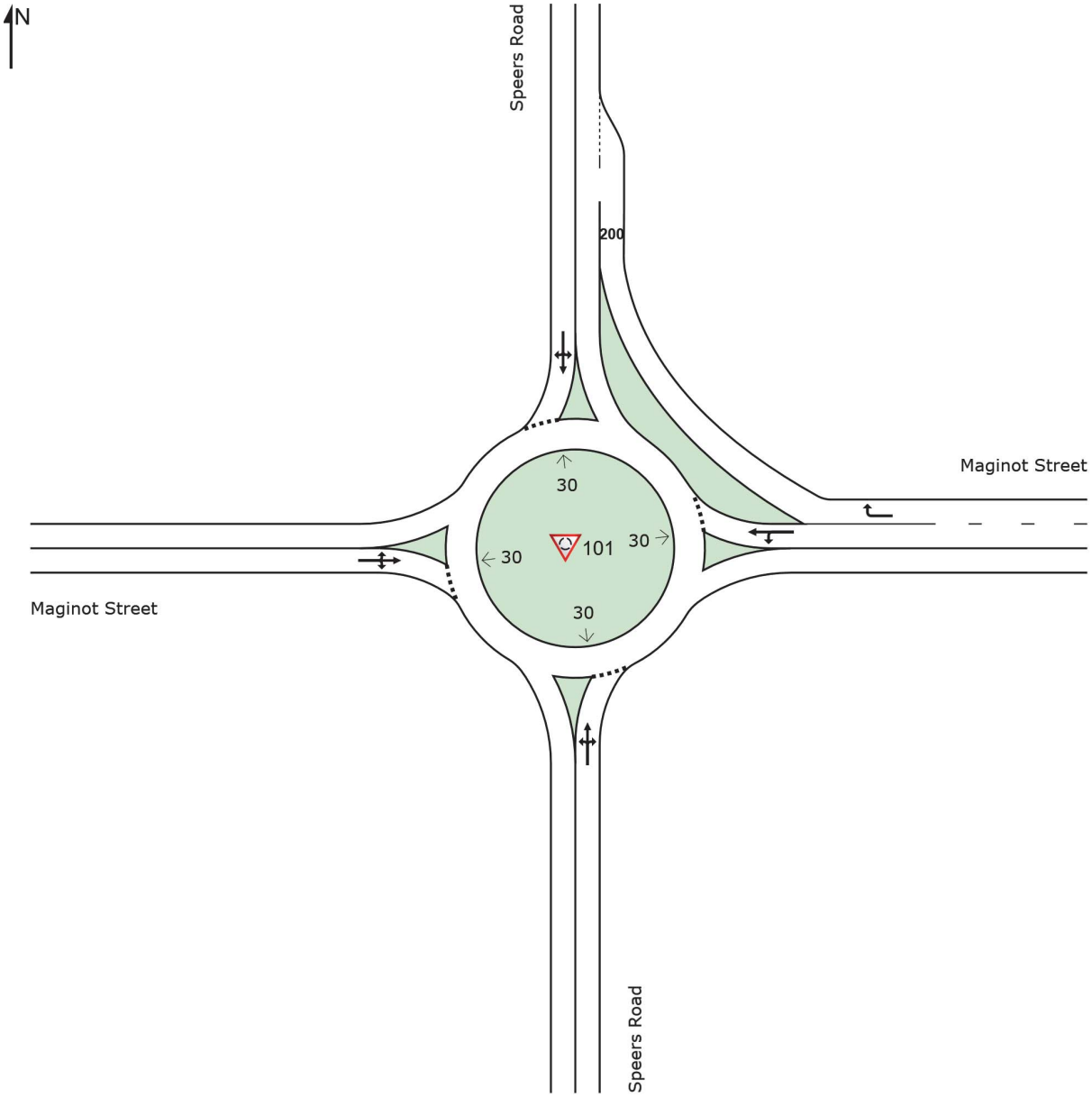
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SITE LAYOUT

Site: 101 [Maginot Street & Speers Road - 2029 PM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2029 PM
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [Maginot Street & Speers Road - 2029 PM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2029 PM
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Speers Road														
1	L2	8	17.0	8	17.0	0.077	10.3	LOS B	0.4	3.3	0.56	0.56	0.56	48.3
2	T1	27	30.0	28	30.0	0.077	4.8	LOS A	0.4	3.3	0.56	0.56	0.56	47.9
3	R2	26	3.0	27	3.0	0.077	4.7	LOS A	0.4	3.3	0.56	0.56	0.56	44.7
Approach		61	16.8	64	16.8	0.077	5.5	LOS A	0.4	3.3	0.56	0.56	0.56	46.9
East: Maginot Street														
4	L2	25	2.0	26	2.0	0.142	7.7	LOS A	0.8	6.3	0.22	0.31	0.22	49.7
5	T1	177	9.0	186	9.0	0.142	2.0	LOS A	0.8	6.3	0.22	0.31	0.22	48.7
6	R2	174	21.0	183	21.0	0.111	2.2	LOS A	0.0	0.0	0.00	0.31	0.00	48.3
Approach		376	14.1	396	14.1	0.142	2.5	LOS A	0.8	6.3	0.12	0.31	0.12	48.6
North: Speers Road														
7	L2	214	10.0	225	10.0	0.300	9.2	LOS A	1.9	14.1	0.49	0.61	0.49	28.1
8	T1	47	1.0	49	1.0	0.300	3.3	LOS A	1.9	14.1	0.49	0.61	0.49	46.7
9	R2	43	1.0	45	1.0	0.300	3.8	LOS A	1.9	14.1	0.49	0.61	0.49	45.6
Approach		304	7.3	320	7.3	0.300	7.5	LOS A	1.9	14.1	0.49	0.61	0.49	33.4
West: Maginot Street														
10	L2	20	25.0	21	25.0	0.207	10.0	LOS A	1.3	9.2	0.54	0.51	0.54	48.5
11	T1	157	2.0	165	2.0	0.207	3.7	LOS A	1.3	9.2	0.54	0.51	0.54	47.0
12	R2	17	1.0	18	1.0	0.207	4.2	LOS A	1.3	9.2	0.54	0.51	0.54	46.9
Approach		194	4.3	204	4.3	0.207	4.4	LOS A	1.3	9.2	0.54	0.51	0.54	47.2
All Vehicles		935	10.0	984	10.0	0.300	4.7	LOS A	1.9	14.1	0.36	0.46	0.36	41.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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ROUNDABOUT ANALYSIS

Site: 101 [Maginot Street & Speers Road - 2029 PM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2029 PM
Roundabout

Roundabout Basic Parameters

Location	Name	Central Island Diam	Circ Width	Insc Diam	Entry Radius	Entry Angle	Circ Lanes	Entry Lanes	Av.Entry Lane Width	App. Dist	Prop Queued Upstr Signal	Extra Bunching
		m	m	m	m	°			m	m		%
South	Speers Road	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
East	Maginot Street	30.00	5.00	40.0	20.0	30.0	1	2[18]	3.70	100.0	NA[5]	0.0
North	Speers Road	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
West	Maginot Street	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

5 Not Applicable (single Site analysis or unconnected Site in Network analysis).
18 Exclusive slip/bypass lane is included in Entry Lanes count.

Roundabout Entry and Circulating / Exiting Stream Parameters

To Approach	Turn	Lane No	Lane Type	Opng Flow	Opng Flow	In-Bunch Hdwy	Prop. Bunched	Cap Const Effect	Priority Sharing	OD Factor	HVE for Entry	Critical Gap [Hdwy	Dist]	Follow-up Hdwy
				veh/h	pcu/h	sec						sec	m	sec
South: Speers Road Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
West	L2	1	Dominant	412	427	2.00	0.406	No	No	0.970	1.09	5.16	44.1	2.69
North	T1	1	Dominant	412	427	2.00	0.406	No	No	0.970	1.15	5.47	46.7	2.85
East	R2	1	Dominant	412	427	2.00	0.406	No	No	0.970	1.02	4.83	41.2	2.52
East: Maginot Street Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
South	L2	1	Dominant	58	66	2.00	0.077	No	No	0.992	1.01	4.43	39.5	2.17
West	T1	1	Dominant	58	66	2.00	0.077	No	No	0.992	1.05	4.58	40.9	2.25
North	R2	2	Continuous											
North: Speers Road Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
East	L2	1	Dominant	221	230	2.00	0.244	No	No	0.988	1.05	5.26	54.7	2.66
South	T1	1	Dominant	221	230	2.00	0.244	No	No	0.988	1.01	5.03	52.3	2.54
West	R2	1	Dominant	221	230	2.00	0.244	No	No	0.988	1.01	5.03	52.3	2.54
West: Maginot Street Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
North	L2	1	Dominant	301	313	2.00	0.316	No	No	0.965	1.13	5.54	41.8	2.84
East	T1	1	Dominant	301	313	2.00	0.316	No	No	0.965	1.01	4.98	37.5	2.55
South	R2	1	Dominant	301	313	2.00	0.316	No	No	0.965	1.01	4.95	37.4	2.54

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

Circulating Lane Flow Rates

Circ. Lane No	Circulating Flow Rate		
	veh/h	pcu/h	Percent

South: Speers Road			
Lane 1	412	427	100.0
Approach	412	427	
East: Maginot Street			
Lane 1	58	66	100.0
Approach	58	66	
North: Speers Road			
Lane 1	221	230	100.0
Approach	221	230	
West: Maginot Street			
Lane 1	301	313	100.0
Approach	301	313	

Roundabout Capacity Model: The SIDRA Standard roundabout capacity model option is in use. This model takes into account the total circulating flow as well as the effect of flow distribution in circulating lanes on the entry capacity results.

Gap Acceptance Cycle Parameters (Lanes)

Opposed Lane	Cycle Time sec	Blocked Time sec	Unblocked Time sec	Unblocked Time Ratio	Minimum Delay sec
South: Speers Road					
1	19.60	7.43	12.17	0.621	2.2
East: Maginot Street					
1	62.72	4.24	58.48	0.932	0.2
North: Speers Road					
1	24.98	5.65	19.34	0.774	1.0
West: Maginot Street					
1	21.70	6.50	15.20	0.700	1.4

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

Gap Acceptance Cycle Parameters (Movements)

To Approach	Turn	Opsd Lane No	Cycle Time sec	Blocked Time sec	Unblocked Time sec	Unblocked Time Ratio	Minimum Delay sec
South: Speers Road							
West	L2	1	19.60	7.43	12.17	0.621	2.2
North	T1	1	20.17	7.91	12.25	0.608	2.5
East	R2	1	19.01	6.92	12.09	0.636	2.0
East: Maginot Street							
South	L2	1	62.57	4.13	58.44	0.934	0.2
West	T1	1	62.74	4.26	58.48	0.932	0.2
North: Speers Road							
East	L2	1	25.08	5.72	19.35	0.772	1.0
South	T1	1	24.76	5.47	19.30	0.779	1.0
West	R2	1	24.76	5.47	19.30	0.779	1.0
West: Maginot Street							
North	L2	1	22.51	7.18	15.33	0.681	1.7
East	T1	1	21.61	6.43	15.18	0.703	1.4
South	R2	1	21.57	6.40	15.18	0.703	1.4

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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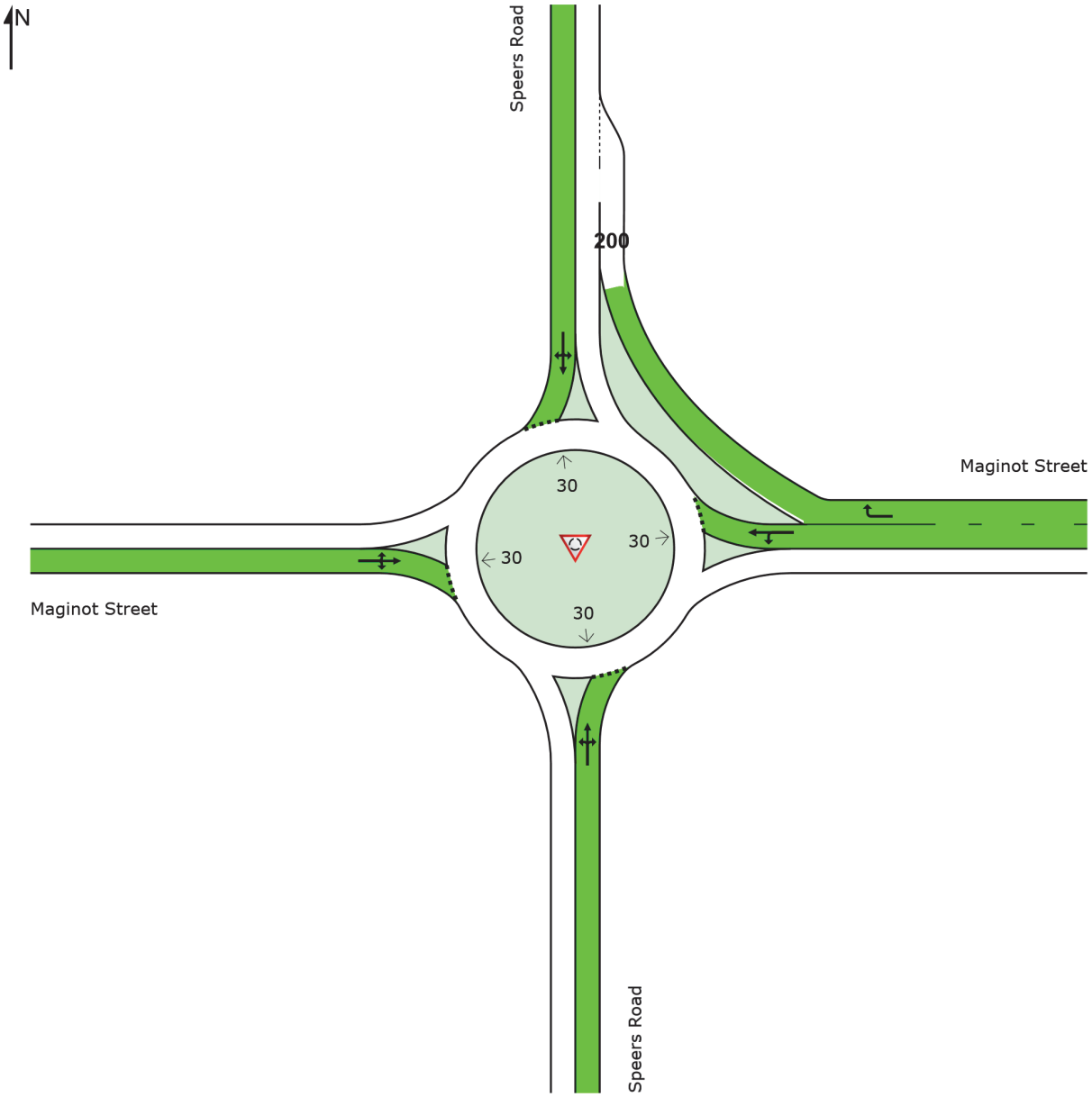
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

Site: 101 [Maginot Street & Speers Road - 2029 PM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2029 PM
Roundabout

	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.08	0.14	0.30	0.21	0.30



Colour code based on Degree of Saturation

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

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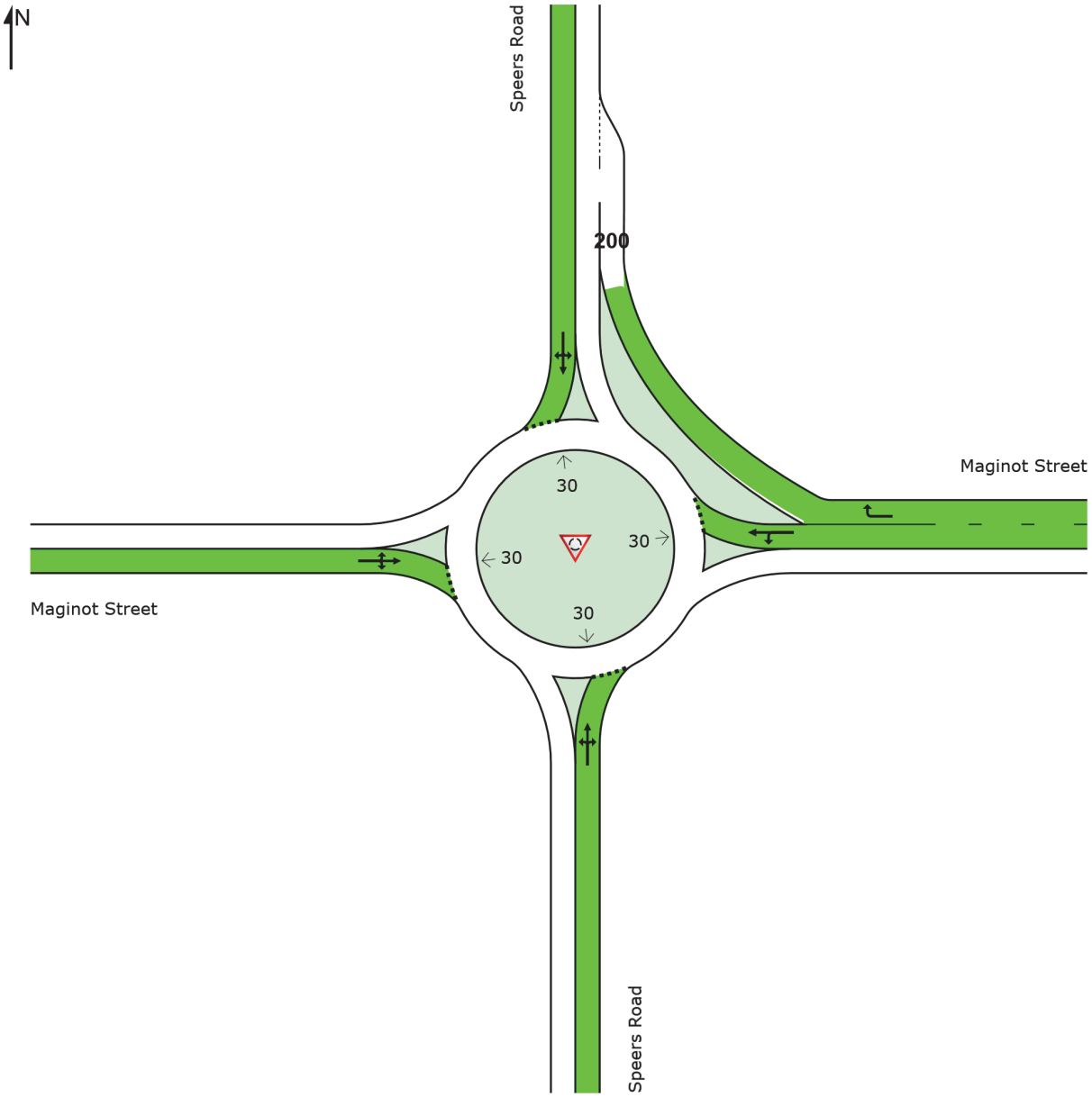
LEVEL OF SERVICE

Lane Level of Service

Site: 101 [Maginot Street & Speers Road - 2029 PM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2029 PM
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	A	A



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: SIDRA Roundabout LOS
Delay Model: SIDRA Standard (Geometric Delay is included).

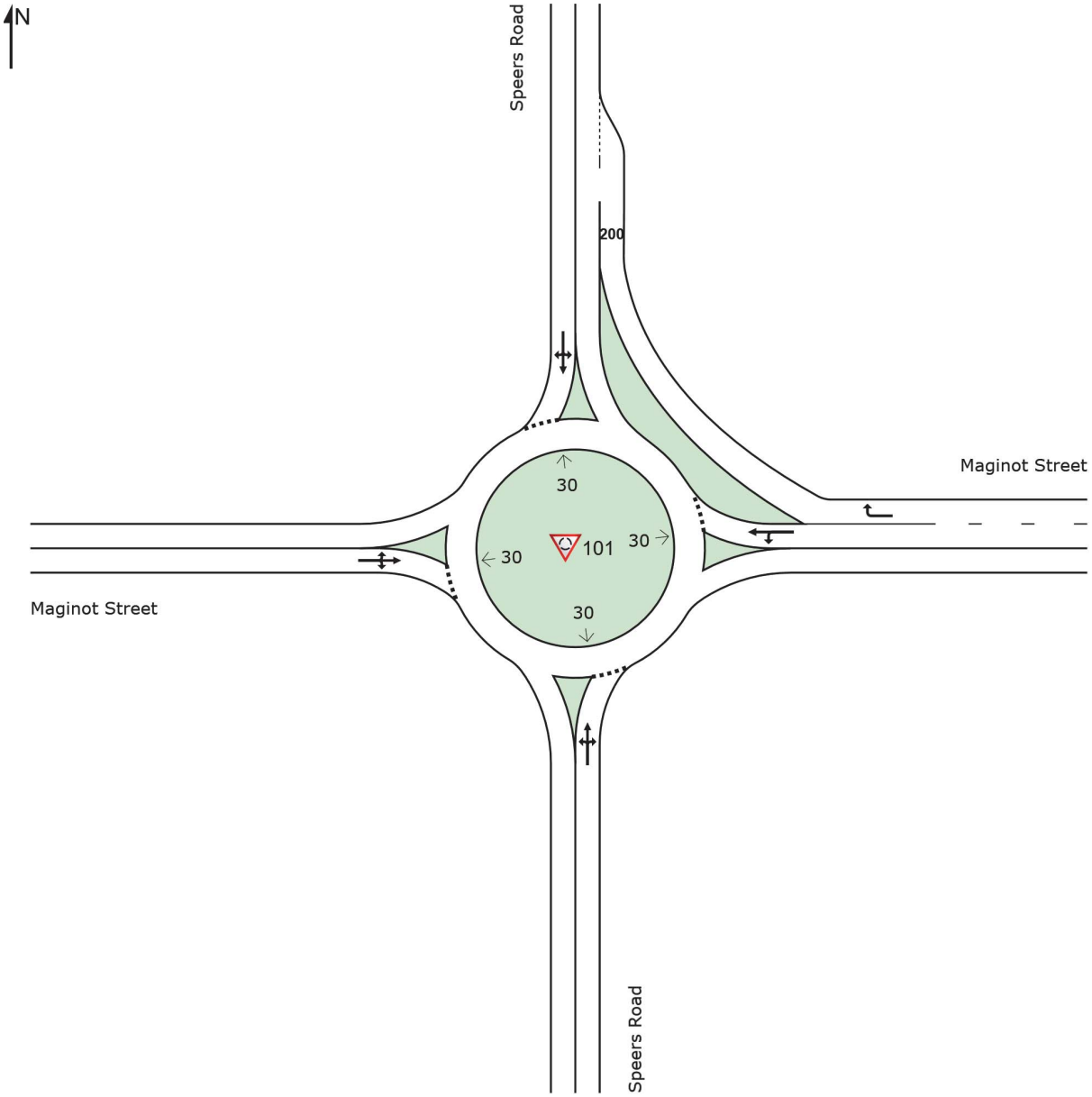
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SITE LAYOUT

Site: 101 [Maginot Street & Speers Road - 2034 AM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2034 AM
Roundabout

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MOVEMENT SUMMARY

Site: 101 [Maginot Street & Speers Road - 2034 AM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2034 AM
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Speers Road														
1	L2	8	17.0	8	17.0	0.095	10.9	LOS B	0.5	4.2	0.62	0.60	0.62	48.0
2	T1	35	30.0	37	30.0	0.095	5.5	LOS A	0.5	4.2	0.62	0.60	0.62	47.6
3	R2	26	3.0	27	3.0	0.095	5.3	LOS A	0.5	4.2	0.62	0.60	0.62	44.2
Approach		69	18.3	73	18.3	0.095	6.1	LOS A	0.5	4.2	0.62	0.60	0.62	46.7
East: Maginot Street														
4	L2	25	2.0	26	2.0	0.146	7.8	LOS A	0.9	6.5	0.26	0.32	0.26	49.5
5	T1	177	9.0	186	9.0	0.146	2.1	LOS A	0.9	6.5	0.26	0.32	0.26	48.5
6	R2	295	21.0	311	21.0	0.188	2.2	LOS A	0.0	0.0	0.00	0.31	0.00	48.2
Approach		497	15.8	523	15.8	0.188	2.5	LOS A	0.9	6.5	0.10	0.31	0.10	48.4
North: Speers Road														
7	L2	278	10.0	293	10.0	0.353	9.2	LOS A	2.4	17.6	0.52	0.62	0.52	28.0
8	T1	41	1.0	43	1.0	0.353	3.3	LOS A	2.4	17.6	0.52	0.62	0.52	46.4
9	R2	40	1.0	42	1.0	0.353	3.9	LOS A	2.4	17.6	0.52	0.62	0.52	45.3
Approach		359	8.0	378	8.0	0.353	8.0	LOS A	2.4	17.6	0.52	0.62	0.52	31.9
West: Maginot Street														
10	L2	29	25.0	31	25.0	0.233	10.5	LOS B	1.5	10.6	0.60	0.57	0.60	48.1
11	T1	158	2.0	166	2.0	0.233	4.1	LOS A	1.5	10.6	0.60	0.57	0.60	46.5
12	R2	17	1.0	18	1.0	0.233	4.7	LOS A	1.5	10.6	0.60	0.57	0.60	46.6
Approach		204	5.2	215	5.2	0.233	5.1	LOS A	1.5	10.6	0.60	0.57	0.60	46.9
All Vehicles		1129	11.5	1188	11.5	0.353	4.9	LOS A	2.4	17.6	0.36	0.48	0.36	40.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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ROUNDABOUT ANALYSIS

Site: 101 [Maginot Street & Speers Road - 2034 AM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2034 AM
Roundabout

Roundabout Basic Parameters

Location	Name	Central Island Diam	Circ Width	Insc Diam	Entry Radius	Entry Angle	Circ Lanes	Entry Lanes	Av.Entry Lane Width	App. Dist	Prop Queued Upstr Signal	Extra Bunching
		m	m	m	m	°			m	m		%
South	Speers Road	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
East	Maginot Street	30.00	5.00	40.0	20.0	30.0	1	2[18]	3.70	100.0	NA[5]	0.0
North	Speers Road	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
West	Maginot Street	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

5 Not Applicable (single Site analysis or unconnected Site in Network analysis).
18 Exclusive slip/bypass lane is included in Entry Lanes count.

Roundabout Entry and Circulating / Exiting Stream Parameters

To Approach	Turn	Lane No	Lane Type	Opng Flow	Opng Flow	In-Bunch Hdwy	Prop. Bunched	Cap Const Effect	Priority Sharing	OD Factor	HVE for Entry	Critical Gap [Hdwy	Dist]	Follow-up Hdwy
				veh/h	pcu/h	sec						sec	m	sec
South: Speers Road Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
West	L2	1	Dominant	489	510	2.00	0.465	No	No	0.956	1.09	5.03	41.7	2.66
North	T1	1	Dominant	489	510	2.00	0.465	No	No	0.956	1.15	5.34	44.2	2.82
East	R2	1	Dominant	489	510	2.00	0.465	No	No	0.956	1.02	4.71	39.0	2.49
East: Maginot Street Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
South	L2	1	Dominant	76	86	2.00	0.099	No	No	0.990	1.01	4.44	39.5	2.19
West	T1	1	Dominant	76	86	2.00	0.099	No	No	0.990	1.05	4.59	40.9	2.26
North	R2	2	Continuous											
North: Speers Road Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
East	L2	1	Dominant	221	230	2.00	0.244	No	No	0.985	1.05	5.21	54.2	2.63
South	T1	1	Dominant	221	230	2.00	0.244	No	No	0.985	1.01	4.99	51.9	2.52
West	R2	1	Dominant	221	230	2.00	0.244	No	No	0.985	1.01	4.99	51.9	2.52
West: Maginot Street Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
North	L2	1	Dominant	362	377	2.00	0.368	No	No	0.954	1.13	5.43	40.0	2.81
East	T1	1	Dominant	362	377	2.00	0.368	No	No	0.954	1.01	4.88	35.9	2.52
South	R2	1	Dominant	362	377	2.00	0.368	No	No	0.954	1.01	4.85	35.7	2.51

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

Circulating Lane Flow Rates

Circ. Lane No	Circulating Flow Rate		
	veh/h	pcu/h	Percent

South: Speers Road			
Lane 1	489	510	100.0
Approach	489	510	
East: Maginot Street			
Lane 1	76	86	100.0
Approach	76	86	
North: Speers Road			
Lane 1	221	230	100.0
Approach	221	230	
West: Maginot Street			
Lane 1	362	377	100.0
Approach	362	377	

Roundabout Capacity Model: The SIDRA Standard roundabout capacity model option is in use. This model takes into account the total circulating flow as well as the effect of flow distribution in circulating lanes on the entry capacity results.

Gap Acceptance Cycle Parameters (Lanes)

Opposed Lane	Cycle Time sec	Blocked Time sec	Unblocked Time sec	Unblocked Time Ratio	Minimum Delay sec
South: Speers Road					
1	19.10	8.29	10.80	0.566	2.8
East: Maginot Street					
1	49.83	4.37	45.46	0.912	0.3
North: Speers Road					
1	25.00	5.67	19.33	0.773	1.0
West: Maginot Street					
1	20.29	7.07	13.23	0.652	1.7

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

Gap Acceptance Cycle Parameters (Movements)

To Approach	Turn	Opsd Lane No	Cycle Time sec	Blocked Time sec	Unblocked Time sec	Unblocked Time Ratio	Minimum Delay sec
South: Speers Road							
West	L2	1	19.03	8.23	10.79	0.567	2.7
North	T1	1	19.64	8.77	10.87	0.554	3.0
East	R2	1	18.38	7.68	10.71	0.582	2.4
East: Maginot Street							
South	L2	1	49.68	4.25	45.43	0.914	0.3
West	T1	1	49.85	4.38	45.47	0.912	0.3
North: Speers Road							
East	L2	1	25.07	5.73	19.34	0.771	1.0
South	T1	1	24.76	5.48	19.28	0.779	1.0
West	R2	1	24.76	5.48	19.28	0.779	1.0
West: Maginot Street							
North	L2	1	21.12	7.77	13.35	0.632	2.1
East	T1	1	20.16	6.95	13.21	0.655	1.7
South	R2	1	20.12	6.92	13.20	0.656	1.7

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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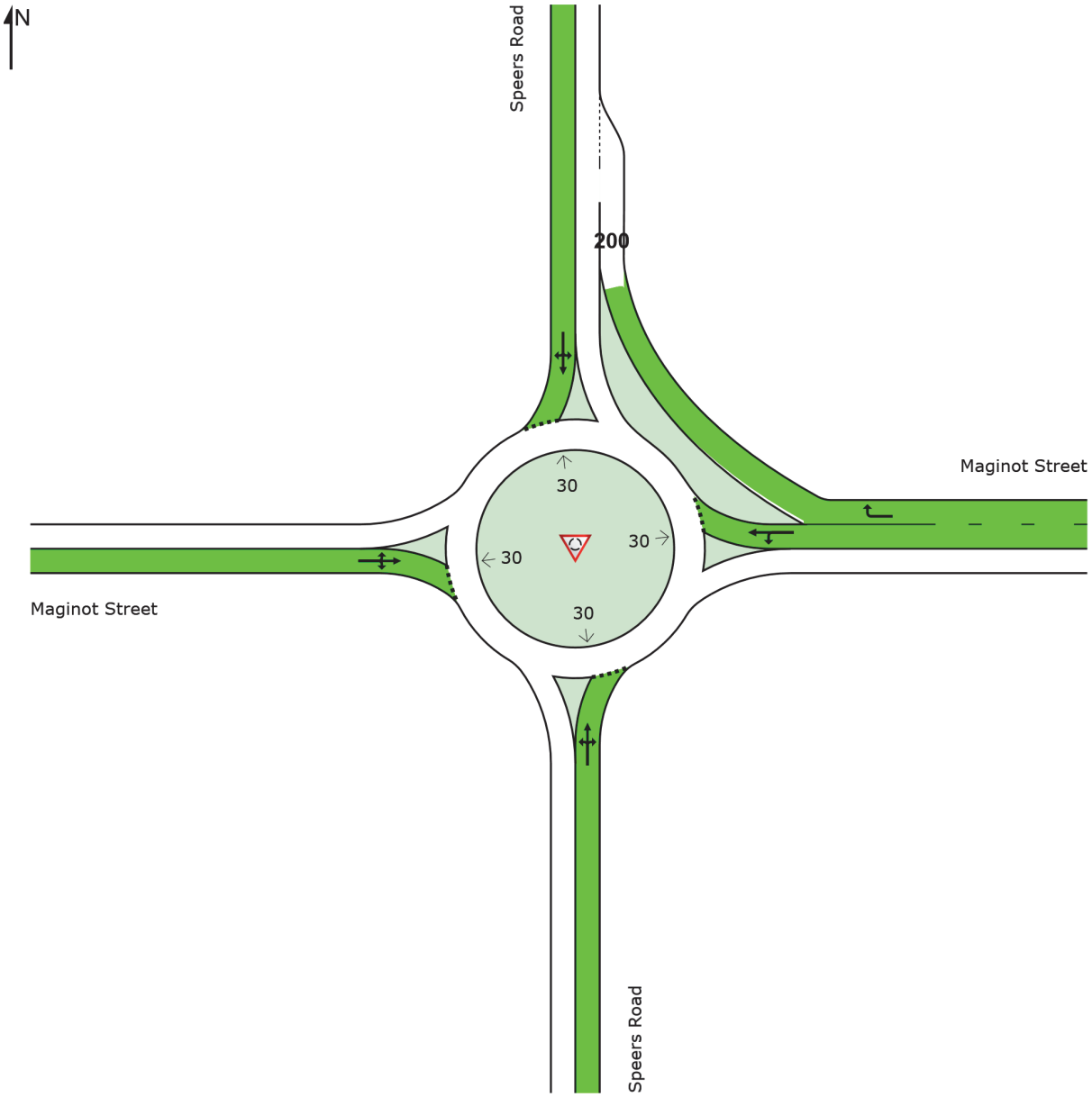
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

Site: 101 [Maginot Street & Speers Road - 2034 AM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2034 AM
Roundabout

	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.09	0.19	0.35	0.23	0.35



Colour code based on Degree of Saturation

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

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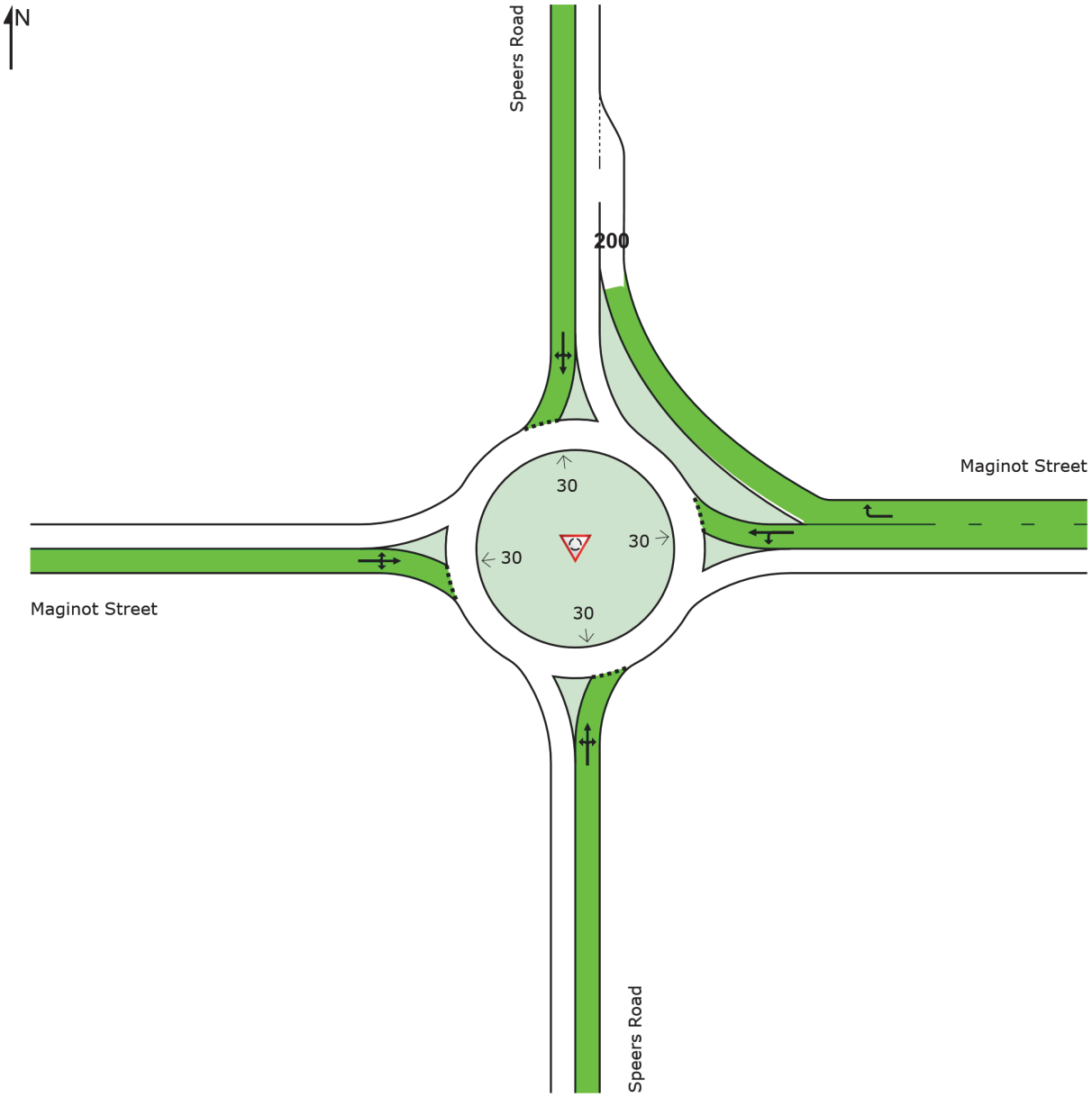
LEVEL OF SERVICE

Lane Level of Service

Site: 101 [Maginot Street & Speers Road - 2034 AM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2034 AM
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	A	A



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: SIDRA Roundabout LOS
Delay Model: SIDRA Standard (Geometric Delay is included).

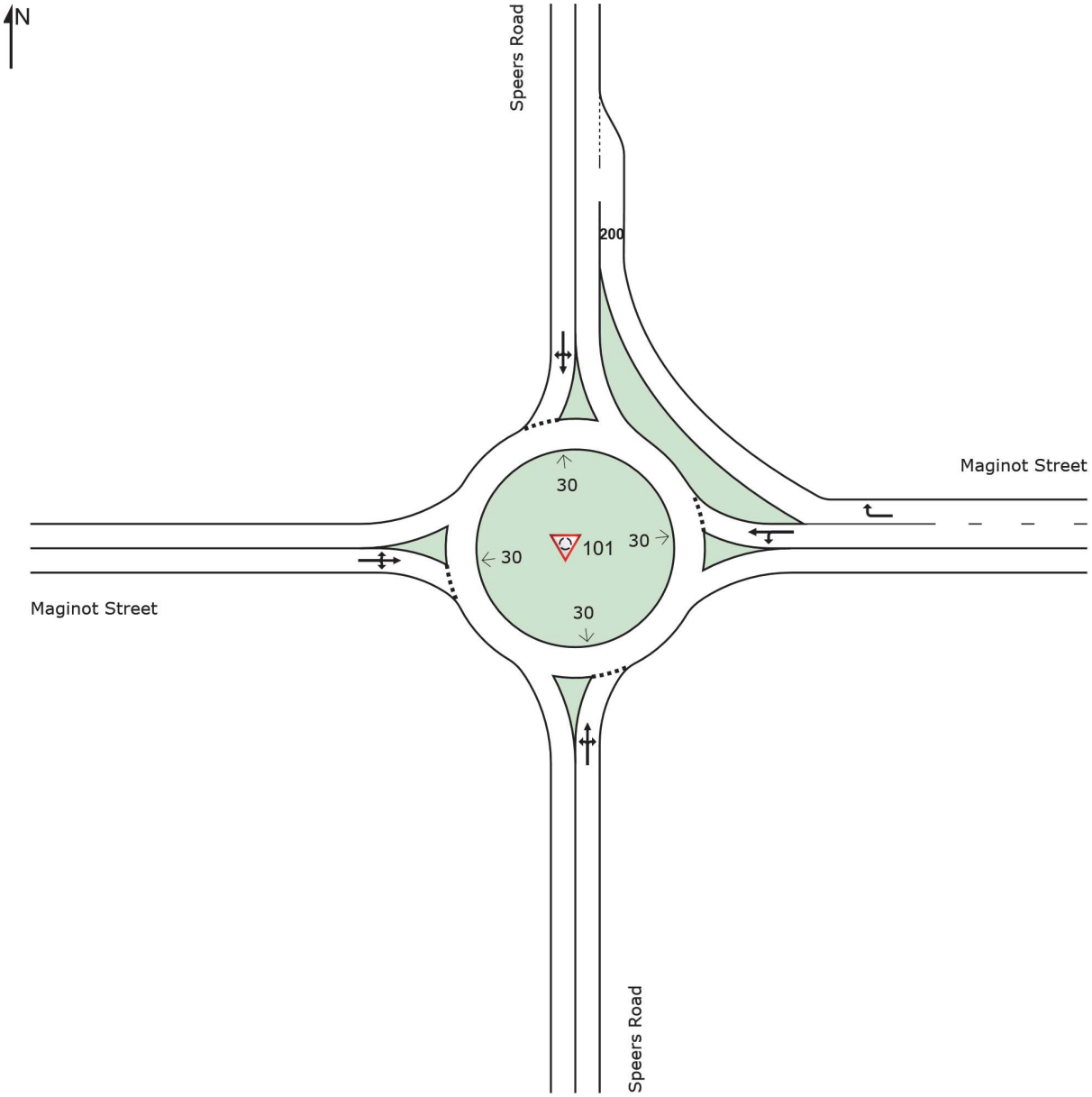
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SITE LAYOUT

Site: 101 [Maginot Street & Speers Road - 2034 PM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2034 PM
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [Maginot Street & Speers Road - 2034 PM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2034 PM
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Speers Road														
1	L2	6	1.0	6	1.0	0.205	9.5	LOS A	1.2	8.6	0.54	0.55	0.54	49.1
2	T1	30	6.0	32	6.0	0.205	3.9	LOS A	1.2	8.6	0.54	0.55	0.54	48.5
3	R2	157	1.0	165	1.0	0.205	4.4	LOS A	1.2	8.6	0.54	0.55	0.54	45.5
Approach		193	1.8	203	1.8	0.205	4.5	LOS A	1.2	8.6	0.54	0.55	0.54	46.3
East: Maginot Street														
4	L2	111	1.0	117	1.0	0.145	7.7	LOS A	0.9	6.2	0.22	0.45	0.22	47.6
5	T1	99	8.0	104	8.0	0.145	2.0	LOS A	0.9	6.2	0.22	0.45	0.22	46.7
6	R2	448	1.0	472	1.0	0.251	2.1	LOS A	0.0	0.0	0.00	0.31	0.00	48.4
Approach		658	2.1	693	2.1	0.251	3.1	LOS A	0.9	6.2	0.07	0.36	0.07	48.0
North: Speers Road														
7	L2	151	15.0	159	15.0	0.215	9.2	LOS A	1.3	9.7	0.47	0.60	0.47	28.1
8	T1	27	1.0	28	1.0	0.215	3.1	LOS A	1.3	9.7	0.47	0.60	0.47	46.7
9	R2	30	13.0	32	13.0	0.215	4.0	LOS A	1.3	9.7	0.47	0.60	0.47	45.5
Approach		208	12.9	219	12.9	0.215	7.6	LOS A	1.3	9.7	0.47	0.60	0.47	32.9
West: Maginot Street														
10	L2	29	1.0	31	1.0	0.178	9.3	LOS A	1.0	7.5	0.52	0.52	0.52	48.5
11	T1	128	6.0	135	6.0	0.178	3.7	LOS A	1.0	7.5	0.52	0.52	0.52	46.5
12	R2	10	1.0	11	1.0	0.178	4.2	LOS A	1.0	7.5	0.52	0.52	0.52	46.7
Approach		167	4.8	176	4.8	0.178	4.7	LOS A	1.0	7.5	0.52	0.52	0.52	47.0
All Vehicles		1226	4.2	1291	4.2	0.251	4.3	LOS A	1.3	9.7	0.27	0.45	0.27	43.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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ROUNDABOUT ANALYSIS

Site: 101 [Maginot Street & Speers Road - 2034 PM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2034 PM
Roundabout

Roundabout Basic Parameters

Location	Name	Central Island Diam	Circ Width	Insc Diam	Entry Radius	Entry Angle	Circ Lanes	Entry Lanes	Av.Entry Lane Width	App. Dist	Prop Queued Upstr Signal	Extra Bunching
		m	m	m	m	°			m	m		%
South	Speers Road	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
East	Maginot Street	30.00	5.00	40.0	20.0	30.0	1	2[18]	3.70	100.0	NA[5]	0.0
North	Speers Road	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0
West	Maginot Street	30.00	5.00	40.0	20.0	30.0	1	1	3.70	500.0	NA[5]	0.0

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

5 Not Applicable (single Site analysis or unconnected Site in Network analysis).
18 Exclusive slip/bypass lane is included in Entry Lanes count.

Roundabout Entry and Circulating / Exiting Stream Parameters

To Approach	Turn	Lane No	Lane Type	Opng Flow	Opng Flow	In-Bunch Hdwy	Prop. Bunched	Cap Const Effect	Priority Sharing	OD Factor	HVE for Entry	Critical Gap [Hdwy	Dist]	Follow-up Hdwy
				veh/h	pcu/h	sec						sec	m	sec
South: Speers Road Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
West	L2	1	Dominant	324	340	2.00	0.339	No	No	0.978	1.01	4.91	42.2	2.53
North	T1	1	Dominant	324	340	2.00	0.339	No	No	0.978	1.03	5.03	43.3	2.59
East	R2	1	Dominant	324	340	2.00	0.339	No	No	0.978	1.01	4.91	42.2	2.53
East: Maginot Street Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
South	L2	1	Dominant	68	70	2.00	0.081	No	No	0.993	1.01	4.41	38.8	2.17
West	T1	1	Dominant	68	70	2.00	0.081	No	No	0.993	1.04	4.56	40.1	2.24
North	R2	2	Continuous											
North: Speers Road Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
East	L2	1	Dominant	227	232	2.00	0.246	No	No	0.987	1.08	5.43	47.7	2.74
South	T1	1	Dominant	227	232	2.00	0.246	No	No	0.987	1.01	5.08	44.6	2.57
West	R2	1	Dominant	227	232	2.00	0.246	No	No	0.987	1.07	5.38	47.2	2.72
West: Maginot Street Environment Factor: 1.05 Entry/Circ Flow Adjustment: Medium														
North	L2	1	Dominant	304	317	2.00	0.320	No	No	0.977	1.01	4.95	35.8	2.53
East	T1	1	Dominant	304	317	2.00	0.320	No	No	0.977	1.03	5.07	36.7	2.60
South	R2	1	Dominant	304	317	2.00	0.320	No	No	0.977	1.01	4.95	35.8	2.53

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

Circulating Lane Flow Rates

Circ. Lane No	Circulating Flow Rate		
	veh/h	pcu/h	Percent

South: Speers Road			
Lane 1	324	340	100.0
Approach	324	340	
East: Maginot Street			
Lane 1	68	70	100.0
Approach	68	70	
North: Speers Road			
Lane 1	227	232	100.0
Approach	227	232	
West: Maginot Street			
Lane 1	304	317	100.0
Approach	304	317	

Roundabout Capacity Model: The SIDRA Standard roundabout capacity model option is in use. This model takes into account the total circulating flow as well as the effect of flow distribution in circulating lanes on the entry capacity results.

Gap Acceptance Cycle Parameters (Lanes)

Opposed Lane	Cycle Time sec	Blocked Time sec	Unblocked Time sec	Unblocked Time Ratio	Minimum Delay sec
South: Speers Road					
1	20.51	6.26	14.25	0.695	1.5
East: Maginot Street					
1	59.37	4.12	55.26	0.931	0.2
North: Speers Road					
1	25.15	5.88	19.27	0.766	1.1
West: Maginot Street					
1	21.33	6.27	15.05	0.706	1.4

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

Gap Acceptance Cycle Parameters (Movements)

To Approach	Turn	Opsd Lane No	Cycle Time sec	Blocked Time sec	Unblocked Time sec	Unblocked Time Ratio	Minimum Delay sec
South: Speers Road							
West	L2	1	20.48	6.24	14.24	0.695	1.5
North	T1	1	20.67	6.40	14.27	0.690	1.6
East	R2	1	20.48	6.24	14.24	0.695	1.5
East: Maginot Street							
South	L2	1	59.30	4.05	55.24	0.932	0.2
West	T1	1	59.46	4.18	55.28	0.930	0.2
North: Speers Road							
East	L2	1	25.22	5.94	19.28	0.764	1.1
South	T1	1	24.73	5.54	19.19	0.776	1.0
West	R2	1	25.15	5.89	19.27	0.766	1.1
West: Maginot Street							
North	L2	1	21.18	6.15	15.03	0.710	1.4
East	T1	1	21.37	6.31	15.06	0.705	1.4
South	R2	1	21.18	6.15	15.03	0.710	1.4

Roundabout Capacity Model: SIDRA Standard
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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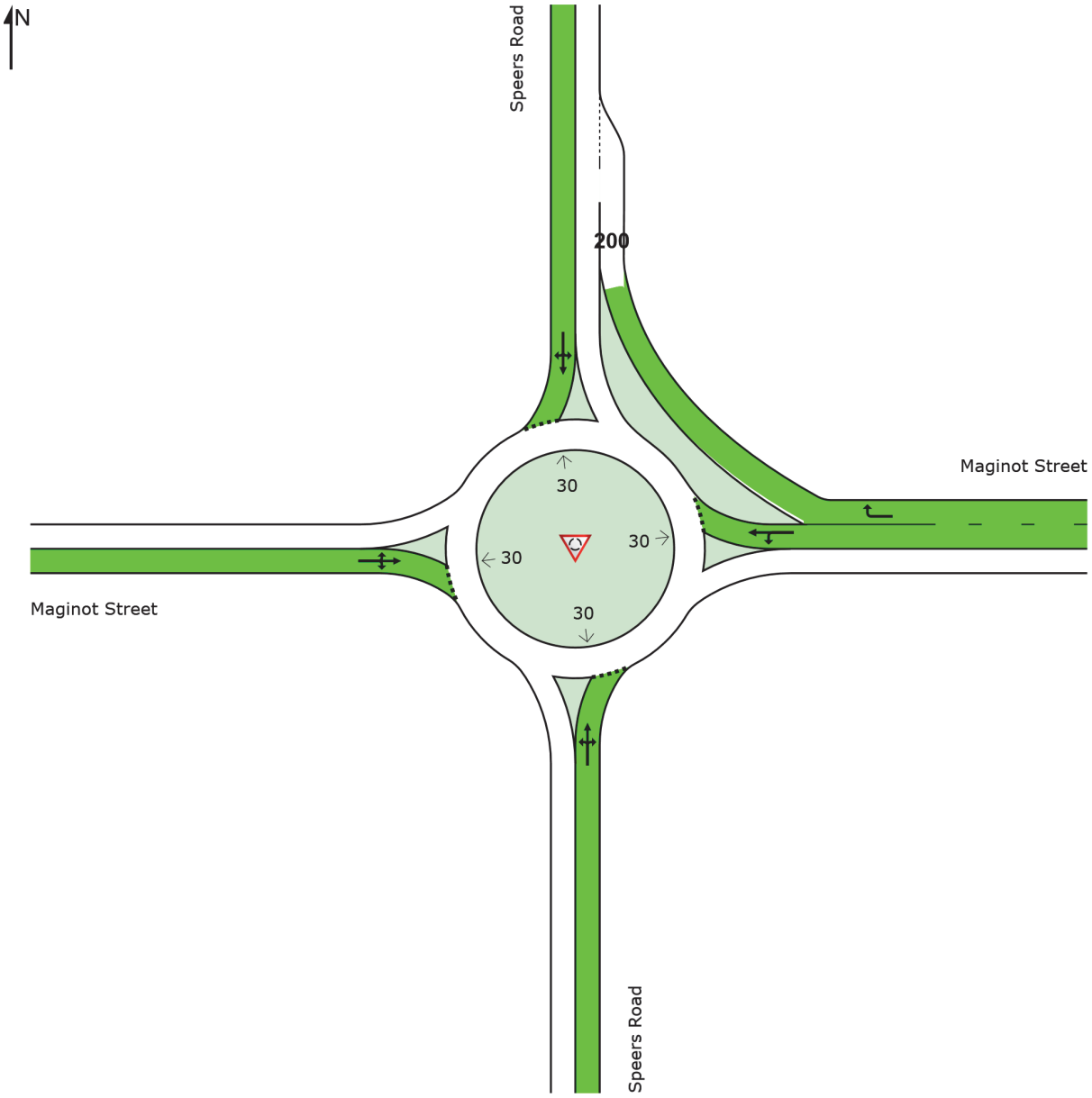
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

Site: 101 [Maginot Street & Speers Road - 2034 PM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2034 PM
Roundabout

	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.20	0.25	0.22	0.18	0.25



Colour code based on Degree of Saturation

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

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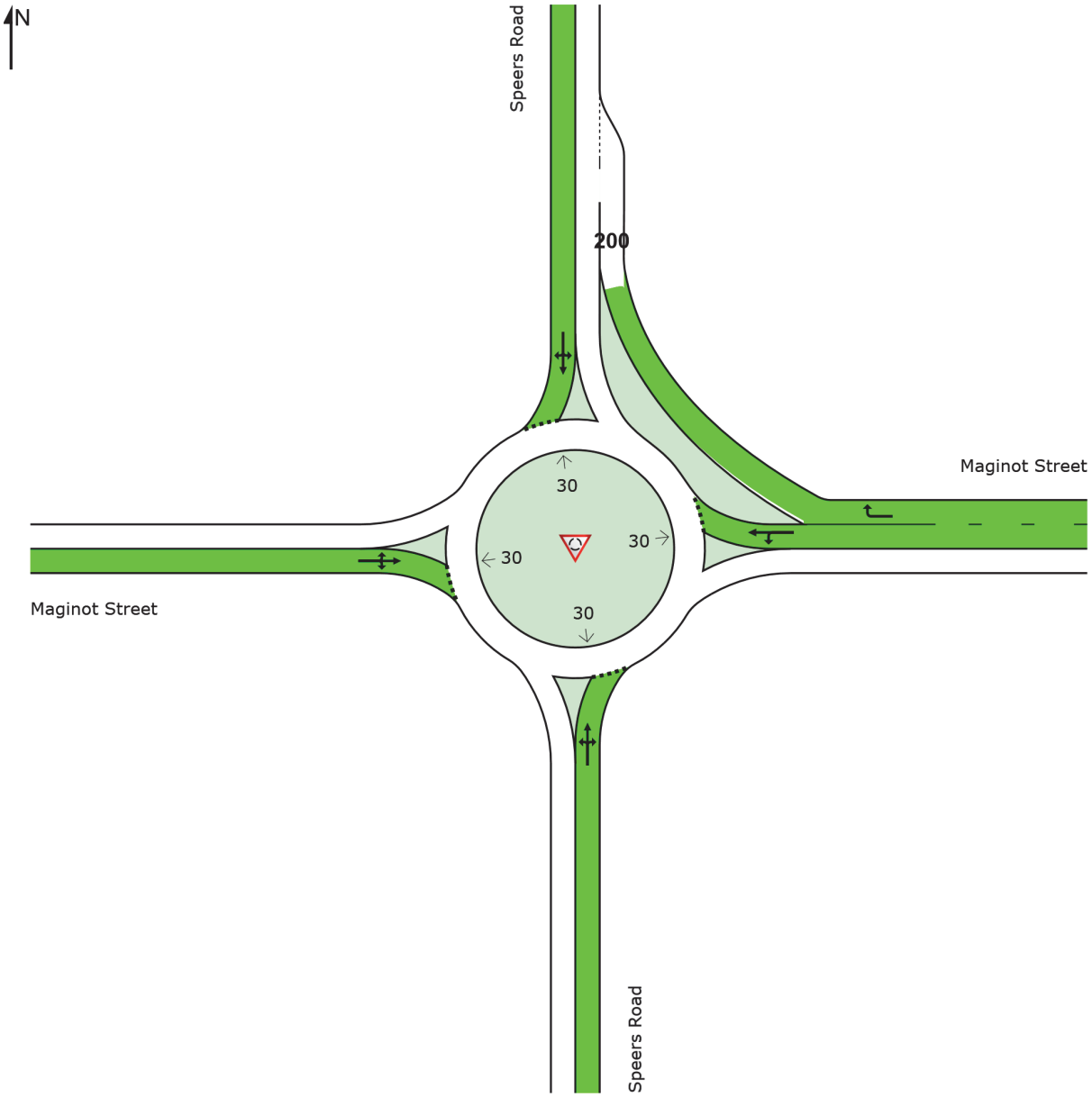
LEVEL OF SERVICE

Lane Level of Service

Site: 101 [Maginot Street & Speers Road - 2034 PM (Site Folder: Maginot & Speers Rd)]

New Maginot Street & Speers Road Roundabout
Site Category: 2034 PM
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	A	A



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: SIDRA Roundabout LOS
Delay Model: SIDRA Standard (Geometric Delay is included).

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May 1, 2024

Confidential

Cover Letter for Servicing Report Revision 1 – 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 from 1200 residential units to 2000 residential units. For the purposes of simplifying your review, the following updates have been made from the original June 2022 version of this report:

- Increase in residential density from 1200 units to 2000 units
- All increases in density impact the wastewater sewer only (specific to this report – transportation impact study is updated separate from this report)
- All impacts to wastewater sewer are on the sections of sewer connecting to Marion Street. No changes in the sections of sewer connecting to Speers Road.
- A field change was made to the pipe between MHW14 and MHW02 (see Appendix B-1 for layout) to increase the slope and thereby increase the capacity within the wastewater sewer. This is accounted for in the first page of Appendix B-2.
- There are no impacts to the water distribution or land drainage designs.

Please contact the undersigned should you have any questions.

Sincerely,

Jason Dunn, P.Eng., PMP,

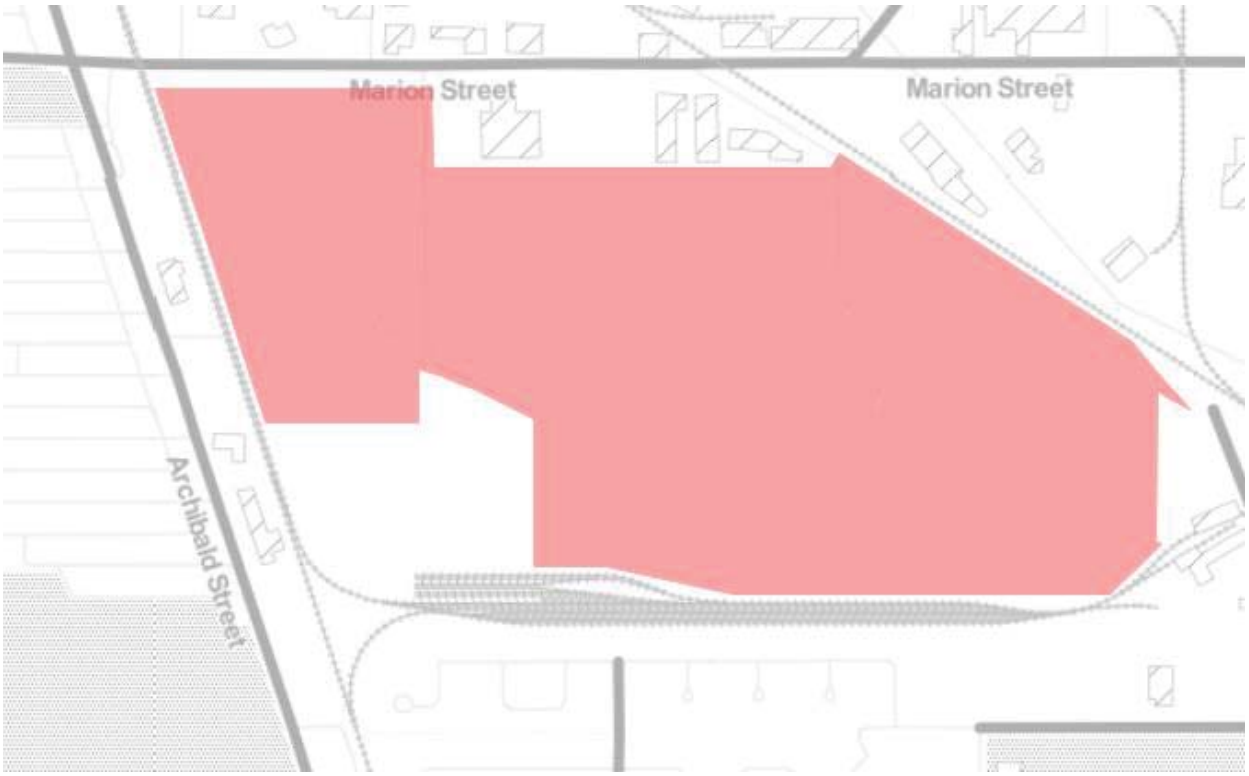
Senior Project Engineer

Land Development, Manitoba

OLEXA DEVELOPMENTS

PUBLIC MARKETS
SERVICING REPORT

MAY 01, 2024



PUBLIC MARKETS
SERVICING REPORT
OLEXA DEVELOPMENTS

DESIGN REPORT-R1

PROJECT NO.: 211-07590-00
DATE: MAY 01, 2024

WSP
1600 BUFFALO PLACE
WINNIPEG, MB
CANADA R3T 6B8

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WSP Canada Inc.

SIGNATURES

PREPARED BY

2024-05-01

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

APPROVED[1] BY



2024-05-01

Bob Hinkelman, C.E.T
Senior Advisor
Land Development, Manitoba

[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

- **B-1** Wastewater Sewer Layout
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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 × average day water demand
- Peak hour water demand: 2.5 × average day water demand

Residential Demand

- Average day water demand: 225 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 watermains 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 Deign 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 L/s ÷ 4) to Junctions 19 though 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 in 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	71.37 L/s	63.60 L/s	0.143%	375 mm
Speers Road @ CN Rail	27.38 L/s	14.62 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 that those in Acre's 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:

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

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

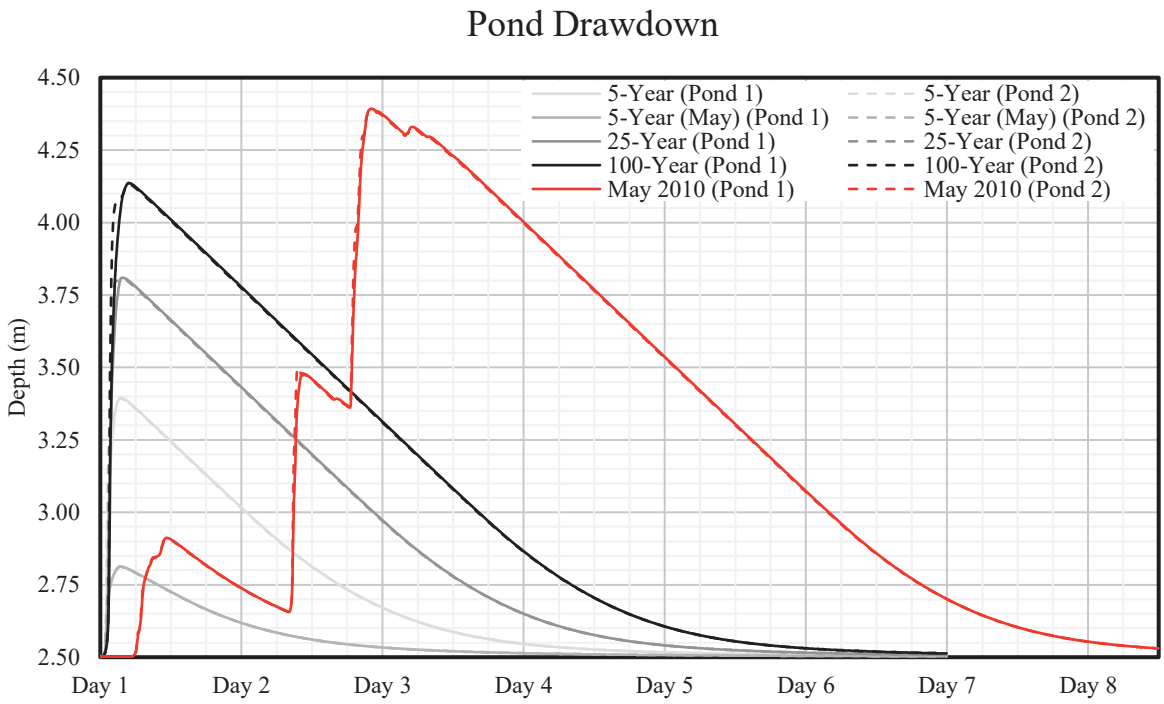


Figure 1: Pond drawdowns for various design storms relative to the beginning of the storm. The normal water level is at a depth of 2.50 m.

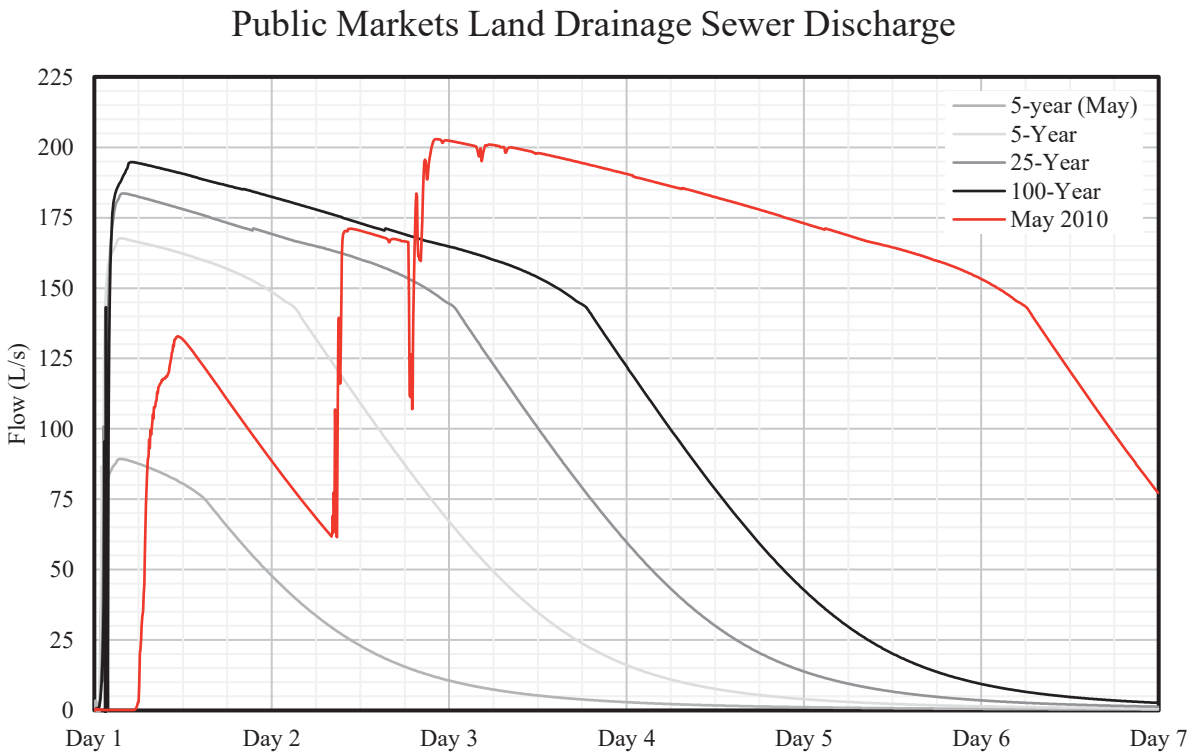


Figure 2: Discharge downstream of the weir manhole during various design storms.

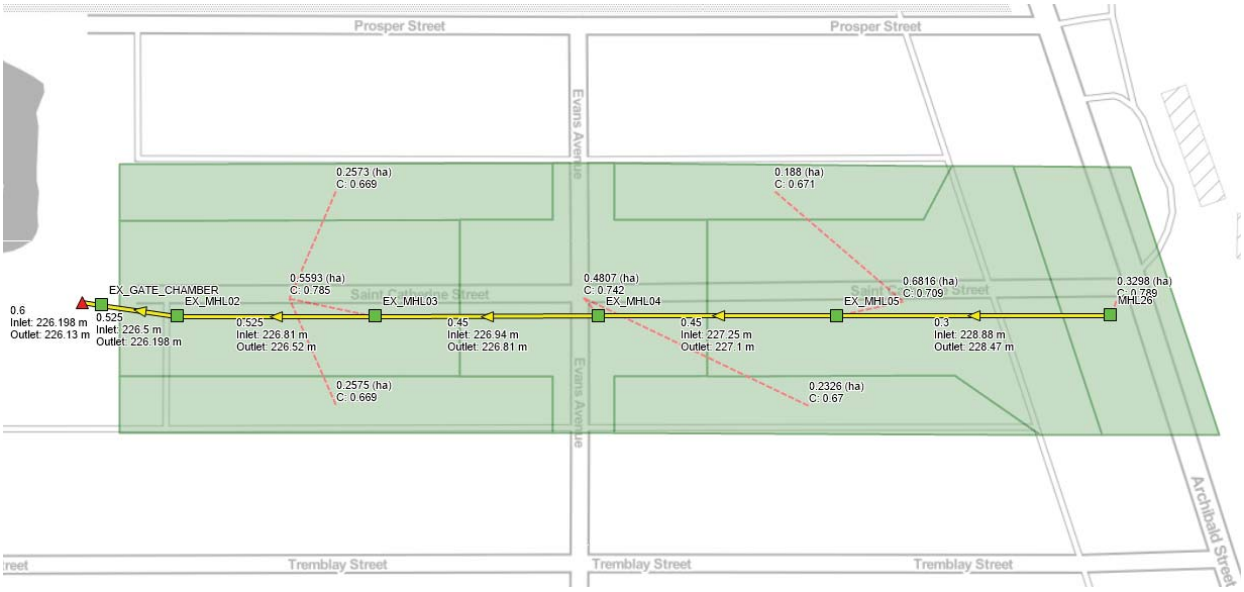


Figure 3: Model of existing conditions for St Catherine Street land drainage sewer.

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.

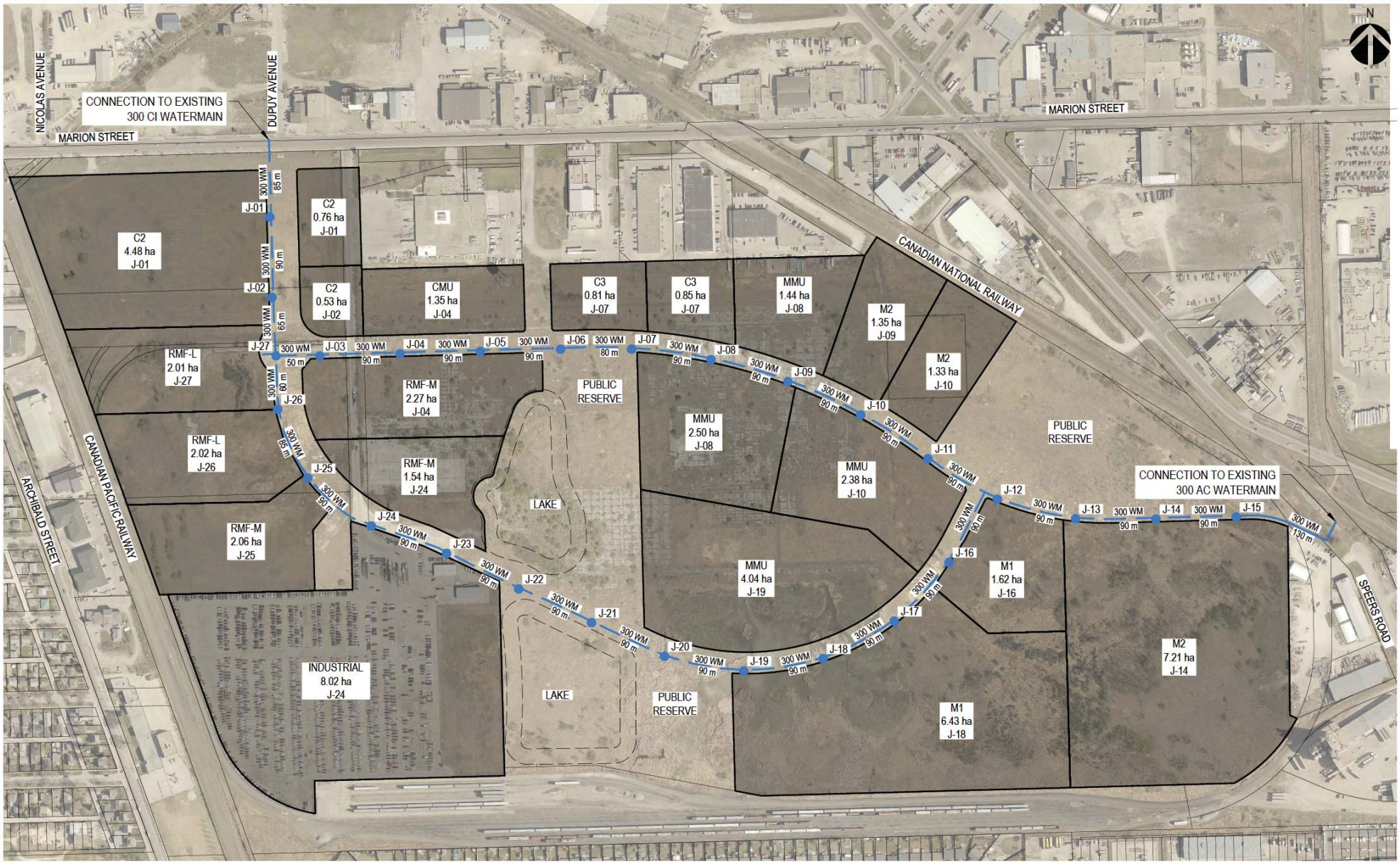
The retention ponds discharge by a pipe crossing the CP Railway and Archibald Street to connect to the existing system on St Catherine Street. An evaluation of the existing system was performed and found that if the last section of existing pipe is upsized and lowered, the effects of the additional storm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

APPENDIX

A WATERMAIN DESIGN

APPENDIX

A-1 WATERMAIN LAYOUT



1600 Buffalo Place, Winnipeg, Manitoba, R3T 6B8
T 204-477-6650 | www.wsp.com

PROJECT NO: 211-07590-00

SCALE:	1:4000
DATE:	2021/12/20
DESIGNED BY:	B.F.
DRAWN BY:	B.F.

PROJECT: PUBLIC MARKETS SERVICING REPORT

TITLE: WATERMAIN LAYOUT

DRAWING: A-1

APPENDIX

A-2 *MULTI-FAMILY DWELLING DENSITIES*

Friesen, Bruce

From: Lau, Ho
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.
M.
E.

winnipeg.ca

From: Friesen, Bruce
Sent: Friday, August 6, 2021 12:15 PM
To: Lau, Ho
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

From: Lau, Ho
Sent: Friday, August 6, 2021 11:39 AM
To: Friesen, Bruce
Cc: Kulczycki, Gregory
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

T.
M.
E.

winnipeg.ca

From: Kulczycki, Gregory
Sent: Thursday, August 5, 2021 1:02 PM
To: Lau, Ho
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:
E:
WATER AND WASTE DEPARTMENT
ENGINEERING SERVICES DIVISION
winnipeg.ca

From: Friesen, Bruce
Sent: Tuesday, August 3, 2021 11:35 AM
To: Kulczycki, Gregory
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

WSP Canada Inc.
1600 Buffalo Place
Winnipeg, Manitoba
R3T 6B8 Canada

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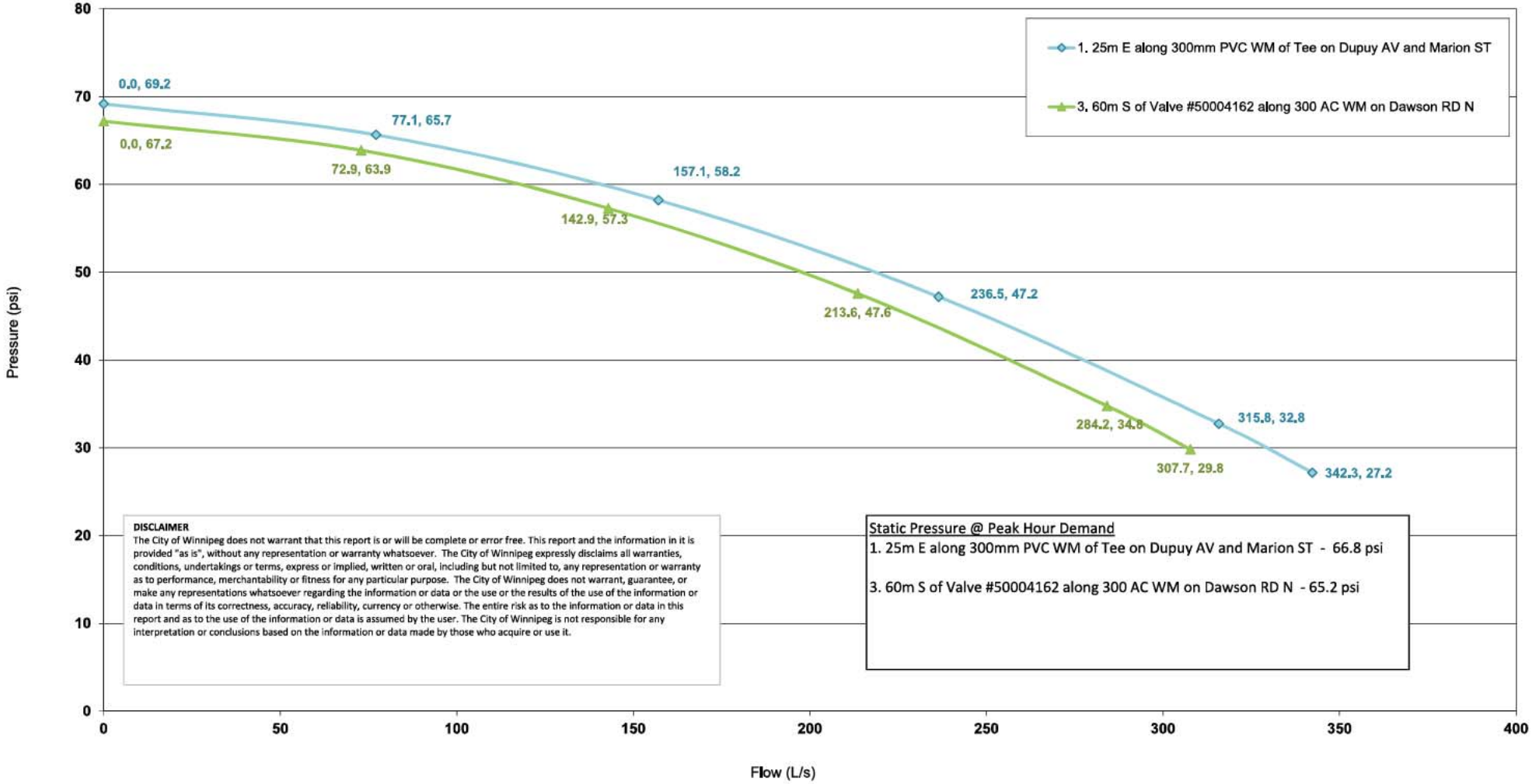
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APPENDIX

A-3 SIMULATED SIMULTANEOUS FIRE FLOW TESTS

Simulated Available Simultaneous Flows and Pressures for MDD

August 13, 2021



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Static Pressure @ Peak Hour Demand

1. 25m E along 300mm PVC WM of Tee on Dupuy AV and Marion ST - 66.8 psi

3. 60m S of Valve #50004162 along 300 AC WM on Dawson RD N - 65.2 psi

APPENDIX

A-4 DESIGN TABLE

Residential

Junction	Single Family				Multi-Family				Summary			
	(1)	(2)	(3)	(1)x(2)x(3) ( )	(5)	(6)	(7)	(5)x(6)x(7) (8)	( ) (8) (9)	(10)	1.6x(10) (11)	2.5x(10) (12)
Downstream	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
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

Non-Residential

Junction	Commercial					Light Industrial					Wet Industrial				
	(13)	(1)	(13)x(1) (15)	1.6x(15) (16)	2.5x(15) (17)	(18)	(19)	(18)x(19) (20)	1.6x(20) (21)	2.5x(20) (22)	(23)	(2)	(23)x(2) (25)	1.6x(25) (26)	2.5x(25) (27)
Downstream	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	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	2.55 L/s										
J-02	0.53 ha	16,800 L/ha/day	0.10 L/s	0.16 L/s	0.25 L/s										
J-03															
J-04	1.35 ha	16,800 L/ha/day	0.26 L/s	0.42 L/s	0.65 L/s										
J-05															
J-06															
J-07	1.66 ha	16,800 L/ha/day	0.32 L/s	0.51 L/s	0.80 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

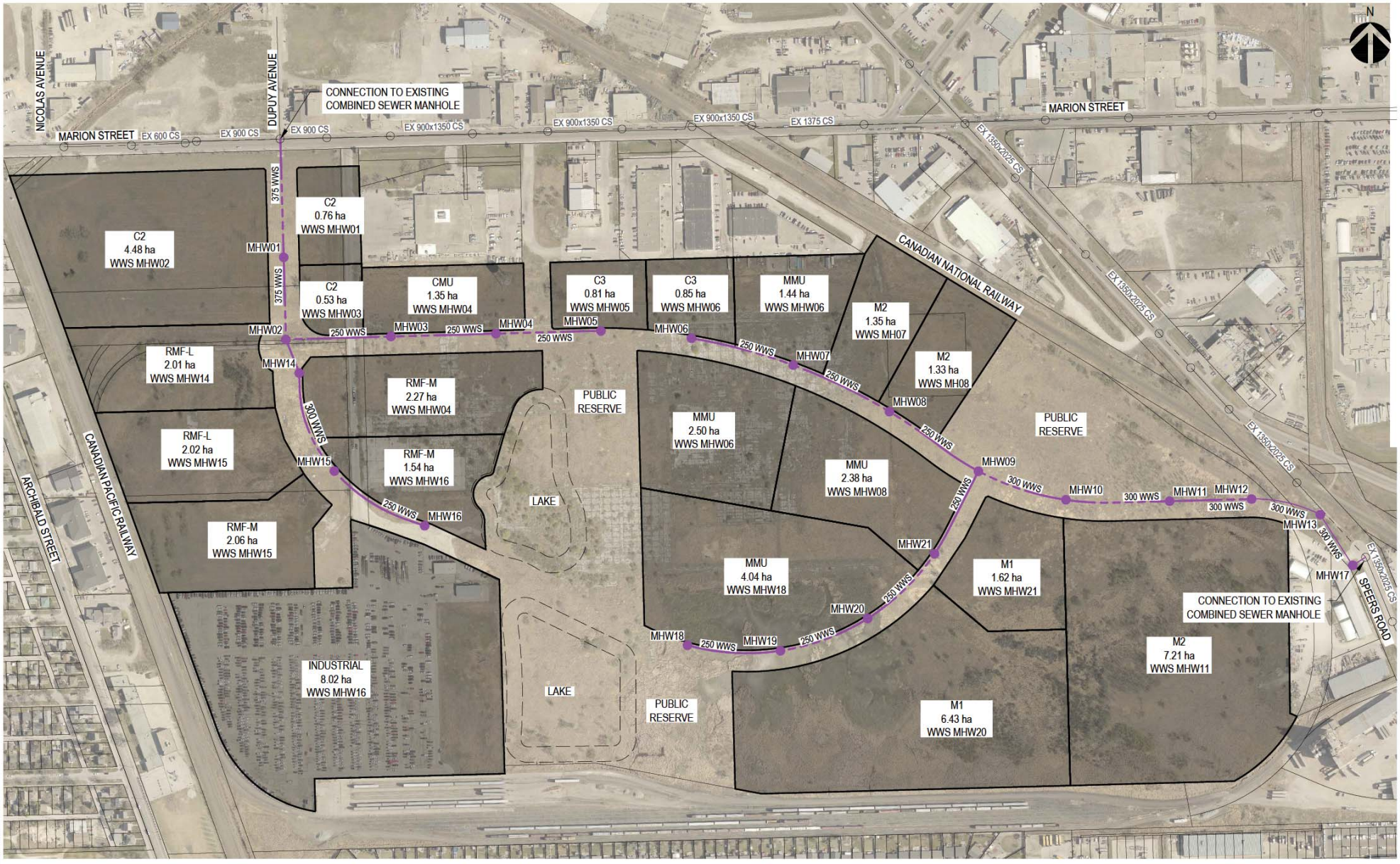
Junction	(10)+(15)+(20)+(25) (28)	(11)+(16)+(21)+(26) (29)	(12)+(17)+(22)+(27) (30)
Downstream	Total Average Day Water Demand	Total Max Day Water Demand	Total Peak Hour Water Demand
J-01	1.02 L/s	1.63 L/s	2.55 L/s
J-02	0.10 L/s	0.16 L/s	0.25 L/s
J-03			
J-04	1.86 L/s	2.98 L/s	4.65 L/s
J-05			
J-06			
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



1600 Buffalo Place, Winnipeg, Manitoba, R3T 6B8
T 204-477-6650 | www.wsp.com

PROJECT NO: 211-07590-00

SCALE:	1:4000
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 - Incl 2000 MF Units plus future 700 MF unit in Car Park Area

Wastewater Sewer Design - Flow Calculation Table

11-Apr-24

	Single Family	3.05	/unit		Per Capita Flow	270	lpcd average
Common Factors		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**	**5**	**6,7**	**8**	**9**	**9**	
			16-15	**15-14**	**14-02**	**5-4**	**4-3**	**3-2**	**2-1**	**1-exist**	
	Gross Area (Ha) Residential		**8.020**	**4.460**	**2.280**	**0.000**	**3.810**	**0.000**	**0.000**	**0.000**	
	Net Area Residential (Ha) net of SRB's and large PR's		**8.020**	**4.460**	**2.280**	**0.000**	**3.810**	**0.000**	**0.000**	**0.000**	
	Single family (ha)		**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	
	Multi family (ha)		**8.02**	**4.08**	**2.01**	**0.00**	**3.81**	**0.00**	**0.00**	**0.00**	
											Totals
	Total Single Family Lots		0	0	0	0	0	0	0	0	0
	Area Total Single Family Population		0	0	0	0	0	0	0	0	
	Accumulated Total Single Family Population		0	0	0	0	0	0	0	0	
	Average flow (l/d) based on 270 lpcd		0	0	0	0	0	0	0	0	
	Total Multi Family Units		700 Units	591 Units	729 Units	Units	680 Units	Units	Units	Units	2700 Units
	Area Total Multi Family Population		1610	1360	1677	0	1564	0	0	0	
	Accumulated Total Multi Family Population		1610	2970	4647	0	1564	1564	6211	6211	
	Average flow (l/d) based on 270 lpcd		434,700	801,900	1,254,690	0	422,280	422,280	1,676,970	1,676,970	
	Total Average Flow Residential		434,700	801,900	1,254,690	0	422,280	422,280	1,676,970	1,676,970	
	Harmon Peaking Factor		3.66	3.45	3.27	4.50	3.67	3.67	3.16	3.16	
1.	**Peak Day flow Residential (l/sec)**		**18.400**	**31.984**	**47.549**	**0.000**	**17.919**	**17.919**	**61.264**	**61.264**	
	Commerical / Industrial Peak Day										
	Commerical - area (Ha)		0.00	0.00	0.00	0.81	1.35	0.53	4.48	0.76	
	Commerical Flow l/sec		0.00 l/s	0.00 l/s	0.00 l/s	0.26 l/s	0.44 l/s	0.17 l/s	1.46 l/s	0.25 l/s	
	Business park - area (Ha)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Business park mix Flow		0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	
	Light industrial - area (Ha) incl schools		0.00	0.00	0.00	0.00	0.00	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	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	
	Wet industrial - area (Ha)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Wet industrial Flow l/sec		0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	
	Total Net Area Commercial / Industrial (Ha)		**0.00**	**0.00**	**0.00**	**0.81**	**1.35**	**0.53**	**4.48**	**0.76**	
2.	**Total Peak Dry Weather Flows Commercial / Industrial**		**0.00**	**0.00**	**0.00**	**0.26**	**0.44**	**0.17**	**1.46**	**0.25**	
3.	**Total Accumulated Peak Dry Weather Flows Com and Ind**		**0.00**	**0.00**	**0.00**	**0.26**	**0.70**	**0.87**	**2.33**	**2.58**	
4.	**Total Peak Day Dry Weather Flows Sub-total 1+3**		**18.40**	**31.98**	**47.55**	**0.26**	**18.62**	**18.79**	**63.60**	**63.84**	
	Additional area for infiltration in commercial/industrial (ROW's)	Ha	0.22	0.00	0.00	0.28	0.28	0.30	0.39	0.39	
	No. of manholes	Res	8.0	4.0	2.0	0.0	4.0	0.0	0.0	0.0	
		Commerical	0.0	0.0	0.0	1.0	1.0	1.0	4.0	1.0	
		ROW	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
			9.00	5.00	3.00	2.00	6.00	2.00	5.00	2.00	
	Manhole infiltration (l/sec)		1.80	1.00	0.60	0.40	1.20	0.40	1.00	0.40	
	Groundwater infiltration (l/sec)		0.210	0.114	0.058	0.028	0.139	0.021	0.124	0.029	
	Total infiltration (l/sec)		2.010	1.114	0.658	0.428	1.339	0.421	1.124	0.429	
5.	**Accumulated Total infiltration (l/sec)**		**2.010**	**3.123**	**3.781**	**0.428**	**1.766**	**2.187**	**7.093**	**7.522**	
	Total peak day wet weather flow (l/sec)		**20.410**	**35.108**	**51.331**	**0.691**	**20.388**	**20.982**	**70.689**	**71.366**	
		Pipe Dia	**250**	**300**	**300**	**250**	**250**	**250**	**375**	**375**	
	Full Flow cap	**@ Min Slope** **Max capacity**	**29.000**	**42.000**	**42.000**	**29.000**	**29.000**	**29.000**	**66.000**	**66.000**	
		@ Asbuilt Slope **Asbuilt**			**59.000**				**73.000**	**73.000**	

Residential

Section		Single Family				Multi-Family				Summary				
Upstream	Downstream	(1) Area	(2) Dwellings / ha	(3) Population / Dwelling	(1)x(2)x(3) (4) Population	(5) Area	(6) Dwellings / ha	(7) Population / Dwelling	(5)x(6)x(7) (8) Population	(4)+(8) (9) Population	(10) PF	(11) Typical Rate	(9)x(11) (12) Average Dry Weather Flow	(10)x(12) (13) Peak Dry Weather Flow
WWS MH17	WWS MH18		0	0	0		0	0	0	0	0 00	0 L/cap/day	0 00 L/s	0 00 L/s
WWS MH18	WWS MH19		0	0	0		0	0	0	0	0 00	0 L/cap/day	0 00 L/s	0 00 L/s
WWS MH19	WWS MH20		0	0	0		0	0	0	0	0 00	0 L/cap/day	0 00 L/s	0 00 L/s
WWS MH20	WWS MH09		0	0	0		0	0	0	0	0 00	0 L/cap/day	0 00 L/s	0 00 L/s
WWS MH06	WWS MH07		0	0	0		0	0	0	0	0 00	0 L/cap/day	0 00 L/s	0 00 L/s
WWS MH07	WWS MH08		0	0	0		0	0	0	0	0 00	0 L/cap/day	0 00 L/s	0 00 L/s
WWS MH08	WWS MH09		0	0	0		0	0	0	0	0 00	0 L/cap/day	0 00 L/s	0 00 L/s
WWS MH09	WWS MH10		0	0	0		0	0	0	0	0 00	0 L/cap/day	0 00 L/s	0 00 L/s
WWS MH10	WWS MH11		0	0	0		0	0	0	0	0 00	0 L/cap/day	0 00 L/s	0 00 L/s
WWS MH11	WWS MH12		0	0	0		0	0	0	0	0 00	0 L/cap/day	0 00 L/s	0 00 L/s
WWS MH12	WWS MH13		0	0	0		0	0	0	0	0 00	0 L/cap/day	0 00 L/s	0 00 L/s
WWS MH13	WWS MH13		0	0	0		0	0	0	0	0 00	0 L/cap/day	0 00 L/s	0 00 L/s
WWS MH13	EXST 1350X2025 CS		0	0	0		0	0	0	0	0 00	0 L/cap/day	0 00 L/s	0 00 L/s

Non-Residential

Section		Commercial					Light Industrial (15%)					Wet Industrial (85%)				
		(14)	(15)	(14)x(15) (16)	(17)	(14)x(17) (18)	(19)	(20)	(19)x(20) (21)	(22)	(19)x(22) (23)	(24)	(25)	(24)x(25) (26)	(27)	(24)x(27) (28)
Upstream	Downstream	Area	Typical Rate	Average Dry Weather Flow	Typical Peak Rate	Peak Dry Weather Flow	Area	Typical Rate	Average Dry Weather Flow	Typical Peak Rate	Peak Dry Weather Flow	Area	Typical Rate	Average Dry Weather Flow	Typical Peak Rate	Peak Dry Weather Flow
WWS MH17	WWS MH18		0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s	0 61 ha	22,500 L/ha/day	0 16 L/s	37,600 L/ha/day	0 26 L/s	3 43 ha	33,600 L/ha/day	1 33 L/s	44,900 L/ha/day	1 78 L/s
WWS MH18	WWS MH19		0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s		0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s	0 00 ha	0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s
WWS MH19	WWS MH20		0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s	0 97 ha	22,500 L/ha/day	0 25 L/s	37,600 L/ha/day	0 42 L/s	5 47 ha	33,600 L/ha/day	2 13 L/s	44,900 L/ha/day	2 84 L/s
WWS MH20	WWS MH09		0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s	0 24 ha	22,500 L/ha/day	0 06 L/s	37,600 L/ha/day	0 11 L/s	1 38 ha	33,600 L/ha/day	0 54 L/s	44,900 L/ha/day	0 72 L/s
WWS MH06	WWS MH07	0 85 ha	16,800 L/ha/day	0 17 L/s	28,100 L/ha/day	0 28 L/s	0 59 ha	22,500 L/ha/day	0 15 L/s	37,600 L/ha/day	0 26 L/s	3 35 ha	33,600 L/ha/day	1 30 L/s	44,900 L/ha/day	1 74 L/s
WWS MH07	WWS MH08		0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s	0 20 ha	22,500 L/ha/day	0 05 L/s	37,600 L/ha/day	0 09 L/s	1 14 ha	33,600 L/ha/day	0 45 L/s	44,900 L/ha/day	0 59 L/s
WWS MH08	WWS MH09		0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s	0 56 ha	22,500 L/ha/day	0 15 L/s	37,600 L/ha/day	0 24 L/s	3 16 ha	33,600 L/ha/day	1 23 L/s	44,900 L/ha/day	1 64 L/s
WWS MH09	WWS MH10		0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s		0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s	0 00 ha	0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s
WWS MH10	WWS MH11		0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s		0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s	0 00 ha	0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s
WWS MH11	WWS MH12		0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s	1 08 ha	22,500 L/ha/day	0 28 L/s	37,600 L/ha/day	0 47 L/s	6 13 ha	33,600 L/ha/day	2 38 L/s	44,900 L/ha/day	3 18 L/s
WWS MH12	WWS MH13		0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s		0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s	0 00 ha	0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s
WWS MH13	WWS MH13		0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s										
WWS MH13	EXST 1350X2025 CS		0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s		0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s	0 00 ha	0,000 L/ha/day	0 00 L/s	0,000 L/ha/day	0 00 L/s

Section		Extraneous						Wastewater Generation Summary				
		(1)+(5)+(14)+(19)+(24)		(29+30)x2200 L/ha/day	((29)x1 6+1)x12 L/min		(31)+(32)+(33)	(12)+(16)+(21)+(26)	(13)+(18)+(23)+(28)	(34)	(36)+(37)	
		(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)
Upstream	Downstream	Lot Area	RoW Area	Groundwater Infiltration	Manhole Infiltration	Weeping Tile Flow	Total	Total Average Dry Weather Flow	Total Peak Dry Weather Flow	Total Extraneous Flow	Peak Wet Weather Flow	Accumulated Peak Wet Weather Flow
WWS MH17	WWS MH18	4 04 ha	0 26 ha	0 11 L/s	1 49 L/s	0 00 L/s	1 60 L/s	1 49 L/s	2 04 L/s	1 60 L/s	3 64 L/s	3 64 L/s
WWS MH18	WWS MH19	0 00 ha	0 27 ha	0 01 L/s	0 20 L/s	0 00 L/s	0 21 L/s	0 00 L/s	0 00 L/s	0 21 L/s	0 21 L/s	3 85 L/s
WWS MH19	WWS MH20	6 43 ha	0 32 ha	0 17 L/s	2 26 L/s	0 00 L/s	2 43 L/s	2 38 L/s	3 26 L/s	2 43 L/s	5 69 L/s	9 54 L/s
WWS MH20	WWS MH09	1 62 ha	0 27 ha	0 05 L/s	0 72 L/s	0 00 L/s	0 77 L/s	0 60 L/s	0 83 L/s	0 77 L/s	1 60 L/s	11 14 L/s
WWS MH06	WWS MH07	4 79 ha	0 27 ha	0 13 L/s	1 73 L/s	0 00 L/s	1 86 L/s	1 62 L/s	2 28 L/s	1 86 L/s	4 14 L/s	4 14 L/s
WWS MH07	WWS MH08	1 35 ha	0 26 ha	0 04 L/s	0 63 L/s	0 00 L/s	0 67 L/s	0 50 L/s	0 68 L/s	0 67 L/s	1 35 L/s	5 49 L/s
WWS MH08	WWS MH09	3 71 ha	0 29 ha	0 10 L/s	1 39 L/s	0 00 L/s	1 49 L/s	1 38 L/s	1 88 L/s	1 49 L/s	3 37 L/s	8 86 L/s
WWS MH09	WWS MH10	0 00 ha	0 31 ha	0 01 L/s	0 20 L/s	0 00 L/s	0 21 L/s	0 00 L/s	0 00 L/s	0 21 L/s	0 21 L/s	20 21 L/s
WWS MH10	WWS MH11	0 00 ha	0 27 ha	0 01 L/s	0 20 L/s	0 00 L/s	0 21 L/s	0 00 L/s	0 00 L/s	0 21 L/s	0 21 L/s	20 42 L/s
WWS MH11	WWS MH12	7 21 ha	0 26 ha	0 19 L/s	2 51 L/s	0 00 L/s	2 70 L/s	2 66 L/s	3 65 L/s	2 70 L/s	6 35 L/s	26 77 L/s
WWS MH12	WWS MH13	0 00 ha	0 18 ha	0 00 L/s	0 20 L/s	0 00 L/s	0 20 L/s	0 00 L/s	0 00 L/s	0 20 L/s	0 20 L/s	26 97 L/s
WWS MH13	WWS MH13		0 17 ha	0 00 L/s	0 20 L/s		0 20 L/s	0 00 L/s	0 00 L/s	0 20 L/s	0 20 L/s	27 18 L/s
WWS MH13	EXST 1350X2025 CS	0 00 ha	0 12 ha	0 00 L/s	0 20 L/s	0 00 L/s	0 20 L/s	0 00 L/s	0 00 L/s	0 20 L/s	0 20 L/s	27 38 L/s

Section		Pipe Design					
Upstream	Downstream	(40) Grade	(41) Depth of Flow	(42) Mannings 'n'	(43) Diameter	(44) Flow	(45) Velocity
WWS MH17	WWS MH18	0 245%	24%	0 013	0 250 m	3 64 L/s	0 41 m/s
WWS MH18	WWS MH19	0 245%	24%	0 013	0 250 m	3 85 L/s	0 41 m/s
WWS MH19	WWS MH20	0 245%	39%	0 013	0 250 m	9 54 L/s	0 54 m/s
WWS MH20	WWS MH09	0 245%	43%	0 013	0 250 m	11 14 L/s	0 56 m/s
WWS MH06	WWS MH07	0 245%	25%	0 013	0 250 m	4 14 L/s	0 42 m/s
WWS MH07	WWS MH08	0 245%	29%	0 013	0 250 m	5 49 L/s	0 46 m/s
WWS MH08	WWS MH09	0 245%	38%	0 013	0 250 m	8 86 L/s	0 52 m/s
WWS MH09	WWS MH10	0 192%	49%	0 013	0 300 m	20 21 L/s	0 59 m/s
WWS MH10	WWS MH11	0 192%	49%	0 013	0 300 m	20 42 L/s	0 59 m/s
WWS MH11	WWS MH12	0 192%	58%	0 013	0 300 m	26 77 L/s	0 63 m/s
WWS MH12	WWS MH13	0 192%	58%	0 013	0 300 m	26 97 L/s	0 64 m/s
WWS MH13	WWS MH13	0 192%	58%	0 013	0 300 m	27 18 L/s	0 64 m/s
WWS MH13	EXST 1350X2025 CS	0 192%	59%	0 013	0 300 m	27 38 L/s	0 64 m/s

APPENDIX

C LAND DRAINAGE SEWER DESIGN

APPENDIX

C-1 LAND DRAINAGE SEWER LAYOUT



1600 Buffalo Place, Winnipeg, Manitoba, R3T 6B8
T 204-477-6650 | www.wsp.com

PROJECT NO: 211-07590-00

SCALE:	1:6000
DATE:	2022/06/08
DESIGNED BY:	B.F.
DRAWN BY:	B.F.

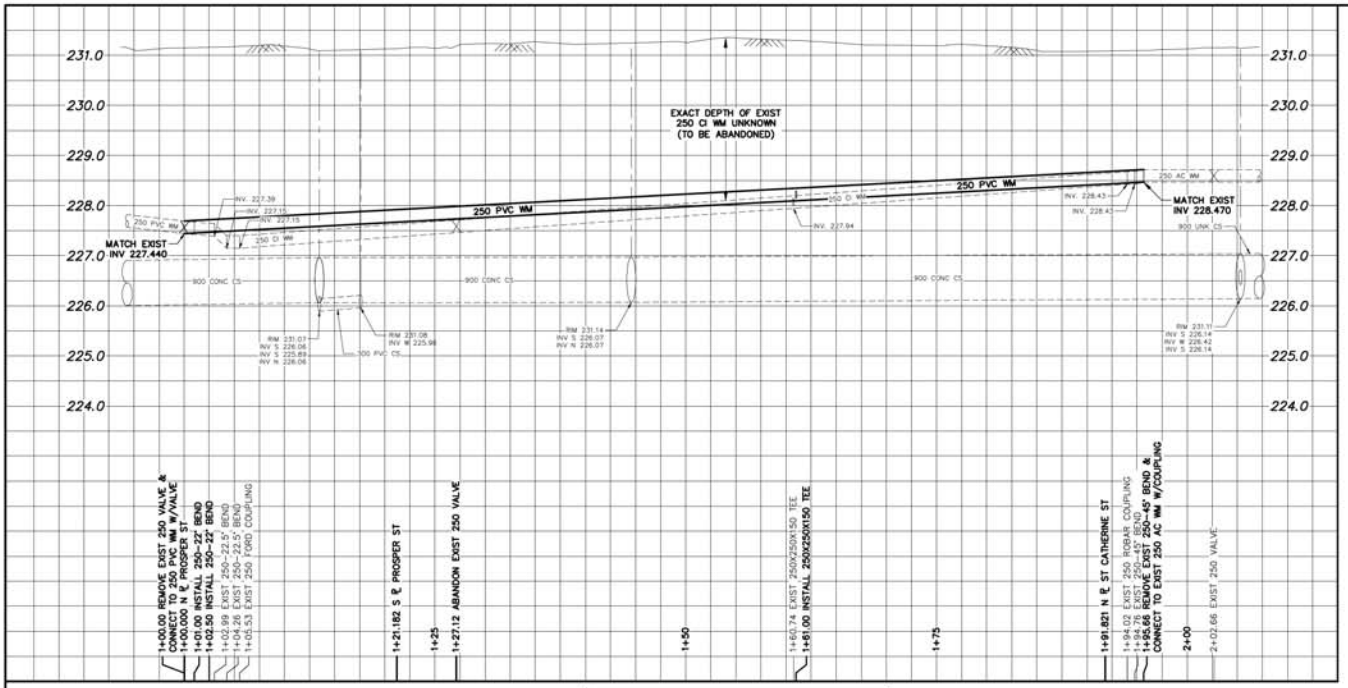
PROJECT: PUBLIC MARKETS SERVICING REPORT

TITLE: LAND DRAINAGE SEWER LAYOUT

DRAWING: C-1

APPENDIX

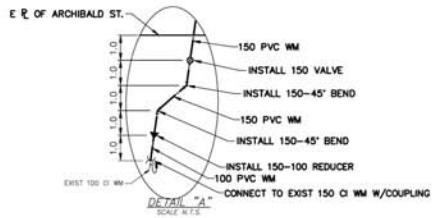
C-2 ARCHIBALD STREET AS-BUILTS



CLASS 2 OR 3 BACKFILL IS REQUIRED WHERE EXCAVATION IS WITHIN 1.0m OF EXISTING OR PROPOSED SIDEWALK AND/OR PAVEMENT

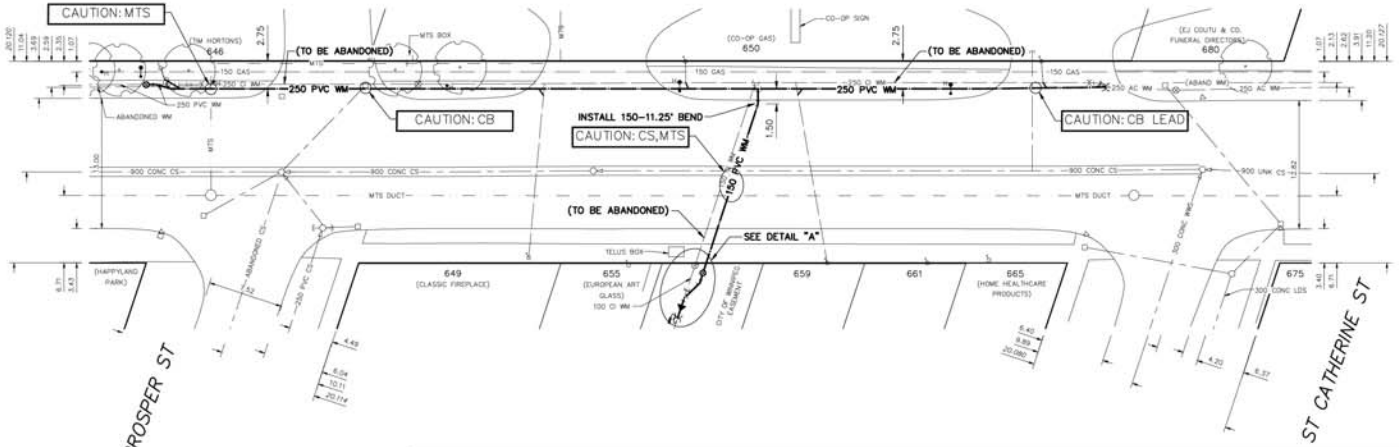
ALL PIPES, SERVICE CONNECTIONS & CATCH LEADS CROSSING STREET (LANE) TO BE INSTALLED USING TRENCHLESS METHOD

ANY RESTORATION OF PAVEMENT CUTS MUST ADHERE TO THE PAVEMENT RESTORATION GUIDELINES SET FORTH IN THE CITY OF WINNIPEG'S 2019 STREET CUTS MANUAL



NOTE: CHAINAGES SHOWN ARE ALONG E. ℄ OF ARCHIBALD STREET

ARCHIBALD STREET



WATER SERVICE INFORMATION

ADDRESS	SIZE (mm) MATERIAL (STREET)	SIZE (mm) MATERIAL (PROP.)	SHORT & LONG MEASUREMENT	CORP. LOCATION	REMARKS
646 ARCHIBALD ST	50	50	7.37 SNL BLDG		RECONNECT SERVICE
COMMERCIAL	CU	CU	19.766 NSL PROSPER ST	0.2 S OF S/C	–
649 ARCHIBALD ST	25	–	2.89 NSL BLDG		RECONNECT SERVICE
COMMERCIAL	CU	–	16.951 SSL PROSPER ST	1.6 S OF S/C	–
650 ARCHIBALD ST	25	–	4.28 NWL BLDG		RECONNECT SERVICE
COMMERCIAL	CU	–	32.578 SSL PROSPER ST	OPP S/C	–
650 ARCHIBALD ST	50	50	15.95 SSL BLDG		RECONNECT SERVICE
COMMERCIAL	DU	CU	2.573 NWL ST CATHERINE ST	OPP S/C	–
655 ARCHIBALD ST	–	25	2.74 NSL BLDG		RECONNECT SERVICE
COMMERCIAL	–	CU	26.904 SSL PROSPER ST	–	–
659 ARCHIBALD ST	38	12	1.42 NSL HSE		RECONNECT SERVICE
RESIDENTIAL	CU	CU	23.935 NWL ST CATHERINE ST	3.1 N OF S/C	–
661 ARCHIBALD ST	–	20	0.98 NSL HSE	–	RECONNECT SERVICE
RESIDENTIAL	–	CU	13.928 NWL ST CATHERINE ST		–
665 ARCHIBALD ST	–	20	2.31 SNL BLDG	–	RECONNECT SERVICE
COMMERCIAL	–	CU	7.802 NWL ST CATHERINE ST		–
675 ARCHIBALD ST	38	38	4.30 EWL BLDG		OUTSIDE LIMITS
COMMERCIAL	CU	CU	20.708 WWL ARCHIBALD ST	OPP S/C	–
680 ARCHIBALD ST	–	25	1.28 NWL BLDG		OUTSIDE LIMITS
COMMERCIAL	–	CU	28.289 SSL ST CATHERINE ST	0.6 N OF S/C	–

• SERVICES TO BE RENEWED TO ℄. ALL OTHERS TO BE RECONNECTED

FOR INDEX SEE D-15381

NOTE: ALL VALVES TO BE INSTALLED CLOCKWISE TO CLOSE

METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

0.0 5.0 10.0 15.0 20.0 25.0

WARNING

IF POWER EQUIPMENT OR EXPLOSIVES ARE TO BE USED FOR EXCAVATION ON THIS PROJECT THE CONTRACTOR MUST:

1) NOTIFY THE GAS COMPANY OF THE PROPOSED LOCATION OF EXCAVATION.

2) TAKE PRECAUTION TO AVOID DAMAGE TO GAS COMPANY INSTALLATIONS.

SEE PROVINCIAL REGULATION 210/72 FOR DETAILS

LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES COMMITTEE — DATE

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.M. ELEV.

NO.	REVISIONS	DATE	BY

DESIGNED BY	T.G.S.	CHECKED BY	SC
DRAWN BY	BL	APPROVED BY	KZ
SCALE: HORIZONTAL	1:250	RELEASED FOR CONSTRUCTION	K.ZUREK
VERTICAL	1:50	DATE	2019 04 05
DATE	2019 04 08		
PLOT DATE:	2019 04 08		

ENGINEER'S SEAL
ORIGINAL SIGNED BY S.R.J. COURNOYER 19/04/04

CONSULTANT DRAWING NUMBER
–

BID OPPORTUNITY: 200-2019
CONTRACT NUMBER: 2

FILE PATH: R:\DRAWINGS\WATER\RENEWAL\2019 RENEWALS\Contract 2\Construction dwgs\
FILE NAME: ARCHIBALD ST.dwg

Winnipeg

THE CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT
ENGINEERING DIVISION

2019 WATER MAIN RENEWALS
CONTRACT 2

ARCHIBALD STREET
PROSPER STREET TO
ST CATHERINES STREET

SHEET 3 OF 15

CITY DRAWING NUMBER
D-15382

C-3 DESIGN TABLE

Pipe Sizing

Job Name:	Public Markets
Job Number:	211-07590-00
Location	Winnipeg, MB
Client:	Olexa Developments
Date:	June 8, 2022
Designed By:	Bruce Friesen

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

HGL Slope = $[\frac{nV}{R^{2/3}}]^2$

where $R = d/4$

Manhole		Catchment	Area	Runoff Coefficient C	CxA	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

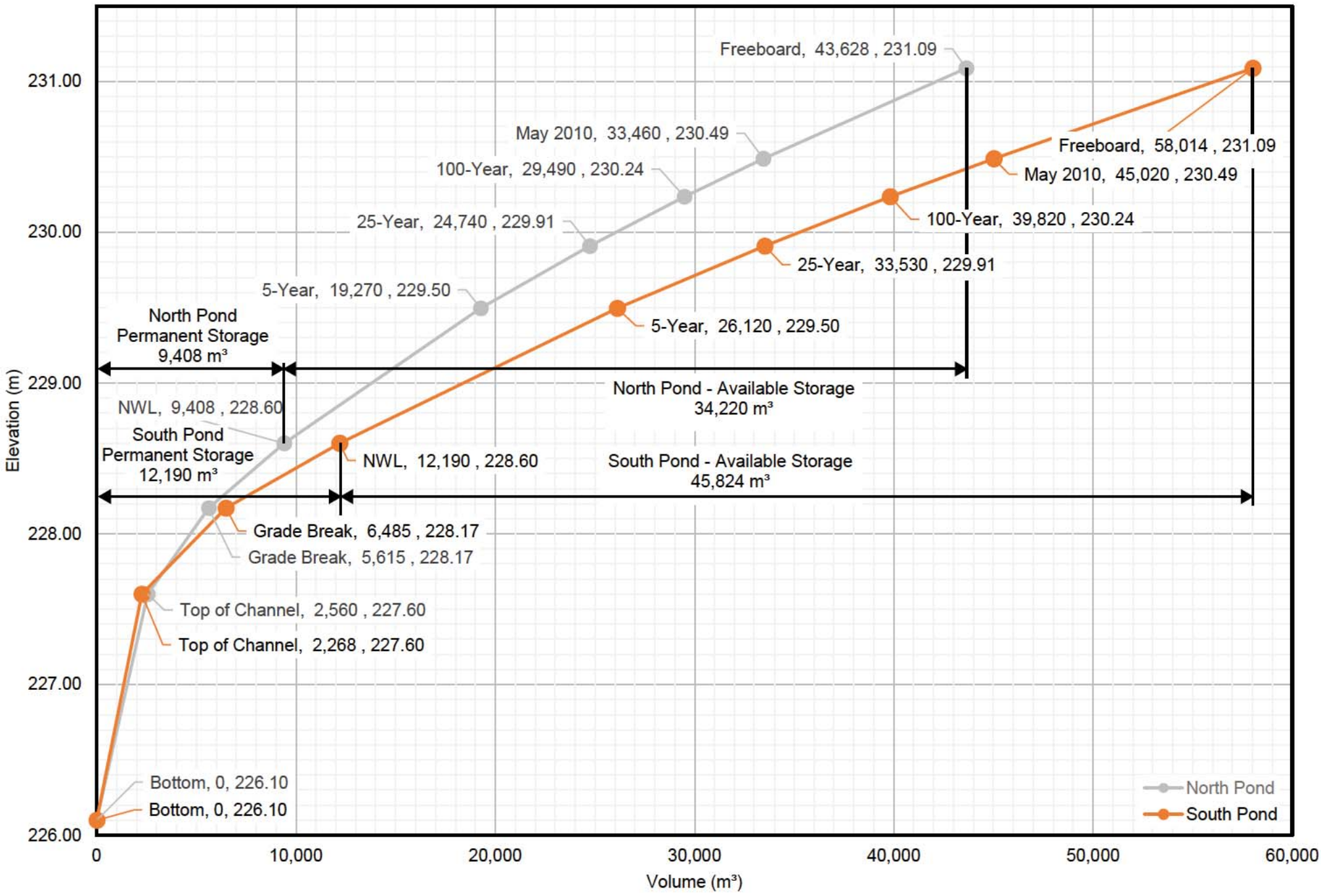
* HGL at taken from SWMM model at branch's maximum HGL

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

APPENDIX

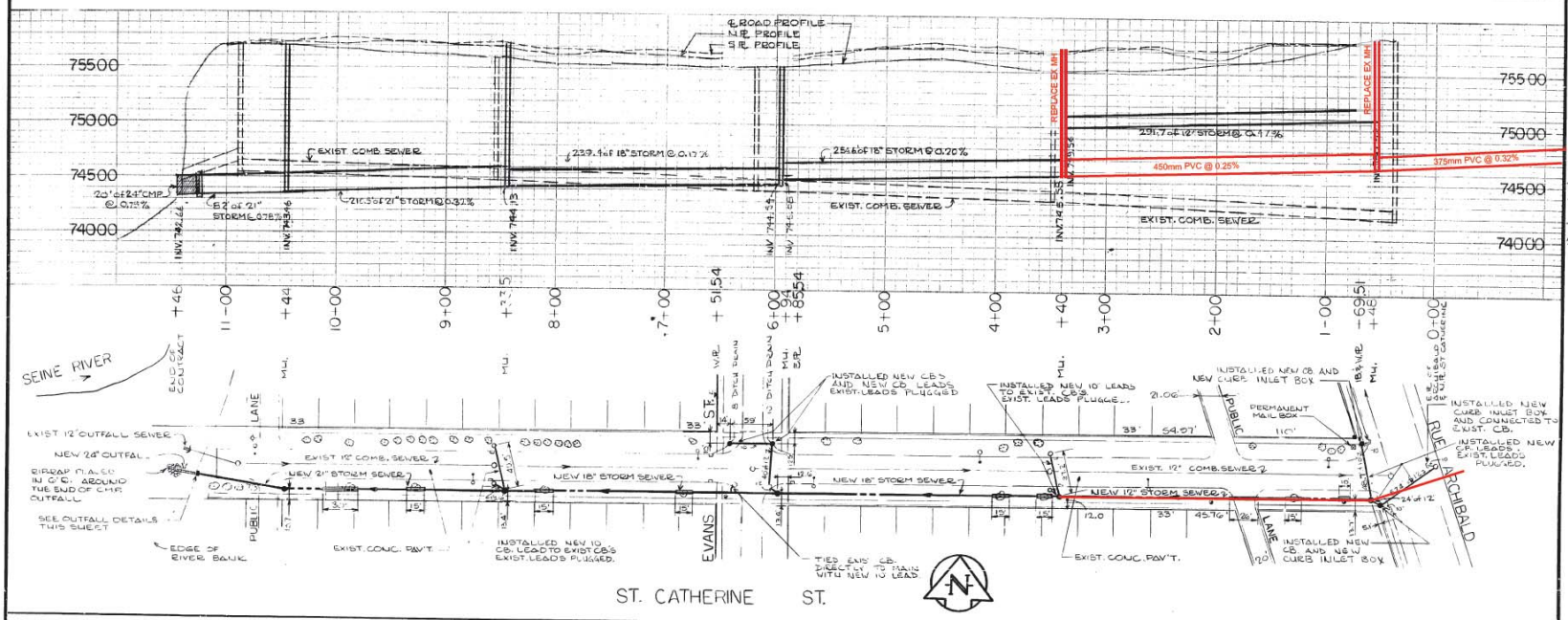
C-4 STAGE-AREA AND STAGE-VOLUME CURVES

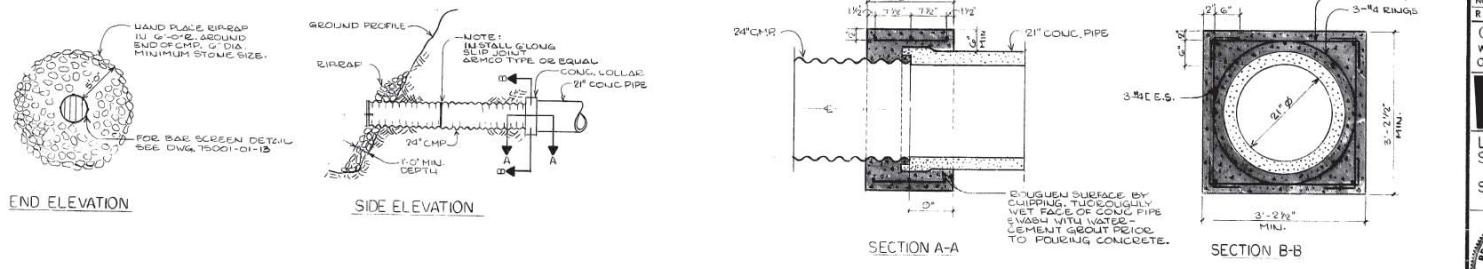
Elevation–Volume Curves



APPENDIX

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





24" OUTFALL DETAILS

NTS.

LEGEND

PROPOSED
- SANITARY SEWERS
- STORM SEWERS
- C.M.P. SEWERS
- FORCEMAINS
- DIRECTION OF FLOW
- MANHOLES
- CATCH BASINS
- CATCH BASIN LEADS
- FENCES

PROPOSED
- WATERMAINS
- VALVES
- HYDRANTS
- VALVE CHAMBER
- ROAD EDGES, CURBS
- CURB INLETS
- CURB INLET LEADS
- CULVERTS
- SIDEWALKS

EXISTING FEATURES
- TREES
- SIGNS
- VALVES
- GAS LINES
- TRAFFIC SIGNALS
- POWER POLES
- LAMP STANDARDS
- MTS UTILITY MANHOLES
- UNDERGROUND CABLES
- KIOSK- (TRANSFORMER)
- ALUMINUM PINS
- IRON BARS

ALL ELEVATIONS ARE BASED ON GEODETIC DATUM (1929 ADJ.)
FIELD BOOK 706 — REG'D PLAN ATLAS AB 27, AB 28

B.M. — ELEV. & DESCRIPTION

C. GREY MID. SPREX 100'N OF DENISET ON EVANS - ELEV. 753.74

ADDITIONAL LEGEND

TRUE SECTIONS OF ALIGNED SEWER

DISTRICT 5 WORKS & OPERATIONS DEPT.

AS-BUILT

DATE	FB. NO.	PAGE
APR 76	SW1	11

NO.	DESCRIPTION	DATE	BY
1	AS-BUILT - GRADES, ELEV'S, & CHANGES REVISED	APR '76	W.D.T.

REVISIONS

CITY OF WINNIPEG
WORKS & OPERATIONS DEPARTMENT
OPERATIONS DIVISION — DISTRICT 5

W. L. WARDROP & ASSOCIATES LTD.
ENGINEERING CONSULTANTS
WINNIPEG · THUNDER BAY · REGINA · BARRIE · EDMONTON

LAND DRAINAGE SEWERS
STAGE I

ST. CATHERINE ST. - ARCHIBALD TO SEINE RIVER

PROVINCE OF MANITOBA — D.W.T. LOWRY — REGISTERED ENGINEER

DESIGNED BY	DRAWN BY	CHECKED BY
J.J. & W.R.D.	D.M.	

APPROVED BY

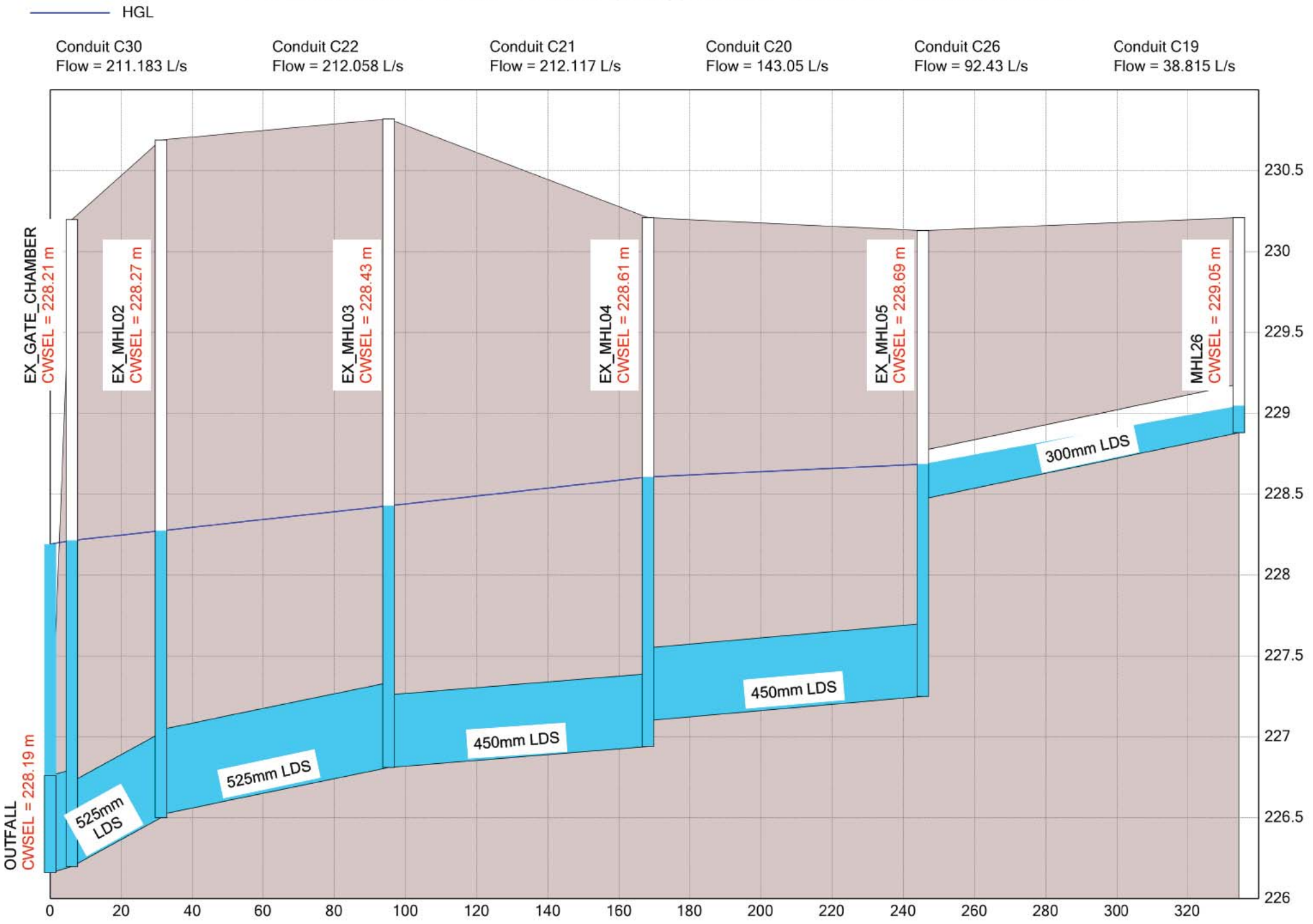
SCALE: HORIZ. 1"=50' VERT. 1"=5' — DATE: NOV. 1975

DRAWING NO. 75001-01-12 — REV. 1

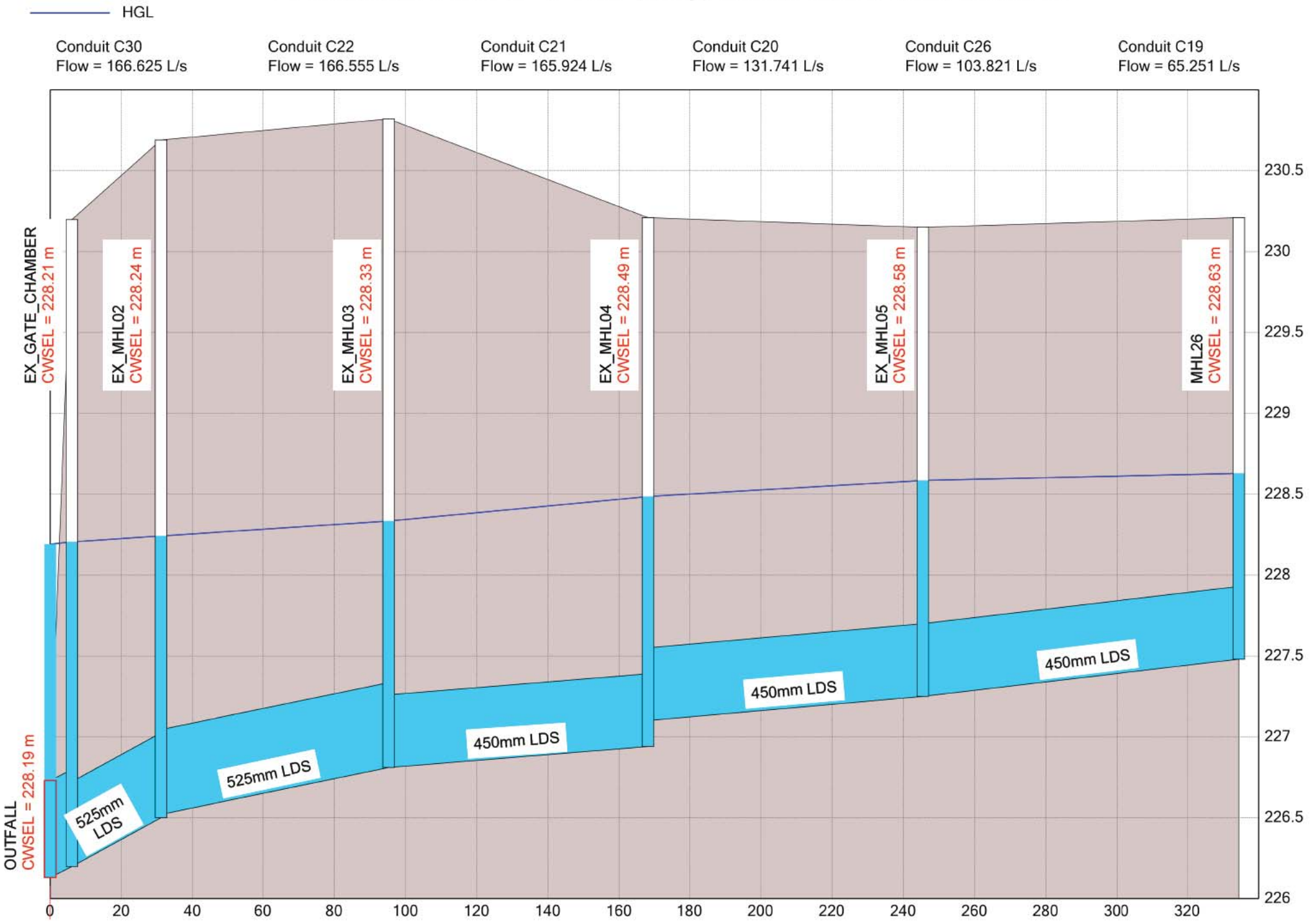
APPENDIX

C-6 ST CATHERINE STREET HYDRAULIC PROFILES

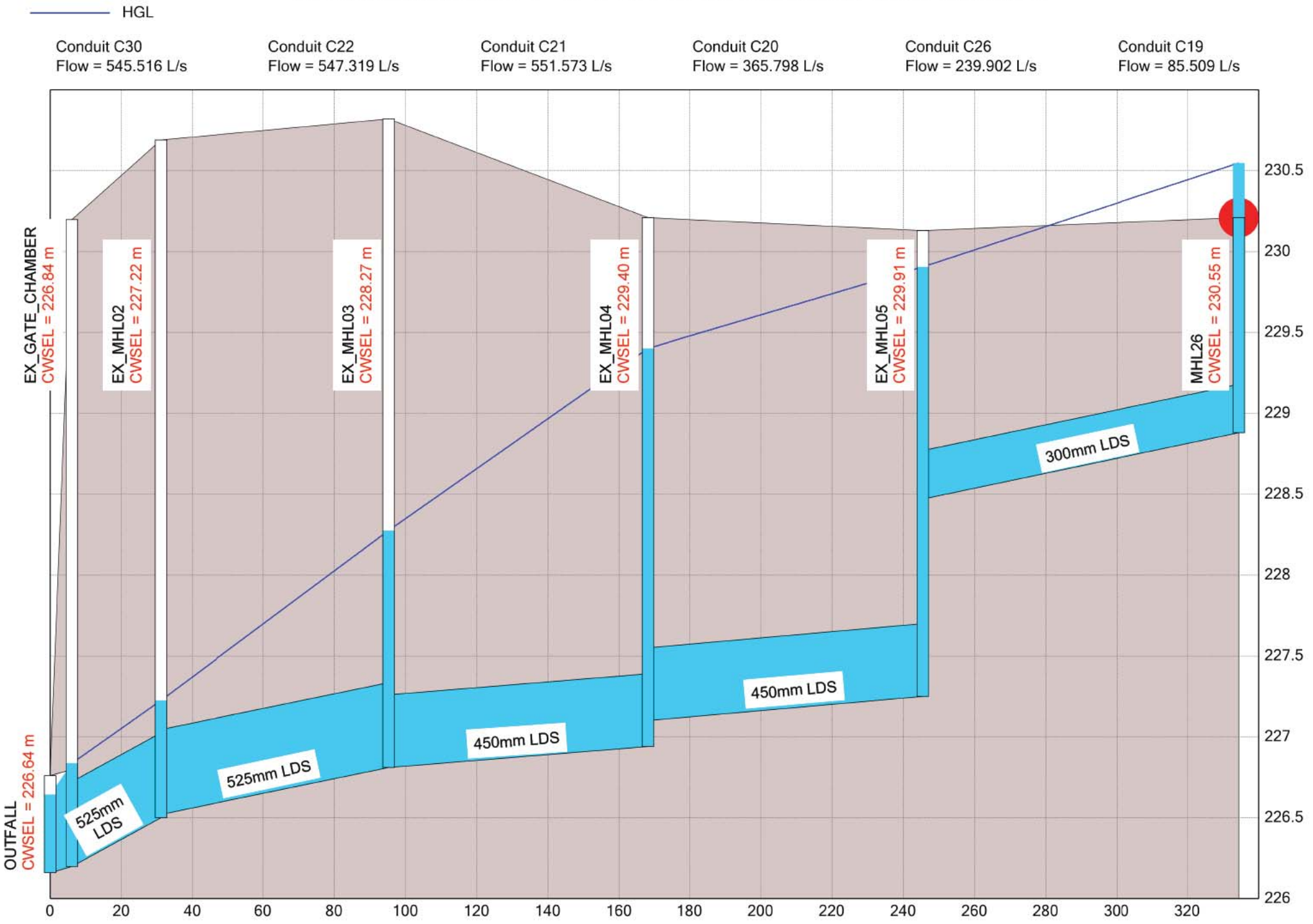
St Catherine Street - 5-Year (May) Storm without Public Markets



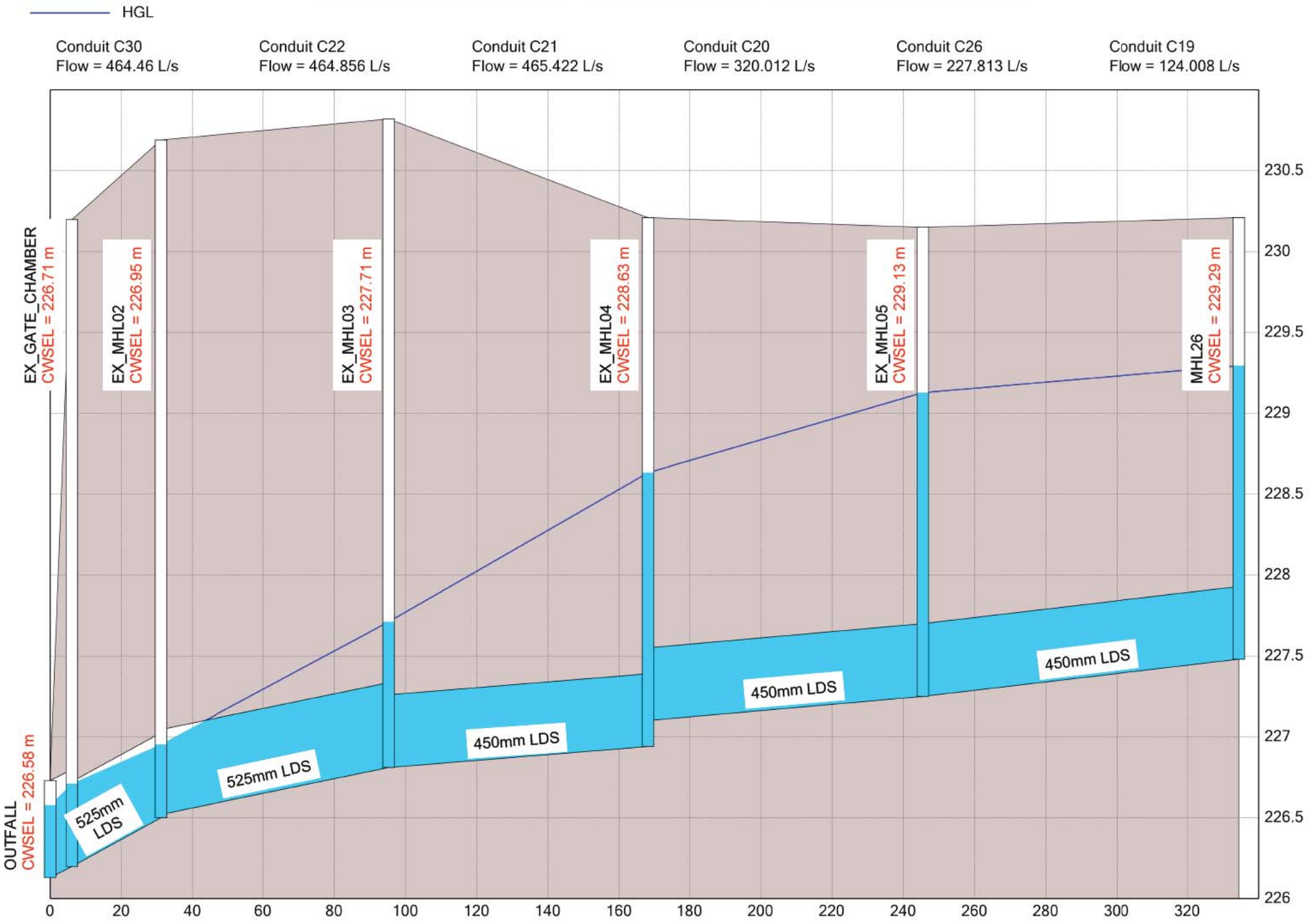
St Catherine Street - 5-Year (May) Storm with Public Markets



St Catherine Street - 5-Year Storm without Public Markets



St Catherine Street - 5-Year Storm with Public Markets



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

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

EXTRANEOUS 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:	**Average**	**Peak**
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

EXTRANEOUS 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:

	Rational Method	**Hydrograph Method**
	Coefficient Inlet Time	**% Imperviousness**
Single Family Dwelling - conventional		
- zero lot line		
Multiple Family	0.80	
Apartments		
Commercial	0.80	
Parks		
Industrial	0.80	

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

Table 1
Public Markets Secondary Plan
Required Amendments
April 8, 2024

1	3.2 Commercial 3.2.2 Policies 5. The combined maximum number of dwelling units in the **Commercial** area and the **Higher Density Residential** area should be 1,200.	3.2 Commercial 3.2.2 Policies 5. The combined maximum number of dwelling units in the **Commercial** area and the **Higher Density Residential** area ~~should be 1,200~~ *shall be subject to policy 8.2.2.* NOTE: Policy 8.2.2 will be amended to include the maximum number of residential units with or without TRAINFO.
2	3.3 HIGHER DENSITY RESIDENTIAL Higher Density Residential areas will accommodate the development of medium to high density residential uses. A range of housing options in terms of size, form, and tenure are encouraged within the designation to meet the needs of diverse household sizes and compositions. Sidewalks and pathways will facilitate connections to public transit locations, commercial areas, and parks and recreation areas. The identification of the residential designation has considered land use compatibility carefully, with respect to existing off-site industrial uses and rail lines. The target for residential dwelling units within the planning area is approximately 1,200.	3.3 HIGHER DENSITY RESIDENTIAL Higher Density Residential areas will accommodate the development of medium to high density residential uses. A range of housing options in terms of size, form, and tenure are encouraged within the designation to meet the needs of diverse household sizes and compositions. Sidewalks and pathways will facilitate connections to public transit locations, commercial areas, and parks and recreation areas. The identification of the residential designation has considered land use compatibility carefully, with respect to existing off-site industrial uses and rail lines. ~~The target for residential dwelling units within the planning area is approximately 1,200.~~ NOTE: Policy 8.2.2 will be amended to include the maximum number of residential units with or without TRAINFO.
3	3.3 Higher Density Residential 3.3.2 Policies 6. The combined maximum number of dwelling units in the **Commercial** area and the **Higher Density Residential** area should be 1,200.	3.3 Higher Density Residential 3.3.2 Policies 6. The combined maximum number of dwelling units in the **Commercial** area and the **Higher Density Residential** area ~~should be 1,200~~ *shall be subject to policy 8.2.2.* NOTE: Policy 8.2.2 will be amended to include the maximum number of residential units with or without TRAINFO.

4	3.3 Higher Density Residential 3.3.2 Policies 2. West of the collector road bisecting the **Higher Density Residential** area, multi-storey residential buildings shall not exceed 10 storeys and 100 feet (30.48 metres) in height, excluding permitted projections in the Winnipeg Zoning By-law.  	3.3 Higher Density Residential 3.3.2 Policies 2. West of the collector road bisecting the **Higher Density Residential** area, multi-storey residential buildings shall not exceed ~~10~~ *(14)* storeys and ~~100~~ *150* feet (~~30.48~~ *45.72* metres) in height, excluding permitted projections in the Winnipeg Zoning By-law. This amendment is necessary to accommodate the following proposed amendment to the Zoning Agreement: a) Modify clause 3 – the maximum height permitted on Lot 2, Block 1 and Lot 3, Block 1, *and Lot 5, Block 4* for any building on the Owner's Land must not exceed ~~*ten (10)*~~ ~~stories~~ *fourteen (14)* *storeys* and one hundred *fifty* ~~*(100)*~~ *(150)* feet ~~*(30.48 metres)*~~ *(45.72 metres)* excluding projections permitted under the Winnipeg Zoning By-law.
5	3.3 Higher Density Residential 3.3.2 Policies 3. East of the collector road bisecting the **Higher Density Residential** area, multi-storey residential buildings shall not exceed 6 storeys and 70 feet (21.34 metres) in height, excluding permitted projections in the Winnipeg Zoning By-law.  	3.3 Higher Density Residential 3.3.2 Policies 3. East of the collector road bisecting the **Higher Density Residential** area, multi-storey residential buildings shall not exceed 6 storeys and 70 feet (21.34 metres) in height, excluding permitted projections in the Winnipeg Zoning By-law. *Multi-storey residential buildings in the westernmost ± 80 metres of this area east of the aforementioned collector road shall be permitted up to 14 storeys and 150 feet (45.72 metres).* This amendment is necessary to accommodate the following proposed amendment to the Zoning Agreement: a) Modify clause 3 – the maximum height permitted on Lot 2, Block 1 and Lot 3, Block 1, *and Lot 5, Block 4* for any building on the Owner's Land must not exceed ~~*ten (10)*~~ ~~stories~~ *fourteen (14)* *storeys* and one hundred *fifty* ~~*(100)*~~ *(150)* feet ~~*(30.48 metres)*~~ *(45.72 metres)* excluding projections permitted under the Winnipeg Zoning By-law.

6	6.2 External Transportation Policies 3. There shall be two collector road connections into the planning area off of Marion Street, including: a. A new right-of-way generally located across from Dupuy Avenue; and b. A new right-of-way generally located across from 765 Marion Street, which will be the responsibility of the developer to acquire and open.	3. There shall be two collector road connections into the planning area off of Marion Street, including: a. A new right-of-way generally located across from Dupuy Avenue; and b. A new right-of-way generally located across from 765 Marion Street, ~~which will be the responsibility of the developer to acquire and open~~.
7	8.2 Phasing Policies 2. Up to 600 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. Additional dwelling units may be permitted once emergency access can be established to the satisfaction of the Director of Planning, Property & Development in consultation with the Chief of the Winnipeg Fire Paramedic Service and Director of Public Works. A proposal to develop the emergency access should be supported by a study that demonstrates how target emergency response times to the planning area will be met.	8.2 Phasing Policies 2. Up to ~~600~~ *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. ~~Additional dwelling units may be permitted once emergency access can be established to the satisfaction of the Director of Planning, Property & Development in consultation with the Chief of the Winnipeg Fire Paramedic Service and Director of Public Works. A proposal to develop the emergency access should be supported by a study that demonstrates how target emergency response times to the planning area will be met.~~ *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.*
8	8.2 Phasing Policies 3. The third collector road located generally across from 765 Marion Street shall be established as part of Phase 1 or Phase 2.	8.2 Phasing Policies ~~3. The third collector road located generally across from 765 Marion Street shall be established as part of Phase 1 or Phase 2.~~

From: Susan Russell
Sent: March 26, 2024 3:18 PM
To: 'Wallace, Tom'
Cc: 'Platt, James'; 'Jackie Wilkie'; 'Lawson, Valdene'; 'Robert Scaletta'; 'Hinkelman, Bob';

Subject: RE: PA 24-110918 (Public Markets)

Flag Status: Flagged

Thanks so much Chief Wallace.

The Marion Street and Speers Avenue access points will be in place together at the time of construction.

Marion Street access will be open and fully functional spring/summer 2024.

For the Speers access, the project engineers will be required to maintain access to the existing Speers businesses in some form during construction and will require ongoing coordination and communication with all affected including the WFPS. The roundabout at Speers and Maginot will have to be constructed in segments, for example, and Speers would be required to be constructed a half side at a time. There could be very short time periods when various accesses are changed over that might require a full closure, but those would be kept to an absolute minimum. WSP believe that they could maintain emergency access during construction.

Thanks
Susan

Susan Russell
President

McGowan Russell Group Inc.
825 St. Joseph Street
Winnipeg, MB R2H 3A8

Vacation Alert – I will be away on April 1st and 2nd, 2024

From: Wallace, Tom
Sent: Monday, March 25, 2024 3:25 PM
To: Susan Russell
Cc: Platt, James 'Jackie Wilkie' Lawson, Valdene 'Robert Scaletta'
Subject: RE: PA 24-110918 (Public Markets)

Good afternoon Susan,

Those three mitigating points outlined below satisfy our concerns with the development. I would just add that we would require the Marion St. and Speers Ave. access points in place together at the time of construction ideally.

Thank you.

From: Susan Russell
Sent: Thursday, March 21, 2024 1:39 PM
To: Wallace, Tom
Cc: Platt, James 'Jackie Wilkie' Lawson, Valdene
'Robert Scaletta'
Subject: FW: PA 24-110918 (Public Markets)

**** EXTERNAL EMAIL - USE CAUTION ****

Chief Wallace,

Thank you again for taking the time to speak to me this afternoon regarding the WFPS preapplication comments that we received from Planning on Tuesday.

Based on our telephone conversation it is our understanding that WFPS support the proposed additional units, the removal of the emergency access as requirement by policy 8.2.2 and the removal of the third collector road as described in policy 8.2.3 with the condition that the following 3 requirements are met:

1) Two collector road access points: One to Marion Street and the second to Speers Avenue.
2) All residential buildings will be sprinklered
3) Trainfo and the associated long term funding for the operation and maintenance of Trainfo is approved by Council and implemented.

Please confirm when you have a moment.

Thank you
Susan
Susan Russell
President

McGowan Russell Group Inc.
825 St. Joseph Street
Winnipeg, MB R2H 3A8