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Site Servicing Report

Arcadia Stage 6
450 Huntmar Drive

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

Value through service and commitment

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1.0 INTRODUCTION

1.1 General

In 2022, J.L. Richards & Associates Limited (JLR) was retained by Minto Communities Inc. (Minto) to prepare the detailed design of municipal infrastructure for Site Plan Approval (SPA) of Arcadia Stage 6. This Site Servicing Report (SSR) presents the servicing constraints and strategies for water, wastewater, stormwater servicing, and stormwater management in accordance with the City of Ottawa Design Guidelines, the associated technical bulletins and relevant design excerpts. This SSR also includes strategies for implementing erosion and sedimentation control measures throughout the construction phase of the project.

1.2 Site Description

Minto's Arcadia Stage 6 is located within the City of Ottawa's Official Plan boundary and consists of a ±5.58 ha parcel bounded by Campeau Drive and Arcadia Stage 3 to the north, Campeau Drive SWMF and Donum Lane to the east, Country Glen Way to the west and by the Light Rail Transit (LRT) / Feedmill Creek to the south (refer to Figure 1-1: Location Plan). The legal description of the subject property is Part of Block 2, Registered Plan 4M-1563 and Part of Lot 3, Concession 1 (Geographic Township of March), City of Ottawa (refer to Appendix A1 for the Legal Plan)

A topographical survey was completed by Stantec Inc. in May 2022 (Appendix A1). The survey indicates that the existing ground surface contains fill piles and generally slopes downwards in a northeasterly direction towards Donum Lane.

1.3 Proposed Development

The proposed development will consist of 368 residential units, one public parkette (0.56 ha) and two (2) amenity blocks (0.087 ha and 0.113 ha). Overall, the site will feature 11 Executive Towns, 80 Avenue Towns, 13 Urban Towns and 264 Metro Towns. The Concept Plan for Arcadia Stage 6 is attached to Appendix A1.

1.4 Proposed Connections to Existing Infrastructure

A review of existing services was completed along both frontages of the subject property to identify existing sewers and watermains to service the development. The proposed connections to the existing infrastructure consists of the following (refer to Appendix A3 for a copy of the background drawings):

Watermain

- East: Connection to existing 305 mm diameter PVC watermain along Donum Lane.
- West: Connection to existing 305 mm diameter PVC watermain along Country Glen Way.

Sanitary

- East: Removal and relocation of existing maintenance hole on Donum Lane and connection using 375 mm pipe.

Storm

- East: Removal and relocation of existing maintenance hole on Donum Lane and connection using 1500 mm pipe.
- West: Connection to existing maintenance hole on Country Glen Way using 900 mm pipe. The existing 600 mm pipe initially intended to service the proposed development will be removed.

The existing watermain, storm and sanitary stubs on Donum Lane will be removed.

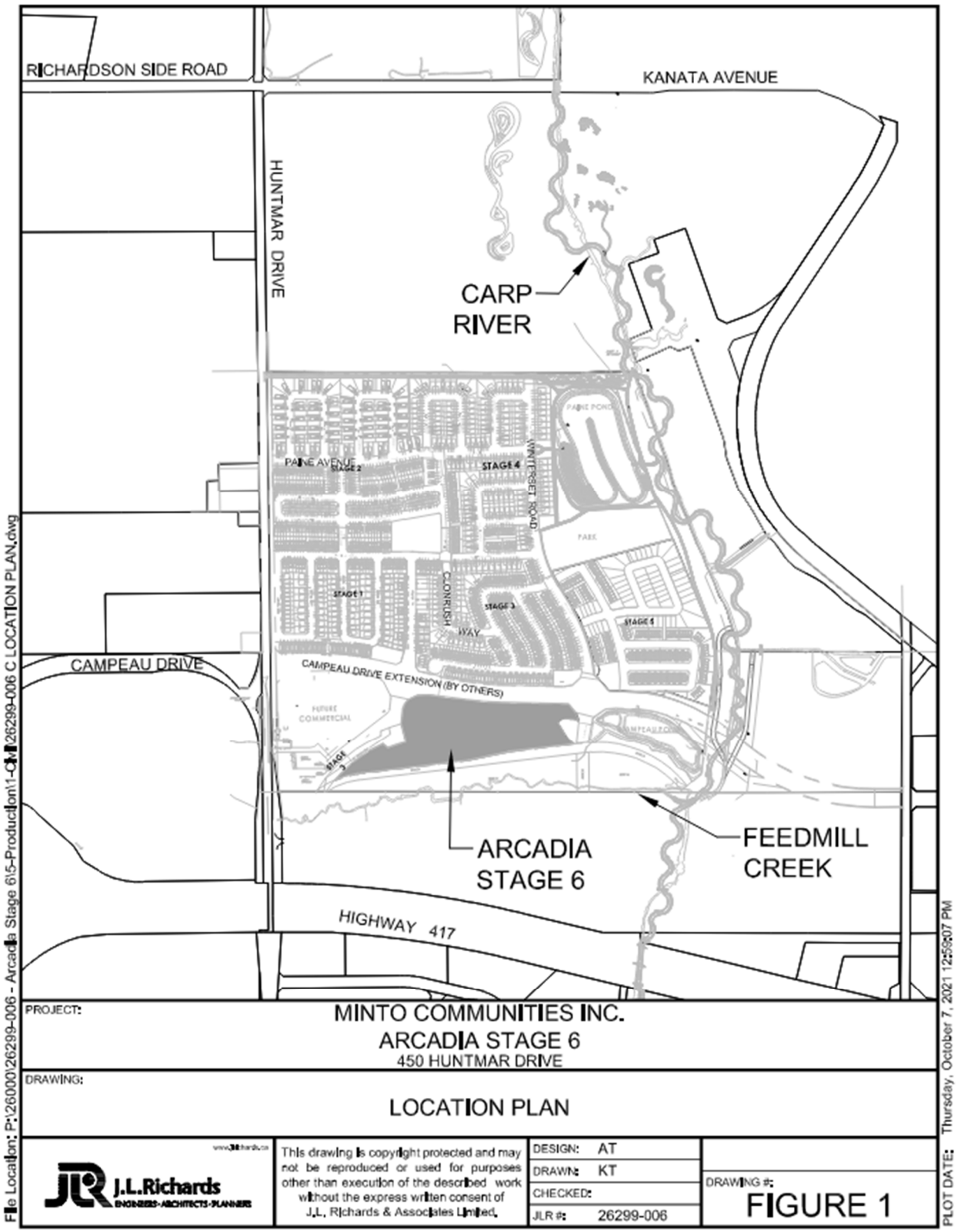
1.5 Consultation and Permits

A pre-consultation meeting was held on September 2, 2021, to discuss the planning process, design criteria, and servicing constraints. A copy of the pre-consultation meeting notes has been provided in Appendix A2.

As stated during the pre-consultation meeting, Stage 6 will be a Site Plan Control Application to the City of Ottawa. Existing structures are in place at the East and West side of the property line. These structures will be removed and/or relocated. As noted in the Servicing Drawings (S1 and S2), Stage 6 will have two storm, one sanitary and two watermain connections. An Environmental Compliance Approval (ECA) will be necessary to meet the Ministry of Environment, Conservation and Parks (MECP) requirements.

In addition, a Servicing Study Checklist has been included in Appendix A4 of this report. The checklist provides all the details associated with this development as well as the approval and permit requirements.

Figure 1-1: Location Plan



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). Since receiving the boundary conditions from the City (Appendix B2), the number of units has been reduced from 409 to 368. The proposed development now consists of 104 townhouses (11 Executive Towns, 80 Avenue Towns and 13 Rear Lane Towns) and 264 duplexes (Metro Towns).

The residential consumption rate for average day demand was set in accordance with the City's TB-2021-03. Table 2-1 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.

Table 2-1: Water Demands

Demand Scenario	Water Consumption or Peaking Factor	Residential Demand (L/s)
Average Day Demand	280 L/c/d	2.88
Maximum Day Demand	2.5 x Avg Day	7.20
Peak Hour Demand	2.2 x Max Day	15.83

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. Several firewalls were specified throughout the development to limit the maximum RFF to 15,000 L/min (250 L/s) in accordance with the boundary conditions received from the City of Ottawa. Critical fire areas for Arcadia Stage 6 are presented in Table 2-2.

Table 2-2: Fire Flow Requirements

Location	Block Number	Calculated Fire Flow L/min (L/s)
Critical Fire Area 1	Block 14	15,000 (250)
Critical Fire Area 2	Block 15	15,000 (250)
Critical Fire Area 3	Block TE-05	15,000 (250)
Critical Fire Area 4	Block TE-11	15,000 (250)

Refer to Appendix B1 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 6 includes a private 203 mm watermain loop connected to the following existing watermains:

- Connection-1: the existing 305 mm watermain south of the intersection of Donum Lane and Campeau Drive; and
- Connection-2: the existing 305 mm watermain stub south of the intersection of Country Glen Way and Campeau Drive.

The water demands will be supplied by local 203 mm PVC watermains and 50 mm PEX water services. All units will be provided with an individual water service from the front except for the duplex blocks with underground parking, which will be provided with a shared water service into the mechanical room for each complex. A 50 mm PEX water service will be extended from the mainline to provide domestic water service to units which do not have direct access to the 203 mm watermains from the front. Refer to Drawing S1 and S2 for the water servicing layout.

2.4.2 Boundary Conditions

Hydraulic boundary conditions were provided by the City at the two proposed connection locations (Connection-1 and Connection-2) listed in Section 2.4.1 above. Tables 2-3 summarizes the hydraulic boundary conditions received (refer to Appendix B2 for a copy of the City correspondence).

Table 2-3: Hydraulic Boundary Conditions

Demand Scenarios	Connection-1 Head (m)	Connection-2 Head (m)
Maximum HGL	161.3	161.3
Peak Hour	156.3	156.3
Max Day plus Fire 1 (167 L/s)	153.8	151.5
Max Day plus Fire 2 (250 L/s)	150.5	145.5

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 B3). The water demands from Table 2-1 and the boundary conditions from Table 2-3 were input into the model for each demand scenario. Table 2-4 summarizes the watermain diameters and roughness coefficients used in the model, based on Sections 4.2.12 and 4.3.5 of the Design Guidelines.

Table 2-4: Watermain Internal Diameters and C-Factors

Nominal Diameter	Inside Diameter	C-Factor
50 mm	50 mm	100
150 mm	155 mm	100
200 mm	204 mm	110
300 mm	297 mm	120

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 528 kPa (76.6 psi) (refer to Appendix B4), which exceeds the minimum pressure criterion of 276 kPa (40 psi) per the Design Guidelines.

2.5.2 Maximum Day Plus Fire Flow

Fire water supply will be provided by hydrants located along the 203 mm watermains. Hydrant spacing was carried out in accordance with the Design Guidelines.

To ensure adequate fire protection, the maximum day demand shown in Table 2-1 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 hydrant without allowing any part of the system to experience pressures less than 140 kPa (20 psi). Except for hydrant H-6, it is expected that the targeted fire flow of 15,000 L/min (250 L/s) can be provided throughout the site (refer to Appendix B5). Contributing fire hydrants were assessed for each structure within the site to confirm that adequate water supply is available per Appendix I of TB-2018-02.

As hydrant H-6 was only able to provide an available fire flow of 247 L/s, fire flow demands of 63 L/s were manually applied to the nearby hydrants (H-4, H-5, H-6 and H-7) to confirm if the hydrants could provide the RFF (250 L/s) while achieving the minimum pressure requirement of 140 kPa (20 psi). The results indicated that the hydrants were able to provide the RFF for Block TE-05 while maintaining the minimum pressure requirement throughout the site (refer to Appendix B5).

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 604 kPa (87.6 psi) and 648 kPa (94.0 psi) (refer to Appendix B6). Since these values exceed the maximum pressure constraint of 552 kPa (80 psi) per the Design Guidelines, all units within Arcadia Stage 6 will require pressure reducing valves (PRVs).

2.6 Summary and Conclusions

Based on the water simulation results, the proposed development can be serviced by a 203 mm watermain loop, 203 mm local watermains and 50 mm water service extensions as shown on Drawing S1 and S2. 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

In accordance with the Kanata West Master Servicing Study (KWMSS), wastewater servicing in Arcadia Stage 6 is designed to outlet to the existing 675 mm diameter gravity sanitary sewer on Campeau Drive. Sanitary sewage will then be conveyed by gravity to the Signature Ridge Pump Station (SRPS) which, in turn, will eventually outlet to the Robert O. Pickard Environmental Centre where wastewater is processed and treated prior to discharge into the Ottawa River.

3.2 Design Criteria

The sanitary sewer system within Arcadia Stage 6 is designed in accordance with the Ottawa Sewer Design Guidelines and subsequent technical bulletins. The design parameters are applied under two scenarios as per ISTB Technical Bulletin 2018-01. In addition to the typical design values, annual values are used for the simulation of the system with failure of the pump station and operation of the overflows. The simulation of the pump station failure should show that the HGL of the sanitary system remains below the underside of footings due to the operation of the overflows. The key design parameters have been summarized in Table 3-1.

Table 3-1: Wastewater Key Design Parameters

Design Parameter	Design Value	Annual Value
Duplex[1] Population Density	2.3 ppu	Same as design
Row Townhouse[2] Population Density	2.7 ppu	Same as design
Residential Average Flow	280 L/Cap/Day	200 L/cap/day
Residential Peaking Factor	Harmon's Formula	Same as design
Harmon's Correction Factor (K)	0.8	0.6
Infiltration Allowance	0.33 L/s/ha	0.3
Manning's Roughness Coefficient (n)	0.013	0.013
Allowable Slopes	Varies (Refer to Section 6.1.2.2 of ODSG)	-
Allowable Velocities	0.6 m/s – 3.0 m/s	-
Allowable Freeboard	-	> 0 m

(1) The product "Metro Towns" are duplex units.
(2) The products "Rear Lane (or Urban) Towns", "Executive Towns", and "Avenue Towns" are row townhouse units.

3.3 Proposed Sanitary Servicing and Design Flows

Wastewater generated from Arcadia Stage 6 will be conveyed via a local 200 mm diameter sanitary sewer system that will discharge into the existing 375 mm sewer on Donum Lane as shown in the Servicing Drawings (S1-S2).

Wastewater flows from the proposed development are presented in the Arcadia Stage 6 Sanitary Design Sheet (refer to Appendix C1). Based on the design criteria (Table 3-1) and the site constraints, a total design peak flow of 11.24 L/s is calculated for the development. Table 3-2 summarizes the results from the sanitary design sheet.

Table 3-2: Sanitary Design Flow Summary

Unit Type	Site Area	Unit Count	Unit Density	Average Flow	Res. Peak Flow	Infilt. Flow	Total Flow
Duplex	5.58 ha	264	2.3 ppu	280 L/cap/day	9.40 L/s	1.84 L/s	11.24 L/s
Row Townhouse		104	2.7 ppu				

The peak wastewater flow calculated for the proposed Arcadia Stage 6 development is 11.24 L/s as shown in Table 3-2. This is based on a total population of 888 people. The sanitary design spreadsheet prepared by IBI (Appendix C2) shows that a flow of 4.80 L/s was allocated for the western portion of Stage 6 and a flow of 20.06 L/s was allocated for a 24.3 ha land parcel which included the eastern portion of Stage 6. This amounts to a pro-rated flow allocation of 1.75 L/s for the eastern portion. Thus, the total flow allocation for the entire Stage 6 development is 6.55 L/s (4.80 L/s + 1.75 L/s).

It is noted that previously, the sanitary flows from this site were to be split between the western portion discharging to Country Glen Way and the eastern portion discharging to Donum Lane. Though two outlets were identified for this site, the flows were anticipated to quickly converge along Campeau Drive into the same sewer located northeast of the site at the Donum Lane/Winterset Road/Campeau Drive intersection (i.e., at ex. MH 307A). Although the calculated peak flow for Arcadia Stage 6 is 11.24 L/s which is greater than the original combined allocated flow of 6.55 L/s the following points discuss the downstream capacities:

1) The Donum Lane detailed design sheets completed as part of Arcadia Stage 3 & 4, show that there is sufficient residual downstream capacity to accept the 11.24 L/s from Arcadia Stage 6 on Donum Lane.

2) The design sheets from the KWMSS for Campeau Drive (Appendix C2) indicate that there is sufficient residual capacity in the downstream system up to the signature ridge pumping station to accommodate the increase in flow.

Given there is sufficient residual capacity in the sewer system, it is proposed to adopt the sanitary servicing strategy described in this section.

3.4 Overflow and Sanitary Hydraulic Grade Line Analysis

Protection against basement flooding within the existing Arcadia Stages 1 to 4 is currently provided by an existing overflow that outlets to the Paine Pond stormwater management facility along with other overflows in the wastewater sewer network. No new overflows are proposed for additional basement protection for Stage 6.

The hydraulic grade line (HGL) analysis carried out for the detailed design of Stage 4 (latest analysis dated February 2020) demonstrated that the design criterion for freeboard was met within the system for Arcadia Stages 1 to 4, including a flow allowance from Stage 6. An updated HGL analysis has been carried out to confirm the HGL within the Stage 6 development.

The HGL analysis was completed using the PCSWMM software platform. The HGL analysis was based on the Signature Ridge HGL analysis completed by IBI in September 2014 with the following revisions:

- Peak wastewater flows were calculated in accordance with the parameters prescribed in Technical Bulletin ISTB-2018-01 and based on residential unit counts and land uses per the current proposed Arcadia Development (Appendix 'A1').
- The local sanitary sewers in Stage 6 were added to the model.
- Land use and residential unit counts were updated using design documents from Arcadia Stages 1, 2 and the Arcadia Retail Development. Appendix C references all applicable documents. Allocations are shown on Drawing OSAN.
- Populations and land uses on the eastern side of the Carp River were maintained as per the 2014 HGL analysis; however, wastewater flows were recalculated based on the parameters in the Technical Bulletin ISTB-2018-01.
- Existing overflows in the model on the East side of the Carp River were maintained in the model although all sanitary sewers were updated as per the GeoOttawa information.
- As per the recent constructed works implemented in Stage 4, an emergency sanitary sewer overflow was included at the Paine SWMF at the 1:25 year design elevation of 93.37 m.

The revisions to the sewershed areas are shown in the marked-up Figures from the September 2014 report (Appendix C8) along with the revised Sanitary Design Sheets for the Dry Weather Flow and Wet Weather Flow with the Annual Parameters. Table 3-4 summarize the wet and dry weather flows for Arcadia Stage 6 under the annual event.

The resulting flows at the overflows are listed in Table 3-3 below using the Annual Parameters for the Dry Weather Flow condition and the Wet Weather Flow Condition. The values can be summed to give the equivalent flow to the SRPS when the pump is operating.

Table 3-3: Sanitary Annual Flows at Overflow Locations

Overflow Location	Overflow Elevation (m)	Dry Weather Flow (l/s)	Wet Weather Flow (l/s)
Paine SWMF	93.37	29	42
SRPS Emergency Overflow	93.70	97	244
Richardson Ridge Overflow	94.10	6	34
Total Flow	-	132	319

The simulated HGL elevations were then compared to underside of footing (USF) elevations of Stage 4 and Stage 3. It should be noted that the USF used in this HGL analysis are generally lower than those assumed as part of the 2013 IBI HGL analysis due to changes in the development criteria of the site during the design phases.

Table 5 6 displays the freeboard under dry and wet weather flows. Results in Table 5 6 indicate that a minimum freeboard greater 0.01m will be achieved throughout Stage 6. HGL levels for conceptual future stages can be found in Appendix 'C8'.

Table 3-4: Freeboard from Sanitary HGL under Pumping Station Failure

Manhole ID	Underside of Footing (m)	DWF Max HGL (m)	DWF Freeboard (m)	WWF Max HGL (m)	WWF Freeboard (m)
100A	94.24	93.92	0.32	94.20	0.04
101	94.24	93.92	0.32	94.20	0.04
101A	94.24	93.92	0.32	94.21	0.03
101B	94.24	93.92	0.32	94.21	0.03
102	94.24	93.92	0.32	94.21	0.03
102A	94.44	93.93	0.51	94.21	0.23
102B	94.62	93.93	0.69	94.22	0.40
103	94.24	93.92	0.32	94.21	0.03
104	94.24	93.92	0.32	94.21	0.03
105	94.24	93.92	0.32	94.21	0.03
106	94.69	93.93	0.76	94.22	0.47
107	94.80	93.93	0.87	94.22	0.58
109	94.80	93.93	0.87	94.23	0.57
110	94.80	93.93	0.87	94.23	0.57
110A	94.80	93.93	0.87	94.23	0.57
110B	94.80	93.93	0.87	94.23	0.57
111	95.10	93.93	1.17	94.23	0.87
112	95.10	93.93	1.17	94.23	0.87
113	95.10	93.93	1.17	94.23	0.87
114	95.15	93.93	1.22	94.23	0.92
114A	95.30	93.93	1.37	94.23	1.07
115	95.43	95.06	0.37	95.07	0.36
116	95.75	93.94	1.81	94.23	1.52
117	95.85	93.94	1.91	94.24	1.61
118	95.50	93.94	1.56	94.24	1.26
119	96.14	94.10	2.04	94.24	1.90
120	96.14	94.17	1.97	94.17	1.97
121	96.14	94.16	1.98	94.24	1.90
122	96.14	95.39	0.75	95.40	0.74
123	96.14	95.05	1.09	95.06	1.08
124	96.14	95.20	0.94	95.20	0.94

Manhole ID	Underside of Footing (m)	DWF Max HGL (m)	DWF Freeboard (m)	WWF Max HGL (m)	WWF Freeboard (m)
124A	96.14	95.47	0.67	95.47	0.67

The table presented below displays the freeboard values for existing Arcadia Stages along with existing downstream infrastructure up to the Signature Ridge Pumping Station. The information summarized below provides a comparison of the updated results from the current JLR model to those presented in the SRPS report.

Table 3-5: 2014 Signature Ridge Pumping Station (IBI Group)

IBI 2014 Signature Ridge Pumping Station Model Parameters					JLR Model Results			
NODE ID	Ground Elevation (approx USF elev.) (m)	USF Elevation	Ultimate Buildout Scenario HGL(m)	Min. FB to ground (FB to approx. USF elev.) (m)	JLR Model Node	JLR HGL (m)	JLR Revised Minimum Freeboard to USF or Ground Elevation (m)	Difference from IBI
Campeau Drive								
1	103.5		99.53	3.97	MHSA66062	96.99	6.51	-2.54
2		96.68	95.47	1.21	MHSA66066	94.44	2.24	-1.03
2B		95.14	94.76	0.38	MHSA65328	94.27	0.87	-0.49
14	99.5		94.64	4.86	MHSA65349	94.19	5.31	-0.45
14A	96		94.52	1.48	MHSA65349	94.19	1.81	-0.33
3		94.8	94.5	0.3	MHSA65349	94.19	0.61	-0.31
4	94.86		94.44	0.42	MHSA65352	94.15	0.71	-0.29
5		94.2	94.23	-0.03	MHSA65123	94.12	0.08	-0.11
12465	95.7		94.27	1.43	MHSA12465	94.12	1.58	-0.15
South of Highway 417								
15	97.6		94.77	2.83	MHSA43765	94.26	3.34	-0.51
Didsbury Road								
20011	97.55		94.29	3.26	MHSA20011	94.13	3.42	-0.16
12461	96.05		94.26	1.79	MHSA12461	94.12	1.93	-0.14
Prop 5E	94.45		94.17	0.28	MHSA69564	94.11	0.34	-0.06
Prop5D	94.38		94.11	0.27	MHSA69565	94.1	0.28	-0.01
Prop 5C	94.33		94.06	0.27	MHSA69566	94.08	0.25	0.02
5A	95.15		94.03	1.12	MHSA65995	94.07	1.08	0.04

Arcadia Stage 1 and 2								
MH9			94.79		MHSA69409	94.29		-0.5
MH41		95.12	94.77	0.35	MHSA69400	94.29	0.83	-0.48
MH32			94.75		MHSA69392	94.29		-0.46
MH31		95.11	94.81	0.3	MHSA69391	94.55	0.56	-0.26
MH30		95.17	94.87	0.3	MHSA69390	94.76	0.41	-0.11
MH29		95.46	95.05	0.41	MHSA69389	94.99	0.47	-0.06
MH28		95.46	95.17	0.29	MHSA69388	95.1	0.36	-0.07
MH27		95.8	95.4	0.4	MHSA69387	95.33	0.47	-0.07
MH26		96.5	95.73	0.77	MHSA69386	95.66	0.84	-0.07
MH25 [S1]		97.77	96.02	1.75	MHSA69385	95.97	1.8	-0.05
MH40		95.11	94.77	0.34	MHSA69399	94.44	0.67	-0.33
MH39		95.1	94.77	0.33	MHSA69398	94.68	0.42	-0.09
MH38		95.17	94.53	0.64	MHSA69397	94.88	0.29	0.35
MH36		95.59	94.76	0.83	MHSA69396	95.1	0.49	0.34
MH37		96.07	95.06	1.01	MHSA69410	95.38	0.69	0.32
MH35		96.04	95.02	1.02	MHSA69395	95.35	0.69	0.33
MH34		96.5	95.46	1.04	MHSA69394	95.78	0.72	0.32
MH33			96.37		MHSA69393	96.67		0.3
MH8			94.8		MHSA69408	94.29		-0.51
MH7			94.8		MHSA69407	94.29		-0.51
MH6		95.27	94.82	0.45	MHSA69406	94.29	0.98	-0.53
MH24		95.2	94.82	0.38	MHSA69556	94.48	0.72	-0.34
MH23		95.37	94.82	0.55	MHSA69555	94.73	0.64	-0.09
MH22		95.16	94.82	0.34	MHSA69554	94.79	0.37	-0.03
MH21		95.5	94.7	0.8	MHSA69553	95.02	0.48	0.32
MH5		95.16	94.86	0.3	MHSA69405	94.38	0.78	-0.48
MH4		95.47	94.9	0.57	MHSA69404	94.54	0.93	-0.36
MH20		95.52	94.9	0.62	MHSA69551	94.83	0.69	-0.07
MH19		95.32	94.66	0.66	MHSA69552	95.05	0.27	0.39
MH3		96.17	95.02	1.15	MHSA69403	94.94	1.23	-0.08
MH18		96.24	95.03	1.21	MHSA69421	95.36	0.88	0.33
MH17		96.59	95.3	1.29	MHSA69420	95.63	0.96	0.33
MH16		96.59	95.41	1.18	MHSA69419	95.73	0.86	0.32
MH15		96.59	95.83	0.76	MHSA69417	96.26	0.33	0.43
MH13		97.25	95.94	1.31	MHSA69417	96.26	0.99	0.32
MH2		97.27	95.73	1.54	MHSA69402	95.68	1.59	-0.05
MH14		97.09	95.7	1.39	MHSA69416	96.02	1.07	0.32
MH13		97.25	95.94	1.31	MHSA69417	96.26	0.99	0.32
MH1 [S2]		98.12	96.31	1.81	MHSA69401	96.25	1.87	-0.06
S6		95.19	94.77	0.42	MHSA65325	94.28	0.91	-0.49
MH104A			94.725		MHSA65342	94.28		-0.445

Heritage Hills								
20116	107.9		103.86	4.04	MHSA20116	103.84	4.06	-0.02
20164	107.3		101.66	5.64	MHSA20164	101.64	5.66	-0.02
12735	102.01		96.37	5.64	MHSA12735	96.35	5.66	-0.02
12732	99.4		95.19	4.21	MHSA12732	94.84	4.56	-0.35
20098	106.8		104.32	2.48	MHSA20098	104.32	2.48	0
20179	106.6		103.67	2.93	MHSA20179	103.63	2.97	-0.04
20123	106.1		103.39	2.71	MHSA20123	103.33	2.77	-0.06
20127	105.4		101.7	3.7	MHSA20127	101.67	3.73	-0.03
20130	102.9		99.29	3.61	MHSA20130	99.27	3.63	-0.02
13058	98		95.06	2.94	MHSA13058	94.98	3.02	-0.08
20161	98		94.84	3.16	MHSA20161	94.61	3.39	-0.23
Terry Fox Drive (Richardson Ridge)								
Baylis	97.15		94.65	2.5	MHSA64878	95.03	2.12	0.38
Rchrdsn N.	96		94.6	1.4	MHSA64876	94.89	1.11	0.29
L. Rchrdsn		94.8	94.5	0.3	MHSA64834	94.45	0.35	-0.05
MH329A		94.81	94.49	0.32	MHSA64833	94.46	0.35	-0.03
MH328A		94.84	94.51	0.33	MHSA64832	94.46	0.38	-0.05
L. Rchrdsn Ea.		94.97	94.46	0.51	MHSA63532	94.45	0.52	-0.01
N62		94.7	94.44	0.26	MHSA63527	94.42	0.28	-0.02
Terry Fox Drive (Broughton to SRPS)								
Broughton		94.7	94.42	0.28	MHSA58579	94.39	0.31	-0.03
MH205	96.99		94.8	2.19	MHSA58578	94.46	2.53	-0.34
MH207		97.26	94.95	2.31	MHSA58577	94.52	2.74	-0.43
TBD	95.42		94.34	1.08	MHSA58582	94.29	1.13	-0.05
SRPS	95.35		94.03	1.32	SPRS	94.07	1.28	0.04

3.5 Summary and Conclusions

Wastewater servicing for Arcadia Stage 6 will be designed in accordance with the City of Ottawa Sewer Design Guidelines, the associated technical bulletins, and various background documents as highlighted throughout this section. The proposed collection and conveyance of wastewater will consist of a local 200 mm diameter sewer which will outlet into Donum Lane as shown on Drawings S1 and S2. It is recommended that this wastewater servicing plan be implemented in order to provide adequate sanitary servicing for the proposed development.

4.0 STORM SERVICING AND STORMWATER MANAGEMENT

4.1 Background

Similar to Arcadia Stages 1 to 4 stormwater management requirements for this development were originally set by the 2006 Kanata West Master Servicing Study (KWMSS), which identified a single stormwater management facility (referred as a Pond One) to service the area of the then proposed Arcadia developments. In 2018, after development of Stages 1 and 2, JLR evaluated various storm servicing strategies for the remainder of the Arcadia Development as part of the document entitled "Stormwater Management Strategy Report - Arcadia Residential Stages 3, 4 and Commercial Stage 2, JLR, May 2018". The 2018 report identified that the preferred solution for the remainder of the Arcadia development was to incorporate a second stormwater management facility (SWM facility) on the south side of Campeau Drive which would improve HGL issues, allow for the immediate servicing of Campeau Drive extension and Light Rail Transit (LRT) and reduce submergence along the minor system when compared to a single pond servicing strategy. The two-pond concept was accepted by the City of Ottawa. The second SWM facility referred to as the Campeau Drive SWMF is the dedicated storm outlet for Stage 3, which included part of the Stage 6 lands.

Storm flows from the west side of Arcadia Stage 6 discharge to existing stubs on Country Glen Road that were included as part of the design for the commercial development on the west side of Country Glen Road. Discharges to the minor system on Country Glen Road flow via the existing minor system through Stages 1, 2 and 4 of Arcadia development and outlet to the Paine Pond, which provides water quantity and quality control for discharges to Carp River. Release rates to Country Glen Road were set in the Arcadia Commercial 370 Huntmar Drive Design Brief by IBI Group, October 2014.

Storm flows from the east side of Arcadia Stage 6 discharge to an existing storm sewer on Donum Lane, which discharges into Campeau Drive SWMF. This facility provides water quantity and quality controls prior to releasing controlled flows into the Carp River. Allowable release rates from the east side of Arcadia Stage 6 were set out in the JLR 2018 report and confirmed in the design of Arcadia Stage 3.

4.2 Design Criteria

Storm and stormwater management servicing for the Arcadia Stage 6 was developed in accordance with the City of Ottawa 2012 Sewer Design Guidelines (OSDG) and the more recent Technical Bulletin PIEDTB-2016-01 (September 6, 2016). These two documents are herein referred to as the Design Guidelines in this section. A summary of the key storm and stormwater management criteria follows:

- Control minor system flows to the allowable release rates at existing stubs at Country Glen Road and Donum Lane;
- Storm sewers are designed to capture the 1:5 year storm event as a minimum using the Rational Method and using the regressions derived from Intensity-Duration-Frequency (IDF) equations as per the Design Guidelines;
- Provide a freeboard in the sewer network to the underside of footing (USF) of 300 mm during the 1:100-year storm where weeping tile connections are present;
- The runoff coefficients (C-factors) for the residential development were based on the maximum lot coverage permitted by the proposed zoning, as per the Design Guidelines.

C-factors for non-residential land uses to be calculated based on the ratio of pervious and impervious surfaces depicted on proposed site plans;
- Minimum roadway profile grades at 0.5%;
- Roadway cross-fall of 3% was used for all streets;
- Minimum roadway slope of 0.1% from crest-to-crest for overland flow route;
- Minimum rear yard slope in the absence of perforated pipe system of 1.5% along with swale side slopes of 3 horizontal to 1 vertical;
- Maximum street ponding depth of 350 mm (static and dynamic) as per the Design Guidelines and maximum depth of rear yard flow to be 300 mm;
- Minimum vertical clearance of 0.15 m between the spill elevation on the street and the finished grade (garage elevation);
- Minimum vertical clearance of 0.30 m between the rear yard spill elevation and the ground elevation at the building in the rear yards;
- During the Climate Change event, the street ponding is not to reach the lowest building opening while the storm HGL must remain at or below the USF;
- The product of the velocity and depth of major system flows on streets during the 1:100-year design storm event is not to exceed 0.60 m²/s; and,
- Major system flows up to and including the 1:100-year design storm event are contained within the site and internally are self-contained within the park and amenity blocks.

4.3 Proposed Stormwater Management Approach

It is proposed to utilize both the west and east connection points to the existing minor storm sewers on Country Glen Road and Donum Lane respectively. The stormwater management approach will require that the discharges to these locations are controlled to the allowable release rates identified in the design of Phase 1 and Stage 3 of the Arcadia site. These allowable release rates are identified in Table XX.

Outlet	Allowable Release Rate (m^3/s)	Set By
West – Country Glen Road	0.667	Arcadia Commercial 370 Huntmar Drive Design Brief by IBI Group, October 2014
East – Donum Lane	0.567	Stormwater Management Strategy report- Arcadia Residential Stages 3, 4 and Commercial Stage 2, JLR, May 2018

It should be noted that the outlet to Country Glen Road is downstream of an additional outlet previously provided for lands covering the Stage 6 development. Since the proposed outlet is the downstream outlet the allowable release rates for both outlets were combined as the pipe network on Country Glen Road will have sufficient capacity for the combined flow at the proposed connection point.

In order to achieve the allowable release rates, the stormwater management of the site will include online detention of the stormwater runoff in underground oversized sewers and allowing increased headwater depths in sewer sections with no weeping tile connections. Where weeping tile connections are proposed the 1:5-year free flow capacity of the pipe network will be maintained and the 1:100-year HGL will remain below the underside of footing of connected units.

4.4 Proposed Minor System Servicing

4.4.1 Runoff Coefficient

Runoff coefficients (C-Factors) were calculated for Arcadia Stage 6 based on the weighted product between the percentage of the pervious area at a C-Factor of 0.2 and the percentage of the impervious area at a C-Factor of 0.9. GIS Mapping of the impervious and pervious surfaces was used in the PCSWMM software spatial weighting tool to develop an overall weighted C-Factor for the site, excluding the park and amenity site. Due to consistency and density of the site, this approach provides a conservative C-Factor to be used across the site. C-Factors are provided in Table 4-1.

Table 4-1: C-Factors

Area	C-Factor
Site Development Area	0.78
Parkland	0.4
Amenity Space	0.4

4.4.2 Minor System Servicing

The proposed storm sewers of Arcadia Stage 6 were sized using the Rational Method based on the C-Factors presented in Table 4-1. Appropriate rainfall intensities were used in the Rational Method based on the rainfall regression equations presented in Section 5.4.2 of the OSDG along with an inlet time of ten (10) minutes at the upstream end of the system. The Rational Method Storm Sewer Design Sheet is included in Appendix 'D1', while the Storm Drainage Plans included in the drawing set provide details associated with the storm drainage areas.

The storm drainage design sheet includes sewer sections which are used to control upstream flows through a restricted size. The restricted sewer sections operate under pressure in the minor system design event to control flows downstream and so show as operating beyond capacity in the design sheet, however these sewers are accounted for in the modelling HGL analysis.

4.4.3 Inlet Control Devices

Storm servicing for Arcadia Stage 6 was developed to limit all flows transmitted to the storm sewers and meet the 0.35 m criterion as the maximum street ponding depth requirement. To achieve this criterion, servicing was developed using ICDs at inlets to the minor system.

The response under the 1:5-year rational method calculation was used to determine the minimum ICD targeted flow for Arcadia Stage 6. The ICDs were selected based on the dynamic model head differential between the maximum HGL at the grate and the higher of the geodetic elevation of the centroid of the ICD or the downstream HGL, in each catch basin lead. Therefore, each ICD was sized to transmit the targeted peak flow based on the calculated water level depth at the top of grate. When water rises above the top of grate in the roadway sag, flows transmitted to the storm sewers will marginally increase due to the increase in the

hydraulic head. Based on the range of flows and hydraulic heads at each catch basin, the following types of ICDs are proposed in Stage 6:

- IPEX Tempest Type A;
- IPEX Tempest Type B;
- IPEX Tempest Type C;
- IPEX Tempest Type D; and,
- IPEX Tempest Type E.

Comprehensive ICD Tables referred to as the Catch Basin Table were prepared and are included in Appendix 'E2'. The Catch Basin Tables show specific information including top of grate elevation, pipe size and invert, the restricted capture rate and ICD type. The information shown on the Catch Basin Tables was extracted and shown on Drawing D1.

4.4.4 Water Quality

The storm discharge criterion for the subdivision is based on the enhanced protection level (80% TSS), which was set to a level greater than the required normal protection level (70% TSS).

The downstream stormwater management ponds, either Campeau Drive SWMF for eastern flows or the Paine Pond for western flows, were designed to provide water quality treatment for the Arcadia Stage 6 development. Excess permanent pool volume was available in both ponds for water quality treatment to 80% TSS removal.

4.5 Stormwater Management Modelling Approach

4.5.1 Dual Drainage Model

The analysis of both major and minor drainage systems was carried out to demonstrate their compliance with respect to the design criteria described in Section 4.2. The performance of the major overland system and minor storm sewer system was analyzed with PCSWMM. This software is a dynamic model which allows both hydrologic and hydraulic components to be simulated in the same platform and also allows the simulation of the interaction between the major and minor systems. The PCSWMM software platform was used to:

- Generate the surface runoff hydrograph for each sub-area under various recurrences.
- Subdivide each inflow hydrograph into its minor and major system components based on the proposed inlet capture rates and roadway sag storage.
- Assess cascading, if any, and carry out dynamic routing of storm flows to determine flow depths along the roadways. As previously stated, the maximum major overland flow depths along the subdivision's roadways are to be limited to 350 mm or less, as per Technical Bulletin PIEDTB-2016-01.
- Demonstrate that the HGL along the storm sewers during the 1:100-year event without sedimentation is 300 mm below the basement's USFs.

PCSWMM was set-up to evaluate the proposed servicing as detailed on Drawings G1 (Grading), Drawings SWM1 (Ponding Plan), Drawings DST, ODST (Drainage) and Drawings S1-S2 & OS (Servicing). As per Drawings DST, the Arcadia Stage 6 lands were discretized into more refined sub-catchments for the immediate drainage area of Stage 6 and lumped sub-catchments for the entire modelled extents. To demonstrate the model schematic, Figure E1-1 and Figure E1-2 (Appendix E1) were prepared and depict the major and minor system elements of the model along with the subcatchments.

4.5.2 Integration with the Carp River Modelling and Boundary Conditions

In order to evaluate the design of the Paine and Campeau Stormwater Management Facilities and the impact on the Carp River, a sub-model of the City of Ottawa PCSWMM Carp River model was extracted to act as the downstream receiver for the stormwater management facilities. The inflow hydrograph at the upstream end of the sub-section of the Carp and the downstream stage hydrograph were both extracted from the overall Carp River model and used as inputs for the respective storm events in the Arcadia Detailed Design model.

Details of the detailed design model and the control of flows released to the Carp River were provided in the Paine Stormwater Management Facility Design Brief, JLR February 2020 for Arcadia Stage 4 and the Stormwater Management Facility Design Brief, Campeau Drive SWMF, JLR May 2019 for Arcadia Stage 3.

Both reports demonstrated that the use of the sub-model was a representation of the flows in the Carp River from the full model and that the stormwater management ponds provided sufficient controls to achieve no impact to the peak flows or maximum water levels in the Carp River.

Since the Arcadia Stage 6 development is internal to the detailed model used in these two reports and discharges to the two ponds, the Arcadia Stage 6 model will use the detailed sub-model to demonstrate that flows to the ponds can be maintained under the proposed Stage 6 stormwater management strategy and therefore there will be no impact on the Carp River.

4.5.3 Simulation of Street Segments

Flow directed to a street segment is split at the major system node; flows are broken down into minor and major system components using an outlet rating curve representing the ICD capture and assigning the minor system flow directly into the minor conduit while maintaining the major system flows on the surface conduit. Flow through the outlet link is calculated based on the HGL above the elevation of the ICD and its rated capacity under various water surface elevations. The ICD rating curves are those provided by the manufacturer.

An additional outlet link with rating curve is placed between the street surface low point and the rear yard connection manhole in the ROW. The outlet link is set at the top of grate elevation of the rear yard connection manhole and, if the street sag storage extents into the rear yard connection manhole lid, the outlet link represents any flow through the holes in the manhole lid which will enter from the ponded runoff.

The storage in roadway sag is included in the model as being inherent within the major system conduits. The dynamic capability of PCSWMM means that the static and any dynamic flow is calculated in the model to provide one depth value at each sag location. The low points and high points in the street conduits are taken from the Civil 3D surface.

The subdivision's grading was developed with roadway static storage depths to maximize detention and attenuation of major overland flows while those of lesser volume sags were designed to maximize the conveyance capability of the dynamic section of the cross-section during events where cascading occurs.

4.5.4 Adjoining Existing Areas

The western half of Campeau Drive, from Huntmar Drive to 160 metres east of the roundabout with Country Glen Road, was included in the SWMHYMO modelling for Arcadia Phase I, which included flows from Campeau Drive, residential facing Campeau Drive, Country Glen Road and minor flows from the commercial areas. The minor system flows were extracted from the approved SWMHYMO modelling and imported into the PCSWMM modelling. The IBI design allowed for some major overland flow to continue down Campeau Drive to the low point at the junction with Donum Lane and this hydrograph was also extracted from the SWMHYMO model and imported into the PCSWMM model.

It should be noted that the previous modelling for Arcadia Phase I included Stage 6 as commercial with all major overland flows retained on site, however, due to the change to residential and some of the properties facing Campeau Drive, the grading means that there is some runoff contributing directly to Campeau Drive flows. In order to capture the change in major system flow and small changes in drainage areas as a result of Stage 4, the hydrographs along Campeau Drive from the Phase I model were removed and replaced with subcatchments, inlet links and weirs representing the runoff and conveyance included in the SWMHYMO model.

The hydrologic parameters used are consistent with the Phase I modelling and the flows in the model are consistent with those in the Phase I modelling. A comparison of the flows is provided in Table 4-2.

Table 4-2: Major Overland Flow Comparison along Campeau Drive

Section of Major Overland Flow along Campeau Drive	SWMHYMO 1:100 year 3-hour Chicago flow (m^3/s)	PCSWMM 1:100 year 3-hour Chicago flow (m^3/s)
MH300 to MH301 at commercial access on Campeau Drive	0.221	0.221
MH301 to MH302	0.267	0.263
MH302 to Country Glen Road roundabout	0.319	0.306
Country Glen Road roundabout to MH304	0.357	0.354
MH304 to Donum Lane roundabout	0.430	0.430

In addition, the total inflow to the low points on Campeau Drive at the Donum Lane roundabout were simulated in the Stage 4 model. The inlet capture defined in the Stage 4 model was set at the 1:10-year rate at each of the low point inlets. Additional flows to the low points at the Donum Lane roundabout included the immediate catchments in the model. In a change to the Stage 4 model, the actual impervious surface coverage was used to refine the imperviousness values used in the hydrology for the Campeau Drive catchment. The imperviousness reduced from 85.7% to 72.0% reflecting the front yards facing the north side of Campeau Drive covered by the catchment area. A comparison of the incoming flow for the 1:10-year and 1:100-year 3-hour Chicago storms at the north and south low points is provided in Table 4-3.

Table 4-3: Incoming Flow to the North and South Low Points – 3-hour Chicago Storm

Low Point	Stage 4 Model 1:10-year incoming flow (m^3/s)	Stage 4 Model 1:100-year incoming flow (m^3/s)	Stage 6 Model 1:10-year incoming flow (m^3/s)	Stage 6 Model 1:100-year incoming flow (m^3/s)	Stage 4 Modelled Minor System Inlet Capture Rate (m^3/s)
North	0.198	0.517	0.174	0.480	0.2
South	0.156	0.452	0.160	0.459	0.16

The comparison with the flows in the SWMHYMO model with those in the Stage 4 modelling shows that the changes to the drainage areas have negligible impact on the hydraulics of Campeau Drive. The flows from upstream are consistent with the previous modelling and the inclusion of the runoff from Stage 6 front yards, along with refinement of the imperviousness values for Campeau Drive, means that the 1:10-year flow rate remains below, or at, the modelled inlet capture rate and the 1:100-year event flows are no greater, or at, previously simulated flow rates.

4.6 Modelling Parameters

4.6.1 Hydrological 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 4.4.1were used to estimate PCSWMM's imperviousness. A total imperviousness (TIMP) of 67.14% was calculated and simulated for all front yard areas, while a TIMP of 54.3% was used for the rear yard areas. Subarea routing (percent of impervious surface routed to pervious surface) was calculated for typical lots.

- **Flow Path Length / Catchment Width**: The flow path length is based on the measured length of the flow from the rear of the property to the street section. The catchment width is, therefore, approximately twice the length of the street segment through the subcatchment, in accordance with the OSDG.

- **Manning's Roughness Coefficient**: Manning's Roughness Coefficients of 0.013 and 0.24 were used for the impervious and pervious surfaces, respectively, which are consistent with the OSDG.

- **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.

Note that for catchments that were previously modelled in SWMHYMO for Arcadia Phase I maintained the catchment parameters as per the SWMHYMO model to maintain consistency with previous work.

4.6.2 Simulation of Storm Distributions

The City of Ottawa requires that the performance of the minor and major systems be investigated under the 3-hour Chicago design storm. As such, 1:2-year, 1:5-year, 1:10-year, 1:25-year, 1:50-year, and 1:100-year 3-hour Chicago storms were evaluated. In addition, the critical storm distribution for the Carp River is the 12-hour SCS storm and so this distribution was also assessed by the model for the same durations, in addition to the standard 24-hour SCS storm distribution for the same durations. The 12-hour SCS storm was found to be critical for the minor system HGL while the Chicago 3-hour storm for the major overland flow system.

The Climate Change stress test event was run for all three storm distributions used. As per the requirements of the Ottawa Sewer Design Guidelines, historical storms were also assessed, including the July 1, 1979 storm, the August 4, 1988 storm and the August 8, 1996 storm.

4.6.3 Simulation of Park and Amenity Blocks

For the park and amenity blocks the model includes a storage node with an outlet link to restrict flow to the minor system to the 1:5-year runoff rate for the blocks. In events greater than the 1:5-year return period then the storage node detains runoff over and above the release rate for the block. The 1:5-year release rates for the blocks are shown in Table 4-4.

Table 4-4: Release Rates for the Park and Amenity Area

Block	Imperviousness (%)	Runoff Coefficient	1:5-year Release Rate (m^3/s)
Park Block	28.57	0.40	0.058
Amenity Block	54.43	0.58	0.061

4.6.4 Simulation of Garage Access Ramps

Two of the units within the Stage 6 development have depressed garage access ramps. One of these will be able to drain via gravity to the storm sewer system while the other to the east of the site will require to be pumped to the minor system. A maximum pump rate of 9 L/s, approximately equivalent to a 1:10 year event. Where the gravity connection is provided the drain is above the underside of footing for the unit and 300mm freeboard should be maintained below the grate elevation.

4.7 Simulation Results

This section of the Report presents the results of the simulation of Stage 6 as part of the detailed model for the Arcadia site as a whole, incorporating Stages 1 to 4 and the Paine Pond and Campeau Drive stormwater management facilities. The modelling includes the future Stage 5 at a conceptual level with the same parameters as used in the Stage 3 and 4 models.

The objective of this section is to assess the performance of the following systems under the build-out condition:

- The major overland system under extreme storm events (i.e., 1:100 year and climate change events) as per the OSDG; and
- The major overland system during the 1:2-year storm event and determine whether surface ponding is to occur.
- Appendices E4 and E5 provide Storm HGL analyses and Street Ponding Analyses respectively for a range of historical storms and interim conditions.

4.7.1 Low Point Ponding Analysis

The results at each of the low points, as generated by a 3-hour Chicago storm distribution, are set out in Table 4-5. Low points correspond to Area IDs from the ponding plan Drawing SWM1.

Table 4-5: Low Point Major System Ponding (3-hour Chicago Event)

Low Point ID	Top of Grate (m)	Maximum Static Depth	1:2 year Depth (mm)	1:5 year Depth (mm)	1:100 year Depth (mm)	Climate Change Depth (mm)
1	97.1	300	-	-	200	230
2	96.9	300	-	-	90	190
3	96.9	100	-	-	-	-

Low Point ID	Top of Grate (m)	Maximum Static Depth	1:2 year Depth (mm)	1:5 year Depth (mm)	1:100 year Depth (mm)	Climate Change Depth (mm)
4	96.8	100	-	-	-	-
5	96.7	190	-	-	-	-
6	96.2	200	-	-	50	100
7	96	150	-	-	100	140
8	95.6	220	-	-	70	110
9	96.87	230	-	-	160	200
10	97.04	230	-	-	100	150
11	96.97	300	-	-	-	-
12	96.88	290	-	-	-	60
13	96.87	200	-	-	-	-
14	96.67	300	-	-	50	100
15	96.57	130	-	-	110	150
16	96.77	160	-	-	150	200
17	96.92	250	-	-	160	210
18	96.67	170	-	-	160	200
19	96.83	240	-	-	160	210
20	96.1	250	-	-	110	150
21	96.2	200	-	-	70	120
22	95.9	250	-	-	100	140
23	95.7	200	-	-	240	260
24	95.6	220	-	-	170	250

The simulation results compiled in Table 4-5 shows that:

- No ponding nor dynamic flow will occur in the 1:2-year or 1:5 year events within the site; and,
- Maximum ponding depth of 200 mm during the 1:100-year event;
- In the climate change event, the peak ponding depth is below 350mm.

4.7.2 Major System Flow

No cascading flow occurs in the site during any events and therefore the depth x velocity requirement is achieved.

4.7.3 Storm Sewer HGL Analysis

The storm sewer HGL under the ultimate servicing scenario is shown at each of the manhole nodes in Table 4-6. Where there is no Underside of Footing (USF) associated with the manhole a dash is shown in the table.

Table 4-6: HGL Analysis (12-hour SCS Storm)

MH ID	USF Elevation (m)	1:100 year Event Max HGL (m)	1:100 year Freeboard (m)-	Climate Change Max HGL (m)	Climate Change Freeboard (m)-
217	-	95.74	-	95.74	-
214A	-	95.74	-	95.74	-
214	95.37	94.97	0.40	94.97	0.4
216	-	95.72	-	95.72	-
213A	-	95.72	-	95.72	-
213	95.32	94.97	0.35	94.97	0.35
210	-	95.16	-	95.16	-
211	-	95.16	-	95.16	-
212	95.32	94.98	0.34	94.98	0.34
J_CBMH1	96.14	95.59	0.55	95.6	0.54
CBMH2	-	95.67	-	95.67	-
224	96.14	95.33	0.81	95.33	0.81
226	96.14	95.2	0.94	95.2	0.94
220	-	95.34	-	95.34	-
218	-	95.2	-	95.2	-
227	95.43	95.04	0.39	95.04	0.39
215	95.3	94.95	0.35	94.95	0.35
MHST77649	-	94.87	-	94.87	-
208	94.69	94.1	0.59	94.1	0.59
207	94.8	93.97	0.83	93.97	0.83
206	94.69	93.9	0.79	93.9	0.79
205	94.24	93.84	0.40	93.84	0.4
201	-	93.71	-	93.71	-
200A	-	93.65	-	93.65	-
200	-	93.65	-	93.65	-
ST6_CB102	-	96.24	-	96.24	-
J_CB103	-	94.43	-	94.44	-
204A	94.69	94.02	0.67	94.02	0.67
204	-	94	-	94	-
203	-	95.49	-	95.49	-
202	-	95.48	-	95.48	-
201A	-	95.45	-	95.45	-
CBMH3	-	95.56	-	95.56	-
202A	-	95.51	-	95.51	-
201A	-	95.45	-	95.45	-

MH ID	USF Elevation (m)	1:100 year Event Max HGL (m)	1:100 year Freeboard (m)-	Climate Change Max HGL (m)	Climate Change Freeboard (m)-
J_CB108	-	94.98	-	95.05	-
J_CBMH4	94.24	93.65	0.59	93.89	0.35

The simulation results compiled in Table 4-6 shows that:

- All nodes achieve HGLs with 300 mm freeboard to the underside of footing in the 1:100-year event with the smallest freeboard being 300 mm; and,
- All nodes maintain a clearance to the underside of footing in the climate change stress test event.

4.7.4 Storm Sewer HGL Analysis for Existing Arcadia Stages

The storm sewer HGL under the ultimate servicing scenario is shown at each of the existing Arcadia Stages 1 and 2 manhole nodes in Table 4-7. Where there is no Underside of Footing (USF) associated with the manhole, a dash is shown in the table.

Table 4-7: Storm HGL Analysis Arcadia Stage 1 and 2 (12-hour SCS)

MH ID	USF (m)	Stage 1 or 2 Interim Buildout HGL (m)	Ultimate Buildout HGL (m)	Difference between Stage 1 Interim & Stage 4 Ultimate HGL (m)[(1)]	Freeboard
MH200	95.15	94.75	94.39	-	0.76
MH201	95.31	94.96	94.59	-	0.72
MH202	95.37	95.07	94.73	-	0.64
MH203	95.43	95.13	94.81	-	0.62
MH204	95.69	95.20	94.93	-	0.76
MH205	97.59	95.87	95.92	0.05	1.67
MH206	97.59	96.01	96.05	0.04	1.54
MH207	97.74	96.50	96.54	0.04	1.20
MH208	97.64	97.13	97.17	0.04	0.47
MH209	96.71	95.74	95.66	-	1.05
MH210	95.94	95.27	95.07	-	0.87
MH211	95.64	95.31	95.16	-	0.48
MH212	96.14	95.54	95.50	-	0.64
MH213	95.89	95.31	95.20	-	0.69
MH214	95.89	95.27	95.15	-	0.74
MH215	95.49	95.15	94.86	-	0.63
MH216	95.39	95.09	94.70	-	0.69

MH ID	USF (m)	Stage 1 or 2 Interim Buildout HGL (m)	Ultimate Buildout HGL (m)	Difference between Stage 1 Interim & Stage 4 Ultimate HGL (m)[1]	Freeboard
MH217	95.64	95.21	94.78	-	0.86
MH501	97.82	95.72	95.54	-	2.28
MH502	96.32	95.37	94.99	-	1.33
MH503	95.57	94.87	94.24	-	1.33
MH504	95.23	94.53	93.97	-	1.26
MH505	95.16	94.48	93.93	-	1.23
MH506	95.12	94.42	93.88	-	1.24
MH513	97.25	96.48	96.11	-	1.14
MH514	96.87	96.01	95.67	-	1.20
MH515	96.59	96.14	95.74	-	0.85
MH516	96.59	95.63	95.27	-	1.32
MH517	96.52	95.51	95.11	-	1.41
MH518	96.17	95.26	94.83	-	1.34
MH519	95.32	94.85	94.34	-	0.98
MH520	95.27	94.81	94.27	-	1.00
MH521	95.14	94.81	94.05	-	1.09
MH522	95.14	94.73	94.05	-	1.09
MH523	95.31	94.72	94.04	-	1.27
MH524	95.16	94.63	93.99	-	1.17
MH525	97.77	95.25	95.25	-	2.52
MH526	96.42	95.25	95.16	-	1.26
MH527	95.77	95.05	94.71	-	1.06
MH528	95.47	94.88	94.59	-	0.88
MH529	95.46	94.81	94.53	-	0.93
MH530	95.23	94.68	94.42	-	0.81
MH531	95.11	94.54	94.31	-	0.80
MH532	0	94.3	94.10	-	-94.10
MH533	97.68	95.58	95.58	-	2.10
MH534	96.42	95.78	95.38	-	1.04
MH535	96.04	95.31	94.73	-	1.31
MH536	95.59	95.05	94.58	-	1.01

MH ID	USF (m)	Stage 1 or 2 Interim Buildout HGL (m)	Ultimate Buildout HGL (m)	Difference between Stage 1 Interim & Stage 4 Ultimate HGL (m)(1)	Freeboard
MH537	96.07	95.16	94.81	-	1.26
MH538	95.31	94.81	94.41	-	0.90
MH539	95.11	94.59	94.25	-	0.86
MH540	95.11	94.46	94.15	-	0.96
(1) If the HGL in ultimate buildout condition is greater than the HGL of the Stage 1 Interim buildout, then the difference in HGL levels is provided.					

The simulation results compiled in Table 4-7 shows that:

- The HGL levels for the ultimate buildout condition are lower than the HGL levels in Arcadia Stages 1 and 2 interim buildout conditions, except in Stage 1 at MH205, MH206, MH207, and MH208.
- A minimum freeboard of 0.3m is provided at all manhole nodes in the existing Arcadia Stages.

4.7.5 System Release Rates

The allowable release rates for the system to Donum Lane and Country Glen Road were identified in Section 4.3. The results of the modelling for the 1:100-year event for the three storm distributions are shown in Table 4-8

Table 4-8: System Release Rates Comparison

Event	Stage 6 to Donum Lane (m^3/s)	Allowable to Donum Lane (m^3/s)	Stage 6 to Country Glen Road (m^3/s)	Allowable Release Rate to Country Glen Road (m^3/s)
3-hour Chicago	0.559	0.567	0.635	0.667
12-hour SCS	0.518	0.567	0.635	0.667
24-hour SCS	0.516	0.567	0.619	0.667

Table 4-8 shows that the system meets the allowable release rate in each of the storm distributions for events up to the 1:100-year event. Since the allowable release rates are achieved the operations of the Paine Pond and Campeau Drive SWMF will be maintained as per the Design Briefs for the facilities and there will be no impact on the downstream Carp River.

4.8 Summary and Conclusions

The stormwater servicing and management concept is proposed to provide stormwater servicing for Arcadia Stage 6, as shown on the Servicing Plan (Drawing S1 and S2).

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 can be implemented during construction as shown on the Erosion and Sediment Control Plan (Drawing ESC):

- Supply and installation of a silt fence barrier, as per OPSD 219.110.
- Supply and installation of siltsack or sentinel CB inserts 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.
- 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.
- Temporary ICDs are to be placed blocking part of the sewer pipe in the connecting storm maintenance holes to eliminate construction debris from entering the existing storm sewer system. The ICDs are to be removed after the proposed storm sewers have been fully cleaned.
- 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).
    - Minimum of 400 mm thick underlain with a geotextile (or graded aggregate filter); and
    - 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 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.

6.0 CONCLUSIONS

Servicing of Minto's Arcadia Stage 6 development, as depicted on the detailed design drawings, has been accounted for in previous studies completed for the subject area. In General, the lands will be serviced as follows:

- Water servicing will be provided by connections to existing watermains on Country Glen Way and Donum Lane, and to the existing feedermain located on Campeau Drive.

- Wastewater servicing will be provided by a local sanitary sewer system that will outlet to existing sanitary sewers on Campeau Drive.

- Storm servicing is to be provided on-site by means of local sewers that outlet to the existing storm sewers on Donum Land and Country Glen way.

- Flows in excess of the prescribed allowable peak flow are to be detained by means of on-site storage methods; either above ground or underground or a combination of both.

This Report has been prepared for the exclusive use of Minto, for the stated purpose, for the named facility. Its discussions and conclusions are summary in nature and cannot be properly 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 was prepared for the sole benefit and use of Minto and may not be used or relied on by any other party without the express written consent of JLR.

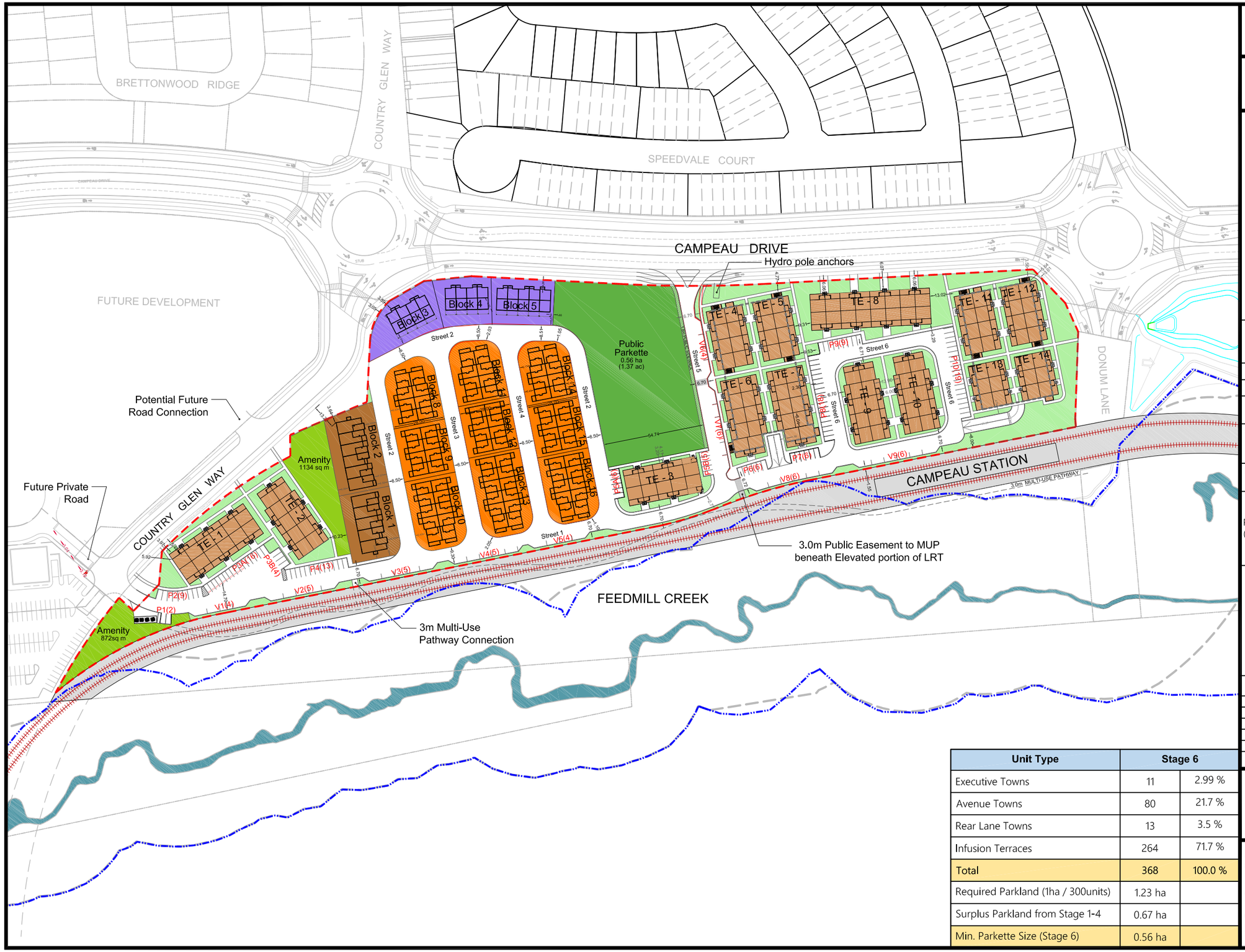
J.L. RICHARDS & ASSOCIATES LIMITED

Annie Williams, P.Eng.

Ivan Dzeparoski, P.Eng.

Appendix A1

Concept Plan, Draft Plan of Subdivision and Topographical Survey



Unit Type	Stage 6	
Executive Towns	11	2.99 %
Avenue Towns	80	21.7 %
Rear Lane Towns	13	3.5 %
Infusion Terraces	264	71.7 %
Total	368	100.0 %
Required Parkland (1ha / 300units)	1.23 ha	
Surplus Parkland from Stage 1-4	0.67 ha	
Min. Parkette Size (Stage 6)	0.56 ha	

Title:

Concept Plan 32

Project:

Arcadia - Stage 6

Legend

- Public Parkette
- Amenity Area
- Open Space
- Executive Towns
- Avenue (B2B) Towns
- Urban (Rear Lane) Towns
- Infusion (Stacked) Towns
- Stage Limits
- 100 Year Floodplain

Site Statistics (For Stacked Towns Only)

		Required	Provided
Unit Count (Stacked Towns only)		264	
Total Amenity Space (6 sq m./unit)		1,584 Sq m.	4,910 Sq m.
Communal Amenity Space (50% of total amenity per unit = min. 3 Sq m./Unit)		792 Sq m.	2,006 Sq m.
Bike Rack Count (0.5/Unit - 8 spaces per rack)		16.5	16
Parking (Section 101)	Above Ground Parking (Units x 1.1)	162	158
	Under Ground Parking (Units x 1.1)	128	148
	Total Parking Spaces	290	306

NOTES:

1. There is a 10m No Build Setback from the northern LRT property line.
2. Each stacked town has an lower unit with a patio (16 sq. m.) and an upper unit with a balcony (6 sq.m.) which are included as private amenity area.
3. All pathways are 1.5m unless otherwise noted.
4. Parking requirement for stacked towns is 0.90 per unit for the residents + 0.1 per unit for visitor = total 1.0 per unit.
5. Assume UG garage for TE-4 to 7 has 80 parking spaces and TE-11 to 14 has 68 parking spaces.

Revisions

No.	Description	Date	By
4	Updated curbs on Street No. 2 & 5. Update underground garage boundary for TE-3 to 7.	2022-06-09	K.G.
3	Add lapsed site plan for west property	2022-06-03	K.G.
2	Update Avenue Town & TE-4 to 7	2022-05-11	K.G.
1	Update Avenue Town models (2022)	2022-05-11	K.G.
0	Issued for Review	2022-05-03	K.G.

minto Communities

Drawn By: K.G.
Checked By: C.S.

Minto Communities Inc
180 Kent Street,
Ottawa, ON
K1P 0B6

North

Scale: NTS

APPROVED UNDER SECTION 51 OF THE PLANNING ACT BY THE CITY OF OTTAWA,

THIS _____ DAY OF _____________ 2022.

STEPHEN WILLIS, MCIP, RPP, GENERAL MANAGER PLANNING, REAL ESTATE AND ECONOMIC DEVELOPMENT DEPARTMENT, CITY OF OTTAWA

OBSERVED REFERENCE POINTS DERIVED FROM THE 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).
COORDINATES TO URBAN ACCURACY PER SEC 14(2) OF O.REG. 216/10

POINT ID	NORTHING	EASTING
Ⓐ	5017917.79	349316.85
Ⓑ	5018259.72	349571.94

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

PLAN 4M-

I HEREBY CERTIFY THAT THIS PLAN 4M-______ IS REGISTERED IN THE LAND REGISTRY OFFICE FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON (No.4) AT_____ O'CLOCK ON THE______ DAY OF _____________, 2022 AND ENTERED IN THE REGISTER FOR P.I.N.____________________, AND THE REQUIRED CONSENTS ARE REGISTERED AS PLAN DOCUMENT NUMBER OC-____________.

REPRESENTATIVE FOR LAND REGISTRAR

THIS PLAN COMPRISES ALL OF PINS 04510-1211, 04510-1092, 04510-1209 AND 04510-1210.
PART OF BLOCK 1 IS SUBJECT TO EASEMENT AS IN INSTRUMENT OC2248967.

PLAN OF SUBDIVISION OF

PART OF BLOCK 2, REGISTERED PLAN 4M-1563 AND PART OF LOT 3 CONCESSION 1

(GEOGRAPHIC TOWNSHIP OF MARCH)
CITY OF OTTAWA

Scale 1:500
10 0 10 20 30 METRES

METRIC CONVERSION
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.

BEARING NOTE
BEARINGS ARE GRID, DERIVED FROM THE CAN-NET VRS NETWORK 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

LEGEND

■	DENOTES	FOUND MONUMENTS(STANTEC)
□	"	SET MONUMENTS (IB) UNLESS OTHERWISE STATED
IB	"	IRON BAR
IBø	"	ROUND IRON BAR
SIB	"	STANDARD IRON BAR
SSIB	"	SHORT STANDARD IRON BAR
CC	"	CUT CROSS
CP	"	CONCRETE PIN
WIT	"	WITNESS
PIN	"	PROPERTY IDENTIFICATION NUMBER
M/MEAS	"	MEASURED
PROP	"	PROPORTIONED
OU	"	ORIGIN UNKNOWN
STANTEC	"	STANTEC GEOMATICS LTD.
P1	"	REGISTERED PLAN 4M-1661

OWNER'S CERTIFICATE
THIS IS TO CERTIFY THAT :
1. BLOCK 1 HAS BEEN LAID OUT IN ACCORDANCE WITH OUR INSTRUCTIONS.

DATE

VICE-PRESIDENT, LAND DEVELOPMENT
MINTO COMMUNITIES INC.
I HAVE THE AUTHORITY TO BIND THE CORPORATION

DATE

MINTO COMMUNITIES INC.
I HAVE THE AUTHORITY TO BIND THE CORPORATION

SURVEYOR'S CERTIFICATE
I CERTIFY THAT :
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 THEM.
2. THE SURVEY WAS COMPLETED ON THE DAY OF , 2022.

DATE

FRANCIS LAU
ONTARIO LAND SURVEYOR

Stantec Geomatics Ltd.
CANADA LANDS SURVEYORS
ONTARIO LAND SURVEYORS
1331 CLYDE AVENUE, SUITE 300
OTTAWA, ONTARIO, K2C 3G4
TEL. 613.722.4420
stantec.com

DRAWN: ME	PM: *	CHECKED: *	FIELD: *	PROJECT No.: 161614463-132A

Stantec

Stantec Geomatics Ltd.
300-1331 Clyde Avenue
Ottawa ON
Tel. 613.722.4420
www.stantec.com

TOPOGRAPHIC SKETCH OF
BLOCK 86
REGISTERED PLAN 4M-1661
AND
PART OF BLOCK 2
REGISTERED PLAN 4M-1563
AND
PART OF LOT 3
CONCESSION 1
(GEOGRAPHIC TOWNSHIP OF MARCH)

CITY OF OTTAWA
Scale 1:100
2 0 2 4 6 METRES

Stantec Geomatics Ltd.
ONTARIO LAND SURVEYORS

BOUNDARY NOTE
BOUNDARY LINEWORK AND INFORMATION IS COMPILED FROM REGISTERED PLAN 1563 AND IS NOT BASED ON ACTUAL SURVEY.

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

ELEVATION NOTE
ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA ELEVATION=95.230.

LEGEND

Symbol		Description
■	DENOTES	FOUND MONUMENTS
□	"	SET MONUMENTS
IB	"	IRON BAR
IBø	"	ROUND IRON BAR
SIB	"	STANDARD IRON BAR
SSIB	"	SHORT STANDARD IRON BAR
CC	"	CUT CROSS
CP	"	CONCRETE PIN
WIT	"	WITNESS
PIN	"	PROPERTY IDENTIFICATION NUMBER
M/MEAS	"	MEASURED
PROP	"	PROPORTIONED
OU	"	ORIGIN UNKNOWN
STANTEC	"	STANTEC GEOMATICS LTD.
P1	"	REGISTERED PLAN 4M-1563
P2	"	REGISTERED PLAN 4M-1661
CB	"	CATCH BASIN
SICB	"	SIDE INLET CB
HH	"	UTILITY ACCESS
LS	"	LIGHT STANDARD
MHSAN	"	MAINTENANCE HOLE SANITARY
MHSTM	"	MAINTENANCE HOLE STORM
MHTRAFFIC	"	MAINTENANCE HOLE TRAFFIC
SN	"	SIGN
TCB	"	TRAFFIC CONTROL BOX
UP	"	UTILITY POLE

OHW OHW OHW
OVERHEAD WIRE

SURVEYOR'S CERTIFICATE
I CERTIFY THAT :
1. THE SURVEY WAS COMPLETED ON THE 21st DAY OF MARCH, 2022.

DATE

FRANCIS LAU
ONTARIO LAND SURVEYOR

DRAWN: TMT CHECKED: FL PM: FL FIELD: CA PROJECT No.: 161614463-111

Appendix A2

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.

Urban Design

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-guidelines-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 Slope Stability Guidelines for Development Applications (revised 2012)
   - ⇨ 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 InformationCentre@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:

    i. Location of service

    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.

    v. Maximum hourly daily demand: ___ l/s.

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

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.

Forestry

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 Type/Size	Single Tree Soil Volume (m3)	Multiple Tree 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 adam.palmer@Ottawa.ca 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:

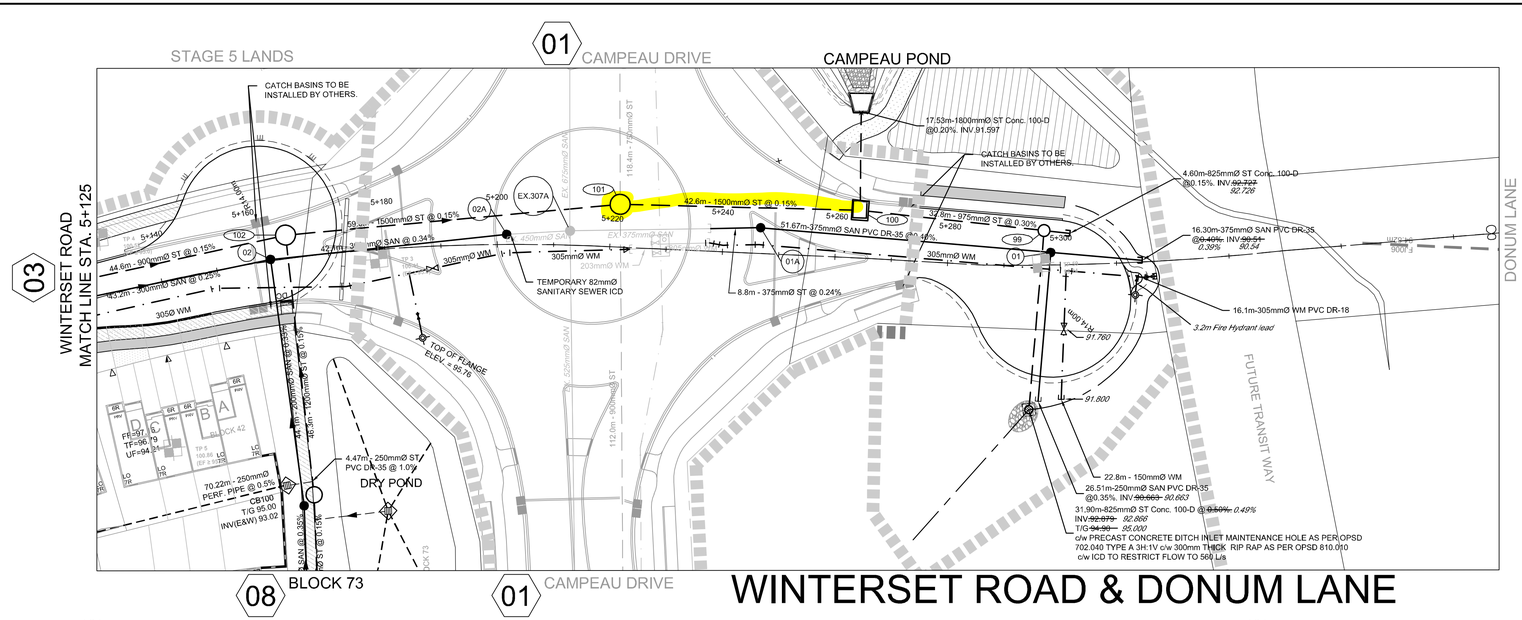
Please refer to the links to Guide to preparing studies and plans and fees for further information. Additional information is available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the development 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.

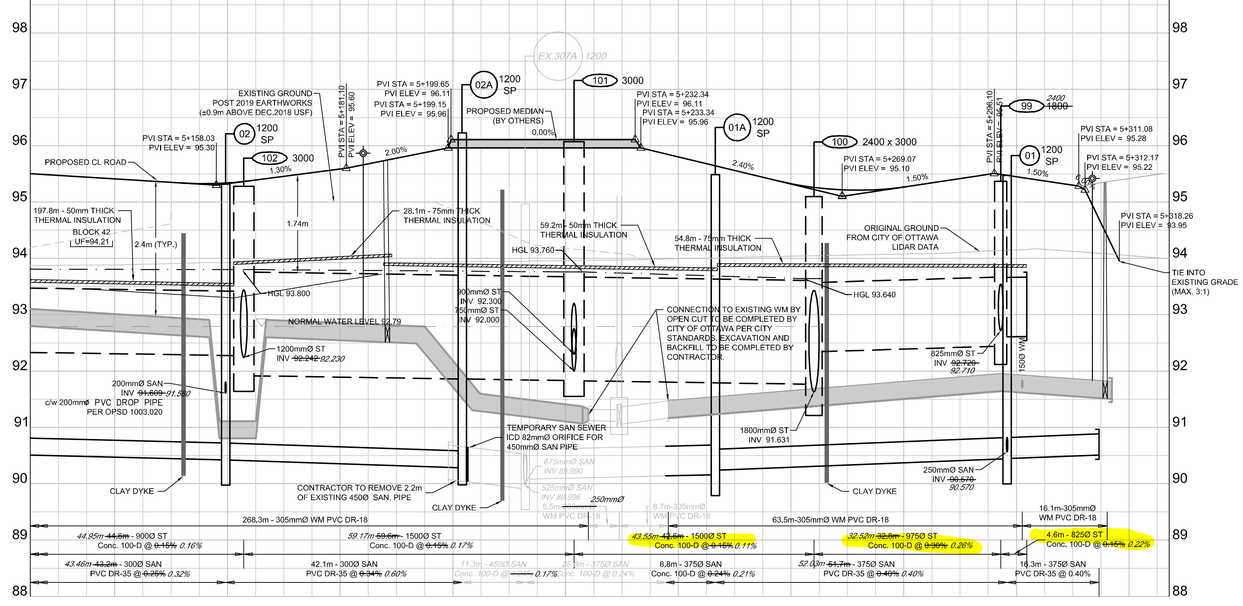
Please do not hesitate to Colette Gorni, at Colette.Gorni@ottawa.ca, if you have any questions.

Appendix A3

As-Built Information



WINTERSET ROAD & DONUM LANE



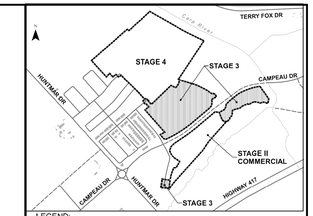
AS CONSTRUCTED INFORMATION

PRODUCED FROM INFORMATION PROVIDED BY FIELD INSPECTOR

date: DECEMBER 17, 2019

J.L. RICHARDS & ASSOCIATES LIMITED

NOTE: ALL SANITARY SERVICES FOR BLOCKS 38, 39, 40, 41 AND 42 ARE REQUIRED TO HAVE CONTROLLED SETTLEMENT JOINTS INSTALLED.



LEGEND:

- EXISTING CATCH BASIN
- PROPOSED CATCH BASIN c/w ICD
- PROPOSED MAINTENANCE HOLE c/w ICD
- FUTURE CATCH BASIN BY OTHERS
- PROPOSED CATCH BASIN & LEAD
- PROPOSED ELBOW CATCHBASIN
- PROPOSED TEE CATCHBASIN
- PROPOSED 3-WAY CATCHBASIN
- 250mmØ PERFORATED PIPE AS PER CITY OF OTTAWA STANDARD DRAWING S29
- PROPOSED WATERMAIN, VALVE & HYDRANT
- PROPOSED WATERMAIN REDUCER
- EXISTING WATERMAIN, VALVE & HYDRANT
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING STORM SEWER & MANHOLE
- PROPOSED SANITARY SEWER & MANHOLE
- PROPOSED STORM SEWER & MANHOLE
- MANHOLE NUMBER AND SIZE (mm) C/W SAFETY PLATFORM PER OPSD 404.020
- SINGLE SERVICE CONNECTION (STORM, SANITARY AND WATER)
- DOUBLE SERVICE CONNECTION (STORM, SANITARY AND WATER)
- SERVICE CONNECTION REQUIRING BENDS
- PHASING LIMIT
- ACOUSTIC WALL
- CONCRETE SIDEWALK
- ASPHALT SIDEWALK
- GRAVEL ACCESS ROAD

No.	ISSUE / REVISION	DD/MM/YY
09	AS-CONSTRUCTED INFORMATION ADDED	17/12/2019
08	ISSUED FOR SI-006 - GEOMETRY UPDATES	13/09/2019
07	ISSUED FOR SI-003 - SERVICE LATERAL UPDATES FOR 2-CAR GARAGE UNITS	13/08/2019
06	ISSUED FOR CONSTRUCTION	28/06/2019
05	ISSUED FOR TENDER	11/06/2019
04	ISSUED TO MECP, REVISED PER CITY COMMENTS	23/05/2019

VERIFY SHEET SIZE AND SCALES. BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING. 0 25mm

SCALE: 1:500H, 1:50V

NOTE: SEE LEGEND & GENERAL NOTES FOR SERVICE BEND REQUIREMENTS.

CLIENT: minto Communities

CONSULTANT: www.jlrichards.ca

J.L.Richards ENGINEERS · ARCHITECTS · PLANNERS

CONSULTANT:

PROFESSIONAL STAMP

PROJECT NORTH

PROJECT:

MINTO COMMUNITIES INC.
ARCADIA STAGE 3

450 HUNTMAR DRIVE

DRAWING:

PLAN & PROFILE
WINTERSET ROAD & DONUM LANE
STA 5+125 TO 5+327.12

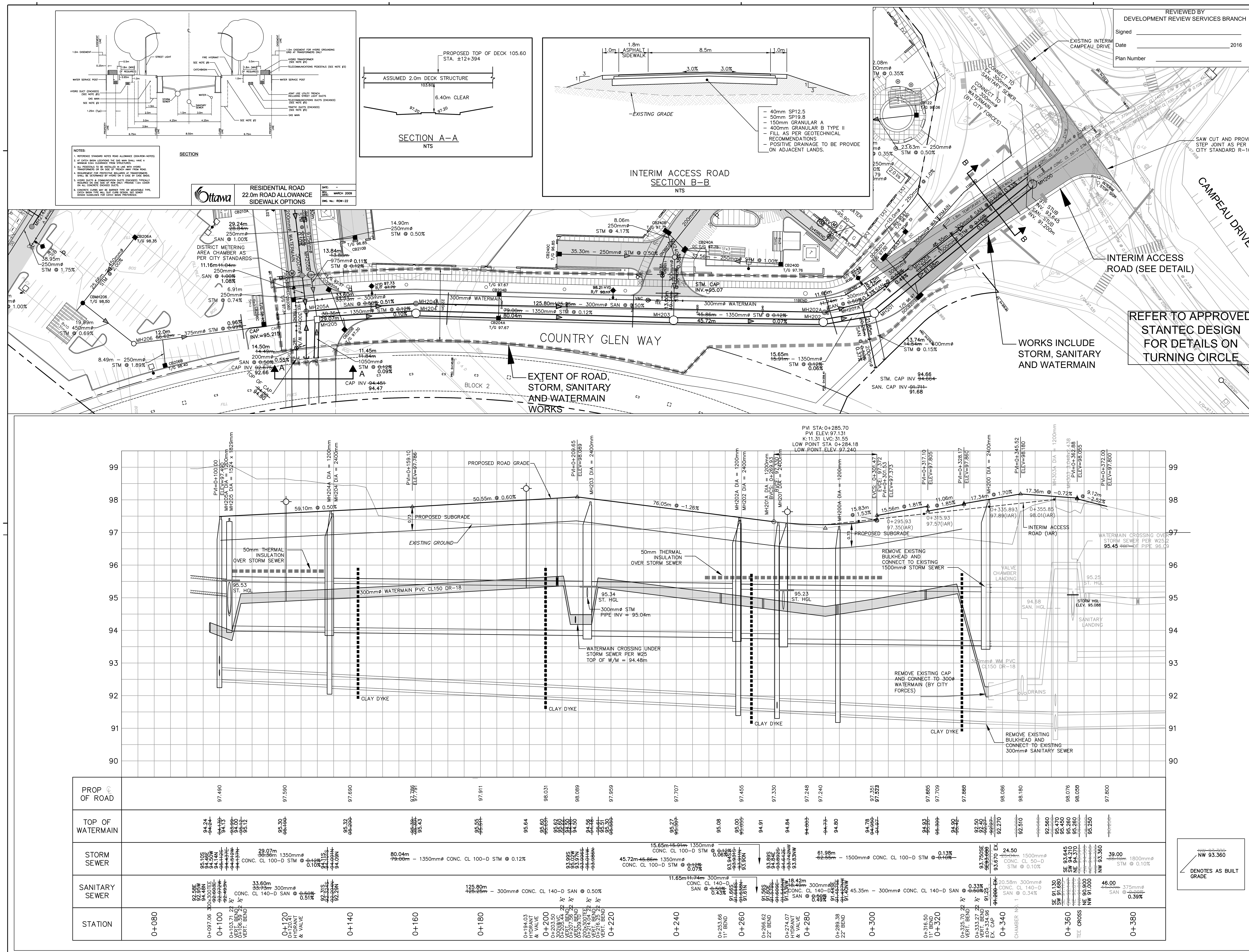
DESIGN:	AT
DRAWN:	CJM
CHECKED:	LD
JLR #:	26299-03

DRAWING #: 02

City File No: DO7-16-0025 Plan No: 17816

PLOT DATE: Friday, December 20, 2019 2:00:06 PM

File Location: V:\26000\26299-03 Arcadia - Stage 3 and Campeau Pond\3-JLR DWG\1-Civil\26299-03 C P&P 02-03 RIVERCHASE.dwg



KEY PLAN

APPROVED ☐ REFUSED ☐

THIS____DAY OF ____________ , 20______

DERRICK MOODIE, ACTING MANAGER
DEVELOPMENT REVIEW, SUBURBAN SERVICES

No.	Description	Date	Checked
10	As-built	17:01:17	DPS
9	Revised as per City Comments	16:08:26	DGY
8	Revised as per new Campeau & asbuilt w/m	16:08:03	DGY
7	Issued for Construction	16:07:13	DGY
6	Add interim Access Rd	16:05:16	DGY
5	Issued for Tender	16:04:05	DGY
4	Revised as per City Comments	14:10:02	DGY
3	Revised as per City Comments	14:08:22	DGY
2	Issued for SPA Resubmission	14.06.27	DGY
1	Issued for SPA	13.11.18	D.G.Y.

Issued for

All measurements and conditions must be checked on the work by the contractor. This drawing not to be used for construction until signed.

Date

plotted J:\35355-ArcadiaComm\5.9 Drawings\59civil\layouts\C-101.dwg
Layout Name: C-101 Plot Style: AIA STANDARD-FULL.CTB Plot
Scale: 1:1 Plotted At: 3/16/2017 11:10 AM Last Saved By: dsiurna
Last Saved At: Mar. 16, 17

TN PN

LICENSED PROFESSIONAL ENGINEER
D. G. Yanroulopoulos
PROVINCE OF ONTARIO

drawn by	DPS	scale	HOR 1:500 VERT. 1:50
checked by	DGY	date	NOV. 2013
printed		file	35355

Arcadia Retail Development

Kanata, Ontario

Minto Properties

200 Kent Street • Suite 180 • Ottawa, Ontario • K1P 0B6
Telephone: (613)782-3137 Fax: (613)782-5777

drawing title:

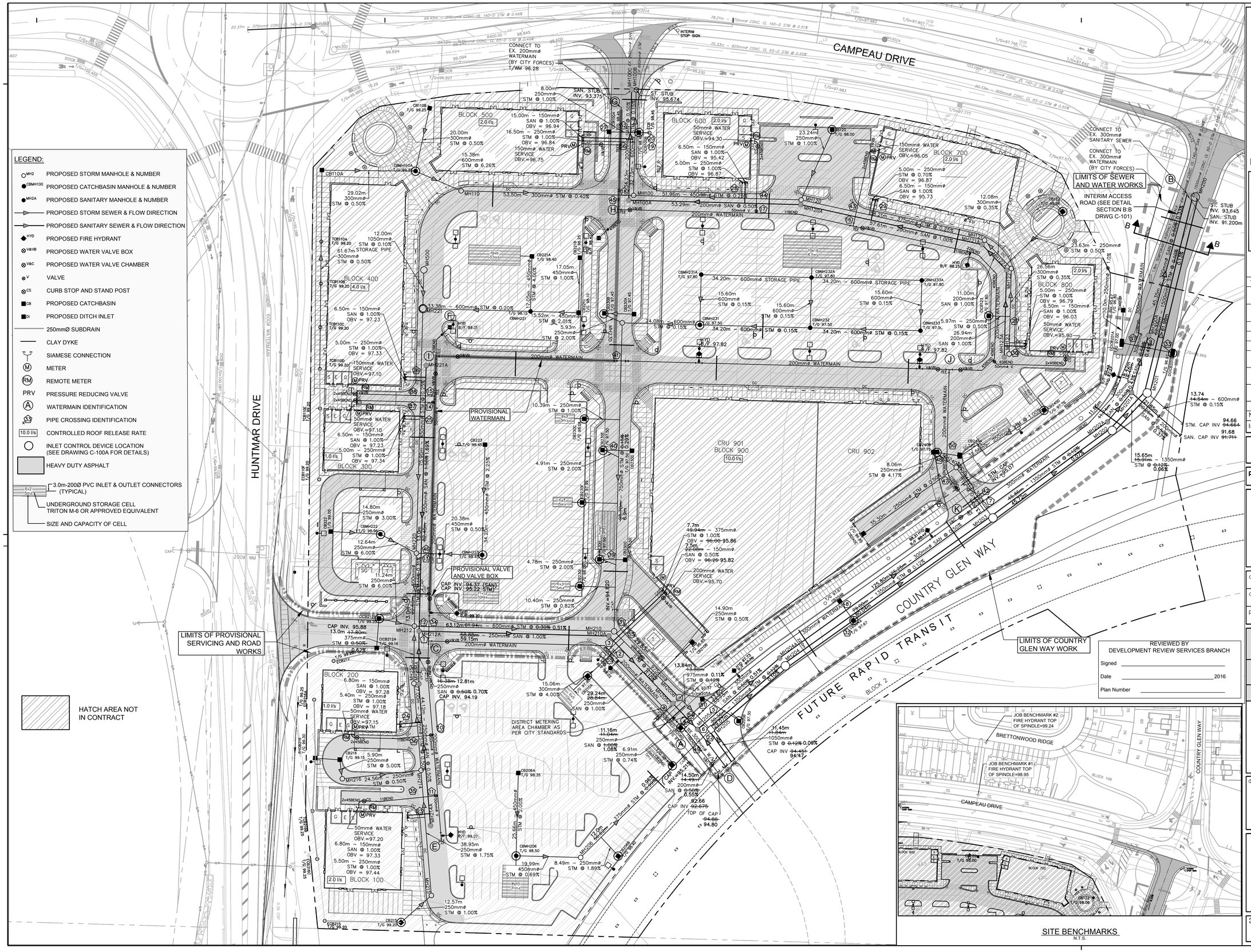
PLAN AND PROFILE COUNTRY GLEN WAY 370 HUNTMAR DRIVE OTTAWA, ON.

IBI GROUP

drawing no. C-101

333 Preston Street Tower 1, Suite 400 Ottawa, Ontario Canada K1S 5N4 Tel (613)225-1311 FAX (613)225-9868

D07-12-14-0014



LEGEND:

- MH2 — PROPOSED STORM MANHOLE & NUMBER
- CBMH100 — PROPOSED CATCHBASIN MANHOLE & NUMBER
- MH2A — PROPOSED SANITARY MANHOLE & NUMBER
- PROPOSED STORM SEWER & FLOW DIRECTION
- PROPOSED SANITARY SEWER & FLOW DIRECTION
- HYD — PROPOSED FIRE HYDRANT
- V&VB — PROPOSED WATER VALVE BOX
- V&C — PROPOSED WATER VALVE CHAMBER
- V — VALVE
- CS — CURB STOP AND STAND POST
- CB — PROPOSED CATCHBASIN
- DI — PROPOSED DITCH INLET
- 250mmØ SUBDRAIN
- CLAY DYKE
- SIAMESE CONNECTION
- M — METER
- RM — REMOTE METER
- PRV — PRESSURE REDUCING VALVE
- A — WATERMAIN IDENTIFICATION
- PIPE CROSSING IDENTIFICATION
- 10.0 l/s — CONTROLLED ROOF RELEASE RATE
- INLET CONTROL DEVICE LOCATION (SEE DRAWING C-100A FOR DETAILS)
- HEAVY DUTY ASPHALT
- 6x2 5cm — 3.0m-200Ø PVC INLET & OUTLET CONNECTORS (TYPICAL)
- UNDERGROUND STORAGE CELL TRITON M-6 OR APPROVED EQUIVALENT
- SIZE AND CAPACITY OF CELL
- HATCH AREA NOT IN CONTRACT

No.	Description	Date	Checked
10	As-built	17:01:17	DPS
9	Revised as per City Comments	16:08:26	DGY
8	Revised Campeau Dr per Stantec Plans	16:08:03	DGY
7	Issued for Construction	16:07:13	DGY
6	Add Interim Access Rd.	16:05:16	DGY
5	Issued for Tender	16:04:05	DGY
4	Revised as per City Comments	14:10:02	DGY
3	Revised as per City Comments	14:08:22	DGY
2	Issued for SPA Resubmission	14.06.27	DGY
1	Issued for SPA	13.11.18	D.G.Y.

Issued for

All measurements and conditions must be checked on the work by the contractor. This drawing not to be used for construction until signed.

Date

plotted J:\1_35355-ArcadiaComm\5.0 Drawings\59civil\layouts\C-100.dwg
Layout Name: Servicing Plan Plot Style: AIA STANDARD-FULL.CTB
Plot Scale: 1:1 Plotted At: 3/16/2017 11:06 AM Last Saved By: dslurno Last Saved At: Mar. 16, 17

drawn by DPS	scale 1:500
checked by DGY	date NOV. 2013
printed	file 35355

Arcadia Retail Development
Kanata, Ontario

Minto Properties
200 Kent Street • Suite 180 • Ottawa, Ontario • K1P 0B6
Telephone: (613)782-3137 Fax: (613)782-5777

drawing title:
SITE SERVICING PLAN
370 HUNTMAR DRIVE
OTTAWA, ON.

IBI GROUP

drawing no.
C-100

333 Preston Street Tower 1, Suite 400
Ottawa, Ontario Canada K1S 5N4 Tel
(613)225-1311 FAX (613)225-9868

D07-12-14-0014

	STATION	DESCRIPTION	FINISHED	TOP OF	AS-BUILT
WATERMAIN SCHEDULE					
A	0+000.00	300Ø x 300Ø TEE	97.24	94.24	
	0+004.00	-	97.31	94.18	
	0+007.00	-	97.32	93.92	
	0+008.47	22.5° VERTICAL BEND	97.33	94.25	
	0+009.92	22.5° VERTICAL BEND	97.28	94.88	
	0+013.98	-	97.29	94.89	
	0+015.00	-	97.30	94.90	
	0+027.40	300Ø x 150ø HYDRANT TEE	97.34	94.94	
	0+040.00	-	97.24	94.98	
	0+058.95	300Ø – 11 1/4° BEND	97.44	95.04	
	0+075.00	-	97.55	95.15	
	0+092.41	300Ø x 150Ø HYDRANT TEE	97.67	95.27	
	0+109.87	300ø V&C	97.77	95.37	
	0+110.60	22.5° VERTICAL BEND	97.78	95.37	
	0+112.71	22.5° VERTICAL BEND	97.79	94.48	
K	0+114.22	300ø x 200ø TEE	97.79	94.48	
	0+118.37	22.5° VERTICAL BEND	97.76	94.48	
	0+120.51	22.5° VERTICAL BEND	97.75	95.35	
	0+135.00	--	97.67	95.27	
	0+153.49	300Ø-22 ½° BEND	95.57	95.17	
	0+159.43	300Ø -11 ¼° BEND	97.50	95.10	
	0+166.99	300Ø -11 ¼° BEND	97.46	95.06	
	0+181.92	300Ø -11 ¼° BEND	97.37	94.97	
	0+185.96	300Ø x 150Ø HYDRANT TEE	97.33	94.93	
	0+195.40	300Ø -11 ¼° BEND	97.28	94.89	
	0+210.00	-	97.34	94.94	
	0+230.00	-	97.41	95.01	
B	0+245.15	EX. 300Ø CAP	97.46	95.06	
C	0+000.00	200Ø x 200ø TEE	99.23	96.83	96.91
	0+003.50	200ø V&VB	99.12	96.72	96.73
	0+025.00	-	98.43	96.03	96.12
	0+050.19	200ø 45° BEND	97.62	95.22	95.20
	0+055.85	200ø x 200ø TEE DOMESTIC SERVICE	97.57	95.17	95.17
	0+060.32	200ø x 150ø HYDRANT TEE	97.53	95.13	95.12
	0+083.70	200ø V&VB	97.33	94.93	94.95
	0+088.00	200ø x 300ø REDUCER	97.28	94.88	94.90
	0+089.13	22.5° VERTICAL BEND	97.27	94.87	94.85
	0+090.79	22.5° VERTICAL BEND	97.25	94.25	94.30
A	0+092.29	300ø x 300ø TEE	97.23	94.24	94.30
	0+099.50	22.5° VERTICAL BEND	97.26	94.25	94.80
	0+100.96	22.5° VERTICAL BEND	97.25	94.85	94.80
	0+103.70	300Ø V&C	97.26	94.86	94.75
D	0+107.06	300Ø CAP	97.28	94.88	94.80
E	0+000.00	200Ø CAP	99.18	96.78	
	0+003.33	200Ø x 150Ø HYDRANT TEE	99.17	96.77	
	0+009.80	200Ø C/W 50ø TVS DOMESTIC SERVICE	99.12	96.72	
	0+028.68	200Ø C/W 50Ø TVS DOMESTIC SERVICE	99.16	96.76	
	0+045.08	TEMP 200Ø CAP 200Ø -11 ¼° BEND	99.18	96.78	96.80
	0+054.52	200ø V&VB	99.22	96.82	96.82
C	0+058.02	200ø x 200Ø TEE	99.23	96.83	96.82
	0+066.80	200Ø x 150Ø HYDRANT TEE	99.21	96.81	96.80
	0+071.10	200Ø V&VB			
	0+085.00	TEMP 200Ø CAP	99.19	96.79	96.79
	0+100.00	-	99.17	96.77	
	0+115.00	--	99.15	96.75	
	0+132.00	200Ø C/W 50Ø TVS DOMESTIC SERVICE	99.13	96.73	
	0+134.00	200Ø x 150Ø TEE DOMESTIC SERVICE	99.13	96.73	
	0+140.92	200Ø V&VB	99.13	96.73	
I	0+146.42	200Ø x 200Ø TEE	99.13	96.73	
	0+151.50	200Ø - 45° BEND	99.10	96.70	
	0+153.50	200ø MV	99.07	96.67	
F	0+157.18	HYDRANT	99.22	96.82	
G	0+000.00	200Ø CAP	98.68	96.28	
	0+009.34	200Ø x 150Ø TEE DOMESTIC SERVICE	98.36	95.96	
	0+015.00	-	98.35	95.95	
	0+025.52	45° BEND VERTICAL BEND	98.58	96.18	
	0+026.09	45° BEND VERTICAL BEND	98.56	95.52	
	0+027.24	--	98.53	95.52	
	0+028.39	45° BEND VERTICAL BEND	98.52	95.52	
	0+028.91	45° BEND VERTICAL BEND	98.52	96.12	
H	0+031.74	200Ø x 200Ø TEE	98.45	96.05	
	0+034.84	200Ø – 45°BEND	98.36	95.96	
	0+039.30	200Ø MV	98.27	95.87	
	0+043.16	HYDRANT	98.40	96.00	
H	0+000.00	200Ø X200ø TEE	98.45	96.05	
	0+003.53	200Ø V&VB	98.43	96.03	
	0+025.00	--	98.34	95.94	
	0+042.60	200Ø C/W 50Ø TVS DOMESTIC SERVICE	98.33	95.93	
	0+056.07	200Ø -11 ¼° BEND	98.32	95.92	
	0+073.14	200Ø x 150Ø TEE DOMESTIC SERVICE	98.09	95.69	
	0+076.14	200Ø V&VB	98.10	95.70	
	0+090.00	-	98.09	95.69	
	0+110.32	200Ø x 150ø HYDRANT TEE	98.08	95.68	
	0+110.74	200Ø -11 ¼° BEND	98.08	95.68	
	0+113.24	200Ø – 22 ½ °BEND	98.05	95.65	
	0+121.21	200Ø – 45°BEND	97.99	95.59	
	0+135.00	-	97.92	95.52	
	0+147.40	200Ø – 45°BEND	97.86	95.46	
	0+148.08	200Ø C/W 50Ø TVS DOMESTIC SERVICE	97.84	95.44	
	0+152.76	200Ø – 45°BEND	97.82	95.42	
	0+159.42	200Ø – V&VB	97.76	95.36	
J	0+162.92	200Ø X200ø TEE	97.72	95.32	
	0+166.42	200Ø – V&VB	97.72	95.32	
	0+172.13	200Ø x 150Ø HYDRANT TEE	97.73	95.33	
	0+185.00	-	97.73	95.33	
	0+205.00	-	97.73	95.33	
	0+225.00	-	97.73	95.33	
	0+240.53	200Ø x 150Ø HYDRANT TEE	97.73	95.33	
	0+255.00	-	97.71	95.31	
	0+265.51	45° BEND VERTICAL BEND	97.69	95.29	
	0+266.29	45° BEND VERTICAL BEND	97.71	94.30	
	0+268.96	45° BEND VERTICAL BEND	97.65	94.30	
	0+269.80	45° BEND VERTICAL BEND	97.75	95.35	
	0+275.00	-	97.88	95.48	
	0+300.00	-	98.53	96.13	
	0+319.53	200ø V&VB	99.04	96.64	
I	0+323.03	200Ø x 200ø TEE	99.13	96.73	
J	0+000.00	200Ø X200ø TEE	97.72	95.32	
	0+015.00	-	97.81	95.41	
	0+030.95	200Ø – 22 ½ °BEND	97.90	95.40	
	0+034.23	200Ø -11 ¼° BEND	97.93	95.39	
	0+037.14	45° BEND VERTICAL BEND	97.91	95.38	
	0+037.63	45° BEND VERTICAL BEND	97.83	95.00	
	0+038.76	-	97.90	94.70	
	0+045.04	200Ø – V&VB	98.05	94.59	
K	0+052.68	300ø x 200ø TEE	97.79	94.48	

REVISED 2017-01-17

REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

Signed ______________________________

Date ______________________________ 2016

Plan Number ______________________________

CATCH BASIN DATA TABLE

STRUCTURE ID	AREA ID	ELEVATION TOP OF GRATE	INVERT INLET	INVERT OUTLET	OUTLET PIPE DIAMETER (mm)	OUTLET PIPE TYPE	100 yr HEAD	FLOW (l/s)	CUSTOM IPEX TEMPEST ICD *SEE NOTE 3.9*
CICB123	123	97.80		96.55	250	PVC DR-35	1.225	15.0	LMF
CB122	122	98.06	97.03	96.61	250	PVC DR-35	1.265	10.0	LMF
			96.71						
CB120	120	98.00		96.55	250	PVC DR-35	1.475	15.0	LMF
CB110B		99.25		97.75	300	PVC DR-35			
CB110A		99.25	97.60	97.45	300	PVC DR-35			
CBMH110A	110	99.35	97.45	97.35	600	PVC DR-35	1.700	40.0	HF
CICB100A		98.45		97.05	250	PVC DR-35			
CICB100B	100	98.45	96.97	96.91	250	PVC DR-35	1.515	30.0	LMF
CBMH233A		97.80		95.64	600	CONC			
CBMH233		97.50	95.62	95.56	600	CONC			
CBMH232A		97.80	96.77	95.57	600	CONC			
			96.37						
CBMH232		97.50	95.51	95.49	600	CONC			
CBMH231A		97.80		95.46	600	CONC			
CBMH231	231	97.50	95.44	95.14	600	CONC	2.264	150.0	HF
CICB230A		97.45		96.00	250	PVC DR-35			
CICB230B	230B	97.45	95.92	95.79	250	PVC DR-35	1.715	70.0	HF
CB230C	230C	98.08	97.05	96.63	250	PVC DR-35	1.395	10.0	LMF
			96.73						
CB230D		97.50		96.05	250	PVC DR-35			
CB230E	230D	97.50	95.97	95.85	250	PVC DR-35	1.679	67.0	HF
CB230F	230F	97.99	96.96	96.54	250	PVC DR-35	1.535	38.0	HF
			96.64						
CB230G		97.50		96.05	250	PVC DR-35			
CB230H	230G	97.50	95.97	95.84	250	PVC DR-35	1.710	53.0	HF
			96.47(N)						
			96.07(N)						
CB230I	230I	98.09	97.06	96.64	250	PVC DR-35	1.435	11.0	LMF
			96.74						
CB221A		98.40	97.37	96.75	450	CONC			
			96.97						
CB221B		98.25		96.50	450	CONC			
CB221C		98.10	96.33	96.33	450	CONC			
CBMH221		98.15	96.02	95.87	600	CONC			
MH221	221	99.22	95.80	95.58	450	CONC	2.349	85.0	HF
CB222		99.05		97.60	250	PVC DR-35			
CBMH222	222	98.96	97.16	96.58	250	PVC DR-35	2.440	15.0	LMF
CB223		98.45		96.80	450	CONC			
CBMH223	223	98.45	96.03	95.81	450	CONC	2.669	32.0	HF
			97.42(S)						
			97.02(S)						
CICB212A		99.16		97.71	250	PVC DR-35			
CICB212B	212	99.16	97.62	97.50	250	PVC DR-35	1.626	24.0	LMF
CB215	215	99.20		97.75	250	PVC DR-35	1.575	10.0	LMF
RYCB216		99.30		97.50	250	PVC DR-35			
CB216		99.15		97.17	250	PVC DR-35			
MH216		99.29	96.88	96.82	250	PVC DR-35			
CB210A	210A	97.90	96.87	96.40	300	PVC DR-35	1.550	77.0	HF
			96.50						
CB210B		96.85		95.40	250	PVC DR-35			
CB206A		98.35		96.70	450	PVC DR-35			
CBMH206	206A	98.50	96.19	95.96	450	CONC	2.413	85.0	HF
			97.47(S)						
			97.07(S)						
MH206		98.58	95.82	95.67	375	PVC DR-35			
CB206B	206B	98.40		96.95	250	PVC DR-35	1.575	10.0	LMF
CB206C	206C	98.40	97.37	96.95	250	PVC DR-35	1.475	14.0	LMF
			97.05						
CB206D	206D	97.34		95.89	250	PVC DR-35	1.465	60.0	HF
CB205A		97.37		95.92	250	PVC DR-35			
CB205B	205	97.30	95.80	95.68	250	PVC DR-35	1.680	60.0	HF
CB204B		97.67		96.25	250	PVC DR-35			
CB204A	204	97.67	96.16	96.04	250	PVC DR-35	1.510	55.0	HF
CB240A		97.75	96.72	96.30	250	PVC DR-35			
			96.40						
CB240B	240A	97.75	96.20	96.07	250	PVC DR-35	1.652	10.0	LMF
CB240C		96.85		95.40	250	PVC DR-35			
CB240D	240D	97.76	96.73	96.31	250	PVC DR-35	1.465	10.0	LMF
			96.43						
DCB201A		97.02		95.57	250	PVC DR-35			
DCB201B	201	97.02	95.42	95.30	250	PVC DR-35	1.707	60.0	HF

CROSSING SCHEDULE

Location	Below Pipe Size (mm)	Below Pipe Obvert	Above Pipe Size (mm)	Above Pipe Invert	Difference (m)
1	250Ø SAN	94.41	200Ø W/M	96.65	2.20
2	250Ø SAN	93.68	250Ø STM	95.95	2.23
3	250Ø SAN	93.33	200Ø W/M	93.85	0.50
4	250Ø SAN	93.69	300Ø W/M	96.16	2.42
5	300Ø SAN	92.80	250Ø STM	95.67	2.79
6	300Ø SAN	92.82	975Ø STM	94.57	1.55
7	300Ø SAN	92.24	300Ø STM	95.07	2.69
8	300Ø SAN	92.50	250Ø STM	96.00	3.43
9	300Ø SAN	91.78	250Ø STM	95.68	3.83
10	250Ø SAN	94.79	50Ø W/M	97.35	2.52
11	250Ø SAN	94.69	50Ø W/M	97.15	2.41
12	250Ø SAN	94.52	600Ø STM	95.19	0.54
13	250Ø SAN	94.86	450Ø STM	95.50	0.55
14	250Ø SAN	95.56	50Ø W/M	96.73	1.12
15	250Ø SAN	95.59	150Ø W/M	96.63	0.99
16	250Ø SAN	94.95	150Ø W/M	95.47	0.50
17	250Ø SAN	94.68	50Ø W/M	95.35	0.63
18	250Ø SAN	93.30	300Ø STM	96.09	2.68
19	250Ø SAN	93.23	250Ø STM	96.99	3.72
20	250Ø SAN	93.21	250Ø STM	96.44	3.19
21	250Ø SAN	95.91	250Ø STM	96.57	0.62
22	250Ø SAN	92.91	375Ø STM	95.19	2.18
23	250Ø STM	96.83	150Ø SAN	97.13	0.26
24	375Ø STM	96.52	150Ø SAN	97.07	0.47
25	450Ø STM	95.99	150Ø SAN	97.03	0.97
26	450Ø STM	96.02	150Ø SAN	97.03	0.94
27	200Ø W/M	95.98	150Ø SAN	96.67	0.69
28	150Ø SAN	95.36	450Ø STM	96.02	0.59
29	150Ø SAN	95.68	375Ø STM	96.23	0.47
30	150Ø SAN	95.98	300Ø STM	96.55	0.49
31	975Ø STM	95.61	150Ø SAN	96.01	0.27
32	1350Ø STM	95.44	250Ø STM	95.97	0.37
33	1500Ø STM	95.23	250Ø STM	95.63	0.25
34	600Ø STM	95.78	200Ø W/M	96.62	0.73
35	250Ø STM	96.74	50Ø W/M	97.35	0.57
36	375Ø STM	96.54	50Ø W/M	97.15	0.52
37	450Ø STM	96.00	50Ø W/M	96.75	0.68
38	450Ø STM	96.01	150Ø W/M	96.65	0.57
39	675Ø STM	95.64	250Ø STM	95.91	0.15
40	675Ø STM	95.70	250Ø STM	95.99	0.18
41	200Ø W/M	94.30	675Ø STM	95.06	0.65
42	300Ø W/M	94.48	300Ø STM	95.04	0.56
43	150Ø W/M	95.63	375Ø STM	96.21	0.50
44	50Ø W/M	95.42	450Ø STM	96.03	0.53
45	200Ø W/M	95.60	300Ø STM	96.10	0.50
46	450Ø STM	96.10	200Ø W/M	96.78	0.68
47	200Ø W/M	94.70	250Ø STM	95.23	0.50
48	200Ø W/M	95.40	250Ø STM	95.90	0.50
49	300Ø W/M	94.35	375Ø STM	95.23	0.79
50	200Ø W/M	95.45	250Ø STM	96.26	0.79
51	300Ø W/M	94.89	250Ø STM	95.71	0.79
52	200Ø W/M	96.24	250Ø STM	97.02	0.76
53	975Ø STM	95.60	200Ø W/M	96.15	0.50
54	300Ø W/M	94.01	975Ø STM	94.57	0.50
55	200Ø W/M	95.16	250Ø STM	96.15	0.97
56	200Ø W/M	95.97	250Ø STM	96.47	0.50
57	300Ø W/M	94.89	250Ø STM	95.71	0.80

DRAWING NOTES

1.0 GENERAL

1.1 CONTRACTOR TO VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION.

1.2 DO NOT SCALE DRAWINGS.

1.3 CONTRACTOR TO REPORT ALL DISCOVERIES OF ERRORS, OMISSIONS OR DISCREPANCIES TO THE ARCHITECT OR DESIGN ENGINEER AS APPLICABLE.

1.4 USE ONLY THE LATEST REVISED DRAWINGS OR THOSE THAT ARE MARKED "ISSUED FOR CONSTRUCTION".

1.5 ALL CONSTRUCTION SHALL COMPLY WITH CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS.

1.6 THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS AND SPECIFICATIONS.

1.7 FOR LEGAL SURVEY INFORMATION REFER TO REGISTERED PLAN.

1.8 REFER TO SITE PLAN BY PELLOW + ASSOCIATES ARCHITECTS INC.FOR SITE PLAN LAYOUT.

1.9 REFER TO LANDSCAPE ARCHITECTURAL DRAWINGS FOR SURFACE FEATURES DETAILS.

1.10 CONTRACTOR TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES AS IDENTIFIED IN THE EROSION AND SEDIMENT CONTROL PLAN TO THE SATISFACTION OF THE CITY OF OTTAWA, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS (FILLING, GRADING, REMOVAL OF VEGETATION, ETC.). DURING ALL PHASES OF THE SITE PREPARATION AND CONSTRUCTION THE MEASURES ARE TO BE MAINTAINED TO THE SATISFACTION OF THE ENGINEER AND CITY OF OTTAWA IN ACCORDANCE WITH THE BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL. SHOULD ANY ADDITIONAL MEASURES BE REQUIRED TO ADDRESS FIELD CONDITIONS THEY SHALL BE INSTALLED AS DIRECTED BY THE ENGINEER OR THE CITY OF OTTAWA. SUCH ADDITIONAL MEASURES MAY INCLUDE BUT NOT BE LIMITED TO INSTALLATION OF FILTER CLOTHS ACROSS MANHOLE AND CATCHBASIN LIDS TO PREVENT SEDIMENT FROM ENTERING THE STRUCTURE AND INSTALLATION AND MAINTENANCE OF A LIGHT DUTY SILT FENCE BARRIER AS REQUIRED.

1.11 ALL IRON WORK ELEVATIONS SHOWN ARE APPROXIMATE AND ARE SUBJECT TO MINOR ADJUSTMENTS AS DETERMINED BY THE ENGINEER.

1.12 ALL CONCRETE CURBS AND SIDEWALKS TO CONFORM TO O.P.S. AND CONSTRUCTED TO CITY STANDARDS. ALL ONSITE CURBS TO BE BARRIER TYPE, WITH DEPRESSIONS AS NOTED.

1.13 ALL CONCRETE SHALL BE "NORMAL PORTLAND CEMENT" IN ACCORDANCE WITH O.P.S.S. 1350 AND SHALL ACHIEVE A MINIMUM STRENGTH OF 30MPa AT 28 DAYS.

1.14 ALL CONSTRUCTION TRAFFIC TO ACCESS SITE FROM CAMPEAU DRIVE.

1.15 FOR DETAILS OF TEST PITS SEE GEOTECHNICAL REPORT.

1.16 CONTRACTOR TO PROTECT EXISTING INFRASTRUCTURE AND PROPERTY SUCH AS TREES, PARKING METERS, SIDEWALKS, CURBS, ASPHALT, AND STREET SIGNS FROM DAMAGE DURING CONSTRUCTION. CONTRACTOR TO PAY THE COST TO REINSTATE OR REPLACE ANY DAMAGED INFRASTRUCTURE OR PROPERTY TO THE SATISFACTION OF THE CITY.

1.17 THE POSITION OF POLE LINES, CONDUITS, WATERMAIN, SEWERS, AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK THE CONTRACTOR SHALL INFORM ITSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, SHALL PROTECT ALL UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

1.18 CONTRACTOR TO SUPPLY SUITABLE FILL MATERIAL WHERE REQUIRED TO ROUGH GRADE THE SITE. ALL IMPORTED FILL MATERIAL TO BE CERTIFIED AS ACCEPTABLE BY THE GEOTECHNICAL ENGINEER.

1.19 CONTRACTOR TO HAUL EXCESS MATERIAL OFFSITE AS NECESSARY TO GRADE SITE TO MEET THE PROPOSED GRADES. ALL EXCESS MATERIAL TO BE HAULED OFFSITE AND DISPOSED OF AT AN APPROVED DUMP SITE. SHOULD THE CONTRACTOR DISCOVER ANY HAZARDOUS MATERIAL, CONTRACTOR IS TO NOTIFY ENGINEER. ENGINEER TO DETERMINE APPROPRIATE DISPOSAL METHOD/LOCATION.

1.20 FILL MATERIAL WITHIN THE PARKING LOT AND BUILDING PAD AREAS, AND SUPPORTING BUILDING FOUNDATIONS SHALL BE COMPACTED TO 98% STANDARD MODIFIED PROCTOR DENSITY AND TO THE SATISFACTION OF THE GEOTECHNICAL ENGINEER.

1.21 ALL COMPACTION METHODS TO BE PERFORMED TO THE SATISFACTION OF THE GEOTECHNICAL ENGINEER TO INCLUDE BUT NOT BE LIMITED TO THE THICKNESS OF LIFTS, AND COMPACTION EQUIPMENT USED.

1.22 ALL DISTURBED BOULEVARDS TO BE REINSTATED WITH SOD ON 100mm TOPSOIL.

1.23 UTILITY DUCTS TO BE INSTALLED PRIOR TO ROAD BASE CONSTRUCTION.

1.24 CLAY DIKES TO BE INSTALLED WHERE INDICATED ON THE DRAWINGS OR AS APPROVED AND DIRECTED BY THE GEOTECHNICAL ENGINEER ALL IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS AND SPECIFICATIONS.

1.25 ALL PIPE BEDDING TO BE OPSS GRANULAR 'A' PLACED A MINIMUM OF 300mm BELOW SEWER AND WATER PIPES AND COMPACTED TO SPRING LINE. BEDDING AND COVER MATERIAL AS PER RECOMMENDATIONS FROM GEOTECHNICAL ENGINEER.

2.0 SANITARY

2.1 ALL SANITARY SEWER MAINS TO BE CSA CERTIFIED, BELL AND SPIGOT TYPE. ONLY FACTORY FITTINGS TO BE USED. SEWER TO BE INSTALLED AS PER OSPD 1005.01. SANITARY SEWER MATERIALS TO BE:
250mmØ AND SMALLER - PVC DR 28
300mmØ AND LARGER - CONC. CL. 140-D

2.2 ALL SANITARY MAINTENANCE HOLES TO BE 1.2m DIAMETER AS PER CITY OF OTTAWA STANDARDS COMPLETE WITH BENCHING, RUNGS, FRAME AND COVER, DROP PIPES AND LANDINGS WHERE NEEDED.

2.3 SANITARY MANHOLE COVERS TO BE CITY OF OTTAWA STD. S25 (MOD. OPSD. 401.020). SANITARY MANHOLE COVER TO BE CLOSED COVER TYPE, AS PER CITY STANDARD S24.

2.4 SANITARY SEWER LEAKAGE TEST AND CCTV INSPECTION SHALL BE COMPLETED AS PER CITY SPECIFICATIONS PRIOR TO INSTALLATION OF BASE COURSE ASPHALT.

2.5 ANY SANITARY SEWER WITH LESS THAN 2.0m COVER REQUIRES THERMAL INSULATION AS PER CITY OF OTTAWA STANDARD W22, OR AS APPROVED BY THE ENGINEER.

2.6 CONNECTION TO THE EXISTING SANITARY SEWER TO BE INCLUDED IN THE COST FOR SANITARY SEWER INSTALLATION. THIS INCLUDES REINSTATEMENT OF ROAD CUTS TO CITY STANDARDS.

Commercial–Storm STRUCTURE TABLE

NAME	RIM ELEV.	INVERT IN	INVERT IN AS–BUILT	INVERT OUT	INVERT OUT AS–BUILT	DESCRIPTION
MH100	98.51	NE95.873 SW96.023		NW95.723		1200ø OPSD 701.010
MH100B	98.58	SE95.674		NW95.674		1200ø OPSD 701.010
MH110	98.95	W96.387		NE96.237		1200ø OPSD 701.010
MH120	98.24	NE96.108 N96.318		SW96.003		1200ø OPSD 701.010
MH121	98.17	E96.329		SW96.254		1200ø OPSD 701.010
MH122	98.24	SE96.401		W96.371		1200ø OPSD 701.010
MH123	97.97			NW96.494		1200ø OPSD 701.010
MH200	97.80	~~SE93.680~~	SE93.75	NW93.670		2400ø OPSD 701.013
MH201	97.27	~~S93.892~~ ~~E94.642~~	SE93.89 SE94.64	~~NW93.742~~	NW93.83	2400ø OPSD 701.013
MH202	97.38	~~S93.931~~	SE93.94	~~N93.911~~	N93.90	2400ø OPSD 701.013
MH203	97.94	~~S93.996~~ ~~W95.011~~	S93.99 W95.02	~~N93.986~~	N93.97	2400ø OPSD 701.013
MH204	97.57	~~S94.101~~	S94.11	~~N94.091~~	N94.09	2400ø OPSD 701.013
MH205	97.43	~~W94.512~~ ~~E94.437~~ ~~S95.112~~	W94.50 E94.46 S95.10	~~N94.137~~	N94.14	1524x1829mm Rectangular Metric
MH205B	97.47	~~W94.538~~	W94.52	~~E94.528~~	E94.515	1800ø OPSD 701.012
MH206	98.59	SW95.824		N95.674		1200ø OPSD 701.010
MH210	97.78	~~SW94.957~~ ~~NW94.807~~	SW94.83 NW94.80	~~E94.582~~	E94.55	1500ø OPSD 701.011
MH212	99.30	~~SE95.927~~ ~~NW95.202~~ ~~SW96.824~~	SE95.80 NW95.18 SW96.83	~~NE95.142~~	NE95.15	1200ø OPSD 701.010
MH213	99.27	SE96.036		NW96.016		1200ø OPSD 701.010
MH214	99.19	SE96.296 SW96.696		NW96.171		1200ø OPSD 701.010
MH215	99.30	S97.624		NW96.978		1200ø OPSD 701.010
MH216	99.29	NW96.879		NE96.819		1200ø OPSD 701.010
MH220	99.12	NW95.386 W95.826 NE95.704		SE95.236		1200ø OPSD 701.010
MH221	99.22	NE95.801 NW95.596		SE95.576		1800ø OPSD 701.012
MH230	97.56	NE95.100 W95.676		SE94.950		1200ø OPSD 701.010
MH240	97.86	S95.224 N95.984 W95.737		E95.089		1200ø OPSD 701.010
MH500	99.21			SE95.608		1800ø OPSD 701.012

3.0 STORM

3.1 ALL STORM SEWERS TO BE CSA CERTIFIED, BELL AND SPIGOT TYPE. ALL STORM SEWERS TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS. ONLY FACTORY FITTINGS TO BE USED. STORM SEWER MATERIALS TO BE : 375mmØ AND SMALLER - PVC DR 35
450mmØ AND LARGER - CONC. CL. 100-D

3.2 ALL STORM MAINTENANCE HOLES TO BE SIZED IN ACCORDANCE WITH THE PLANS AND AS PER CITY OF OTTAWA STANDARDS COMPLETE WITH BENCHING, RUNGS, AND FRAME AND COVER.

3.3 STORM MH COVERS TO BE OPEN TYPE, AS PER CITY STANDARD S24, FRAMES TO BE PER CITY OF OTTAWA STD. S25.. CONTRACTOR TO INSTALL FILTER FABRIC UNDER STORM MH COVER UNTIL SODDING IS COMPLETE.

3.4 STORM MAINTENANCE HOLES AND CBMH'S TO BE OPSD, SIZE AS SPECIFIED, TAPER TOP FOR MH AND FLAT TOP FOR CBMH, UNLESS OTHERWISE NOTED.

3.5 ALL CATCH BASINS TO BE AS PER OPSD 705.010, FRAME & FISH TYPE GRATE AS PER CITY OF OTTAWA STD. S19.1, ALL CB LEAD PIPES TO BE 250mm DIAMETER PVC DR 35 @ 1.00% SLOPE WITH OUTLET INVERT AT 1.45m BELOW TOP OF GRATE, UNLESS OTHERWISE NOTED.

3.6 150mm DIAMETER SOCK-WRAPPED PERFORATED PVC SUBDRAINS TO BE INSTALLED AT ALL CB'S, EXTEND 3.0m FROM 4 SIDES OF CB. WHERE CB IS ADJACENT TO CURB EXTEND SUBDRAIN 3.0m IN EACH DIRECTION ALONG CURB.

3.7 ANY STORM SEWER WITH LESS THAN 2.0m COVER REQUIRES THERMAL INSULATION AS PER CITY OF OTTAWA STANDARD W22, OR AS APPROVED BY THE ENGINEER.

3.8 CONNECTION TO THE EXISTING STORM SEWER TO BE INCLUDED IN THE COST FOR STORM SEWER INSTALLATION. THIS INCLUDES REINSTATEMENT OF ROAD CUT TO CITY STANDARDS.

3.9 CONTRACTOR TO PROVIDE IPEX-TEMPEST ICD'S (OR EQUIVALENT)SHOP DRAWINGS BASED ON HEAD AND FLOW RATE SPECIFIED IN CB DATA TABLE, FOR ENGINEERS REVIEW PRIOR TO ORDERING ICD'S.

3.10 CONTRACTOR TO PROVIDE TRITON M-6 STORAGE CELL (OR EQUIVALENT) SHOP DRAWING BASED ON VOLUME SPECIFIED FOR ENGINEERS APPROVAL PRIOR TO ORDERING MATERIAL.

4.0 WATER

4.1 ALL WATERMAINS TO BE PVC DR 18, WITH MINIMUM COVER OF 2.4m AND INSTALLED PER CITY OF OTTAWA STANDARDS. ALL DOMESTIC WATER SERVICES ARE TO BE 200mmØ.

4.2 THRUST BLOCKS TO BE INSTALLED AT ALL BENDS, TEES, AND CAPS ALL AS PER OPSD 1103.01 AND 1103.02.

4.3 CONTRACTOR TO CONDUCT PRESSURE AND LEAKAGE TESTING OF ALL WATERMAINS AND DISINFECT AND CHLORINATE ALL WATERMAINS TO THE SATISFACTION OF M.O.E. AND THE CITY OF OTTAWA.

4.4 TRACER WIRE TO BE INSTALLED ALONG THE FULL LENGTH OF WATERMAIN AND ATTACHED TO EACH MAIN STOP AS PER CITY OF OTTAWA STANDARDS.

4.5 ALL COMPONENTS OF THE WATER DISTRIBUTION SYSTEM SHALL BE CATHODICALLY PROTECTED AS PER CITY OF OTTAWA STANDARDS.

4.6 ALL VALVES & VALVE BOXES AND CHAMBERS, HYDRANTS, AND HYDRANT VALVES AND ASSEMBLIES SHALL BE INSTALLED AS PER CITY OF OTTAWA STANDARDS.

4.7 ANY WATERMAIN WITH LESS THAN 2.4m COVER REQUIRES THERMAL INSULATION AS PER CITY OF OTTAWA STANDARD W22, OR AS APPROVED BY THE ENGINEER.

4.8 CONTRACTOR IS RESPONSIBLE FOR ACQUIRING THE WATER PERMIT FROM THE CITY OF OTTAWA AND PAYMENT OF ANY FEES ASSOCIATED WITH SECURING THE WATER PERMIT. OWNER IS RESPONSIBLE FOR REIMBURSING THE CONTRACTOR FOR THE ACTUAL COST OF ACQUIRING THE WATER PERMIT.

4.9 CONNECTION TO EXISTING WATERMAIN TO BE INCLUDED IN THE COST FOR THE WATERMAIN INSTALLATION. THIS COST INCLUDES REINSTATEMENT OF ROAD CUTS TO CITY STANDARDS.

5.0 PARKING LOT AND WORK IN PUBLIC RIGHTS OF WAY

5.1 CONTRACTOR TO REINSTATE ROAD CUTS PER CITY OF OTTAWA STANDARD R-10.

5.2 THE CONTRACTOR SHALL PREPARE A TRAFFIC MANAGEMENT PLAN FOR REVIEW AND APPROVAL BY THE CITY OF OTTAWA. CONTRACTOR TO MAINTAIN TRAFFIC FLOW DURING THE ENTIRE CONSTRUCTION PERIOD. MAINTENANCE OF ROAD CUTS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. PROVISION OF FLAGMEN, DETOURS AS NECESSARY, BARRICADES AND SIGNS TO THE FULL SATISFACTION OF THE ENGINEER AND ROAD AUTHORITY SHALL BE THE CONTRACTOR'S RESPONSIBILITY.

5.3 CONTRACTOR TO PREPARE SUBGRADE, INCLUDING PROOFROLLING, TO THE SATISFACTION OF THE GEOTECHNICAL ENGINEER PRIOR TO THE COMMENCEMENT OF PLACEMENT OF GRANULAR B MATERIAL.

5.4 FILL TO BE PLACED AND COMPACTED PER THE GEOTECHNICAL REPORT REQUIREMENTS.

5.5 CONTRACTOR TO SUPPLY, PLACE AND COMPACT GRANULAR B MATERIAL IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOETCHNICAL ENGINEER. CONTRACTOR TO PROVIDE ENGINEER WITH SAMPLES OF GRANULAR B MATERIAL FOR TESTING AND CERTIFICATION FROM THE GEOTECHNICAL ENGINEER THAT THE MATERIAL MEETS THE GRADATION REQUIREMENTS SPECIFIED IN THE GEOTECHNICAL REPORT.

5.6 GRANULAR A MATERIAL TO BE PLACED ONLY UPON APPROVAL BY THE GEOTECHNICAL ENGINEER OF GRANULAR B PLACEMENT.

5.7 CONTRACTOR TO SUPPLY, PLACE AND COMPACT GRANULAR A MATERIAL IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOETCHNICAL ENGINEER. CONTRACTOR TO PROVIDE ENGINEER WITH SAMPLES OF GRANULAR A MATERIAL FOR TESTING AND CERTIFICATION FROM THE GEOTECHNICAL ENGINEER THAT THE MATERIAL MEETS THE GRADATION REQUIREMENTS SPECIFIED IN THE GEOTECHNICAL REPORT.

5.8 ASPHALT MATERIAL TO BE PLACED ONLY UPON APPROVAL BY THE GEOTECHNICAL ENGINEER OF GRANULAR A PLACEMENT.

5.9 CONTRACTOR TO SUPPLY, PLACE AND COMPACT ASPHALT MATERIAL IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL ENGINEER. CONTRACTOR TO PROVIDE ENGINEER WITH SAMPLES OF ASPHALT MATERIAL FOR TESTING AND CERTIFICATION FROM THE GEOTECHNICAL ENGINEER THAT THE MATERIAL MEETS THE REQUIREMENTS SPECIFIED IN THE GEOTECHNICAL REPORT.

5.10 CONTRACTOR IS RESPONSIBLE FOR ESTABLISHING LINE AND GRADE IN ACCORDANCE WITH THE PLANS, AND FOR PROVIDING THE ENGINEER WITH VERIFICATION PRIOR TO PLACEMENT.

5.11 ANY DITCHES DISTURBED DURING SERVICING AND GRADING OPERATIONS ARE TO BE REINSTATED TO THEIR ORIGINAL CONDITION AND FLOWLINE GRADES.

5.12 ALL RE GRADED AREAS IN EXISTING PUBLIC RIGHTS OF WAY AND ANY OTHER DISTURBED AREAS IN EXISTING PUBLIC RIGHTS OF WAY ARE TO BE FINISHED WITH SOD ON 100mm TOPSOIL.

5.13 ALL EXCESS MATERIAL TO BE HAULED OFFSITE AND DISPOSED OF AT AN APPROVED DUMP SITE. SHOULD THE CONTRACTOR DISCOVER ANY HAZARDOUS MATERIAL, CONTRACTOR IS TO NOTIFY ENGINEER. ENGINEER TO DETERMINE APPROPRIATE DISPOSAL METHOD/LOCATION.

5.14 PAVEMENT STRUCTURE (MATERIAL TYPES AND THICKNESSES) FOR HEAVY DUTY AND LIGHT DUTY AREAS TO BE AS SPECIFIED IN THE GEOTECHNICAL REPORT AND SHOWN ON THE PLANS.

Commercial–Sanitary STRUCTURE TABLE

NAME	RIM ELEV.	INVERT IN	INVERT IN AS–BUILT	INVERT OUT	INVERT OUT AS–BUILT	DESCRIPTION
BLK100A	99.58			NE97.184		BLDG SERVICE
BLK200A	99.44			NE97.126		BLDG SERVICE
BLK300A	99.43			NE97.081		BLDG SERVICE
BLK400A	99.40			NE97.077		BLDG SERVICE
BLK600A	98.68			SE95.265		BLDG SERVICE
BLK700A	98.43			SE95.580		BLDG SERVICE
BLK800A	98.28			SW95.878		BLDG SERVICE
BLK900A	97.99					BLDG SERVICE
MH100A	98.50	NE94.283		NW93.061		OPSD 701.010
MH100C	94.42	SE92.890				OPSD 701.010
MH120A	98.21	NE94.580		SW94.550		OPSD 701.010
MH121A	98.13	E95.356		SW95.156		OPSD 701.010
MH122A	98.06	SE95.566		W95.466		OPSD 701.010
MH123A	97.93			NW95.835		OPSD 701.010
MH200A	97.18	~~SE91.457~~	SE91.44	~~NW91.427~~	NW91.40	OPSD 701.010
MH201A	97.30	~~S91.579~~ ~~E91.609~~	S91.56 E91.60	~~NW91.549~~	NW91.53	OPSD 701.010
MH202A	97.45	~~S91.668~~	S91.66	~~N91.638~~	N91.61	OPSD 701.010
MH204A	97.66	~~S92.324~~	S92.31	~~N92.294~~	N92.29	OPSD 701.010
MH205A	97.49	~~W92.972~~ ~~E92.603~~	W92.95 E92.58	~~N92.493~~	N92.48	OPSD 701.010
MH205C	97.55	~~W93.112~~	W93.09	~~E93.082~~	E93.07	OPSD 701.010
MH210A	97.82	~~SW93.530~~	SW93.46	~~E93.400~~	E93.39	OPSD 701.010
MH212A	99.24	~~SE94.179~~ ~~NW94.179~~	SE94.10 NW94.15	~~NE94.119~~	NE94.05	OPSD 701.010
MH213A	99.23	SE94.291		NW94.261		OPSD 701.010
MH214A	99.25			NW94.512		OPSD 701.010
MH221A	99.18			SE95.415		OPSD 701.010

PAVEMENT STRUCTURE

LIGHT DUTY

50mm 12.5 SUPERPAVE
150mm GRANULAR 'A'
400mm GRANULAR 'B' TYPE II

HEAVY DUTY

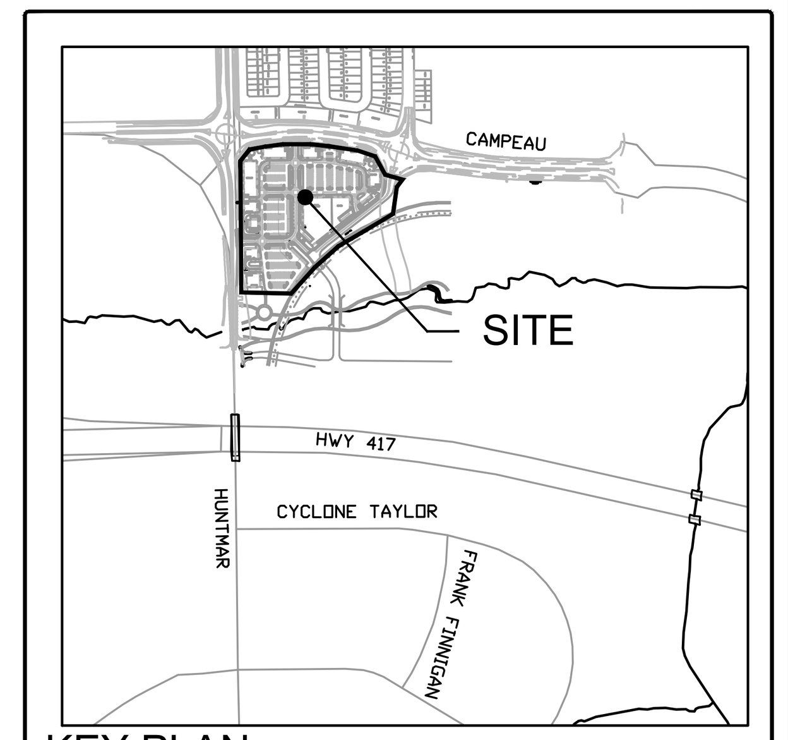
40mm 12.5 SUPERPAVE
50mm 19.0 SUPERPAVE
150mm GRANULAR 'A'
450mm GRANULAR 'B' TYPE II

COUNTRY GLEN WAY

40mm 12.5 SUPERPAVE
50mm 19.8 SUPERPAVE
50mm 19.8 SUPERPAVE
150mm GRANULAR 'A'
450mm GRANULAR 'B' TYPE II

INTERIM ACCESS ROAD

40mm 12.5 SUPERPAVE
50mm 19.8 SUPERPAVE
150mm GRANULAR 'A'
400mm GRANULAR 'B' TYPE II



KEY PLAN

APPROVED ☐ REFUSED ☐

THIS____DAY OF ____________ , 20______

DERRICK MOODIE, ACTING MANAGER
DEVELOPMENT REVIEW, SUBURBAN SERVICES

No.	Description	Date	Checked
9	As–built	17:01:17	DPS
8	Revised as per City Comments	16:08:26	DGY
7	Issued for Construction	16:07:13	DGY
6	Revised per Interim Access Road	16:05:16	DGY
5	Issued for Tender	16:04:05	DGY
4	Revised as per City Comments	14:10:02	DGY
3	Revised as per City Comments	14:08:22	DGY
2	Issued for SPA Resubmission	14.06.27	DGY
1	Issued for SPA	13.11.18	DGY

Issued for

All measurements and conditions must be checked on the work by the contractor. This drawing not to be used for construction until signed.

Date

plotted J:\35355–ArcadiaComm\5.9 Drawings\59civil\layouts\C–100A.dwg Layout Name: Detail Sheet Plot Style: AIA STANDARD–FULL.CTB Plot Scale: 1:1 Plotted At: 3/16/2017 11:08 AM Last Saved By: dsiurna Last Saved At: Mar. 16, 17

LICENSED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
PROVINCE OF ONTARIO

drawn by DPS	scale 1:500
checked by DGY	date NOV. 2013
printed	file 35355

Arcadia Retail Development
Kanata, Ontario

Minto Properties
200 Kent Street • Suite 180 • Ottawa, Ontario • K1P 0B6
Telephone: (613)782-3137 Fax: (613)782-5777

drawing title:
DETAILS AND SCHEDULES
370 HUNTMAR DRIVE
OTTAWA, ON.

IBI GROUP

drawing no.
C–100A

333 Preston Street Tower 1, Suite 400
Ottawa, Ontario Canada K1S 5N4 Tel
(613)225–1311 FAX (613)225–9868

D07-12-14-0014

Appendix A4

Servicing Study Checklist

MINTO COMMUNITIES INC. ARCADIA STAGE 6

DEVELOPMENT SERVICING STUDY CHECKLIST

REFERENCED STUDIES AND REPORTS	REFERENCE
Site Servicing Report for Minto Communities Inc., Arcadia Stage 6 (J.L. Richards & Associates Limited, Revision 0 dated July 2022)	SSR
Geotechnical Investigation, Proposed Residential Development – Arcadia Stage 6, Campeau Drive - Ottawa, Ontario" Report Number PG5648-1, Revision 4 dated June 30, 2022	GR

4.1	GENERAL CONTENT	REFERENCE
☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	SSR (Title Page)
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	SSR (Figure 1-1, Appendix 'A1')
☒	Plan showing the site and location of all existing services.	Site Servicing Plan (S1)
☒	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	SSR (Sect. 1.0)
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	SSR (Appendix 'A2')
☒	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	SSR (Sect. 1.0)
☒	Statement of objectives and servicing criteria.	SSR (Sect. 2.1, 3.1, 3.2, 4.1, 4.2)
☒	Identification of existing and proposed infrastructure available in the immediate area.	SSR (Sect. 1.4) Site Servicing Plan (S1)
☒	Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	SSR (Sect. 3.1, 4.1)
☒	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	GR Grading Plans (G1, G2) Ponding Plans (SWM1, SWM2)

☐	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐	Proposed phasing of the development, if applicable.	N/A
☒	Reference to geotechnical studies and recommendations concerning servicing.	GR
☒	All preliminary and formal site plan submissions should have the following information: ▪ Metric scale ▪ North arrow (including construction North) ▪ Key plan ▪ Name and contact information of applicant and property owner ▪ Property limits, including bearings and dimensions ▪ Existing and proposed structures and parking areas ▪ Easements, road widening and rights-of-way ▪ Adjacent street names	All Drawings

4.2	DEVELOPMENT SERVICING REPORT: WATER	REFERENCE
☒	Confirm consistency with Master Servicing Study, if available.	SSR (Sect. 2)
☒	Availability of public infrastructure to service proposed development.	SSR (Sect. 1.4, 2.4) Site Servicing Plan (S1)
☒	Identification of system constraints.	SSR (Sect. 2.0)
☒	Identify boundary conditions.	SSR (Sect. 2.4)
☒	Confirmation of adequate domestic supply and pressure.	SSR (Sect. 2.5, Appendix B)
☒	Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	SSR (Sect. 2.3, 2.5, Appendix B)
☒	Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	SSR (Sect. 2.5)
☐	Definition of phasing constraints. Hydraulic modelling is required to confirm servicing for all defined phases of the project, including the ultimate design.	N/A
☒	Address reliability requirements, such as appropriate location of shutoff valves.	Site Servicing Plan (S1)
☐	Check on the necessity of a pressure zone boundary modification.	N/A

☒	Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range.	SSR (Sect. 2.0)
☒	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants), including special metering provisions.	SSR (Sect. 2.0) Site Servicing Plan (S1)
☐	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
☒	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	SSR (Sect. 2.2)
☒	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	SSR (Appendix B)

4.3	DEVELOPMENT SERVICING REPORT: WASTEWATER	REFERENCE
☒	Summary of proposed design criteria (Note: Wet weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	SSR (Sect. 3.2)
☒	Confirm consistency with Master Servicing Study and/or justifications for deviations.	SSR (Sect. 3)
☐	Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the Guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
☒	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	SSR (Sect. 1.4, 3.1, Appendix C)
☒	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable.)	SSR (Sect. 3.3)
☒	Calculations related to dry weather and wet weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	SSR (Appendix C)
☒	Description of proposed sewer network, including sewers, pumping stations and forcemains.	SSR (Sect. 3.4, Appendix C)

☒	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	GR
☐	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☒	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	SSR (Section 3.4)
☐	Special considerations, such as contamination, corrosive environment, etc.	N/A

4.4	DEVELOPMENT SERVICING REPORT: STORMWATER	REFERENCE
☒	Description of drainage outlets and downstream constraints, including legality of outlets (i.e., municipal drain, right-of-way, watercourse, or private property).	SSR (Sect. 1.6, 6.1, 6.2)
☒	Analysis of available capacity in existing public infrastructure.	SSR (Sect. 1.3)
☒	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Drawing DST, ODST
☒	Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected sub watersheds, taking into account long-term cumulative effects.	SSR (Sect. 4.2, 4.3)
☒	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	SSR (Sect. 4.3)
☒	Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	SSR (Sect. 4, Drawing S1, DST, ODST)
☐	Setback from private sewage disposal systems.	N/A
☐	Watercourse and hazard lands setbacks.	N/A
☒	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Appendix A2

☒	Confirm consistency with subwatershed and Master Servicing Study, if applicable study exists.	SSR (Sect. 4)
☒	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:2 year return period) and major events (1:100 year return period).	SSR (Sect. 4, Appendix E)
☐	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
☒	Calculate pre- and post-development peak flow rates, including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	SSR (Sect. 4, Appendix E)
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
☒	Proposed minor and major systems, including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Site Servicing Plan (S1) Plan and Profile Drawings Ponding Plans Appendix E
☐	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
☒	Identification of potential impacts to receiving watercourses.	SSR (Sect 4.3)
☐	Identification of municipal drains and related approval requirements.	N/A
☒	Description of how the conveyance and storage capacity will be achieved for the development.	SSR (Sect. 4.3)
☒	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	SSR (Sect. 4.3) Site Servicing Plan (S1) Ponding Plans (SWM1 & SWM2) Appendix E
☒	Inclusion of hydraulic analysis, including hydraulic grade line elevations.	SSR (Sect. 4.3, Appendix E)
☒	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	SSR (Sect. 5.0) Erosion & Sediment Control Plan (ESC)
☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☒	Identification of fill constraints related to floodplain and geotechnical investigation.	GR

4.5	APPROVAL AND PERMIT REQUIREMENTS	REFERENCE
The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development, as well as the relevant issues affecting such approval. The approval and permitting shall include but not be limited to the following:		
☐	Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams, as defined in the Act.	N/A
☐	Application for Environmental Compliance Approval (ECA) under the Ontario Water Resources Act.	N/A
☐	Changes to Municipal Drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation, etc.).	N/A

4.6	CONCLUSION CHECKLIST	REFERENCE
☒	Clearly stated conclusions and recommendations.	SSR (Sect. 2, 3 & 4)
☐	Comments received from review agencies, including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	N/A (first submission)
☒	All draft and final reports shall be signed and stamped by a Professional Engineer registered in Ontario.	SSR, Drawings

Appendix B1

Water Demands and FUS Calculations

WATERMAIN DEMAND CALCULATION SHEET

PROJECT : ARCADIA STAGE 6
LOCATION : CITY OF OTTAWA
DEVELOPER : MINTO COMMUNITIES INC.

NODE	RESIDENTIAL						NON-RESIDENTIAL			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			PEAK HOUR DEMAND (l/s)		
	DUPLEX	EXECUTIVE TOWNHOUSE	REAR LANE TOWNHOUSE	AVENUE (B2B) TOWNHOUSE	UNIT COUNT	POP'N	COMM (ha.)	INST. (ha.)	PARK (ha.)	Res.	Non-res.	Total	Res.	Non-res.	Total	Res.	Non-res.	Total
ARCADIA STAGE 6																		
J-1	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J-2	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J-3	0	5	0	5	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-4	0	0	0	11	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-5	6	0	0	1	7	17	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-6	0	6	0	8	14	38	0.00	0.00	0.00	0.12	0.00	0.12	0.31	0.00	0.31	0.67	0.00	0.67
J-7	0	0	8	16	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-8	0	0	2	4	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-9	4	0	0	0	4	9	0.00	0.00	0.00	0.03	0.00	0.03	0.07	0.00	0.07	0.17	0.00	0.17
J-10	4	0	0	0	4	9	0.00	0.00	0.00	0.03	0.00	0.03	0.07	0.00	0.07	0.16	0.00	0.16
J-11	16	0	0	0	16	37	0.00	0.00	0.00	0.12	0.00	0.12	0.30	0.00	0.30	0.66	0.00	0.66
J-12	16	0	0	0	16	37	0.00	0.00	0.00	0.12	0.00	0.12	0.30	0.00	0.30	0.66	0.00	0.66
J-13	4	0	0	0	4	9	0.00	0.00	0.00	0.03	0.00	0.03	0.07	0.00	0.07	0.16	0.00	0.16
J-14	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J-15	12	0	0	0	12	28	0.00	0.00	0.00	0.09	0.00	0.09	0.22	0.00	0.22	0.49	0.00	0.49
J-17	0	0	3	16	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-18	0	0	0	11	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-20	8	0	0	0	8	18	0.00	0.00	0.00	0.06	0.00	0.06	0.15	0.00	0.15	0.33	0.00	0.33
J-21	12	0	0	0	12	28	0.00	0.00	0.00	0.09	0.00	0.09	0.22	0.00	0.22	0.49	0.00	0.49
J-22	4	0	0	0	4	9	0.00	0.00	0.00	0.03	0.00	0.03	0.07	0.00	0.07	0.16	0.00	0.16
J-23	8	0	0	0	8	18	0.00	0.00	0.00	0.06	0.00	0.06	0.15	0.00	0.15	0.33	0.00	0.33
J-24	8	0	0	0	8	18	0.00	0.00	0.00	0.06	0.00	0.06	0.15	0.00	0.15	0.33	0.00	0.33
J-25	8	0	0	0	8	18	0.00	0.00	0.00	0.06	0.00	0.06	0.15	0.00	0.15	0.33	0.00	0.33
J-26	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J-27	16	0	0	0	16	37	0.00	0.00	0.00	0.12	0.00	0.12	0.30	0.00	0.30	0.66	0.00	0.66
J-28	6	0	0	8	14	35	0.00	0.00	0.00	0.11	0.00	0.11	0.29	0.00	0.29	0.63	0.00	0.63
J-29	4	0	0	0	4	9	0.00	0.00	0.00	0.03	0.00	0.03	0.07	0.00	0.07	0.16	0.00	0.16
J-32	72	0	0	0	72	166	0.00	0.00	0.00	0.54	0.00	0.54	1.34	0.00	1.34	2.95	0.00	2.95
J-33	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J-34	56	0	0	0	56	129	0.00	0.00	0.00	0.42	0.00	0.42	1.04	0.00	1.04	2.30	0.00	2.30
TOTALS	264	11	13	80	368	888	0.00	0.00	0.00	**2.88**	**0.00**	**2.88**	**7.20**	**0.00**	**7.20**	**15.83**	**0.00**	**15.83**

ASSUMPTIONS

RESIDENTIAL DENSITIES

- DUPLEX (INFUSION TERRACES) 2.3 p / p / u
- TOWNHOUSE UNITS (AVENUE, EXECUTIVE, ROW) 2.7 p / p / u

AVG. DAILY DEMAND

- Residential 280 l / cap / day
- Institutional 28,000 l / ha / day
- Commercial 28,000 l / ha / day

MAX. DAILY DEMAND

- Residential 700 l / cap / day
- Institutional 42,000 l / ha / day
- Commercial 42,000 l / ha / day

MAX. HOURLY DEMAND

- Residential 1,540 l / cap / day
- Institutional 75,600 l / ha / day
- Commercial 75,600 l / ha / day

Required Fire Flows

Block 12 c/w FW
RFF=167 L/s

Block 8 c/w FW
RFF=167 L/s

Block 1,2,3,4,5: City Cap= RFF= 167 L/s

TE-1 cw FW
RFF=167 L/s

TE-2
RFF=233 L/s

Block 14 and 15
RFF=250 L/s

TE-4
RFF=233 L/s

TE-5
RFF=250 L/s

TE-8 c/w FW
RFF=217 L/s

TE-11
RFF=250 L/s

TE-12 c/w FW
RFF=167 L/s

TE-13 and TE-14
RFF=217 L/s

TE-10 c/w FW
RFF=200 L/s

TE-7 c/w FW
RFF=167 L/s

TE-3
RFF=200 L/s

Block 13 c/w FW
RFF=200 L/s

Block 10 and 16 c/w FW
RFF=183 L/s

No.	ISSUE / REVISION	DD/MM/YY
01	ISSUED TO CITY FOR REVIEW FIRST ENGINEERING SUBMISSION	18/07/22

VERIFY SHEET SIZE AND SCALES. BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING. 0 25mm

SCALE:

CLIENT: minto Communities

CONSULTANT: www.jlrichards.ca

J.L.Richards ENGINEERS · ARCHITECTS · PLANNERS

CONSULTANT:

PROFESSIONAL STAMP

PROJECT NORTH

PROJECT:

ARCADIA STAGE 6

450 HUNTMAR DRIVE

DRAWING:

DESIGN:	MM
DRAWN:	KC
CHECKED:	KF
JLR #:	26299-006

DRAWING #:

PLOT DATE: July 14, 2022 4:05:10 PM

File Location: P:\26000\26299-006 - Arcadia Stage 6\5-Production\1-Civil\26299-006 C SERVICING.dwg

FUS Fire Flow Calculations

ARCADIA STAGE 6 - Block TE - 5 - Duplex Townhouse
(JLR 26299-06)

Step	Parameter	Value		Note
A	Type of Construction	Wood Frame		Block TE-5
	Coefficient (C)	1.5		
B	Ground Floor Area	470	m^2	
C	Height in storeys	3	storeys	Basements are excluded.
	Total Floor Area	1410	m^2	
D	Fire Flow Formula	$F=220C\sqrt{A}$		
	Fire Flow	12391	L/min	
	Rounded Fire Flow	12000	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	-1800		
	Fire Flow	10200	L/min	No rounding applied.
F	Sprinkler Protection	None		No sprinkler.
	Sprinkler Credit	0%		
	Decrease for Sprinkler	0	L/min	
G	*North Side Exposure*			
	Exposing Wall:	Wood Frame		TE-5
	Exposed Wall:	Wood Frame		No structures within 50m
	Length of Exposed Wall:	24.0	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	72.0	m-storeys	
	Separation Distance	50	m	
	North Side Exposure Charge	0%		
	East Side Exposure			
	Exposing Wall:	Wood Frame		TE-5
	Exposed Wall:	Wood Frame		TE-8
	Length of Exposed Wall:	14.0	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	42.0	m-storeys	
	Separation Distance	11	m	
	East Side Exposure Charge	13%		
	South Side Exposure			
	Exposing Wall:	Wood Frame		TE-5
	Exposed Wall:	Non-combustible		Firewall
	Length of Exposed Wall:	14.0	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	42.0	m-storeys	
	Separation Distance	3.5	m	
	South Side Exposure Charge	18%		
	West Side Exposure			
	Exposing Wall:	Wood Frame		TE-5
	Exposed Wall:	Wood Frame		TE-4
	Length of Exposed Wall:	32.0	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	96.0	m-storeys	
	Separation Distance	11	m	
	West Side Exposure Charge	15%		
	Total Exposure Charge	46%		The total exposure charge is below the maximum value of 75%.
	Increase for Exposures	4692	L/min	
H	Fire Flow	14892	L/min	
	Rounded Fire Flow	15000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	**Required Fire Flow (RFF)**	**15000**	**L/min**	City Cap Does Not Apply
		250	**L/s**	

Fire Underwriters Survey (FUS) Fire Flow Calculations
In accordance with City of Ottawa Technical Bulletin ISTB-2018-02 dated March 21, 2018

FUS Fire Flow Calculations

ARCADIA STAGE 6 - Block TE - 11 - Duplex Townhouse
(JLR 26299-06)

Step	Parameter	Value		Note
A	Type of Construction	Wood Frame		Block TE-11
	Coefficient (C)	1.5		
B	Ground Floor Area	470	m^2	8 units (From total of 10 units)
C	Height in storeys	3	storeys	Basements are excluded.
	Total Floor Area	1410	m^2	
D	Fire Flow Formula	$F=220C\sqrt{A}$		
	Fire Flow	12391	L/min	
	Rounded Fire Flow	12000	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	-1800		
	Fire Flow	10200	L/min	No rounding applied.
F	Sprinkler Protection	None		No sprinkler.
	Sprinkler Credit	0%		
	Decrease for Sprinkler	0	L/min	
G	*North Side Exposure*			
	Exposing Wall:	Wood Frame		TE-11
	Exposed Wall:	Wood Frame		No structure within 50m
	Length of Exposed Wall:	16.0	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	48.0	m-storeys	
	Separation Distance	50	m	
	North Side Exposure Charge	0%		
	East Side Exposure			
	Exposing Wall:	Wood Frame		TE-11
	Exposed Wall:	Wood Frame		TE-12
	Length of Exposed Wall:	32.0	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	96.0	m-storeys	
	Separation Distance	12	m	
	East Side Exposure Charge	15%		
	South Side Exposure			
	Exposing Wall:	Wood Frame		TE-11
	Exposed Wall:	Wood Frame		TE-13
	Length of Exposed Wall:	14.0	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	42.0	m-storeys	
	Separation Distance	3.5	m	
	South Side Exposure Charge	18%		
	West Side Exposure			
	Exposing Wall:	Wood Frame		TE-11
	Exposed Wall:	Wood Frame		TE-8 and TE-10
	Length of Exposed Wall:	17.0	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	51.0	m-storeys	
	Separation Distance	15	m	
	West Side Exposure Charge	13%		
	Total Exposure Charge	46%		The total exposure charge is below the maximum value of 75%.
	Increase for Exposures	4692	L/min	
H	Fire Flow	14892	L/min	
	Rounded Fire Flow	15000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	**Required Fire Flow (RFF)**	**15000**	**L/min**	City Cap Does Not Apply
		250	**L/s**	

Fire Underwriters Survey (FUS) Fire Flow Calculations
In accordance with City of Ottawa Technical Bulletin ISTB-2018-02 dated March 21, 2018

FUS Fire Flow Calculations

ARCADIA STAGE 6 - Block 14 - Back-to-Back Townhouse
(JLR 26299-06)

Step	Parameter	Value		Note
A	Type of Construction	Wood Frame		Block 14
	Coefficient (C)	1.5		
B	Ground Floor Area	443	m^2	8 units
C	Height in storeys	3	storeys	Basements are excluded.
	Total Floor Area	1329	m^2	
D	Fire Flow Formula	F=220C√A		
	Fire Flow	12030	L/min	
	Rounded Fire Flow	12000	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	-1800		
	Fire Flow	10200	L/min	No rounding applied.
F	Sprinkler Protection	None		No sprinkler.
	Sprinkler Credit	0%		
	Decrease for Sprinkler	0	L/min	
G	*North Side Exposure*			
	Exposing Wall:	Wood Frame		Block 14
	Exposed Wall:	Wood Frame		Block 5
	Length of Exposed Wall:	16.0	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	48.0	m-storeys	
	Separation Distance	19	m	
	North Side Exposure Charge	13%		
	East Side Exposure			
	Exposing Wall:	Wood Frame		Block 14
	Exposed Wall:	Wood Frame		No exposure within 50 m
	Length of Exposed Wall:	19.0	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	57.0	m-storeys	
	Separation Distance	50	m	
	East Side Exposure Charge	0%		
	South Side Exposure			
	Exposing Wall:	Wood Frame		Block 14
	Exposed Wall:	Wood Frame		Block 15
	Length of Exposed Wall:	18.0	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	54.0	m-storeys	
	Separation Distance	3.1	m	
	South Side Exposure Charge	18%		
	West Side Exposure			
	Exposing Wall:	Wood Frame		Block 14
	Exposed Wall:	Wood Frame		Block 11 and 12
	Length of Exposed Wall:	27.0	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	81.0	m-storeys	
	Separation Distance	19	m	
	West Side Exposure Charge	14%		
	Total Exposure Charge	45%		The total exposure charge is below the maximum value of 75%.
	Increase for Exposures	4590	L/min	
H	Fire Flow	14790	L/min	
	Rounded Fire Flow	15000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	**Required Fire Flow (RFF)**	**15000**	**L/min**	City Cap Does Not Apply
		250	**L/s**	

Fire Underwriters Survey (FUS) Fire Flow Calculations
In accordance with City of Ottawa Technical Bulletin ISTB-2018-02 dated March 21, 2018

FUS Fire Flow Calculations

ARCADIA STAGE 6 - Block 15 - Back-to-Back Townhouse
(JLR 26299-06)

Step	Parameter	Value		Note
A	Type of Construction	Wood Frame		Block 15
	Coefficient (C)	1.5		
B	Ground Floor Area	435	m^2	8 units
C	Height in storeys	3	storeys	Basements are excluded.
	Total Floor Area	1305	m^2	
D	Fire Flow Formula	$F=220C\sqrt{A}$		
	Fire Flow	11921	L/min	
	Rounded Fire Flow	12000	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	-1800		
	Fire Flow	10200	L/min	No rounding applied.
F	Sprinkler Protection	None		No sprinkler.
	Sprinkler Credit	0%		
	Decrease for Sprinkler	0	L/min	
G	*North Side Exposure*			
	Exposing Wall:	Wood Frame		Block 15
	Exposed Wall:	Wood Frame		Block 14
	Length of Exposed Wall:	17.0	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	51.0	m-storeys	
	Separation Distance	3.1	m	
	North Side Exposure Charge	18%		
	East Side Exposure			
	Exposing Wall:	Wood Frame		Block 15
	Exposed Wall:	Wood Frame		No exposure within 50 m
	Length of Exposed Wall:	19.0	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	57.0	m-storeys	
	Separation Distance	50	m	
	East Side Exposure Charge	0%		
	South Side Exposure			
	Exposing Wall:	Wood Frame		Block 15
	Exposed Wall:	Wood Frame		Block 16
	Length of Exposed Wall:	17.0	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	51.0	m-storeys	
	Separation Distance	3.1	m	
	South Side Exposure Charge	18%		
	West Side Exposure			
	Exposing Wall:	Wood Frame		Block 15
	Exposed Wall:	Wood Frame		Block 12 and 13
	Length of Exposed Wall:	26.0	m	
	Height of Exposed Wall:	3	storeys	
	Length-Height Factor	78.0	m-storeys	
	Separation Distance	19	m	
	West Side Exposure Charge	14%		
	Total Exposure Charge	50%		The total exposure charge is below the maximum value of 75%.
	Increase for Exposures	5100	L/min	
H	Fire Flow	15300	L/min	
	Rounded Fire Flow	15000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	**Required Fire Flow (RFF)**	**15000**	**L/min**	City Cap Does Not Apply
		250	**L/s**	

Fire Underwriters Survey (FUS) Fire Flow Calculations
In accordance with City of Ottawa Technical Bulletin ISTB-2018-02 dated March 21, 2018

Appendix B2

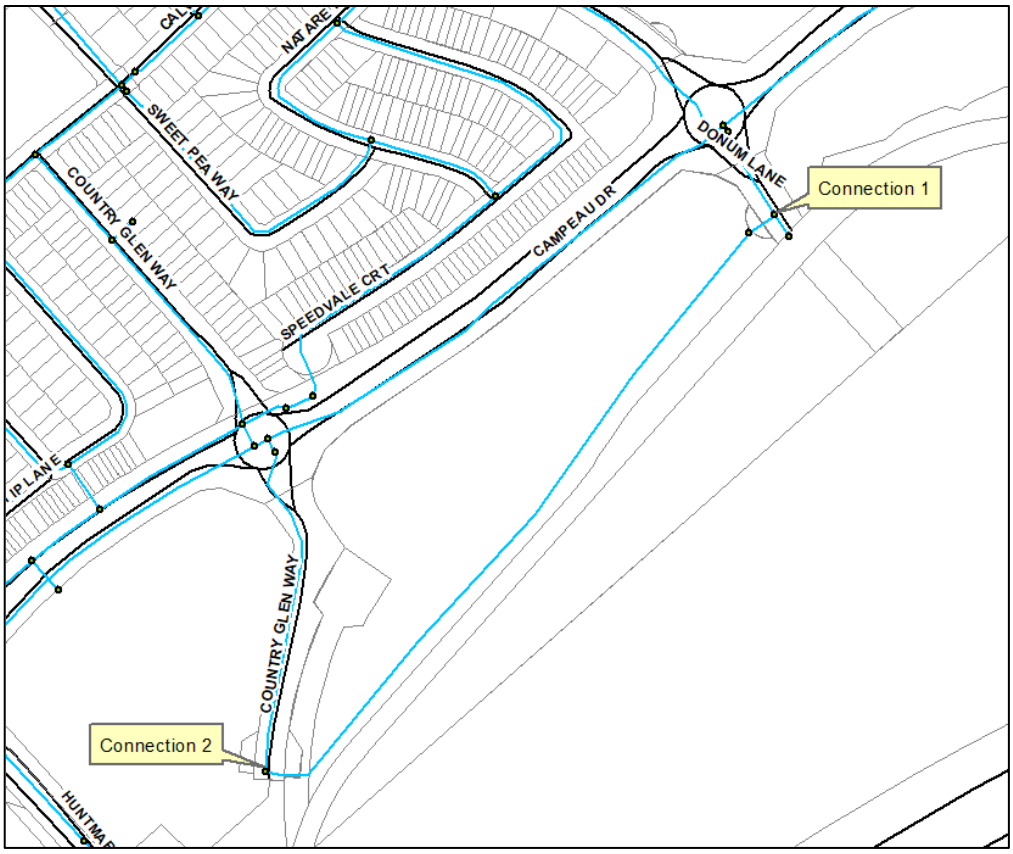
City Correspondence –
Boundary Conditions

Boundary Conditions
Arcadia Stage 6

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	179	2.98
Maximum Daily Demand	446	7.44
Peak Hour	982	16.36
Fire Flow Demand #1	10,000	166.67
Fire Flow Demand #2	15,000	250.00

Location



Results

Connection 1 – Donum Lane

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	161.3	95.4
Peak Hour	156.3	88.3
Max Day plus Fire 1	153.8	84.8
Max Day plus Fire 2	150.5	80.0

Ground Elevation = 94.2 m

Connection 2 – Country Glen Way

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	161.3	88.8
Peak Hour	156.3	81.7
Max Day plus Fire 1	151.5	74.9
Max Day plus Fire 2	145.5	66.4

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.

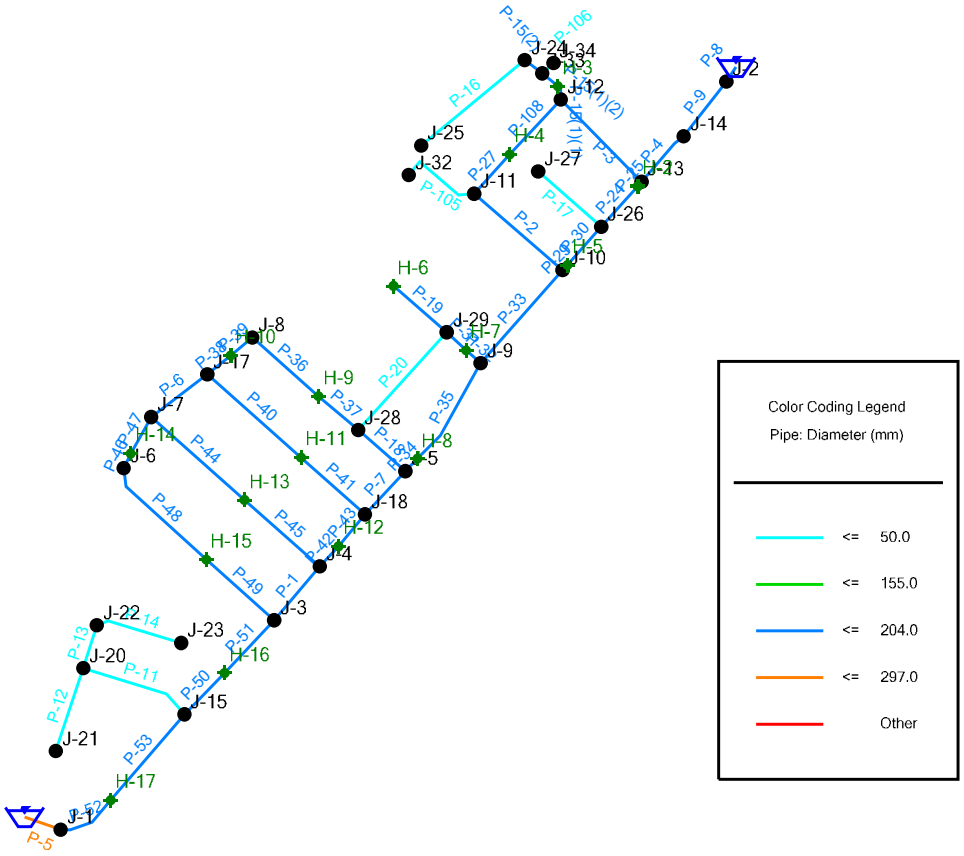
Disclaimer

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.

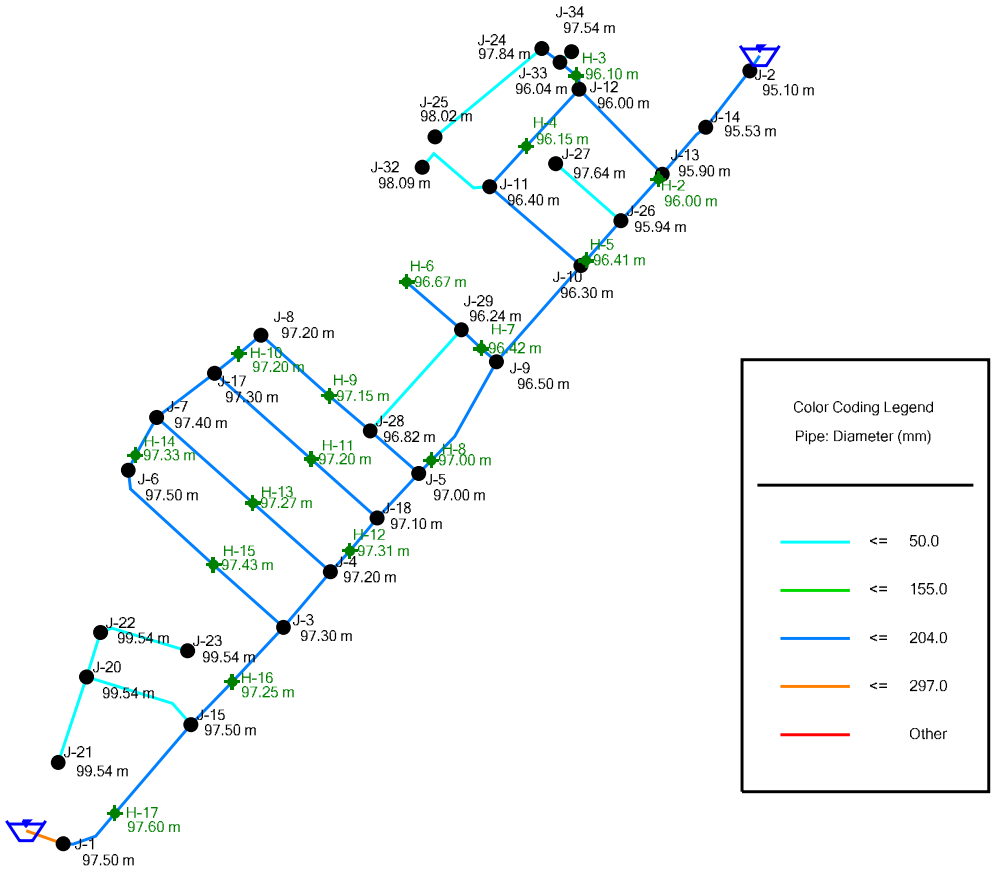
Appendix B3

WaterCAD Schematics

Arcadia Stage 6
Model Schematic



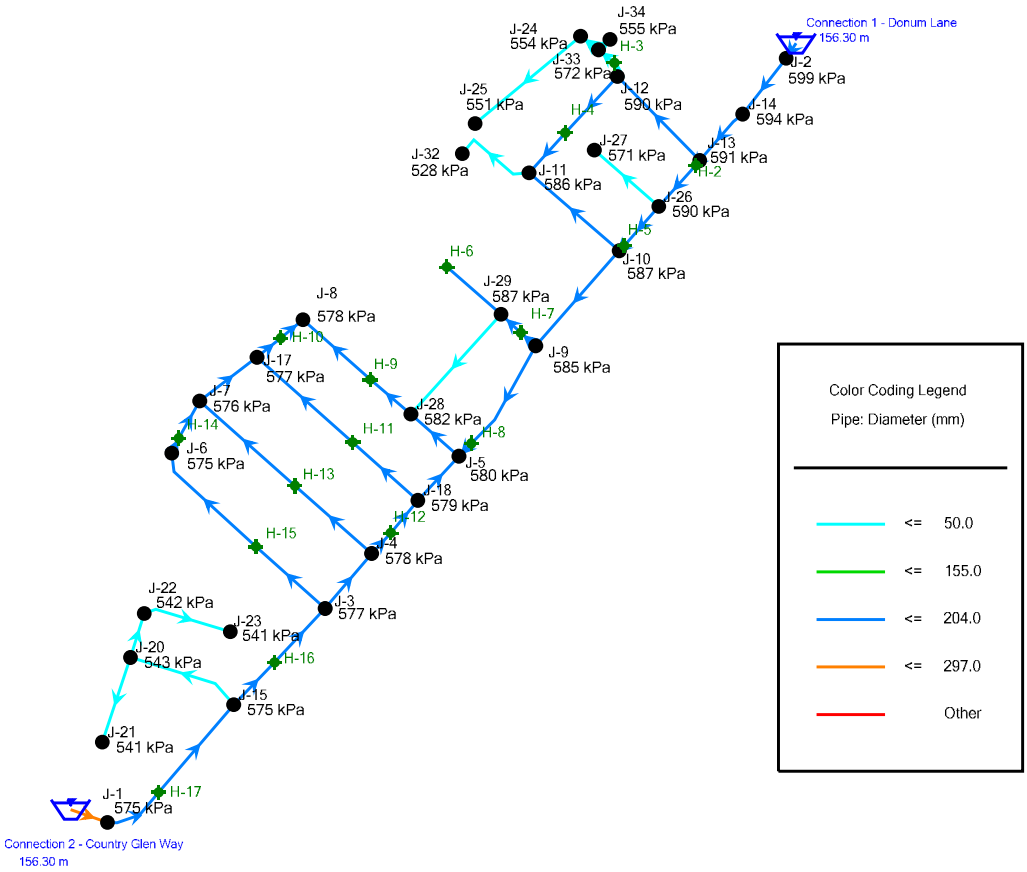
Arcadia Stage 6
Model Schematic
Elevation Model



Appendix B4

Simulation Results – Peak Hour Demand

Arcadia Stage 6
Peak Hour Demand
Existing Condition



Arcadia Stage 6
Peak Hour Demand
Existing Condition
Junction Table

Label	ID	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-32	436	98.09	2.95	152.07	528
J-23	345	99.54	0.33	154.85	541
J-21	341	99.54	0.49	154.85	541
J-22	343	99.54	0.16	154.92	542
J-20	337	99.54	0.33	155.00	543
J-25	349	98.02	0.33	154.32	551
J-24	347	97.84	0.33	154.44	554
J-34	442	97.54	2.30	154.21	555
J-27	354	97.64	0.66	155.98	571
J-33	439	96.04	0.00	154.50	572
J-6	53	97.50	0.67	156.24	575
J-15	95	97.50	0.49	156.26	575
J-1	33	97.50	0.00	156.30	575
J-7	54	97.40	1.16	156.24	576
J-17	167	97.30	0.91	156.24	577
J-3	44	97.30	0.48	156.25	577
J-8	55	97.20	0.29	156.24	578
J-4	47	97.20	0.53	156.24	578
J-18	171	97.10	0.53	156.24	579
J-5	50	97.00	0.29	156.24	580
J-28	360	96.82	0.63	156.24	582
J-9	62	96.50	0.17	156.24	585
J-11	70	96.40	0.66	156.24	586
J-10	67	96.30	0.16	156.24	587
J-29	363	96.24	0.16	156.24	587
J-12	72	96.00	0.66	156.24	590
J-26	351	95.94	0.00	156.24	590
J-13	74	95.90	0.16	156.25	591
J-14	78	95.53	0.00	156.27	594
J-2	34	95.10	0.00	156.29	599

Arcadia Stage 6
Peak Hour Demand
Existing Condition
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-106	8	50.0	PEX	130.0	154.50	154.21	2.30	1.17
P-16	70	50.0	PEX	100.0	154.44	154.32	0.33	0.17
P-15 (2)	12	50.0	PEX	100.0	154.50	154.44	0.66	0.34
P-15 (1)(2)	11	50.0	PEX	100.0	155.51	154.50	2.96	1.51
P-14	46	50.0	PEX	100.0	154.92	154.85	0.33	0.17
P-12	46	50.0	PEX	100.0	155.00	154.85	0.49	0.25
P-13	24	50.0	PEX	100.0	155.00	154.92	0.49	0.25
P-11	60	50.0	PEX	100.0	156.26	155.00	1.31	0.67
P-15 (1)(1)	8	50.0	PEX	100.0	156.24	155.51	2.96	1.51
P-17	44	50.0	PEX	100.0	156.24	155.98	0.66	0.34
P-2	61	204.0	PVC	110.0	156.24	156.24	2.61	0.08
P-105	44	50.0	PEX	100.0	152.07	156.24	-2.95	1.50
P-27	28	204.0	PVC	110.0	156.24	156.24	-1.00	0.03
P-108	39	204.0	PVC	110.0	156.24	156.24	-1.00	0.03
P-20	69	50.0	PEX	100.0	156.24	156.24	0.01	0.01
P-36	46	204.0	PVC	110.0	156.24	156.24	-0.02	0.00
P-37	27	204.0	PVC	110.0	156.24	156.24	-0.02	0.00
P-39	15	204.0	PVC	110.0	156.24	156.24	0.27	0.01
P-38	16	204.0	PVC	110.0	156.24	156.24	0.27	0.01
P-6	37	204.0	PVC	110.0	156.24	156.24	0.75	0.02
P-7	31	204.0	PVC	110.0	156.24	156.24	0.60	0.02
P-18	33	204.0	PVC	110.0	156.24	156.24	-0.63	0.02
P-34	9	204.0	PVC	110.0	156.24	156.24	-0.32	0.01
P-40	66	204.0	PVC	110.0	156.24	156.24	-0.43	0.01
P-19	37	204.0	PVC	110.0	156.24	156.24	0.00	0.00
P-31	14	204.0	PVC	110.0	156.24	156.24	-0.17	0.01
P-32	10	204.0	PVC	110.0	156.24	156.24	-0.17	0.01
P-33	65	204.0	PVC	110.0	156.24	156.24	0.66	0.02
P-35	61	204.0	PVC	110.0	156.24	156.24	-0.32	0.01
P-47	22	204.0	PVC	110.0	156.24	156.24	1.08	0.03
P-41	45	204.0	PVC	110.0	156.24	156.24	-0.43	0.01
P-43	22	204.0	PVC	110.0	156.24	156.24	1.57	0.05
P-46	9	204.0	PVC	110.0	156.24	156.24	1.08	0.03
P-44	65	204.0	PVC	110.0	156.24	156.24	-0.84	0.03
P-42	14	204.0	PVC	110.0	156.24	156.24	1.57	0.05
P-29	4	204.0	PVC	110.0	156.24	156.24	-3.44	0.11
P-1	37	204.0	PVC	110.0	156.25	156.24	2.93	0.09
P-45	53	204.0	PVC	110.0	156.24	156.24	-0.84	0.03
P-48	67	204.0	PVC	110.0	156.24	156.24	-1.75	0.05
P-30	27	204.0	PVC	110.0	156.24	156.24	-3.44	0.11
P-49	48	204.0	PVC	110.0	156.24	156.25	-1.75	0.05

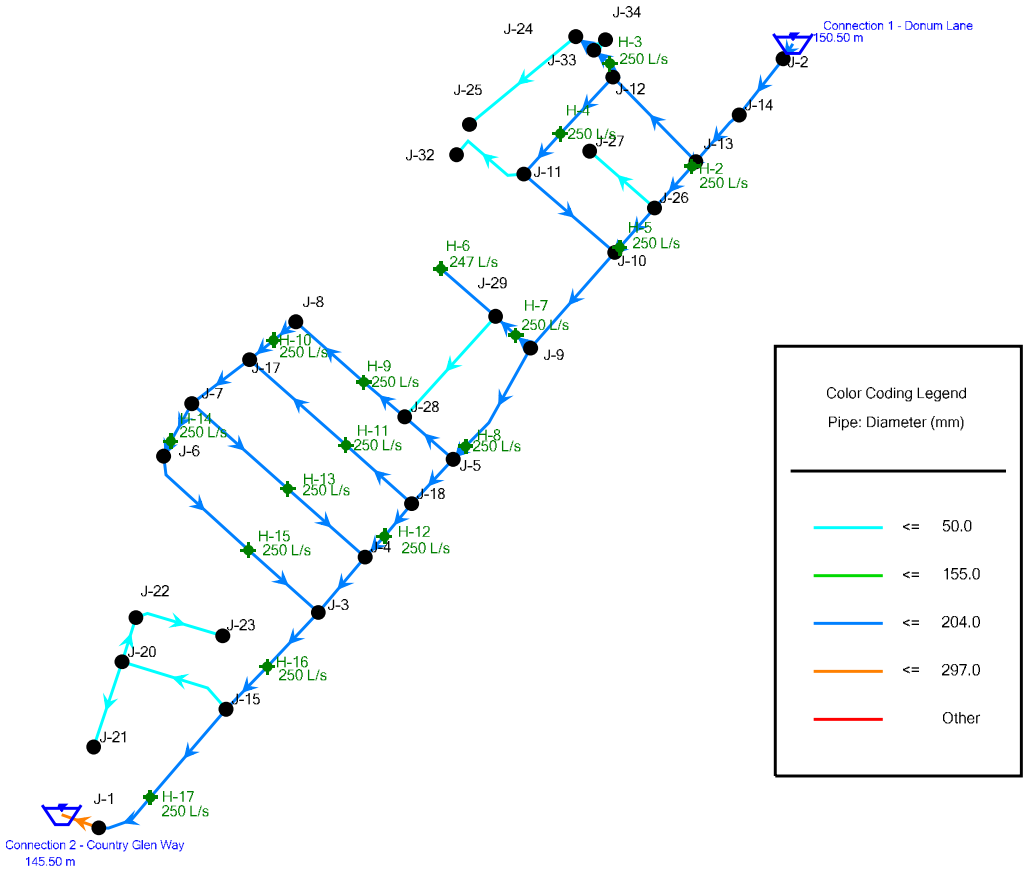
Arcadia Stage 6
Peak Hour Demand
Existing Condition
Pipe Table

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-51	38	204.0	PVC	110.0	156.25	156.25	5.16	0.16
P-24	29	204.0	PVC	110.0	156.24	156.25	-4.10	0.13
P-3	60	204.0	PVC	110.0	156.24	156.25	-4.62	0.14
P-25	3	204.0	PVC	110.0	156.25	156.25	-4.10	0.13
P-50	30	204.0	PVC	110.0	156.26	156.25	5.16	0.16
P-53	59	204.0	PVC	110.0	156.29	156.26	6.96	0.21
P-4	33	204.0	PVC	110.0	156.25	156.27	-8.87	0.27
P-52	32	204.0	PVC	110.0	156.30	156.29	6.96	0.21
P-9	36	204.0	PVC	110.0	156.27	156.29	-8.87	0.27
P-5	20	297.0	PVC	120.0	156.30	156.30	-6.96	0.10
P-8	9	204.0	PVC	110.0	156.29	156.30	-8.87	0.27

Appendix B5

Simulation Results – Maximum Day + Required Fire Flow

Arcadia Stage 6
Maximum Day Fire Flow (RFF=250L/s)

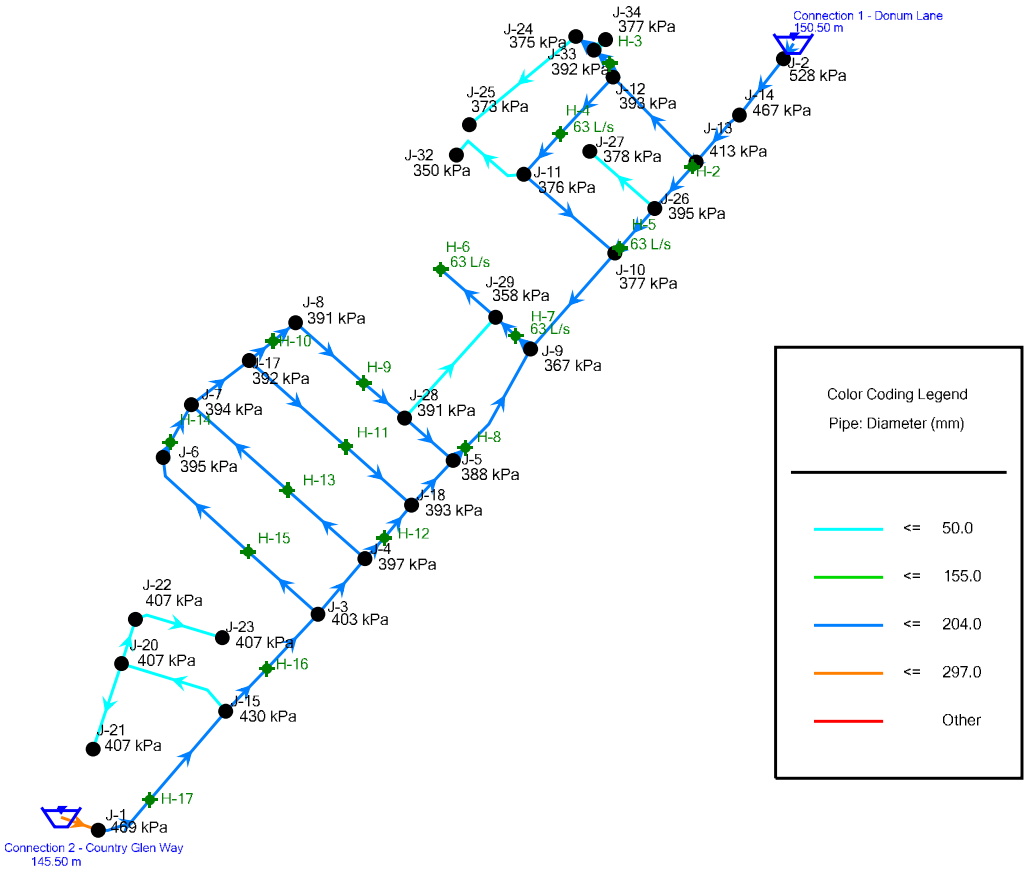


Arcadia Stage 6

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

Label	Fire Flow (Available) (L/s)	Flow (Total Available) (L/s)	Satisfies Fire Flow Constraints?	Pressure (Residual Lower Limit) (kPa)	Pressure (Calculated System Lower Limit) (kPa)	Pressure (Calculated Residual) (kPa)	Junction w/ Minimum Pressure (System)
H-6	247	247	True	140	256	140	J-29
H-2	250	250	True	140	363	385	J-32
H-4	250	250	True	140	302	305	J-32
H-5	250	250	True	140	348	360	J-32
H-7	250	250	True	140	287	290	H-6
H-8	250	250	True	140	311	303	J-5
H-9	250	250	True	140	280	250	J-8
H-10	250	250	True	140	268	260	J-8
H-11	250	250	True	140	298	256	J-17
H-12	250	250	True	140	304	290	J-4
H-13	250	250	True	140	297	252	H-14
H-14	250	250	True	140	260	252	J-6
H-15	250	250	True	140	289	253	J-6
H-16	250	250	True	140	346	322	J-3
H-17	250	250	True	140	420	406	J-23
H-3	250	250	True	140	280	292	J-34

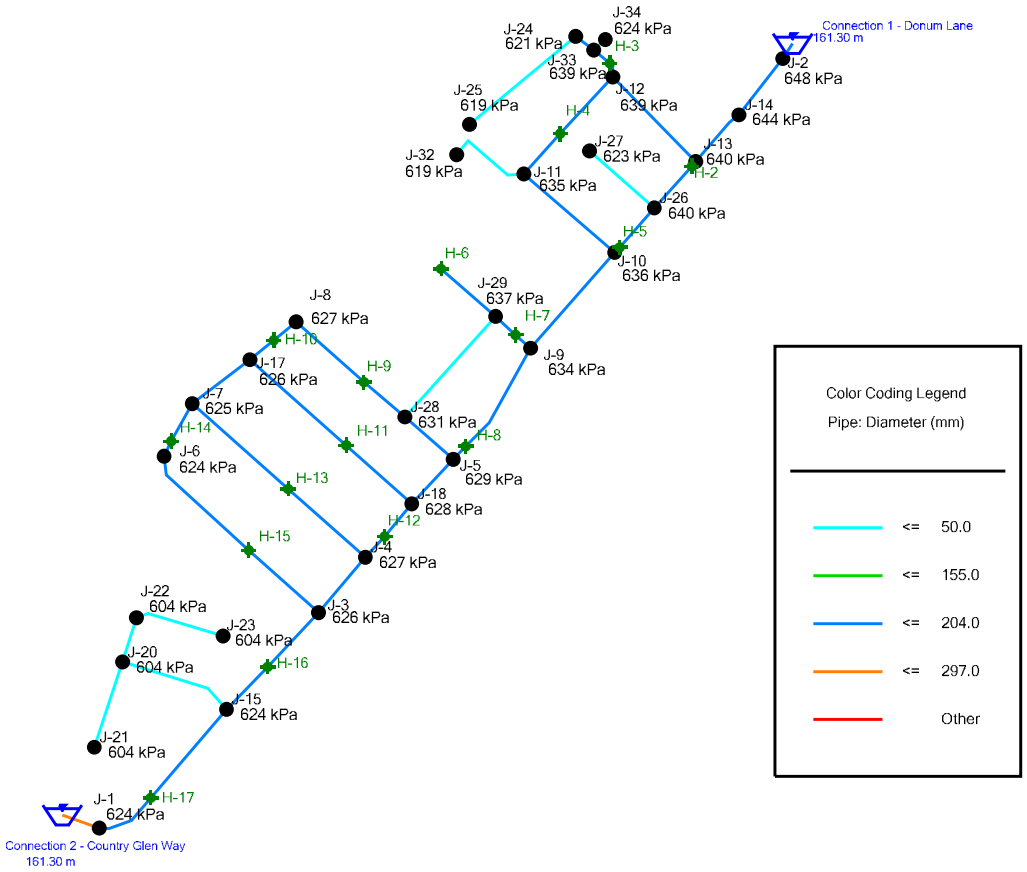
Arcadia Stage 6
Maximum Day Fire Flow (RFF=250L/s)
TE-05 Hydraulics Test



Appendix B6

Simulation Results – Maximum HGL

Arcadia Stage 6
Maximum Day Analysis
Existing Condition



Arcadia Stage 6
Maximum Day Analysis
Existing Condition
Junction Table

Label	ID	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-20	337	99.54	0.00	161.30	604
J-21	341	99.54	0.00	161.30	604
J-22	343	99.54	0.00	161.30	604
J-23	345	99.54	0.00	161.30	604
J-32	436	98.09	0.00	161.30	619
J-25	349	98.02	0.00	161.30	619
J-24	347	97.84	0.00	161.30	621
J-27	354	97.64	0.00	161.30	623
J-34	442	97.54	0.00	161.30	624
J-1	33	97.50	0.00	161.30	624
J-6	53	97.50	0.00	161.30	624
J-15	95	97.50	0.00	161.30	624
J-7	54	97.40	0.00	161.30	625
J-3	44	97.30	0.00	161.30	626
J-17	167	97.30	0.00	161.30	626
J-4	47	97.20	0.00	161.30	627
J-8	55	97.20	0.00	161.30	627
J-18	171	97.10	0.00	161.30	628
J-5	50	97.00	0.00	161.30	629
J-28	360	96.82	0.00	161.30	631
J-9	62	96.50	0.00	161.30	634
J-11	70	96.40	0.00	161.30	635
J-10	67	96.30	0.00	161.30	636
J-29	363	96.24	0.00	161.30	637
J-33	439	96.04	0.00	161.30	639
J-12	72	96.00	0.00	161.30	639
J-26	351	95.94	0.00	161.30	640
J-13	74	95.90	0.00	161.30	640
J-14	78	95.53	0.00	161.30	644
J-2	34	95.10	0.00	161.30	648

Arcadia Stage 6
Maximum Day Analysis
Existing Condition
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-1	37	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-2	61	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-3	60	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-4	33	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-5	20	297.0	PVC	120.0	161.30	161.30	0.00	0.00
P-6	37	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-7	31	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-8	9	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-9	36	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-11	60	50.0	PEX	100.0	161.30	161.30	0.00	0.00
P-12	46	50.0	PEX	100.0	161.30	161.30	0.00	0.00
P-13	24	50.0	PEX	100.0	161.30	161.30	0.00	0.00
P-14	46	50.0	PEX	100.0	161.30	161.30	0.00	0.00
P-16	70	50.0	PEX	100.0	161.30	161.30	0.00	0.00
P-17	44	50.0	PEX	100.0	161.30	161.30	0.00	0.00
P-18	33	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-19	37	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-20	69	50.0	PEX	100.0	161.30	161.30	0.00	0.00
P-24	29	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-25	3	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-27	28	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-29	4	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-30	27	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-31	14	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-32	10	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-33	65	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-34	9	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-35	61	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-36	46	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-37	27	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-38	16	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-39	15	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-40	66	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-41	45	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-42	14	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-43	22	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-44	65	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-45	53	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-46	9	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-47	22	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-48	67	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-49	48	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-50	30	204.0	PVC	110.0	161.30	161.30	0.00	0.00

Arcadia Stage 6
Maximum Day Analysis
Existing Condition
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-51	38	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-52	32	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-53	59	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-105	44	50.0	PEX	100.0	161.30	161.30	0.00	0.00
P-15 (2)	12	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-106	8	50.0	PEX	130.0	161.30	161.30	0.00	0.00
P-15 (1)(1)	8	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-15 (1)(2)	11	204.0	PVC	110.0	161.30	161.30	0.00	0.00
P-108	39	204.0	PVC	110.0	161.30	161.30	0.00	0.00

Appendix C1

Sanitary Sewer Design Sheet

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

ARCADIA STAGE 6
SANITARY DESIGN SHEET

DESIGNED BY: MM
CHECKED BY: AW
2022-07-19

LOCATION			RESIDENTIAL AREA AND POPULATION								PARKS/ROADS		INFILTRATION			Peak Design Flow L/s	Pipe Data									Upstream Geometry				Downstream Geometry				
Street Name	From	To	Area (ha)	Cum. Area (ha)	Duplex Units	Townhouse Units	Pop.	Cum. Pop.	Peaking Factor	Residential Flows (L/s)	Area (ha)	Cum. Area (ha)	Total Area (ha)	Total Cum. Area (ha)	Infilt. Flow (L/s)		Type	Nominal Dia. (mm)	Actual Dia. (mm)	Slope	Length (m)	Q Full (L/s)	V Full (m/s)	Residual Capacity (L/s)	% Full	TG From	Obvert	Invert	Cover	TG To	Drop	Obvert	Invert	Cover
DONUM LANE OUTLET (TO EX.307A ON CAMPEAU DRIVE)																																	
TE-2 SERVICE/AMENITY	124A	124	0.15	0.15	8		18	18	3.71	0.22		0.00	0.15	0.15	0.05	0.27	Circular	200	203.20	0.65%	42.07	27.59	0.85	27.32	1%	98.057	**95.977**	**95.774**	2.080	98.058		**95.704**	**95.501**	2.354
TE-2 SERVICE	124	123	0.04	0.19	4		9	27	3.69	0.32		0.00	0.04	0.19	0.06	0.39	Circular	200	203.20	0.65%	26.07	27.59	0.85	27.20	1%	98.058	**95.704**	**95.501**	2.354	97.903	0.300	**95.534**	**95.331**	2.369
TE-1 SERVICE	122	123	0.09	0.09	12		28	28	3.69	0.33		0.00	0.09	0.09	0.03	0.36	Circular	200	203.20	0.65%	52.37	27.59	0.85	27.22	1%	97.902	**95.575**	**95.372**	2.328	97.903		**95.234**	**95.031**	2.669
TE-1 SERVICE	123	121	0.06	0.34	8		18	73	3.62	0.86		0.00	0.06	0.34	0.11	0.97	Circular	200	203.20	0.65%	46.09	27.59	0.85	26.62	4%	97.903	**95.234**	**95.031**	2.669	97.615	0.600	**94.935**	**94.732**	2.680
STREET 1	121	119		0.34			0	73	3.62	0.86		0.00	0.00	0.34	0.11	0.97	Circular	200	203.20	0.50%	10.45	24.19	0.75	23.23	4%	97.615	**94.335**	**94.132**	3.280	97.417		**94.283**	**94.079**	3.135
STREET 1	120	119	0.40	0.40	12		28	28	3.69	0.33		0.00	0.40	0.40	0.13	0.47	Circular	200	203.20	0.65%	51.58	27.59	0.85	27.12	2%	97.148	**94.678**	**94.475**	2.470	97.417	0.060	**94.343**	**94.139**	3.075
STREET 1	119	118		0.74			0	101	3.59	1.18	0.12	0.12	0.12	0.86	0.28	1.46	Circular	200	203.20	0.50%	63.00	24.19	0.75	22.73	6%	97.417	**94.283**	**94.079**	3.135	97.300		**93.968**	**93.764**	3.332
STREET 2	115	118	0.49	0.49		24	65	65	3.63	0.77		0.00	0.49	0.49	0.16	0.93	Circular	200	203.20	0.65%	102.73	27.59	0.85	26.66	3%	97.420	**95.235**	**95.032**	2.185	97.300	0.600	**94.568**	**94.364**	2.732
STREET 1	118	117		1.23			0	166	3.54	1.91	0.04	0.16	0.04	1.39	0.46	2.36	Circular	200	203.20	0.50%	36.50	24.19	0.75	21.83	10%	97.300	**93.968**	**93.764**	3.332	97.200		**93.785**	**93.582**	3.415
STREET 2	114A	114	0.07	0.07		3	8	8	3.74	0.10		0.00	0.07	0.07	0.02	0.12	Circular	200	203.20	0.65%	24.51	27.59	0.85	27.47	0%	97.266	**94.045**	**93.842**	3.221	97.361		93.886	**93.683**	3.475
STREET 2	114	113	0.15	0.22		6	16	24	3.70	0.29		0.00	0.15	0.22	0.07	0.36	Circular	200	203.20	0.50%	36.87	24.19	0.75	23.83	1%	97.361	93.886	**93.683**	3.475	97.300		93.702	**93.498**	3.598
STREET 3	114	117	0.39	0.39		27	73	73	3.62	0.86		0.00	0.39	0.39	0.13	0.99	Circular	200	203.20	0.65%	116.65	27.59	0.85	26.60	4%	97.361	94.603	**94.400**	2.758	97.200	0.060	**93.845**	**93.642**	3.355
STREET 1	117	116		1.62			0	239	3.50	2.71	0.04	0.20	0.04	1.82	0.60	3.31	Circular	200	203.20	0.50%	36.50	24.19	0.75	20.89	14%	97.200	**93.785**	**93.582**	3.415	97.100		**93.603**	**93.399**	3.497
STREET 4	113	116	0.38	0.38		27	73	73	3.62	0.86		0.00	0.38	0.38	0.13	0.98	Circular	200	203.20	0.65%	111.34	27.59	0.85	26.60	4%	97.300	94.386	**94.183**	2.914	97.100	0.060	**93.663**	**93.459**	3.437
STREET 1	116	110		2.00			0	312	3.46	3.50	0.04	0.24	0.04	2.24	0.74	4.23	Circular	200	203.20	0.50%	36.52	24.19	0.75	19.96	18%	97.100	**93.603**	**93.399**	3.497	97.000	0.460	**93.420**	**93.217**	3.580
STREET 2	113	112	0.09	0.31		4	11	35	3.67	0.42		0.00	0.09	0.31	0.10	0.52	Circular	200	203.20	0.65%	31.18	27.59	0.85	27.07	2%	97.300	93.702	**93.498**	3.598	97.094		**93.499**	**93.296**	3.595
STREET 2/PUBLIC PARKETTE	112	111	0.02	0.33		1	3	38	3.67	0.45	0.56	0.56	0.58	0.89	0.29	0.75	Circular	200	203.20	0.50%	9.67	24.19	0.75	23.45	3%	97.094	**93.499**	**93.296**	3.595	97.114		**93.451**	**93.247**	3.663
STREET 2	111	110A	0.15	0.48		9	24	62	3.64	0.73		0.56	0.15	1.04	0.34	1.07	Circular	200	203.20	0.50%	70.49	24.19	0.75	23.12	4%	97.114	**93.451**	**93.247**	3.663	96.803		**93.098**	**92.895**	3.705
TE-3 SERVICE	110B	110A	0.06	0.06	10		23	23	3.70	0.28		0.00	0.06	0.06	0.02	0.30	Circular	200	203.20	1.00%	51.50	34.22	1.06	33.92	1%	96.608	**93.613**	**93.410**	2.994	96.803		**93.098**	**92.895**	3.705
STREET 2	110A	110	0.07	0.61		3	8	93	3.60	1.09		0.56	0.07	1.17	0.39	1.47	Circular	200	203.20	0.50%	27.65	24.19	0.75	22.72	6%	96.803	**93.098**	**92.895**	3.705	97.000		**92.960**	**92.757**	4.040
STREET 1	110	109	0.03	2.64	2		5	410	3.41	4.54		0.80	0.03	3.44	1.14	5.67	Circular	200	203.20	0.50%	22.27	24.19	0.75	18.52	23%	97.000	**92.960**	**92.757**	4.040	96.527		**92.849**	**92.645**	3.678
STREET 1	109	107	0.08	2.72	8		18	428	3.41	4.72		0.80	0.08	3.52	1.16	5.89	Circular	200	203.20	0.50%	40.70	24.19	0.75	18.31	24%	96.527	**92.849**	**92.645**	3.678	96.500		**92.645**	**92.442**	3.855
STREET 1	107	106		2.72			0	428	3.41	4.72	0.24	1.04	0.24	3.76	1.24	5.97	Circular	200	203.20	0.50%	33.42	24.19	0.75	18.23	25%	96.500	**92.645**	**92.442**	3.855	96.215		**92.478**	**92.275**	3.737
STREET 1	106	105		2.72			0	428	3.41	4.72	0.06	1.10	0.06	3.82	1.26	5.99	Circular	200	203.20	0.50%	36.60	24.19	0.75	18.21	25%	96.215	**92.478**	**92.275**	3.737	96.278		**92.295**	**92.092**	3.983
STREET 6	104	105	0.18	0.18	8		18	18	3.71	0.22		0.00	0.18	0.18	0.06	0.28	Circular	200	203.20	0.65%	39.03	27.59	0.85	27.31	1%	96.212	**93.149**	**92.945**	3.063	96.278	0.600	**92.895**	**92.692**	3.383
STREET 1	105	101A		2.90			0	446	3.40	4.91	0.03	1.13	0.03	4.03	1.33	6.24	Circular	200	203.20	0.50%	29.08	24.19	0.75	17.95	26%	96.278	**92.295**	**92.092**	3.983	95.859		**92.150**	**91.946**	3.709
TE-9 AND TE-10 SERVICE	101B	101A	0.10	0.10	16		37	37	3.67	0.44		0.00	0.10	0.10	0.03	0.47	Circular	200	203.20	1.00%	39.58	34.22	1.06	33.74	1%	96.100	**93.145**	**92.942**	2.955	95.859	0.600	**92.750**	**92.546**	3.109
STREET 1	101A	101		3.00			0	483	3.39	5.30	0.03	1.16	0.03	4.16	1.37	6.67	Circular	200	203.20	0.65%	32.04	27.59	0.85	20.91	24%	95.859	**92.150**	**91.946**	3.709	96.038		**91.941**	**91.738**	4.097
TE-5 AND TE-8 SERVICE	102B	102A	0.50	0.50	88		202	202	3.52	2.30		0.00	0.50	0.50	0.17	2.47	Circular	200	203.20	0.65%	70.22	27.59	0.85	25.12	9%	96.420	**93.468**	**93.265**	2.951	96.207		**93.012**	**92.809**	3.195
TE-11 SERVICE	102A	102	0.33	0.83	56		130	332	3.45	3.71		0.00	0.33	0.83	0.27	3.98	Circular	200	203.20	0.65%	30.37	27.59	0.85	23.60	14%	96.207	**93.012**	**92.809**	3.195	95.916		**92.815**	**92.611**	3.101
STREET 6	103	102	0.22	0.22	24		55	55	3.64	0.65		0.00	0.22	0.22	0.07	0.72	Circular	200	203.20	0.65%	59.67	27.59	0.85	26.86	3%	96.268	**93.262**	**93.059**	3.005	95.916	0.060	**92.875**	**92.671**	3.041
STREET 6	102	101	0.16	1.21	8		18	405	3.42	4.48		0.00	0.16	1.21	0.40	4.88	Circular	200	203.20	0.65%	57.43	27.59	0.85	22.70	18%	95.916	**92.815**	**92.611**	3.101	96.038	0.500	**92.441**	**92.238**	3.597
STREET 1	101	100A		4.21			0	888	3.27	9.40	0.10	1.26	0.10	5.47	1.81	11.20	Circular	300	304.80	1.00%	63.04	100.88	1.38	89.68	11%	96.038	**91.941**	**91.637**	4.097	95.098		**91.311**	**91.006**	3.787
STREET 1/DONUM LANE	100A	100		4.21			0	888	3.27	9.40	0.11	1.37	0.11	5.58	1.84	11.24	Circular	300	304.80	1.50%	16.76	123.55	1.69	112.31	9%	95.098	**91.311**	**91.006**	3.787	95.354	0.200	**91.060**	**90.755**	4.294
							888				1.37		5.58								1554												
DONUM LANE	100	01A		4.21			0	888	3.27	9.40	0.17	0.17	0.17	5.75	1.90	11.30	Circular	375	381.00	0.40%	60.16	115.68	1.01	104.39	10%	95.220	90.860	90.479	4.360	95.290		90.619	90.238	4.671
DONUM LANE/CAMPEAU	01A	EX.307A		4.21			0	888	3.27	9.40	0.21	0.38	0.21	5.96	1.97	11.37	Circular	375	381.00	0.21%	33.84	83.82	0.74	72.45	14%	95.290	90.609	90.228	4.681	95.000	-0.139	90.537	90.156	4.463
TOTALS:			**4.21**		264	104	888				**3.12**		**5.96**								**1648**												

Design Parameters		
Duplex	2.3	Cap/Unit
Townhouse	2.7	Cap/Unit
Residential Flows	280	L/Cap/d
Infiltration Flows	0.33	L/s/ha
Harmon's Correction Factor (K)	0.8	unitless
Manning Coefficient	0.013	unitless

GENERAL NOTES:

- Total Site Area = 5.58 ha
- Design parameters as per the City of Ottawa Sewer Design Guidelines (2012) and Associated Technical Bulletins
- As-Built Information as per "As Constructed Information for Minto Communities Inc. Arcadia Stage 3". Prepared by J.L. Richards & Associates and signed on December 17, 2019
- Actual catchment area (from 2022) at Donum Lane was used for flow allocation of existing infrastructure on Donum Lane.
- Duplex units must be serviced at front entrance except for blocks with undeground parking garages
- Servicing for underground parking garage units shown on Servicing Drawings for Arcadia Stage 6

Existing Infrastructure (Downstream Info)	OBV	INV
@ MH 01A on Donum Lane	**90.619**	90.238
@ MH EX.307A on Campeau Drive/Donum Lane	**90.537**	90.156

Legend

89.232	Proposed Mainline Sewers
89.232	Proposed Service Sewers for Duplexes
89.232	Existing (As-Built Information)

Statistics

No. of Duplexes:	264
No. of THs:	104
No. of Total Units:	368
Total Population:	888
Total DST Area within property line:	5.58
Total Pipe Length within property line:	1554

Appendix C2

Background Sanitary Documents

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

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

STREET	M.H. #		RESIDENTIAL								COMMERCIAL				PARK/ROAD		INFILTRATION			PEAK DESIGN FLOW L/s
			NUMBER OF UNITS				CUMULATIVE		PEAKING FACTOR	POPUL. FLOW l/s	AREA ha	CUMM. AREA ha	PEAKING FACTOR	INST. FLOW l/s	AREA ha	CUMM. AREA ha	AREA ha	CUMM. AREA ha	PEAK EXTR. FLOW l/s	
	FROM	TO	SING.	MULT.	AREA ha	POPUL. peop.	POPUL. peop.	AREA ha												
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		0.18	7	55	0.83	3.64	0.65		0.0	1.5	0.0		0.00	0.18	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
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
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
Winterset Road (Stage 3B)	22	22B	1.0		0.16	3	345	5.37	3.44	3.85		0.0	1.5	0.0		0.00	0.16	5.37	1.77	5.62
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
Parabolica	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	71	21	14.0		0.67	48	55	0.84	3.64	0.65		0.0	1.5	0.0		0.00	0.67	0.84	0.28	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
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
Winterset Road (Stage 4)	20	19		4	0.17	11	534	8.19	3.37	5.83		0.0	1.5	0.0		0.00	0.17	8.19	2.70	8.53
Winterset Road (Stage 4)	19	18		3	0.15	8	542	8.34	3.36	5.91		0.0	1.5	0.0		0.00	0.15	8.34	2.75	8.66
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	7	0.44	36	73	1.05	3.62	0.86		0.0	1.5	0.0		0.00	0.44	1.05	0.35	1.20
Calvington Avenue (Stage 3B)	60	18	2	2	0.22	12	85	1.27	3.61	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

J.L.Richards
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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	units/ha
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

STREET	M.H. #		Actual	SEWER DATA					RESIDUAL	UPSTREAM					DOWNSTREAM					SELF-CLEANSING VELOCITIES							
	FROM	TO	DIA.	DIA.	SLOPE	CAPAC.	VEL.	LENGTH	CAP.	Center Line	Obvert Drop	Obvert	Invert	Cover	Center Line	Obvert Drop	Obvert	Invert	Cover	Angle	Depth (m)	Area (m^2)	Wetted Perimeter	Flow	Flow (L/s)	Velocity (L/s)	Q/Qmax
			mm	mm	%	l/s	m/s	m	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	0.158	0.001	0.924	0.3	0.317
Eramosa Crescent (Stage 3B)	92	93	203	200	0.35	20.2	0.62	61.890	19.07	96.750		94.268	94.064	2.482	96.550		94.051	93.848	2.499	96.5054	0.033	0.003	0.168	0.001	1.178	0.3	0.341
Eramosa Crescent (Stage 3B)	93	94	203	200	0.35	20.2	0.62	10.750	18.93	96.550		94.051	93.848	2.499	96.550		94.013	93.810	2.537	99.2827	0.035	0.004	0.173	0.001	1.313	0.4	0.352
Eramosa Crescent (Stage 3B)	94	81	203	200	0.35	20.2	0.62	116.510	18.17	96.550		94.013	93.810	2.537	96.060		93.606	93.402	2.454	112.088	0.044	0.005	0.196	0.002	2.073	0.4	0.403
Paine Avenue (Stage 3B)	EX.9	81	203	200	0.77	30.0	0.92	48.060	29.64	96.060		93.974	93.771	2.086	96.627		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)	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
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	0.158	0.001	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
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
Winterset Road (Stage 4)	20	19	254	250	0.35	36.7	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)	19	18	254	250	0.35	36.7	0.72	32.390	28.04	95.370		91.532	91.278	3.838	95.550		91.419	91.165	4.131	142.197	0.085	0.015	0.310	0.009	8.661	0.6	0.593
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		91.403 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	0.177	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
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

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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

STREET	M.H. #		RESIDENTIAL								COMMERCIAL				PARK/ROAD		INFILTRATION			PEAK DESIGN FLOW L/s
			NUMBER OF UNITS		AREA	POPUL.	CUMULATIVE POPUL.	CUMULATIVE AREA	PEAKING FACTOR	POPUL. FLOW	AREA	CUMM. AREA	PEAKING FACTOR	INST. FLOW	AREA	CUMM. AREA	AREA	CUMM. AREA	PEAK EXTR. FLOW	
	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
Natare	45 E	46		17	0.48	46	46	0.48	3.66	0.54		0.0	1.5	0.0		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
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		0.03	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		0.00	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	0.18	14	213	2.84	3.51	2.42		0.0	1.5	0.0		0.01	0.18	2.85	0.94	3.36
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			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
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			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	2A	ex. 307A				0	2236	25.85	3.04	22.02		0.0	1.5	0.0		2.88	0.00	28.73	9.48	31.50
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
Donum Lane	South Stub	1A					0	0.00			24.28	24.3	1.5	11.8	0.37	0.37	24.65	24.65	8.13	19.94
Donum Lane	1A	ex. 307A					0	0.00				24.3	1.5	11.8	0.37	0.37	0.37	25.02	8.26	20.06
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 FLOW ALLOCATIONS
24.65 Ha, 20.06 L/s
Stage 6 Lands 2.15ha, 1.75 L/s

J.L.Richards
ENGINEERS · ARCHITECTS · I

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

SANITARY SEWER DESIGN SHEET

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	units/ha
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

STREET	M.H. #		Actual	SEWER DATA					RESIDUAL	UPSTREAM					DOWNSTREAM					SELF-CLEANSING VELOCITIES							
	FROM	TO	DIA. mm	DIA. mm	SLOPE %	CAPAC. l/s	VEL. m/s	LENGTH m	CAP. l/s	Center Line	Obvert Drop	Obvert	Invert	Cover	Center Line	Obvert Drop	Obvert	Invert	Cover	Angle	Depth (m)	Area (m^2)	Wetted Perimeter	Flow	Flow (L/s)	Velocity (L/s)	Q/Qmax
Winterset Road	16	14	305	300	0.25	50.4	0.69	119.600	32.68	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	0.631
Winterset Road	14	13	305	300	0.25	50.4	0.69	50.600	32.38	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	0.634
Winterset Road	13	2	305	300	0.25	50.2	0.69	43.200	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
Natare	45 E	46	203	200	0.96	33.6	1.03	60.200	32.86	96.430		93.626	93.423	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
Natare	47	46	203	200	0.65	27.5	0.85	18.900	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
Speedvale	46	39	203	200	0.35	20.2	0.62	9.800	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
Speedvale	39	38	203	200	0.35	20.2	0.62	74.800	18.71	95.940		92.746	92.542	3.194	95.600		92.484	92.281	3.116	102.859	0.038	0.004	0.180	0.002	1.501	0.4	0.366
Speedvale	38	37	203	200	0.35	20.2	0.62	45.100	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
Speedvale	37	36	203	200	0.35	20.2	0.62	32.000	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
Speedvale	36	30	203	200	0.35	20.2	0.62	33.900	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
Natare	45	44	203	200	0.65	27.6	0.85	16.900	27.39	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	0.246
Natare	44	43	203	200	0.33	19.5	0.60	35.300	19.09	96.460		93.647	93.443	2.813	96.160		93.532	93.328	2.628	75.4648	0.021	0.002	0.132	0.000	0.429	0.2	0.246
Natare	43	42	203	200	0.35	20.2	0.62	47.900	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
Sweet Pea	54	53	203	200	0.35	20.2	0.62	105.982	19.29	97.070		93.956	93.753	3.114	96.770	0.030	93.585	93.382	3.185	91.1911	0.030	0.003	0.159	0.001	0.945	0.3	0.319
Sweet Pea	53	52	203	200	0.35	20.2	0.62	10.580	19.16	96.770		93.555	93.352	3.215	96.750	0.030	93.518	93.315	3.232	94.1148	0.032	0.003	0.164	0.001	1.069	0.3	0.331
Sweet Pea	52	51	203	200	0.35	20.2	0.62	70.071	18.63	96.750		93.488	93.285	3.262	96.130		93.243	93.040	2.887	104.734	0.039	0.004	0.183	0.002	1.609	0.4	0.374
Sweet Pea	51	50	203	200	0.35	20.2	0.62	25.280	18.56	96.130		93.243	93.040	2.887	96.320		93.154	92.951	3.166	105.874	0.040	0.004	0.185	0.002	1.676	0.4	0.378
Sweet Pea	50	42	203	200	0.35	20.2	0.62	8.680	18.56	96.320		93.154	92.951	3.166	96.400	0.060	93.124	92.921	3.276	105.985	0.040	0.004	0.185	0.002	1.683	0.4	0.379
Natare	42	40	203	200	0.35	20.2	0.62	63.600	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
Natare	40	31	203	200	0.35	20.2	0.62	34.300	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
Speedvale	34	33	203	200	0.65	27.6	0.85	17.100	27.30	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	0.277
Speedvale	33	32	203	200	0.36	20.4	0.63	100.900	19.03	97.220		93.249	93.045	3.971	96.680	0.031	92.888	92.685	3.792	101.258	0.037	0.004	0.177	0.001	1.430	0.4	0.364
Speedvale	32	31	203	200	0.34	20.0	0.62	65.500	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
Speedvale	31	30	203	200	0.35	20.2	0.62	74.300	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
	30	30A	203	200	0.35	20.2	0.62	39.890	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
Speedvale	30A	2	203	200	0.33	19.7	0.61	44.100	11.44	95.700		91.958	91.754	3.742	94.860	1.083	91.812	91.609	3.048	168.984	0.090	0.014	0.295	0.008	7.910	0.6	0.574
Stage 5*	Stub	2	305	300	0.35	59.7	0.82	19.200	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
Winterset Road	2	2A	305	300	0.34	58.7	0.80	42.100	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
Winterset Road	2A	ex. 307A	457	450	1.04	303.3	1.85	13.460	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
Campeau Drive	ex.306A	ex. 307A	533	525	0.24	219.8	0.98	120.080	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
Donum Lane	South Stub	1A	381	375	0.40	115.8	1.02	67.970	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
Donum Lane	1A	ex. 307A	381	375	0.24	89.6	0.79	8.800	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
Campeau Drive	ex. 307A	ex. 308A	686	675	0.25	438.5	1.19	118.960	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

IBI Group
400-333 Preston Street
Ottawa, Ontario
K1S 5N4

SANITARY SEWER DESIGN SHEET

PROJECT: NAME OF PROJECT
LOCATION: CITY OF OTTAWA
CLIENT: NAME OF CLIENT

LOCATION				RESIDENTIAL									ICI AREAS							INFILTRATION ALLOWANCE			TOTAL	PROPOSED SEWER DESIGN							
				UNIT TYPES				AREA	POPULATION		PEAK	PEAK	AREA (Ha)						PEAK	AREA (Ha)		FLOW	FLOW	CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	VELOCITY	AVAILABLE CAPACITY	
													INSTITUTIONAL		COMMERCIAL		INDUSTRIAL										(full)	(actual)		
STREET	AREA ID	FROM MH	TO MH	SF	SD	TH	APT	(Ha)	IND	CUM	FACTOR	FLOW (L/s)	IND	CUM	IND	CUM	IND	CUM	FLOW (L/s)	IND	CUM	(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(m/s)	(m/s)	L/s	(%)
	BLK800	BLK800A	MAIN						0.0	0.0	4.00	0.00		0.00	0.06	0.06		0.00	0.05	0.06	0.06	0.02	0.07	15.89	6.50	150	1.00	0.871		15.82	99.57
	123A	MH123A	MH122A						0.0	0.0	4.00	0.00		0.00	0.29	0.35		0.00	0.30	0.29	0.35	0.10	0.40	34.22	26.94	200	1.00	1.055		33.81	98.83
	122A	MH122A	MH121A						0.0	0.0	4.00	0.00		0.00	0.09	0.44		0.00	0.38	0.09	0.44	0.12	0.51	34.22	11.00	200	1.00	1.055		33.71	98.52
	BLK700	BLK700A	MAIN						0.0	0.0	4.00	0.00		0.00	0.10	0.10		0.00	0.09	0.10	0.10	0.03	0.11	15.89	6.50	150	1.00	0.871		15.77	99.28
	121A	MH121A	MH120A						0.0	0.0	4.00	0.00		0.00	0.08	0.62		0.00	0.54	0.08	0.62	0.17	0.71	34.22	57.61	200	1.00	1.055		33.50	97.92
	BLK600	BLK600A	MAIN						0.0	0.0	4.00	0.00		0.00	0.06	0.06		0.00	0.05	0.06	0.06	0.02	0.07	15.89	6.50	150	1.00	0.871		15.82	99.57
	120A	MH120A	MH100A						0.0	0.0	4.00	0.00		0.00	0.56	1.24		0.00	1.08	0.56	1.24	0.35	1.42	24.19	53.29	200	0.50	0.746		22.77	94.12
	BLK500	BLK500A	MAIN						0.0	0.0	4.00	0.00		0.00	0.09	0.09		0.00	0.08	0.09	0.09	0.03	0.10	15.89	15.00	150	1.00	0.871		15.78	99.35
	100A	MH100A	MH100C						0.0	0.0	4.00	0.00		0.00	0.46	1.79		0.00	1.55	0.46	1.79	0.50	2.06	24.19	34.23	200	0.50	0.746		22.14	91.51
		MH100C	*EXMH301A*						0.0	0.0					0.00	1.79			1.55	0.00	1.79	0.50	2.06	*24.19*	*23.50*	*200*	*0.50*	*0.746*		*22.14*	*91.51*
	BLK400	BLK400A	MAIN						0.0	0.0	4.00	0.00		0.00	0.15	0.15		0.00	0.13	0.15	0.15	0.04	0.17	15.89	6.50	150	1.00	0.871		15.72	98.92
	BLK300	BLK300A	MAIN						0.0	0.0	4.00	0.00		0.00	0.05	0.05		0.00	0.04	0.05	0.05	0.01	0.06	15.89	6.50	150	1.00	0.871		15.83	99.64
	221A	MH221A	MH212A						0.0	0.0	4.00	0.00		0.00	0.71	0.91		0.00	0.79	0.71	0.91	0.25	1.04	75.98	82.40	250	1.50	1.500	0.522	74.94	98.63
	BLK100	BLK100A	MAIN						0.0	0.0	4.00	0.00		0.00	0.06	0.06		0.00	0.05	0.06	0.06	0.02	0.07	15.89	6.85	150	1.00	0.871		15.82	99.57
	BLK200	BLK200A	MAIN						0.0	0.0	4.00	0.00		0.00	0.05	0.05		0.00	0.04	0.05	0.05	0.01	0.06	15.89	6.75	150	1.00	0.871		15.83	99.64
	214A	MH214A	MH213A						0.0	0.0	4.00	0.00		0.00	0.42	0.53		0.00	0.46	0.42	0.53	0.15	0.61	43.87	44.12	250	0.50	0.866	0.301	43.26	98.61
	213A	MH213A	MH212A						0.0	0.0	4.00	0.00		0.00	0.13	0.66		0.00	0.57	0.13	0.66	0.18	0.76	43.87	16.38	250	0.50	0.866	0.325	43.11	98.27
	212A	MH212A	MH210A						0.0	0.0	4.00	0.00		0.00	0.31	1.88		0.00	1.63	0.31	1.88	0.53	2.16	62.04	58.88	250	1.00	1.224	0.551	59.88	96.52
	BLK900	BLK900A	MAIN						0.0	0.0	4.00	0.00		0.00	0.47	0.47		0.00	0.41	0.47	0.47	0.13	0.54	11.23	22.08	150	0.50	0.616		10.69	95.20
	210A	MH210A	MH205C						0.0	0.0	4.00	0.00		0.00	0.32	2.67		0.00	2.32	0.32	2.67	0.75	3.07	62.04	28.84	250	1.00	1.224	0.633	58.97	95.06
		MH205C	MH205A						0.0	0.0	4.00	0.00		0.00	0.19	2.86		0.00	2.48	0.19	2.86	0.80	3.28	62.04	11.04	250	1.00	1.224	0.633	58.76	94.71
External South mixed	EXT 2	STUB	MH205A						0.0	0.0	4.00	0.00		0.00		0.00		0.00	3.01	2.82	2.82	0.79	3.80	24.19	14.51	200	0.50	0.746		20.39	84.29
Country Glen Way	205A	MH205A	MH204A						0.0	0.0	4.00	0.00		0.00	0.08	2.94		0.00	5.56	0.08	5.76	1.61	7.18	71.33	33.73	300	0.50	0.978	0.620	64.16	89.94
Country Glen Way	204A	MH204A	MH202A						0.0	0.0	4.00	0.00		0.00	0.32	3.26		0.00	5.84	0.32	6.08	1.70	7.54	71.33	125.25	300	0.50	0.978	0.628	63.79	89.43
Country Glen Way	202A	MH202A	MH201A						0.0	0.0	4.00	0.00		0.00	0.04	3.30		0.00	5.87	0.04	6.12	1.71	7.59	71.33	11.74	300	0.50	0.978	0.633	63.75	89.36
External East Mix	EXT-1	Stub	MH201A						0.0	0.0	4.00	0.00		0.00		0.00		0.00	0.79	0.74	0.74	0.21	1.00	24.19	20.27	200	0.50	0.746		23.19	95.87
Country Glen Way	201A	MH201A	MH200A						0.0	0.0	4.00	0.00		0.00	0.10	3.40		0.00	6.75	0.10	6.96	1.95	8.70	71.33	18.49	300	0.50	0.978	0.659	62.63	87.80
Country Glen Way	200A	MH200A	*EX CAP*						0.0	0.0	4.00	0.00		0.00		3.40		0.00	6.75	0.00	6.96	1.95	8.70	58.82	45.35	300	0.34	0.806	0.630	50.12	85.20
Campeau Dr		*EX CAP*	*EXMH303A*						0.0	0.0			*0.00*	*0.00*	*0.00*	*3.40*	*0.00*	*0.00*	*6.75*	*0.00*	*6.96*	*1.95*	*8.70*	*58.82*	*20.50*	*300*	*0.34*	*0.806*	*0.630*	*50.12*	*85.20*

Design Parameters:

Residential			ICI Areas			
SF	3.4	p/p/u				Peak Factor
TH/SD	2.7	p/p/u	INST	50,000	L/Ha/day	1.5
APT	1.8	p/p/u	COM	50,000	L/Ha/day	1.5
Other	60	p/p/Ha	IND	35,000	L/Ha/day	MOE Chart
				17000	L/Ha/day	

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 350 L/day 300 L/day
3. Infiltration allowance: 0.28 L/s/Ha 0.4 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+P^0.5))
   where P = population in thousands

Designed: RM
Checked: DY
Dwg. Reference: 12345-501

No.	Revision	Date
1.	Issued for SPA	11/15/2013
2.	Revised as per City Comments	6/24/2014
3.	Revised as per City Comments	8/22/2014
4.	Revised as per City Comments	10/2/2014

File Reference: 12345.5.7.1 **Date:** 11/15/2013 **Sheet No:** 1 of 1

SANITARY SEWER DESIGN SHEET
PROJECT : Kanata West Servicibility Stury
LOCATION : CITY OF OTTAWA

PROJECT: 3598-LD-03
DATE: Apr 2005
DESIGN: JIM
FILE: 3598LD.sewers.XLS

PHASE 1 SIGNATURE RIDGE (population based criteria..ICI simultaneous peaking)

LOCATION				TOTAL AREA	RESIDENTIAL							EMPLOYMENT/RETAIL/BUSINESS PARK/OPEN SPACES							INFILTRATION				TOTAL FLOW	PROPOSED SEWER					
STREET	FROM MH	TO MH			APPLIC AREA	UNIT/Ha	TOTAL UNITS	POPULATION INDIV	POPULATION ACCUM	PEAK FACTOR	PEAK FLOW	APPLIC AREA	ACCUM AREA	TOTAL AREA	FLOW RATE	PEAK FLOW INDIV	PEAK FLOW ACCUM	PEAK FLOW TOTAL	AREA (Ha) INDIV	AREA (Ha) CUMUL	AREA (Ha) TOTAL CUMUL	PEAK FLOW (l/s)		CAPACITY	VELOCITY (full)	LGTH.	PIPE	GRADE	AVAIL. CAP.
				(Ha)	(Ha)						(l/s)	(Ha)	(Ha)	(Ha)	(l/Ha/d)	(l/s)	(l/s)	(l/s)					(l/s)	l/s	m/s	(m)	(mm)	%	(%)
Campeau Drive Trunk Sewer	1	2	Area 1 (PBP)	0.00								0.00	0.00		35000	0.00	0.00		0.00	0.00									
			Area 2 (PBP)	0.00								0.00	0.00		35000	0.00	0.00		0.00	0.00									
			Area 3 Ext Employment	0.00								0.00	0.00		50000	0.00	0.00		0.00	0.00									
			Area 4 HP Employment	0.00								0.00	0.00	0.00	50000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	283.79	1.27	500.0	525	0.40	100.00%
	2	3	Area 5 Residential	29.19	29.19	19	555	1664	1664	3.65	24.58			0.00				0.00	29.19	29.19								
			Area 9 Ext Employment	0.00							24.58	0.00	0.00		50000	0.00	0.00	0.00	0.00	0.00	29.19	8.17	32.75	286.61	0.98	700.0	600	0.20	88.57%
	14	3	Area 6/8 Ext Employment	0.00								0.00	0.00	0.00	50000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
			Area 7 HP Employment	0.00								0.00	0.00	0.00	50000	0.00	0.00	0.00	0.00	0.00				148.74	0.91	920.0	450	0.25	100.00%
	3	4							1664	3.65	24.58	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	29.19	8.17	32.75	200.67	0.90	150.0	675	0.20	83.68%
	4A	4	Area 10 Residential	27.86	27.86	19	529	1588	1588	3.66	23.55								27.86	27.86	27.86	7.80	31.36	34.00	0.67	750.0	450	0.25	7.76%
	4	5	14 Mixed Use	4.13	1.76	50	88	263	3515	3.38	48.17	2.37	2.37	123.33	35000	1.44	1.44	1.44	4.13	4.13	61.18	17.13	66.74	200.67	0.90	600.0	750	0.20	66.74%
Corel Centre Etc. (Existing Sewer)		15	Area 35 HP Employment	6.05								6.05	6.05		30000	3.15	3.15		6.05										
			Area 36 (Corel Centre)																			30.00							
			Area 38 Exten Employment	20.15								20.15	26.20	26.20	14400	5.04	8.19	8.19	20.15	26.20	26.20	7.34	45.52				*Existing*		
First Line Road Sewer		15	Area 40 Employment	14.59								14.59	14.59		35000	8.87	8.87		14.59	14.59									
			Area 41 Employment	11.97								11.97	26.56		35000	7.27	16.14		11.97	26.56									
			Area 42 Employment	20.66								20.66	47.22		35000	12.55	28.69		20.66	47.22									
			Area 43 Employment	28.89								28.89	76.11	76.11	35000	17.55	46.25	46.25	28.89	76.11	76.11	21.31	67.56	*100.21*	*0.88*	*694.0*	*375*	*0.30*	*32.59%*
Totals South Of Queensway To SRPS	**15**	**5A**		**102.31**	**0.00**		**0**		**0**		**0.00**	**102.31**						**54.44**	**102.31**		**102.31**	**58.65**	**113.08**	**203.90**	**1.24**	**230.0**	**450**	**0.47**	**44.54%**
	Queensway	5	Area 13 Community Retail	6.35								6.35	108.66		35000	3.86	58.29		6.35	6.35									
			Area 11/12 Mixed Use	11.80	5.02	50	251	752	752	3.88	11.81	6.79	115.45	115.45	35000	4.12	62.42	62.42	11.80	18.15	120.46	63.73	137.96	*203.90*	*1.24*	*420.0*	*450*	*0.47*	*32.34%*
	5	5A	Area 15 Community Retail	3.88								3.88	119.33		35000	2.36	64.77		3.88	124.34									
			Area 44	25.54							59.98	25.54	144.87	268.20	35000	15.52	81.73	81.73	25.54	149.88	211.06	89.10	230.81	*519.43*	*1.14*	*300.0*	*750*	*0.20*	*55.56%*
				149.88																		63.73	63.73						
Heritage Hills		5A	Area 100 Residential	90.20	90.20	19	1714	5141	5141	3.23	67.35	0.00							90.20										
Heritage Hills		5A	Area 100 Non-Residential	4.88							67.35	4.88	4.88	4.88	50000	4.24	4.24	4.24	4.88	95.08	95.08	26.62	98.21						
Broughton-Richardson / Interstitial		5A																					65.00						
Total To SRPS	**5A**	**SRPS**		**306.14**	**154.03**		**3136**		**9409**		**127.33**	**152.12**						**85.97**			**306.14**	**115.72**	**394.02**	**625.68**	**1.37**	**30.0**	**750**	**0.29**	**37.03%**

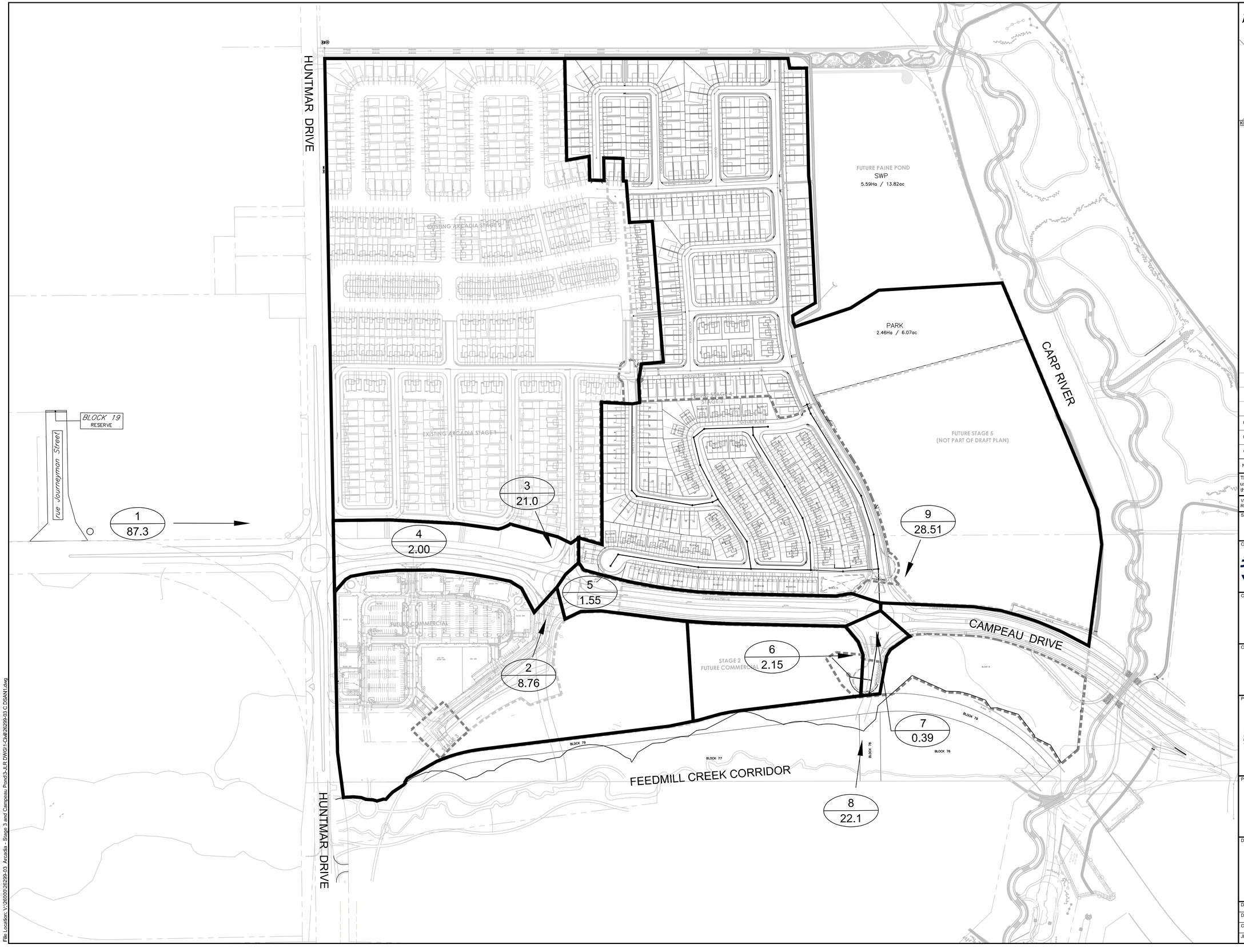
Average Daily Per capita Flow Rate = 350 l/cap/d
Infiltration Allowance Flow Rate = 0.28 l/sec/Ha
Residential Peaking Factor = 1+(14/(4+(P^0.5))), P=Pop. in 1000's, Max of 4
Population density per unit = 3.00
P. F. For Employment/Retail/Business Park = 1.50
Mixed Uses Assumes: 15% Community Retail, 42.5% Business Park and 42.5% Residential

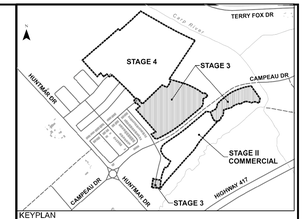
Note: Sewer from node 5 to SRPS is existing and is to be replaced.

Revision No. 1: April 11, 2005
Revision No. 2: April 20, 2005
Revision No. 3: June 07, 2005
Revision No. 4: Oct. 14, 2005
Revision No. 5: Feb. 15, 2006

Stantec CCL/IBI

FIG. 4.2-2





KEYPLAN

AREA ID
10
2.15
AREA (ha)

AREA DESCRIPTIONS

1. 87.3 ha COMMERCIAL / EMPLOYMENT AS PER SIGNATURE RIDGE PUMPING STATION HYDRAULIC GRADE ANALYSIS , IBI GROUP, 2014 (REV 2)
2. 5.2 COMMERCIAL & 3.56 ha INFILTRATION AS PER ARCADIA RETAIL DEVELOPMENT DESIGN (IBI GROUP, 2014)
3. 21 ha RESIDENTIAL DEVELOPEMITN AS PER ARCADIA STAGE 1 DETAILED DESIGN (IBI GROUP 2012) AND ARCADIA STAGE 2 DETAILED DESIGN (JLR 2014)
4. 2 ha RESIDENTIAL & R.O.W. AS PER ARCADIA STAGE 1 DETAILED DESIGN (IBI GROUP 2012)
5. 1.54 ha R.O.W. AS PER CURRENT DESIGN (JLR)
6. 2.15 ha FUTURE COMMERCIAL AS PER CURRENT DESIGN (JLR)
7. 0.37 ha R.O.W. AS PER CURRENT DESIGN (JLR)
8. 22.13 Ha COMMERCIAL AS PER SIGNATURE RIDGE PUMPING STATION HYDRAULIC GRADE ANALYSIS , IBI GROUP, 2014 (REV 2)

No.	ISSUE / REVISION	DD/MM/YY
03	ISSUED TO CITY FOR REVIEW - SUBMISSION 3	26/04/2019
02	ISSUED TO CITY FOR REVIEW - SUBMISSION 2	22/02/2019
01	ISSUED TO CITY FOR REVIEW - SUBMISSION 1	27/11/2018

VERIFY SHEET SIZE AND SCALES. BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING. 0 25mm

SCALE: 1:2000

CLIENT: minto Communities

CONSULTANT: www.jlrichards.ca

J.L.Richards ENGINEERS · ARCHITECTS · PLANNERS

CONSULTANT:

PROFESSIONAL STAMP: LICENSED PROFESSIONAL ENGINEER, M. N. L. DALRYMPLE, Apr 12/19, PROVINCE OF ONTARIO

PROJECT NORTH

PROJECT:

MINTO COMMUNITIES INC.
ARCADIA STAGE 3

450 HUNTMAR DRIVE

DRAWING:

OVERALL SANITARY DRAINAGE PLAN

DESIGN:	AT
DRAWN:	CJM
CHECKED:	LD
JLR #:	26299-03

DRAWING #: OSAN

City File No: DO7-16-16-0025 Plan No: 17816

PLOT DATE: May 1, 2019 - 12:53:41 PM

File Location: V:\26000\26299-03 Arcadia - Stage 3 and Campeau Pond\5-JLR DWG\1-Civil\26299-03 C DSAN1.dwg

Appendix D1

Storm Sewer Design Sheet

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

ARCADIA STAGE 6
STORM SEWER DESIGN SHEET

DESIGNED BY: MM
CHECKED BY: AW
2022-07-19

LOCATION			DRAINAGE AREAS						PEAK FLOW ESTIMATION (RATIONAL METHOD)																			Pipe Data									Upstream Geometry					Downstream Geometry				
			C-Factor (1:5 Yr)			C-Factor (1:10 Yr)						1:2 Year Storm					1:5 Year Storm					1:10 Year Storm																						
Street Name	From	To	0.40	0.58	0.78	0.80	Total Area (ha)	Cum. Total Area (ha)	Inlet Time (min.)	In Pipe Flow Time (min)	Total Time	2.78AR	Add. 2.78AR	Cum. 2.78AR	1:2 Yr Intensity (mm/hr)	Peak Flow (L/s)	2.78AR	Add. 2.78AR	Cum. 2.78AR	1:5 Yr Intensity (mm/hr)	Peak Flow (L/s)	2.78AR	Add. 2.78AR	Cum. 2.78AR	1:10 Yr Intensity (mm/hr)	Peak Flow (L/s)	Total Peak Flow (L/s)	Type	Nominal Dia. (mm)	Actual Dia. (mm)	Slope	Length (m)	Q Full (L/s)	V Full (m/s)	Residual Capacity (L/s)	% Full	TG From	Obvert	Invert	Springline Elev	Cover	TG To	Drop	Obvert	Invert	Springline Elev	Cover
COUNTRY GLEN WAY OUTLET (TO PAINE POND)																																											
STREET 1	220	218	0.09		0.48		0.57	0.57	10.00	2.16	12.16						1.14		1.14	104.19	118.88						118.88	Circular	450	457.20	0.25%	117.52	148.72	0.91	29.84	80%	**97.200**	95.285	94.827	95.056	1.915	**97.300**		94.991	94.534	94.762	2.309
STREET 2	218	227			0.34		0.34	0.91	12.16	1.52	13.69						0.74		1.88	94.01	176.56						176.56	Circular	525	533.40	0.22%	86.15	210.44	0.94	33.87	84%	**97.300**	94.991	94.457	94.724	2.309	**97.300**		94.801	94.268	94.535	2.499
BLOCK TE-2	CBMH1	224			0.14		0.14	0.14	10.00	0.38	10.38						0.30		0.30	104.19	31.63						31.63	Circular	375	381.00	1.00%	37.00	182.91	1.60	151.28	17%	**97.700**	95.841	95.460	95.651	1.859	**98.000**		95.471	95.090	95.281	2.529
AMENITY SPACE	CBMH2	224		0.24			0.24	0.24	10.00	0.29	10.29						0.39		0.39	104.19	40.32						40.32	Circular	300	304.80	0.80%	21.78	90.23	1.24	49.91	45%	**97.220**	95.607	95.303	95.455	1.613	**98.000**		95.433	95.128	95.281	2.567
AMENITY SPACE	224	226					0.00	0.38	10.38	0.26	10.65						0.00		0.69	102.21	70.58						70.58	Circular	375	381.00	0.80%	22.74	163.60	1.43	93.02	43%	**98.000**	95.471	95.090	95.281	2.529	**97.800**		95.289	94.908	95.099	2.511
BLOCK 2	226	227					0.00	0.38	10.65	0.28	10.92						0.00		0.69	100.89	69.67						69.67	Circular	375	381.00	1.50%	32.54	224.02	1.96	154.35	31%	**97.800**	95.289	94.908	95.099	2.511	**97.300**		94.801	94.420	94.611	2.499
STREET 2	227	215					0.00	1.29	13.69	0.35	14.04						0.00		2.57	88.05	226.19						226.19	Circular	600	609.60	0.18%	19.74	271.77	0.93	45.58	83%	**97.300**	94.801	94.192	94.496	2.499	**97.500**		94.766	94.156	94.461	2.734
STREET 2	210	211			0.31		0.31	0.31	10.00	1.44	11.44						0.67		0.67	104.19	70.04						70.04	Circular	900	914.40	0.15%	96.55	731.45	1.11	661.41	10%	**97.000**	95.418	94.504	94.961	1.582	**97.200**		95.273	94.359	94.816	1.927
STREET 2 *See note in Legend	211	212	0.50				0.50	0.81	11.44	0.17	11.62						0.56		1.23	97.13	119.30						119.30	Circular	250	254.00	0.45%	8.40	41.62	0.82	-77.68	287%	**97.200**	94.613	94.359	94.486	2.587	**97.200**		94.575	94.321	94.448	2.625
STREET 2	212	213			0.07		0.07	0.88	11.62	0.52	12.14						0.15		1.38	96.37	132.99						132.99	Circular	900	914.40	0.15%	35.08	731.45	1.11	598.45	18%	**97.200**	95.236	94.321	94.778	1.964	**97.300**		95.183	94.269	94.726	2.117
STREET 4	216	213A			0.41		0.41	0.41	10.00	1.56	11.56						0.89		0.89	104.19	92.63						92.63	Circular	900	914.40	0.15%	104.34	731.45	1.11	638.81	13%	**97.100**	95.367	94.453	94.910	1.733	**97.200**		95.210	94.296	94.753	1.990
STREET 4 *See note in Legend	213A	213					0.00	0.41	11.56	0.14	11.70						0.00		0.89	96.61	85.89						85.89	Circular	200	203.20	0.45%	6.10	22.95	0.71	-62.94	374%	**97.200**	94.499	94.296	94.398	2.701	**97.300**		94.472	94.269	94.370	2.828
STREET 3	217	214A			0.43		0.43	0.43	10.00	1.64	11.64						0.93		0.93	104.19	97.15						97.15	Circular	900	914.40	0.15%	109.54	731.45	1.11	634.29	13%	**97.200**	95.319	94.405	94.862	1.881	**97.300**		95.155	94.241	94.698	2.145
STREET 3 *See note in Legend	214A	214					0.00	0.43	11.64	0.14	11.78						0.00		0.93	96.27	89.76						89.76	Circular	200	203.20	0.45%	6.10	22.95	0.71	-66.81	391%	**97.300**	94.444	94.241	94.342	2.856	**97.400**		94.417	94.213	94.315	2.983
STREET 2	213	214			0.10		0.10	1.39	12.14	0.55	12.69						0.22		2.49	94.10	233.93						233.93	Circular	900	914.40	0.15%	36.85	731.45	1.11	497.52	32%	**97.300**	95.183	94.269	94.726	2.117	**97.400**		95.128	94.213	94.671	2.272
STREET 2	214	215			0.08		0.08	1.90	12.69	0.57	13.26						0.17		3.59	91.84	329.88						329.88	Circular	900	914.40	0.15%	38.14	731.45	1.11	401.57	45%	**97.400**	95.128	94.213	94.671	2.272	**97.500**		95.071	94.156	94.613	2.429
COUNTRY GLEN WAY	215	EXMH201					0.00	**3.19**	14.04	0.21	14.25						0.00		6.16	86.79	534.68						534.68	Circular	900	914.40	0.15%	14.20	731.45	1.11	196.76	73%	**97.500**	95.071	94.156	94.613	2.429	**98.000**		95.049	94.135	94.592	2.951
							3.19																																					
FUTURE COMMERCIAL (IBI 2013)	EXMH205B	EXMH205							14.15	0.23	**14.38**						0.00	7.74	7.74	86.41	668.80						668.80	Circular	**975**	990.60	0.11%	13.84	775.41	1.01	106.61	86%	**97.470**	95.506	94.515	95.010	1.964	97.430		95.491	94.500	94.995	1.939
FUTURE COMMERCIAL (IBI 2013)	EXMH206	EXMH205							10.43	0.13	10.56						0.00	1.23	1.23	101.98	125.43						125.43	Circular	**375**	381.00	0.96%	12.00	179.22	1.57	53.79	70%	**98.590**	95.596	95.215	95.406	2.994	97.430		95.481	95.100	95.291	1.949
COUNTRY GLEN WAY	EXMH205	EXMH204							**14.38**	0.41	14.79						0.00	0.33	9.30	85.62	796.25						796.25	Circular	**1350**	1371.60	0.10%	29.07	1760.81	1.19	964.57	45%	**97.430**	95.512	94.140	94.826	1.918	97.570		95.482	94.110	94.796	2.088
COUNTRY GLEN WAY	EXMH204	EXMH203							14.79	1.02	15.81						0.00	0.27	9.57	84.26	806.33						806.33	Circular	**1350**	1371.60	0.12%	80.04	1928.87	1.31	1122.55	42%	**97.570**	95.462	94.090	94.776	2.108	97.940		95.362	93.990	94.676	2.578
COUNTRY GLEN WAY	EXMH203	EXMH202							15.81	0.76	16.57						0.00	0.30	9.87	81.04	799.82						799.82	Circular	**1350**	1371.60	0.07%	45.72	1473.20	1.00	673.38	54%	**97.940**	95.342	93.970	94.656	2.598	97.380		95.312	93.940	94.626	2.068
COUNTRY GLEN WAY	EXMH202	EXMH201							16.57	0.28	**16.85**						0.00	0.89	10.76	78.80	847.89						847.89	Circular	**1350**	1371.60	0.06%	15.65	1363.92	0.92	516.03	62%	**97.380**	95.272	93.900	94.586	2.108	97.270		95.262	93.890	94.576	2.008
COUNTRY GLEN WAY	EXMH201	EXMH200							**16.85**	0.71	17.56						0.00		16.92	78.01	1319.93						1319.93	Circular	**1500**	1524.00	0.13%	61.98	2658.92	1.46	1338.98	50%	98.000	95.354	93.830	**94.592**	2.646	98.000		95.274	93.750	94.512	2.726
COUNTRY GLEN WAY/CAMPEAU	EXMH200	EXMH303							17.56	0.32	**17.88**						0.00		16.92	76.10	1287.60						1287.60	Circular	**1500**	1524.00	0.10%	24.50	2332.02	1.28	1044.42	55%	98.000	95.194	93.670	94.432	2.806	98.100		95.169	93.645	94.407	2.931
DONUM LANE OUTLET (TO CAMPEAU POND)																																											
STREET 5	208	207			0.29		0.29	0.29	10.00	1.10	11.10						0.63		0.63	104.19	65.52						65.52	Circular	375	381.00	0.35%	62.58	108.21	0.95	42.69	61%	**96.600**	94.310	93.929	94.120	2.290	**96.500**		94.091	93.710	93.901	2.409
STREET 1	207	206			0.12		0.12	0.41	11.10	0.57	11.67						0.26		0.89	98.73	87.77						87.77	Circular	450	457.20	0.35%	36.76	175.96	1.07	88.19	50%	**96.500**	94.091	93.634	93.863	2.409	**96.300**		93.963	93.506	93.734	2.337
STREET 1	206	205			0.25		0.25	0.66	11.67	0.60	12.27						0.54		1.43	96.13	137.57						137.57	Circular	525	533.40	0.21%	33.22	205.60	0.92	68.03	67%	**96.300**	93.963	93.429	93.696	2.337	**96.300**		93.893	93.360	93.626	2.407
BLOCK TE-5	CB102	CB103			0.14		0.14	0.14	10.00	0.29	10.29						0.30		0.30	104.19	31.63						31.63	Circular	250	254.00	1.00%	21.32	62.04	1.22	30.41	51%	**96.200**	94.805	94.551	94.678	1.395	**96.450**		94.592	94.338	94.465	1.858
BLOCK TE-8	CB103	204A			0.07		0.07	0.21	10.29	0.69	10.98						0.15		0.46	102.68	46.76						46.76	Circular	375	381.00	0.90%	63.38	173.52	1.52	126.77	27%	**96.300**	94.656	94.275	94.465	1.644	**96.450**		94.085	93.704	93.895	2.365
BLOCK TE-8	204A	204					0.00	0.21	10.98	0.09	11.07						0.00		0.46	99.27	45.20						45.20	Circular	375	381.00	0.90%	7.90	173.52	1.52	128.32	26%	**96.450**	94.085	93.704	93.895	2.365	**96.200**		94.014	93.633	93.824	2.186
STREET 6	204	205		0.16			0.16	0.37	11.07	0.38	11.45						0.35		0.80	98.86	79.31						79.31	Circular	375	381.00	0.48%	25.25	126.72	1.11	47.41	63%	**96.200**	94.014	93.633	93.824	2.186	**96.300**		93.893	93.512	93.703	2.407
STREET 1	205	201		0.15			0.15	1.18	12.27	0.99	13.27						0.33		2.56	93.55	239.36						239.36	Circular	600	609.60	0.24%	64.10	313.81	1.08	74.44	76%	**96.300**	93.893	93.283	93.588	2.407	**95.800**		93.739	93.130	93.434	2.061
BLOCK TE-12	CBMH3	202A		0.14			0.14	0.14	10.00	0.83	10.83						0.30		0.30	104.19	31.63						31.63	Circular	300	304.80	0.34%	40.14	58.82	0.81	27.19	54%	**95.500**	94.231	93.926	94.078	1.269	**96.000**		94.094	93.790	93.942	1.906
BLOCK TE-8	202A	TEE-2					0.00	0.14	10.83	0.32	11.15						0.00		0.30	100.00	30.36						30.36	Circular	300	304.80	0.34%	15.36	58.82	0.81	28.46	52%	**96.000**	94.094	93.790	93.942	1.906	**95.850**		94.042	93.737	93.890	1.808
BLOCK TE-12	CB106	TEE-2		0.04			0.04	0.04	10.00	0.02	10.02						0.09		0.09	104.19	9.04						9.04	Circular	200	203.20	2.00%	1.84	48.39	1.49	39.35	19%	**95.850**	94.028	93.825	93.927	1.822	**95.800**		93.991	93.788	93.890	1.809
BLOCK TE-12	TEE-2	202					0.00	0.18	11.15	0.23	11.38						0.00		0.39	98.50	38.45						38.45	Circular	300	304.80	0.34%	11.07	58.82	0.81	20.38	65%	**95.800**	94.042	93.737	93.890	1.758	**96.000**		94.005	93.700	93.852	1.995
STREET 6	203	202		0.27			0.27	0.27	10.00	1.33	11.33						0.59		0.59	104.19	61.00						61.00	Circular	525	533.40	0.16%	64.05	179.46	0.80	118.46	34%	**96.400**	94.221	93.688	93.955	2.179	**96.000**		94.119	93.585	93.852	1.881
STREET 6	202	201A		0.19			0.19	0.64	11.38	1.06	12.44						0.41		1.39	97.45	135.23						135.23	Circular	525	533.40	0.16%	51.20	179.46	0.80	44.23	75%	**96.000**	94.119	93.585	93.852	1.881	**95.820**		94.037	93.504	93.770	1.783
STREET 6 *See note in Legend	201A	201					0.00	0.64	12.44	0.13	12.57						0.00		1.39	92.86	128.87						128.87	Circular	250	254.00	0.43%	6.10	40.78	0.80	-88.10	316%	**95.820**	93.758	93.504	93.631	2.062	**95.800**	0.500	93.731	93.477	93.604	2.069
BLOCK TE-13	201	200A		0.03			0.03	1.85	13.27	0.81	14.08						0.07		4.01	89.61	359.49						359.49	Circular	750	762.00	0.23%	59.65	556.99	1.22	197.51	65%	**95.800**	93.739	92.977	93.358	2.061	**95.100**		93.602	92.840	93.221	1.498
BLOCK TE-12	CB108	CBMH4		0.08			0.08	0.08	10.00	0.39	10.39						0.17		0.17	104.19	18.07						18.07	Circular	525	533.40	1.00%	46.62	448.66	2.01	430.58	4%	**95.400**	93.981	93.447	93.714	1.419	**94.950**		93.514	92.981	93.248	1.436
BLOCK TE-12	CBMH4	200A		0.21			0.21	0.29	10.39	0.05	10.44						0.46		0.63	102.19	64.26						64.26	Circular	525	533.40	1.00%	6.48	448.66	2.01	384.40	14%	**94.950**	93.514	92.981	93.248	1.436	**95.100**		93.450	92.916	93.183	1.650
STREET 1/DONUM LANE	200A	200					0.00	**2.14**	14.08	0.34	14.42						0.00		4.64	86.65	402.10						402.10	Circular	825	838.20	0.19%	24.14	652.75	1.18	250.65	62%	**95.100**	**93.602**	92.764	**93.183**	1.498	**95.400**		93.556	92.718	93.137	1.844
							2.14																																					
DONUM LANE	FUTURE	200				1.68	1.68	1.68	10.00	0.00	10.00	0.00		0.00	76.81	0.00	0.00		0.00	104.19	0.00	3.74		3.74	122.14	456.36	456.36																			
DONUM LANE	200	EX100					0.00	3.82	**14.42**	0.40	14.82	0.00		0.00	63.17	0.00	0.00		4.64	85.48	396.65	0.00		3.74	100.11	374.05	770.70	Circular	**975**	990.60	0.26%	37.12	1192.13	1.55	421.42	65%	95.400	**93.556**	92.566	93.061	1.844	95.470		93.460	92.469	92.964	2.010
DONUM LANE/CAMPEAU DRIVE	EX101	EX100				0.30	13.91	13.91	**17.69**	0.54	**18.23**	0.00	10.97	10.97	56.07	615.09	0.00	9.57	9.57	75.77	725.08	0.67	5.69	6.36	88.69	564.08	1904.25	Circular	**1500**	1524.00	0.11%	43.55	2445.85	1.34	541.59	78%	95.520	93.515	91.991	92.753	2.005	95.470		93.468	91.944	92.706	2.002
CAMPEAU POND	EX100	POND					0.00	17.73	**18.23**	0.15	**18.38**	0.00		10.97	55.06	604.03	0.00		14.21	74.39	1057.09	0.00		10.10	87.07	879.11	2540.23	Circular	**1800**	1828.80	0.19%	17.53	5227.09	1.99	2686.86	49%	95.470	93.468	91.631	92.545	2.002	95.430		93.426	91.597	92.511	2.004

Design Parameter	
Manning's Coefficient	0.013

Legend

89.232	Proposed Mainline Sewers
89.232	Proposed Storage Sewers
89.232	Proposed Connection to CB/Landscape Pot
89.232	Existing (As-Built Information)
*Note for sewer pipes over capacity:	Sewer operating under pressure to provide flow control

Statistics

Area Tributary to Paine Pond:	3.19
Area Tributary to Campeau Pond:	2.14
Total DST Area for Arcadia Stage 6	**5.33**

Appendix E1

Modelling Schematics

Legend

Junctions
- Carp River Nodes
- Low Points
- High Points
- Mid Points
- Outfalls

Storages
- On-Site Storage
- Pond

Conduits
- Carp River
- Streets
- Overland Flow Path (Weir)

Subcatchments
- IBI Model
- Rear_Yard
- Front_Yard
- Pond
- Road
- Commercial
- Park

N

100 m

PROJECT:

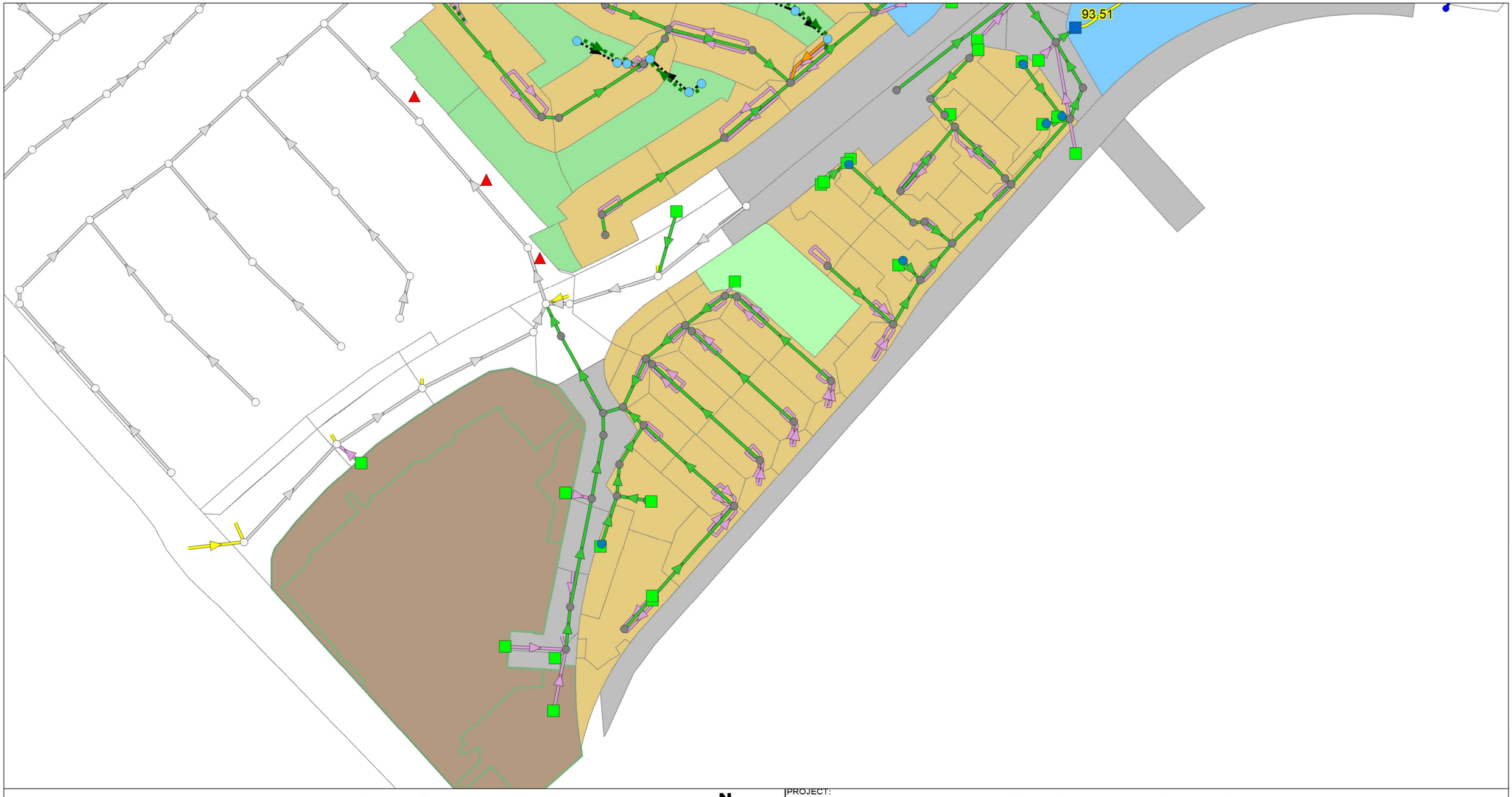
Minto Communities Arcadia Stage 6
450 Huntmar Drive

DRAWING:

Major System Model Schematic

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

DESIGN:	ID	JLR NO.:	26299-006
DRAWN:	ID	DRAWING NO.:	FIGURE E1-1
CHECKED:	BP		



Legend

Storages
- On-Site Storage
- Manhole
- Existing Manhole
- Rear Yard Catchbasin

Conduits
- Campeau Drive Inlets
- Existing Sewers
- Storm Sewers
- Rear Yard Storm

Outlets
- Street Inlet
- Rear Yard Inlet
- Culvert

Subcatchments
- IBIModel
- Rear_Yard
- Front_Yard
- Pond
- Road
- Commercial
- Park

N

100 m

PROJECT:

Minto Communities Arcadia Stage 6
450 Huntmar Drive

DRAWING:

Minor System Model Schematic

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

DESIGN:	ID	JLR NO.:	26299-006
DRAWN:	ID	DRAWING NO.:	FIGURE E1-2
CHECKED:	BP		

Appendix E2

CB Tables

STREET CATCHBASINS

Street Name	CB ID Number	T/G	Inlet		Outlet		Return Period (years)	Rational Method Capture Rate (1:5 yr) (L/s)	Max Depth (100 yr) (m)	1:100 Yr Restricted Capture Rate (L/s)	ICD TYPE
			Pipe Dia. (mm)	Invert	Pipe Dia. (mm)	Invert					
Street 1	CB1	97.1	-	-	200	95.30	1:5 year	10	1.65	47	MHF_IPEX_TYPE_C
	CB2	97.1	-	-	200	95.30	1:5 year	76	1.65	47	MHF_IPEX_TYPE_C
	CB3	96.9	-	-	200	95.10	1:5 year	34	1.89	25	MHF_IPEX_TYPE_A
	CB4	96.9	-	-	200	95.10	1:5 year	34	1.89	25	MHF_IPEX_TYPE_A
	CB5	96.9	200	95.15	250	95.10	1:5 year	9	0.68	9	MHF_IPEX_TYPE_A
	CB6	96.9	-	-	200	95.21	1:5 year	9	0.68	9	MHF_IPEX_TYPE_A
	CB7	96.8	200	95.05	250	95.00	1:5 year	9	0.76	9	MHF_IPEX_TYPE_A
	CB8	96.8	-	-	200	95.11	1:5 year	9	0.76	9	MHF_IPEX_TYPE_A
	CB9	96.7	200	94.95	250	94.90	1:5 year	9	0.33	9	MHF_IPEX_TYPE_A
	CB10	96.7	-	-	200	95.01	1:5 year	9	0.33	9	MHF_IPEX_TYPE_A
	CB11	96.2	-	-	200	94.40	1:5 year	28	1.85	25	MHF_IPEX_TYPE_A
	CB12	96.2	-	-	200	94.40	1:5 year	28	1.85	25	MHF_IPEX_TYPE_A
	CB13	96	-	-	200	94.20	1:5 year	54	1.9	35	MHF_IPEX_TYPE_B
	CB14	96	-	-	200	94.20	1:5 year	54	1.9	35	MHF_IPEX_TYPE_B
	CB15	95.6	-	-	200	93.80	1:5 year	33	1.87	25	MHF_IPEX_TYPE_A
	CB16	95.6	-	-	200	93.80	1:5 year	33	1.87	25	MHF_IPEX_TYPE_A
Street 2	CB17	96.87	-	-	200	95.07	1:5 year	43	1.96	25	MHF_IPEX_TYPE_A
	CB18	96.87	-	-	200	95.07	1:5 year	43	1.96	25	MHF_IPEX_TYPE_A
	CB19	97.04	-	-	200	95.24	1:5 year	34	1.9	25	MHF_IPEX_TYPE_A
	CB20	97.04	-	-	200	95.24	1:5 year	34	1.9	25	MHF_IPEX_TYPE_A
	CB21	96.97	-	-	200	95.17	1:5 year	19	1.06	19	MHF_IPEX_TYPE_A
	CB22	96.97	-	-	200	95.17	1:5 year	19	1.06	19	MHF_IPEX_TYPE_A
	CB23	96.88	-	-	200	95.08	1:5 year	23	1.54	22	MHF_IPEX_TYPE_A
	CB24	96.88	-	-	200	95.08	1:5 year	23	1.54	22	MHF_IPEX_TYPE_A
	CB25	96.87	-	-	200	95.07	1:5 year	16	0.82	16	MHF_IPEX_TYPE_A
	CB26	96.87	-	-	200	95.07	1:5 year	16	0.82	16	MHF_IPEX_TYPE_A
	CB27	96.67	-	-	200	94.87	1:5 year	27	1.85	24	MHF_IPEX_TYPE_A
	CB28	96.67	-	-	200	94.87	1:5 year	27	1.85	24	MHF_IPEX_TYPE_A
	CB29	96.57	-	-	200	94.77	1:5 year	33	1.91	24	MHF_IPEX_TYPE_A
	CB30	96.57	-	-	200	94.77	1:5 year	33	1.91	24	MHF_IPEX_TYPE_A
Street 3	CB31	96.8	-	-	200	95.00	1:5 year	42	1.95	25	MHF_IPEX_TYPE_A
	CB32	96.8	-	-	200	95.00	1:5 year	42	1.95	25	MHF_IPEX_TYPE_A
	CB33	96.92	-	-	200	95.12	1:5 year	44	1.96	25	MHF_IPEX_TYPE_A
	CB34	96.92	-	-	200	95.12	1:5 year	44	1.96	25	MHF_IPEX_TYPE_A
Street 4	CB35	96.67	-	-	200	94.87	1:5 year	42	1.96	25	MHF_IPEX_TYPE_A
	CB36	96.67	-	-	200	94.87	1:5 year	42	1.96	25	MHF_IPEX_TYPE_A
	CB37	96.83	-	-	200	95.03	1:5 year	43	1.96	25	MHF_IPEX_TYPE_A
	CB38	96.83	-	-	200	95.03	1:5 year	43	1.96	25	MHF_IPEX_TYPE_A
Street 5	CB39	96.1	-	-	200	94.30	1:5 year	36	1.91	25	MHF_IPEX_TYPE_A
	CB40	96.1	-	-	200	94.30	1:5 year	36	1.91	25	MHF_IPEX_TYPE_A
	CB41	96.2	-	-	200	94.40	1:5 year	30	1.87	25	MHF_IPEX_TYPE_A
	CB42	96.2	-	-	200	94.40	1:5 year	30	1.87	25	MHF_IPEX_TYPE_A
Street 6	CB43	95.9	-	-	200	94.10	1:5 year	36	1.9	25	MHF_IPEX_TYPE_A
	CB44	95.9	-	-	200	94.10	1:5 year	36	1.9	25	MHF_IPEX_TYPE_A
	CB45	95.7	-	-	200	93.90	1:5 year	61	2.04	40	MHF_IPEX_TYPE_C
	CB46	95.7	-	-	200	93.90	1:5 year	61	2.04	40	MHF_IPEX_TYPE_C
	CB47	95.6	-	-	200	93.80	1:5 year	43	1.97	29	MHF_IPEX_TYPE_B
	CB48	95.6	-	-	200	93.80	1:5 year	43	1.97	29	MHF_IPEX_TYPE_B

REAR YARD ICD TABLE

STREET	CB ID Number	T/G	INLET		OUTLET			1:100 Yr Restricted Flow (L/s)	ICD TYPE
			Pipe Dia. (mm)	Invert	Pipe Dia. (mm)	Pipe Length	Invert		
BLOCK TE-12	CB108	95.40	-	-	525	46.62	93.447	22	MHF_IPEX_TYPE_A
	CBMH4	94.8	525	92.981	525	6.48	92.981	61	MHF_IPEX_TYPE_D
BLOCK TE-5	CB103	96.30	250	94.338	375	63.38	94.275	65	MHF_IPEX_TYPE_D
BLOCK TE-2	CBMH1	97.70	-	-	375	37.00	95.460	57	MHF_IPEX_TYPE_D

Appendix E3

HGL Analysis

ARCADIA ALL STAGES HGL ANALYSIS

MH ID	USF Elevation (m)	1:2 Year Event (12 hr SCS)		1:5 Year Event (12 hr SCS)		1:10 Year Event (12 hr SCS)		1:25 Year Event (12 hr SCS)		1:50 Year Event (12 hr SCS)		1:100 Year Event (12 hr SCS)		1:100 Year Event (24 hr SCS)	
		Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)
217	-	94.79	-	94.99	-	95.18	-	95.50	-	95.64	-	95.74	-	95.68	-
214A	-	94.79	-	94.99	-	95.18	-	95.50	-	95.64	-	95.74	-	95.68	-
214	95.37	94.61	0.76	94.70	0.67	94.77	0.60	94.86	0.51	94.92	0.45	94.97	0.40	94.95	0.42
216	-	94.82	-	95.02	-	95.18	-	95.50	-	95.64	-	95.72	-	95.67	-
213A	-	94.81	-	95.01	-	95.18	-	95.50	-	95.63	-	95.72	-	95.66	-
213	95.32	94.63	0.69	94.71	0.61	94.78	0.54	94.87	0.45	94.92	0.40	94.97	0.35	94.96	0.36
210	-	94.69	-	94.81	-	94.89	-	95.00	-	95.08	-	95.16	-	95.13	-
211	-	94.69	-	94.81	-	94.89	-	95.00	-	95.08	-	95.16	-	95.13	-
212	95.32	94.64	0.68	94.72	0.60	94.79	0.53	94.88	0.44	94.93	0.39	94.98	0.34	94.96	0.36
J_CBMH1	96.14	95.54	0.60	95.56	0.58	95.57	0.57	95.58	0.56	95.58	0.56	95.59	0.55	95.59	0.55
CBMH2	-	95.42	-	95.46	-	95.49	-	95.54	-	95.60	-	95.67	-	95.66	-
224	96.14	95.22	0.92	95.25	0.89	95.27	0.87	95.29	0.85	95.31	0.83	95.33	0.81	95.33	0.81
226	96.14	95.02	1.12	95.04	1.10	95.05	1.09	95.08	1.06	95.14	1.00	95.20	0.94	95.19	0.95
220	-	95.02	-	95.06	-	95.09	-	95.18	-	95.26	-	95.34	-	95.32	-
218	-	94.72	-	94.82	-	94.91	-	95.05	-	95.12	-	95.20	-	95.18	-
227	95.43	94.62	0.81	94.72	0.71	94.81	0.62	94.92	0.51	94.98	0.45	95.04	0.39	95.03	0.40
215	95.30	94.59	0.71	94.67	0.63	94.75	0.55	94.85	0.45	94.90	0.40	94.95	0.35	94.93	0.37
MHST77649	-	94.37	-	94.52	-	94.63	-	94.75	-	94.82	-	94.87	-	94.85	-
208	94.69	94.04	0.65	94.06	0.63	94.07	0.62	94.08	0.61	94.09	0.60	94.10	0.59	94.10	0.59
207	94.80	93.82	0.98	93.85	0.95	93.88	0.92	93.91	0.89	93.94	0.86	93.97	0.83	93.97	0.83
206	94.69	93.67	1.02	93.72	0.97	93.76	0.93	93.81	0.88	93.85	0.84	93.90	0.79	93.90	0.79
205	94.24	93.56	0.68	93.62	0.62	93.66	0.58	93.72	0.52	93.77	0.47	93.84	0.40	93.84	0.40
201	-	93.33	-	93.42	-	93.49	-	93.57	-	93.63	-	93.71	-	93.71	-
200A	-	93.21	-	93.33	-	93.42	-	93.51	-	93.57	-	93.65	-	93.62	-
200	-	93.21	-	93.33	-	93.42	-	93.51	-	93.56	-	93.65	-	93.62	-
ST6_CB102	-	94.77	-	95.14	-	95.44	-	95.86	-	96.19	-	96.24	-	96.23	-
J_CB103	94.69	94.38	0.31	94.40	0.29	94.41	0.28	94.42	0.27	94.43	0.26	94.43	0.26	94.43	0.26
204A	94.69	93.85	0.84	93.89	0.80	93.92	0.77	93.96	0.73	93.99	0.70	94.02	0.67	94.02	0.67
204	-	93.83	-	93.87	-	93.90	-	93.94	-	93.97	-	94.00	-	94.00	-
203	-	94.29	-	94.78	-	95.13	-	95.35	-	95.44	-	95.49	-	95.46	-
202	-	94.29	-	94.78	-	95.13	-	95.34	-	95.43	-	95.48	-	95.45	-
201A	-	94.28	-	94.76	-	95.11	-	95.31	-	95.40	-	95.45	-	95.42	-
CBMH3	-	94.31	-	94.82	-	95.18	-	95.39	-	95.50	-	95.56	-	95.53	-
202A	-	94.30	-	94.80	-	95.15	-	95.36	-	95.45	-	95.51	-	95.48	-
201A	-	94.28	-	94.76	-	95.11	-	95.31	-	95.40	-	95.45	-	95.42	-
CB108	-	93.67	-	94.23	-	94.74	-	94.87	-	94.92	-	94.98	-	94.97	-
CBMH4	94.24	93.21	1.03	93.33	0.91	93.42	0.82	93.51	0.73	93.57	0.67	93.65	0.59	93.63	0.61
Ex._508	94.73	93.09	1.64	93.30	1.43	93.46	1.27	93.63	1.10	93.72	1.01	93.81	0.92	93.79	0.94
116	94.12	93.16	0.96	93.30	0.82	93.42	0.70	93.60	0.52	93.70	0.42	93.78	0.34	93.76	0.36
173	94.17	93.17	1.00	93.24	0.93	93.32	0.85	93.44	0.73	93.53	0.64	93.61	0.56	93.59	0.58
120	93.90	93.08	0.82	93.20	0.70	93.28	0.62	93.40	0.50	93.49	0.41	93.57	0.33	93.55	0.35
171	93.98	93.24	0.74	93.27	0.71	93.30	0.68	93.42	0.56	93.50	0.48	93.57	0.41	93.55	0.43
121	93.89	93.08	0.81	93.20	0.69	93.28	0.61	93.37	0.52	93.45	0.44	93.53	0.36	93.52	0.37
122	93.84	93.08	0.76	93.20	0.64	93.28	0.56	93.36	0.48	93.41	0.43	93.51	0.33	93.49	0.35
192	95.08	93.33	1.75	93.39	1.69	93.53	1.55	93.70	1.38	93.78	1.30	93.86	1.22	93.84	1.24
193	94.86	93.13	1.73	93.33	1.53	93.48	1.38	93.64	1.22	93.72	1.14	93.81	1.05	93.79	1.07
194	94.74	93.09	1.65	93.32	1.42	93.46	1.28	93.62	1.12	93.71	1.03	93.79	0.95	93.77	0.97
191	95.05	93.46	1.59	93.48	1.57	93.54	1.51	93.71	1.34	93.80	1.25	93.88	1.17	93.86	1.19
Ex._509	94.54	93.08	1.46	93.29	1.25	93.44	1.10	93.61	0.93	93.70	0.84	93.78	0.76	93.76	0.78
Ex._510	94.14	93.08	1.06	93.25	0.89	93.38	0.76	93.54	0.60	93.63	0.51	93.71	0.43	93.69	0.45
127	94.16	93.08	1.08	93.27	0.89	93.41	0.75	93.57	0.59	93.65	0.51	93.72	0.44	93.70	0.46
128	94.07	93.08	0.99	93.27	0.80	93.42	0.65	93.57	0.50	93.65	0.42	93.72	0.35	93.70	0.37
124	93.88	93.08	0.80	93.20	0.68	93.28	0.60	93.38	0.50	93.46	0.42	93.54	0.34	93.52	0.36
123	93.88	93.08	0.80	93.20	0.68	93.28	0.60	93.38	0.50	93.46	0.42	93.54	0.34	93.52	0.36
160	94.09	93.08	1.01	93.21	0.88	93.32	0.77	93.47	0.62	93.57	0.52	93.65	0.44	93.63	0.46
172	94.54	93.44	1.10	93.46	1.08	93.47	1.07	93.47	1.07	93.51	1.03	93.57	0.97	93.56	0.98
118	94.01	93.08	0.93	93.20	0.81	93.31	0.70	93.46	0.55	93.56	0.45	93.64	0.37	93.62	0.39
119	94.01	93.08	0.93	93.20	0.81	93.29	0.72	93.43	0.58	93.53	0.48	93.61	0.40	93.59	0.42
161	94.63	94.13	0.50	94.15	0.48	94.16	0.47	94.17	0.46	94.17	0.46	94.17	0.46	94.17	0.46
162	94.79	94.10	0.69	94.13	0.66	94.14	0.65	94.16	0.63	94.16	0.63	94.16	0.63	94.16	0.63
180	94.02	93.08	0.94	93.20	0.82	93.31	0.71	93.44	0.58	93.52	0.50	93.60	0.42	93.58	0.44
PAINE_PON	-	93.08	-	93.20	-	93.28	-	93.36	-	93.39	-	93.51	-	93.49	-
104_(Ex-	-	93.23	-	93.34	-	93.42	-	93.52	-	93.59	-	93.67	-	93.67	-
103_(Ex-	-	93.22	-	93.34	-	93.42	-	93.51	-	93.57	-	93.65	-	93.62	-
100_(Ex-	-	93.21	-	93.34	-	93.42	-	93.51	-	93.56	-	93.65	-	93.62	-
101_(Ex-	-	93.21	-	93.34	-	93.42	-	93.51	-	93.57	-	93.65	-	93.62	-
102_(Ex-	94.21	93.21	1.00	93.34	0.87	93.42	0.79	93.52	0.69	93.58	0.63	93.65	0.56	93.65	0.56
113_(Ex-	94.21	93.21	1.00	93.34	0.87	93.42	0.79	93.52	0.69	93.58	0.63	93.65	0.56	93.65	0.56
114_(Ex-	94.21	93.21	1.00	93.34	0.87	93.42	0.79	93.52	0.69	93.59	0.62	93.67	0.54	93.67	0.54
115_(Ex-	94.24	93.21	1.03	93.34	0.90	93.42	0.82	93.52	0.72	93.61	0.63	93.69	0.55	93.69	0.55
130_(Ex-	94.25	93.21	1.04	93.34	0.91	93.42	0.83	93.52	0.73	93.61	0.64	93.68	0.57	93.68	0.57
130A_(Ex-	-	93.21	-	93.34	-	93.42	-	93.52	-	93.59	-	93.67	-	93.67	-
131_(Ex-	94.26	93.24	1.02	93.39	0.87	93.46	0.80	93.56	0.70	93.64	0.62	93.72	0.54	93.71	0.55
132_(Ex-	94.93	93.54	1.39	93.57	1.36	93.58	1.35	93.62	1.31	93.66	1.27	93.74	1.19	93.73	1.20
133_(Ex-	95.43	93.77	1.66	93.80	1.63	93.80	1.63	93.80	1.63	93.80	1.63	93.81	1.62	93.81	1.62
134_(Ex-	95.62	93.48	2.14	93.64	1.98	93.78	1.84	93.80	1.82	93.80	1.82	93.81	1.81	93.81	1.81
136_(Ex-	94.25	93.23	1.02	93.36	0.89	93.44	0.81	93.54	0.71	93.62	0.63	93.70	0.55	93.69	0.56
137_(Ex-	94.26	93.27	0.99	93.39	0.87	93.46	0.80	93.55	0.71	93.63	0.63	93.71	0.55	93.70	0.56
139_(Ex-	94.26	93.39	0.87	93.46	0.80	93.52	0.74	93.59	0.67	93.65	0.61	93.73	0.53	93.73	0.53
138_(Ex-	94.26	93.30	0.96	93.41	0.85	93.48	0.78	93.57	0.69	93.63	0.63	93.71	0.55	93.71	0.55
146_(Ex-	94.43	93.55	0.88	93.58	0.85	93.59	0.84	93.62	0.81	93.67	0.76	93.74	0.69	93.74	0.69
147_(Ex-	94.43	93.71	0.72	93.73	0.70	93.73	0.70	93.73	0.70	93.73	0.70	93.76	0.67	93.76	0.67
145_(Ex-	94.39	93.91	0.48	93.95	0.44	93.97	0.42	93.97	0.42	93.97	0.42	93.98	0.41	93.98	0.41
140_(Ex-	94.26	93.28	0.98	93.42	0.84	93.49	0.77	93.58	0.68	93.65	0.61	93.73	0.53	93.73	0.53

ARCADIA ALL STAGES HGL ANALYSIS

MH ID	USF Elevation (m)	1:2 Year Event (12 hr SCS)		1:5 Year Event (12 hr SCS)		1:10 Year Event (12 hr SCS)		1:25 Year Event (12 hr SCS)		1:50 Year Event (12 hr SCS)		1:100 Year Event (12 hr SCS)		1:100 Year Event (24 hr SCS)	
		Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)
142_(Ex-	94.48	93.53	0.95	93.60	0.88	93.63	0.85	93.67	0.81	93.72	0.76	93.78	0.70	93.78	0.70
143_(Ex-	94.43	93.91	0.52	93.95	0.48	93.96	0.47	93.96	0.47	93.96	0.47	93.96	0.47	93.96	0.47
144_(Ex-	94.51	93.74	0.77	93.74	0.77	93.74	0.77	93.74	0.77	93.74	0.77	93.74	0.77	93.74	0.77
150_(Ex-	94.43	93.66	0.77	93.71	0.72	93.71	0.72	93.72	0.71	93.74	0.69	93.80	0.63	93.79	0.64
151_(Ex-	94.50	93.81	0.69	93.87	0.63	93.88	0.62	93.88	0.62	93.88	0.62	93.89	0.61	93.88	0.62
152_(Ex-	94.75	93.88	0.87	93.94	0.81	93.95	0.80	93.95	0.80	93.96	0.79	93.96	0.79	93.96	0.79
153_(Ex-	94.89	94.04	0.85	94.08	0.81	94.09	0.80	94.09	0.80	94.09	0.80	94.10	0.79	94.10	0.79
154_(Ex-	95.06	94.16	0.90	94.18	0.88	94.19	0.87	94.19	0.87	94.19	0.87	94.19	0.87	94.19	0.87
CAMPEAU_	-	93.21	-	93.33	-	93.42	-	93.51	-	93.56	-	93.65	-	93.62	-

TEXT	Stage 6
TEXT	Stage 4
TEXT	Stage3
TEXT	Stages 1 & 2

MH305	-	94.80	-	94.84	-	94.87	-	94.91	-	94.91	-	94.93	-	94.92	-
MH304	-	94.80	-	94.84	-	94.87	-	94.90	-	94.91	-	94.93	-	94.92	-
MH303C	-	94.63	-	94.66	-	94.68	-	94.73	-	94.77	-	94.83	-	94.81	-
MH303B	-	94.64	-	94.70	-	94.74	-	94.80	-	94.86	-	94.91	-	94.88	-
MH303	-	94.21	-	94.40	-	94.54	-	94.67	-	94.75	-	94.81	-	94.79	-
MH302	-	95.25	-	95.30	-	95.34	-	95.38	-	95.41	-	95.43	-	95.41	-
MH301	-	95.76	-	95.82	-	95.85	-	95.91	-	95.94	-	95.97	-	95.94	-
MH300	-	96.29	-	96.36	-	96.41	-	96.47	-	96.51	-	96.51	-	96.51	-
MH217	95.44	94.17	1.27	94.36	1.08	94.50	0.94	94.64	0.80	94.71	0.73	94.78	0.66	94.76	0.68
MH216	95.20	94.06	1.14	94.27	0.93	94.41	0.79	94.56	0.64	94.63	0.57	94.70	0.50	94.68	0.52
MH215	95.40	94.65	0.75	94.72	0.68	94.76	0.64	94.81	0.59	94.83	0.57	94.86	0.54	94.86	0.54
MH214	95.51	95.02	0.49	95.07	0.44	95.11	0.40	95.14	0.37	95.14	0.37	95.15	0.36	95.15	0.36
MH213	96.19	95.11	1.08	95.14	1.05	95.17	1.02	95.20	0.98	95.20	0.98	95.20	0.98	95.20	0.98
MH212	95.89	95.40	0.49	95.45	0.44	95.49	0.40	95.50	0.39	95.50	0.39	95.50	0.39	95.50	0.39
MH211	95.53	95.01	0.52	95.08	0.45	95.13	0.40	95.15	0.38	95.15	0.38	95.16	0.37	95.16	0.37
MH210	95.79	94.90	0.89	94.96	0.83	95.00	0.79	95.04	0.75	95.06	0.73	95.07	0.72	95.07	0.72
MH209	96.10	95.50	0.60	95.56	0.54	95.60	0.50	95.63	0.47	95.65	0.45	95.66	0.44	95.66	0.44
MH208	97.64	97.12	0.52	97.15	0.49	97.17	0.47	97.17	0.47	97.17	0.47	97.17	0.47	97.17	0.47
MH207	97.64	96.50	1.14	96.53	1.11	96.54	1.10	96.54	1.10	96.54	1.10	96.54	1.10	96.54	1.10
MH206	97.64	95.99	1.65	96.03	1.61	96.05	1.59	96.05	1.59	96.05	1.59	96.05	1.59	96.05	1.59
MH205	96.85	95.87	0.98	95.90	0.95	95.92	0.93	95.92	0.93	95.92	0.93	95.92	0.93	95.92	0.93
MH204	95.62	94.72	0.90	94.78	0.84	94.83	0.79	94.87	0.75	94.90	0.72	94.93	0.69	94.92	0.70
MH203	95.43	94.46	0.97	94.56	0.87	94.63	0.80	94.71	0.72	94.75	0.68	94.81	0.62	94.80	0.63
MH202	95.35	94.30	1.05	94.41	0.94	94.48	0.87	94.59	0.76	94.66	0.69	94.73	0.62	94.72	0.63
MH201	95.11	93.91	1.20	94.13	0.98	94.28	0.83	94.43	0.68	94.52	0.59	94.59	0.52	94.57	0.54
MH200	95.11	93.70	1.41	93.88	1.23	94.04	1.07	94.21	0.90	94.30	0.81	94.39	0.72	94.37	0.74
MH541	95.10	93.17	1.93	93.42	1.68	93.60	1.50	93.81	1.29	93.92	1.18	94.03	1.07	94.00	1.10
MH532	95.10	93.19	1.91	93.46	1.64	93.64	1.46	93.87	1.23	93.99	1.11	94.10	1.00	94.07	1.03
MH104	95.32	93.24	2.08	93.50	1.82	93.68	1.64	93.90	1.42	94.01	1.31	94.12	1.20	94.10	1.22
MH513	97.18	95.84	1.34	95.93	1.25	96.01	1.17	96.08	1.10	96.09	1.09	96.11	1.07	96.10	1.08
MH519	95.33	94.13	1.20	94.18	1.15	94.22	1.11	94.22	1.11	94.24	1.09	94.34	0.99	94.32	1.01
MH540	95.25	93.62	1.63	93.70	1.55	93.76	1.49	93.92	1.33	94.04	1.21	94.15	1.10	94.13	1.12
MH531	95.68	93.62	2.06	93.70	1.98	93.79	1.89	94.07	1.61	94.19	1.49	94.31	1.37	94.28	1.40
MH520	95.33	93.92	1.41	93.99	1.34	94.03	1.30	94.05	1.28	94.12	1.21	94.27	1.06	94.24	1.09
MH501	97.83	95.37	2.46	95.42	2.41	95.45	2.38	95.49	2.34	95.52	2.31	95.54	2.29	95.54	2.29
MH518	96.37	94.66	1.71	94.71	1.66	94.75	1.62	94.80	1.57	94.81	1.56	94.83	1.54	94.83	1.54
MH529	95.47	93.94	1.53	94.00	1.47	94.05	1.42	94.28	1.19	94.40	1.07	94.53	0.94	94.50	0.97
MH517	96.57	94.99	1.58	95.03	1.54	95.07	1.50	95.09	1.48	95.10	1.47	95.11	1.46	95.10	1.47
MH527	96.23	94.56	1.67	94.61	1.62	94.64	1.59	94.66	1.57	94.67	1.56	94.71	1.52	94.69	1.54
MH528	95.78	94.02	1.76	94.08	1.70	94.13	1.65	94.34	1.44	94.46	1.32	94.59	1.19	94.56	1.22
MH526	96.51	95.06	1.45	95.10	1.41	95.13	1.38	95.15	1.36	95.16	1.35	95.16	1.35	95.16	1.35
MH525	97.77	95.25	2.52	95.25	2.52	95.25	2.52	95.25	2.52	95.25	2.52	95.25	2.52	95.25	2.52
MH524	95.17	93.32	1.85	93.41	1.76	93.57	1.60	93.81	1.36	93.90	1.27	93.99	1.18	93.97	1.20
MH523	95.23	93.86	1.37	93.90	1.33	93.92	1.31	93.93	1.30	93.97	1.26	94.04	1.19	94.03	1.20
MH522	95.15	93.75	1.40	93.75	1.40	93.75	1.40	93.75	1.40	93.75	1.40	94.05	1.10	93.95	1.20
MH521	95.28	94.05	1.23	94.05	1.23	94.05	1.23	94.05	1.23	94.05	1.23	94.05	1.23	94.05	1.23
MH516	96.60	95.17	1.43	95.21	1.39	95.24	1.36	95.26	1.34	95.27	1.33	95.27	1.33	95.27	1.33
MH505	95.16	93.16	2.00	93.37	1.79	93.53	1.63	93.73	1.43	93.83	1.33	93.93	1.23	93.91	1.25
Ex._509	94.54	93.08	1.46	93.29	1.25	93.44	1.10	93.61	0.93	93.70	0.84	93.78	0.76	93.76	0.78
MH515	96.73	95.60	1.13	95.64	1.09	95.68	1.05	95.71	1.02	95.72	1.01	95.74	0.99	95.74	0.99
MH504	95.28	93.20	2.08	93.40	1.88	93.56	1.72	93.77	1.51	93.87	1.41	93.97	1.31	93.95	1.33
MH514	97.10	95.41	1.69	95.50	1.60	95.57	1.53	95.64	1.46	95.65	1.45	95.67	1.43	95.67	1.43
MH502	96.38	94.74	1.64	94.82	1.56	94.87	1.51	94.93	1.45	94.96	1.42	94.99	1.39	94.99	1.39
MH503	95.98	93.90	2.08	93.98	2.00	94.04	1.94	94.11	1.87	94.16	1.82	94.24	1.74	94.22	1.76
MH530	95.47	93.75	1.72	93.83	1.64	93.90	1.57	94.18	1.29	94.30	1.17	94.42	1.05	94.39	1.08
MH506	95.13	93.11	2.02	93.33	1.80	93.50	1.63	93.70	1.43	93.79	1.34	93.88	1.25	93.86	1.27

TEXT	Stage 6
TEXT	Stage 4
TEXT	Stage3
TEXT	Stages 1 & 2

ARCADIA ALL STAGES HGL ANALYSIS

MH ID	USF Elevation (m)	1:100 Year Event (3hr Chicago)		Climate Change Event (12 hr SCS)		Historical Storm July 1979		Historical Storm August 1988		Historical Storm August 1996	
		Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)
217	-	95.75	-	95.87	-	95.76	-	95.61	-	95.20	-
214A	-	95.75	-	95.87	-	95.76	-	95.61	-	95.20	-
214	95.37	94.94	0.43	95.08	0.29	94.90	0.47	94.90	0.47	94.80	0.57
216	-	95.73	-	95.85	-	95.74	-	95.59	-	95.21	-
213A	-	95.73	-	95.85	-	95.74	-	95.59	-	95.21	-
213	95.32	94.95	0.37	95.08	0.24	94.91	0.41	94.91	0.41	94.81	0.51
210	-	95.15	-	95.33	-	95.05	-	95.03	-	94.91	-
211	-	95.15	-	95.33	-	95.05	-	95.04	-	94.91	-
212	95.32	94.95	0.37	95.08	0.24	94.92	0.40	94.91	0.41	94.81	0.51
J_CBMH1	96.14	95.61	0.53	95.60	0.54	95.58	0.56	95.59	0.55	95.57	0.57
CBMH2	-	95.67	-	95.91	-	95.55	-	95.61	-	95.49	-
224	96.14	95.35	0.79	95.49	0.65	95.29	0.85	95.31	0.83	95.27	0.87
226	96.14	95.21	0.93	95.38	0.76	95.10	1.04	95.14	1.00	95.06	1.08
220	-	95.34	-	95.47	-	95.21	-	95.23	-	95.11	-
218	-	95.20	-	95.33	-	95.09	-	95.10	-	94.96	-
227	95.43	95.03	0.40	95.17	0.26	94.95	0.48	94.97	0.46	94.84	0.59
215	95.30	94.92	0.38	95.06	0.24	94.88	0.42	94.89	0.41	94.78	0.52
MHST77649	-	94.83	-	94.99	-	94.81	-	94.82	-	94.67	-
208	94.69	94.12	0.57	94.23	0.46	94.08	0.61	94.11	0.58	94.09	0.60
207	94.80	93.98	0.82	94.17	0.63	93.92	0.88	94.01	0.79	93.91	0.89
206	94.69	93.86	0.83	94.09	0.60	93.81	0.88	93.96	0.73	93.79	0.90
205	94.24	93.77	0.47	94.01	0.23	93.73	0.51	93.89	0.35	93.69	0.55
201	-	93.57	-	93.88	-	93.65	-	93.75	-	93.52	-
200A	-	93.51	-	93.88	-	93.63	-	93.65	-	93.51	-
200	-	93.51	-	93.88	-	93.62	-	93.60	-	93.51	-
ST6_CB102	-	96.33	-	96.36	-	95.86	-	96.20	-	95.69	-
J_CB103	94.69	94.44	0.25	94.44	0.25	94.42	0.27	94.43	0.26	94.42	0.27
204A	94.69	94.00	0.69	94.20	0.49	93.96	0.73	94.06	0.63	93.94	0.75
204	-	93.98	-	94.18	-	93.94	-	94.04	-	93.93	-
203	-	95.49	-	95.60	-	95.42	-	95.42	-	95.20	-
202	-	95.48	-	95.59	-	95.41	-	95.41	-	95.19	-
201A	-	95.45	-	95.56	-	95.38	-	95.38	-	95.16	-
CBMH3	-	95.56	-	95.69	-	95.48	-	95.49	-	95.22	-
202A	-	95.51	-	95.63	-	95.44	-	95.43	-	95.20	-
201A	-	95.45	-	95.56	-	95.38	-	95.38	-	95.16	-
CB108	-	94.99	-	95.05	-	94.88	-	94.91	-	94.77	-
CBMH4	94.24	93.51	0.73	93.89	0.35	93.64	0.60	93.66	0.58	93.51	0.73
Ex._508	94.73	93.62	1.11	93.96	0.77	93.79	0.94	93.83	0.90	93.51	1.22
116	94.12	93.63	0.49	93.89	0.23	93.77	0.35	93.80	0.32	93.49	0.63
173	94.17	93.47	0.70	93.76	0.41	93.62	0.55	93.64	0.53	93.44	0.73
120	93.90	93.43	0.47	93.76	0.14	93.58	0.32	93.59	0.31	93.41	0.49
171	93.98	93.43	0.55	93.76	0.22	93.58	0.40	93.59	0.39	93.44	0.54
121	93.89	93.40	0.49	93.76	0.13	93.55	0.34	93.56	0.33	93.40	0.49
122	93.84	93.38	0.46	93.76	0.08	93.51	0.33	93.51	0.33	93.39	0.45
192	95.08	93.69	1.39	94.01	1.07	93.85	1.23	93.89	1.19	93.56	1.52
193	94.86	93.63	1.23	93.95	0.91	93.80	1.06	93.83	1.03	93.53	1.33
194	94.74	93.61	1.13	93.93	0.81	93.78	0.96	93.82	0.92	93.52	1.22
191	95.05	93.70	1.35	94.02	1.03	93.86	1.19	93.90	1.15	93.57	1.48
Ex._509	94.54	93.60	0.94	93.93	0.61	93.77	0.77	93.81	0.73	93.50	1.04
Ex._510	94.14	93.53	0.61	93.85	0.29	93.70	0.44	93.74	0.40	93.48	0.66
127	94.16	93.56	0.60	93.84	0.32	93.73	0.43	93.75	0.41	93.48	0.68
128	94.07	93.56	0.51	93.84	0.23	93.73	0.34	93.75	0.32	93.48	0.59
124	93.88	93.39	0.49	93.76	0.12	93.56	0.32	93.57	0.31	93.40	0.48
123	93.88	93.39	0.49	93.76	0.12	93.56	0.32	93.57	0.31	93.40	0.48
160	94.09	93.51	0.58	93.76	0.33	93.65	0.44	93.66	0.43	93.45	0.64
172	94.54	93.48	1.06	93.76	0.78	93.59	0.95	93.60	0.94	93.47	1.07
118	94.01	93.49	0.52	93.76	0.25	93.64	0.37	93.65	0.36	93.44	0.57
119	94.01	93.46	0.55	93.76	0.25	93.62	0.39	93.63	0.38	93.43	0.58
161	94.63	94.17	0.46	94.17	0.46	94.17	0.46	94.17	0.46	94.17	0.46
162	94.79	94.17	0.62	94.17	0.62	94.16	0.63	94.16	0.63	94.15	0.64
180	94.02	93.43	0.59	93.76	0.26	93.61	0.41	93.63	0.39	93.43	0.59
PAINE_PON	-	93.38	-	93.76	-	93.47	-	93.44	-	93.39	-
104_(Ex-	-	93.52	-	93.89	-	93.65	-	93.72	-	93.52	-
103_(Ex-	-	93.52	-	93.89	-	93.63	-	93.60	-	93.51	-
100_(Ex-	-	93.51	-	93.88	-	93.61	-	93.58	-	93.51	-
101_(Ex-	-	93.52	-	93.88	-	93.63	-	93.60	-	93.51	-
102_(Ex-	94.21	93.52	0.69	93.88	0.33	93.64	0.57	93.64	0.57	93.51	0.70
113_(Ex-	94.21	93.52	0.69	93.89	0.32	93.64	0.57	93.64	0.57	93.51	0.70
114_(Ex-	94.21	93.52	0.69	93.89	0.32	93.64	0.57	93.65	0.56	93.51	0.70
115_(Ex-	94.24	93.52	0.72	93.89	0.35	93.65	0.59	93.68	0.56	93.51	0.73
130_(Ex-	94.25	93.53	0.72	93.89	0.36	93.68	0.57	93.68	0.57	93.52	0.73
130A_(Ex-	-	93.52	-	93.89	-	93.66	-	93.66	-	93.52	-
131_(Ex-	94.26	93.55	0.71	93.89	0.37	93.71	0.55	93.71	0.55	93.54	0.72
132_(Ex-	94.93	93.60	1.33	93.89	1.04	93.74	1.19	93.74	1.19	93.60	1.33
133_(Ex-	95.43	93.80	1.63	93.89	1.54	93.82	1.61	93.82	1.61	93.80	1.63
134_(Ex-	95.62	93.81	1.81	93.89	1.73	93.82	1.80	93.82	1.80	93.80	1.82
136_(Ex-	94.25	93.53	0.72	93.89	0.36	93.69	0.56	93.69	0.56	93.53	0.72
137_(Ex-	94.26	93.54	0.72	93.89	0.37	93.70	0.56	93.71	0.55	93.53	0.73
139_(Ex-	94.26	93.56	0.70	93.89	0.37	93.73	0.53	93.73	0.53	93.56	0.70
138_(Ex-	94.26	93.55	0.71	93.89	0.37	93.71	0.55	93.72	0.54	93.54	0.72
146_(Ex-	94.43	93.60	0.83	93.89	0.54	93.73	0.70	93.74	0.69	93.59	0.84
147_(Ex-	94.43	93.73	0.70	93.89	0.54	93.76	0.67	93.76	0.67	93.73	0.70
145_(Ex-	94.39	93.98	0.41	93.98	0.41	93.97	0.42	93.97	0.42	93.97	0.42
140_(Ex-	94.26	93.57	0.69	93.89	0.37	93.73	0.53	93.72	0.54	93.56	0.70

ARCADIA ALL STAGES HGL ANALYSIS

MH ID	USF Elevation (m)	1:100 Year Event (3hr Chicago)		Climate Change Event (12 hr SCS)		Historical Storm July 1979		Historical Storm August 1988		Historical Storm August 1996	
		Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)	Max HGL (m)	Freeboard (m)
142_(Ex-	94.48	93.67	0.81	93.89	0.59	93.78	0.70	93.78	0.70	93.63	0.85
143_(Ex-	94.43	93.96	0.47	93.97	0.46	93.96	0.47	93.96	0.47	93.96	0.47
144_(Ex-	94.51	93.74	0.77	93.74	0.77	93.74	0.77	93.74	0.77	93.74	0.77
150_(Ex-	94.43	93.72	0.71	93.89	0.54	93.80	0.63	93.79	0.64	93.71	0.72
151_(Ex-	94.50	93.89	0.61	93.93	0.57	93.89	0.61	93.88	0.62	93.88	0.62
152_(Ex-	94.75	93.96	0.79	93.98	0.77	93.96	0.79	93.95	0.80	93.95	0.80
153_(Ex-	94.89	94.10	0.79	94.10	0.79	94.09	0.80	94.09	0.80	94.09	0.80
154_(Ex-	95.06	94.19	0.87	94.19	0.87	94.19	0.87	94.19	0.87	94.19	0.87
CAMPEAU_	-	93.51	-	93.88	-	93.61	-	93.58	-	93.51	-
TEXT	Stage 6										
TEXT	Stage 4										
TEXT	Stage3										
TEXT	Stages 1 &										
MH305	-	94.93	-	94.99	-	94.91	-	94.91	-	94.88	-
MH304	-	94.92	-	94.99	-	94.91	-	94.90	-	94.88	-
MH303C	-	94.79	-	94.94	-	94.76	-	94.77	-	94.69	-
MH303B	-	94.87	-	95.02	-	94.85	-	94.86	-	94.76	-
MH303	-	94.76	-	94.94	-	94.74	-	94.75	-	94.57	-
MH302	-	95.42	-	95.48	-	95.41	-	95.41	-	95.35	-
MH301	-	95.95	-	96.01	-	95.95	-	95.95	-	95.87	-
MH300	-	96.51	-	96.51	-	96.47	-	96.51	-	96.42	-
MH217	95.44	94.72	0.72	94.90	0.54	94.70	0.74	94.72	0.72	94.53	0.91
MH216	95.20	94.64	0.56	94.83	0.37	94.62	0.58	94.65	0.55	94.44	0.76
MH215	95.40	94.85	0.55	94.93	0.47	94.82	0.58	94.84	0.56	94.78	0.62
MH214	95.51	95.15	0.36	95.17	0.34	95.14	0.37	95.15	0.36	95.12	0.39
MH213	96.19	95.21	0.98	95.22	0.97	95.20	0.98	95.20	0.98	95.19	1.00
MH212	95.89	95.50	0.39	95.50	0.39	95.50	0.39	95.50	0.39	95.50	0.39
MH211	95.53	95.16	0.37	95.17	0.36	95.15	0.38	95.16	0.37	95.14	0.39
MH210	95.79	95.07	0.72	95.11	0.68	95.04	0.75	95.06	0.73	95.01	0.78
MH209	96.10	95.66	0.44	95.68	0.42	95.63	0.47	95.66	0.44	95.61	0.49
MH208	97.64	97.17	0.47	97.17	0.47	97.17	0.47	97.17	0.47	97.17	0.47
MH207	97.64	96.55	1.09	96.55	1.09	96.54	1.10	96.54	1.10	96.54	1.10
MH206	97.64	96.05	1.59	96.05	1.59	96.05	1.59	96.05	1.59	96.05	1.59
MH205	96.85	95.92	0.93	95.92	0.93	95.92	0.93	95.92	0.93	95.92	0.93
MH204	95.62	94.91	0.71	94.99	0.63	94.88	0.74	94.90	0.72	94.84	0.78
MH203	95.43	94.77	0.66	94.90	0.53	94.73	0.70	94.77	0.66	94.65	0.78
MH202	95.35	94.67	0.68	94.83	0.52	94.63	0.72	94.68	0.67	94.50	0.85
MH201	95.11	94.51	0.60	94.72	0.39	94.51	0.60	94.54	0.57	94.31	0.80
MH200	95.11	94.27	0.84	94.53	0.58	94.31	0.80	94.35	0.76	94.05	1.06
MH541	95.10	93.83	1.27	94.20	0.90	93.97	1.13	94.02	1.08	93.59	1.51
MH532	95.10	93.90	1.20	94.27	0.83	94.03	1.07	94.08	1.02	93.62	1.48
MH104	95.32	93.93	1.39	94.30	1.02	94.05	1.27	94.11	1.21	93.66	1.66
MH513	97.18	96.12	1.06	96.12	1.06	96.08	1.10	96.09	1.09	96.07	1.11
MH519	95.33	94.23	1.10	94.52	0.81	94.26	1.07	94.32	1.01	94.22	1.11
MH540	95.25	93.95	1.30	94.34	0.91	94.07	1.18	94.14	1.11	93.78	1.47
MH531	95.68	94.12	1.56	94.50	1.18	94.21	1.47	94.26	1.42	93.82	1.86
MH520	95.33	94.08	1.25	94.44	0.89	94.17	1.16	94.25	1.08	94.04	1.29
MH501	97.83	95.54	2.29	95.54	2.29	95.50	2.33	95.50	2.33	95.46	2.37
MH518	96.37	94.83	1.54	94.86	1.51	94.80	1.57	94.82	1.55	94.78	1.59
MH529	95.47	94.37	1.10	94.74	0.73	94.43	1.04	94.45	1.02	94.08	1.39
MH517	96.57	95.11	1.46	95.12	1.45	95.10	1.47	95.10	1.47	95.09	1.48
MH527	96.23	94.67	1.56	94.95	1.28	94.66	1.57	94.66	1.57	94.66	1.57
MH528	95.78	94.43	1.35	94.80	0.98	94.49	1.29	94.50	1.28	94.16	1.62
MH526	96.51	95.16	1.35	95.16	1.35	95.15	1.36	95.15	1.36	95.15	1.36
MH525	97.77	95.25	2.52	95.25	2.52	95.25	2.52	95.25	2.52	95.25	2.52
MH524	95.17	93.80	1.37	94.17	1.00	93.95	1.22	94.00	1.17	93.58	1.59
MH523	95.23	93.93	1.30	94.23	1.00	94.01	1.22	94.05	1.18	93.93	1.30
MH522	95.15	93.75	1.40	94.23	0.92	93.77	1.38	94.05	1.10	93.75	1.40
MH521	95.28	94.05	1.23	94.37	0.91	94.05	1.23	94.05	1.23	94.05	1.23
MH516	96.60	95.28	1.32	95.28	1.32	95.26	1.34	95.27	1.33	95.26	1.34
MH505	95.16	93.73	1.43	94.08	1.08	93.89	1.27	93.94	1.22	93.56	1.60
Ex._509	94.54	93.60	0.94	93.93	0.61	93.77	0.77	93.81	0.73	93.50	1.04
MH515	96.73	95.76	0.97	95.77	0.96	95.72	1.01	95.72	1.01	95.71	1.02
MH504	95.28	93.76	1.52	94.13	1.15	93.92	1.36	93.98	1.30	93.58	1.70
MH514	97.10	95.68	1.42	95.71	1.39	95.64	1.46	95.66	1.44	95.61	1.49
MH502	96.38	94.99	1.39	94.99	1.39	94.94	1.44	94.94	1.44	94.90	1.48
MH503	95.98	94.16	1.82	94.45	1.53	94.17	1.81	94.21	1.77	94.07	1.91
MH530	95.47	94.25	1.22	94.62	0.85	94.32	1.15	94.36	1.11	93.93	1.54
MH506	95.13	93.69	1.44	94.03	1.10	93.85	1.28	93.90	1.23	93.54	1.59
TEXT	Stage 6										
TEXT	Stage 4										
TEXT	Stage3										
TEXT	Stages 1 &										

Appendix E4

Street Ponding Areas

STREET PONDING TABLE

Ponding Area ID	Top of Grate (m)	Maximum Static Depth (m)	1:2 year	1:5 year Depth	1:10 year		1:25 year		1:50 year		1:100 year		Climate Change		Lowest Opening Grade (m)
			Total Ponding Depth (m)	Total Ponding Depth (m)	Total Ponding Depth (m)	Max. HGL (m)	Total Ponding Depth (m)	Max. HGL (m)	Total Ponding Depth (m)	Max. HGL (m)	Total Ponding Depth (m)	Max. HGL (m)	Total Ponding Depth (m)	Max. HGL (m)	
1	97.1	0.30	0	0	0.02	97.12	0.08	97.18	0.14	97.24	0.2	97.30	0.23	97.33	98.10
2	96.9	0.30	0	0	0	-	0.04	96.94	0.07	96.97	0.09	96.99	0.19	97.09	97.40
4	96.9	0.10	0	0	0	-	0	-	0.00	-	0	-	0	-	97.08
6	96.8	0.10	0	0	0	-	0	-	0.00	-	0	-	0	-	96.99
8	96.7	0.19	0	0	0	-	0	-	0.00	-	0	-	0	-	96.86
9	96.2	0.20	0	0	0	-	0	-	0.00	-	0.05	96.25	0.1	96.30	96.70
11	96	0.15	0	0	0	-	0.06	96.06	0.08	96.08	0.1	96.10	0.14	96.14	96.65
12	95.6	0.22	0	0	0	-	0.02	95.62	0.05	95.65	0.07	95.67	0.11	95.71	96.20
3	96.87	0.23	0	0	0.06	96.93	0.1	96.97	0.13	97.00	0.16	97.03	0.2	97.07	97.26
30	97.04	0.23	0	0	0	-	0.04	97.08	0.07	97.11	0.1	97.14	0.15	97.19	97.48
28	96.97	0.30	0	0	0	-	0	-	0.00	-	0	-	0	-	97.32
27	96.88	0.29	0	0	0	-	0	-	0.00	-	0	-	0.06	96.94	97.24
26	96.87	0.20	0	0	0	-	0	-	0.00	-	0	-	0	-	97.12
24	96.67	0.30	0	0	0	-	0	-	0.00	-	0.05	96.72	0.1	96.77	97.12
23	96.57	0.13	0	0	0	-	0.04	96.61	0.08	96.65	0.11	96.68	0.15	96.72	96.86
5	96.77	0.16	0	0	0.05	96.82	0.09	96.86	0.12	96.89	0.15	96.92	0.2	96.97	97.08
29	96.92	0.25	0	0	0.06	96.98	0.11	97.03	0.14	97.06	0.16	97.08	0.21	97.13	97.24
7	96.67	0.17	0	0	0.05	96.72	0.1	96.77	0.13	96.80	0.16	96.83	0.2	96.87	96.99
25	96.83	0.24	0	0	0.05	96.88	0.1	96.93	0.13	96.96	0.16	96.99	0.21	97.04	97.12
22	95.9	0.25	0	0	0	-	0.05	95.95	0.07	95.97	0.1	96.00	0.14	96.04	96.2
16	95.7	0.20	0	0	0.07	95.77	0.15	95.85	0.22	95.92	0.24	95.94	0.26	95.96	96.02
15	95.6	0.22	0	0	0.04	95.64	0.09	95.69	0.12	95.72	0.17	95.77	0.25	95.85	96.2

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