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Servicing Brief Arcadia Stage 5



Servicing Brief Arcadia Stage 5

Table of Contents

1.0	Introd	duction	1
	1.1	Background	
	1.2	Site Description and Proposed Development	
	1.3	Existing Conditions and Infrastructure	
	1.4	Pre-Consultation, Permits and Approvals	
	1.5	Conceptual Grading	
2.0		r Servicing	
2.0	2.1	Water Supply Design Criteria	
	2.2	Domestic Water Demands	
	2.3	Fire Flow Requirements	
	2.4	Proposed Water Servicing, Boundary Conditions and Water Model	
		2.4.1 Proposed Water Servicing	
		2.4.2 Boundary Conditions	
		2.4.3 Water Model	
	2.5	Simulation Results.	
	2.0	2.5.1 Peak Hour	
		2.5.2 Maximum Day Plus Fire Flow	
		2.5.3 Maximum Pressure	
	2.6	Summary and Conclusions	
3.0	_	ewater Servicing	
0.0	3.1	Background	
	3.2	Design Criteria	
	3.3	Wastewater Flow Calculations	
	3.4	Allowable Peak Flows	
	3.5	Overflows and Hydraulic Grade Line (HGL) Analysis	10
	3.6	Wastewater Conclusions	12
4.0		n Servicing and Stormwater Management	
	4.1	Background	
	4.2	Design Criteria	
		4.2.1 Minor System	
		4.2.2 Major System	
	4.3	Proposed Storm Servicing	
		4.3.1 Minor System	
		4.3.2 Major System	
		4.3.3 Stormwater Quality	
		4.3.4 Hydrological Modelling Parameters	15
		4.3.5 Simulation of Storm Distributions	
	4.4	Simulation Results	16
		4.4.1 Low Point Ponding Analysis	16
		4.4.2 Water Quality	
		4.4.3 Dry Pond Operation	19
		4.4.4 Draw-down Time	20
		4.4.5 Allowable Release Rate	21
		4.4.6 Impact on Winterset System	21
	4.5	Infiltration	22
	4.6	Storm Servicing and Stormwater Management Conclusions	
5.0	Erosi	on and Sedimentation Control	23

Servicing Brief Arcadia Stage 5

List of Tables

Table 2: Fire F Table 3: Hydra Table 4: Desig Table 5: Allow Table 6: Minor Table 7: Catch Table 8: Storm Table 9: Wate	r Demands Flow Requirements Flow Requirements Flow Criteria Flow Summary for Arcadia Stage 5 Flow System Release Rates Flow Summary for Arcadia Stage 5 Flow Summary	
	d Operation (24-hour SCS Storm)	
	nparison of Release Rates and Allowable	
	nparison of Pre-development and Post-development Flows along W	
		22
Table 14: Infilt	ration Assessment	23
List of Fig		
Figure 1: Loca	ition Plan	2
	v-Down Time	
List of App	pendices	
Appendix A Appendix B Appendix C Appendix D Appendix E	Draft Plan of Subdivision, Concept Plan and Topographic Survey Pre-consultation meeting notes Water Servicing Wastewater Servicing Storm Servicing and Stormwater Management	

List of Drawings

Drawing CS1 Conceptual Servicing
Drawing CG1 Conceptual Grading

Drawing CESC Conceptual Erosion and Sediment Control

1.0 Introduction

1.1 Background

Minto Communities Inc. (Minto) has retained the services of J.L. Richards & Associates Limited (JLR) to prepare a Servicing Brief for municipal infrastructure for their respective development referred to as Arcadia Stage 5.

Arcadia Stage 5 is situated along the eastern limit of the Arcadia subdivision just north of Campeau Drive and will include low-rise residential units and a dry pond. Arcadia Stage 5 is the final phase of the overall Arcadia subdivision requiring approvals.

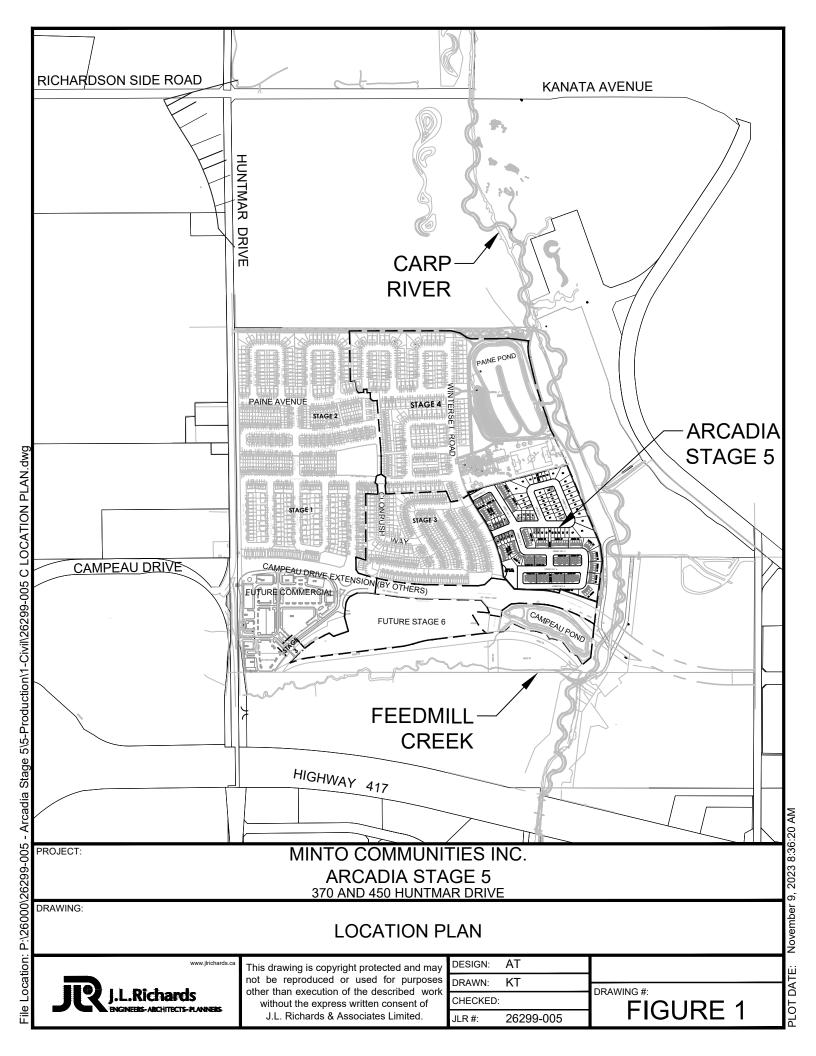
This Servicing Brief will be used for a Plan of Subdivision Application to the City. It has been prepared to outline the design objectives and criteria, servicing constraints and high-level strategies for developing the subject lands with water, wastewater, storm, and stormwater management services in accordance with previous servicing studies developed for the area and the Servicing Study Guidelines for Development Applications in the City of Ottawa.

1.2 Site Description and Proposed Development

Arcadia Stage 5 is located within the City of Ottawa's Urban Boundary, consisting of a 8.25 ha parcel of land located at 8370 Campeau Drive. The property is apart of the developing Arcadia subdivision within the Kanata Urban Area in the township of March, Ottawa. The site boundaries include the Carp River to the east, Campeau Drive to the south, Arcadia Stage 3 to the west, and existing Lyndon Hooper Park to the north as depicted on the Location Plan (Figure 1).

The Draft Plan of Subdivision prepared by Stantec is attached in Appendix A. Arcadia Stage 5 is currently an undeveloped parcel and is zoned as a Development Reserve [DR]. The site is designated as General Urban Area in the Official Plan, 2003 and Neighborhood, with an Evolving Overlay in the Official Plan 2022 and the Carp River Restoration Policy Area Overlay applies. The land is undeveloped, and the most recent topographic survey conducted by ASL on April 21, 2021 indicates a relatively flat terrain. However, there is a steep downward slope towards the southwestern corner of the site which is the location of the proposed dry pond. A copy of the topographic survey prepared by ASL is attached to Appendix A.

As shown in the concept plan prepared by Minto (refer to Appendix A), the proposed development for Arcadia Stage 5 will feature low-rise residential dwellings and a dry pond. The proposed development consists of 175 townhouses (101 Executive Towns and 74 Avenue (B2B) Towns) and 62 singles for a total unit count of 237 units.



1.3 Existing Conditions and Infrastructure

A review of existing services was carried out along the frontage of the subject property to identify existing sewers and watermains. Based on a review of GeoOttawa for Winterset Road, the following infrastructure has been identified to exist within municipal right-of-way (R.O.W.):

Watermains:

• 305 mm diameter PVC watermain along Winterset Road.

Sanitary Sewers:

• 300 mm diameter PVC sanitary sewer along Winterset Road.

Storm Sewers:

- 600 mm diameter CONC. Storm sewer along Winterset Road; and
- 900 mm diameter CONC. Storm sewer along Winterset Road.

1.4 Pre-Consultation, Permits and Approvals

The pre-consultation meeting that was held on September 2, 2021, summarizes the planning process, design criteria and servicing constraints for the development. As stated in the pre-consultation meeting notes, the stormwater management objectives for this site are based on the criteria outlined in the 2006 Kanata West Master Servicing Study (KWMSS) and any deviations of the KWMSS during the previous phases (Stages 1 to 4) of the Arcadia Development. The storm discharge criteria and allowable peak flow used for the preparation of this Report are presented in Section 4. A copy of the pre-consultation meeting notes can be found in Appendix B.

1.5 Conceptual Grading

A conceptual Grading Plan (refer to Drawing CG1) has been developed for the Arcadia Stage 5 development. Centre line of road grades (preliminary high and low points) from the local streets were conceptually designed to tie into existing roads from the adjacent street (Winterset Road). The conceptual road grades were developed to convey and safely evacuate the minor system's runoff excess to strategic low points. The 1:100-year runoff is to be contained on-site; however, the emergency overland flow route will be directed towards Campeau Pond.

2.0 Water Servicing

2.1 Water Supply Design Criteria

A Hydraulic Network Analysis (HNA) was carried out to confirm the site's watermain sizing and to demonstrate its compliance to the Ottawa Design Guidelines for Water Distribution (July 2010) and Technical Bulletins ISDTB-2014-02, ISTB-2018-02 and ISTB-2021-03. These documents are herein referred to as the Design Guidelines and TB-2014-02, TB-2018-02, and TB-2021-03, respectively.

Section 4.2.2 of the Design Guidelines states the following criteria for development additions to the public water distribution system:

- Under maximum hourly demand conditions (peak hour), the residual pressures shall not be less than 276 kPa (40 psi);
- During periods of maximum day and fire flow demand, the residual pressure at any point in the distribution system shall not be less than 140 kPa (20 psi);
- In accordance with the Ontario Building Code (OBC) in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi);
- The maximum pressure at any point in the distribution system in unoccupied areas shall not exceed 689 kPa (100 psi); and
- Feedermains, which have been provided primarily for the purpose of redundancy, shall meet, at a minimum, the basic day plus fire flow demand.

2.2 Domestic Water Demands

The estimated domestic water demands presented in this section are based on the site layout and unit count proposed in the Concept Plan (Appendix A1). The proposed development consists of 175 townhouses (101 Executive Towns and 74 Avenue (B2B) Towns) and 62 singles for a total unit count of 237 units and a projected population of 684 persons.

The residential consumption rate for average day demand was set in accordance with the City's TB-2021-03. Table 1 summarizes the water consumption rates and total estimated water demands used in the HNA. Calculated in accordance with Section 4.2.8 of the Design Guidelines, the detailed water demand distribution is presented in Appendix B1.

Demand ScenarioWater Consumption or
Peaking FactorTotal Demands (L/s)Average Day Demand280 L/c/d2.22Maximum Day Demand2.5 x Avg Day5.54Peak Hour Demand2.2 x Max Day12.18

Table 1: Water Demands

2.3 Fire Flow Requirements

The City has specified that the Fire Underwriters Survey (FUS) method shall be used for any public or private site where new fire hydrants are being designed. Specifically, the required fire flow (RFF) for each structure was calculated in accordance with TB-2018-02. Critical fire areas for Arcadia Stage 5 are presented in the table below.

Table 2: Fire Flow Requirements

Location	Block Number	Calculated Fire Flow L/min (L/s)
Critical Fire Area 1	Block 79	10,000 (167)
Critical Fire Area 2	Singles 2-5	10,000 (167)
Critical Fire Area 3	Block 75	10,000 (167)
Critical Fire Area 4	Block 74	10,000 (167)
Critical Fire Area 5	Block 83	13,000 (217)
Critical Fire Area 6	Block 84	15,000 (250)

Refer to Appendix C for the detailed RFF calculations for the critical fire areas.

2.4 Proposed Water Servicing, Boundary Conditions and Water Model

2.4.1 Proposed Water Servicing

The proposed water servicing for Arcadia Stage 5 includes a looped 200 mm watermain to supply the local roads, with three (3) connections to the existing 305 mm diameter watermain at Winterset Road as shown in the Servicing Plan.

The water demands will be supplied by local 200 mm PVC watermains. All units will be provided with an individual 19 mm PEX water service.

2.4.2 Boundary Conditions

Hydraulic boundary conditions were provided by the City at two of the proposed connection locations (Connection-1 and Connection-2) listed in Section 2.4.1 above. The City has confirmed that the upper limit for fire flow is 18,000 L/min (300 L/s). Table 2 summarizes the hydraulic boundary conditions received (refer to Appendix C for a copy of the City correspondence).

After discussions with the City, a third connection point on Winterset was included as part of this submission. For this submission, the City has confirmed the existing boundary conditions can be used for the third connection (refer to Appendix C for a copy of the City correspondence). At the detailed design stage, new boundary conditions will be requested for the new three (3) connection configuration.

The HGLs at Connection-3 have been modelled with equivalent HGLs to Connection-1. The modelled HGLs at Connection-3 are conservatively estimated, as Connection-3 is closer to the Campeau Drive feedermain compared to Connection-1.

Table 3: Hydraulic Boundary Conditions

Demand Scenarios	Connection-1 Head (m)	Connection-2 Head (m)	Connection-3 Head (m)
Maximum HGL	161.3	161.3	161.3
Peak Hour	156.3	156.3	156.3
Max Day plus Fire 1 (167 L/s)	153.3	152.6	153.3
Max Day plus Fire 2 (250 L/s)	149.3	148.0	149.3
Max Day plus Fire 3 (300 L/s)	146.4	144.6	146.4

2.4.3 Water Model

A hydraulic water model within the WaterCAD® software platform was used to carry out the HNA (refer to the overall schematics presented in Appendix C). The water demands from Table 1 and the boundary conditions from Table 3 were input into the model for each demand scenario. A 204 mm inside diameter and roughness coefficient of 110 were used in the model based on Sections 4.2.12 and 4.3.5 of the Design Guidelines.

2.5 Simulation Results

The HNA was carried out under steady-state peak hour, maximum day plus fire flow, and maximum pressure conditions to confirm that the proposed water servicing can meet the design criteria outlined in Section 2.1.

2.5.1 Peak Hour

The simulation results found the minimum pressure at the site during the peak hour condition to be 588 kPa (85.3 psi) (refer to Appendix C), which exceeds the minimum pressure criterion of 276 kPa (40 psi) per the Design Guidelines. All of the pressure results under the peak hour condition exceed the maximum pressure constraint of 552 kPa (80 psi) per the Design Guidelines, so all units within Arcadia Stage 5 will require pressure reducing valves (PRVs).

2.5.2 Maximum Day Plus Fire Flow

Fire water supply will be provided by hydrants located along the 200 mm watermains. Hydrant spacing will be carried out in accordance with the Design Guidelines at the detailed design stage.

To ensure adequate fire protection, the maximum day demand shown in Table 1 was analyzed simultaneously with the fire flow requirements. The fire flow simulation was carried out by allowing WaterCAD® to calculate the maximum fire flow that can be drawn from each node without allowing any part of the system to experience pressures less than 140 kPa (20 psi). Based on the results, it is expected that the maximum targeted fire flow of 15,000 L/min (250 L/s) can be provided throughout the site (refer to Appendix C).

Servicing Brief Arcadia Stage 5

2.5.3 Maximum Pressure

Based on a zero (0 L/s) demand condition, the simulation results found the pressures at the site during the maximum pressure condition to range between 638 kPa (92.5 psi) and 644 kPa (93.4 psi) (refer to Appendix C). Since these values exceed the maximum pressure constraint of 552 kPa (80 psi) per the Design Guidelines, all units within Arcadia Stage 5 will require PRVs.

2.6 Summary and Conclusions

Based on the water simulation results, the proposed development can be serviced by 200 mm local watermains as shown on Drawing CS1. Simulation results under peak hour demand and maximum pressure conditions showed that the design criteria can be achieved with the installation of PRVs for all of the units within the site. Furthermore, adequate fire water supply can be achieved with the proposed servicing.

3.0 Wastewater Servicing

3.1 Background

Wastewater servicing in Arcadia Stage 5 was conceptually designed as part of the KWMSS to outlet to existing gravity sanitary sewers in the Kanata West Community, which then outlets to the existing Campeau Drive 675 mm diameter trunk sanitary sewer. The existing Campeau Drive trunk sanitary sewer ultimately discharges to the Signature Ridge Pump Station (SRPS) which, in turn, outlets to the Robert O. Pickard Environmental Centre (ROPEC) where wastewater is processed and treated prior to discharge into the Ottawa River.

Specifically, wastewater generated within Arcadia Stage 5 will be directed to the existing sanitary maintenance hole (Ex. MH16) located at the intersection of Natare Place and Winterset Road (Drawing CS1). The sewage from this maintenance hole will outlet to the 300 mm diameter PVC along Winterset Road and then eventually discharge into the 675 mm diameter trunk sanitary sewer on Campeau Drive. This existing trunk sanitary sewer is the dedicated outlet for the entire Arcadia Development in accordance with the 2006 Kanata West Master Servicing Study (KWMSS).

3.2 Design Criteria

Wastewater servicing for Arcadia Stage 5 will be designed based on the City of Ottawa Sewer Design Guidelines (October 2012) (OSDG) and Technical Bulletin ISTB-2018-01. Key design parameters have been summarized in Table 4.

Table 4: Design Criteria

Design Criteria	Design Value	Reference
Residential average flow	280 L/cap/day	ISTB-2018-01
Residential peaking factor	Harmon Formula x 0.8	ISTB-2018-01
ICI peaking factor -1.5 if ICI contribution >20%, 1.0 otherwise	1.0/1.5	ISTB-2018-01
Total Infiltration	0.33 L/s/ha	ISTB-2018-01
Minimum velocity	0.6 m/s	OSDG Section 6.1.2.2
Maximum velocity	3.0 m/s	OSDG Section 6.1.2.2
Manning Roughness Coefficient (for smooth wall pipes)	0.013	OSDG Section 6.1.8.2
Minimum allowable slopes	Varies	OSDG Table 6.2, Section 6.1.2.2
Population Density	Single Family: 3.4 p/unit Townhouses: 2.7 p/unit	OSDG Table 4.2, Section 4.3

3.3 Wastewater Flow Calculations

The proposed collection and conveyance of wastewater generated within the planned development will consist of a local 200 mm diameter sanitary sewer system. The system will service ± 7.9 ha of land and will discharge into the existing sanitary maintenance hole (EX16) located at the intersection of Natare Place and Winterset Road (refer to Drawing CS1). An additional ± 0.37 ha of lands will be serviced by the existing Winterset Road sanitary sewers.

Population forecasts used to calculate peak flows were obtained using the projected number of residential units and corresponding population densities prescribed in the 2012 Design Guidelines. Three (3) types of residential densities were identified in the subdivision concept plan and a corresponding population was calculated for each unit type based on the concept plan presented in appendix A.

It is anticipated that the proposed residential development will generate a peak wastewater flow of 9.56 L/s which will then discharge into the maintenance hole (EX16) located at the intersection of Natare Place and Winterset Road. This is based on a total population of 644 people. Table 5 summarizes the calculated peak flows for the system. A copy of the Conceptual Sanitary Sewer Design Sheet and Sanitary Drainage Areas Schematic prepared for Arcadia Stage 5 can be found in Appendix D. In addition to the above 9.56 L/s, there will also be frontage on Winterset Road which is expected to generate an additional 0.61 L/s of wastewater flows. Therefore, the Stage 5 lands is anticipated to generate a peak wastewater flow of 10.17 L/s.

Table 5: Allowable Peak Flow Summary for Arcadia Stage 5

Discharge Location	Mixed Use Residential Area (ha)	Unit	Pop. (1)	Residential Peaking Factor ⁽²⁾	Res. Peak Flow ⁽³⁾ (L/s)	Infiltration Flow ⁽⁴⁾ (L/s)	Total Allowable Peak Flow (L/s)
Intersection of Natare Place and Winterset Road (Maintenance Hole - EX16)	7.9	222	644	3.33	6.95	2.61	9.56
Winterset Road Sewers (Ex.16- Ex.2)	0.37	15	40	3.67	0.49	0.12	0.61
Total Arcadia Stage 5 Wastewater Flows						10.17 L/s	

- 1. Population density is based on OSDG Table 4.2 in Section 4.3
- 2. Residential peaking factor based on Harmon equation.
- 3. Based on Residential Flow Rate 280 L/cap/day as per Technical Bulletin ISTB-2018-01
- 4. Based on Infiltration Rate 0.33 L/s/ha as per Technical Bulletin ISTB-2018-01

3.4 Allowable Peak Flows

The peak wastewater flow for the Stage 5 lands as presented in Table 5 was compared to flows allocated for the Future Stage 5 lands as part of the Winterset Road sanitary sewer design. Based on the City approved sanitary design sheets from Arcadia Stage 4 (refer to Appendix D), an allowable flow of 13.36 L/s was attributed for the 8.2 ha future Stage 5 lands. It was proposed that the wastewater from Stage 5 would then discharge into the existing 675 mm Campeau Drive trunk sanitary sewer system.

The wastewater servicing analysis from Stage 3 and 4 conformed to the allowable flow restrictions set by IBI Group (IBI) on the Campeau Drive sanitary sewer. The flow restriction was set as 35.62 L/s for the 32.67 ha parcel north of Campeau Drive, which included the future Stage 5 lands, to the existing 450 mm diameter sanitary sewer extending northward along Winterset Road. A copy of IBI's design sheet for the Campeau trunk sanitary sewer is attached to Appendix D.

The calculated peak flow of 10.17 L/s for the Stage 5 lands presented in Section 3.3 well below the allowable flow of 13.36 L/s presented in the Stage 4 Winterset Road and it is expected that there will be adequate residual capacity in the downstream sewers to accommodate the wastewater flows generated within Arcadia Stage 5.

The existing Campeau Drive trunk sanitary sewer has been identified in the 2006 KWMSS as the dedicated outlet for the Arcadia Development. The trunk carries flows to the Signature Ridge Pump Station on the east side of the Carp River. Therefore, these two pieces of infrastructure will set the allowable release rate for the Stage 5 development. The Stage 5 development discharges to the Winterset Road sanitary sewer which is a direct connection into the Campeau Road trunk.

Servicing Brief Arcadia Stage 5

Analysis of the sanitary sewer system was undertaken as part of Stage 2 of the Arcadia Development. The resulting report by IBI Group titled: [Update to] Signature Ridge Pump Station Hydraulic Grade Line Analysis Arcadia Stage 2 (2014 SRPS HGL Analysis) contained details on flow rates and HGLs in the event of a failure of the pump station.

The IBI Group's Campeau trunk sanitary sewer design allocated 32.67 ha and 35.6 L/s of the Arcadia Development north of Campeau Drive to the existing 450 mm diameter sanitary sewer stub extending northerly along Winterset Road (refer to the IBI Group Sanitary Sewer Design Sheet and External Sanitary Drainage Area Plan provided in Appendix D). The flow allocation is slightly less than the 37.21 L/s allocated for the lands in the 2014 SRPS HGL Analysis.

Distribution of the 35.6L/s flow allowance was completed in the City approved sanitary design sheets from Arcadia Stage 4 (refer to Appendix D). From the Stage 4 design sheets an allowable flow of 13.36 L/s was attributed for the 8.2 ha future Stage 5 lands.

The calculated peak flow of 10.17 L/s for the Stage 5 lands presented in Section 3.3 is below the allowable flow of 13.36 L/s presented in the Stage 4 Winterset Road and it is expected that there will be adequate residual capacity in the downstream sewers to accommodate the wastewater flows generated within Arcadia Stage 5. In addition, there is allocated capacity for this flow at the downstream pump station based on allocations made in 2014 on the Signature Ridge Pump Station Hydraulic Grade Line Analysis and the previously approved Arcadia Stage 4 development.

3.5 Overflows and Hydraulic Grade Line (HGL) Analysis

Protection against basement flooding within the existing Arcadia phases (Stages 1 to 4) is currently provided by an existing 600 mm diameter overflow that outlets to the Paine stormwater management facility, constructed as part of Stage 4. As per the 2014 SRPS HGL Analysis and subsequent detailed design for Stage 4, protection against basement flooding for the future Arcadia development is to be provided by this emergency sanitary sewer. The detailed design of the sanitary overflow at Paine Pond included an allowance of flows from Stage 5 at 13.36 L/s as detailed in Section 3.4. Design flows for Stage 5 are now lower which means that the overflow design was conservative.

The sanitary HGL analysis was carried out based on detailed design of Stages 3 and 4 which has shown that the design criterion for freeboard was met for these stages. An updated HGL analysis will be carried out during detailed design to reflect the addition of the wastewater flows to the system from Stage 5 and ensure the freeboard criterion is met for the new units and maintained for existing units.

The results of the sanitary HGL analysis during the wet weather flow event can be found in the table below.

Table 6: Sanitary HGL Analysis

BLOCK	USF Elevation (m)	WWF Event Max HGL (m)	Freeboard to USF (m)
S5_1_(P- San)	94.1	94.03	0.07
S5_2_(P- San)	94.1	94.04	0.06
S5_3_(P- San)	94.1	94.04	0.06
S5_4_(P- San)	94.1	94.06	0.04
S5_5_(P- San)	94.15	94.06	0.09
S5_6_(P-	94.15	94.06	0.09
San) S5_7_(P-	94.25	94.06	0.19
San) S5_8_(P-	94.25	94.06	0.19
San) S5_9_(P- San)	94.4	94.06	0.34
S5_10_(P- San)	94.5	94.06	0.44
S5_11_(P- San)	94.5	94.06	0.44
S5_12_(P- San)	94.4	94.06	0.34
S5_13A_(P- San)	94.4	94.06	0.34
S5_14A_(P- San)	94.2	94.06	0.14
S5_15_(P- San)	94.2	94.06	0.14
S5_16A_(P- San)	94.15	94.07	0.08
S5_17_(P- San)	94.15	94.07	0.08
S5_18A_(P- San)	94.15	94.07	0.08
S5_18B_(P- San)	94.15	94.08	0.07
S5_19_(P- San)	94.15	94.08	0.07
S5_20_(P- San)	94.15	94.08	0.07
S5_21_(P- San)	94.15	94.08	0.07

BLOCK	USF Elevation (m)	WWF Event Max HGL (m)	Freeboard to USF (m)
S5_22_(P- San)	94.15	94.08	0.07
S5_23_(P- San)	94.2	94.08	0.12
S5_24_(P- San)	94.15	94.08	0.07
S5_25_(P- San)	94.15	94.07	0.08
S5_26_(P- San)	94.15	94.07	0.08
S5_27_(P- San)	94.2	94.07	0.13
S5_28_(P- San)	94.2	94.07	0.13

The simulation results compiled in Table 5 shows that:

• All sanitary HGLs are below the USF elevations

3.6 Wastewater Conclusions

Wastewater servicing for Arcadia Stage 5 will be designed based on the City of Ottawa Sewer Design Guidelines, associated Technical Bulletins and with the previously approved Site Servicing Reports for Arcadia Stages 3 & 4. It is recommended that the sanitary servicing systems shown on the Conceptual Servicing Drawing (Drawing CS1) be implemented for the proposed development.

4.0 Storm Servicing and Stormwater Management

4.1 Background

In 2006, the KWMSS was prepared on behalf of the Kanata West Owner's Group to investigate servicing requirements for a large mixed-use community in Kanata West. The KWMSS recommended that all stages of the Arcadia development, the Campeau Drive right-of-way (from Huntmar to Carp River), and the future transit way be serviced by Pond 1, the largest SWM facility in Kanata West.

In August 2016, JLR developed an alternative SWM solution for the Arcadia Development to the one presented in the 2006 KWMSS. This solution was presented to the City in the form of a Memorandum entitled "Conceptual Alternate Stormwater Servicing and Stormwater Management Strategy" dated August 2, 2016. The proposed stormwater management approach consisted of two (2) wet ponds supplemented by privately owned water quality units, all of which would serve as the dedicated outlets to the Arcadia Development as well as for the future Campeau Drive ROW and transit way. The two wet ponds are located immediately west of the Carp River: one at Paine Avenue and one south of Campeau Drive to service the Arcadia Development.

Servicing Brief Arcadia Stage 5

Stormwater flows were allocated to the Arcadia Stage 5 land parcel as part of the KWMSS and later accounted for as part of both the Campeau and Paine Pond designs. An additional dry pond is proposed as part of Stage 5 to control overland flow north of Campeau Drive. The major system will direct flow to the dry pond where it will drain at a controlled rate into the minor system.

4.2 Design Criteria

The functional design of the storm sewer system was developed for Minto's Arcadia Stage 5 lands depicted in Drawing CS1 was done to respect the flow allocations and drainage boundaries allocated during Paine and Campeau pond designs. Detailed design of the stormwater management system for Stage 5 will be in accordance with the City of Ottawa 2012 Sewer Design Guidelines (OSDG) and Technical Bulletins. Design criteria that will be applied at detailed design for both minor and major systems are described below.

4.2.1 Minor System

Design Capture and Level of Service

- Minimum 1:2 year capture for local roads
- Minimum 1:5 year capture for Winterset Road
- Maximum allowable release rates from Stage 5 are 800 L/s at the northern minor system outlet to MH 116_(Ex-Stm) and 780 L/s at the southern minor system outlet to MH 102_(Ex-Stm)

Design Flows

- Initial sizing of the storm sewers with Rational Method design sheets and final sizing confirmed with a HGL analysis;
- IDF Rainfall statistics as per OSDG;
- Time of concentration (Tc) based on a minimum inlet time of 10 minutes;
- Runoff coefficients based on recently approved developments of similar nature as per Section 5.4.5.2.2 of the OSDG (to be verified at the detailed design stage).

Sewer Design Criteria

Design Criteria as per the OSDG

- Minimum velocity 0.80 m/s;
- Maximum velocity 6.0 m/s;
- Manning roughness coefficient 0.013;
- Minimum allowable slopes as per Table 6.1 of the OSDG;
- Minor losses at maintenance holes set in accordance with Appendix 6B of the OSDG;

4.2.2 Major System

Major System Flow Outlets

Detention of runoff from storm events up to 1:100 year recurrence period is required for the site.

4.3 Proposed Storm Servicing

4.3.1 Minor System

The proposed storm sewers for Arcadia Stage 5 will be sized at detailed design to provide the minimum 1:2 year capture rate using the Rational Method. Two minor system outlets were allocated for Stage 5 as part of the pond designs:

- the existing storm maintenance hole (EX116) located at Natare Place at Winterset Road which ultimately discharges to the Paine pond; and
- the existing storm maintenance hole (EX102) near the intersection of Campeau Drive and Winterset Road which ultimately discharges to the Campeau pond.

The Overall Storm Drainage Plan (Drawing OST) presented in Appendix E depicts the minor and major system drainage areas allocated for the Stage 5 land parcels. A high level overall drainage plan for Stage 5 is also presented in the conceptual storm drainage schematic (Appendix E) that demonstrates how this drainage boundary will be respected during detailed design.

C-Factors used for the design of Arcadia Stage 5 are consistent with the c-values used in all other stages of Arcadia and therefore consistent with zoning since these are all tributary to the Carp river. A consistent c-factor of 0.67 was used for the catchments representing buildings, front-yards and roadways, while a c-factor of 0.61 was used for landscaped/rear-yard areas.

The conceptual rational method design sheet calculations show that with capture of the 1:2 year return period event peak flow release rates are less than the allowable release rates from the site (Table 6). The downstream system therefore has sufficient capacity for the proposed conceptual site. A copy of the Storm Sewer Design Sheet and Conceptual Storm Drainage Plan (Drawing CDST) for Arcadia Stage 5 can be found in Appendix E.

The Arcadia Stage 5 PCSWMM model is based on that submitted for the detailed design of Arcadia Stages 3 and 4, and includes the entire development areas upstream of the existing Paine and Campeau stormwater management facilities and the section of the Carp River. A single downstream boundary condition is present in the model on the Carp River and, through analysis in the Design Briefs for the two stormwater management facilities, the boundary condition is consistent with the Carp River modelling completed by the City of Ottawa.

The Stage 5 development has been incorporated at a conceptual level in the PCSWMM modelling that was carried out for Stages 3, 4 and 6. Design sheets and drainage plans reflecting the modelling in the previous stages can be found in Appendix E. Copies of the model are provided and the release rates from the site's minor system network are provided in Table 6.

Table 6: Minor System Release Rates

Connection Location	Allowable Release Rate (L/s)	1:2 year Rational Method Flow Rate (L/s)	Peak 1:100 year Modelled Flow Rate (L/s)
116_(P-Stm) – North Connection	800	421	690
102_(Ex-Stm) – South Connection	780	371	612

4.3.2 Major System

All major system flows up to the 1:100 year return period event are to be detained on site. This will be achieved through the use of street sag storage and grading towards a dry pond located at the south corner of the site. The dry pond will provide major system storage and will release via the additional capacity available via the south minor system connection.

The grading means that some of the rear yards will not be able to grade towards the site and will slope towards the Carp River. This uncontrolled clean rear yard runoff will be in the form of overland sheet flow. Due to timing of the localized sheet flow it will not affect peak flow rates or peak water levels in the Carp River, however during detailed design the outlet configuration of the Paine Pond will be assessed to ensure that the peak flows in the Carp River continued to be maintained as per the 2018 City of Ottawa Modelling results.

4.3.3 Stormwater Quality

Stormwater quality control will be provided by the Paine and Campeau Ponds respectively. The ponds were designed to accept flows from these areas for water quality treatment and have sufficient capacity to do so.

4.3.4 Hydrological Modelling Parameters

The following parameters were used in the hydrologic component of PCSWMM:

- Areas and Imperviousness: Catchment ID and drainage areas used by PCSWMM match those shown on either Drawing DST or Figure E-1 (Appendix E1). In regard to the imperviousness of subcatchments, C-Factors reported in Section 4.2.1Error! Reference source not found. were used to estimate PCSWMM's imperviousness.
- Catchment Width: The catchment width is approximately twice the length of
 the street segment through the subcatchment, in accordance with the OSDG
 for the majority of catchments where there is an even split on the road. In some
 cases the catchment width is the length of the road section if the catchment is
 all to one side of the road.

- Manning's Roughness Coefficient: Manning's Roughness Coefficients of 0.013 and 0.25 were used for the impervious and pervious surfaces, respectively within the Stage 6 area, which are consistent with the OSDG. Historically other values have been used for the pervious component in other stages and these have been maintained.
- CN Infiltration parameters: For consistency with the City of Ottawa Carp River Model the CN infiltration approach was used. The CN value of 75 for pervious land cover was maintained from the Carp River Model.

Since PCSWMM is based on the Nonlinear Reservoir Routing Method (SWMM 5 engine) to generate runoff from subcatchments, the infiltration and depression storage are accounted for separately. The formulation of the SCS Loss Method incorporated into SWMM does not include the Initial Abstraction term. CN is used in SWMM to compute infiltration losses only, not total hydrologic losses as in the original SCS methodology. Therefore, the CN value is used and not a modified CN (CN*) as this alters for term to account for the difference in Initial Abstraction.

• **Initial Abstraction**: Initial abstraction of 4.67 mm and 1.57 mm was used for the pervious and impervious surfaces respectively, consistent with the OSDG and Carp River Model.

4.3.5 Simulation of Storm Distributions

To assess peak flow rates and peak volume storage requirements the 3-hour Chicago storm has been simulated for the site for the 1:2-year event and 1:100-year event and the 24-hour SCS storms for the 1:100-year event.

4.4 Simulation Results

4.4.1 Low Point Ponding Analysis

The results at each of the low points, as generated by a 3-hour Chicago and 24-hour SCS storm distribution, are set out in Table 7. The simulation results compiled in Table 7 below shows the ponding depths at the locations where the catchbasin manhole structures were utilized to convey the surface flow into the storm sewer. At these locations the modelling is such that surface flow head is required to be present to drive the flow through the grate opening into the minor system in the low points in the parking area and landscaped areas are shown in Table 7.

Table 7: Catchbasin Ponding Depths

Low Point ID	Top of Grate (m)	3-hour Chicago 1:2 year Depth (mm)	3-hour Chicago 1:100 year Depth (mm)	24-hour SCS 1:2 year Depth (mm)	24-hour SCS 1:100 year Depth (mm)
AS5_J18	95.37	0	30	0	0

 J.L. Richards & Associates Limited
 July 26, 2024

 4JLR No.: 26299-005.1
 -16 Revision: 3

Low Point ID	Top of Grate (m)	3-hour Chicago 1:2 year Depth (mm)	3-hour Chicago 1:100 year Depth (mm)	24-hour SCS 1:2 year Depth (mm)	24-hour SCS 1:100 year Depth (mm)
AS5_J19	95.37	0	40	0	0
AS5_J20	95.27	0	190	0	180
AS5_J21	95.37	0	110	0	80
AS5_J22	95.42	0	190	0	190
AS5_J23	95.42	0	180	0	170
AS5_J24	95.52	0	100	0	40
AS5_J25	95.57	0	190	0	180
AS5_J26	95.42	0	190	0	180
AS5_J27	95.32	0	180	0	170
AS5_J28	95.37	0	160	0	140
AS5_J30	95.42	0	240	0	230
AS5_J31	95.47	0	280	0	280
AS5_J32	95.52	0	220	0	200
AS5_J33	95.52	0	260	0	240
AS5_J34	95.62	0	180	0	160
AS5_J35	95.62	0	220	0	210
AS5_J36	95.42	0	160	0	150
AS5_LP11	95.27	0	170	0	160
*LP5	95.30	0	170	0	150
*S- Riverchase -N	95.15	20	220	10	150

^{*1:5} year ponding depth are shown for Low Points along Winterset Road

The ponding at the S-Riverchase-N node is greater than 0 mm in the 5-year event due to the model setup. The outlet link has been set at the top of grate elevation as the control is at the surface. Therefore, the model requires a head buildup over the structure for simulation of flows.

The simulation results compiled in Table 7 shows that:

- No ponding nor dynamic flow will occur in the 1:2-year event for all nodes as well as in the 1:5-year event at nodes along Winterset road
- Maximum ponding depth of 280 mm during the 1:100-year event; and,

• There is no spill from the site in the 1:100-year event.

Table 8: Storm Maximum HGL Analysis

ВLОСК	1:100 year Event Max HGL (m)	USF Elevation (m)	Freeboard to USF (m)
Block 80/81	93.55	94.1	0.55
Block 63/64	93.65	94.1	0.45
Block 79	93.65	94.1	0.45
Block 78	93.5	93.9	0.4
Singles 1-5	93.8	94.2	0.4
Singles 6-9	93.75	94.15	0.4
Singles 10- 12	94	94.4	0.4
Singles 13- 16	94.05	94.45	0.4
Singles 17- 20	94.25	94.65	0.4
Singles 50- 57	94	94.4	0.4
Singles 42- 49	94.1	94.5	0.4
Singles 21- 25	94.25	94.65	0.4
Singles 26- 31	94	94.4	0.4
Singles 32- 41	93.9	94.25	0.35
Singles 58- 62	93.8	94.2	0.4
Block 65	93.6	94.15	0.55
Block 76	93.5	93.9	0.4
Block 75	93.6	94.15	0.55
Block 77	93.5	93.9	0.4
Block 74	93.5	94.15	0.65
Block 73	93.5	94.15	0.65
Block 66-68	93.65	94.15	0.5
Block 69-71	93.7	94.15	0.45
Block 72	93.65	94.15	0.5
Block 82-84 (West)	93.65	94.20	0.55
Block 82-84 (East)	93.6	94.20	0.60
Block 85-87 (West)	93.6	94.20	0.60
Block 85-87 (East)	93.55	94.20	0.65

The minimum freeboard achieved to the USF is 350 mm.

4.4.2 Water Quality

The storm discharge criterion for the subdivision is based on the enhanced protection level of 80% TSS removal. As described in JLR design briefs for Stormwater Management Facilities for Campeau and Paine Ponds, the 80 % of TSS removal was used as a design criterion to complete the detailed design of aforementioned facilities to provide water quality treatment for Arcadia Stage 5 development. Campeau Drive Pond services flows coming from southern portion of development while Paine Pond services flows from northern portion of development.

The comparison of the design values used and the proposed values are shown in Table 9 and demonstrate that the ponds have the required water quality treatment capacity.

	Stage 5 Area	Stage 5 C Factor	Stage 5 AxC
Campeau Pond Allocated	4.28	0.70	3.00
Campeau Pond Proposed	3.11	0.66	2.05
Paine Pond Allocated	4.17	0.70	2.92
Paine Pond Proposed	4.11	0.65	2.67

Table 9: Water Quality Capacity Analysis

In Table 9 the allocated values to Campeau Pond are from the Arcadia Stage 3 Campeau Drive Pond Stormwater Management Facility Design Brief and the Stormwater Drainage Plan is contained in Appendix E. The allocated values to Paine Pond are from the design sheet in the Arcadia Commercial 370 Huntmar Drive Design Brief by IBI Group, October 2014 (also copied in Appendix E). Since the design sheet does not have any GIS mapping associated with it the split between Campeau Pond and Paine Pond is not specifically mapped, however the allocations were made in the modelling and the areas calculated now are consistent with the latest boundaries and GIS spatial mapping.

Table 9 shows that the overall AxC value proposed going to each pond is less than that originally allocated under the previous modelling which was used to size the pond permanent pool and extended detention volumes and therefore there is sufficient water quality control capacity in the downstream facilities. It is also recognized that the overall C-Factor of 0.78 used for the areas going to Campeau Pond is conservative as it does not reflect the park or amenity areas within the site boundaries, despite these areas being included in the area calculation.

4.4.3 Dry Pond Operation

The pond was sized to contain major overland flow while releasing flows at a controlled rate to the minor system storage. Pond side slopes will be 4:1 and have been simulated using a stage-storage curve developed from the proposed grading surface. The pond has been sized to meet the OSDG requirements.

As shown in the Pond Drawing (Drawing POND), the bottom of the pond is at an elevation of 93.87 m, and has a depth of 0.63 meters which brings the top of the pond to 94.5 meters.

The operation of the pond is provided in Table 10 for the 3-hour Chicago storm distribution and Table 11 for the 24-hour SCS storm distribution.

Table 10: Pond Operation (3-hour Chicago Storm)

Event	Max HGL (m)	Max Depth (m)	Total Inflow (L/s)	Peak Release Rate (L/s)	Max Storage Volume (m3)
1:2 year	93.96	0.09	55	51	6
1:100 year	94.17	0.3	165	123	25

Table 11: Pond Operation (24-hour SCS Storm)

Event	Max HGL (m)	Max Depth (m)	Total Inflow (L/s)	Peak Release Rate (L/s)	Max Storage Volume (m3)
1:2 year	93.96	0.09	53	51	6
1:100 year	94.13	0.26	131	113	21

The modelling results show that the pond contains flow only in the 1:100-year Chicago storm distribution event. The frequent event flows are only from the immediate catchment runoff. The maximum water level in the pond is 94.17 m, which provides 330 mm freeboard to the surrounding area. Maximum pond depth is 300 mm.

4.4.4 Draw-down Time

The draw-down time for the pond to drop from its Max HGL of 94.17 to 93.87 m is approximately 3 hours per the Figure 3 shown below.

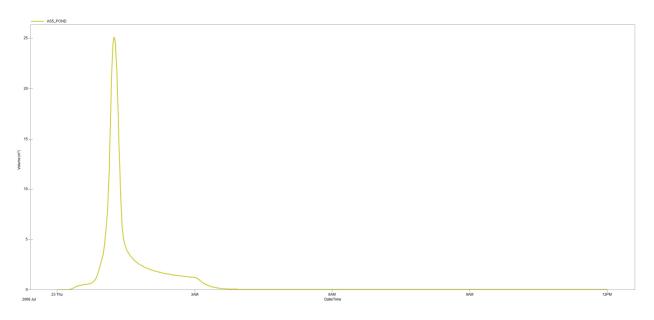


Figure 2: Draw-Down Time

4.4.5 Allowable Release Rate

The allowable release rates for the site were allocated to the Arcadia Stage 5 land parcel as part of the KWMSS. The stormwater management system was design to control to the allowable release rate and the results are shown in Table 12 below for the critical 3-hour Chicago event:

Allowable Release Node Rate (L/s)		1:100-year 3-hour Chicago Release Rate (L/s)		
EX116	800	690		
129 (P-Stm)	780	612		

Table 12: Comparison of Release Rates and Allowable

4.4.6 Impact on Winterset System

This section will evaluate the extents of the impacts of the Stage 5 design on the flows at both low points along Winterset road in the 100-year, 3-hour Chicago storm event.

Due to the increased catchment area of residential properties fronting Winterset Road, the ICD at LP5 on Winterset Road has been increased to allow greater capture rates and maintain the ponding depth criteria at the low point. The increase capacity of the ICD results in increased flow entering the storm sewer system. However, due to the lower release rates from Stage 5, the overall impact on the

storm sewers downstream on Winterset Road is a reduction in flow, as shown in Table 13.

The flow at the most downstream sewer on Winterset prior to the incoming flow from Campeau Drive, under the Campeau Pond design Brief model from 2019, is 1.797 m³/s whereas in the revised Arcadia Stage 5 model, despite increasing the size of the ICD, the flow is now 1,628 m³/s. This is due to the reduction in flow from the Stage 5 minor system.

Table 13: Comparison of Pre-development and Post-development Flows along Winterset Road

Conduit	Pre-Stage 5 Arcadia Model (m³/s)	Stage 5 Arcadia Model (m³/s)
Pipe(138)_(Ex-Stm) (MH102- MH101)	1.797	1,628

4.5 Infiltration

The Carp River Subwatershed Study and the KWMSS recommends that infiltration be maintained in the Kanata West area to maintain baseflow to the Carp River. FIG 5.4 of the KWMSS shows infiltration targets within the Kanata West Area. The Arcadia development has a "Low Recharge Target" (refer to FIG 5.4, of the KWMSS) due to its soils that are clay material. A target of 50 mm-70 mm/year is the targeted infiltration in the Arcadia development. Based on the KWMSS, this rate is to be increased by 25% to 62.5-87.5 mm/year to compensate for the additional impervious surfaces where no infiltration will occur, however this increase does not need to be met if only pervious surfaces are considered when demonstrating that the volume is infiltrated.

During detailed design of Stage 3, JLR reached out to Paterson to ascertain the effectiveness of soakaway trenches that would promote infiltration on private lots. Paterson provided a Memorandum on the Suitability of Soils for Use of Soakaway Trenches. Based on their assessment, the infiltration rate associated with the hard stiff clay is in the order of 1-10 mm/hr with hydraulic conductivities ranging between 1.7 x 10-9 and 4.0 x 10-9 m/sec. Based on the MECP SWMPDM, soakaway trenches are recommended when soils have a minimum infiltration rate of 15 mm/hr. It is unlikely that the native soil will provide vertical groundwater movement and deep groundwater recharge. Therefore, soakaway trenches are not recommended as they will be ineffective due to the native silty clay.

In order to provide infiltration in the range of 50 to 70 mm/year, across pervious surfaces only, a 300mm deep layer of topsoil will be placed across pervious surfaces in the development. According to Table 3.1 of the MECP SWMPDM rates of infiltration for Silt Loam, which is the low end of the topsoil quality, are around 182 mm/year. Infiltration provided would then be increased beyond the pre-development level required. Table 14 below shows that if topsoil is only provided across the pervious residential area and above the maximum water surface in the pond then a net increase in infiltration is achieved across the site compared to pre-development.

Table 14: Infiltration Assessment

Land Area	Pervious Area (ha)	Average Infiltration Rate Target (mm/year)	Average Annual Infiltration (m³)
Pre-Development Arcadia Stage 5	7.3	60	4,380
Residential (pervious areas in Stage 5 residential lots)	2.7	182	4,914

4.6 Storm Servicing and Stormwater Management Conclusions

The stormwater servicing and management concept shown on the Conceptual Servicing Plan (Drawing CS1) is proposed to provide stormwater servicing for Arcadia Stage 5.

5.0 Erosion and Sedimentation Control

Erosion and sediment control measures, as outlined in the Ontario Ministry of Natural Resources (MNR) Guidelines on Erosion and Sediment Control for Urban Construction Sites, will be implemented to trap sediment on site. The following erosion and sediment control measures could be implemented during construction, refer to attached Conceptual Erosion and Sediment Control Plan CESC:

- Supply and installation of a silt fence barrier, as per OPSD 219.110.
- Supply and installation of silt sack between the frame and cover of catch basins and maintenance holes adjacent to the project area during construction, to prevent sediment from entering the sewer system. The silt sack is to be inspected regularly and corrected as required.
- Stockpiling of material during construction is to be located along flat areas away from drainage paths. For material placed on sloped areas, stockpiles are to be enclosed with a silt fence to protect watercourses.
- All catch basins are to be equipped with sumps, inspected frequently, and cleaned as required.
- A mud mat is to be built at each of the site entranceways to prevent the transport of sediment onto paved surfaces. The mud mat shall be:
 - Minimum of 20 m in length for the full width of the entrance way (10 m wide minimum).
 - o Minimum of 400 mm thick underlain with a geotextile (or graded aggregate filter); and
 - o Constructed with 50 mm diameter clear stone for the first 10 m (extending from the paved street) and the remainder of the length with 150 mm diameter clear stone.

The following erosion and sediment control measures should be implemented for the lifespan of the facility:

 Inspections of ESC measures at a frequency specified per the ESC plan, for dry weather periods (active and inactive construction phases), after Significant Storm Events (means a minimum of 25 mm of rain in any 24 hours period) and Significant Snowmelt Events

Servicing Brief Arcadia Stage 5

(means the melting of snow at a rate which adversely affects the performance and function of the system), and after any extreme weather events.

- Inspections and maintenance of temporary ESC measures shall continue until they are no longer required.
- Identify and rectify any deficiencies and undertake necessary maintenance measures as soon as possible.
- The contractor shall ensure that records of inspection, including at a minimum, the inspector's name, date of inspection, visual observations, and any necessary remedial measures to maintain the interim ESC measures.

The proposed removal and reinstatement measures as well as the erosion control measures shall conform to the following documents:

- "Guidelines on Erosion and Sediment Control for Urban Construction Sites" published by Ontario Ministries of Natural Resources, Environment, Municipal Affairs, and Transportation & Communication, Association of Construction Authorities of Ontario and Urban Development Institute, Ontario, May 1987.
- "MTO Drainage Manual", Chapter F: "Erosion of Materials and Sediment Control", Ministry of Transportation & Communications, 1985.
- "Erosion and Sediment Control" Training Manual by Ministry of Environment, Spring 1998.
- Applicable Regulations and Guidelines of the Ministry of Natural Resources.

Servicing Brief Arcadia Stage 5

This report has been prepared by J.L. Richards & Associates Limited for Minto Communities' exclusive use. Its discussions and conclusions are summary in nature and cannot properly be used, interpreted or extended to other purposes without a detailed understanding and discussions with the client as to its mandated purpose, scope and limitations. This report is based on information, drawings, data, or reports provided by the named client, its agents, and certain other suppliers or third parties, as applicable, and relies upon the accuracy and completeness of such information. Any inaccuracy or omissions in information provided, or changes to applications, designs, or materials may have a significant impact on the accuracy, reliability, findings, or conclusions of this report.

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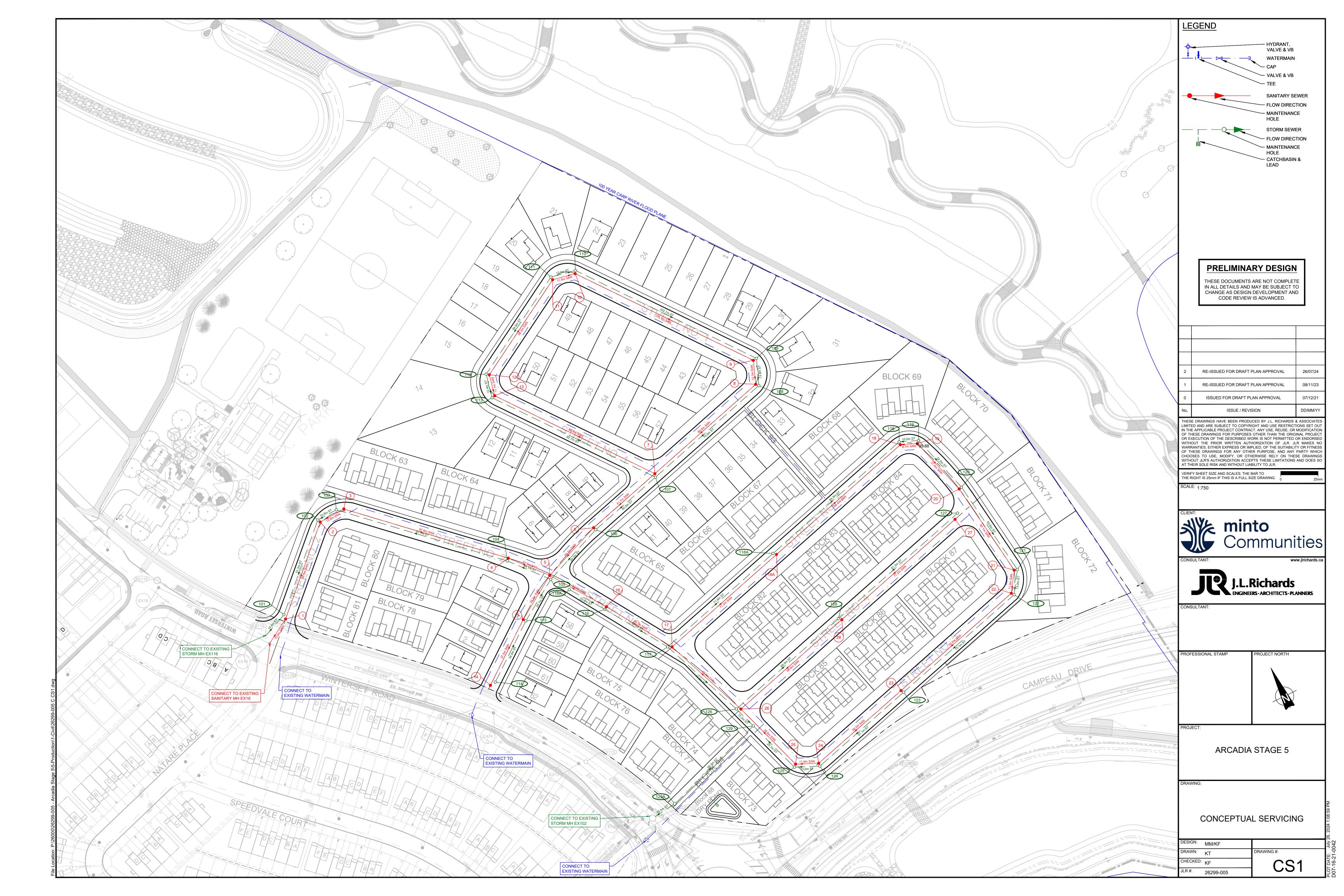
Prepared by:

Reviewed by:

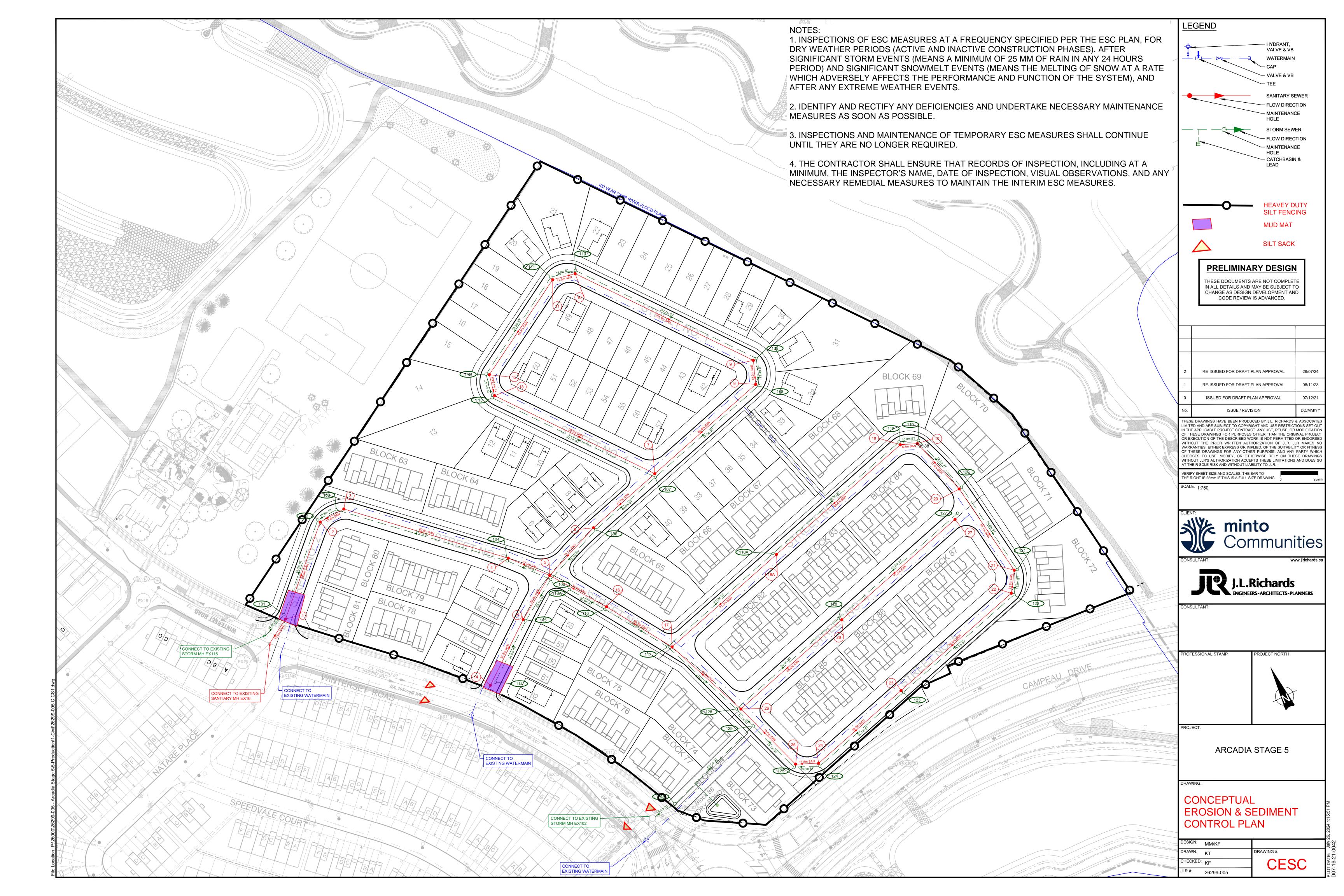
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Macelle

Karla Ferrey, P.Eng. Senior Associate, Manager, Ottawa, Civil Development Senior Civil Engineer

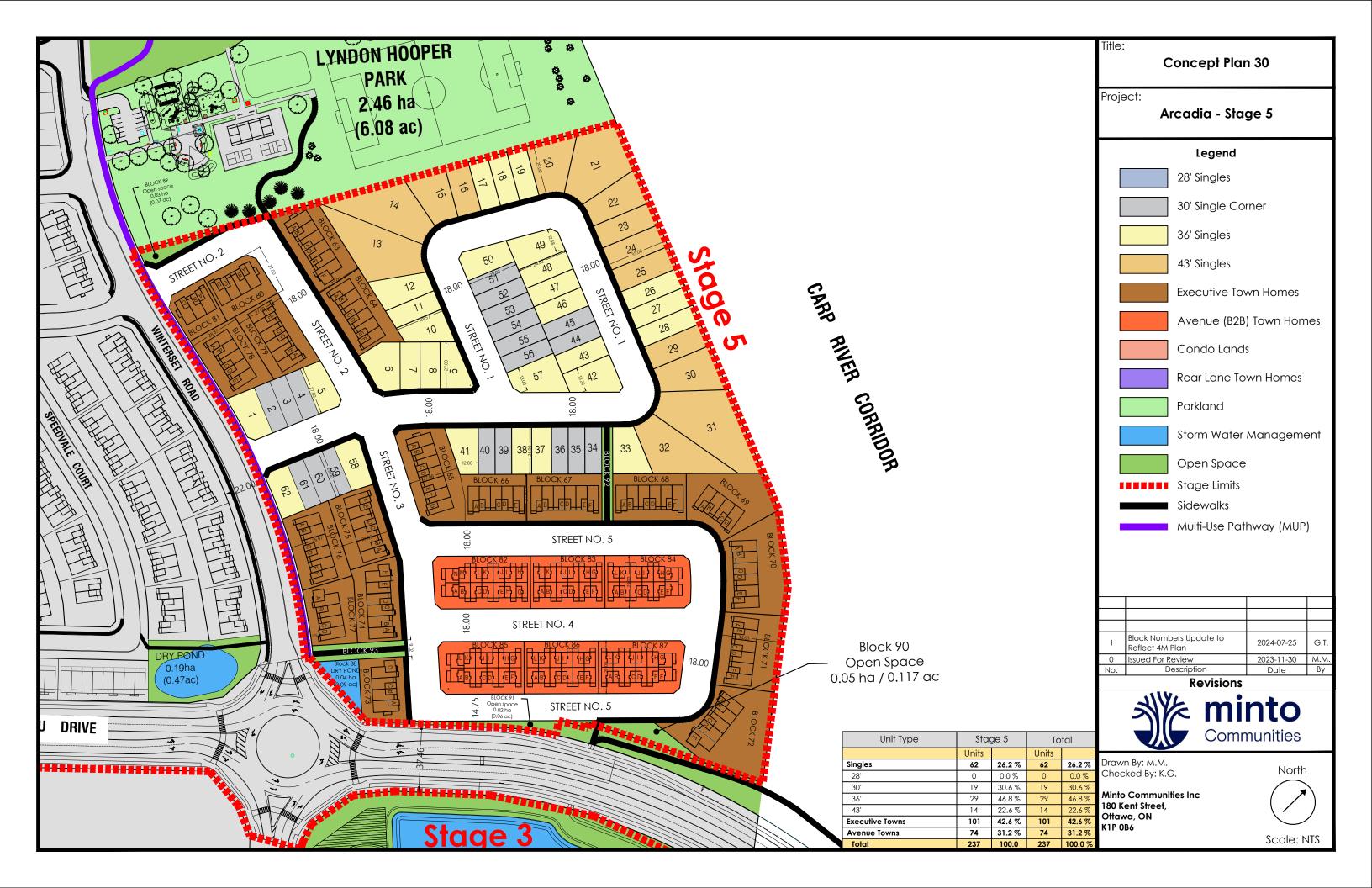






Appendix A

Draft Plan of Subdivision, Concept Plan and Topographic Survey





APPROVED UNDER SECTION 51 OF THE PLANNING ACT BY THE CITY OF OTTAWA THIS ____ DAY OF ____

> VIVI CHI, INTERIM GENERAL MANAGER PLANNING, DEVELOPMENT AND BUILDING SERVICES DEPARTMENT CITY OF OTTAWA

Curve Table Curve # | Length | Radius | Chord Direction | Chord Length C1 | 7.37 | 276.00 | N66° 24' 57"W | 12.37 C2 | 28.00 | 276.00 | N70° 05' 16"W | 27.99 1.81 | 276.00 | N73° 10' 56"W | 1.81 1.81 | 274.00 | N73° 10′ 49"W | 1.81 C5 | 24.19 | 274.00 | N70° 27' 40"W | 24.19 C6 | 24.01 | 274.00 | N65° 25' 14"W | 24.01 3.08 | 274.00 | N62° 35' 18"W | 3.08 C8 | 21.93 | 326.00 | N62° 50' 03"W | 21.93 C9 | 40.76 | 326.00 | N57° 19' 20"W | 40.74 C10 | 30.92 | 326.00 | N51° 01' 32"W | 30.91 C11 | 7.39 | 148.59 | N27° 51' 10"E | 7.38 C12 | 25.36 | 148.59 | N34° 09' 50"E | 25.33 C13 | 9.63 | 130.59 | N28° 31' 56"E | 9.63 C14 | 18.10 | 130.59 | N34° 36' 59"E | 18.09 C15 | 11.90 | 18.00 | N45° 07' 57"W | 11.69 C17 | 7.26 | 18.00 | N22° 08' 58"E | 7.21 C18 | 9.12 | 18.00 | N48° 12' 47"E | 9.02 C19 | 11.05 | 18.00 | N80° 19' 20"E | 10.88 5.66 | 18.00 | N73° 04' 13"W | 5.64 7.02 | 18.00 | N52° 52' 59"W | 6.98 C22 | 12.03 | 18.00 | N22° 33′ 46″W | 11.81 C23 | 12.16 | 18.00 | N15° 56' 38"E | 11.93 4.14 | 18.00 | N41° 53' 05"E | 4.13 11.45 | 254.53 | N73° 41' 45"W | 11.45 C26 24.51 | 254.53 | N69° 38' 54"W | 24.50 | 21.44 | 18.00 | N82° 35′ 39″E | 20.20 C28 | 4.59 | 18.00 | N55° 58' 00"W | 4.58 33.52 | 150.00 | N42° 15' 11"W | 33.45 5.03 | 150.00 | N34° 53' 22"W | 5.03 C31 | 9.01 | 150.00 | N47° 31' 00"W | 9.01

COORDINATES TO URBAN ACCURACY PER SEC 14(2) OF O.REG. 216/10

OR BOUNDARIES SHOWN ON THIS PLAN.

EASTING

394532.84

349646.98

NORTHING

5018839.93

5018501.10

PLAN 4M-

I CERTIFY THAT THIS PLAN IS REGISTERED IN THE LAND REGISTRY OFFICE

FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON No.4 AT_____

O'CLOCK ON THE____ DAY OF _____, 2024 AND ENTERED IN

THE PARCEL REGISTER FOR PROPERTY IDENTIFIER 04510-1203, 04510-1204,

04510-1205, 04510-1212, 04510-1213, 04510-1553 & 04510-1365, AND THE REQUIRED CONSENTS ARE REGISTERED AS PLAN DOCUMENT NUMBER

THIS PLAN COMPRISED OF ALL OF PINS 04510-1203, 04510-1204, 04510-1205, 04510-1212,

REPRESENTATIVE FOR LAND REGISTRAR

04510-1213, 04510-1553 AND 04510-1365.

PLAN OF SUBDIVISION of

PART OF LOTS 3 AND 4 **CONCESSION 1**

(GEOGRAPHIC TOWNSHIP OF MARCH)

BLOCK 82, REGISTERED PLAN 4M-1661

BLOCK 186, REGISTERED PLAN 4M-1680 CITY OF OTTAWA

DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

GRID SCALE CONVERSION

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999914

BEARINGS ARE GRID, DERIVED FROM CAN-NET VRS NETWORK GPS

OBSERVATIONS ON NCC HORIZONTAL CONTROL MONUMENTS 19773035 AND 19680191, CENTRAL MERIDIAN, 76° 30' WEST LONGITUDE MTM ZONE 9, NAD83 (ORIGINAL).

19773035 N:5006060.42 E:324888.04 19680191 N:5033564.26 E:388064.94

FOUND MONUMENTS SET MONUMENTS (IB) UNLESS OTHERWISE STATED ROUND IRON BAR STANDARD IRON BAR

CUT CROSS CONCRETE PIN PROPERTY IDENTIFICATION NUMBER MEASURED

SHORT STANDARD IRON BAR

PROPORTIONED ORIGIN UNKNOWN STANTEC GEOMATICS LTD. OBSERVED REFERENCE POINT REGISTERED PLAN 4M-1661 REGISTERED PLAN 4M-1680 PLAN 4R-28227

ALL OF PIN 04510-1365 ALL OF PIN 04510-1553

ALL OF PIN 04510-1203 ALL OF PIN 04510-1204

ALL OF PIN 04510-1205 OWNER'S CERTIFICATE ALL OF PIN 04510-1212 ALL OF PIN 04510-1213

THIS IS TO CERTIFY THAT:

1. LOTS 1 TO 62 BOTH INCLUSIVE, BLOCKS 63 TO 93, BOTH INCLUSIVE, THE STREETS, NAMELY - HAVE BEEN LAID OUT IN ACCORDANCE WITH OUR INSTRUCTIONS.

2. THE STREETS ARE DEDICATED TO CITY OF OTTAWA AS PUBLIC HIGHWAYS.

MINTO COMMUNITIES INC.

BRENT STRACHAN PRESIDENT

VICE PRESIDENT, OPERATIONS LOW RISE CONSTRUCTION I HAVE THE AUTHORITY

SURVEYOR'S CERTIFICATE

I HAVE THE AUTHORITY TO BIND THE CORPORATION

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER

THE SURVEY WAS COMPLETED ON THE DAY OF, 2024

FRANCIS LAU ONTARIO LAND SURVEYOR

MARK ARNOLD

TO BIND THE CORPORATION

Stantec Geomatics Ltd.

CANADA LANDS SURVEYORS ONTARIO LAND SURVEYORS 1331 CLYDE AVENUE, SUITE 300 OTTAWA, ONTARIO, K2C 3G4

TEL. 613.722.4420 DRAWN: ME CHECKED: * PM: FL FIELD: * PROJECT No.: 161614463-132

Appendix B

Pre-consultation meeting notes

File Number: PC2021-0275 September 2, 2021

Pre-application Consultation Meeting Notes

Site Address: 370 Huntmar Drive and 450 Huntmar Drive

Location: Virtual - Microsoft Teams Meeting Date: August 12, 2021

Attendees: Colette Gorni – Planner, City of Ottawa

Wendy Tse – Planner, City of Ottawa

Justin Armstrong – Project Manager (Infrastructure), City of Ottawa

Mark Young - Planner (Urban Design), City of Ottawa

Jeff Goettling – Planner (Parks), City of Ottawa Mike Russett – Planner (Parks), City of Ottawa Jeffrey Ren – Co-op Student, City of Ottawa

Matt Craig – MVCA Erica Ogden – MVCA

Curtiss Scarlett - Minto Communities Inc.

Bronwyn Anderson – Minto Communities Inc.

Kiara Gonzales – Minto Communities Inc.

Danielle Forget – Minto Communities Inc.

Alexandre Tourigny - J.L Richards

Eric Forhan – J.L Richards

Lucie Dalrymple – J.L Richards

Andrew Harte - CGH Transportation

Regrets: Mark Richardson – Planning Forester, City of Ottawa

Mike Giampa - Project Manager (Transportation), City of Ottawa

Matthew Hayley – Planner (Environmental), City of Ottawa

APPLICANT COMMENTS:

- 1. Two separate developments are proposed:
 - a. Stage 5 will be a Plan of Subdivision application and a Zoning By-law Amendment application:
 - Stage 5 is located east of Arcadia Stages 1-4; it is the last piece north of Campeau Drive;
 - Existing infrastructure extends to the boundaries of the site and two accesses off of Winterset Road are proposed;
 - A total of 225 low-rise units are proposed in the form of singles, townhouses and back-to-back townhouses; and,

- The site is designated as General Urban Area in the Official Plan; the Carp River Restoration Policy Area Overlay applies; and the site is zoned Development Reserve (DR).
- b. Stage 6 will be a Site Plan Control application and a Zoning By-law Amendment application:
 - Stage 6 lands are located south of Campeau Drive, the parcel closest to the intersection of Huntmar Drive and Campeau Drive was sold by Minto to a hotel developer;
 - The site is designated as Mixed-Use Centre in the Official Plan, the Kanata West Concept Plan identifies this area as a community core, and the site is zoned Development Reserve;
 - Land dedications have been made for the proposed future Campeau Station LRT Station;
 - Two accesses, one off of Campeau Drive is proposed and one off of Country Glen Way, are proposed;
 - Infrastructure connections are proposed to be made from Country Glen Way and Donum Lane;
 - A total of 480 units are proposed in the form of stacked townhouses (please note that the submitted plans reference a higher unit count); and,
 - 2 communal amenity spaces are proposed.
- 2. The separate applications for both developments are expected to be submitted in September 2021 (Stage 5) and October 2021 (Stage 6).

STAFF COMMENTS:

Planning

Stage 5

- 1. A Major Zoning By-law Amendment application will be required for the Stage 5 lands to permit the proposed development. Urban Exception 1932 can removed through this application as the Holding Symbol has now been lifted.
- 2. A new Plan of Subdivision application will be required to permit the proposed development, as Stage was not included in the previous draft approval.
- 3. Please note that there is a 30cm reserve along Winterset Road that will need to be lifted.
- 4. Staff are generally satisfied with the current layout.

5. Please consider adding another pedestrian connection between Street 1 and 6; please consider providing a pedestrian plan with the application submissions.

6. Please submit a streetscape plan with your application. The location of trees and sidewalks should be considered early in the design process.

Stage 6

- 7. A Major Zoning By-law Amendment application will be required to permit the proposed development on the Stage 6 lands.
- 8. The Phase 6 lands previously received draft approval through a previous plan of subdivision application (File No. D07-16-16-0025).
- 9. It is understood that the applicant currently intends to allow the draft approval to lapse and pursue Site Plan Control and Plan of Condominium applications to permit the proposed development.
 - a. The proposed development requires a Complex (Manager Approval, Public Consultation) Site Plan Control Application.
- 10. Please note that there are 30cm reserves along Country Glen Way, Campeau, and Donum Lane.
- 11. It is understood that the applicant is interested in straightening the jagged section of the Country Glen Way right-of-way. Staff have reach out to the City's Corporate Real Estate Office (CREO) to discuss the possibility of a land swap, and will provide more information once a response is received.
- 12. Please ensure that adequate bicycle parking is provided both in and outside the proposed storage building.
- 13. Please review the City's Urban Design Guidelines for Transit Oriented Development to ensure that proposed development conforms to the guidelines

General

- 14. Fees and forms for the above mentioned applications can be found here; please note that each planning application fee will be reduced by 10 per cent if two or more applications are submitted at the same time and for the same lands.
- 15. Please ensure that each submission considers the Official Plan policies that are applicable at the time of the submission of the application
 - a. If a complete application is received by no later than the day before the new Official Plan is adopted (October 2021), it will be processed on the basis of existing Official Plan policy provided it is consistent with the 2020 Provincial Policy Statement.

b. Applications received after the day before the new Official Plan is adopted (October 2021), will be reviewed and evaluated on the basis of the policies of the new Official Plan, which is consistent with the 2020 Provincial Policy Statement.

Please contact the Planner, Colette Gorni, at Colette.Gorni@ottawa.ca if you have any questions or require additional information relating to the comments above.

<u>Urban Design</u>

Stage 5

- 1. A design brief is required. A terms of reference is attached.
- 2. Please ensure the pathway connections to the Carp River Open Space Lands are accessible. This may require co-locating the two blocks in the vicinity of Lot 25 and Block 8 to provide additional length for these blocks.
- 3. Please consider locations for sidewalks and trees at the time of submission, as it relates to utilities and clay soils.
- 4. Orientation of units to minimize the need for noise walls on Winterset Road should be considered.
- 5. A pathway connection should be provided within Block 43 Dry Pond to provide access to Winterset Road.

Stage 6

- 6. A design brief is required. A terms of reference is attached.
- 7. The subject lands are located within a design priority area. A high-quality site and building design are expected, suitable for a mixed use centre.
- 8. Consideration should be given to providing more than one product/dwelling type for this site.
- 9. Options to eliminate the need for a single loaded private street abutting Campeau Drive should be explored.
- 10. The current access on Campeau should be considered for a more urban treatment vs. a pork chop island.
- 11. The units abutting Campeau Drive in the Western Block, should be oriented to be in alignment with Campeau Drive vs. being offset.
- 12. The treatment of built form abutting Country Glen Way should be reviewed.

 Opportunities to regularize this property line should also be explored if possible.
- 13. Connectivity to the MUP along Feedmill Creek should be strengthened at key locations.

- 14. Consideration should be given to allowing for live/work arrangements at grade.
- 15. Consideration should be given to allowing for a mix of uses on-site.

Please contact Urban Design Planner Mark Young at Mark.Young@ottawa.ca if you have any questions or require additional information relating to the comments above.

Engineering

- 1. The Servicing Study Guidelines for Development Applications are available at the following address: http://ottawa.ca/en/development-application-review-process-0/servicing-study-quidelines-development-applications
- 2. Servicing and site works shall be in accordance with the following documents:
 - ⇒ Ottawa Sewer Design Guidelines (October 2012)
 - ⇒ Ottawa Design Guidelines Water Distribution (2010)
 - ⇒ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)

 - ⇒ City of Ottawa Environmental Noise Control Guidelines (January, 2016)
 - ⇒ City of Ottawa Park and Pathway Development Manual (2012)
 - ⇒ City of Ottawa Accessibility Design Standards (2012)
 - Ottawa Standard Tender Documents (latest version)
 - ⇒ Ontario Provincial Standards for Roads & Public Works (2013)
- 3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at lnformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455).
- 4. The Stormwater Management Criteria, for the subject site, is to be based on the criteria outlined in the KWMSS. Understanding that deviations have been made to the KWMSS in previous phases and that Phases 5 & 6 are the final two phases in the Arcadia subdivision area, and that infrastructure and stormwater management facilities surrounding the sites have been constructed as part of previous phases of development, it will be important to demonstrate that the surrounding infrastructure has been designed with enough capacity to support the proposed developments.

Deviations from previous design assumption shall be justified in the plans and reports.

- 5. As was mentioned in the pre-consultation meeting, Phases 5 & 6 are the final two phases in the Arcadia subdivision area, and the surrounding infrastructure intended to provide servicing for Phases 5 & 6 has been constructed as part of previous Phases. The plans and reports that are to be submitted in support of Phase 5 & 6 will need to demonstrate that the surrounding/downstream infrastructure has been designed with enough capacity to support the proposed developments and that any works required by the KWMSS to support the proposed developments have been completed. Any deviations within Phase 5 & 6 from previous design assumptions will need to be clearly justified.
- 6. Preference for servicing of Phase 5 would be entirely internal to Phase 5 (i.e., individual building service connections to Winterset to be avoided) in order to eliminate any potential service disruptions to existing residents.
- 7. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:

ii.	Type of development and the amount of fire flow required (as per FUS 1999).
iii.	Average daily demand: l/s.

iv.	Maximum daily demand:l/s.	
٧.	Maximum hourly daily demand: _	l/s.

i. Location of service

- 8. As mentioned in the pre-consultation meeting, soil and geotechnical conditions are of potential concern for these sites. Sufficient justification should be provided to support the feasibility of Phase 5 and 6 proposals from a geotechnical perspective. For these proposals, where sensitive marine clays exist, the following information must be provided to the City:
 - A map that shows:
 - i. Location and depth of sensitive soils
 - ii. Location of utilities

iii. Location of proposed landscaping

9. MOECC ECA Requirements

It is anticipated that an MECP Environmental Compliance Approval(s) (ECA) will be needed (or existing will need to be amended) for sewers as well as for any deviation from previous ECA approvals.

10. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

Please contact Infrastructure Project Manager Justin Armstrong at Justin.Armstrong@ottawa.ca if you have any questions or require additional information relating to the comments above.

Transportation

- 1. A TIA is warranted- proceed to scoping.
- 2. The application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable). Although a full review of the TIA Strategy report (Step 4) is not required prior to an application, it is strongly recommended.
- 3. Synchro files are required with Step 4.
- 4. ROW protection on Campeau is 37.5m.
- 5. Geometric Road Design (GRD) drawings will be required with the first submission of underground infrastructure and grading drawings.
- 6. These drawings should include such items as, but is not limited to:
 - a. Road Signage and Pavement Marking for the subdivision;
 - b. Intersection control measure at new internal intersections; and
 - c. Location of depressed curbs and TWSIs;
 - d. Include traffic calming measures on roads within the limits of their subdivision to limit vehicular speed to 30 kph and improve pedestrian safety. These measures may include either vertical or horizontal features.
- 7. Site triangles at the following locations on the final plan will be required:
 - a. Local Road to Local Road: 3 metre x 3 metres
 - b. Local Road to Collector Road: 5 metre x 5 metres
 - c. Collector Road to Collector Road: 5 metre x 5 metres

- d. Collector Road to Arterial Road: 5 metre x 5 metres.
- 8. A Road Noise Impact Study is required.
- 9. Please note that all new applications (pre-consultation meetings dated after March 3, 2021) must use the NEW TRANS Trip Generation Manual when forecasting site generated trips using this manual. The TRANS committee (a joint transportation planning committee serving the National Capital region) finalized a new manual early in March 2021. The document will be available in French and English on the TRANS website http://www.ncr-trans-rcn.ca/surveys/2009-trip-generation. The new manual has simplified the conversion from vehicle trips to person trips and then trips by modal share.
- 10. Any Development Charge road work may be front ended by the applicant, so long as the work is listed in the affordable network. Repayment will be based on warrants, as determined solely by the Transportation Services Department. A Front Ending application is required.

Please contact Transportation Project Manager Mike Giampa at Mike.Giampa@ottawa.ca if you have any questions or require additional information relating to the comments above.

Parks Parks

- 1. Staff understand that the applicant intends to provide cash-in-lieu rather than dedicate land for parkland for both Stages 5 and 6.
- 2. Please confirm lands that are to be dedicated to the City (e.g., corner park blocks, dry ponds, open space blocks, etc.) in each application..
- 3. Please provide more information on pedestrian pathways to the adjacent park and open space blocks for Stage 5.
- 4. Please reach out to Councillor Sudds to discuss the cash-in-lieu of parkland proposal.

Please contact Parks Planner Mike Russett at Mike.Russett@ottawa.ca if you have any questions or require additional information relating to the comments above.

Environment

- 1. Up-dated EIS, should focus on the transition from the developed lands to the natural area/watercourse blocks.
- 2. Implementing all recommendations from older EIS if still applicable.

Please contact Environmental Planner Matthew Hayley at Matthew.Hayley@ottawa.ca if you have any questions or require additional information relating to the comments above.

<u>Forestry</u>

TCR requirements:

- 1. A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
 - a. An approved TCR is a requirement of Site Plan approval.
 - b. The TCR may be combined with eh LP provided all information is supplied
- 2. As of January 1 2021, any removal of privately-owned trees 10cm or larger in diameter, or publicly (City) owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 340); the permit will be based on an approved TCR and made available at or near plan approval.
- 3. The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR
 - a. If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester
 - b. Compensation may be required for city owned trees if so, it will need to be paid prior to the release of the tree permit
- 4. The TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter and health condition
- 5. Please identify trees by ownership private onsite, private on adjoining site, city owned, co-owned (trees on a property line)
- 6. the TCR must list all trees on adjacent sites if they have a critical root zone that extends onto the development site
- 7. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained
- 8. All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree-Protection-Specification or by searching Ottawa.ca
 - a. The location of tree protection fencing must be shown on a plan;
 - b. Show the critical root zone of the retained trees; and,
 - c. If excavation will occur within the critical root zone, please show the limits of excavation .

9. The City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.

For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on City of Ottawa

Landscape Plan Tree Planting requirements:

10. Minimum Setbacks

- a. Maintain 1.5m from sidewalk or MUP/cycle track.
- b. Maintain 2.5m from curb
- c. Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.
- d. Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing.
- e. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

11. Tree specifications

- a. Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
- b. Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
- c. Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
- d. Plant native trees whenever possible
- e. No root barriers, dead-man anchor systems, or planters are permitted.
- f. No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

12. Hard surface planting

- a. Curb style planter is highly recommended
- b. No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.

c. Trees are to be planted at grade

13. Soil Volume

a. Please ensure adequate soil volumes are met:

Tree	Single Tree Soil	Multiple Tree
Type/Size	Volume (m3)	Soil Volume
		(m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

^{**}Please note that these soil volumes are not applicable in cases with Sensitive Marine Clay.

14. Sensitive Marine Clay

a. Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines.

Please contact Adam Palmer at <u>adam.palmer@Ottawa.ca</u> if you have any questions or require additional information relating to the landscape plan tree planting requirements.

MVCA

- 1. MVCA staff have recently reviewed permit applications and related documents required as part of the Lifting of a Holding Symbol application for the Stage 5 lands.
- 2. Please ensure that the Campeau pond setbacks and LRT alignment are considered as the site designs for both applications are further refined.
- 3. Please note that the MVCA will be conducting a floodplain mapping update by the end of the year.
- 4. Please refer to MVCA comments provided for previous stages of the Arcadia subdivision.

Please contact the MVCA's Planning Manager, Matt Craig, at MCraig@mvc.on.ca if you have any questions or require additional information relating to the comments above.

NEXT STEPS:

Please refer to the links to <u>Guide to preparing studies and plans</u> and <u>fees</u> for further information. Additional information is available related to <u>building permits</u>, <u>development charges</u>, and the <u>Accessibility Design Standards</u>. Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-con comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.

Please do not hesitate to Colette Gorni, at Colette.Gorni@ottawa.ca, if you have any questions.

Appendix C

Water Servicing

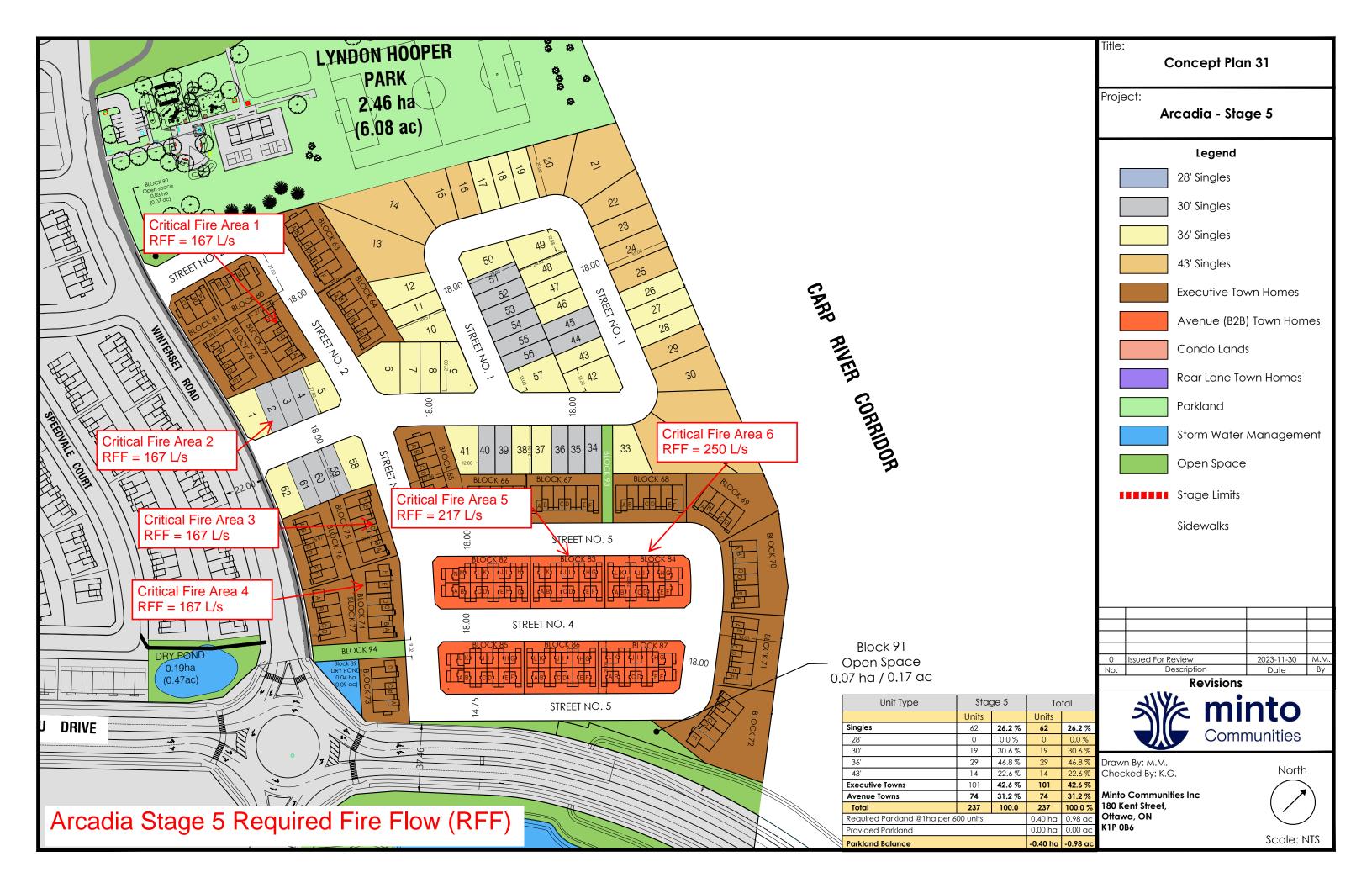
J.L. Richards & Associates Limited

WATERMAIN DEMAND CALCULATION SHEET

ARCADIA STAGE 6
CITY OF OTTAWA
MINTO COMMUNITIES INC.

			RESIDENTIAL			NON	I-RESIDEN	NTIAL	A'	VERAGE DAI	LY	M	AXIMUM DAI	LY		PEAK HOUR	
NODE	SINGLES	EXECUTIVE (ROW)	AVENUE (B2B)	UNIT COUNT	POP'N	COMM	INST.	PARK		DEMAND (I/s	,		DEMAND (I/s	,		DEMAND (I/s	
		TOWNHOUSE	TOWNHOUSE			(ha.)	(ha.)	(ha.)	Res.	Non-res.	Total	Res.	Non-res.	Total	Res.	Non-res.	Total
ARCADIA STAGE 5																	
J-15		19		19	51	0.00	0.00	0.00	0.17	0.00	0.17	0.42	0.00	0.42	0.91	0.00	0.91
J-16	12	18		30	89	0.00	0.00	0.00	0.29	0.00	0.29	0.72	0.00	0.72	1.59	0.00	1.59
J-17	10			10	34	0.00	0.00	0.00	0.11	0.00	0.11	0.28	0.00	0.28	0.61	0.00	0.61
J-18	13			13	44	0.00	0.00	0.00	0.14	0.00	0.14	0.36	0.00	0.36	0.79	0.00	0.79
J-19	12			12	41	0.00	0.00	0.00	0.13	0.00	0.13	0.33	0.00	0.33	0.73	0.00	0.73
J-20	8			8	27	0.00	0.00	0.00	0.09	0.00	0.09	0.22	0.00	0.22	0.48	0.00	0.48
J-21		17	7	24	65	0.00	0.00	0.00	0.21	0.00	0.21	0.53	0.00	0.53	1.16	0.00	1.16
J-22			6	6	16	0.00	0.00	0.00	0.05	0.00	0.05	0.13	0.00	0.13	0.29	0.00	0.29
J-23		6	6	12	32	0.00	0.00	0.00	0.11	0.00	0.11	0.26	0.00	0.26	0.58	0.00	0.58
J-24		10	6	16	43	0.00	0.00	0.00	0.14	0.00	0.14	0.35	0.00	0.35	0.77	0.00	0.77
J-25		12	12	24	65	0.00	0.00	0.00	0.21	0.00	0.21	0.53	0.00	0.53	1.16	0.00	1.16
J-26		5	6	11	30	0.00	0.00	0.00	0.10	0.00	0.10	0.24	0.00	0.24	0.53	0.00	0.53
J-27		4	6	10	27	0.00	0.00	0.00	0.09	0.00	0.09	0.22	0.00	0.22	0.48	0.00	0.48
J-28			12	12	32	0.00	0.00	0.00	0.11	0.00	0.11	0.26	0.00	0.26	0.58	0.00	0.58
J-29			6	6	16	0.00	0.00	0.00	0.05	0.00	0.05	0.13	0.00	0.13	0.29	0.00	0.29
J-33	/	10		/	24	0.00	0.00	0.00	0.08	0.00	0.08	0.19	0.00	0.19	0.42	0.00	0.42
J-34		10	7	17	46	0.00	0.00	0.00	0.15	0.00	0.15	0.37	0.00	0.37	0.82	0.00	0.82
TOTALS	62	101	74	237	684	0.00	0.00	0.00	2.22	0.00	2.22	5.54	0.00	5.54	12.18	0.00	12.18

		ASSUMPTIONS			
RESIDENTIAL DENSITIES		AVG. DAILY DEMAND		MAX. HOURLY DEMAND	
SINGLES	<u>3.4</u> p/p/u	- Residential	<u>280</u> I / cap / day	- Residential	<u>1,540</u> l / cap / day
		- Institutional	28,000 I / ha / day	- Institutional	<u>75,600</u> l / ha / day
TOWNHOUSE UNITS (AVENUE/B2B AND EXECUTIVE/ROW)	<u>2.7</u> p/p/u	- Commercial	28,000 I / ha / day	- Commercial	75,600 I / ha / day
		MAX. DAILY DEMAND			
		- Residential	700 I / cap / day		
		- Institutional	42,000 I / ha / day		
		- Commercial	<u>42,000</u> I / ha / day		



FUS Fire Flow Calculations

ARCADIA STAGE 5 - Block 79 - Row Townhouse (JLR 26299-05)

Step	Parameter	Value		Note
Α	Type of Construction	Wood Frame		_
	Coefficient (C)	1.5		
В	Ground Floor Area	523.67	m ²	ROW TH with 6 Units
С	Height in storeys	3	storeys	Basements are excluded.
	Total Floor Area	1571.01	m ²	
D	Fire Flow Formula	F=220C√A		
	Fire Flow	13080	L/min	
	Rounded Fire Flow	13000	L/min	Flow rounded to nearest 1000 L/min.
E	Occupancy Class	Limited Combustible		Residential units have a limited combustible occupancy.
	Occupancy Charge	-15%		
	Occupancy Increase or	-1950		
	Decrease Fire Flave	11050		No rounding applied
	Fire Flow	11050	L/min	No rounding applied.
•	Sprinkler Protection	None		<u> </u>
	Sprinkler Credit	0%		<u> </u>
	Decrease for Sprinkler	0	L/min	
3	North Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	37.3	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	111.8	m-storeys	
	Separation Distance	27.31	m	<u> </u>
	North Side Exposure	10%		
	Charge East Side Exposure			_
	•	Wood Frame		
	Exposing Wall:	Wood Frame		
	Exposed Wall:			
	Length of Exposed Wall:	15.4	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	30.9	m-storeys	
	Separation Distance	10.95	m	<u> </u>
	East Side Exposure Charge	12%		
	South Side Exposure			_
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	30.9	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	92.6	m-storeys	
	Separation Distance	13.88	m	*assumed min. 6 m setback for unit 54
	South Side Exposure	450/		_
	Charge	15%		_
	West Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	15.2	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	45.5	m-storeys	
	Separation Distance	10.81	m	
	West Side Exposure	13%		
	Charge	13/0		The total commence of the second state of
	Total Exposure Charge	50%		The total exposure charge is below the maximum valuof 75%.
	Increase for Exposures	5525	L/min	
1	Fire Flow	16575	L/min	
	Rounded Fire Flow	17000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	Required Fire Flow (RFF)	10000	L/min	The City of Ottawa's cap does apply since separation of front and back is greater than 10 m AND total exposinarea is less than 600 sq-m (and less than 7 units in dwelling)

Fire Underwriters Survey (FUS) Fire Flow Calculations

FUS Fire Flow Calculations

ARCADIA STAGE 5 - Singles 2-5 - Single Family Dwelling (JLR 26299-05)

Step	Parameter	Value		Note
Α	Type of Construction	Wood Frame		<u> </u>
	Coefficient (C)	1.5		
В	Ground Floor Area	488.81	m ²	4 single family dewllings counted as 1, as the separation between buildings is less than 3m.
2	Height in storeys	2	storeys	Basements are excluded.
	Total Floor Area	977.62	m²	
)	Fire Flow Formula	F=220C√A		
	Fire Flow	10318	L/min	
	Rounded Fire Flow	10000	L/min	Flow rounded to nearest 1000 L/min.
	Occupancy Class	Limited Combustible		Residential units have a limited combustible occupant
	Occupancy Charge	-15%		
	Occupancy Increase or	-1500		
	Decrease		 .,	N P P I
	Fire Flow	8500	L/min	No rounding applied.
	Sprinkler Protection	None		<u> </u>
	Sprinkler Credit	0%		<u> </u>
	Decrease for Sprinkler	0	L/min	
	North Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	15.6	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	31.2	m-storeys	
	Separation Distance	29.55	m	<u></u>
	North Side Exposure	8%		
	Charge			<u> </u>
	East Side Exposure	W 15		
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	37.9	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	75.9	m-storeys	
	Separation Distance	25.41	m	<u> </u>
	East Side Exposure Charge	9%		<u></u>
	South Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	11.5	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	23.0	m-storeys	
	Separation Distance	3.12	m	<u> </u>
	South Side Exposure	17%		
	Charge West Side Exposure			_
	West Side Exposure	Wood Frame		
	Exposing Wall:	Wood Frame		
	Exposed Wall:		m	
	Length of Exposed Wall:	18.0	m	
	Height of Exposed Wall:	3	storeys m-storeys	
	Length-Height Factor	53.9	m-storeys	
	Separation Distance West Side Exposure	10.96	m	
	Charge	13%		
	Total Exposure Charge	47%		The total exposure charge is below the maximum val of 75%.
	Increase for Exposures	3995	L/min	
	Fire Flow	12495	L/min	
	Rounded Fire Flow	12000	L/min	Flow rounded to nearest 1000 L/min.
ity Ca	Required Fire Flow	10000	L/min	The City of Ottawa's cap does apply since separation front and back is greater than 10 m AND total exposi area is less than 600 sq-m (and less than 7 units in
		167	L/s	dwelling)
		107	L/ 3	

Fire Underwriters Survey (FUS) Fire Flow Calculations

FUS Fire Flow Calculations

ARCADIA STAGE 5 - Block 75 - Row Townhouse (JLR 26299-05)

Step	Parameter	Value		Note
Α	Type of Construction	Wood Frame		<u> </u>
	Coefficient (C)	1.5		
3	Ground Floor Area	524.27	m ²	ROW TH with 6 Units
C	Height in storeys	3	storeys	Basements are excluded.
	Total Floor Area	1572.81	m ²	
)	Fire Flow Formula	F=220C√A		
	Fire Flow	13087	L/min	
	Rounded Fire Flow	13000	L/min	Flow rounded to nearest 1000 L/min.
E	Occupancy Class	Limited Combustible		Residential units have a limited combustible occupancy.
	Occupancy Charge	-15%		
	Occupancy Increase or	-1950		
	Decrease Fire Flow	11050		No rounding applied
	Fire Flow	11050	L/min	No rounding applied.
:	Sprinkler Protection	None		<u> </u>
	Sprinkler Credit	0%		_
	Decrease for Sprinkler	0	L/min	
ì	North Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	22.8	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	68.3	m-storeys	
	Separation Distance	26.55	m	*assumed min. 6 m rear yard setback for units 32-34
	North Side Exposure	9%		
	Charge East Side Exposure			_
	•	Mood Frama		
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	13.9	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	41.6	m-storeys	
	Separation Distance	6.41	m	_
	East Side Exposure Charge	18%		
	South Side Exposure			_
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	35.2	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	105.5	m-storeys	
	Separation Distance	14.71	m	
	South Side Exposure			_
	Charge	15%		
	West Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	17.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	34.0	m-storeys	
	Separation Distance	11.33	m	
	West Side Exposure	13%		_
	Charge	13%		_
	Total Exposure Charge	55%		The total exposure charge is below the maximum valu of 75%.
	Increase for Exposures	6078	L/min	
ł	Fire Flow	17128	L/min	
	Rounded Fire Flow	17000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	Required Fire Flow	10000	L/min	The City of Ottawa's cap does apply since separation of front and back is greater than 10 m AND total exposinarea is less than 600 sq-m (and less than 7 units in dwelling)

Fire Underwriters Survey (FUS) Fire Flow Calculations

FUS Fire Flow Calculations

ARCADIA STAGE 5 - Block 74 - Row Townhouse (JLR 26299-05)

Step	Parameter	Value		Note
Α	Type of Construction	Wood Frame		<u> </u>
	Coefficient (C)	1.5		
В	Ground Floor Area	554.02	m ²	ROW TH with 6 Units
C	Height in storeys	3	storeys	Basements are excluded.
	Total Floor Area	1662.06	m ²	
D	Fire Flow Formula	F=220C√A		
	Fire Flow	13454	L/min	
	Rounded Fire Flow	13000	L/min	Flow rounded to nearest 1000 L/min.
E	Occupancy Class	Limited Combustible		Residential units have a limited combustible occupancy.
	Occupancy Charge	-15%		
	Occupancy Increase or	-1950		
	Decrease Fire Flow	11050		No vounding applied
	Fire Flow	11050	L/min	No rounding applied.
:	Sprinkler Protection	None		<u> </u>
	Sprinkler Credit	0%		<u> </u>
	Decrease for Sprinkler	0	L/min	
ì	North Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	15.3	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	46.0	m-storeys	
	Separation Distance	26.54	m	*assumed min. 6 m rear yard setback for units 32-34
	North Side Exposure	8%		
	Charge			<u> </u>
	East Side Exposure	W 15		
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	14.3	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	42.8	m-storeys	
	Separation Distance	12.44	m	<u> </u>
	East Side Exposure Charge	13%		
	South Side Exposure			_
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	24.9	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	74.6	m-storeys	
	Separation Distance	12.69	m	
	South Side Exposure			_
	Charge	14%		
	West Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	13.9	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	41.7	m-storeys	
	Separation Distance	6.41	m	
	West Side Exposure			_
	Charge	18%		
	Total Exposure Charge	53%		The total exposure charge is below the maximum valu of 75%.
	Increase for Exposures	5857	L/min	
ł	Fire Flow	16907	L/min	
	Rounded Fire Flow	17000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	Required Fire Flow	10000	L/min	The City of Ottawa's cap does apply since separation of front and back is greater than 10 m AND total exposinarea is less than 600 sq-m (and less than 7 units in dwelling)

Fire Underwriters Survey (FUS) Fire Flow Calculations

FUS Fire Flow Calculations

ARCADIA STAGE 5 - Block 83 - Back-to-Back Townhouse (JLR 26299-05)

Step	Parameter	Value		Note
Α	Type of Construction	Wood Frame		<u></u>
	Coefficient (C)	1.5		
В	Ground Floor Area	364	m ²	Back-to-back TH with 12 units separated by one (1) FW. FW divides the block into two (2) compartments with six (6) units.
С	Height in storeys	3	storeys	Basements are excluded.
	Total Floor Area	1092	m ²	
D	Fire Flow Formula	F=220C√A		
	Fire Flow	10905	L/min	
	Rounded Fire Flow	11000	L/min	Flow rounded to nearest 1000 L/min.
E	Occupancy Class	Limited Combustible		Residential units have a limited combustible occupancy.
	Occupancy Charge	-15%		
	Occupancy Increase or Decrease	-1650		
	Fire Flow	9350	L/min	No rounding applied.
F	Sprinkler Protection	None		
	Sprinkler Credit	0%		
	Decrease for Sprinkler	0	L/min	_
G	North Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	0.0	m	
	Height of Exposed Wall:	0	storeys	
	Length-Height Factor	0.0	m-storeys	
	Separation Distance	100	m	
	North Side Exposure			_
	Charge	0%		
	East Side Exposure			_
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	20.1	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	60.2	m-storeys	
	Separation Distance	25.84	m	
	East Side Exposure	00/		_
	Charge	8%		<u></u>
	South Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	21.4	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	64.1	m-storeys	
	Separation Distance	3.12	m	
	South Side Exposure	19%		_
	Charge	1370		<u> </u>
	West Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	17.6	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	52.8	m-storeys	
	Separation Distance	27.27	m	<u> </u>
	West Side Exposure Charge	8%		_
	Total Exposure Charge	35%		The total exposure charge is below the maximum value of 75%.
	Increase for Exposures	3273	L/min	
Н	Fire Flow	12623	L/min	
	Rounded Fire Flow	13000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	Required Fire Flow	13000	L/min	The City of Ottawa's cap does not apply
,	(RFF)			
		217	L/s	

Fire Underwriters Survey (FUS) Fire Flow Calculations

FUS Fire Flow Calculations

ARCADIA STAGE 5 - Block 84 - Back-to-Back Townhouse (JLR 26299-05)

Step	Parameter	Value		Note
Α	Type of Construction	Wood Frame		<u></u>
	Coefficient (C)	1.5		
В	Ground Floor Area	485.21	m²	Back-to-back TH with 14 Units separated by one (1) FW into two (2) compartments: one with six (6) units and one with wight (8) units. The eight (8) unit compartments was used for analysis.
С	Height in storeys	3	storeys	Basements are excluded.
	Total Floor Area	1455.63	m ²	
D	Fire Flow Formula	F=220C√A		
	Fire Flow	12590	L/min	
	Rounded Fire Flow	13000	L/min	Flow rounded to nearest 1000 L/min.
E	Occupancy Class	Limited Combustible		Residential units have a limited combustible occupance
	Occupancy Charge	-15%		
	Occupancy Increase or	-1950		
	Decrease Fire Flow	11050		No recording applied
_	Fire Flow	11050	L/min	No rounding applied.
F	Sprinkler Protection	None		<u> </u>
	Sprinkler Credit	0%		<u> </u>
	Decrease for Sprinkler	0	L/min	
G	North Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	0.0	m	
	Height of Exposed Wall:	0	storeys	
	Length-Height Factor	0.0	m-storeys	
	Separation Distance North Side Exposure	100	m	<u> </u>
	Charge	0%		
	East Side Exposure			_
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	24.0	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	72.0	m-storeys	
	Separation Distance	25.63	m	
	East Side Exposure			_
	Charge	9%		
	South Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	21.4	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	64.1	m-storeys	
	Separation Distance	3.1	m	
	South Side Exposure	19%		
	Charge			<u>—</u>
	West Side Exposure	Mand France		
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	19.4	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	58.1	m-storeys	
	Separation Distance West Side Exposure	27.14	m	<u>—</u>
	Charge Exposure	8%		The total exposure charge is below the maximum valu
	Total Exposure Charge	36%		of 75%.
	Increase for Exposures	3978	L/min	
Н	Fire Flow	15028	L/min	
	Rounded Fire Flow Required Fire Flow	15000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	(RFF)	15000	L/min	The City of Ottawa's cap does not apply
		250	L/s	

Fire Underwriters Survey (FUS) Fire Flow Calculations

Boundary Conditions 8370 Campeau Drive

Provided Information

Scenario	Der	nand
	L/min	L/s
Average Daily Demand	125	2.08
Maximum Daily Demand	313	5.21
Peak Hour	688	11.46
Fire Flow Demand #1	10,020	167
Fire Flow Demand #2	15,000	250
Fire Flow Demand #3	18,000	300

Location



Results

Connection 1 – Winterset Road South

Demand Scenario	Head (m)	Pressure ¹ (psi)
Maximum HGL	161.3	91.9
Peak Hour	156.3	84.8
Max Day plus Fire Flow #1	153.3	80.5
Max Day plus Fire Flow #2	149.3	74.9
Max Day plus Fire Flow #3	146.4	70.8

¹ Ground Elevation = 96.6 m

Connection 2 - Winterset Road North

Demand Scenario	Head (m)	Pressure ¹ (psi)
Maximum HGL	161.3	88.8
Peak Hour	156.3	81.8
Max Day plus Fire Flow #1	152.6	76.5
Max Day plus Fire Flow #2	148.0	70.0

Max Day plus Fire Flow #3	144.6	65.1
---------------------------	-------	------

¹ Ground Elevation = 98.8 m

Notes

- 1. As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:
 - a. If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
 - b. Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

Annie Williams

From: Armstrong, Justin < justin.armstrong@ottawa.ca>

Sent: November 2, 2023 1:03 PM

To: Tatyana Roumie

Cc: Kiara Gonzales; Connor Joy; Karla Ferrey; Mahad Musse; Annie Williams

Subject: RE: 26299-005 Arcadia Stage 5 - Boundary Condition Request

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Hi Tatyana,

I reached out to our Water Services Group to confirm, and it seems that there have been some discussions that resulted in the agreement internally that 300L/s would now be acceptable as the upper limit for RFF, with the caveat that the local system and hydrant network must be able to support the RFF as well. So, note the additional challenge identified for hydrant coverage requirements within 75m/150m of the 300L/s RFF as per City guidelines, while still respecting the City's hydrant spacing requirements so as to not overburden the City with additional hydrants from a maintenance perspective. As well as local main sizing requirement of 200mm.

So, it seems that for Arcadia Stage 5, as long as hydrant coverage allows, and the mains remain 200mm in diameter while maintaining adequate pressures, 300L/s would be acceptable.

Thank you, Justin

Justin Armstrong, P.Eng.

Project Manager

Planning, Real Estate and Economic Development Department – Direction générale de la planification, des biens immobiliers et du développement économique

Development Review - West Branch

City of Ottawa | Ville d'Ottawa

110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1

613.580.2424 ext./poste 21746, justin.armstrong@ottawa.ca

From: Tatyana Roumie <troumie@jlrichards.ca>

Sent: October 31, 2023 2:30 PM

To: Armstrong, Justin < justin.armstrong@ottawa.ca>

Cc: Kiara Gonzales < Kiara.Gonzales@minto.com>; Connor Joy < cjoy@jlrichards.ca>; Karla Ferrey < kferrey@jlrichards.ca>;

Mahad Musse <mmusse@jlrichards.ca>; Annie Williams <awilliams@jlrichards.ca>

Subject: FW: 26299-005 Arcadia Stage 5 - Boundary Condition Request

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Hello Justin,

Thank you for sending the attached boundary conditions in support of Minto's Arcadia Stage 5.

We wanted to ask you about the available fire flow for this subdivision. When we were designing Arcadia Stage 6 (located near Stage 5 just south of Campeau), the City had informed us that our maximum available fire flow should be limited to 250 L/s based on their master planning. As such, Minto proceeded with adding firewalls to certain townhouse blocks in order to limit the required fire flow to 250 L/s. For the current Arcadia Stage 5, the City has provided a boundary condition for 300 L/s of fire flow without any requirement to limit this value to 250 L/s. It is clear from the boundary conditions that both of these Stages have more than adequate water pressure from the nearby feedermain, and it appears from the attached boundary conditions that a fire flow of 300 L/s is available.

Can the City comment on why we were limited in available fire flow for Arcadia Stage 6 but are not limited for Arcadia Stage 5?

Thank you, Tatyana

Tatyana Roumie, EIT, M.Eng. Civil Engineering Intern

J.L. Richards & Associates Limited 1000-343 Preston Street, Ottawa, ON K1S 1N4 Direct: 343-804-9370





From: Armstrong, Justin < <u>justin.armstrong@ottawa.ca</u>>

Sent: Friday, October 20, 2023 9:13 AM **To:** Tatyana Roumie troumie@jlrichards.ca

Cc: Kiara Gonzales <Kiara.Gonzales@minto.com>; Connor Joy <cjoy@jlrichards.ca>; Karla Ferrey <kferrey@jlrichards.ca>;

Mahad Musse < mmusse@jlrichards.ca >

Subject: RE: 26299-005 Arcadia Stage 5 - Boundary Condition Request

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Hello Tatyana,

See attached for the requested boundary conditions.

Thanks, Justin From: Armstrong, Justin

Sent: October 13, 2023 1:55 PM

To: 'Tatyana Roumie' < troumie@jlrichards.ca>

Cc: Kiara Gonzales < Kiara.Gonzales@minto.com>; Connor Joy < cjoy@jlrichards.ca>; Karla Ferrey < kferrey@jlrichards.ca>;

Mahad Musse <mmusse@jlrichards.ca>

Subject: RE: 26299-005 Arcadia Stage 5 - Boundary Condition Request

Thanks Tatyana.

I have forwarded the request to our boundary conditions group and will let you know once I have received the results.

One thing I will note from the figure in the attached is that there are locations where the backs of some lots/blocks abut the sides of other lots/blocks. In these situations where there is not 10-metres of separation between the back of the first dwelling to the side of the second dwelling, the first dwelling would not qualify for the FUS 10,000L/min cap, and all adjacent dwellings with less than 3.0m separation will need to be considered a singular fire area. To mitigate the high demand for these locations, the City's position is to request 3.0m fire-break easements to split up the continuous fire area.

Thanks, and have a great weekend.

Justin

Justin Armstrong, P.Eng.

Project Manager

Planning, Real Estate and Economic Development Department – Direction générale de la planification, des biens immobiliers et du développement économique

Development Review - West Branch

City of Ottawa | Ville d'Ottawa

110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1

613.580.2424 ext./poste 21746, justin.armstrong@ottawa.ca

From: Tatyana Roumie <troumie@jlrichards.ca>

Sent: October 12, 2023 8:26 AM

To: Armstrong, Justin < justin.armstrong@ottawa.ca>

Cc: Kiara Gonzales <Kiara.Gonzales@minto.com>; Connor Joy <cjoy@jlrichards.ca>; Karla Ferrey <kferrey@jlrichards.ca>;

Mahad Musse <mmusse@jlrichards.ca>

Subject: 26299-005 Arcadia Stage 5 - Boundary Condition Request

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Hello Justin,

We have been retained by Minto Communities to proceed with a Functional Design Resubmission for the Arcadia Stage 5 development.

We are requesting water boundary conditions for Minto Communities' proposed subdivision development at 8370 Campeau Drive (Arcadia Stage 5). The subject property consists of single homes, back-to-back townhouses, and row townhouses, for a total of 222 units.

Based on the 2020 FUS guidelines, the Ottawa Design Guidelines for Water Distribution, and the site plan, the estimated water demands and required fire flows (RFF) are as follows:

- Average Day Demand = 2.08 L/s
- Maximum Day Demand = 5.21 L/s
- Peak Hour Demand = 11.46 L/s
- FUS 1 RFF = 167 L/s
- FUS 2 RFF = 250 L/s
- FUS 3 RFF = 300 L/s

It is requested that the water boundary conditions are provided on Winterset Road as shown in the attached BC Request. Note the site will have a 200 mm looped watermain supply. If the requested fire flow is not available on the existing watermain on Winterset Road, we ask that the maximum available fire flow be provided.

We kindly ask that the City provide boundary conditions for the demand scenarios listed above, at your earliest convenience.

Should you have any questions or require anything further, please do not hesitate to contact us.

Thank you, Tatyana

Tatyana Roumie, EIT, M.Eng. Civil Engineering Intern

J.L. Richards & Associates Limited 1000-343 Preston Street, Ottawa, ON K1S 1N4 Direct: 343-804-9370





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4

Zach Georgitsos

From: Rasool, Rubina < Rubina.Rasool@ottawa.ca>

Sent: June 21, 2024 10:35 AM

To: Tatyana Roumie

Cc: Karla Ferrey; Annie Williams; Kiara Gonzales; Connor Joy

Subject: RE: Arcadia Stage 5 - Watermain City Comment

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Hi Tatyana,

That should be fine to re-submit. At detail design, please request revised boundary conditions.

Thank you,

Rubina

Rubina Rasool

Project Manager
Planning, Infrastructure and Economic Development Department
Development Review – West Branch
City of Ottawa
110 Laurier Avenue West Ottawa, ON K1P 1J1

613-580-2424 Ext. 24221 rubina.rasool@ottawa.ca

From: Tatyana Roumie <troumie@jlrichards.ca>

Sent: June 21, 2024 10:08 AM

To: Rasool, Rubina < Rubina. Rasool@ottawa.ca>

Cc: Karla Ferrey <kferrey@jlrichards.ca>; Annie Williams <awilliams@jlrichards.ca>; Kiara Gonzales

<Kiara.Gonzales@minto.com>; Connor Joy <cjoy@jlrichards.ca>

Subject: RE: Arcadia Stage 5 - Watermain City Comment

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Hello Rubina,

Thank you for your detailed response.

Based on the addition of the third connection, are we good to proceed with our re-submission using the boundary conditions we currently have?

Thanks,







Tatyana Roumie, M.Eng., B.Eng., EIT Civil Engineering Graduate

1000-343 Preston Street Ottawa, ON, K1S 1N4

Work: <u>343-804-9370</u> troumie@jlrichards.ca

From: Rasool, Rubina < Rubina.Rasool@ottawa.ca>

Sent: Thursday, April 4, 2024 4:21 PM

To: Tatyana Roumie < troumie@jlrichards.ca >

Cc: Karla Ferrey < kferrey@jlrichards.ca>; Annie Williams < awilliams@jlrichards.ca>; Kiara Gonzales

<Kiara.Gonzales@minto.com>

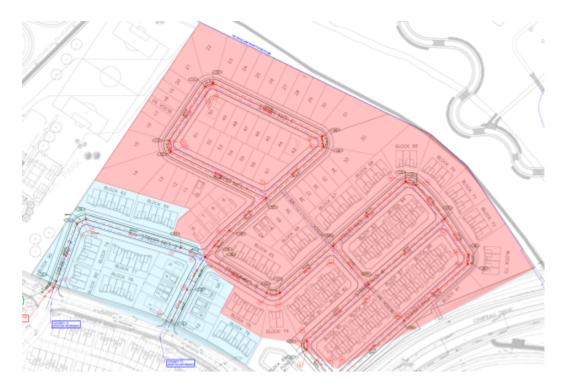
Subject: RE: Arcadia Stage 5 - Watermain City Comment

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Hello Tatyana,

Excuse the delayed response. I have discussed this comment internally with Infrastructure Planning and Water Distribution management.

The water distribution guidelines 4.3.1 ISTB-2021-03 states residential areas serving 50 or more dwellings shall be connected with a minimum of two watermains, separated by an isolation valve, to avoid the creation of a vulnerable service area. While the proposed configuration has two watermains connected to City mains, they are not configured in a way that avoids creating service disruption for the entire subdivision. In fact, since the connection points are so close together upstream of the subdivision, any disruption would cut-off the water service for the majority of the subdivision. I have marked-up plan that show some of these areas.



Redundancy does not have to be provided for the entire subdivision, but at least 50 dwelling units. The City's position remains that the proposed configuration is not adequate and the City has proposed two options for watermain connections. Furthermore, I can confirm the City would accept connection in the backbone watermain on Campeau Dr, if this option was selected. Please do not hesitate to contact me if you have any questions.

Thank you,

Rubina

Rubina Rasool

Project Manager
Planning, Infrastructure and Economic Development Department
Development Review – West Branch
City of Ottawa
110 Laurier Avenue West Ottawa, ON K1P 1J1
613-580-2424 Ext. 24221
rubina.rasool@ottawa.ca

From: Tatyana Roumie <troumie@jlrichards.ca>

Sent: February 29, 2024 11:51 AM

To: Rasool, Rubina < Rubina. Rasool@ottawa.ca >

Cc: Karla Ferrey <kferrey@jlrichards.ca>; Annie Williams <awilliams@jlrichards.ca>; Kiara Gonzales

< Kiara. Gonzales@minto.com >

Subject: Arcadia Stage 5 - Watermain City Comment

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Hello Rubina,

In response to City Comment #34, our design follows the City Guideline, which states that "service areas with a basic day demand greater than 50 m3/day (about 50 homes) shall be connected with a minimum of two feedermains to avoid the creation of a vulnerable service area."

However, City Comment #34 suggests that we should include 3 connection points (i.e. a triple loop). We feel this is over redundant since it's assuming there will be two breaks in the system at once. Our proposed servicing provides looping for every location such that a single watermain break will not disrupt service to any users. We feel that in accordance with the City's guidelines, it is not required to provide triple redundancy for two simultaneous watermain breaks.

Please confirm the City's agreement to proceed with our proposed watermain layout.

Thanks, Tatyana

Tatyana Roumie, EIT, M.Eng. Civil Engineering Intern

J.L. Richards & Associates Limited 1000-343 Preston Street, Ottawa, ON K1S 1N4 Direct: 343-804-9370





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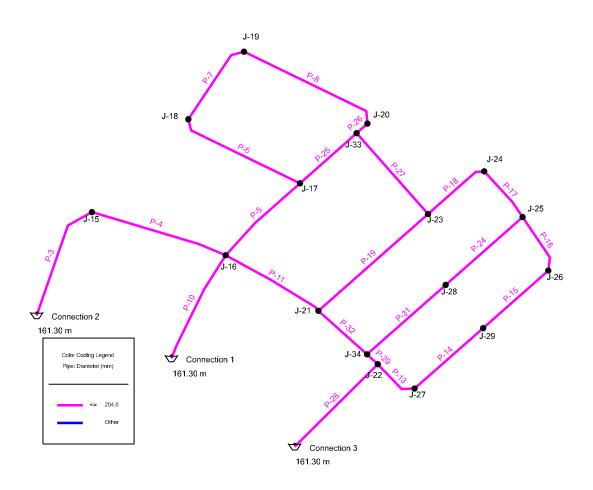
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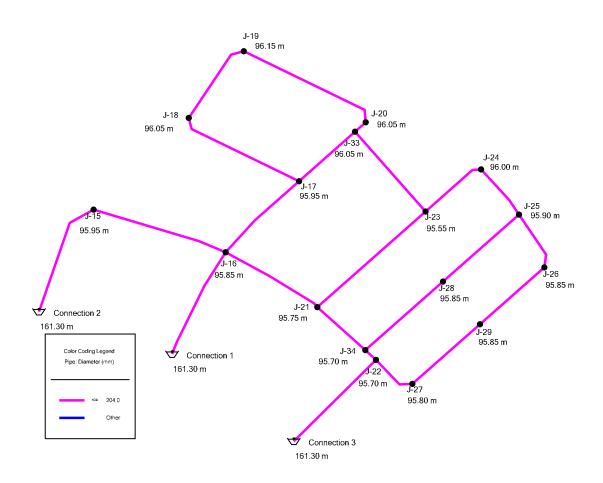
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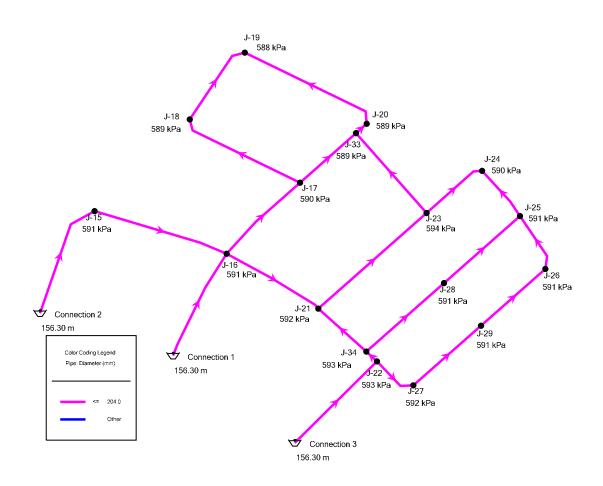
Arcadia Stage 5 Model Schematic



Arcadia Stage 5 Model Schematic Elevation Model



Arcadia Stage 5 Peak Hour Demand



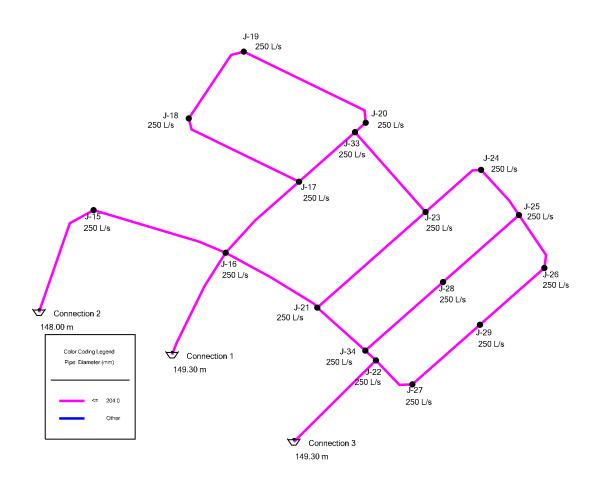
Arcadia Stage 5 Peak Hour Demand Junction Table

Label	ID	Elevation Demand (m) (L/s)		Hydraulic Grade (m)	Pressure (kPa)	
J-19	51	96.15	0.73	156.28	588	
J-18	50	96.05	0.79	156.28	589	
J-20	52	96.05	0.48	156.28	589	
J-33	90	96.05	0.42	156.28	589	
J-24	56	96.00	0.77	156.28	590	
J-17	49	95.95	0.61	156.28	590	
J-15	47	95.95	0.91	156.29	591	
J-25	57	95.90	1.16	156.28	591	
J-26	58	95.85	0.53	156.28	591	
J-28	60	95.85	0.58	156.28	591	
J-29	61	95.85	0.29	156.28	591	
J-16	48	95.85	1.59	156.29	591	
J-27	59	95.80	0.48	156.28	592	
J-21	53	95.75	1.16	156.28	592	
J-34	106	95.70	0.82	156.28	593	
J-22	54	95.70	0.29	156.28	593	
J-23	55	95.55	0.58	156.28	594	

Arcadia Stage 5 Peak Hour Demand Pipe Table

	ripe lable								
Label	Length (Scaled)	Diameter (mm)	Material	Hazen-Williams C	Hydraulic Grade (Start)	Hydraulic Grade	Flow (L/s)	Velocity (m/s)	
	(m)				(m)	(Stop) (m)			
P-3	89	204.0	PVC	110.0	156.30	156.29	3.20	0.10	
P-4	102	204.0	PVC	110.0	156.29	156.29	2.28	0.07	
P-5	75	204.0	PVC	110.0	156.29	156.28	2.73	0.08	
P-6	96	204.0	PVC	110.0	156.28	156.28	1.02	0.03	
P-7	65	204.0	PVC	110.0	156.28	156.28	0.24	0.01	
P-8	107	204.0	PVC	110.0	156.28	156.28	-0.49	0.02	
P-10	84	204.0	PVC	110.0	156.30	156.29	4.25	0.13	
P-11	78	204.0	PVC	110.0	156.29	156.28	2.21	0.07	
P-13	34	204.0	PVC	110.0	156.28	156.28	1.78	0.05	
P-14	66	204.0	PVC	110.0	156.28	156.28	1.30	0.04	
P-15	63	204.0	PVC	110.0	156.28	156.28	1.01	0.03	
P-16	45	204.0	PVC	110.0	156.28	156.28	0.48	0.01	
P-17	43	204.0	PVC	110.0	156.28	156.28	0.24	0.01	
P-18	52	204.0	PVC	110.0	156.28	156.28	-0.53	0.02	
P-19	106	204.0	PVC	110.0	156.28	156.28	-1.41	0.04	
P-24	74	204.0	PVC	110.0	156.28	156.28	0.91	0.03	
P-25	55	204.0	PVC	110.0	156.28	156.28	1.10	0.03	
P-26	10	204.0	PVC	110.0	156.28	156.28	0.98	0.03	
P-27	78	204.0	PVC	110.0	156.28	156.28	-0.30	0.01	
P-28	85	204.0	PVC	110.0	156.30	156.28	4.73	0.14	
P-29	11	204.0	PVC	110.0	156.28	156.28	2.65	0.08	
P-31	76	204.0	PVC	110.0	156.28	156.28	1.48	0.05	
P-32	47	204.0	PVC	110.0	156.28	156.28	0.35	0.01	

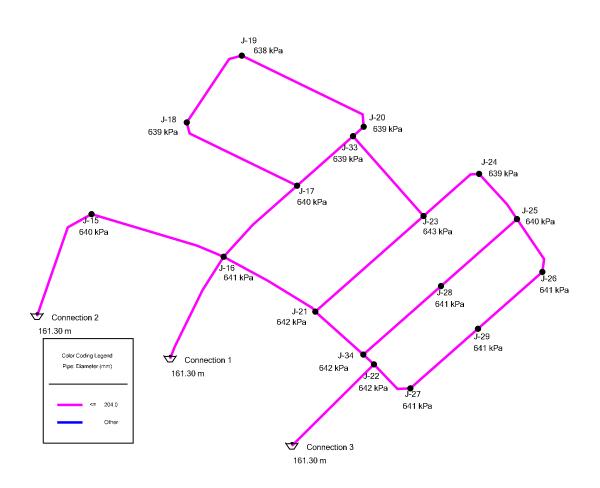
Arcadia Stage 5 Maximum Day Fire Flow (RFF = 250L/s)



Arcadia Stage 5 Maximum Day Fire Flow (RFF = 250L/s) Junction Table

Label	Fire Flow (Available)	Flow (Total Available)	Satisfies Fire Flow	Pressure (Residual	Pressure (Calculated	Pressure (Calculated	Junction w/ Minimum
	(L/s)	(L/s)	Constraints?	Lower Limit)	System Lower	Residual)	Pressure
				(kPa)	Limit)	(kPa)	(System)
					(kPa)		
J-15	250	250	True	140	499	423	J-19
J-19	250	250	True	140	325	276	J-18
J-18	250	250	True	140	322	284	J-19
J-20	250	250	True	140	377	361	J-19
J-33	250	250	True	140	380	379	J-20
J-24	250	250	True	140	420	385	J-25
J-17	250	250	True	140	392	387	J-18
J-16	250	251	True	140	469	467	J-19
J-25	250	251	True	140	409	395	J-26
J-26	250	250	True	140	397	361	J-29
J-28	250	250	True	140	427	374	J-25
J-29	250	250	True	140	398	352	J-26
J-27	250	250	True	140	411	392	J-29
J-21	250	251	True	140	458	438	J-24
J-34	250	250	True	140	445	441	J-28
J-22	250	250	True	140	446	445	J-27
J-23	250	250	True	140	429	414	J-24

Arcadia Stage 5 Maximum HGL Analysis



Arcadia Stage 5 Maximum HGL Analysis

Junction Table

Label	ID	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-19	51	96.15	0	161.30	638
J-18	50	96.05	0	161.30	639
J-20	52	96.05	0	161.30	639
J-33	90	96.05	0	161.30	639
J-24	56	96.00	0	161.30	639
J-15	47	95.95	0	161.30	640
J-17	49	95.95	0	161.30	640
J-25	57	95.90	0	161.30	640
J-16	48	95.85	0	161.30	641
J-26	58	95.85	0	161.30	641
J-28	60	95.85	0	161.30	641
J-29	61	95.85	0	161.30	641
J-27	59	95.80	0	161.30	641
J-21	53	95.75	0	161.30	642
J-22	54	95.70	0	161.30	642
J-34	106	95.70	0	161.30	642
J-23	55	95.55	0	161.30	643

Arcadia Stage 5 Maximum HGL Analysis

Pipe Table

				•				
Label	Length (Scaled) (m)	Diameter (mm)	Material	Hazen-Williams C	Hydraulic Grade (Start) (m)	Hydraulic Grade (Stop) (m)	Flow (L/s)	Velocity (m/s)
P-3	89	204.0	PVC	110.0	161.30	161.30	0	0.00
P-4	102	204.0	PVC	110.0	161.30	161.30	0	0.00
P-5	75	204.0	PVC	110.0	161.30	161.30	0	0.00
P-6	96	204.0	PVC	110.0	161.30	161.30	0	0.00
P-7	65	204.0	PVC	110.0	161.30	161.30	0	0.00
P-8	107	204.0	PVC	110.0	161.30	161.30	0	0.00
P-10	84	204.0	PVC	110.0	161.30	161.30	0	0.00
P-11	78	204.0	PVC	110.0	161.30	161.30	0	0.00
P-13	34	204.0	PVC	110.0	161.30	161.30	0	0.00
P-14	66	204.0	PVC	110.0	161.30	161.30	0	0.00
P-15	63	204.0	PVC	110.0	161.30	161.30	0	0.00
P-16	45	204.0	PVC	110.0	161.30	161.30	0	0.00
P-17	43	204.0	PVC	110.0	161.30	161.30	0	0.00
P-18	52	204.0	PVC	110.0	161.30	161.30	0	0.00
P-19	106	204.0	PVC	110.0	161.30	161.30	0	0.00
P-24	74	204.0	PVC	110.0	161.30	161.30	0	0.00
P-25	55	204.0	PVC	110.0	161.30	161.30	0	0.00
P-26	10	204.0	PVC	110.0	161.30	161.30	0	0.00
P-27	78	204.0	PVC	110.0	161.30	161.30	0	0.00
P-28	85	204.0	PVC	110.0	161.30	161.30	0	0.00
P-29	11	204.0	PVC	110.0	161.30	161.30	0	0.00
P-31	76	204.0	PVC	110.0	161.30	161.30	0	0.00
P-32	47	204.0	PVC	110.0	161.30	161.30	0	0.00

Appendix D

Wastewater Servicing

MINTO COMMUNITIES INC. ARCADIA STAGE 5 CONCEPTUAL SANITARY SEWER DESIGN SHEET JLR NO. 26299-005

DESIGNED BY: TR/KT CHECKED BY: KF Rev 1: December 2021 Rev 2: November 2023 Rev 3: July 2024

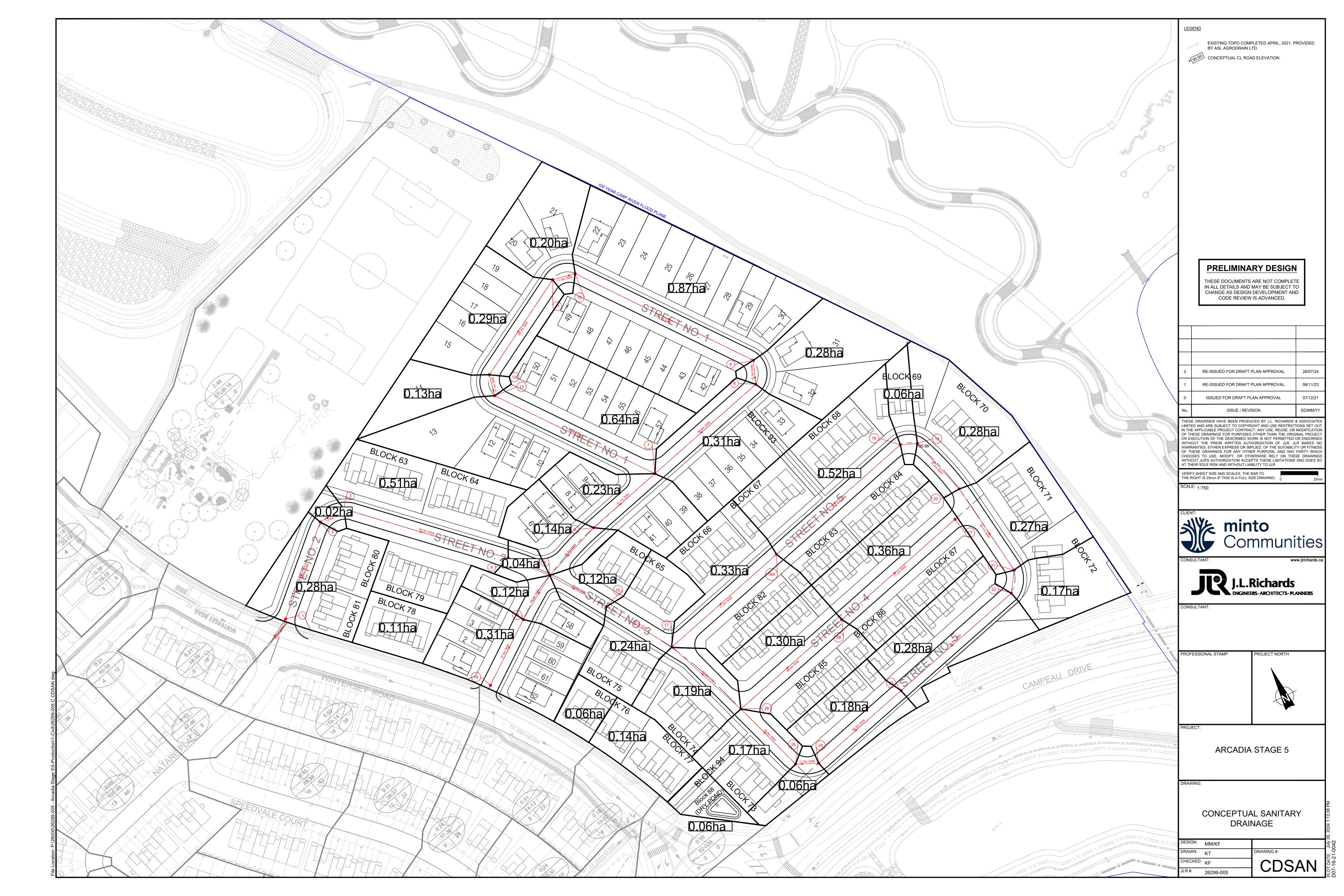
Street Name	Mainten	ace Hole No.				Residenti	al			Comme	cial/Institut	onal	Park/Roa	ads	Inf	filtration	Peak					Pipe Data					Upstrea	m Geome	try		Downstream (eometry	
	From	То	Singles	Multiples	Area (ha)	p. Cun Pop		Peaking Factor	Residential Flow (L/s)	Area (ha) Cur Are	a Peaking		Area /		rea Ar	rea Flow L/s	Design Flow L/s	Dia	Actual Diameter	Slope	Q Full (L/s)	V Full	Length	Residual Capacity	% Full	TG From	Obvei	rt Invert	Cover	тд то	Drop Obve	rt Invert	Cove
Winterset Road (Stage 3B)	EX.18	EX16		7	0.31 19	9 630	10.07	3.34	6.81			 		2.45 0.	.31 12.	2.52 4.13	10.94	-		 										+			
												ļ															ļ						
STREET 5	20	21	ł	7	0.27 19	9 19	0.27	3.71	0.23	0.0	0 1.50	0.00		0.00 0.	.27 0.2	27 0.09	0.32	200	203.20	0.35%	20.24	0.64	50.10	19.93	2%	95.851	93.92	2 93.719	1.929	95.843	93.74	7 93.544	2.09
STREET 5	21	22		4	0.17 1	1 30	0.44	3.68	0.36	0.0	0 1.50	0.00	(0.00 0.	.17 0.4	.44 0.15	0.50	200	203.20	0.35%	20.24	0.64	11.85	19.74	2%	95.843	93.74	7 93.544	2.097	95.856	93.70	5 93.502	2.15
STREET 5 STREET 5	22	23 24		11	0.28 30				0.71 0.93	0.0		0.00			.28 0.7		0.95 1.22				20.24	0.64 0.64	75.05 56.03	19.30 19.02	5% 6%	95.856 95.829				95.829 95.685		3 93.240 7 93.043	
STREET 3	24	25 25		1	0.06 3				0.96	0.0		0.00			.06 0.9		1.28		203.20				11.79	18.97	6%			7 93.043		95.686		93.043	
STREET 3	25	26		4	0.17 1				1.09	0.0		0.00			.17 1.1		1.46				20.24		39.63	18.78	7%	95.686				95.750		7 92.863	
STREET 4	27	28		21	0.36 5	7 57	0.36	3.64	0.67	0.0	0 1.50	0.00		0.00 0.	.36 0.3	36 0.12	0.79	200	203 20	0.35%	20 24	0.64	77 22	19.45	4%	95 901	93 57	8 93 374	2.323	95.823	93.30	7 93.104	2.51
STREET 4	28	26		16	0.30 4				1.17	0.0				0.00 0.							20.24		68.77	18.86	7%				2.516	95.750		7 92.863	
STREET 3	26	17		6	0.19 16	3 209	1.98	3.51	2.38	0.0	0 1.50	0.00		0.00 0.	10 10	.98 0.65	3 03	200	203 20	0.35%	20.24	0.64	47.20	17.21	15%	05.750	03.06	7 02 963	2.683	95,749	02.00	1 92.698	2 94
	20	17			0.19	208	1.90	3.31	2.30	0.0	0 1.30	0.00		0.00	. 19 1.3	.90 0.03	3.03	200	203.20	0.3376	20.24	0.04	41.25	17.21	1370	93.730	93.00	7 92.003	2.003	93.749	92.90	92.090	2.04
STREET 5	20	19		7	0.28 19				0.23	0.0		0.00			.28 0.2		0.32		203.20		20.24		31.50	19.92	2%	95.851			2.264	95.879		6 93.273	
STREET 5 STREET 5	19 18	18 18A		23	0.06 5 0.52 62				0.29 1.01	0.0		0.00			.06 0.3 .52 0.8	 	0.40 1.29		203.20	0.35%	20.24	0.64 0.64	8.72 84.39	19.84 18.95	2% 6%	95.879 95.910			2.403 2.464	95.910 95.846		6 93.242 0 92.947	
STREET 5	18A	17		14	0.33 38				1.44	0.0					.33 1.		1.83				20.24			18.41	9%	95.846			2.696	95.749		1 92.698	
STREET 3	4-7	40									4.50				04 0	44	5.40	000	000.00	0.050/		0.04	74.40	45.44	050/	05.040	00.00	4 00 000	0.045	95.749	20.05	00.440	
STREET 3	17 16	16 5		3	0.24 24				3.98 4.06	0.0		0.00		0.00 0. 0.00 0.	.24 3.4		5.10 5.23		203.20		20.24 20.24		71.19 33.04	15.14 15.02	25% 26%	95.846 95.545				95.749		92.449 92.333	
												0.00								0.0070					2070								
STREET 1 STREET 1	11 10	10 9	2 17		0.20 7 0.87 58	7 3 65			0.08 0.77	0.0		0.00			.20 0.2 .87 1.0		0.15 1.12		203.20		20.24		11.90 101.13	20.09 19.12	1% 6%	96.020 96.150	93.47		2.542 2.714	96.150 95.975		6 93.232 2 92.878	
STREET 1	9	8	2		0.28 7				0.77	0.0		0.00			.28 1.3		1.12			0.35%	20.24	0.64	12.30	18.95	6%	95.975				95.943		92.835	
STREET 1	8	7	6		0.31 20				1.07	0.0	0 1.50	0.00	(0.00 0.	.31 1.6	66 0.55	1.62		203.20	0.35%	20.24	0.64	68.77	18.62	8%	95.943	93.03	9 92.835	2.905	95.949		92.595	
STREET 1	11	12	5	·	0.29 1	7 17	0.29	3.71	0.20	0.0	0 1.50	0.00		0.00 0.	.29 0.2	29 0.10	0.30	200	203.20	0.35%	20.24	0.64	58.26	19.94	1%	96.020	93.35	9 93.156	2.661	95.933	03 15	5 92.952	2 77
STREET 1	12	13	1		0.13 3				0.24	0.0		0.00			.13 0.4		0.38		203.20		20.24	0.64	11.06	19.86	2%			5 92.952		96.014		6 92.913	
STREET 1	13	7	12		0.64 4			3.64	0.72	0.0	0 1.50	0.00	(0.00 0.	.64 1.0	.06 0.35	1.07	200	203.20		20.24	0.64	90.91	19.17	5%	96.014	93.11	6 92.913	2.898	95.949	92.79	8 92.595	3.15
STREET 1	7	6	5		0.23 1	7 170	2.95	3.54	1.95	0.0	0 1.50	0.00		0.00 0.	.23 2.9	.95 0.97	2.92	200	203 20	0.35%	20.24	0.64	41.69	17.32	14%	95.949	92 79	8 92.595	3.151	95.608	92.65	2 92.449	2 95
STREET 1	6	5	2			177			2.03	0.0		0.00		0.00 0.			3.05				20.24		33.06	17.20	15%			2 92.449		95.843		6 92.333	
STREET 1	44	45			0.31 2	7 07	0.24	2.00	0.20	0.0	0 4.50	0.00		0.00 0.	.31 0.3	24 0.40	0.42	200	202.20	0.250/	20.24	0.64	27.50	40.00	20/	05.400	00.75	9 92.556	0.000	05.052	00.60	00.405	2.00
STREET 1	14 15	15 5	2		0.31 2				0.32 0.41	0.0		0.00		0.00 0.			0.43						37.50 26.25	19.82 19.70	2% 3%				3.025	95.653 95.843		8 92.425 6 92.333	
												İ																					
STREET 2 STREET 2	5 4	4	<u> </u>	10	0.04 0	Ŭ.,			6.26 6.76	0.0		0.00			.04 7.0 .51 7.6		8.60 9.27		203.20	0.35%	20.24	0.64 0.64	22.92 87.57	11.64 10.97	42% 46%	95.843 95.725	92.53		3.307 3.269	95.725 95.770		6 92.253 0 91.946	
STREET 2	3	2		10	0.02 0				6.76	0.0		0.00			.02 7.6		9.28		203.20		20.24		13.79	10.97	46%	95.770				95.669		1 91.898	
STREET 2	2	1		7	0.28 19				6.95	0.0		0.00			.28 7.9		9.56		203.20				52.54	10.68	47%	95.669				95.774		7 91.714	
STREET 2	1	EX16			0	644	7.90	3.33	6.95	0.0	0 1.50	0.00		0.00 0.	.00 7.9	90 2.61	9.56	200	203.20	0.35%	20.24	0.64	15.03	10.68	47%	95.774	91.91	7 91.714	3.857	95.858	0.600 91.86	91.662	3.99
Winterset Road	EX16	EX14		20	0.71 54	4 132	8 18.68	3.17	13.66			† <u> </u> -		2.45 0.	.71 21.	.13 6.97	20.63	300	304.80	0.26%	51.48	0.73	119.04	30.85	40%	95.890	91.26	5 90.960	4.625	95.440	90.95	5 90.650	4.63
Winterset Road	EX14	EX13		10	0.37 2				13.92			Ţ <u> </u>		2.45 0.			21.01		304.80		45.28		50.64	24.27	46%	95.440			4.495	95.320	90.84		4.63
Winterset Road	EX13	EX2		11	0.47 30	138	5 19.52	3.16	14.20			<u> </u>		2.45 0.	.47 21.	.97 7.25	21.45	300	304.80	0.32%	57.46	0.81	43.46	36.01	37%	95.320	90.84	3 90.538	4.477	94.860	90.70	2 90.397	4.31
Speedvale	EX30A	EX2			0.20 0	549	6.49	3.36	5.98			Ţ -	0.20 (0.24 0.	.40 6.7	73 2.22	8.20	200	203.20	0.32%	19.26	0.61	44.81	11.14	42%	95.700	91,92	5 91.722	3.775	94.860	1.083 91.78	3 91,580	3.17
												İ															<u> </u>		<u> </u>				
Winterset Road	EX2	EX2A			0.24 0	193	4 26.25	3.08	19.29				0.18	2 87 0	42 29	.12 9.61	28 90	300	304.80	0.60%	77.88	1.10	42.12	46.62	40%	04 860	90.70	2 90 397	4.158	94.860	90.29	90.146	4.56

Design Parameters		
Single Family Population	3.4	Cap/Unit
Semi-Detached/Townhouse Population	2.7	Cap/Unit
Residential Flows	280	L/Cap/Day
Infiltration Flows	0.33	L/s/ha
Manning Coefficient	0.013	

Legend

89.232

Existing/Proposed Infrastructure Existing (As-Built Information)





ARCADIA STAGES 3 & 4 CITY OF OTTAWA MINTO COMMUNITIES INC. JLR NO. 26299-03

Single Family 3.4 pers/unit Semi-Detached/Townhouse (row) 2.7 pers/unit *Future Stage 5 Unit Density 44.0 Manning's Coeff. N = 0.013

q =	280	L/cap/day
l =	0.330	L/s/ha
Inst. =	28000	L/ha/day

Denotes Existing Sanitary Sewers from Arcadia Stage 2 Development as per JLR's design sheet dated July 2015 Sanitary Drainage Areas/population for future Arcadia Stages 4 and 5

			Sanitary [Drainage A	Areas/popul	ation for Are	cadia Stage	3												
						RES	IDENTIAL					CC	MMERCIAL		PAF	RK/ROAD		INFILTRA	TION	PEAK DESIGN
	M.	H. #	NUMB					LATIVE	PEAKING	POPUL.		CUMM.	PEAKING	INST.		CUMM.		CUMM.	PEAK EXTR.	FLOW
STREET			UN		AREA	POPUL.	POPUL.	AREA	FACTOR	FLOW	AREA	AREA	FACTOR	FLOW	AREA	AREA	AREA	AREA	FLOW	L/s
	FROM	ТО	SING.	MULT.	ha	peop.	peop.	ha		l/s	ha	ha		l/s	ha	ha	ha	ha	I/s	
Eramosa Crescent (Stage 3B)	90	91	14.0		0.65	48	48	0.65	3.65	0.57		0.0	1.5	0.0		0.00	0.65	0.65	0.21	0.78
Eramosa Crescent (Stage 3B)	91	92	2.0		0.03	7	55	0.83	3.64	0.65		0.0	1.5	0.0		0.00	0.03	0.83	0.27	0.92
Eramosa Crescent (Stage 3B)	92	93	4.0		0.28	14	69	1.11	3.63	0.81		0.0	1.5	0.0		0.00	0.28	1.11	0.37	1.18
Eramosa Crescent (Stage 3B)	93	94	2.0		0.17	7	76	1.28	3.62	0.89		0.0	1.5	0.0		0.00	0.17	1.28	0.42	1.31
Eramosa Crescent (Stage 3B)	94	81	14.0		0.65	48	124	1.93	3.57	1.44		0.0	1.5	0.0		0.00	0.65	1.93	0.64	2.07
Paine Avenue (Stage 3B)	EX.9	81	6.0		0.28	20	20	0.28	3.70	0.24		0.0	1.5	0.0		0.00	0.28	0.28	0.09	0.33
Tame Avenue (Glage 3D)	EX.5	01	0.0		0.20	20	20	0.20	3.70	0.24		0.0	1.5	0.0		0.00	0.20	0.20	0.00	0.55
Paine Avenue (Stage 3B)	81	80	12.0		0.52	41	185	2.73	3.53	2.12		0.0	1.5	0.0		0.00	0.52	2.73	0.90	3.02
Coco (Stage 3B)	27 E	23	5.0		0.30	17	17	0.30	3.71	0.20		0.0	1.5	0.0		0.00	0.30	0.30	0.10	0.30
Winterset Road (Stage 3B)	24	23	2.0		0.15	7	7	0.15	3.74	0.08		0.0	1.5	0.0		0.00	0.15	0.15	0.05	0.13
Winterset Road (Stage 3B)	23	22	17.0		0.83	58	82	1.28	3.61	0.96		0.0	1.5	0.0		0.00	0.83	1.28	0.42	1.38
Coco (Stage 3B)	27	28	2.0		0.18	7	7	0.18	3.74	0.08		0.0	1.5	0.0		0.00	0.18	0.18	0.06	0.14
Coco (Stage 3B)	28	80	15.0		0.69	51	58	0.87	3.64	0.68		0.0	1.5	0.0		0.00	0.69	0.87	0.29	0.97
					0.00			0.00	0.40	224							0.00			
Paine Avenue (Stage 3B)	80	22	5.0		0.33	17	260	3.93	3.48	2.94		0.0	1.5	0.0		0.00	0.33	3.93	1.30	4.23
			4.0		0.40		0.45	5.07	0.44	0.05		0.0	4.5	0.0		0.00	0.40	5.07	4.77	5.00
Winterset Road (Stage 3B)	22	22B	1.0		0.16	3	345	5.37	3.44	3.85 4.03		0.0	1.5	0.0		0.00	0.16 0.32	5.37	1.77	5.62 5.91
Winterset Road (Stage 3B)	22B	21	5.0		0.32	17	362	5.69	3.43	4.03		0.0	1.5	0.0		0.00	0.32	5.69	1.88	5.91
Dorobolico	72	71	2.0		0.17	7	7	0.17	3.74	0.08		0.0	1.5	0.0		0.00	0.17	0.17	0.06	0.14
Parabolica Parabolica	71	21	14.0		0.17	48	55	0.17	3.64	0.65		0.0	1.5	0.0		0.00	0.17	0.17	0.28	0.14
Parabolica	71	21	14.0		0.07	40	55	0.04	3.04	0.03		0.0	1.5	0.0		0.00	0.07	0.04	0.26	0.93
Riverchase Drive (Stage 4)	21	20	11		0.56	37	454	7.09	3.40	5.00		0.0	1.5	0.0		0.00	0.56	7.09	2.34	7.34
Parabolica	73 S	61	5		0.30	17	17	0.30	3.71	0.20		0.0	1.5	0.0		0.00	0.30	0.30	0.10	0.30
Parabolica	72 S	73	7		0.33	24	24	0.33	3.70	0.29		0.0	1.5	0.0		0.00	0.33	0.33	0.11	0.40
T di decinod	720	70	,		0.00			0.00	0.70	0.20		0.0	1.0	0.0		0.00	0.00	0.00	0.11	0.40
Basalt	73	20	6	9	0.60	45	69	0.93	3.63	0.81		0.0	1.5	0.0		0.00	0.60	0.93	0.31	1.12
					0.45		=0.4	0.40		= 00							0.45			0.50
Winterset Road (Stage 4) Winterset Road (Stage 4)	20 19	19 18		3	0.17 0.15	11 8	534 542	8.19 8.34	3.37 3.36	5.83 5.91		0.0	1.5 1.5	0.0		0.00	0.17 0.15	8.19 8.34	2.70 2.75	8.53 8.66
Willerset Road (Glage 4)	19	10		3	0.13	0	342	0.54	3.30	3.31		0.0	1.5	0.0		0.00	0.13	0.54	2.13	0.00
Calvington Avenue (Stage 3B)	62	61	6		0.31	20	20	0.31	3.70	0.24		0.0	1.5	0.0		0.00	0.31	0.31	0.10	0.34
Calvington Avenue (Stage 3B)	61	60	5 2	7	0.44	36	73 85	1.05 1.27	3.62 3.61	0.86		0.0	1.5 1.5	0.0		0.00	0.44	1.05 1.27	0.35	1.20 1.41
Calvington Avenue (Stage 3B)	60	18		2	0.22	12	65	1.27	3.01	0.99		0.0	1.5	0.0		0.00	0.22	1.27	0.42	1.41
Park (Stage 3B)	Stub	18				0	0	0.00				0.0	1.5	0.0	2.46	2.46	2.46	2.46	0.81	0.81
Winterset Road (Stage 3B)	18	16	5		0.30	17	644	9.91	3.33	6.95		0.0	1.5	0.0		2.46	0.30	12.37	4.08	11.04
Stage 5*	Stub	16		180	4.10	486	486	4.10	3.38	5.33		0.0	1.5	0.0		0.00	4.10	4.10	1.35	6.68
Stage 5	Stub	10		100	4.10	400	400	4.10	3.30	0.33		0.0	1.5	0.0		0.00	4.10	4.10	1.33	0.00



Single Family 3.4

Semi-Detached/Townhouse (row) 2.7

*Future Stage 5 Unit Density 44.0 Manning's Coeff. N = 0.013 pers/unit

pers/unit

ARCADIA STAGES 3 & 4 CITY OF OTTAWA MINTO COMMUNITIES INC. JLR NO. 26299-03

SANITARY SEWER DESIGN SHEET

Checked by: TC

Designed by: NG

Date: April 2019

Denotes Existing Sanitary Sewers from Arcadia Stage 2 Development as per JLR's design sheet dated July 2015 Sanitary Drainage Areas/population for future Arcadia Stages 4 and 5

Sanitary Drainage Areas/population for Arcadia Stage 3

			Sanitary Drainage Areas/population for Arcadia Stage 3 Actual SEWER DATA RESIDUAL UPSTREAM DOWNSTREAM														1									
	I		Actual		S	SEWER DA	ATA		RESIDUAL	П	UPST	REAM				DOV	WNSTREAM					SELF-CLEANSING	VELOCITIES	3		$\overline{}$
STREET	М.	H. #	DIA.	DIA.	SLOPE			LENGTH		Center	Obvert Obvert	Invert	Cover	Center	Obvert	Obvert	Invert	Cover	Angle	Depth	Area	Wetted	Flow	Flow (L/s)	Velocity	Q/Qmax
	FROM	TO	mm	mm	%	l/s	m/s	m	l/s	Line	Drop			Line	Drop					(m)	(m²)	Perimeter			(L/s)	
Eramosa Crescent (Stage 3B)	90	91	203	200	0.35	20.2	0.62	79.430	19.46	96.710	94.573	94.370	2.137	96.780		94.295	94.092	2.485	86.9263	0.027	0.003	0.152	0.001	0.783	0.3	0.302
Eramosa Crescent (Stage 3B)	91	92	203	200	0.35	20.2	0.62	7.951	19.32	96.780	94.295	94.092	2.485	96.750		94.268	94.064	2.482	90.6673	0.030	0.003			0.924	0.3	0.317
Eramosa Crescent (Stage 3B) Eramosa Crescent (Stage 3B)	92 93	93 94	203 203	200	0.35 0.35	20.2	0.62	61.890 10.750	19.07 18.93	96.750 96.550	94.268 94.051	94.064 93.848	2.482	96.550 96.550		94.051	93.848 93.810	2.499 2.537	96.5054 99.2827	0.033	0.003 0.004		0.001	1.178 1.313	0.3	0.341
Eramosa Crescent (Stage 3B)	94	81	203	200	0.35	20.2	0.62	116.510	18.17	96.550	94.013	93.810	2.499	96.060		93.606	93.402	2.454	112.088	0.033	0.004			2.073	0.4	0.332
												33.5.5										0.100	*****		• • • • • • • • • • • • • • • • • • • •	
Doing Avenue (Stone 2D)	EX.9	81	202	200	0.77	20.0	0.00	48.060	29.64	96.060	93.974	93.771	2.006	06 607		93.606	93.402	3.021	63.8425	0.015	0.001	0.111	0.000	0.333	0.3	0.307
Paine Avenue (Stage 3B)	EA.9	01	203	200	0.77	30.0	0.92	46.000	29.04	96.060	93.974	93.771	2.086	96.627		93.606	93.402	3.021	03.0423	0.013	0.001	0.111	0.000	0.333	0.3	0.307
D.:	0.4	00	202	200	0.05	20.0	0.00	70.000	47.00	00.000	00.000	02.400	0.454	05.050		00.050	00.450	0.407	404.000	0.050	0.007	0.047	0.000	2.040	0.4	0.440
Paine Avenue (Stage 3B)	81	80	203	200	0.35	20.2	0.62	72.060	17.23	96.060	93.606	93.402	2.454	95.850		93.353	93.150	2.497	124.328	0.053	0.007	0.217	0.003	3.016	0.4	0.449
Coco (Stage 3B)	27 E	23	203	200	0.65	27.6	0.85	70.240	27.28	96.000	93.938	93.734	2.062	95.550		93.481	93.278	2.069	63.7538	0.015	0.001	0.111	0.000	0.304	0.3	0.282
Winterset Road (Stage 3B)	24	23	254	250	0.25	31.0	0.61	23.320	30.88	95.340	93.539	93.285	1.801	95.550		93.481	93.227	2.069	50.9399	0.012	0.001	0.111	0.000	0.134	0.2	0.153
Winterset Road (Stage 3B)	23	22	254	250	0.25	31.0	0.61	116.700	29.64	95.550	93.481	93.227	2.069	95.250	0.102	93.189	92.935	2.061	90.1089	0.037	0.004	0.197	0.001	1.382	0.3	0.309
Coco (Stage 3B)	27	28	203	200	0.65	27.6	0.85	7.560	27.44	95.960	93.894	93.691	2.066	95.980	0.030	93.845	93.642	2.135	53.2136	0.011	0.001	0.093	0.000	0.144	0.2	0.224
Coco (Stage 3B)	28	80	203	200	0.35	20.2	0.62	114.710	19.27	95.980	93.815	93.612	2.165	95.850	0.060	93.413	93.210	2.437	91.8319	0.030	0.003	0.160	0.001	0.971	0.3	0.322
Paine Avenue (Stage 3B)	80	22	203	200	0.35	20.2	0.62	76.040	16.01	95.850	93.353	93.150	2.497	95.250		93.087	92.884	2.163	137.121	0.063	0.009	0.239	0.004	4.232	0.5	0.494
			0.54				0.00	E 100	24.00				0.010				20.011	0.440								
Winterset Road (Stage 3B)	22	22B	254	250	0.35	36.7	0.72	5.420	31.08	95.300	93.087	92.833	2.213	95.480	0.870	93.068	92.814	2.412	125.29	0.068	0.011	0.273	0.006	5.620	0.5	0.525
Winterset Road (Stage 3B)	22B	21	254	250	0.35	36.7	0.72	70.600	30.80	95.250	92.198	91.944	3.052	95.350		91.951	91.697	3.399	127.072	0.069	0.011	0.277	0.006	5.906	0.5	0.532
Parabolica	72	71	203	200	0.65	27.6	0.85	11.700	27.45	95.470	92.579	92.376	2.891	95.480	0.030	92.503	92.300	2.977	52.9392	0.010	0.001	0.092	0.000	0.140	0.2	0.223
Parabolica	71	21	203	200	0.35	20.2	0.62	110.810	19.32	95.480	92.473	92.270	3.007	95.350	0.134	92.085	91.882	3.265	90.7404	0.030	0.003			0.927	0.3	0.318
Riverchase Drive (Stage 4)	21	20	254	250	0.35	36.7	0.72	77.580	29.37	95.350	91.951	91.697	3.399	95.450		91.680	91.426	3.770	135.315	0.077	0.013	0.295	0.007	7.337	0.6	0.566
Parabolica	73 S	61	203	200	1.00	34.2	1.06	74.370	33.91	96.200	92.738	92.535	3.462	96.800		91.994	91.791	4.806	60.4855	0.014	0.001	0.106	0.000	0.304	0.3	0.327
																			07.0000	2 2 4 7	0.004	0.110	0.000	0.000		0.000
Parabolica	72 S	73	203	200	0.65	27.6	0.85	68.200	27.19	95.500	92.582	92.379	2.918	96.200		92.138	91.935	4.062	67.9896	0.017	0.001	0.119	0.000	0.396	0.3	0.306
Basalt	73	20	203	200	0.35	20.2	0.62	116.810	19.12	96.200	92.138	91.935	4.062	95.450	0.050	91.730	91.526	3.720	95.2179	0.033	0.003	0.166	0.001	1.118	0.3	0.336
Winterest Deed (Store 4)	20	19	254	250	0.35	26.7	0.72	42.140	28.17	95.450	91.680	91.426	3.770	95.370		91.532	91.278	3.838	141.532	0.084	0.014	0.309	0.009	8.528	0.6	0.591
Winterset Road (Stage 4) Winterset Road (Stage 4)	19	18	254	250	0.35	36.7 36.7	0.72	32.390	28.17	95.450	91.532	91.426	3.770	95.370		91.532	91.278	4.131	141.532	0.085	0.014		0.009	8.661	0.6	0.591
vviiloroot read (olago 4)	10	10	201	200	0.00	00.7	0.72	02.000	20.04	00.070	01.002	01.270	0.000	00.000		91.403	01.100	4.101	112.107	0.000	0.010	0.010	0.000	0.001	0.0	0.000
Calvington Avenue (Stage 3B)	62	61	203	200	0.65	27.6	0.85	58.210	27.24	96.750	92.372	92.169	4.378	96.800		91.994	91.791	4.806	65.6322	0.016	0.001	0.115	0.000	0.343	0.3	0.292
Calvington Avenue (Stage 3B)	61	60	203	200	0.35	20.2	0.62	61.700	19.04	96.800	91.994	91.791	4.806	95.680		91.778	91.575	3.902	97.0541	0.034	0.004	0.169	0.001	1.204	0.3	0.343
Calvington Avenue (Stage 3B)	60	18	203	200	0.35	20.2	0.62	64.400	18.83	95.680	91.778	91.575	3.902	95.550	0.134	91.553	91.350	3.997	101.213	0.037	0.004		0.001	1.414	0.4	0.360
Park (Stage 3B)	Stub	18	203	200	0.65	27.6	0.85	15.340	26.77	94.018	91.518	91.315	2.500	95.550		91.419	91.216	4.131	81.1472	0.024	0.002	0.142	0.001	0.812	0.4	0.379
r air (Staye SD)	Stub	10	203	200	0.05	27.0	0.00	13.340	20.11	34.010	91.316	31.313	2.500	93.550		31.413	31.210	4.131	01.1472		0.002	0.142	0.001		0.4	0.319
Winterset Road (Stage 3B)	18	16	305	300	0.25	50.4	0.69	62.820	39.41	95.550	91.419	91.114	4.131	95.690		91.262	90.957	4.428	138.987	0.097	0.020	0.364	0.011	11.035	0.6	0.554
Stage 5*	Stub	16	203	200	0.35	20.2	0.62	15.350	13.56	94.288	91.788	91.585	2.500	95.690	0.473	91.735	91.532	3.955	158.051	0.081	0.012	0.276	0.007	6.683	0.6	0.561
											0 30	2000	000					2.000		3.001	J.V.Z	J10	3.007	2.003		



ARCADIA STAGES 3 & 4 CITY OF OTTAWA MINTO COMMUNITIES INC. JLR NO. 26299-03

Single Family 3.4 pers/unit

Semi-Detached/Townhouse (row) 2.7 pers/unit

*Future Stage 5 Unit Density 44.0 units/ha

Manning's Coeff. N = 0.013

q =	280	L/cap/day
I =	0.330	L/s/ha
Inst. =	28000	L/ha/day

Denotes Existing Sanitary Sewers from Arcadia Stage 2 Development as per JLR's design sheet dated July 2015
Sanitary Drainage Areas/population for future Arcadia Stages 4 and 5

Sanitary Drainage Areas/population for Arcadia Stage 3

			Carillary L	rainage r	псаз/рора	ation for Ar														
	-				_	RES	IDENTIAL						MMERCIAL	ı	PAI	RK/ROAD		INFILTRA		PEAK DESIGN
	М.	· . #	NUMB					ILATIVE	PEAKING	POPUL.		CUMM.	PEAKING	INST.		CUMM.		CUMM.	PEAK EXTR.	FLOW
STREET			UN		AREA	POPUL.	POPUL.	AREA	FACTOR	FLOW	AREA	AREA	FACTOR	FLOW	AREA	AREA	AREA	AREA	FLOW	L/s
	FROM	TO	SING.	MULT.	ha	peop.	peop.	ha		l/s	ha	ha		l/s	ha	ha	ha	ha	l/s	
Winterset Road	16	14		14	0.60	38	1168	14.61	3.20	12.13		0.0	1.5	0.0		2.46	0.60	17.07	5.63	17.76
Winterset Road	14	13		8	0.29	22	1189	14.90	3.20	12.33		0.0	1.5	0.0		2.46	0.29	17.36	5.73	18.06
Winterset Road	13	2		4	0.18	11	1200	15.08	3.20	12.44		0.0	1.5	0.0		2.46	0.18	17.54	5.79	18.23
Neg	45.5	40		47	0.40	40	40	0.40	0.00	0.54		0.0	4.5	0.0		0.00	0.40	0.40	0.40	0.70
Natare	45 E	46		17	0.48	46	46	0.48	3.66	0.54		0.0	1.5	0.0	1	0.00	0.48	0.48	0.16	0.70
Natare	47	46		3	0.13	8	8	0.13	3.74	0.10		0.0	1.5	0.0		0.00	0.13	0.13	0.04	0.14
Natale	47	40		3	0.13	0	0	0.13	3.74	0.10		0.0	1.5	0.0		0.00	0.13	0.13	0.04	0.14
Speedvale	46	39				0	54	0.61	3.65	0.64		0.0	1.5	0.0	0.03	0.03	0.03	0.64	0.21	0.85
Speedvale	39	38		16	0.48	43	97	1.09	3.60	1.13		0.0	1.5	0.0	0.00	0.03	0.48	1.12	0.37	1.50
Speedvale	38	37		12	0.31	32	130	1.40	3.57	1.50		0.0	1.5	0.0		0.03	0.31	1.43	0.47	1.97
Speedvale	37	36		9	0.24	24	154	1.64	3.55	1.77		0.0	1.5	0.0		0.03	0.24	1.67	0.55	2.32
Speedvale	36	30		7	0.24	19	173	1.88	3.54	1.98		0.0	1.5	0.0		0.03	0.24	1.91	0.63	2.61
·																				
Natare	45	44		4	0.19	11	11	0.19	3.73	0.13		0.0	1.5	0.0		0.00	0.19	0.19	0.06	0.19
Natare	44	43		6	0.18	16	27	0.37	3.69	0.32		0.0	1.5	0.0		0.00	0.18	0.37	0.12	0.44
Natare	43	42		10	0.31	27	54	0.68	3.65	0.64		0.0	1.5	0.0		0.00	0.31	0.68	0.22	0.86
Sweet Pea	54	53	17		0.80	58	58	0.80	3.64	0.68		0.0	1.5	0.0		0.00	0.80	0.80	0.26	0.95
Sweet Pea	53	52	2		0.15	7	65	0.95	3.63	0.77		0.0	1.5	0.0		0.00	0.15	0.95	0.31	1.08
Sweet Pea	52	51	10		0.44	34	99	1.39	3.60	1.15		0.0	1.5	0.0		0.00	0.44	1.39	0.46	1.61
Sweet Pea	51	50	1		0.10	3	102	1.49	3.59	1.19		0.0	1.5	0.0	0.04	0.00	0.10	1.49	0.49	1.68
Sweet Pea	50	42			0.01	0	102	1.50	3.59	1.19		0.0	1.5	0.0	0.01	0.01	0.02	1.51	0.50	1.69
Natare	42	40		16	0.48	43	199	2.66	3.52	2.27		0.0	1.5	0.0		0.01	0.48	2.67	0.88	3.15
Natare	40	31		5	0.48	14	213	2.84	3.51	2.42		0.0	1.5	0.0		0.01	0.48	2.85	0.94	3.36
ivatare	40	31		J	0.10	14	213	2.04	3.31	2.42		0.0	1.5	0.0		0.01	0.10	2.00	0.54	3.30
Speedvale	34	33		6	0.27	16	16	0.27	3.71	0.19		0.0	1.5	0.0		0.00	0.27	0.27	0.09	0.28
Speedvale	33	32		29	0.68	78	95	0.95	3.60	1.10		0.0	1.5	0.0		0.00	0.68	0.95	0.31	1.42
Speedvale	32	31		12	0.30	32	127	1.25	3.57	1.47		0.0	1.5	0.0		0.00	0.30	1.25	0.41	1.88
,																				
Speedvale	31	30		14	0.32	38	377	4.41	3.43	4.19		0.0	1.5	0.0		0.01	0.32	4.42	1.46	5.65
	30	30A				0	550	6.29	3.36	5.99		0.0	1.5	0.0		0.04		6.33	2.09	8.08
Speedvale	30A	2	<u> </u>		0.20	0	550	6.49	3.36	5.99		0.0	1.5	0.0	0.20	0.24	0.40	6.73	2.22	8.22
<u> </u>	2: 1			100		100	100		0.00							2.22			4.0-	0.00
Stage 5*	Stub	2		180	4.10	486	486	4.10	3.38	5.33		0.0	1.5	0.0		0.00	4.10	4.10	1.35	6.68
Winterset Road	2	2A	1		0.18	0	2236	25.85	3.04	22.02		0.0	1.5	0.0	0.18	2.88	0.36	28.73	9.48	31.50
Winterset Road Winterset Road	2A	ex. 307A	1	1	υ.18	0	2236	25.85	3.04	22.02		0.0	1.5	0.0	υ.18	2.88	0.36	28.73	9.48	31.50 31.50
Willerset Nodu	2A	6A. 307 A	1	1		U	2230	20.00	3.04	22.02	1	0.0	1.5	0.0		2.00	0.00	20.13	9.40	31.30
Campeau Drive	ex.306A	ex. 307A			23.00	1700	1700	23.00	3.11	17.14	95.58	95.6	1.5	46.5	5.10	5.10	123.68	123.68	40.81	104.42
Campeau Drive	EX.SUDA	EX. 307A			25.00	1700	1700	25.00	3.11	17.14	33.36	93.0	1.0	40.0	5.10	5.10	123.00	123.00	40.01	104.42
Danier Land	Courte Ct.	4.0	1				0	0.00			24.28	24.3	1.5	11.0	0.37	0.27	24.65	24.65	0.42	19.94
Donum Lane	South Stub	1A	1	1				0.00			24.28		1.5	11.8		0.37		24.65	8.13	
Donum Lane	1A	ex. 307A	1	1			0	0.00			1	24.3	1.5	11.8	0.37	0.37	0.37	25.02	8.26	20.06
	007	222																		
Campeau Drive	ex. 307A	ex. 308A					3936	48.85	2.87	36.63		119.9	1.5	58.3		8.35	0.00	177.43	58.55	153.45

SANITARY SEWER DESIGN SHEET



ARCADIA STAGES 3 & 4 CITY OF OTTAWA MINTO COMMUNITIES INC. JLR NO. 26299-03

Designed by: NG

Checked by: TC

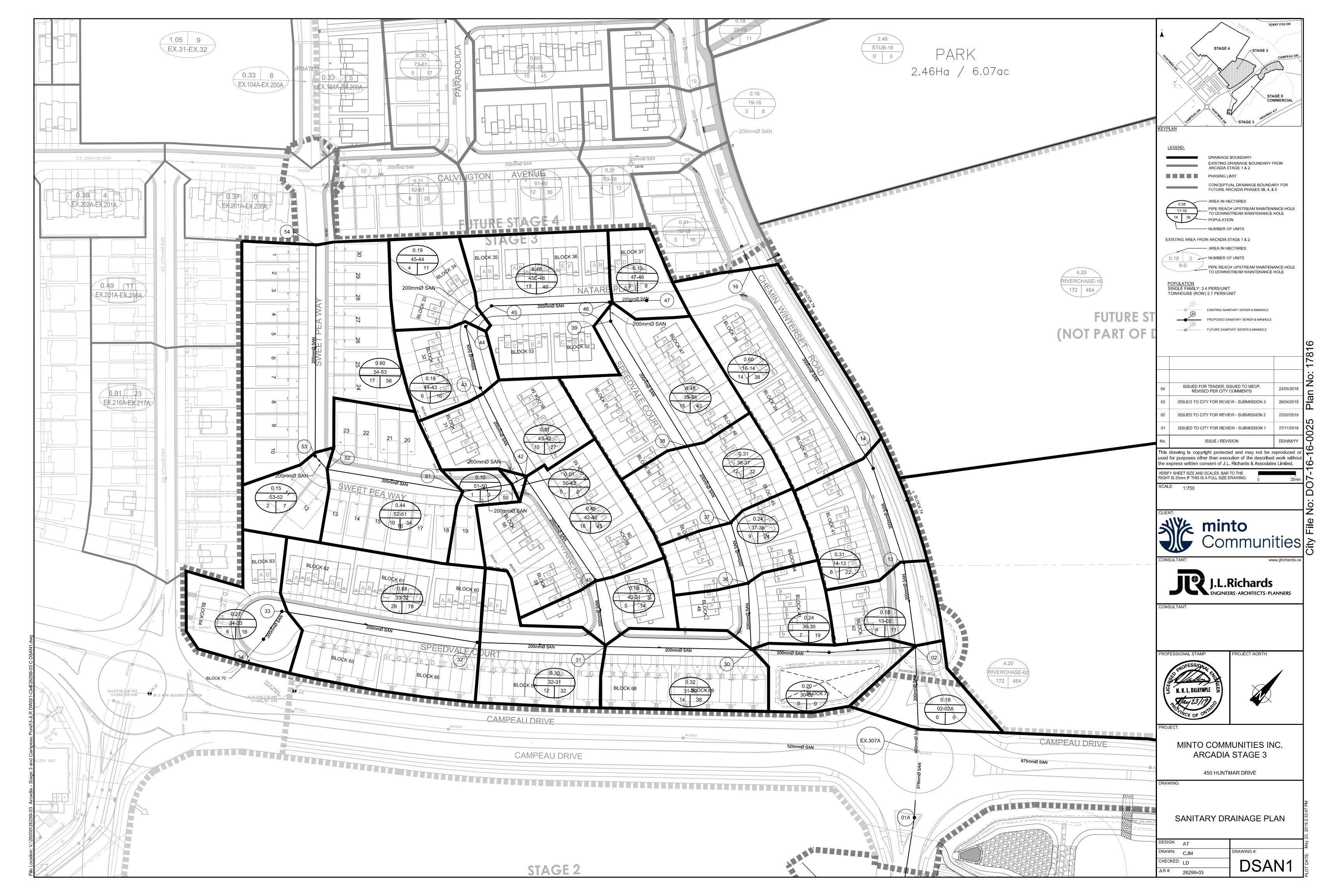
Date: April 2019

Single Family 3.4 pers/unit Semi-Detached/Townhouse (row) 2.7 pers/unit *Future Stage 5 Unit Density 44.0 Manning's Coeff. N = 0.013

> Denotes Existing Sanitary Sewers from Arcadia Stage 2 Development as per JLR's design sheet dated July 2015 Sanitary Drainage Areas/population for future Arcadia Stages 4 and 5

Sanitary Drainage Areas/population for Arcadia Stage 3

go	Samilary Dramage Areas/pop	-,	0. go 0										7						
	" Actual	SEWER DATA	Α	RESIDUAL	_		UPST	REAM			DOV	WNSTREAM				SELF-CLEANSING	VELOCITIES		
L. L	.H. #		VEL. LENG		Center	Obvert	Obvert	Invert	Cover	Center Obvert	Obvert	Invert Cover	Angle	Depth	Area	Wetted	Flow Flow (L/s)	Velocity	Q/Qmax
/s	TO mm mm %	% I/s	m/s m	l/s	Line	Drop				Line Drop				(m)	(m²)	Perimeter		(L/s)	
_			0.69 119.60		95.690		91.262	90.957	4.428	95.440	90.963	90.658 4.477	161.429	0.126	0.028	0.423	0.018 17.752	0.6	
			0.69 50.60		95.440		90.963	90.658	4.477	95.320	90.836	90.531 4.484	162.348	0.127	0.028	0.425	0.018 18.056	0.6	0.00
69	2 305 300 0.25	0.25 50.2	0.69 43.20	0 32.01	95.320		90.836	90.531	4.484	94.860	90.729	90.424 4.131	162.839	0.128	0.029	0.426	0.018 18.146	0.6	0.633
12	46 202 200 0.06	0.06	1.03 60.20	0 32.86	96.430		93.626	02.422	2.804	96.100 0.237	93.047	92.843 3.053	75.2809	0.021	0.002	0.131	0.001 0.730	0.4	0.421
)3	46 203 200 0.96	0.96 33.6	1.03 60.20	0 32.86	96.430		93.626	93.423	2.804	96.100 0.237	93.047	92.843 3.053	75.2609	0.021	0.002	0.131	0.001 0.730	0.4	0.421
35	46 203 200 0.65	0.65 27.5	0.85 18.90	0 27.34	95.790		93.009	92.805	2.781	96.100 0.077	92.887	92.683 3.213	53.0113	0.011	0.001	0.093	0.000 0.141	0.2	0.222
,,,	10 200 200 0.00	0.00	0.00	27.04	50.750		00.000	02.000	2.701	00.100 0.011	02.001	0.210	00.0110	0.011	0.001	0.000	0.000 0.111	0.2	U.ZZZ
32	39 203 200 0.35	0.35 20.2	0.62 9.80	19.34	96.100		92.810	92.606	3.290	95.940 0.030	92.776	92.572 3.164	88.7314	0.029	0.003	0.155	0.001 0.847	0.3	0.308
			0.62 74.80		95.940		92.746	92.542	3.194	95.600	92.484	92.281 3.116	102.859	0.038	0.004			0.4	
62	37 203 200 0.35	0.35 20.2	0.62 45.10	0 18.21	95.600		92.484	92.281	3.116	95.660	92.328	92.124 3.332	110.571	0.043	0.005	0.193	0.002 1.965	0.4	0.396
62	36 203 200 0.35	0.35 20.2	0.62 32.00	0 17.92	95.660		92.328	92.124	3.332	95.700	92.216	92.012 3.484	115.603	0.047	0.006	0.202	0.002 2.322	0.4	0.416
62	30 203 200 0.35	0.35 20.2	0.62 33.90	0 17.60	95.700		92.216	92.012	3.484	95.700	92.097	91.894 3.603	119.404	0.050	0.006	0.208	0.003 2.607	0.4	0.430
			0.85 16.90		96.430		93.787	93.583	2.643	96.460 0.030	93.677	93.473 2.783	57.1272	0.012	0.001	0.100	0.000 0.193	0.2	
			0.60 35.30		96.460		93.647	93.443	2.813	96.160	93.532	93.328 2.628	75.4648	0.021	0.002	0.132		0.2	
52	42 203 200 0.35	0.35 20.2	0.62 47.90	0 19.38	96.160		93.532	93.328	2.628	96.400 0.300	93.364	93.161 3.036	89.0885	0.029	0.003	0.155	0.001 0.862	0.3	0.311
```	53 203 200 0.35	0.35 20.2	0.62 105.98	32 19.29	97.070		93.956	00.750	0.444	96.770 0.030	93.585	93.382 3.185	91.1911	0.030	0.003	0.159	0.001 0.945	0.2	0.319
			0.62 105.98		96.770		93.956	93.753 93.352	3.114 3.215	96.770 0.030	93.585	93.382 3.185	94.1148	0.030	0.003	0.159	0.001 0.945	0.3	
			0.62 70.07		96.770		93.488	93.285	3.262	96.130	93.243	93.040 2.887	104.734	0.032	0.003		0.001 1.003	0.3	0.00.
			0.62 25.28		96.130		93.243	93.040	2.887	96.320	93.154	92.951 3.166	105.874	0.033	0.004		0.002 1.676	0.4	0.0
			0.62 8.680		96.320		93.154	92.951	3.166	96.400 0.060	93.124	92.921 3.276	105.985	0.040	0.004			0.4	
	200 200 0.00	0.00	0.02	10.00	00.020		00.101	02.001	0.100	00.100	002.	52.52.		0.0.0					
32	40 203 200 0.35	0.35 20.2	0.62 63.60	0 17.03	96.400		93.064	92.861	3.336	95.730 0.030	92.843	92.639 2.887	125.856	0.054	0.007	0.220	0.003 3.140	0.5	0.453
32	31 203 200 0.35	0.35 20.2	0.62 34.30	0 16.82	95.730		92.813	92.609	2.917	96.000 0.060	92.693	92.490 3.307	128.167	0.056	0.007	0.224	0.003 3.347	0.5	0.461
			0.85 17.10	-	97.430		93.410	93.206	4.020	97.220 0.050	93.299	93.095 3.921	62.926	0.015	0.001	0.110	0.000 0.288	0.3	
			0.63 100.90		97.220		93.249	93.045	3.971	96.680 0.031	92.888	92.685 3.792	101.258	0.037	0.004		0.001 1.430	0.4	
32	31 203 200 0.34	0.34 20.0	0.62 65.50	0 18.13	96.680		92.857	92.654	3.823	96.000	92.633	92.430 3.367	109.186	0.042	0.005	0.191	0.002 1.859	0.4	0.387
```	20 202 202 225	0.05	0.00 74.00	0 4450	00,000		00.000	00.400	0.007	05 700 0 070	00.070	00.470	140 722	0.074	0.011	0.064	0.006 5.647	0.5	0.535
02	30 203 200 0.35	0.35 20.2	0.62 74.30	0 14.59	96.000		92.633	92.430	3.367	95.700 0.276	92.373	92.170 3.327	149.732	0.074	0.011	0.261	0.006 5.647	0.5	0.535
2	30A 203 200 0.35	0.35 20.2	0.62 39.89	0 12.16	95.700		92.097	91.894	3.603	95.700	91.958	91.754 3.742	168.505	0.090	0.014	0.294	0.008 8.080	0.6	0.589
			0.62 39.89		95.700		91.958	91.754	3.742	94.860 1.083	91.812	91.609 3.048	168.984	0.090	0.014			0.6	
,,	2 203 200 0.33	0.55	0.01 44.10	0 11.44	93.700		31.330	31.734	3.142	34.000 1.003	31.012	91.009 3.040	100.504	0.000	0.014	0.233	0.000 7.510	0.0	0.074
32	2 305 300 0.35	0.35 59.7	0.82 19.20	0 53.00	93.493		90.993	90.688	2.500	94.860 0.197	90.926	90.621 3.934	114.846	0.069	0.012	0.301	0.007 6.683	0.5	0.542
30	2A 305 300 0.34	0.34 58.7	0.80 42.10	0 27.15	94.860		90.729	90.424	4.131	94.860	90.587	90.282 4.273	186.472	0.158	0.038	0.488	0.031 30.821	0.8	0.814
35	ex. 307A 457 450 1.04	1.04 303.3	1.85 13.46	0 271.83	94.860		90.587	90.130	4.273	95.500 -0.229	90.447	89.990 5.053	112.381	0.100	0.026	0.441	0.031 31.363	1.2	1.195
98	ex. 307A 533 525 0.24	0.24 219.8	0.98 120.08	115.38	95.500		90.817	90.284	4.683	95.500	90.529	89.996 4.971	179.408	0.261	0.108	0.822	0.104 104.420	1.0	0.971
)2	1A 381 375 0.40	0.40 115.8	1.02 67.97	0 95.89	94.740		90.891	90.510	3.849	95.290	90.618	90.237 4.672	103.197	0.071	0.015	0.338	0.009 8.707	0.6	0.599
7 9	ex. 307A 381 375 0.24	0.24 89.6	0.79 8.80	69.55	95.290		90.618	90.237	4.672	95.500	90.537	90.156 4.963	103.197	0.071	0.015	0.338	0.007 6.736	0.5	0.463
19	ex. 308A 686 675 0.25	0.25 438.5	1.19 118.90	285.02	95.500		90.676	89.990	4.824	94.400	90.379	89.693 4.021	156.838	0.270	0.133	0.924	0.141 141.389	1.1	1.059
9	ex. 308A 686 675 0.25	0.25 438.5	1.19 118.90	60 285.02	95.500		90.676	89.990	4.824	94.400		90.379	90.379 89.693 4.021	90.379 89.693 4.021 156.838	90.379 89.693 4.021 156.838 0.270	90.379 89.693 4.021 156.838 0.270 0.133	90.379 89.693 4.021 156.838 0.270 0.133 0.924	90.379 89.693 4.021 156.838 0.270 0.133 0.924 0.141 141.389	90.379 89.693 4.021 156.838 0.270 0.133 0.924 0.141 141.389 1.1





MINTO COMMUNITIES INC. ARCADIA STAGE 4 450 HUNTMAR DRIVE SANITARY SEWER DESIGN SHEET JLR NO. 26299-004

Street Name	Maintenace	e Hole No.				Resid	dential				Park/F	Roads		Infiltration		Peak			Pipe	Data				Upstream	Geometry			Dov	nstream Geometry		
	From	То	Singles	Multiples	Area (ha)	Pop.	Cum. Pop.	Cum. Area (ha)	Peaking Factor	Residential Flow (L/s)	Area (ha)	Cum. Area (ha)	Area (ha)	Cum. Area (ha)	Peak Extr. Flow L/s	Design Flow L/s	Dia	Slope	Q Full (L/s)	V Full	Length	Residual Capacity	Centerline	Obvert	Invert	Cover	Centerline	Drop	Obvert	Invert	Cover
Eramosa Crescent Eramosa Crescent	90	91	14		0.65	48	48	0.65	3.65	0.57		0.00	0.65	0.65	0.21	0.78	200	0.55%	25.28	0.80	79.43	24.50	97.000	94.675 94.242	94.472	2.325	97.300		94.242	94.039 94.011 93.794 93.754 93.350	3.058
Eramosa Crescent Eramosa Crescent	92	93	4		0.10	14	69	1.11	3.63	0.81		0.00	0.28	1.11	0.37	1.18	200	0.35%	20.24	0.64	61.89	19.32 19.07	97.300	94.214	94.472 94.039 94.011	3.086	97.300 97.300 97.100 97.100		94.242 94.214 93.997 93.957	93.794	3.103
Eramosa Crescent Eramosa Crescent	93 94	94 81	2 14		0.18 0.65	7 48	76 124	1.29 1.94	3.62 3.57	0.89 1.44		0.00	0.18 0.65	1.29	0.37 0.43 0.64	1.32 2.08	200 200	0.35% 0.35%	20.24 20.24 20.24 20.24	0.64 0.64	11.42 115.53	18.93 18.17	97.000 97.300 97.300 97.100 97.100	94.214 93.997 93.957	93.794 93.754	3.086 3.103 3.143	97.100 96.150		93.957 93.553	93.754 93.350	3.058 3.086 3.103 3.143 2.597
	EX. 8	EX. 9				0		0.00	3.90	0.00			0.00	0.00	0.00	0.00	250			0.63	27.94				93.890						
Paine Avenue Paine Avenue	EX. 9	81	7		0.29	24	24	0.29	3.70	0.29		0.00 0.00	0.29	0.29	0.10	0.38	200	0.25% 0.35%	31.05 20.24	0.64	47.35	31.05 19.86	97.100 97.100	94.144 93.719	93.515	2.956 3.381	97.100 96.150		93.719 93.553	93.820 93.350	3.381 2.597
Paine Avenue	81	80	10		0.50	34	182	2.73	3.53	2.08		0.00	0.50	2.73	0.90	2.98	200	0.35%	20.24	0.64	72.77	17.26	96.150	93.553	93.350	2.597	95.850	0.200	93.298	93.095	2.552
Coco	27	23	5		0.30	17	17	0.30	3.71	0.20		0.00	0.30	0.30	0.10	0.30	200	0.65%	27.59	0.88	70.24	27.28	96.110	93.697	93.494	2 413	95.550		93.241	93.037	2.309
Winterset Road	24	22	2		0.15	7	7	0.15	3.74	0.08		0.00	0.15	0.16	0.05	0.14	260	0.35%	36.70	0.76	27.04	36.57	95.450	93.370	02.116	2.090	95.550		93.241	92.987	2.309
	29	23	16				t= :::	1.28	3.74	1			0.13	1.28		1.34	230			0.73	37.01				83.110	2.000					
Winterset Road	23	22	16		0.83	54	/8	1.28	3.62	0.91		0.00	0.83	1.28	0.42	1.34	250	0.35%	36.70	0.75	116.70	35.36	95.550	93.241	92.987	2.309	95.220		92.832	92.578	2.388
Coco Coco	27 28	28 80	2 15		0.18 0.69	7 51	- 7 58	0.18 0.87	3.74 3.64	0.08 0.68		0.00 0.00	0.18	0.18 0.87	0.06	0.14	200	0.65% 0.35%	27.59 20.24	0.88 0.64	7.56 114.71	27.44 19.27	96.110 96.150	93.649 93.500	93.446 93.297	2.461 2.650	96.150 95.850	0.100	93.600 93.098	93.397 92.895	2.550 2.752
Paine Avenue	90	22	6		0.35	20	260	3.94	3.48	2.94		0.00	0.26	3.94	1.30	4.24	200	0.35%	20.24	0.64	76.04	16.01	95.850	93.098	92.895	2.752	95.220		92.832	92.629	2.388
	- 00	22	- 0			20	200	3.54	3.40	2.54		0.00	0.33	3.54	1.30	4.24	200		20.24	0.04	70.04			53.050	82.083	2.132			82.032		
Winterset Road Winterset Road	22B	21	5		0.09	17	355	5.63	3.44	3.95		0.00	0.09	5.63	1.75	5.53	300	0.50% 0.25%	50.44	0.89	61.00	38.34 44.63	95.220 95.210	92.832 91.954	91.649	3.256	95.210 95.350	0.590	91.802	92.503 91.497	2.453 3.548
	22B	22C	0		 	0	0	0.00	3.80	0.00		0.00	0.00	0.00	0.00	0.00	600	1.17%	692.87 680.92	2.45	50.56	692.87 680.92	95.250 95.350	93.980	93.370	1.270	94.400	1.574	93.388 93.278	92.778 92.668	1.012
Pond Block Pond Block	22C	Overflow	0			0	0	0.00	3.80	0.00			0.00	0.00	0.00	0.00	600	1.13%	680.92	2.41	9.77	680.92		93.388	92.778		94.400 93.850				1.012 0.572
Parabolica Parabolica	72	71	2		0.18	7	7	0.18	3.74	0.08		0.00 0.00	0.18	0.18	0.06	0.14	200	0.65%	27.59	0.88	11.70	27.44	99.210 96.120	92.598	92.395	6.612	96.120 95.350		92.522 91.802	92.319 91.598	3.598 3.548
		21	14		0.67	48	35	0.85	3.64	0.65			0.67	0.85	0.28	0.93	200	0.65%	27.59	0.88	110.81	26.66		92.522	92.319	3.598					
Winterset Road	21	20	10		0.56	34	444	7.04	3.40	4.89		0.00	0.56	7.04	2.32	7.22	300	0.25%	50.44	0.71	77.58	43.23	95.350	91.802	91.497	3.548	95.700		91.608	91.303	4.092
Parabolica	61	73	5		0.28	17	17	0.28	3.71	0.20		0.00	0.28	0.28	0.09	0.30	200	0.65%	27.59	0.88	74.02	27.29	96.600	92.998	92.794	3.602	96.600		92.517	92.313	4.083
Parabolica	72	73	7		0.33	24	24	0.33	3.70	0.29		0.00	0.33	0.33	0.11	0.40	200	0.65%	27.59	0.88	68.20	27.19	96.110	92.960	92.757	3.150	96.600		92.517	92.313	4.083
Basalt	73	20	6	9	0.60	45	86	1.21	3.61	1.01		0.00	0.60	1.21	0.40	1.40	200	0.35%	20.24	0.64	116.81	18.84	96.600	92.517	92.313	4.083	95.700	0.500	92.108	91.905	3.592
Winterset Road	20	19	3		0.19	10	540	8.44	3.37	5.89		0.00	0.19	8.44	2.78	8.67	300	0.25%	50.44	0.71	42.14	41.77	95.700	91.608	91.303	4.092	95.638		91.502	91.198	4.136
Park	19B	19				0	0	0.00	3.80	0.00	2.45	2.45	2.45	2.45	0.81	0.81	200	0.35%	20.24	0.64	15.38	19.43	95.710	91.556	91.353	4.154	95.638		91.502	91.299	4.136
Winterset Road	19	18	2		0.15	7	547	8.58	3.36	5.96		2.45	0.15	11.03	3.64	9.60	300	0.25%	50.44	0.71	32.40	40.84	95.638	91.502	91.198	4.136	95.787		91.421	91.117	4.366
	60	64			0.22	20	20	0.22	3.70	0.24		0.00	0.22	0.22	0.44	0.25	200	0.050	27.50	0.00	50.64	27.24		02.269	02.464	2 222		0.450	02.000	92 777	
Calvington Avenue Calvington Avenue Calvington Avenue	61	60	5	6	0.43	33	53	0.32	3.65	0.63		0.00	0.43	0.32	0.25	0.87	200	0.65%	27.59 27.59 27.59	0.88	61.68	26.71	96.700 96.800 96.800	92.830	92.627	3.970	96.800 96.800 95.787	0.150	92.429	92.226 91.808	3.820 4.371 3.776
	60	18	2	3	0.23	15	68	0.98	3.63	0.80		0.00	0.23	0.98	0.32	1.12	200	0.65%		0.88	64.24	26.46		92.429	92.226	4.3/1		0.590	92.011		
Winterset Road Winterset Road	18 Winterset Stub	Winterset Stub 16		7	0.31	19	634 634	9.87	3.34	6.85 6.85		2.45 2.45	0.31	12.32 12.32	4.07 4.07	10.92 10.92	300 300	0.25% 0.24%	50.44 48.98	0.71 0.69	50.64 12.73	39.52 38.06	95.787 95.787	91.421 91.295	91.117 90.990	4.366 4.492	95.787 95.890		91.295 91.112	90.990	4.492 4.778
Stage 5*	Stage 5	16		180	4.10	486	486	4.10	3 38	5.33		0.00	4 10	4 10	1.35	6.68	250	0.14%	22.85	0.47	22.12	16.16	97.820	91.244	90.990	6.576	95.890		91.265	90.960	4.625
	46	- 44		- 14		20		44.57	2.24				0.60	47.00	F 60		200			0.72	119.59	22.74			00.000	4.625				00.050	
Winterset Road Winterset Road Winterset Road	14	13		8	0.60 0.31	22	1158 1180	14.88	3.21	12.03 12.24		2.45 2.45 2.45	0.80	17.02 17.33	5.72	17.65 17.97	300	0.26% 0.20%	51.36 45.28	0.64	50.62	27.32	95.890 95.440	91.265 90.945	90.640	4.495	95.440 95.320		90.802 90.690	90.538	4.638 4.630 4.311
	13	02		4	0.18	11	1191	15.06	3.20	12.35			0.18	17.51	5.78	18.13	300	0.33%	57.61	0.81	43.24	39.48	95.320	90.843	90.538	4.477	94.860		90.549	90.397	
Natare	45	46		17	0.48	46	46	0.48	3.66	0.55		0.00	0.48	0.48	0.16	0.70	200	1.03%	34.66	1.10	60.23	33.96	96.430	93.641	93.438	2.789	96.100	0.237	92.922	92.820	3.178
Natare	47	46		3	0.13	8	- 8	0.13	3.74	0.10		0.00	0.13	0.13	0.04	0.14	200	1.53%	42.34	1.35	18.94	42.20	95.790	93.153	92.950	2.637	96.100	0.077	92.762	92.660	3.338
Speedvale Speedvale	46	39				0	54	0.61	3.65	0.64		0.00	0.00	0.61	0.20	0.84	200	0.31%	18.94	0.60	9.79	18.10	96.100 95.940	92.783	92.580	3.317	95.940 95.600	0.030	92.652	92.550	3.288 3.228
Speedvale Speedvale	39	38		16	0.48	32	129	1.40	3.60	1.13		0.00	0.48	1.40	0.36	1.49	200	0.35%	19.74	0.63	74.79 45.09	18.68 17.78 17.76	95.940 95.600 95.660	92.733	92.530 92.260	3.207	95.660 95.700		92.372	92.270	3.228 3.448 3.598
Speedvale Speedvale Speedvale	37 36	36 30		9 7	0.24	24	153 172	1.64	3.55 3.54	1.76		0.00	0.24	1.64	0.54	2.30	200	0.34% 0.35%	20.07	0.64	31.99 33.90	17.76	95.660 95.700	92.313 92.193	92.110 91.990	3.347 3.507	95.700 95.700		92.102 91.972	92.000 91.870	3.598 3.728
	46	44		4	0.10	- 11	- 11	0.10	2.72	0.13		0.00	0.10	0.10	0.06	0.20	200	0.70%	29.61	0.01	16 99	29.41	06.420	02 706	02 502	2 624	06.460	0.030	02 577	02.475	2 002
Natare Natare Natare	44	43		6	0.18	16	27	0.18	3.69	0.13		0.00	0.18	0.17	0.12	0.44	200	0.27%	17.65	0.56	35.33	17.20	96.460	93.643	93.440	2.817	96.460 96.160 96.400	0.000	93.448	93.346	2.712
	43	42		10	0.31	27	54	0.68	3.65	0.64		0.00	0.31	0.68	0.22	0.86	200	0.37%	20.69	0.66	47.88	19.82	96.160	93.549	93.346	2.611	96.400	0.300	93.273	93.1/1	3.127
Sweet Pea Sweet Pea Sweet Pea Sweet Pea Sweet Pea Sweet Pea	54 53	53 52	17		0.80	58 7	58 65	0.80	3.64	0.68		0.00	0.80 0.15	0.80	0.26	0.95 1.08	200	0.34% 0.44% 0.35%	19.94 22.60	0.63 0.72	107.78 9.16	18.99 21.53 18.58	97.070 96.770	93.951 93.563	93.748 93.360	3.119 3.207	96.770 96.750	0.030	93.484 93.422	93.382 93.320	3.286 3.328
Sweet Pea Sweet Pea	52 51	51 50	10		0.44	34	99	1.39	3.60	1.15		0.00	0.44	1.39	0.46	1.61	200	0.35%	20.19	0.64	70.07 25.28	18.58	96.750 96.130	93.513	93.310 93.056	3.237 2.871	96.130 96.320		93.168	93.066 92.968	2.962 3.250
Sweet Pea	50	42			0.01	0	102	1.50	3.59	1.19		0.00	0.01	1.50	0.50	1.68	200	0.35% 0.40%	21.52	0.68	7.59	19.83	96.130 96.320	93.154	92.951	3.166	96.400	0.060	93.023	92.921	3.377
Natare Natare	42	40		16	0.48	43	199	2.66	3.52	2.27		0.00 0.00	0.48	2.66	0.88	3.15	200	0.33%	19.61	0.62	63.65	16.46	96.400 95.730	93.063	92.860	3.337	95.730	0.030	92.753	92.651	2.977 3.396
	40	31		5	0.18	14	213	2.84	3.51	2.42		0.00	0.18	2.84	0.94	3.36	200	0.29%	18.38	0.59	34.32	15.02		92.804	92.601	2.926	96.000	0.060	92.604	92.502	
Speedvale Speedvale Speedvale	34 33	33 32		6 29	0.27 0.68	16 78	16 94	0.27 0.95	3.71 3.60	0.19 1.10		0.00	0.27 0.68	0.27 0.95	0.09	0.28 1.41	200	0.70% 0.60%	28.67 26.52	0.91 0.84	17.09 100.89	28.39 25.11	97.430 97.220 96.680	93.719 93.534	93.516 93.331	3.711 3.686	97.220 96.680	0.050 0.031	93.498 92.827	93.396 92.725	3.722 3.853 3.438
	32	31		12	0.30	32	126	1.25	3.57	1.46		0.00	0.30	1.25	0.41	1.87	200	0.35%	20.28	0.65	65.48	18.41		92.893	92.690	3.787	96.000		92.562	92.460	
Speedvale	31	30		14	0.32	38	377	4.41	3.43	4.19		0.00	0.32	4.41	1.46	5.64	200	0.36%	20.50	0.65	74.35	14.86	96.000	92.640	92.437	3.360	95.700	0.276	92.272	92.170	3.428
Speedvale Speedvale	30	30A			0.30	0	549	6.29	3.36	5.98		0.00 0.00	0.00	6.29	2.08	8.06	200	0.34%	19.94	0.63	39.77	11.88	95.700	92.070	91.867	3.630	95.700 94.860	1.083	91.834	91.732	3.866 3.178
	JUA CO	02		400	0.20	100	249	0.49	3.30	5.90			0.20	0.49	2.14	6.68	200	1.13%	10.41	0.02	99.12	11.29	93.493	01.820	01.022	1.319		1.003	01.002	91.580	
Stage 5*	Stage 5S	02		180	4.10	486	486	4.10	3.38	5.33		0.00	4.10	4.10	1.35	6.68	250		65.90	1.34	30.13	59.22		92.1/4	91.920		94.860	0.19/	90.899	91.580	3.961
Winterset Road Winterset Road	02 02A	02A EX. 307A			0.18	0	2226 2226	25.83 25.83	3.04	21.93 21.93		2.45 2.45	0.18	28.28 28.28	9.33 9.33	31.26 31.26	300 450	0.60% 0.17%	77.88 122.12	1.10 0.77	42.12 11.27	46.62 90.86	94.860 94.860	90.702 90.466	90.397 90.009	4.158 4.394	94.860 95.500	-0.229	90.298 90.219	90.146 89.990	4.562 5.281
Campeau Drive	ex.306A	EX. 307A			23.00	0	0	23.00	3.80	0.00		0.00	23 00	23.00	7.59	7 59	525	0.24%	219.72	1,02	120 08	212 13	95.500	90.817	90.284	4.683	95.500	-0.147	90.263	89,996	5.237
Donum Lane	South Stub	01				0	- 0	0.00	3 90	0.00		0.00	0.00	0.00	0.00	0.00	376	0.39%	114.62	1.04	16.20	114.62	94.740	90.921	90.640	3.819	94.740		90.667	90.476	4.074
	Common : LOI	01				0		0.00	3.00				0.00	0.00			000			1.04	10.30				00.000					00.470	
Donume Lane	Commercial Stub	01				0	0	0.00	3.80	0.00		0.00	0.00	0.00	0.00	0.00	250	0.35%	36.75	0.75	26.51	36.75	94.740	90.917	90.663	3.823	94.740		90.697	90.570	4.043
Donum Lane Donum Lane	01 01A	01A Ex. 307A				0	0	0.00	3.80	0.00		0.00	0.00	0.00	0.00	0.00	375 375	0.40% 0.21%	116.06 84.37	1.05 0.76	51.67 33.84	116.06 84.37	94.740 95.290	90.827 90.609	90.446 90.228	3.913 4.681	95.290 95.500	-0.139	90.429 90.347	90.238 90.156	4.862 5.153
Campeau Drive	Ex. 307A	Ex. 308A				0	2226	48.83	3.04	21.93		2.45	0.00	51.28	16.92	38.85	675	0.25%	438.19	1.22	118.95	399.34	95.500	90.676	89.990	4.824	95.500		90.036	89.693	5.464
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 Jeeligin Parameters
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 Cap Unit

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 Cap Unit

 Semi-Detectined Townscuse Population
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 Cap Unit

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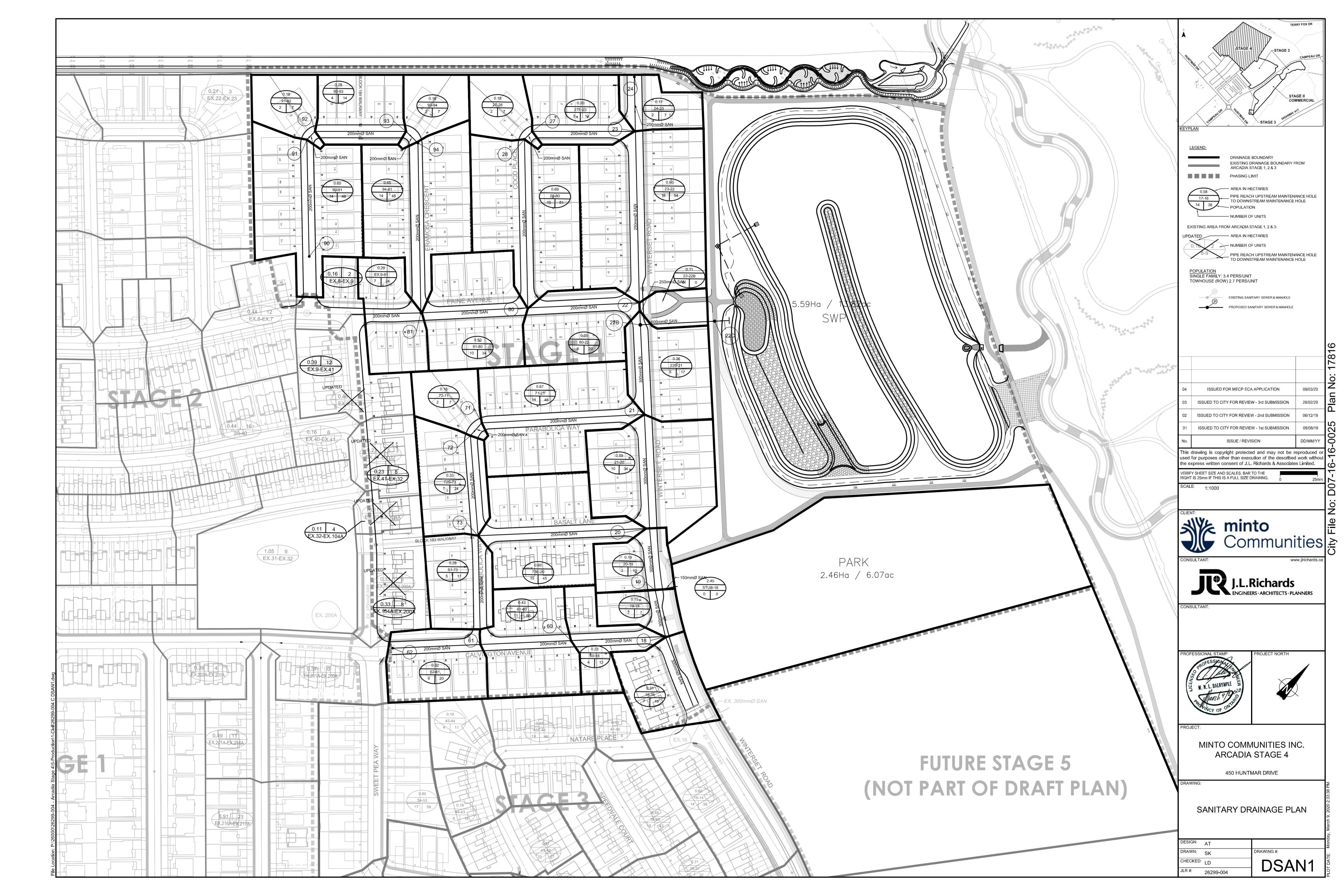
 filteration Flows
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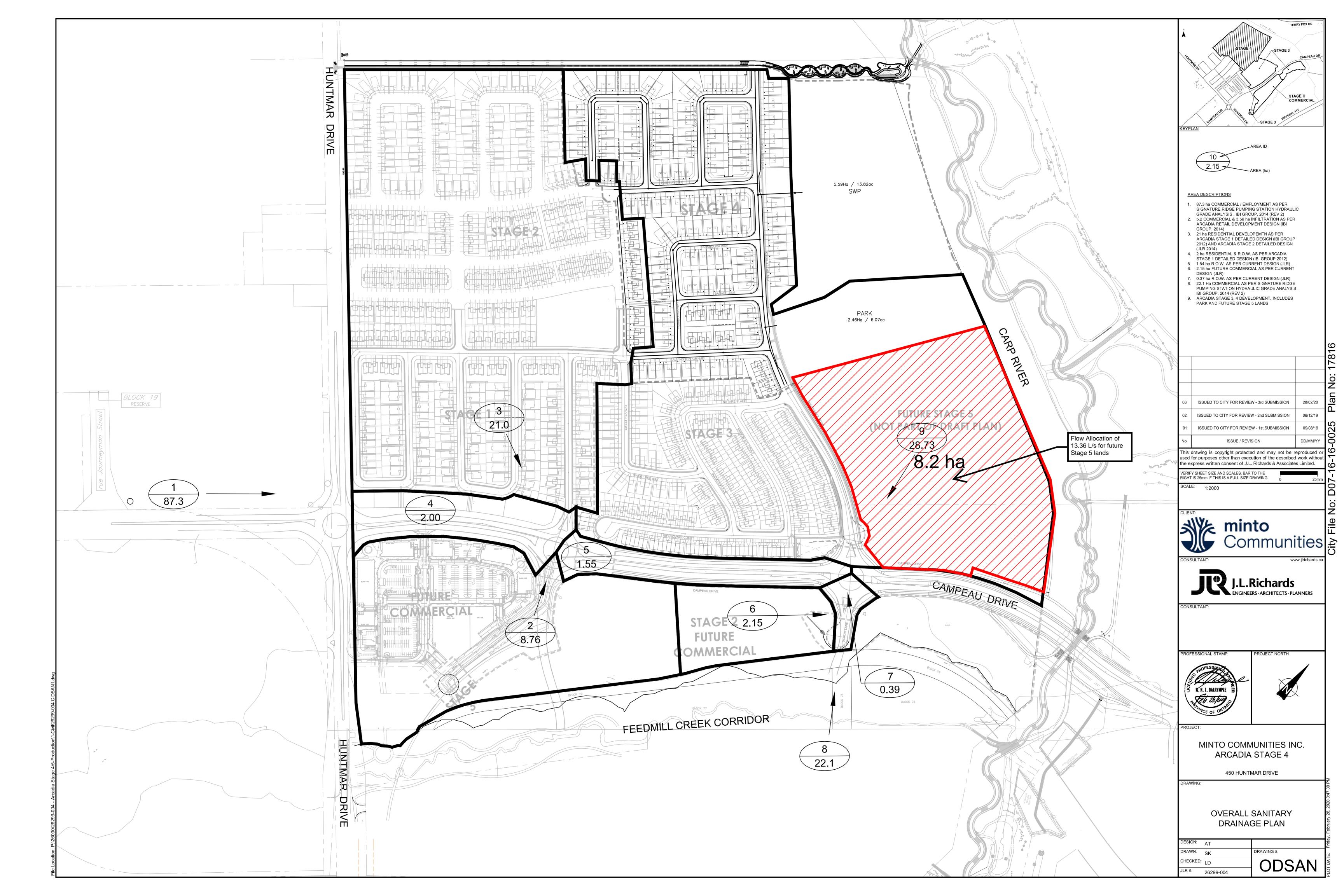
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Existing/Proposed Infrastructu







Ottawa, Ontario K1S 5N4

1BI Group 333 Preston Street - Suite 400

SANITARY SEWER DESIGN SHEET

PROJECT: DEVELOPER: ARCADIA PHASE 1 MINTO

JOB #: 3775-5.7 DATE PRINTED: 27-Jun-18 DESIGN: LE

Part	LOCAT	TION		1		INDIVI	DUAL		CIIN	M. RES. FLOW	, 1			NSTIT., INDUST.,	& COMM. FLOV	w		ı	INFILTRATIO	N	TOTAL			DD	DOSED S	EWED		
Mary Mary			то		RESID. UNIT					1		Indust.				**	PEAK	INCR.		1	4 1			PHO	JPOSED S		ΔVΔΙΙ	ΑνΔΙΙ
Proper 1		МН					4	POP.	POP.	PEAK	l 8			_		PEAK				FLOW	R H	CAP.	PIPE	LGTH	SLOPE			
Company Comp				"	1		(Ha)								I .			H	I							· ' /		
Page Page																				, ,	† <u> </u>		. ()	(,	- 1			
Company Name	Phase 2	Stub	104 A	122	116		11.05	728.0	728	3.88	11.59)						11.05	11.05	3.09	14.69	166.68	375	12.00	0.83	1.46	151.99	91%
Company Name						ļ <u>.</u>																						
September 1970 Septem	Paine Avenue	104 C	104 A	19			0.71	64.6	65	4.00	1.06						ļ	0.71	0.71	0.20	1.26	135.67	375	25.68	0.55	1.19	134.41	99%
September 1970 Septem	01	101	000 4	<u> </u>																								
Company Control (1907) 250 A 251 A 551 A	Cionrush waik	104 A	200 A		/		0.27	18.9	812	3.86	12.83						ļ	0.27	12.03	3.37	16.20	77.64	375	76.75	0.18	0.68	61.44	79%
Company Control (1907) 250 A 251 A 551 A	Cabrington Avenue	Stub	200 4	 	-		0.10	12.5	14	4.00	0.22							0.40	0.10	0.05								
Marie Parl Concern 197 1	Calvington Avenue	Stub	200 A	 			0.15	13.5	- 14	4.00	0.22		_				 	0.19	0.19	0.05	0.27	26.72	200	16.50	0.61	0.82	26.45	99%
Marie Parl Concern 197 1	Calvington Avenue	200 A	201 A	-	7		0.29	18.9	844	3.85	13 31				-			0.20	10.51	2.50	16 01	05.05	975	75.74	0.00	0.75	00.04	
Misses Indicessor 17 A 306 A 5								10.0		0.00	10.01							0.23	12.51	3.30	10.01	03.03	3/3	75.74	0.22	0.75	09.04	80%
Makes Parl Creeces	Mission Trail Crescent	208 A	207 A	7			0.42	23.8	24	4.00	0.39							0.42	0.42	0.12	0.51	28.02	200	76 69	0.67	0.86	27.51	08%
Hatever Part Conceases 290 A 291 A 29 A 29 A 29 A 20	Mission Trail Crescent	207 A	206 A	5			0.28	17.0	41	4.00	0.67														_			
Carbeyer Anthone	Mission Trail Crescent	206 A	205 A		2		0.08	5.4	46	4.00	0.76							0.08	0.78	0.22		28.83			$\overline{}$			
Masses Enforcement 20 A 20 A 50 A 50 A 50 A 50 A 50 A 50 A	Calvington Avenue	205 A	204 A		15		0.43	40.5	87	4.00	1.42							0.43	1.21	0.34	1.76	52.24	200	65.73	2,33	1.61		
Masses Enforcement 20 A 20 A 50 A 50 A 50 A 50 A 50 A 50 A																												
Callenger Avenue		+			<u> </u>	\vdash				_								<u> </u>							0.64			
Belphonod Cresont 21 A 21 A 11 15 15 15 430 646 12 12 13 15 15 26 27 17 10 10 12 12 13 15 15 15 15 15 15 15	Mission Trail Crescent	210 A	204 A	6	1	\vdash	0.41	23.1	71	4.00	1.16							0.41	1.15	0.32	1.48	22.44	200	84.00	0.43	0.69	20.96	93%
Belphonod Cresont 21 A 21 A 11 15 15 15 430 646 12 12 13 15 15 26 27 17 10 10 12 12 13 15 15 15 15 15 15 15	Cabrington Avenue	004 4	000 4	-i	45		0.40	40.5	400	100																		
Bestimonard Crescont 21 A 203 A 7	Calvington Avenue	204 A	203 A		15	-	U.4b	40.5	198	4.00	3.25							0.46	2.82	0.79	4.04	24.19	200	69.35	0.50	0.75	20.16	83%
Bestimonard Crescont 21 A 203 A 7	Brettonwood Crescent	212 A	211 A	15			n 75	51.0	51	4.00	0.94							0.75	0.75	0.04	<u> </u>	00.04	000	00.00	0.00	2.2-	67.45	
Cabrington Avenue 203 A 282 A 15												-					_	⊩										
Referenced Coscert 14 A 1			200 /1	1			0.07	20.0		4.00	1.20							0.57	1.12	0.31	1.54	29.43	200	83.32	0.74	0.91	27.91	95%
Restances Cossert 214 A 21 A 1	Calvington Avenue	203 A	202 A	1	15		0.47	40.5	313	4.00	5.14							0.47	4 41	1 23	6.37	24 19	200	75 77	0.50	0.75	17.82	74%
Bristonoud Crescent 214 A 215 A 33 0.67 442 48 4.00 0.78 0.77 0.72 0.78 0.77				1																1.20	· · · · · ·	21110		70.77	0,00	0.15	17.02	- 14/0
Brittonwood Crosseed 21 A 21 B 31 0.67 44.2 48 4.00 0.78 0.78 1.27 1.00	Brettonwood Crescent	213 A	214 A	1			0.11	3.4	3	4.00	0.06							0.11	0.11	0.03	0.09	32.82	200	11.96	0.92	1.01	32 73	100%
Teleformoco Gregoria 215 A 202 A 8 1 1 0.48 229 70 4.00 127 4.00 127	Brettonwood Crescent	214 A	215 A	13			0.67	44.2	48	4.00	0.78							0.67					$\overline{}$					
Cabringtion Nemure 202 A 201 A 8 0.31 215 412 400 6.78	Brettonwood Crescent	215 A	202 A	8	1		0.48	29.9	78	4.00	1.27							0.48	1.26	0.35	1.62	26.07	200	87.67	0.58			
Country Glen Way 201 A 216 A 5 4 8.0 8.3 77.8 1284 5.72 119.85 1284 5.73 1286 5.74 1286 5.75 128.8 1284 5.75 1																			-									
Country Gen May 219 A 217 A 13 12	Calvington Avenue	202 A	201 A	↓	8	\sqcup	0.31	21.6	412	4.00	6.76			_				0.31	5.98	1.67	8.44	21.92	200	72.79	0.41	0.68	13.49	62%
Country Gen May 219 A 217 A 13 12	Country Clan May	004 4	040 4	<u> </u>	— —		0.40	07.0	1001																			
Country (Gen Way 217 A 303 A 0.03 19.8 1389 3.71 20.97 0.05 10.0 0.71 20.97 0.00 0.71 20.97 0.					_											-												
Campeau Drive				13	- 12	\vdash																						
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Compeau Drive 301 A 302 A 14 9.51 37.8 78 4.00 1.28 46.00 1.50 0.85 0.48 0.49 0.51 85.00 1.50 0.81 37.8 78 4.00 1.28 46.00 1.50 0.81 85.00 1.50 0.81 85.00 1.50 0.81 85.00 1.80 0.81 85.00 1.50 0.81 85.00 1.80 0.81 85.00 1.80 0.81 85.00 1.80 0.81 85.00 1.50 0.81 85.00 1.8	Campeau Drive	300 A	301 A		15		0.65	40.5	41	4.00	0.66	10.10	65.40	45.60	45.60	1.60	69.40	95.15	05.45	02.04	00.01	104.04	075	00.50	0.40	4.00	04.40	
Campeau Drive 301 A 302 A 14	- Cumpous Cine	000 11	001 71		1.0		0.00	40.5		4.00	0.00	13.10		45.00	45.00	1.50	00.40	65.15	65.15	23.04	92.91	124.04	3/5	99.52	0.46	1.09	31.13	25%
Campeau Drive 301 A 302 A 14	Commercial Site	Stub	301 A					0.0	0	4.00	0.00		0.85	0.49	0.49	1 50	0.74	0.85	0.85	0.24	0.98	24 10	200	24.14	0.50	0.75	22.22	000/
Campeau Drive 302 A 303 A 5 5 0.51 13.5 92 4.00 1.51 46.09 1.50 68.14 0.51 67.02 24.57 95.01 118.57 37 10.67 0.42 1.04 23.59 205. Future Street Stub 303 A 304 A 20 0.59 46.0 17.47 3.63 26.01 48.42 1.50 72.63 0.59 116.77 32.70 131.34 210.50 525 84.99 0.22 0.94 79.16 389. Campeau Drive 304 A 305 A 24 0.57 55.2 1803 3.62 26.76 48.42 1.50 72.63 0.59 116.77 32.70 131.34 210.50 525 84.99 0.22 0.94 79.16 389. Campeau Drive 304 A 305 A 24 0.57 55.2 1803 3.62 26.76 48.42 1.50 72.63 0.59 116.77 32.70 131.34 210.50 525 84.99 0.22 0.94 79.16 389. Campeau Drive 304 A 307 A 308 A 307 A 308 A 307 A 308 A 307 A 308 A 307 A 308 B 38.8 28.8 29.9 22.2 14.44 5.50 1.50 1.50 3.36 1.50 5.08 32.67 32.67 5.15 35.62 180.92 4.00 3.76 389. Future north Stub 307 A 308 A 308 A 308 A 309 A 300 18.72 1.08 4.00 3.99 3.37 50.28 1.00 3.39 3.37 50.28 1.00 3.39 3.37 50													0.00	0.10	0.10		0	0.00	0.00	0.24	0.30	24.13	200	24-14	0.30	0.73	23.22	90%
Campeau Drive 302 A 303 A 5 0.51 13.5 32 4.00 1.55 46.66 1.50 69.14 0.51 87.02 24.37 95.01 118.57 375 0.666 0.42 1.04 23.56 2075 Future Street Slub 303 A 304 A 20 0.59 46.0 1747 3.63 25.01 3.82 1.35 2.33 2.33 1.50 3.48 8.99 8.99 2.52 8.77 58.81 300 20.56 0.34 0.81 48.04 88% Campeau Drive 303 A 3.04 A 20 0.59 46.0 1747 3.63 25.01 48.42 1.50 72.63 0.59 116.77 22.70 131.34 210.50 555 84.99 0.22 0.94 79.16 38% Campeau Drive 305 A 24 0.57 55.2 1903 3.82 28.76 48.42 1.50 72.63 0.57 117.34 23.68 132.28 179.44 555 79.82 0.16 0.80 47.19 25% Campeau Drive 305 A 306 A 307 A 308 30.02 28.65 18.99 3.99 29.22 48.42 1.50 72.63 0.85 118.01 33.09 133.78 215.19 555 170.02 0.96 81.41 38% Campeau Drive 305 A 306 A 307 A 308 30.02 28.65 30.00	Campeau Drive	301 A	302 A		14		0.51	37.8	78	4.00	1.28				46.09	1.50	69.14	0.51	86.51	24.22	94.65	131.91	375	76.90	0.52	1.16	37 26	28%
Future Street Stub 303 A 1 20 382 229 229 4.00 3.76 3.82 1.38 2.33 1.50 3.46 8.99 8.99 2.52 8.77 \$8.81 300 20.58 0.34 0.81 49.04 83%. Campeau Drive 304 A 305 A 24 0.57 55.2 1803 3.62 26.76 48.42 1.50 72.63 0.59 116.77 32.70 131.34 210.50 526 84.99 0.22 0.94 79.16 0.80 47.19 28.82 0.66 0.60 47.19 28.82 0.66 0.60 47.19 28.82 0.66 0.60 47.19 28.82 0.66 0.60 47.19 28.82 0.66 0.60 47.19 28.82 0.66 0.60 47.19 28.82 0.66 0.60 47.19 28.82 0.66 0.60 47.19 28.82 0.66 0.60 47.19 28.82 0.66 0.60 47.19 28.82 0.66 0.60 47.19 28.82 0.66 0.60 47.19 28.82 0.60 47.19 28.82 0.60 47.19 28.82 0.60 47.19 28.82 0.60 47.19 28.19 2	Campeau Drive	302 A	303 A		5		0.51	13.5	92	4.00																		
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Campeau Drive 304 A 305 A 306 A 305 A 306 A 306 A 306 A 306 A 306 A 306 A 306 A 306 A 306 A 306 A 306 A 306 A 306 A 306 A 306 A 307 A 308 A 307 A 308 A 307 A 308 A 307 A 308 A 307 A 308 A 307 A 308 A 307 A 308 A 307 A 308 A 307 A 308 A 308 A 308 A 308 A 309 A 309 A 309 A 309 A 309 A 309 A 309 A 309 A 301 A 300 A 309 A 301 A 300 A 309 A 301 A 300 A 309 A 301 A 300 A 301 A 300 A 301 A 300 A 301 B 302 B 303	0	000	001		ļ	L																						
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Future north Stub 307 A 160 200 19.72 1084.0 1084 5.50 1.95 3.36 3.36 1.50 5.03 32.67 32.67 9.15 35.62 180.92 450 13.46 0.37 1.10 145.30 80% Future south Stub 307 A 30.8 A 3.98 238.8 239 3.98 1.41 2.43 2.43 1.50 3.64								_		-											-				_			
Future south Stub 307 A 3.98 238.8 239 3.98 1.41 2.43 2.43 1.50 3.64 3.98 238.8 239 4.00 3.92 22.13 12.81 15.24 1.50 22.86 31.50 31.50 8.82 35.60 89.61 375 25.50 0.24 0.79 54.01 60% Campeau Drive 307 A 308 A 0.43 0.0 3639 3.37 50.28 67.02 1.50 100.53 0.43 183.92 51.50 202.31 328.02 675 71.29 0.14 0.89 125.71 38% Campeau Drive 309 A 310 A 0.0 3639 3.37 50.28 28.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2	Campeau Diive	300 A	301 M			J0	V.02	07.4	195/	3.09	29.22				48.42	1.50	72.63	0.82	119.01	33.32	135.18	219.88	525	120.08	0.24	0.98	84.70	39%
Future south Stub 307 A 3.98 238.8 239 3.98 1.41 2.43 2.43 1.50 3.64 3.98 238.8 239 4.00 3.92 22.13 12.81 15.24 1.50 22.86 31.50 31.50 8.82 35.60 89.61 375 25.50 0.24 0.79 54.01 60% Campeau Drive 307 A 308 A 0.43 0.0 3639 3.37 50.28 67.02 1.50 100.53 0.43 183.92 51.50 202.31 328.02 675 71.29 0.14 0.89 125.71 38% Campeau Drive 309 A 310 A 0.0 3639 3.37 50.28 28.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2	Future north	Stub	307 A	160	200		19.72	1084.0	1084	İ											<u> </u>							=
Future south Stub 307 A 398 238.8 239				1						3.70	21.44	5.50	1,95	3.36	3.36	1.50	5,03	32,67	32,67	9.15	35.62	180 92	450	13.46	0.37	1.10	145.20	D00/
Campeau Drive 307 A 308 A 309 A 0.31 0.0 3639 3.37 50.28 67.02 1.50 100.53 0.43 183.61 51.41 202.22 447.33 675 118.96 0.26 1.21 245.11 55% Campeau Drive 308 A 309 A 0.31 0.0 3639 3.37 50.28 7 0.00 100.53 0.00 183.92 51.50 202.31 388.47 675 36.21 0.25 1.19 236.15 54% Campeau Drive 310 A 311 A 312 A 0.0 3639 3.37 50.28 7 0.0 3639								-						5.30						5.10	00.02	.00.32	400	10/40	U.OF	1,10	140.00	0076
Campeau Drive 307 A 308 A 309 A 309 A 310 A 311 A 312 A 308 A 311 A 312 A 308 A 309 A 309 A 309 A 300 3639 3.37 50.28 50	Future south	Stub	307 A				3.98	238.8	239		1	3.98	1.41	2.43	2.43	1.50	3.64							$-\overline{1}$				$\overline{}$
Campeau Drive 307 A 308 A 0.0 3639 3.37 50.28 67.02 1.50 100.53 0.43 183.61 51.41 202.22 447.33 675 118.96 0.26 1.21 245.11 55% Campeau Drive 308 A 309 A 0.31 0.0 3639 3.37 50.28 67.02 1.50 100.53 0.31 183.92 51.50 202.31 328.02 675 71.29 0.14 0.89 125.71 38% Campeau Drive 309 A 310 A 0.0 3639 3.37 50.28 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8								0.0	239	4.00	3.92		22.13	12.81	15.24	1.50	22.86	31.50	31.50	8.82	35.60	89.61	375	25,50	0.24	0.79	54.01	60%
Campeau Drive 308 A 309 A 310 A 310 A 311 A 312 A 312 A 313 A 314 A 315 A 315 A 315 A 315 A 316 A 317 A 318																											2045	
Campeau Drive 309 A 310 A 310 A 310 A 311 A 312 A 312 A 310 A 312 A 310 A 312 A 310 A 312 A 310 A 312 A 310 A 312 A 310 A 312 A 310 A 312 A 310 A 312 A 310 A 312 A 310 A 312 A 310 A 312 A 310 A 312 A 310 A 312 A 310 A 310 A 312 A 310					\vdash			-		$\overline{}$															0.26	1.21	245.11	55%
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Campeau Drive 310 A 311 A 0.0 3639 3.37 50.28 5 54% 67.02 1.50 100.53 0.00 183.92 51.50 202.31 438.47 675 120.85 0.25 1.19 236.15 54% Campeau Drive 311 A 312 A 0.0 3639 3.37 50.28 5 50% 67.02 1.50 100.53 0.00 183.92 51.50 202.31 401.90 675 70.47 0.21 1.09 199.58 50% Campeau Drive 312 A SAN 8 0.0 3639 3.37 50.28 5 50.20 1.50 100.53 0.00 183.92 51.50 202.31 438.47 675 36.21 0.25 1.19 236.15 54%				<u> </u>									PHO	1 AI	67.02							$\overline{}$						
Campeau Drive 312 A SAN 8 0.0 3639 3.37 50.28 51.50 202.31 401.90 675 70.47 0.21 1.09 199.58 50% (Appeau Drive 312 A SAN 8 0.0 3639 3.37 50.28 51.50 202.31 438.47 675 36.21 0.25 1.19 236.15 54%				-								—— A	W//		7/			$\overline{}$							$\overline{}$			
Where O = suprang daily ng could by (250 (1904) (19		-		<u> </u>		 						/.	~ 	<u> </u>											\rightarrow			
				00/11/202 /	cau)	ll		0.0	3039	3.31	DU.28	- / 4	/ 		Z (67.02)	1.50	100.53	0.00	183.92	51.50	202.31	438.47	675	36.21	0.25	1.19	236.15	54%

Where Q = average daily per capita flow (350 Vcap.d.) or (0.0041Vsec/cap) = Unit of peak extraneous flow (0.28 Vsec/ha)

M = Residential Peaking factor = Harmon Peaking Factor , $M = 1+(14/(4+P^{2}0.5))$, where P = population in thousands

Q(p) = Peak population flow (Vs)
Q(i) = peak extraneous flow (Vs)

Gross Residential Lands = 60 persons/gross hectare
J\3775_KanataWestG7_Cabulations\57.1 Sewers & Grading\CCS_sanitary_sawer_design_Ph1_AsBuilt_2014-07-31Sanitary - MOE

Population Density = 3.4 per single family, 2.7 per semi-detached and row townhouse units and 2.3 per stacked townhouse unit Commercial, Employment Area - Average flow 50,000 Vday/ha (0.579 Vs/ha) with Peaking Factor = 1.5

Light Industrial; Business Park - Average flow 35,000 Vday/ha (0.405 Vs/ha) with Peaking Factor = 1.5

As Built Pipe Lengths and Slopes

Appendix E

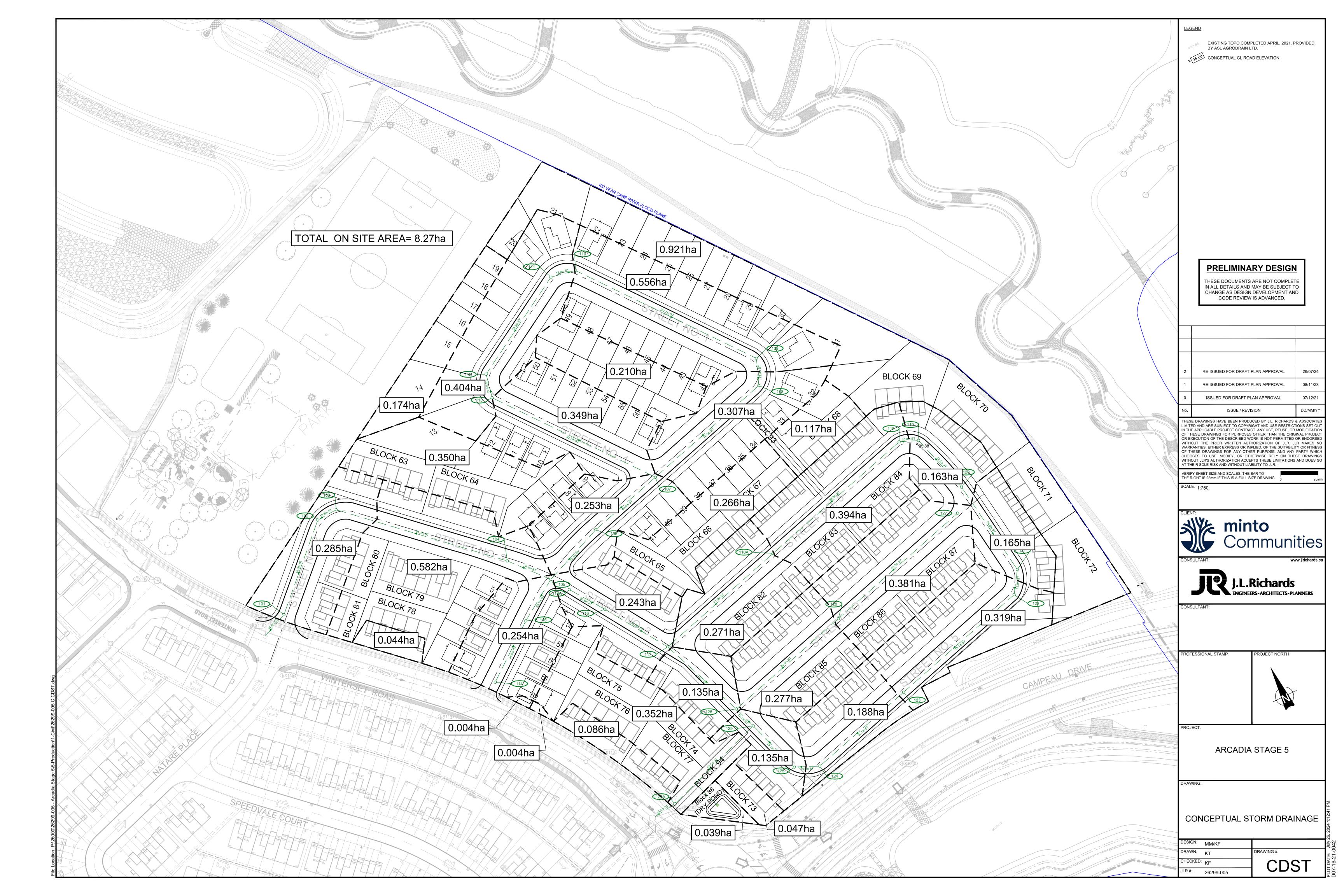
Storm Servicing and Stormwater Management



MINTO COMMUNITIES INC. ARCADIA STAGE 5 450 HUNTMAR DRIVE STORM SEWER DESIGN SHEET JLR NO. 26299-005

	Maintena	ace Hole No	o. 1:2 Year Storm	1:51	Year Storm		1:10	0 Year S	torm	To	tal Areas	To	otal Additional Cum.		In Pipe			1:2 Year P	eak Flow			1:5	Year Peak Fl	ow			1:10 Ye	ear Peak Flo	ow	To	otal			Pip	oe Data				Upstream Ge	eometry		Downstream Ge	eometry	
Street Name	From	То	0.20 0.61 0.67 0.70	0.52 0.30 0.61	0.67	0.70 0.7	72 0.8	0.0	61 0.66	1:2 Yr	1:5 Yr 1:1	Ar	rea Area from Total Ar	ea iniet iime	Flow Time (min)	e Time	2.78AR Addition 2.78A	nal Cu R 2.78		2 Yr Peak nsity Flow	2.78AR	Additional 2.78AR		1:5 Yr Intensity	Peak Flow	2.78AR	Additional 2.78AR	Cum. 2.78AR	1:10 Yr Intensity	Po	eak	Actu Type Diam	ete Slope	Q Full (L/s)	V Full	Length	Residual % Ful	TG Fro	m Obvert	Invert	Cover TG To	Drop Obvert	Invert	Cover
TO PAINE POND:					_	4-4-		4						4	 						-																							
STREET 1 STREET 1	111	110	0.556		1			#==			0.00 0		.00 0.00	10.00	0.26	10.26	0.00	0.0		.81 0.00 .84 78.54			0.00	104.19	0.00	0.00		0.00	122.14 120.57	0.00 0.	1.00 300 8.54 450	Circular 304. Circular 457.	80 0.35%	59.68 148.72	0.84	12.96	59.68 0% 70.18 53%	95.978	94.440	94.135	1.538 96.094 1.699 95.928	94.395	94.090	1.699
STREET 1 STREET 1	109	109 108	0.327 0.307					#==		0.00	0.00 0	.00 0.		12.09 12.36	0.28	12.36	0.00	1.0	04 69	.63 72.11 .78 148.71	0.00		0.00	94.33	0.00	0.00		0.00	110.53	0.00 72 0.00 144	2.11 450	Circular 457. Circular 609.	20 0.20%	133.02	0.84		70.18 53% 60.91 54% 99.38 60%		94.395 94.138 94.110			94.138 94.110	93.653 93.395	1.785
STREET 1	106	107						#=			0.00 0					13.70	1.13	2.			0.00					0.00			109.17	0.00 141	0.71 000					70.52	99.36 00%	95.090		93.300				1.090
STREET 1		112 113	0.174 0.404								0.00 0 0.00 0			10.00 11.01		11.01	0.00	1.0		.81 80.46 .12 76.60				104.19 99.13	0.00	0.00		0.00	116.18	0.00 76	6.60 375	5 Circular 381. 5 Circular 381.	0.35%		0.98	12.42	31.61 71%	95.883			1.537 95.883 1.650 95.965	94.233 94.190	93.809	
STREET 1	113	107	0.349								0.00 0				1.67	12.89		1.7		.40 122.91			0.00	98.14	0.00	0.00		0.00	115.02	0.00 12		5 Circular 533.							94.190		1.775 95.894		93.471	
STREET 1 STREET 1	107 106	106 105	0.266					+		0.27	0.00 0 0.00 0	.00 0.	.27 2.38 .25 2.64	13.70 14.41		14.41 14.94	0.45 0.47		31 65 78 63	.01 280.23 .19 302.15			0.00		0.00	0.00		0.00	103.08 100.14	0.00 28 0.00 30	0.23 675 2.15 825	5 Circular 685. 5 Circular 838.	80 0.15% 20 0.15%	339.63 579.98	0.95 1.08	40.53 34.20	59.40 83% 277.83 52%				1.890 95.571 1.627 95.794	93.943	93.258 93.054	1.627
STREET 1					 								.00 0.00	10.00	0.70	10.70	0.00			.81 0.00	0.00		0.00		0.00					0.00 0.	.00 375	5 Circular 381.						95.356			1.315 95.608	02.054	00.570	4.054
STREET 1	115	115 105	0.254					4			0.00 0 0.00 0		.25 0.25			11.20	0.47	0.0	47 74	.21 35.11	0.00		0.00	100.62	0.00	0.00 0.00 0.00		0.00	122.14	0.00 35	5.11 375	5 Circular 381.	00 0.25%	91.46	0.83 0.83	24.74	91.46 0% 56.35 38%			93.573	1.654 95.794	93.892	93.511	1.901
STREET 2 STREET 2	105 104	104 103	0.250 0.592					#==			0.00 0			14.94	0.37	15.31	0.00			.91 325.34 .05 423.20	0.00		0.00	83.75 82.57	0.00	0.00		0.00	98.08 96.69	0.00 32	5.34 825	5 Circular 838. 0 Circular 914.			1.08 1.15						1.901 95.680 1.824 95.733	93.856 93.719		
STREET 2 STREET 2	103	102	0.330 0.362			##		#=		0.00	0.00 0	.00 0.	.00 3.82	16.63 16.79 17.53	0.16	16.79	0.00	6.9 6.9 7.4	93 58	.17 403.27 .85 431.75	0.00		0.00		0.00	0.00		0.00 0.00 0.00	92.06 91.55	0.00 40	3.27 900	Circular 914.	40 0.15%	731.45	1.15	10.78	328.18 55%	95.733	93.719	92.805	2.014 95.622 1.919 95.715	93.703	92.789	1.919
STREET 2		EX116	0.285					#=			0.00 0		.00 4.11	17.53	0.74	17.74	0.00			.38 420.76			0.00		0.00	0.00		0.00	89.18	0.00 43	0.76 900	Circular 914. Circular 914.				51.30 14.60	299.69 59% 310.68 58%		93.703			93.626 93.604	92.712	2.137
Winterset	EX116	EX118			0.24					0.00	0.24 0	.00 0.:		17.74			0.00	7.	46 55	.97 417.75	0.45		0.45	75.63	33.81	0.00		0.00	88.53	0.00 45	1.55 900	Circular 914.	40 0.35%	1117.30	1.76	61.27	665.75 40%	95.741	93.604	92.690	2.137 95.877	93.389	92.475	2.488
					 	$\pm \pm$	-	+=				4.	1.35	+	-	+	7.46				0.45					0.00						+	_	-				+						<u> </u>
					-									-																							+							\vdash
TO CAMPEAU PONI Block 73		EX102	0.460					-				0.	.46 6.10	16.58	0.53	17.10	0.86 10.9	7 10.	.97 58	.28 639.17					0.00					0.00 63	9.17 120	0 Circular 1219	.20 0.17%	1676.99	1.48	45.30	1037.83 38%	95.128	93.526	92.31	1.602 95.280	93.623	92.23	1.657
Winterset Road	EX115	EX114			0.52	+-+				0.00	0.52 0	.00 0.	.52 0.52	10.00	1.98	11.98					0.98		0.98	104.19	101.69					0.00 10	11.69 600	Circular 609.	60 0.15%	248.09	0.88	99.41	146.40 41%	95.780	93.455	92.85	2.325 95.507	93.220	92.61	2.288
Winterset Road Winterset Road	EX114 EX113	EX114 EX113 129A						#==		0.00	0.00 0	.00 0.	00 0.52	11.98 12.89	0.92	12.89 13.55	0.00	0.0	00 67	24 0.00	0.00		0.98 0.98	94.80 91.05	92.52 88.87					0.00 92	2.52 750 3.87 900	Circular 762. Circular 914.	0.17%	478.86 755.43	1.08	58.05 44.95	146.40 41% 386.34 19% 666.57 12%	95.507 95.415	93.372 93.385	92.61	2.135 95.415 2.030 94.954			2.030 1.641
STREET 3	1160	116	0.243					#==		0.24	0.00 0	00 0	24 0.24	10.00		10.42	0.45	0.4	45 76	.81 34.76	0.00		0.00		0.00	0.00		0.00	122 14	0.00 34							56.69 38%		93.634			93 582		
STREET 3	116	117	0.240					#==			0.00 0			10.42	0.75	11.17	0.00			.24 34.05			0.00	102.04	0.00	0.00		0.00	119.60	0.00 34		5 Circular 381.	00 0.25%	91.46	0.83	37.32	57.40 37%	95.501					93.107	
STREET 5		119	0.163					#=		0.16	0.00 0	.00 0.	.16 0.16	10.00	0.65	10.65	0.30			.81 23.32			0.00	104.19	0.00	0.00		0.00	122.14	0.00 23		5 Circular 381				32.33	68.14 25%			93.529			93.448	
STREET 5	118	118 118A	0.394					+=		0.39	0.00 0 0.00 0	.00 0.:	.39 0.56	10.65 10.85	1.71	12.56	0.00 0.73	1.0	04 73	.39 22.59 .68 76.45	0.00		0.00	99.90	0.00	0.00			118.24 117.09	0.00 76	6.45 450	Circular 457.	20 0.20%	133.02	0.84	85.92	68.87 25% 56.57 57%	95.859	93.829 9 93.804	93.347	2.055 95.797	93.632	93.175	2.165
STREET 5		117	0.271								0.00 0			12.56	T					.19 105.16					0.00			0.00	108.21								95.48 52%		93.632				92.955	
STREET 3	117	126	0.135								0.00 0			13.86	T	14.81	0.25	2.3	25 64	.61 145.13	0.00		0.00	87.45	0.00	0.00		0.00	102.43	0.00 14	5.13 52	5 Circular 533.	40 0.16%	179.46	0.83	47.27	34.33 81%	95.700		92.955	2.212 95.452	93.413	92.879	2.039
STREET 5 STREET 5	120 121	121 122	0.165		 						0.00 0			10.00 11.02		11.02 11.28	0.31	0.:		.81 23.60 .09 22.46	0.00		0.00	104.19 99.09		0.00		0.00	122.14 116.13	0.00 23 0.00 22	3.60 375 2.46 375	5 Circular 381. 5 Circular 381.	00 0.25% 00 0.25%	91.46 91.46	0.83	50.77 12.99	67.85 26% 68.99 25%	95.804 95.796	93.867 93.740		1.937 95.796 2.056 95.815	93.740 93.708	93.359 93.327	2.056
STREET 5 STREET 5		123 124	0.319 0.188					4		0.32	0.00 0 0.00 0	.00 0.:	.32 0.48	11.28 12.78	1.50	12.78	0.59		90 72	.21 65.09 .56 84.56			0.00	97.87	0.00	0.00		0.00	114.70 107.18			Circular 457. Circular 533.	20 0.20%				67.92 49%	95.815	93.708 93.558				93.100 92.933	
STREET 5		125						#=			0.00 0			13.93						.42 80.63					0.00												98.83 45%		93.466				92.912	
STREET 3	125	129	0.135			+		#==		0.14	0.00 0	.00 0.	.14 0.81	14.19	0.60	14.79	0.25	1.3	50 63	.75 95.83	0.00		0.00	86.27	0.00	0.00		0.00	101.05	0.00 95	5.83 529	5 Circular 533.	40 0.16%	179.46	0.83	29.72	83.64 53%	95.634	93.446	92.912	2.188 95.590	93.398	92.865	2.192
STREET 4 STREET 4	127	128 126	0.381					#=		0.38	0.00 0 0.00 0	.00 0.	38 0.38	10.00	1.62	11.62	0.71	0.1		.81 54.50 10 87 14			0.00	104.19	0.00	0.00		0.00	122.14 112.91	0.00 54	4.50 450	Circular 457.	20 0.20%	133.02	0.84	81.29	78.51 41% 45.88 66%			93.257 93.094	2.138 95.766 2.215 95.452	93.552	93.094 92.956	
STREET 3		129	0.211		1===	##		#=			0.00 0			14.81			0.02			.10 87.14				84.19		0.00		0.00	98.60	0.00 87	6.06 675	5 Circular 685.						95.452		92.727			92.956	
			0.000 0.000					#=			0.00 0					T	0.00			81 435.74			1					0.00		0.00												 		
BLOCK 94	129	129A	0.039 0.399					+				.00 0.4		10.00		1	0.70				0.00			104.19	0.00	0.00		0.00	122.14	0.00 43	5.74 900	Circular 914.						95.590	93.398	92.484	2.192 94.954	93.336	92.422	1.618
Winterset Road	129A	EX102			0.36					0.00	0.36 0	.00 0.		13.55		13.74	0.00	3.1	67 65	.42 371.10	0.68		1.65		146.48	0.00		0.00	103.74	0.00 51	7.65 900	O Circular 914.	0.1070	700.40	1.19	10.40	201.10 0070	94.954	93.336	92.422	1.618 95.280	93.623	92.400	1.657
Winterset Road	EX102	EX101	+				0.20			0.00	0.00 0	.20 0.:	.20 10.30 0.30	17.10	0.57	17.67	0.00 6.53	16.	.64 57	.21 952.06	0.00 1.65		1.65	77.33	127.90	0.16 0.16		0.16	90.53	14.48 109	94.44 150	0 Circular 1524	.00 0.17%	3040.59	1.72	59.17	1946.15 36%	95.280	93.623	92.099	1.657 96.071	93.522	91.998	2.549
						1		1						1		1																		ļ										

14.20 Denotes existing Sewers (As-Constructed Information from Stage 3 - Dec 2019)
61.27 Denotes existing Sewers (As-Constructed Information from Stage 4 - Fall 2020)



ARCADIA STAGES 3

CITY OF OTTAWA
MINTO COMMUNITIES INC.

5.45 102.74 559.80 15.02 73.80 1108.42 449.95 872.20 STORM SEWER DESIGN SHEET

92.568 91.631 93.460 93.426 92.469 91.597

Designed by: AT Checked by: LD

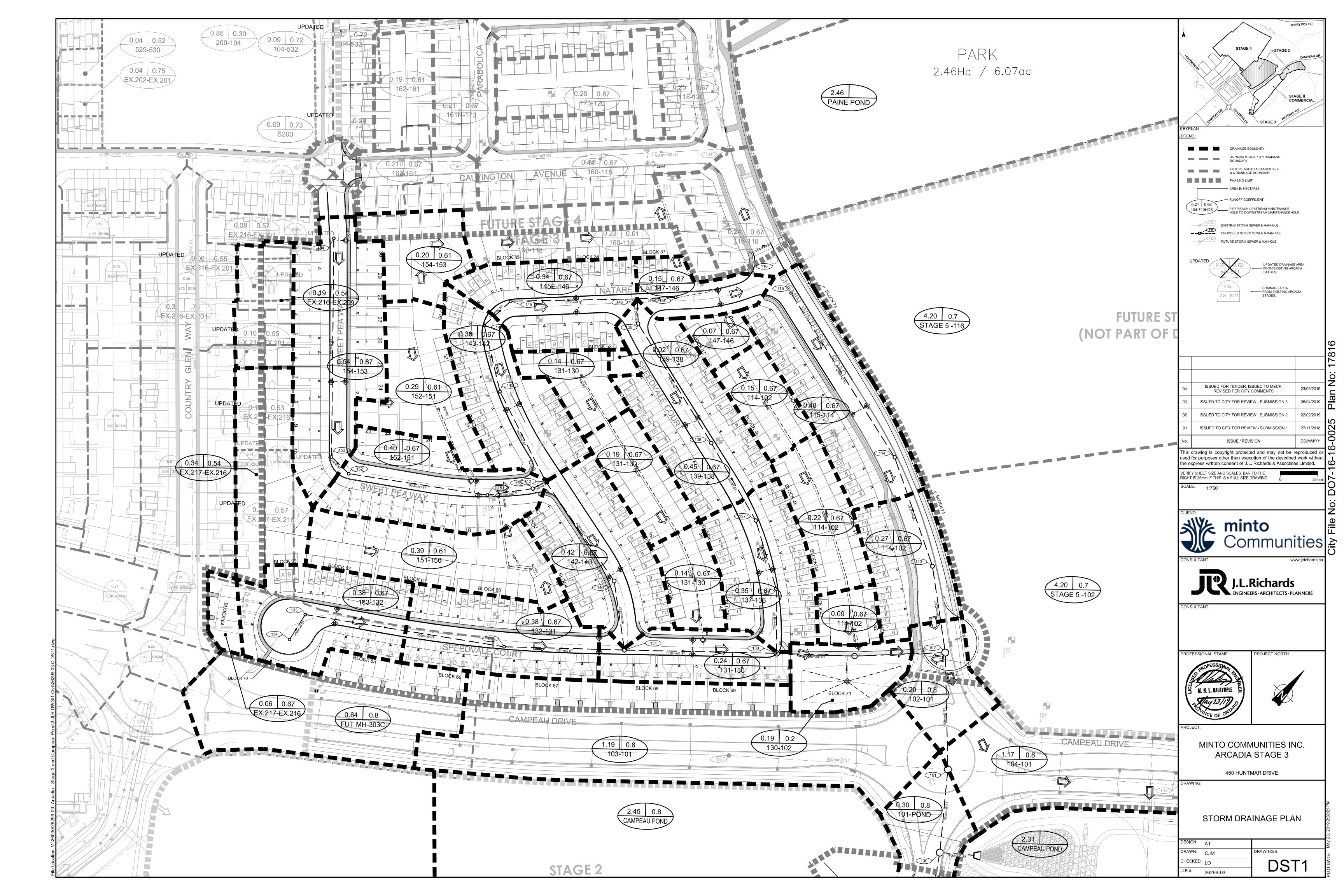
Date: April 2019

Manning	's Coefficient n = 0.013			
		year		
			•	
	Denotes Sewers for Future A	Arcadia St	ages 3B,4, and 5	

ed Sewers for Arcadia Stage 3A Invert Invert STREET Stage 3 Outlet to Campeau Pond 93.821 93.795 93.500 93.454 93.360 Sweet Pea Way Sweet Pea Way Sweet Pea Way Sweet Pea Way Sweet Pea Way 2.49 2.49 2.03 2.27 2.25 94.041 93.821 93.643 93.500 93.377 145 144 143 72.66 48.72 0.64 4.70 4.70 63.51 61.96 588.9 815.1 1.90 2.30 93.207 92.916 63.2 2.16 145 E 76.81 94.135 93.513 2.16 76.81 31.47 93.962 93.581 93.894 93.513 93.731 93.373 93.175 131 130 61.13 93.591 92.524 2.05 Speedvale Street 1.70 130A 102 0.49 58.82 57.80 1.63 Stage 5 4.20 0.00 93.410 92.344 93.387 92.321 115 114 113 0.27 67.12 57.51 102 101 56.67 2.00 Winterset Road 10.97 621.44 9.57 76.58 732.88 39.88 93.613 92.089 92.000 101 11.86 2.20 2.65 2.65 111.67 295.53 295.53 900 95.52 2.31 104 2.46 0.00 317.82 92.881 92.000 2.00 Campeau Drive 92.119 92.762 0.45 2.00 Donum Lane 100 10.97 55.46 608.21 9.57 74.93 717.11 0.67 6.36 557 89 972.9 93.524 92 000 93 460 91.936 0.07 123.6 1.95 456.36 1.95 Stub 99 92.877 92.720 CL Future Commercial 5.45 104.19 567.73

54.63

599.14



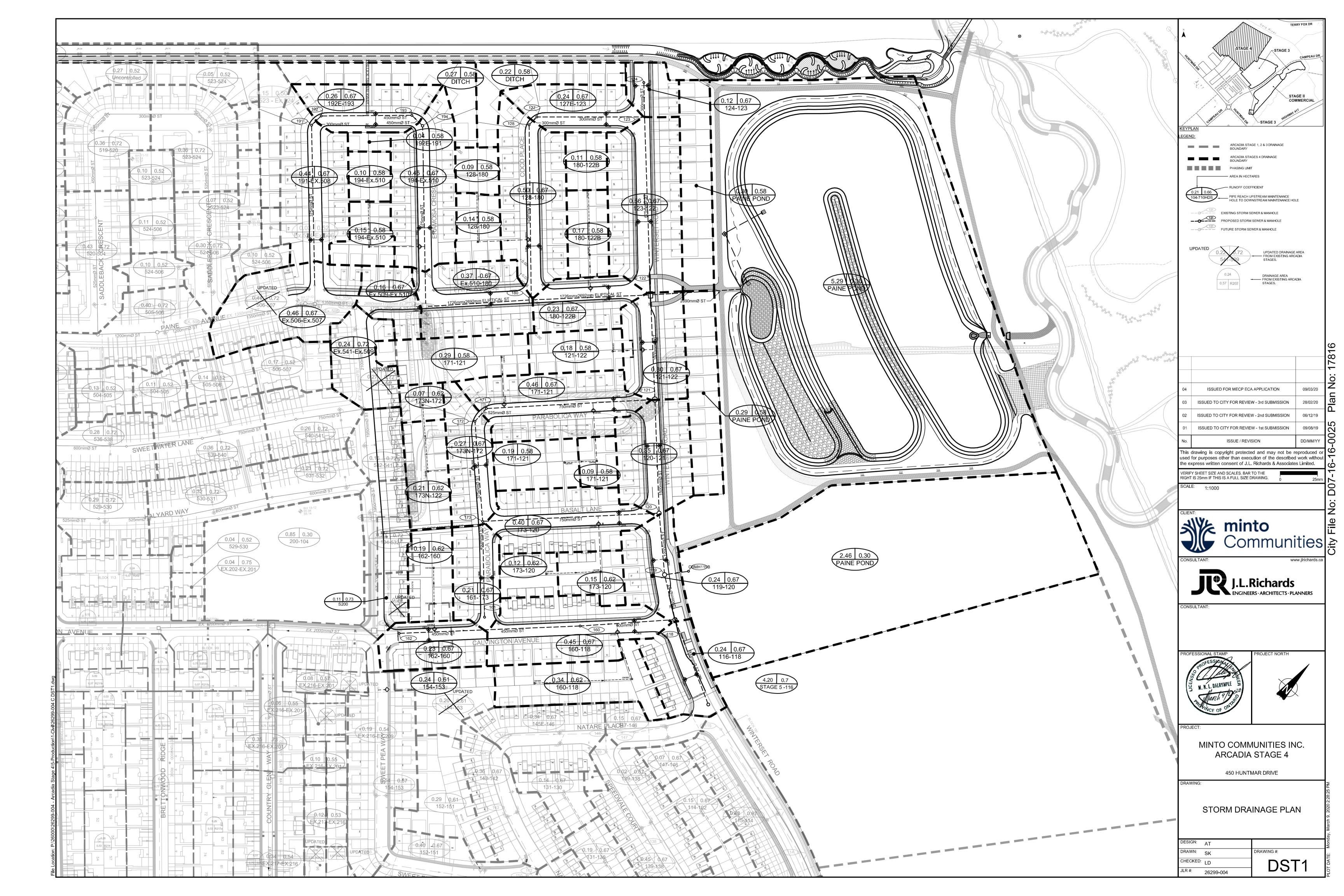


MINTO COMMUNITIES INC. ARCADIA STAGE 4 450 HUNTMAR DRIVE STORM SEWER DESIGN SHEET JLR NO. 26299-004

	Maintenace Hol	e No.	1:2 Year Storm		1:5 Year S	Storm	_ 1	1:10 Year St	Storm To	tal Areas .	otal	Cum.	Indak Tim	In Pipe			1:2 Year Peak Addition	Flow		A 1 1'4' 0	Peak Flow um. 1:5 Yr		A 1.11	10 Year Pertion Cum.		Total			Pipe Data		Residu	Upstream Ge	ometry	Down	nstream Geometry
Street Name	From To	0.	58 0.62 0.65 0	.67 0.	0.52 0.30 0.61 0.65	0.67 0.70	0 0.72 0.57	0.61	0.66 1:2 Yr		Area fro Other	Total Are	a (min.)	Flow Time	Total Time	2.78AR	al Cum.	1:2 Yr Peak tensity Flow	2.78A	AR al 2.	78A Intensi	Peak Flow	2.78AR a	2.78A	1:10 Yr Intensity Peak Flow	Peak Flow	Dia Heigh	Width Type SI	lope Q Full (L/s)	V Full Length	al TG F	rom Obvert	Invert Cover T	G To Dro	rop Obvert Invert Cover
											Stages	()		()			2.76AR			2.70AK	. ,		2.78						· · · /		Capacit				
Eramosa Eramosa	191 NS NS01 Ex. 5		0).44		I				0.00 0.00 0.00 0.00	0.44	0.44	10.00 11.73		11.73 11.92	0.82		76.81 62.95 70.74 57.98	0.00		0.00 104.19 0.00 95.86	0.00	0.00		122.14 0.00 112.33 0.00	62.95 57.98	375 375	Circular 0.		1.05 108.80 1.13 12.93		93.976		- 5.610	93.541 93.160 - 93.481 93.100 3.129
B-i	Ex. 506 Ex. 5				47	0.46				0.63 0.00				0.73		0.00									100.64 341.15	1346.98	4250						91.150 4.328 96		
Paine Paine	Ex. 506 Ex. 5			0.	J. 17	0.46				0.00 0.00		8.28 8.28		0.73		0.00		61.73 0.00			1.71 85.92 1.71 83.51				97.79 331.52		1350	Circular 0. Circular 0.					92.030 3.168 96		
Paine	Ex. 508 Ex. 5	509							0.00	0.00 0.00	0.00	8.72	15.06	0.28	15.33	0.00	0.82	61.64 50.51	0.00	0 1	1.71 83.38	976.04	0.00	3.39	97.64 331.01	1357.56	1350	Circular 0.	21% 2545.58	3 1.72 28.85	1188.01 96.6	93.382	92.010 3.248 96	6.750 0.0	099 93.322 91.950 3.428
Clonrush	Ex. 541 Ex. 5	509					0.24		0.00	0.24 0.00	0.24 28.63	28.87	17.61	0.61	18.22	0.00	0.00	56.22 0.00	0.48	8 47.12 4	7.60 75.97	3616.39	0.00 7.1	7.12	88.94 633.23	4249.62	2100	Circular 0.	14% 6853.07	7 1.92 69.67	2603.45 96.9	900 93.734	91.600 3.166 96	6.750 0.4	411 93.634 91.500 3.116
Paine	Ex. 509 Ex. 5	510				0.16			0.00	0.16 0.00	0.16	37.75	18.22	0.27	18.48	0.00	0.82	55.09 45.15	0.30	0 5	9.60 74.43	4436.17	0.00	10.51	87.12 915.61	5396.93	1725	2690 Elliptical 0.	16% 7352.57	7 3.05 48.54	1955.64 96.7	750 93.223	91.470 3.527 96	6.062	93.143 91.390 2.920
Eramosa	191 19							T	0.00		0.00	0.00	10.00	0.18	10.18	0.00	0.00	76.81 0.00	0.00	0 0	0.00 104.19	0.00	0.00		122.14 0.00	0.00	300	Circular 0.	35% 59.68	0.84 9.05	59.68 97.3	207 93.632	93.327 3.575 97	7.175	93.600 93.295 3.574
Eramosa Eramosa	192 19 193 19	3 0.	04 0).26						0.00 0.00		0.30	10.18 11.11		11.11 11.26	0.55 0.00		76.13 41.78	0.00		0.00 103.26 0.00 98.68	0.00	0.00	0.00	121.04 0.00 115.65 0.00	41.78 39.95	450 450			1.11 61.70 1.11 10.21	134.19 97. 136.02 96.9		93.143 3.574 96 92.927 3.597 97	6.981 7.027	93.384 92.927 3.597 93.348 92.891 3.679
Eramosa	194 Ex.		25 0).45		 				0.00 0.00		1.00	11.26		12.68			72.28 129.38	0.00		.00 97.97		0.00		114.81 0.00				35% 518.06			93.348	92.663 3.679 96	5.062	92.919 92.233 3.143
Paine	Ex. 510 18	0				0.37			0.00	0.37 0.00	0.37	39.12	18.48	0.97	19.45	0.00	2.61	54.61 142.51	0.69	9 6	0.29 73.77	4447.90	0.00	10.51	86.35 907.50	5497.91	2690 1727	2692 Elliptical 0.	15% 7032.78	3 1.24 71.94	1534.86 96.0	92.919	91.165 3.143 95	5.778 0.3	369 92.811 91.057 2.967
Coco	127 12									0.00 0.00		0.00	10.00		10.11	0.00		76.81 0.00			.00 104.19				122.14 0.00	0.00	300		65% 81.33					5.112	93.227 92.922 2.884
Coco	128 18		23 0	0.50						0.00 0.00		0.73			11.73			76.39 99.48			103.63				121.47 0.00					1.23 119.16					368 92.810 92.277 2.968
Paine	180 12	2		0.).28	0.23				0.51 0.00		40.36	19.45	0.70	20.15	0.00	3.91	52.93 207.06	0.83		1.13 71.48			10.51	83.66 879.23	5455.70	2690 1727	2692 Elliptical 0.	37% 11036.31	1 1.94 81.20	5580.61 95.3	778 92.442	90.688 3.336 95	5.229	92.142 90.388 3.086
Coco	127 12	3	0).24					0.24	0.00 0.00	0.24	0.24	10.00	1.06	11.06	0.45	0.45	76.81 34.33	0.00	0 0	.00 104.19	0.00	0.00	0.00	122.14 0.00	34.33	300	Circular 0.	65% 81.33	1.15 73.32	47.00 96.0	93.145	92.840 2.913 95	5.493 -0.1	103 92.669 92.364 2.824
Winterset	124 12	3				0.12			0.00	0.12 0.00	0.12	0.12	10.00	0.45	10.45	0.00	0.00	76.81 0.00	0.22	2 (104.19	23.29	0.00	0.00	122.14 0.00	23.29	300	Circular 0.	36% 60.75	0.86 23.46	37.46 95.1	281 92.857	92.552 2.425 95	5.493	92.771 92.467 2.721
Winterset	123 12	2				0.56			0.00	0.56 0.00	0.56	0.92	11.06	1.65	12.71	0.00	0.45	72.95 32.61	1.04	4 1	.27 98.90	125.26	0.00	0.00	115.91 0.00	157.88	675	Circular 0	25% 438.47	1.23 121.17	280.59 95.4	193 92.771	92.086 2.721 95	5.229 0.3	326 92.469 91.783 2.760
Calvinton	162 16 160 11		0.19 0	0.23		 		_		0.00 0.00 0.00 0.00	0.42	0.42 1.21	10.00	1.36	11.36 11.98	0.76 1.42		76.81 58.06 71.94 156.84			0.00 104.19 0.00 97.51		0.00		122.14 0.00	58.06	450 900		65% 239.80	1.51 123.27) 1.76 64.74				5.011	93.627 93.170 2.383
Calvinton			0.34 0	1.45									11.30	1					0.00	0			0.00		114.27 0.00	L	L						92.713 2.383 95	0.077	93.401 92.486 2.477
Winterset Winterset	Stage5 11 116 11	8				0.24	0		0.00	4.20 0.00 0.24 0.00	1.20).24	4.20 4.44	12.00 12.19	0.19	12.19 12.78	0.00	0.00	69.89 0.00 69.31 0.00	0.45	7 E	1.17 94.70 1.62 93.90			0.00	110.96 0.00 110.02 0.00	773.97 809.42	900 900	Circular 0. Circular 0.	35% 1117.30 35% 1117.30	1.76 19.88 1.76 62.02	343.33 94.3 307.88 95.	95 93.687 741 93.618	92.773 0.608 95 92.703 2.124 95	5.741 5.877	93.401 92.486 2.477
Winterset	118 11	9							0.00	0.00 0.00	0.00	5.65	12.78	0.37	13.15	0.00	2.18	67.57 147.30	0.00	0 8	1.62 91.50	788.77	0.00	0.00	107.20 0.00	936.06	1200	Circular 0.	15% 1575.26	5 1.39 31.33	639.19 95.8	93.401	92.182 2.477 95	5.535	93.354 92.135 2.181
Park	Park 11	9			1.23	 			0.00	1.23 0.00	1.23	1.23	15.00	0.23	15.23	0.00	0.00	61.77 0.00	1.03	3 1	.03 83.56	85.71	0.00	0.00	97.85 0.00	85.71	375	Circular 0.	50% 129.34	1.17 16.45	43.62 94.	700 93.017	92.636 1.683 95	5.535 -0.4	419 92.935 92.554 2.601
Winterset	119 12	0				0.24		+	0.00	0.24 0.00	0.24	7.12	13.15	0.50	13.66	0.00	2.18	66.50 144.98	0.45	5 1	0.09 90.05	908.83	0.00	0.00	105.48 0.00	1053.82	1200	Circular 0.	15% 1575.26	3 1.39 42.06	521.44 95.5	93.354	92.135 2.181 95	5.619	93.291 92.072 2.328
Parabolica	161 17	3	0).21		+		+	0.21	0.00 0.00	0.21	0.21	10.00	0.72	10.72	0.39	0.39	76.81 30.04	0.00	0 0	.00 104.19	0.00	0.00	0.00	122.14 0.00	30.04	450	Circular 0.	65% 239.80	1.51 65.25	209.76 96.9	60 94.486	94.028 2.074 96	5.574 0.3	350 94.062 93.604 2.512
Parabolica	172 17	3	0.28 0).27					0.55	0.00 0.00	0.55	0.55	10.00	0.85	10.85	0.99	0.99	76.81 75.69	0.00	0 0	0.00 104.19	0.00	0.00	0.00	122.14 0.00	75.69	375	Circular 0.	65% 147.47	1.34 68.22	71.78 96.	159 94.155	93.774 2.004 96	5.574	93.712 93.331 2.862
Basalt	173 12		0.27 0	0.40						0.00 0.00		1.43			12.14	1.23		73.68 192.28			.00 99.90				117.09 0.00		750	Circular 0.	35% 687.10	1.56 120.24	494.82 96.9	574 93.712	92.950 2.862 95	5.619	93.291 92.529 2.328
Winterset	120 12					0.35				0.35 0.00		8.90			14.45			65.13 311.97			0.74 88.17				103.28 0.00					1 1.62 77.39			91.767 2.328 95		93.175 91.651 2.143
Parabolica	172 17			_				-		0.00 0.00		0.00	10.00	0.12		0.00		76.81 0.00	0.00		0.00 104.19		0.00		122.14 0.00	0.00	525			1.67 11.61				5.152	93.821 93.288 2.331
Parabolica	171 12		57 0	0.46		1				0.00 0.00		1.03			11.02			76.36 135.61			0.00 104.15		0.00		121.43 0.00					2.12 114.88		152 93.821	93.059 2.331 95		100 93.075 92.313 2.243
Winterset	121 12	2 0.	18			0.30		_	0.18	0.30 0.00	0.48	10.41	14.45	0.36	14.82	0.29	6.86	63.09 432.52	0.56	6 1	1.30 85.37	964.95	0.00	0.00	99.98 0.00	1397.47	1800	Circular 0.	49% 8351.30	3.28 71.22	6953.82 95.3	93.175	91.346 2.143 95	5.229 0.6	687 92.829 91.000 2.399
Paine	122 Pond B	ottom				+		+	0.00	0.00 0.00	0.00	51.69	20.15	0.83	20.97	0.00	11.21	51.80 580.87	0.00	0 7	3.70 69.93	5153.62	0.00	10.51	81.83 860.07	6594.55	2692 1727	2692 Elliptical 0.	15% 7032.78	3 1.24 61.21	438.22 95.2	229 92.142	90.388 3.086 93	3.316	92.051 90.296 1.265

Denotes exis

Denotes existing Sewers
Denotes existing information from Stage 2 Design Sheet July 2015 by H.M
Denotes existing Sewers (As-Built Information from stage 2 July 2015 by H.M)





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