Report
Project: 125506-6.4.3

PATHWAYS PHASE 3 - BLOCK 60 SERVICING BRIEF

Prepared for Leitrim South Holdings Inc.
by IBI GROUP

August 2021

Table of Contents

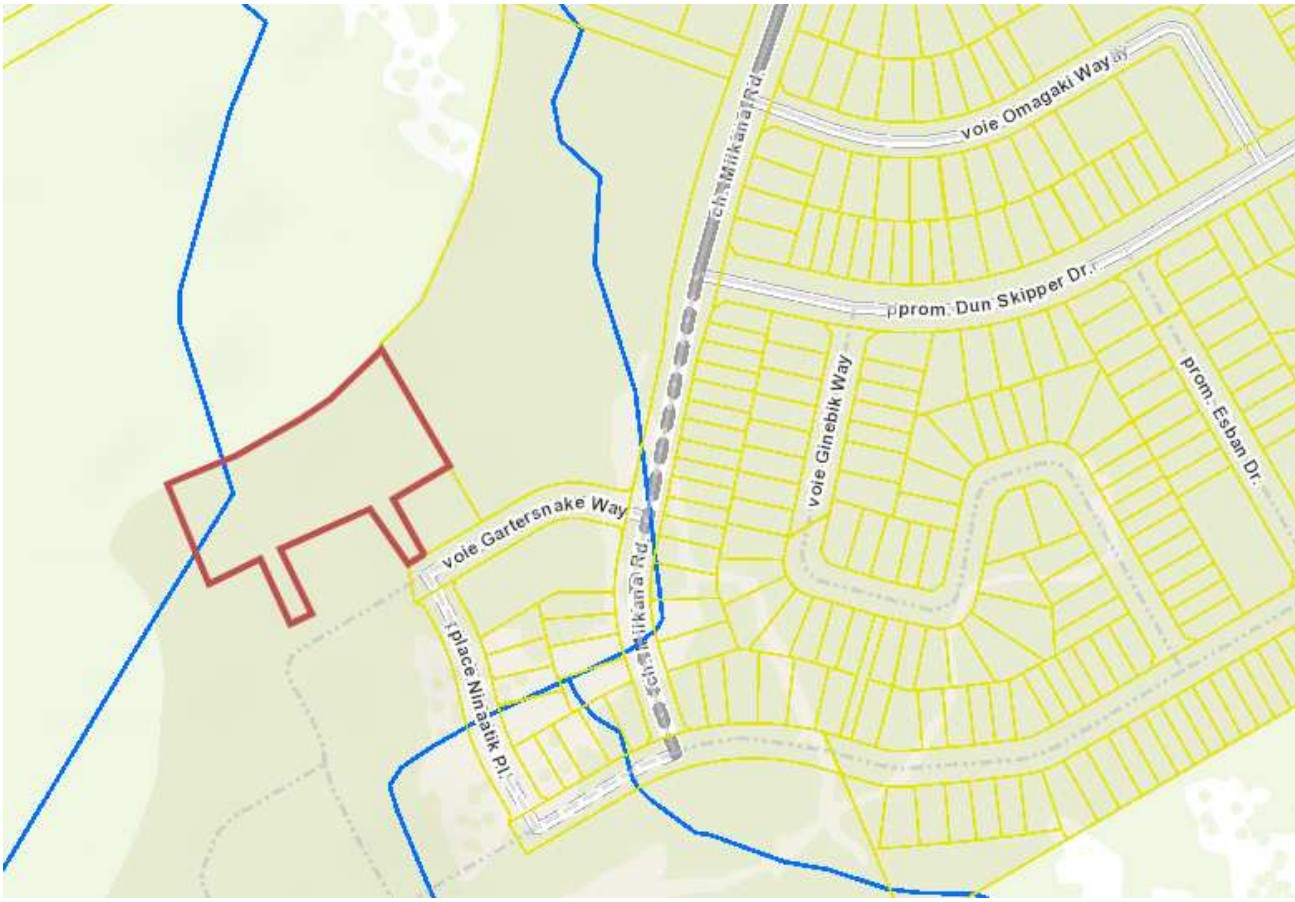
List of Appendices

1 INTRODUCTION

Pathways Block 60 is located in the southern portion of the Leitrim Development Area (LDA) and is part of the Pathways at the Findlay Creek subdivision. IBI Group Professional Services Inc. (IBI Group) has been retained to provide professional engineering services for Block 60. The subject site is approximately 0.9 ha and consists of 26 townhouse units. The site consists of freehold frontage onto a 6.7m wide private street. There will be a common elements agreement in place for the shared elements of the site.

Block 60 is bounded by natural environmental area to the North and West, Gartersnake Way and Future Pathways Phase 3 lands to the south, and a future municipal Park, Miikana Road and future Pathways Phase 2 lands to the east. Refer to key plan on **Figure 1.1** for block location.

Figure 1.1 Site Location



The proposed servicing design conforms to current City of Ottawa and MECP design criteria, and no pre-consultation meetings were requested from the Rideau Valley Conservation Authority (RVCA) or the Ontario Ministry of Environment, Conservation and Parks (MECP).

Report updated

Repeat Comment: This isn't RVCA's district so you wouldn't receive anything from them.

1.1 Guidelines and Standards

This evaluation takes into consideration the City of Ottawa Sewer Design Guidelines (OSDG) (October 2012), and the February 2014 Technical Bulletin ISDTB-2014-01, the September 2016 Technical Bulletin PIEDTB-2016-01, the June 2018 Technical Bulletin ISTB-2018-04, October 2019 Technical Bulletin 2019-01, and the July Technical Bulletin 2019-02.

It also considers the City of Ottawa Water Distribution Design Guidelines (OWDDG), and the 2010 Technical Bulletin 2010-02, the 2014 Technical Bulletin 2014-02, and the 2018 Technical Bulleting 2018-02.

All specifications are as per current City of Ottawa standards and specifications, and Province of Ontario (OPSS/D) standards, specifications and drawings.

1.2 Pre-Consultation Meeting

The City of Ottawa hosted a virtual pre-consultation meeting on August 11th, 2020. Notes of the meeting are provided in **Appendix A**. There were no major engineering concerns flagged in this meeting. The City of Ottawa Servicing Study Checklist has also been included in **Appendix A**.

1.3 Environmental Issues

There are no environmental issues related to this site, as all environmental concerns were dealt with as part of the applicants Pathways Phase 2 & 3 subdivision approval.

There are no existing watercourses or drainage features associated with this site, however the site is immediately adjacent to the Leitrim Natural Environment Area.

1.4 Geotechnical Concerns

Golder was retained by Leitrim South Holdings Inc. to review the grading plan to ensure that the recommendations with its original report for the subject area. There were no particular design concerns for this development, although bedrock was noted at shallow depths.

2 WATER DISTRIBUTION

2.1 Existing Conditions

There is an existing 250mm watermain in Gartersnake Way in Pathways Phase 2 to the south of the site, which is proposed to continue west on Gartersnake Way in Pathways Phase 3 to the south west of the site. The proposed development was considered in the water model for the Pathways Phase 2 and 3 development.

2.2 Design Criteria

2.2.1 Water Demands

Block 60 consists of 26 townhouse units. Per unit population density and consumption rates are taken from **Tables 4.1** and **4.2** of the Ottawa Design Guidelines – Water Distribution and are summarized as follows:

- Semi Detach/Townhouse 2.7 person per unit
- Average Day Demand 350 l/cap/day
- Peak Daily Demand 875 l/cap/day
- Peak Hour Demand 1,925 l/cap/day

A water demand calculation sheet is included in **Appendix B** and the total water demands are summarized as follows:

- Average Day 0.28 l/s
- Maximum Day 0.71 l/s
- Peak Hour 1.56 l/s

2.2.2 System Pressures

The 2010 City of Ottawa Water Distribution Guidelines states that the preferred practice for design of a new distribution system is to have normal operating pressures range between 345 kPa (50 psi) and 552 kPa (80 psi) under maximum daily flow conditions. Other pressure criteria identified in the guidelines are as follows:

Minimum Pressure	Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi).
Fire Flow	During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event.
Maximum Pressure	Maximum pressure at any point in the distribution system in unoccupied areas shall not exceed 689 kPa (100 psi). In accordance with the Ontario Building/Plumbing Code the maximum pressure should not exceed 552 kPa (80 psi) in occupied areas. Pressure reduction controls may be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa.

2.2.3 Fire Flow Rate

A Fire Underwriters Survey has been carried out on a representative block to determine the fire flow for the site. The calculations result in a fire flow of 9,000 l/min; a copy of the FUS calculation is included in **Appendix B**.

2.2.4 Boundary Conditions

The City of Ottawa has provided hydraulic boundary conditions two locations in Pathways Phase 2. The City has provided existing condition and SUC Zone reconfiguration boundary conditions. The existing condition has the highest maximum HGL value and is used in the analysis to determine maximum pressure while the SUC Zone reconfiguration value has the lower values for peak hour and fire and is used in the analysis. A copy of the Boundary Condition is included in **Appendix B** and summarized as follows:

CRITERIA	HYDRAULIC HEAD	
	CONNECTION 1 Miikana @ Dun Skipper	CONNECTION 2 Dun Skipper @ Esban
Max HGL (Basic Day)	155.9 m	155.9 m
Peak Hour	143.7 m	143.7 m
Max Day + Fire (9,000 l/m)	136.6 m	136.9 m

2.2.5 Hydraulic Model

A computer model for the Block 60 water distribution system has been developed using the InfoWater SA program. The model includes the boundary conditions provided by the City of Ottawa and a portion of Pathways Phase 2 and 3 and Pathways South Phase 2 watermains.

2.3 Proposed Water Plan

2.3.1 Hydraulic Analysis

The hydraulic model was run under basic day conditions with the existing boundary condition to determine the maximum pressure for the site. The minimum pressure for the site is determined in the peak hour analysis using the SUC Zone reconfiguration boundary condition. There are two fire hydrants in the site and they are represented by nodes B1 and B2 in the model; the model was run under the max day plus fire (9,000 l/min) SUC Zone Reconfiguration Boundary condition to determine the design fire flow at the hydrant locations. Results of the analysis for the Block 60 site are summarized in Section 2.3.2 and the water model schematic and model results are included in **Appendix B**.

2.3.2 Summary of Results

Results of the hydraulic analysis for Block 60 are summarized as follows:

Pressures (kPa)
- Basic Day (Max HGL) 576.2 – 579.1
- Peak Hour 456.2 – 459.2

Residual Pressure @ 9,000 l/min. Fire Flow (kPa) 306.1 – 309.3

A comparison of the results and design criteria is summarized as follows:

Maximum Pressure	All nodes have basic day pressure above 552 kPa for existing conditions; therefore, pressure reducing control is required for this site.
Minimum Pressure	All nodes exceed the minimum requirement of 276 kPa during peak hour conditions for the SUC Zone configuration.
Fire Flow	The model was run with a fire flow of 9,000 l/min under the SUC Zone Reconfiguration. The residual pressures at both nodes exceed the minimum requirement of 276 kPa.

3 WASTEWATER

3.1 Existing Conditions

The Leitrim Pump Station is the wastewater outlet for all developed lands within the LDA, including the subject property. In 2002, the City constructed the station, associated forcemains and outlet sewers in Bank Street and Conroy Road. Sewage from the LDA outlets to the Conroy Road Trunk Sewer eventually discharging to a sewage treatment plant located near the Ottawa River. The Pathways Phase 1 report prepared by IBI Group dated July 2017 confirmed that the existing 375mm sewer in Kelly Farm Drive has sufficient capacity for the Pathways at Findlay Creek property inclusive of the proposed development.

3.1.1 Verification of Existing Sanitary Sewer Capacity

There is an existing 200mm sanitary sewer in Gartersnake Way, which connects to the existing sanitary sewer in Miikana Road, then to the 375 mm diameter sub-trunk sewer in Kelly Farm Drive. In the previous Pathways Phase 2 report, the design for Block 60 was for 22 townhouses, with an allocated population of 59.4 people, a site area of 0.93 and a total flow of 1.01 L/s, see **Appendix B** for excerpts from the Phase 2 report.

For the subject development, the total proposed population is 70.2, area 0.96Ha and a total flow of 1.14L/s. This represents a total peaking flow increase of **0.13L/s** when compared to the Phase 2 allocation. Upon reviewing the proposed and existing sewers from the subject site to the Pathways Phase 1 connection at Miikana and Kelly Farm Drive, all sewers have a residual theoretical design capacity greater than the increase in flow resulting for the 4 additional units in this development. The increase in flow on the existing system is considered negligible, and the subject development will have no negative impacts on downstream infrastructure.

3.2 Proposed Sewers

All on-site sewers have been designed to City of Ottawa and MOE design criteria which include but are not limited to the below listed criteria. A copy of the detailed sanitary tributary area plan 400 and the sanitary sewer design sheets are included in **Appendix B** illustrate the population densities and sewers which provide the necessary outlets.

3.2.1 Design Flow:

Average Residential Flow	-	280 l/cap/day
Peak Residential Factor	-	Harmon Formula
Infiltration Allowance	-	0.33 l/sec/Ha
Minimum Pipe Size	-	200mm diameter

3.2.2 Population Density:

Semi-Detatched & Townhouse	-	2.7 person/unit

4 SITE STORMWATER MANAGEMENT

4.1 Objective

The purpose of this evaluation is to prepare the dual drainage design, including the minor and major system, for the Block 60 development. The design includes the assignment of inlet control devices, on-site storage, maximum depth of surface ponding and hydraulic grade line analysis. The evaluation takes into consideration the City of Ottawa Sewer Design Guidelines (OSDG) (October 2012), the February 2014 Technical Bulletin ISDTB-2014-01, the September 2016 Technical Bulletin PIEDTB-2016-01 and the June 2018 Technical Bulletin ISTB-2018-04.

4.2 Existing Conditions

The subject development is tributary to the Miikana Road storm sewer, which was approved for construction for the Pathways Phase 2 development. Subsequent to the approval of Phase 2, the stormwater management analysis for Pathways Phase 3 included an updated to the subject sites tributary allocation into the Miikana Road storm sewer. As part of that approval, a 600mm diameter storm sewer was approved for the subject block. The subject block is referenced as “EXT 5”, or BLK 6018 in the Pathways Phase 2 & 3 design. A copy of the design sheet, and approved drainage area plan for Phase 3 have been included in **Appendix D**.

Additionally, the Pathways Phase 3 stormwater management identified a minor system restriction for this site to be the 5 year modelled flow of **187 l/s**. An excerpt from the Phase 3 report has been included in **Appendix D.**

4.3 Design Criteria

The stormwater system was designed following the principles of dual drainage, making accommodations for both major and minor flow.

Some of the key criteria include the following:

- Design Storm — 1:2 year return (Ottawa)

  (It should be noted that the overall Pathways Site utilized 1:5 year return storm for minor system release from the subject site, further details are provided in Section 4.4 and 4.5.2)
- Rational Method Sewer Sizing
- Initial Time of Concentration — 10 minutes
- Runoff Coefficients
  - Front Yards — C = 0.57
  - Rear Yards — C = 0.76
- Pipe Velocities — 0.80 m/s to 3.0 m/s
- Minimum Pipe Size — 250 mm diameter (200 mm CB Leads)

A sample calculation of run-off coefficients has been provided in Appendix D. The runoff coefficients used are based on the actual footprint in the site plan. Zoning setbacks do not apply to the site plan. The values calculated are lower than the values used, thus a conservative approach has been provided in this analysis.

4.4 System Concept

According to the Pathways Phase 3 report prepared by IBI Group dated July 2017, the development of the adjacent downstream properties included the expected stormwater servicing needs of the subject property. The existing storm sewers constructed adjacent to the site were oversized to provide the needed capacity for minor storm runoff from the subject site. Minor storm runoff from the subject site will connect to the existing 600 mmØ sewer stub that connects to the existing 900mmØ trunk storm sewer in Gartersnake Way.

4.4.1 Dual Drainage Design

The dual drainage system proposed for the subject site will accommodate both major and minor stormwater runoff. Minor flow from the subject site will be conveyed through the storm sewer network and discharge into the existing 600 mmØ sewer stub that connects to the existing 900mm ø trunk storm sewer in Gartersnake Way.

The balance of the surface flow not captured by the minor system will be conveyed via the major system. Where possible, storage will be provided in surface sags or low points within the roadway. Storage will also be provided within oversized storm pipes. Once the maximum storage is utilized, the excess flow will cascade to the next downstream street sag. Major flow from street segments up to 100-year storm event will be restricted and detained on-site, major flow above and beyond the 5 year event from the two rear yard segments will be overflow to the NEA to the north once on-site surface ponds have reach capacity.

The existing Pathways Phase 2 and 3 modelling identified major overland flow being directed from Block 60 out to Gartersnake Way via the eastern private entrance road. However, based on the proposed grades from Phase 2/3, overflow to the public street is not possible, rather the emergency overland flow route established in Phase 2/3 is easterly, towards the future park lands. Given the 100 year retention within the proposed site plan, overflow is limited to events greater than the 100year storm, or for situations where the outlet has not been maintained (blockages). Therefore, there are no negative impacts on the existing drainage for these rear yards.

4.4.2 Proposed Minor System

Using the criteria identified in Section 4.3, the proposed on-site storm sewers were sized accordingly. A detailed storm sewer design sheet and the associated storm sewer drainage area plan is included in **Appendix C**. The general plan of services, depicting all on-site storm sewers can be found in **Appendix A**.

The owner of the site will be responsible for regular maintenance of the on-site sewers, catch basins and inlet control devices (ICDs). Maintenance includes but is not limited to the cost of regular cleaning of the structures and ICDs as necessary. The site owner will also be responsible for replacement of damaged or missing catch basin structures, grates or ICDs as needed.

4.5 Stormwater Management

4.5.1 Water Quality Control

The subject site is part of the larger development referred to as the Leitrim Development Area. The stormwater management strategy was outlined in the following reports:

- Addendum to Leitrim Development Area Stormwater Management Environmental Study Report and Pre-Design Volumes 1 and II (IBI Group, July 2005);
- Design Brief and Amendment to MOE Certificate of Approval Findlay Creek Village Stormwater Facility (IBI Group, July 2005);

- Final Serviceability Report Leitrim Development Area City of Ottawa (IBI Group, March 2007).
- 2016 Final Updated Serviceability Report (Class EA OPA76 Areas 8a, 9a and 9b) Leitrim Development Area (IBI Group, September 2016)

The subject site is part of the drainage area which ultimately discharges into the existing Findlay Creek Village Stormwater Facility. The Findlay Creek Village Stormwater Facility was constructed in 2006 and provides water quality control to an Enhanced Level of Protection according to MOE Stormwater Management Planning and Design Guidelines (March 2003).

4.5.2 Water Quantity Control

The subject site will be limited to a maximum minor system release rate of **187 L/s** based on the Pathways Phase 3 Servicing Brief, reference information is provided within **Appendix D**. This will be achieved through a combination of inlet control devices (ICD's) at inlet locations, surface storage where possible and underground storage in oversized storm pipes where required.

There are 2 small locations where water is left to discharge uncontrolled from the subject property. The uncontrolled release can be calculated as follows;

Uncontrolled Release, where $Q_{uncontrolled} = 2.78(C \times i100_{yr} \times A_{uncontrolled})$

C	=Runoff Coefficient	=0.25
Tc	=Time of Concentration	=10min
$i100_{yr}$	=100yr intensity $(1735.688 / (Tc + 6.014)^{0.820}$	=178.56
A_{unc}	=Area uncontrolled	=0.023Ha
$Q_{uncontrolled}$		**=2.85 L/s**

The Maximuma allowable release rate from the site can be determined by subtracting the Uncontrolled release rate from the minor system restricted flow rate.

$Q_{max} = Q_{restricted} - Q_{uncontrolled}$

Q_{max} = 187 L/s – 1.86L/s

Q_{max} = 184.15 L/s

Surface flows in excess of the site's allowable release rate will be stored on site in strategic surface storage areas or oversized underground pipes and gradually released into the minor system to respect the site's allowable release rate. The maximum surface retention depth located within the developed areas will be limited to 300mm during a 1:100 year event as show on the ponding plan located in **Appendix C** and grading plans located in **Appendix D.** Overland flow routes will be provided in the grading to permit emergency overland flow.

The modified rational method was used to evaluate the on-site stormwater management. There are no uncontrolled, or unrestricted areas on this site, as would commonly be found on most medium density development blocks. Therefore, the total restricted flow rate through the minor system will be the design flow rate of **184.15 l/s**. This will be achieved by the used of Inlet Control Devices (ICD's) placed in all on-site catchbasins. A summary of the ICD's, their corresponding storage requirements, storage availability, and associated drainage areas has been provided below.

DRAINAGE AREA	ICD RESTRICTED FLOW (L/s)	100 YEAR STORAGE REQUIRED (m^3)	SURFACE STORAGE PROVIDED (m^3)	100yr OVERFLOW
R3	35	19.39	8.25	11.11
R4	35	15.33	38.70	0.00
S2	90	39.37	21.44	17.93

S5	24	39.59	57.78**	0.00
TOTAL	**184**	**113.68**	**126.17****	**0**

*Overflow only during major storm events, directed to NEA with no negative impact on downstream storm sewer system
**Area S5 storage provided includes 30.72m3 of surface storage and 27.06m3 of underground storage which is provided by a pre-manufactured storage system, Stormtech SC-310 or an approved equivalent.

4.5.3 2 Year Ponding

A review of the 2 year ponding has been completed using the modified rational method. A minimum Tc of 10min has been used. Where volumes are calculated as a negative value, 0.0m3 has been shown. A summary of each drainage area has been provided below.

DRAINAGE AREA	Total 2-Year Ponding Volume (m3)	Comment
R3	0.0	-
R4	0.0	-
S2	0.0	-
S5	6.43	This area is controlled at MH6, and there is 27.06m3 of sub-surface storage provided in this area. The required ponding is provided underground, not on the street. A 50% reduction to the release rate was considered for this area.

Based on the above, there will be no surface ponding in the 2 year event.

4.5.4 100 year + 20% Stress Test

A cursory review of the 100yr event + 20% has been performed using the modified rational method. The Peak flow from each area during a 100year event has been increased by 20%. The calculations have been included in **Appendix B.**

A summary of the require storage volumes, and overflow balances is provided below.

DRAINAGE AREA	ICD RESTRICTED FLOW (L/s)	100yr20 STORAGE REQUIRED (m^3)	SURFACE STORAGE PROVIDED (m^3)	100yr20 OVERFLOW
R3	35	27.01	8.25	18.76*
R4	35	22.18	38.70	2.24
S2	90	58.05	21.44	36.61*
S5	24	51.11	57.78**	57.00
TOTAL	**184**	**158.35**	**126.17****	**114.61**

*Overflow from R3 to R4, and from S2 to S5.
**Storage provided in R4 and S5 reduces the total overflow.

As noted above, the overland flow from the rear yards (R3 & R4) is directed to the NEA lands to the north. The volume of overflow is 4.65m3. Based on a Tc of 9minutes, this volume can be reverse calculated to 8.6 L/s. Given that the spill elevation is flat for this rear yard, it has infinite capacity to convey. The flow rate is negligible.

The stress test overflow from S5 will follow the intended overflow route as identified in the Phase 2 and Phase 3 grading design drawings. The volume of overflow is 57.00m3. Based on the Tc of 25minutes, this volume can be reverse calculated to 38.00 L/s.

Based on the spill point cross section, at the limit of the private road boulevard, a simple v

channel with side slopes of 2.0%, and a grade of 0.1% can convey 38.26 L/s @ a depth of 0.08m, therefore, the 100year +20% overflow of 38.0 L/s will have a maximum depth of 0.08m.

4.6 Storm Hydraulic Grade Line

The Pathways Phase 2 report indicates that the 100 year hydraulic grade line (HGL) in Bulkhead 6018N **93.68**, refer to **Appendix D** for the excerpt from the Pathways Phase 2 HGL analysis. The HGL has been extended through the subject site have been calculated as follows:

LOCATION	MH #	USF ELEV (M)	STORM HGL (M)	FREEBOARD (M)
Gartersnake	BLK6018N	-	93.450	-
Block 5	MH 5	94.32	93.680	0.640
Block 4	MH 4	94.64	93.749	0.891
Block 3	MH 3	94.49	93.883	0.607
Block 2	MH 2	94.79	94.284	0.506
Block 1	MH 1	95.43	94.284	1.146

All underside of footing elevations have been designed to provide a minimum of 300mm separation between the greater of governing pipe obvert or governing HGL. A copy of the storm HGL analysis for Block 60 is provided in **Appendix D**.

5 SOURCE CONTROLS

5.1 General

On site level or source control management of runoff will be provided to provide quality control for the subject lands. Such controls or mitigative measures are proposed for the development not only for final development but also during construction and build out. Some of these measures are:

- flat lot grading;
- split lot drainage;
- Roof-leaders to vegetated areas;
- vegetation planting; and
- groundwater recharge.

5.2 Lot Grading

There is an elevation difference of approximately 2m from southwest to northeast in Block 60. In accordance with local municipal standards, the parking lots will be graded northeast between 1.5% and 5.0%. Most landscaped area drainage will be directed into a swale drainage system, and connects to the storm sewer system. Typically swales will have slopes larger than 1.5% with subdrains. Copies of the grading plans have been included in **Appendix D.**

5.3 Roof Leaders

This development will consist of stacked homes and apartments. It is proposed that roof leaders from these units be constructed such that runoff is directed to grass areas adjacent to the units. This will promote water quality treatment through settling, absorption, filtration and infiltration and a slow release rate to the conveyance network.

5.4 Vegetation

As with most subdivision agreements, the developer will be required to complete a vegetation and planting program. Vegetation throughout the development including planting along roadsides and within public parks provides opportunities to re-create lost natural habitat.

6 CONVEYANCE CONTROLS

6.1 General

Besides source controls, the development also proposes to use several conveyance control measures to improve runoff quality. These will include:

- flat vegetated swales;
- catchbasin and maintenance hole sumps; and
- pervious rear yard drainage.

6.2 Flat Vegetated Swales

The development will make use of relatively flat vegetated swales where possible to encourage infiltration and runoff treatment.

6.3 Catchbasins

All catchbasins within the development, either rear yard or street, will be constructed with minimum 600 mm deep sumps. These sumps trap pollutants, sand, grit and debris which can be mechanically removed prior to being flushed into the minor pipe system. Both rear yard and street catchbasins will be fabricated to OPSD 705.010 or 705.020. All storm sewer maintenance holes servicing local sewers less than 900 mm diameter shall be constructed with a 300 mm sump as per City standards.

6.4 Pervious Landscaped Area Drainage

Some of the landscaped area swales make use of a filter wrapped perforated drainage pipe constructed below the rear yard swale. This perforated system is designed to provide some ground water recharge and generally reduce both volumetric and pollutant loadings that enter the minor pipe system.

7 SEDIMENT AND EROSION CONTROL PLAN

7.1 General

During construction, existing stream and conveyance systems can be exposed to significant sediment loadings. Although construction is only a temporary situation, it is proposed to introduce a number of mitigative construction techniques to reduce unnecessary construction sediment loadings. These will include:

- groundwater in trench will be pumped into a filter mechanism prior to release to the environment;
- bulkhead barriers will be installed at the nearest downstream manhole in each sewer which connects to an existing downstream sewer;
- seepage barriers will be constructed in any temporary drainage ditches; and
- silt sacks will remain on open surface structure such as manholes and catchbasins until these structures are commissioned and put into use.

7.2 Trench Dewatering

During construction of municipal services, any trench dewatering using pumps will be discharged into a filter trap made up of geotextile filters and straw bales similar in design to the OPSD 219.240 Dewatering Trap. These will be constructed in a bowl shape with the fabric forming the bottom and the straw bales forming the sides. Any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filters as needed including sediment removal and disposal and material replacement as needed.

7.3 Bulkhead Barriers

At the first manhole constructed immediately upstream of an existing sewer, a ½ diameter bulkhead will be constructed over the lower half of the outletting sewer. This bulkhead will trap any sediment carrying flows, thus preventing any construction –related contamination of existing sewers. The bulkheads will be inspected and maintained including periodic sediment removal as needed.

7.4 Seepage Barriers

These barriers will consist of both the Light Duty Straw Bale Barrier as per OPSD 219.100 or the Light Duty Silt Fence Barrier as per OPSD 219.110 and will be installed in accordance with the sediment and erosion control drawing. The barriers are typically made of layers of straw bales or geotextile fabric staked in place. All seepage barriers will be inspected and maintained as needed.

7.5 Surface Structure Filters

All catchbasins, and to a lesser degree manholes, convey surface water to sewers. However, until the surrounding surface has been completed these structures will be covered to prevent sediment from entering the minor storm sewer system. Until rear yards are sodded or until streets are asphalted and curbed, all catchbasins and manholes will be equipped with geotextile filter socks. These will stay in place and be maintained during construction and build until it is appropriate to remove them.

7.6 Stockpile Management

During construction of any development similar to that being proposed both imported and native soils are stockpiled. Mitigative measures and proper management to prevent these materials entering the sewer systems is needed.

During construction of the deeper municipal services, water, sewers and service connections, imported granular bedding materials are temporarily stockpiled on site. These materials are however quickly used up and generally before any catchbasins are installed. Street catchbasins are installed at the time of roadway construction and rearyard catchbasins are usually installed after base course asphalt is placed.

Contamination of the environment as a result of stockpiling of imported construction materials is generally not a concern since these materials are quickly used and the mitigative measures stated previously, especially the use of filter fabric in catchbasins and manholes help to manage these concerns.

The roadway granular materials are not stockpiled on site. They are immediately placed in the roadway and have little opportunity of contamination. Lot grading sometimes generates stockpiles of native materials. However, this is only a temporary event since the materials are quickly moved off site.

The construction of this development will involve a substantial rock blasting, breaking and crushing operation. Given the existing topography, a substantial cut and fill operation is required in order to construction a development that meets City Standards. As part of this operation, materials will be manipulated onsite, and provided the sediment and erosion control measures are in place, are generally inconsequential to the surrounding environment.

8 ROADS AND NOISE ATTENUATION

Vehicular access to Block 60 is provided by two private entrances from Gartersnake Way.

There are no sidewalks or pathways proposed within the development. Pedestrian access to the site will be via the private roadway.

The site has been designed in order to provide curbside municipal waste disposal.

There are no bus routes proposed within Block 60.

There are no collector streets or nearby noise sources that would trigger an environmental noise assessment.

8.1 Aircraft Sound Levels

As stated in Section 2.1, the site is within the Airport Vicinity Development Zone (AVDZ), the limit of the AVCZ is shown on Figure 2. The site however is outside of the 25 NEF/NEP contour line so the building components and ventilation requirements of Part 6 Prescribed Measures for Aircraft Noise of the Guidelines do not apply. A warning clause is required for the residential units inside the AVDZ.

Warning clause for aircraft noise is as follows:

“Purchasers/tenants are advised that due to the proximity of the airport, noise from the airport and individual aircraft may at times interfere with outdoor or indoor activities”.

9 SOILS

Golder Associates Ltd. was retained to prepare a geotechnical investigation for the proposed mixed use development for the Pathways Phase 2& 3. The objectives of the investigation were to prepare a report to:

- Determine the subsoil and groundwater conditions at the site by means of test pits and boreholes and;
- To provide geotechnical recommendations pertaining to design of the proposed development including construction considerations.

The geotechnical report 20142688-1148-001 was prepared by Golder Associates Ltd. in January 2021. The report contains recommendations which include but are not limited to the following:

- The maximum permissible grade raise is 4.0m
- In areas where finished grade exceeds grade raise limits, geotechnical reviews are required
- Fill placed below the foundations to meet OPSS Granular 'A' or Granular 'B' Type II placed in 300 mm lifts compacted to 98% SPMDD.
- Fill for roads to be suitable native material in 300mm lifts compared to 95% SPMDD

Pavement Structure:

LOCAL ROAD	THICKNESS
Asphaltic Concrete	90mm
OPSS Granular A Base	150mm
OPSS Granular B Type II Subbase	400mm

- Pipe bedding and cover; bedding to be minimum 150 mm OPSS Granular 'A' up to spring line of pipe. Cover to be 300 mm OPSS A (PUC and concrete pipes) or sand for concrete pipes. Both bedding and cover to be placed in maximum 225 mm lifts compacted to 95% SPMDD.

In general the grading plan for Block 60 adheres to the grade raise constraints noted above. A copy of the grading plans is included in **Appendix E**. The site does not pose any significant grade raise; thus a grading plan review letter is not required for this development.

10 RECOMMENDATIONS

Water, wastewater and stormwater systems required to develop Pathways Block 60 will be designed in accordance with MOE and City of Ottawa's current level of service requirements.

The use of lot level controls, conveyance controls and end of pipe controls outlined in the report will result in effective treatment of surface stormwater runoff from the site. Adherence to the proposed sediment and erosion control plan during construction will minimize harmful impacts on surface water.

Final detail design will be subject to governmental approval prior to construction, including but not limited to the following:

- Block 60 Commence Work Order: City of Ottawa
- ECA for Sewage Works: MOECP Transfer of Review by City of Ottawa
- Block 60 Watermain Approval: City of Ottawa
- Block 60 Commence Work Order (utilities): City of Ottawa

Report prepared by:

Demetrius Yannoulopoulos, P.Eng.
Director

Ryan Magladry, C.E.T.
Project Manager

J:\125506_PathwaysBk60\6.0_Technical\6.04_Civil\03_Tech-Reports\Submission #1\CTR-Servicing Brief_2021-05.docx

APPENDIX A

AOV Plan of Subdivision for the Pathways at the Findlay Creek
Site Plan for Pathways Block 60
125506-001 - General Plan of Services

CURVE SCHEDULE

NUM.	LOCATION	RADIUS	ARC	CHORD	BEARING
C1	Block 7 / 9	58.00	17.14	17.08	N 22°33'50" W
C2	Block 8 / 9	100.00	29.55	29.44	N 22°33'50" W
C3	Lot 55	50.00	8.30	8.30	N 79°02'55" W

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

THIS _____ DAY OF _____, _____

_____
STEPHEN WILLIS, GENERAL MANAGER
PLANNING, INFRASTRUCTURE AND ECONOMIC
DEVELOPMENT DEPARTMENT
CITY OF OTTAWA

PLAN 4M-

I CERTIFY THAT THIS PLAN
IS REGISTERED IN THE LAND REGISTRY OFFICE
FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON NO. 4
AT _____ O'CLOCK ON THE _____ DAY OF _____, _____
AND ENTERED IN THE PARCEL REGISTER FOR PROPERTY
IDENTIFIERS 04328-4223 AND 04328-xxxx AND THE REQUIRED
CONSENTS ARE REGISTERED AS PLAN DOCUMENT NO._____
_____

_____
REPRESENTATIVE FOR LAND REGISTRAR

This plan comprises all of PIN 04328-xxxx and part of PIN 04328-4223.

PLAN OF SUBDIVISION OF

PART OF LOTS 21 and **22**
CONCESSION 4 (RIDEAU FRONT)
Geographic Township of Gloucester
and
BLOCK 208
REGISTERED PLAN 4M-XXXX
CITY OF OTTAWA

Surveyed by Annis , O'Sullivan , Vollebekk Ltd.

Scale 1 : 1000

40 30 20 10 0 20 40 Metres

Metric

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

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 , 2020.

_____ _____
Date T. Hartwick
Ontario Land Surveyor

OWNER'S CERTIFICATE

THIS IS TO CERTIFY THAT :

1. Lots 1 to 54, both inclusive, Part of Lots 55 and 56, Blocks 57 to 65, both inclusive and the Streets, namely, voie Gartersnake Way and avenue Paakanaak Avenue have been laid out in accordance with our instructions.
2. The Streets are dedicated as public highways to City of Ottawa.

Dated the _____ day
of _____2020. _____
David Kardish
Leitrim South Holdings Inc.
I have authority to bind the corporation.

OWNER'S CERTIFICATE

THIS IS TO CERTIFY THAT :

1. Part of Lots 55 & 56.

Dated the _____ day
of _____2020. _____
David Kardish
Pathways South Regional Inc.
I have authority to bind the corporation.

NOTES AND LEGEND

-□-	denotes	Survey Monument Planted.
-■-	"	Survey Monument Found
SIB	"	Standard Iron Bar.
SSIB	"	Short Standard Iron Bar.
IB	"	Iron Bar.
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
P&W	"	Post & Wire
(P1)	"	Plan 4R-29621
(P2)	"	Plan 4R-29630
(P3)	"	Registered Plan 4M-1618

Distances shown on curved limits are Arc distances unless otherwise noted.

Bearings and distances illustrated on this plan, between found survey monuments, are consistent with (P3).

Distances shown on this plan are ground distances and can be converted to grid distances by multiplying by the combined scale factor of 0.99996.

Bearings are grid, derived from Can-Net 2016 Real Time Network GPS observations on reference points A and B, shown hereon, having a bearing of N 23°29'45" W and are referenced to Specified Control Points 01919760735 and 01919871649, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

Coordinates are derived from Can-Net 2016 Real Time Network GPS observations referenced to Specified Control Points 01919760735 and 01919871649, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

Coordinate values are to urban accuracy in accordance with O. Reg. 216/10.

. 01919760735	Northing	5026903.34	Easting	376968.72
. 01919871649	Northing	5007189.87	Easting	372435.05
. Point A	Northing	5018553.24	Easting	375471.54
. Point B	Northing	5018741.00	Easting	375389.92

Caution: Coordinates cannot, in themselves, be used to re-establish corners or boundaries shown on this plan.

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors

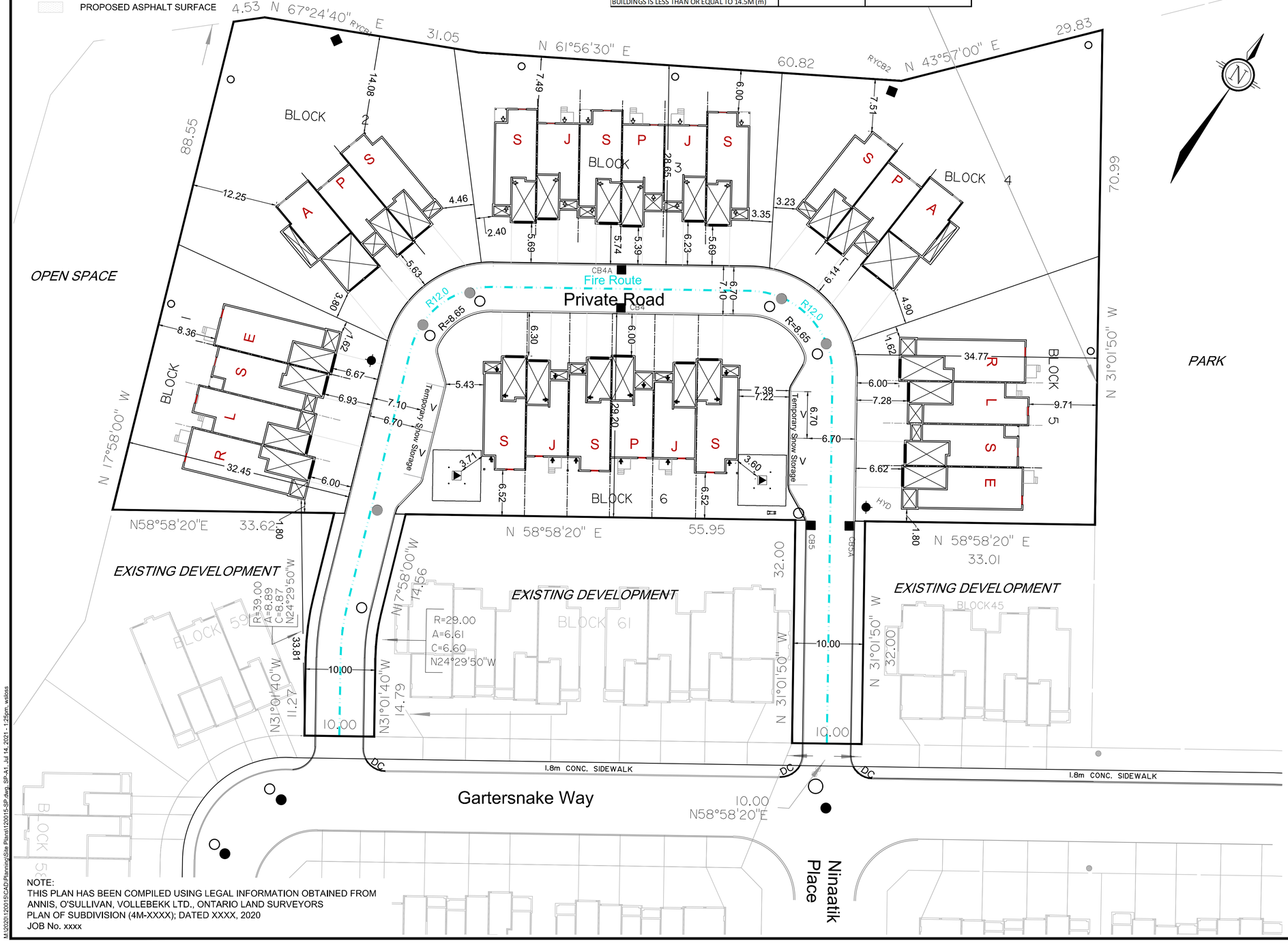
Job No. 17533-19 Regional Pt Lts 21 22 C4 RF GL SUB D7 | N

LEGEND

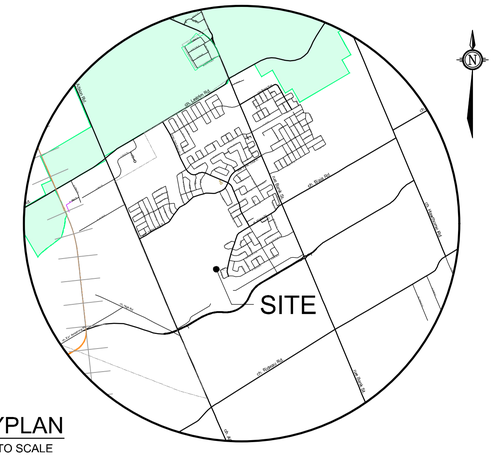
- PROPOSED FIRE ROUTE
- HYD — HYDRANT C/W VALVE & LEAD
- CATCH BASIN
- CATCH BASIN MANHOLE
- SANITARY MANHOLE
- STORM MANHOLE
- ROGERS PEDESTAL
- BELL PEDESTAL
- REAR YARD DRAIN
- STREET LIGHT
- TRANSFORMER
- CMB — COMMUNITY MAILBOX
- DC — DEPRESSED CURB
- PROPOSED ASPHALT SURFACE

Pathways at Findlay Creek, Block 60 - Zoning Table

ZONING PROVISIONS - City of Ottawa Zoning By-law 2008-250		
PROVISION	**REQUIRED**	**PROPOSED**
RESIDENTIAL FOURTH DENSITY, SUBZONE Z (R4Z [2370])		
MIN LOT WIDTH (m)	18	10
MIN LOT AREA (m^2)	1,400	9514.78
MAX BUILDING HEIGHT (m)	11	9.75
MIN FRONT YARD SETBACK (m)	3	33.81
MIN CORNER SIDE YARD SETBACK (m)	3	N/A
MIN REAR YARD SETBACK (m)	6	6
MIN INTERIOR SIDE YARD SETBACK (m)	6	1.8
PARKING RATES		
MIN PARKING SPACE RATE	1 per dwelling unit	1 per dwelling unit
MIN VISITOR PARKING SPACE RATE	0.2 per dwelling unit	1 per dwelling unit
PLANNED UNIT DEVELOPMENT		
MIN WIDTH OF PRIVATE WAY (m)	6	6.7
MIN SETBACK FOR ANY WALL OF A RESIDENTIAL USE BUILDING TO A PRIVATE WAY (m)	1.8	6.52
MIN SETBACK FOR ANY GARAGE OR CARPORT ENTRANCE FROM A PRIVATE WAY (m)	5.2	5.39
MIN SEPARATION AREA BETWEEN BUILDINGS WITHIN A PUD – WHERE THE HEIGHT OF ABUTTING BUILDINGS IS LESS THAN OR EQUAL TO 14.5M (m)	1.2	3.73



NOTE:
THIS PLAN HAS BEEN COMPILED USING LEGAL INFORMATION OBTAINED FROM ANNIS, O'SULLIVAN, VOLLEBEKK LTD., ONTARIO LAND SURVEYORS
PLAN OF SUBDIVISION (4M-XXXX); DATED XXXX, 2020
JOB No. xxxx



KEYPLAN
NOT TO SCALE

SITE PLAN

BLOCK 60

PART OF LOTS 21 & 22
CONCESSION 4 (Rideau Front)
TOWNSHIP OF GLOUCESTER
Now CITY OF OTTAWA
BLOCK 60, PLAN 4M-XXXX

pathways at FINDLAY CREEK

EQ HOMES

No.	REVISION	DATE	BY
4	REVISED PER CITY COMMENTS	JULY 15/21	JI
3	UPDATED UNITS	MAR 30/21	JI
2	UPDATED UNITS	FEB 10/21	JI
1	ISSUED FOR COORDINATION	DEC 18/20	JI

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

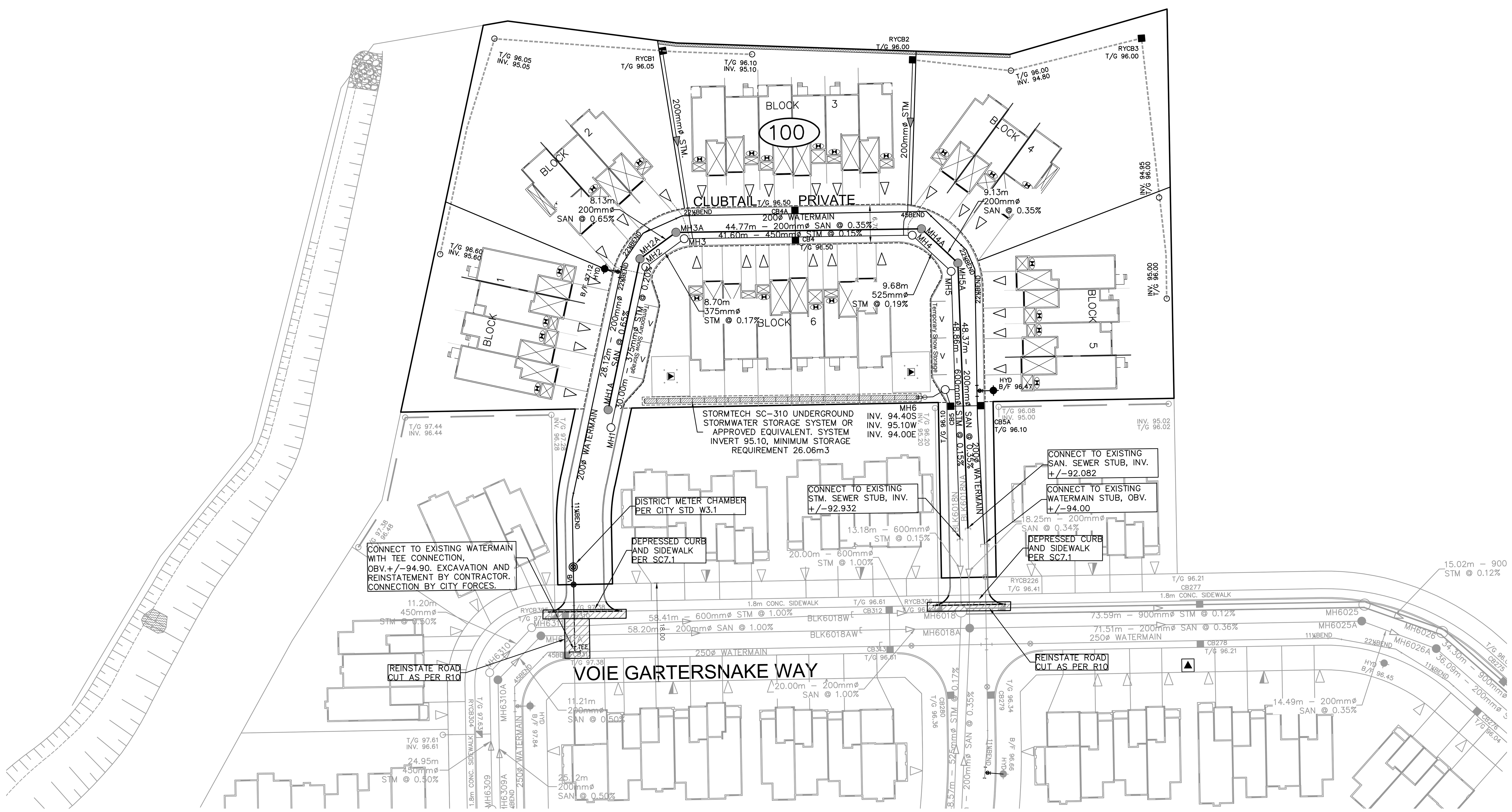
ISSUED
JULY, 2021

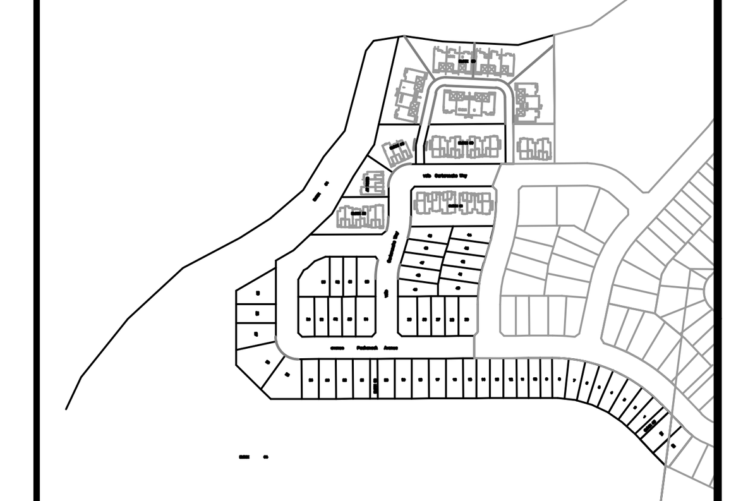
PROJECT No.
120015

DRAWING No.
120015-SP

D07-12-21-0070

M:\2020\120015\CAD\Planning\Site Plans\120015-SP.dwg, SP-A1, Jul 14, 2021 - 1:25pm, wsloss





No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
2	REVISED PER CITY COMMENTS	D.G.Y.	2021:08:24
1	SUBMISSION No.1 FOR CITY REVIEW	D.G.Y.	2021:05:13

LEITRIM SOUTH HOLDINGS INC.

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

Project Title
pathways at FINDLAY CREEK
BLOCK 60

LICENSED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
21/08/24
PROVINCE OF ONTARIO

N

Drawing Title
GENERAL PLAN OF SERVICES

Scale
1:500

Design	Date
R.M.	OCTOBER 2020
Drawn	Checked
M.M.	K.H.
Project No.	Drawing No.
125506	001

D07-12-21-0070

#18475

Fw: Pre-consult recap - Pathway Ph3 Block 60

Ryan Magladry <rmagladry@IBIGroup.com>
Mon 1/25/2021 11:31 AM
To: Ryan Magladry <rmagladry@IBIGroup.com>

3 attachments (11 MB)
D02-02-15-0072 Environmental Impact Statement and Tree Conservation Report.pdf; DesignBrief_TOR_Pathways Phase 3.pdf; Pre-con Applicant's Study and Plan Identification List.pdf;

Ryan Magladry CET
WORKING REMOTELY
REACHABLE ON CELL @ 613.795.5610

Project Manager

IBI GROUP
400-333 Preston Street
Ottawa ON K1S 5N4 Canada
tel +1 613 225 1311 ext 64061 fax +1 613 225 9868

From: Evan Garfinkel <egarfinkel@regionalgroup.com>
Sent: Tuesday, August 18, 2020 4:11 PM
To: Greg Winters <G.Winters@novatech-eng.com>; James Ireland <j.ireland@novatech-eng.com>; Ryan Magladry <rmagladry@IBIGroup.com>
Subject: FW: Pre-consult recap - Pathway Ph3 Block 60

Greg, James, Ryan.

Please see attached and below. I'm going to work to put together a schedule in the coming week and hope to circulate that soon.

Talk soon.

Evan Garfinkel
Coordinator, Land Development

Regional Group
1737 Woodward Drive
Ottawa, ON K2C 0P9
T: 613-230-2100 x 6004
C: 613-884-5574

egarfinkel@regionalgroup.com
www.regionalgroup.com

From: Gervais, Melanie <Melanie.Gervais@ottawa.ca>
Sent: Tuesday, August 18, 2020 4:02 PM
To: Evan Garfinkel <egarfinkel@regionalgroup.com>
Subject: Pre-consult recap - Pathway Ph3 Block 60

Hi Evan,

Please find below a recap of our pre-consultation meeting. Please note that during the COVID-19 pandemic the department is accepting electronic applications. Please send pdfs of your submission material (including a scanned copy of the application form) to planningcirculations@ottawa.ca (and cc myself). They will create the file number and upload the files to the proper location. Following the receipt of the electronic submission I will send you an email with your new file number and the process for submitting payment.

Planning:

You will need to submit a New - Complex Site Plan application with a fee of $35,487.53 + engineering review fees + $1,015 (Conservation Authority fee).

The property is zoned R4Z[2370] (Residential Fourth Density Subzone Z Exception 2370), the zoning provisions for R4Z can be found here and all the provisions for Planned Unit Developments can be found here. Below is an excerpt of Table 162A with non-applicable sections removed. The applicable endnotes are also below.

I Sub-Zone	II Prohibited Uses	III Principal Dwelling Types	IV Minimum Lot Width (m)	V Minimum Lot Area (m^2)	VI Maximum Building Height (m)	VII Minimum Front Yard Setback (m)	VIII Minimum Corner Side Yard Setback (m)	IX Minimum Rear Yard Setback (m)	X Minimum Interior Side Yard Setback (m)	XI End-notes (see Table 162B)
Z	None	Planned unit development	18	1,400	as per dwelling type	3[10]	3[10]	varies[1]	varies[1]	1, 10, 16
		Semi-detached	7	190	11[18,20]	3[10]	3[10]	6	0.9	10, 16,18
		Townhouse	6	150	11[18,20]	3[10]	3[10]	6	1.2	10, 16,18

Endnotes:

1
Despite the definitions of rear yard and interior side yard, buildings in a PUD must be located so that they are set back,

a. *an amount equal to the minimum required rear yard setback for the dwelling type proposed, from a lot line where it abuts a rear yard on an abutting lot but need not exceed 7.5 metres,*
b. *an amount equal to the minimum required interior side yard setback for the dwelling type proposed, from a lot line where it abuts a side yard on an abutting lot for the first 18 metres back from the street and 25 percent of the lot depth for the remainder, to a maximum 7.5 metres, and*
c. *in the case of an abutting vacant lot, a minimum required interior side yard of 1.8 metres, and a minimum required rear yard setback based on the minimum rear yard setback applicable to the dwelling type proposed to be located within the PUD adjacent to the rear lot line.*

A Minor Variance would be required to rectify endnote 1.

Proper landscaping will be required on site. This includes the addition of trees along the street edge. Please note that all Landscape Plans need to be stamped by a Landscape Architect. A cross-section of the private street is recommended to ensure the width can accommodate servicing, utilities and trees.

The Planning Rationale will have to explain the proposal, review the applicable Official Plan and CDP policies, if applicable, review the applicable Zoning By-law provisions and review the Accessibility Design Standards.

Please see the attached list identifying the submission requirements. Although the list identifies numbers of paper copies these are **not** required at this time.

Urban Design:

- A Design Brief is required for the site plan control application. The Terms of Reference for the Design Brief is attached for convenience.
- With respect to the design concept:
  - Consideration should be given to the provision of a pedestrian pathway to link the proposed development and the new municipal park. A possible location for the pathway may at between Block 6 and Block 45.
  - Consideration may also be given to the provision of a pathway to link the proposed development and the conservation area if a pathway system exists or is proposed to allow access to the conservation area.
  - Please maximize opportunities for street trees through an careful examination of both the plan view design and cross section design of the private street.
  - Considerations may be given to rebalancing the allocation of front yard and rear yard for Blocks 1, 2, 5 and 6 if more spaces are required for accommodating street trees, which are often in competition with utilities. The backyard of these Blocks appears to be very generous and there are rooms to move around the buildings in order to create more spaces in the front. The intent to create a consistent front yard setback is appreciated. However, given the lot and street configuration the design may envision a cluster of buildings rather than a row of buildings along a U-shape street.
  - Considerations should be given the visitor parking. The proposed double driveways are quite shallow and can hardly accommodate additional vehicles if needed.
  - The design presented at the meeting is slightly different from the design circulated prior to the meeting. The design presented at the meeting shows a few buildings with a double garage projecting out from the building façade. Generally, a design with a projected garage does not contribute to the quality of public realm design and should be avoided.

Engineering:

Site Servicing Study:

- Prior to submitting the servicing report the consultant should contact John Sevigny and request boundary conditions for the watermain design. The consultant will need to provide the type of development, fire flow required (including the FUS calculations), average day demand, maximum day demand and maximum hour demand as well as a location plan showing the points of connection to the public system.
- The storm water management design is to follow the design parameters from the Pathways Phase 3 Design Brief.

Geotechnical Study:

- Containing detailed information on geotechnical matters and recommendations (i.e. pavement, foundation, bedding construction etc.).
- Sensitive Marine Clay (SMC) is widely found across Ontario – geotechnical reports should include Atterberg Limits, consolidation testing, sensitivity values, and vane shear test results (at a minimum) with a discussion for proposals in areas containing SMC; If SMC exists than the tree planting restrictions are to be discussed and follow the City's most current tree planting guidelines.

Exterior Site Lighting Letter

- This requirement was not mentioned in the pre-consult however it would be appreciated if we could have it at the time of submission. That being said, we would not deem the application incomplete if it was the only thing missing from the submission.
- The letter is to be certified by a qualified engineer confirming the site lighting design a) meets the criteria for Full Cut-off (Sharp cut-off) Classification, as recognized by the Illuminating Engineering Society of North America (IESNA or IES) AND b) the site lighting spillage will be minimal (i.e. 0.5 foot-candle is normally the maximum allowable spillage).

Engineering Drawings:

- The following are the engineering plans that are required with the submission. The link below outlines the requirements for the plans https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans
  - Site Servicing Plan
  - Grading and Drainage Plan (ponding if applicable)
  - Erosion and Sediment Control Plan (can be combined with the grading plan)
  - Plan and Profile Drawings
  - Stormwater and Sanitary Drainage Area Plans

A couple items to make note of are:

- All reports should follow the City's Guides for Preparing Studies and plans – these guides can be found at standard for https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#standards-policies-and-guidelines
- In terms of the MECP ECA requirement, since the site will be free-hold, the ECA will be required however, the City currently has the opportunity to request that the works be completed under the transfer of review process.

Transportation:

- Traffic Impact Assessment Guidelines Screening Form was reviewed. A TIA is not required for this application.
- On site plan:
  - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
  - Turning movement diagrams required for all accesses showing the largest vehicle to access/egress the site.
  - Turning movement diagrams required for internal movements (garbage truck, emergency vehicles).
  - Show sight-lines at the accesses, due to the curvature in Gartersnake Way.
  - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
  - Show lane/aisle widths.
  - Consider providing a pedestrian pathway on-site along the private street that would connect to the sidewalk along Gartersnake Way.
  - Sidewalk is to be continuous across accesses as per City Specification 7.1.
  - Grey out any area that will not be impacted by this application.
- AODA legislation is in effect for all organizations, please ensure that the design conforms to these standards.
- Noise Impact Study required for the following:
  - Aircraft, site is within Airport Vicinity Development Zone.

Environmental Planner:

The subdivision did have a large EIS at the subdivision, a memo confirming that the mitigations still apply would be appropriate. The SNC may have more requirements due to the significant wetland – EP zone to the east and west.

Landscaping will need to include only native species.

Planning Forester:

A Tree Conservation Report will be required if there are trees to be removed; please contact Mark Richardson for information on permitting and TCR requirements.

Attached is the Tree Conservation Report from the subdivision application. Map 2 identifies Tree #1 as a notable tree within Miikana Park (Park Block 46 on Plan 4M-1618). This tree is located in proximity to Block 60, although the distance from the lot line is difficult to assess from the drawing. The tree is a 50cm dbh, 20m high, white spruce in good condition. It would be helpful if the landscape plan for the site plan application could identify the location of Tree #1 relative to the boundary of Block 60 and also show the tree protection measures to be implemented by the contractor if the tree is close enough to the lot line to be at risk of damage during construction.

South Nation Conservation:

O. Reg. 170/06: The EMP indicates a mapped watercourse for the site and the Leitrim Core Provincially Significant Wetland (PSW) adjacent to the north. Any interference with a watercourse or development within 120m of the wetland may require a permit under O. Reg. 170/06 and restrictions may apply.

EIS/TOR: the 2016 study or site specific study is requested. To obtain a permit, the study must demonstrate no negative hydrologic impacts to the provincially significant wetland. The study is also expected to prescribe appropriate mitigation of impacts, both during and following

construction, to the adjacent wetland. Please provide this study to South Nation Conservation (SNC) for review. A memo that pulls the relevant information from the EIS/TOR is fine but I don't believe it will be sufficient for the permit because I don't believe it specifically discusses the hydrologic impacts to the PSW and watercourse. The CA regulations apply to the majority of this property and I want to be sure that we don't have difficulty issuing the permit down the road. I suspect that fill we be necessary for the development and stormwater will be directed away from the wetland, so the memo should be aware of the proposed stormwater design.

Stormwater management must conform to the finalized storm water management design for Phase 3. SNC has recently reviewed and commented on the following study. Any deviation from the finalized study will require an additional review by SNC.

- DESIGN BRIEF PATHWAYS AT FINDLAY CREEK 4800 BANK STREET PHASE 3 LEITRIM DEVELOPMENT AREA. Prepared by IBI. Dated May 2020. Signed, stamped and dated May 7, 2020.

The applicant is responsible for addressing all applicable conditions of draft approval from the DRAFT Conditions Extension of April 11, 2017. It is recommended that the applicant and review agencies be provided with a copy of the condition list with the appropriate conditions highlighted.

Please contact James Holland at SNC for any clarifications, jholland@nation.on.ca.

******

If you require any clarifications on the above, do not hesitate to contact me.

Regards,

Mélanie Gervais *MCIP, RPP*
Planner / Urbaniste
Development Review /
Examen des demandes d'aménagement
Planning, Infrastructure and Economic Development Department /
Services de la planification, de l'infrastructure et du développement économique
City of / Ville d'Ottawa
110, avenue Laurier Avenue West / Ouest,
4th Floor / 4ième étage
Ottawa, ON K1P 1J1
Tel. : 613-580-2424 ext. 24025
Fax / Télécopieur : 613-580-2576
E-mail / Courriel : Melanie.Gervais@ottawa.ca
Mail Code: 01-14

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Servicing study guidelines for development applications

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

- ☐ Executive Summary (for larger reports only).
- ☒ Date and revision number of the report.
- ☒ Location map and plan showing municipal address, boundary, and layout of proposed development.
- ☒ Plan showing the site and location of all existing services.
- ☐ 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.
- ☒ Summary of Pre-consultation Meetings with City and other approval agencies.
- ☐ 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.
- ☒ Statement of objectives and servicing criteria.
- ☒ Identification of existing and proposed infrastructure available in the immediate area.
- ☒ 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).
- ☒ 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.
- ☐ 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.
- ☐ Proposed phasing of the development, if applicable.

☒ Reference to geotechnical studies and recommendations concerning servicing.

☒ 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

4.2 Development Servicing Report: Water

☒ Confirm consistency with Master Servicing Study, if available
☒ Availability of public infrastructure to service proposed development
☒ Identification of system constraints
☐ Identify boundary conditions
☒ Confirmation of adequate domestic supply and pressure
☒ 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.
☒ 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.
☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design
☒ Address reliability requirements such as appropriate location of shut-off valves
☐ Check on the necessity of a pressure zone boundary modification.
☒ 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

- ☒ 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.
- ☐ 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.
- ☒ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.
- ☐ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

- ☒ 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).
- ☒ Confirm consistency with Master Servicing Study and/or justifications for deviations.
- ☐ 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.
- ☒ Description of existing sanitary sewer available for discharge of wastewater from proposed development.
- ☒ 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)
- ☐ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix ‘C’) format.
- ☒ Description of proposed sewer network including sewers, pumping stations, and forcemains.
- ☐ 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).
- ☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.
- ☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.
- ☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.
- ☐ Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

- ☒ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)
- ☐ Analysis of available capacity in existing public infrastructure.
- ☒ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.
- ☒ 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 subwatersheds, taking into account long-term cumulative effects.
- ☒ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.
- ☒ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.
- ☐ Set-back from private sewage disposal systems.
- ☐ Watercourse and hazard lands setbacks.
- ☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.
- ☐ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.
- ☒ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- ☐ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- ☒ 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.
- ☐ Any proposed diversion of drainage catchment areas from one outlet to another.
- ☒ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- ☐ 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.
- ☐ Identification of potential impacts to receiving watercourses
- ☐ Identification of municipal drains and related approval requirements.
- ☒ Descriptions of how the conveyance and storage capacity will be achieved for the development.
- ☒ 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

- ☐ Inclusion of hydraulic analysis including hydraulic grade line elevations.
- ☒ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- ☐ 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.
- ☐ Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 Approval and Permit Requirements: Checklist

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 each 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.
- ☐ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.
- ☐ Changes to Municipal Drains.
- ☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

4.6 Conclusion Checklist

- ☒ Clearly stated conclusions and recommendations
- ☒ 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.
- ☒ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

APPENDIX B

Water Distribution Model

IBI GROUP
333 PRESTON STREET
OTTAWA, ONTARIO
K1S 5N4

WATERMAIN DEMAND CALCULATION SHEET

PROJECT : Pathways Block 60
CLIENT : Pathways Leitrim Inc.

FILE: 125506-6.4.4
DATE PRINTED: 28-Jan-21
DESIGN: RM
PAGE: 1 OF 1

NODE	RESIDENTIAL				NON-RESIDENTIAL (ICI)			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)			FIRE DEMAND (l/min)
	SINGLE FAMILY UNITS	Semi Detached Townhouse UNITS	Appartment UNITS	POPULATION	INDUST. (ha)	COMM. (ha)	INSTIT. (ha)	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	
B1		8		21.60				0.09		0.09	0.22		0.22	0.48		0.48	9,000
B2		9		24.30				0.10		0.10	0.25		0.25	0.54		0.54	9,000
Total										0.19			0.46			1.02	

POPULATION DENSITY

Single Family	3.4 persons/unit
Semis & towns	2.7 persons/unit
Apartments	1.8 persons/unit

WATER DEMAND RATES

Residential	350 l/cap/day
Commercial Shopping Center	2,500 L/(1000m2)/day

PEAKING FACTORS

Maximum Daily	
Residential	2.5 x avg. day
Commercial	1.5 x avg. day
Maximum Hourly	
Residential	2.2 x max day
Commercial	1.8 x max day

FIRE DEMANDS

Single Family	10,000 l/min (166.7 l/s)
Semi Detached & Townhouse	9,000 l/min (150 l/s)
Medium Densit	15,000 l/min (250 l/s)

Boundary Conditions
Pathways Block 60

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	11.40	0.19
Maximum Daily Demand	27.60	0.46
Peak Hour	61.20	1.02
Fire Flow Demand 1	9,000.00	150

Location

Results – Existing Conditions

Connection 1 – Mikana Rd.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	155.9	86.3
Peak Hour	147.5	74.3
Max Day plus Fire 1	139.3	62.7

[1] Ground Elevation = 95.2 m

Connection 2 – Esban Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	155.9	84.3
Peak Hour	147.5	72.3
Max Day plus Fire 1	139.5	61.0

[1] Ground Elevation = 96.6 m

Results – SUC Zone Reconfiguration

Connection 1 – Dun Skipper Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	147.0	73.7
Peak Hour	143.7	69.0
Max Day plus Fire 1	136.6	58.9

[1] Ground Elevation = 95.2 m

Connection 2 – Esban Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	147.0	71.7
Peak Hour	143.7	67.0
Max Day plus Fire 1	136.9	57.3

[1] Ground Elevation = 96.6 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.

Fire Flow Requirement from Fire Underwriters Survey

Pathways Block 60 - BLK 3

Building Floor Area

Area	17.0	m
depth	30.0	m
stories	1	
Area	510.0	m^2

$F = 220C\sqrt{A}$

C	1.5	
A	510	m^2
F	7,452	l/min
use	7,000	l/min

C =

1.5	wood frame
1.0	ordinary
0.8	non-combustile
0.6	fire-resistive

Occupancy Adjustment

Use	-15%	
Adjustment	-1050	l/min
Fire flow	5,950	l/min

-25%	non-combustile
-15%	limited combustile
0%	combustile
+15%	free burning
+25%	rapid burning

Sprinkler Adjustment

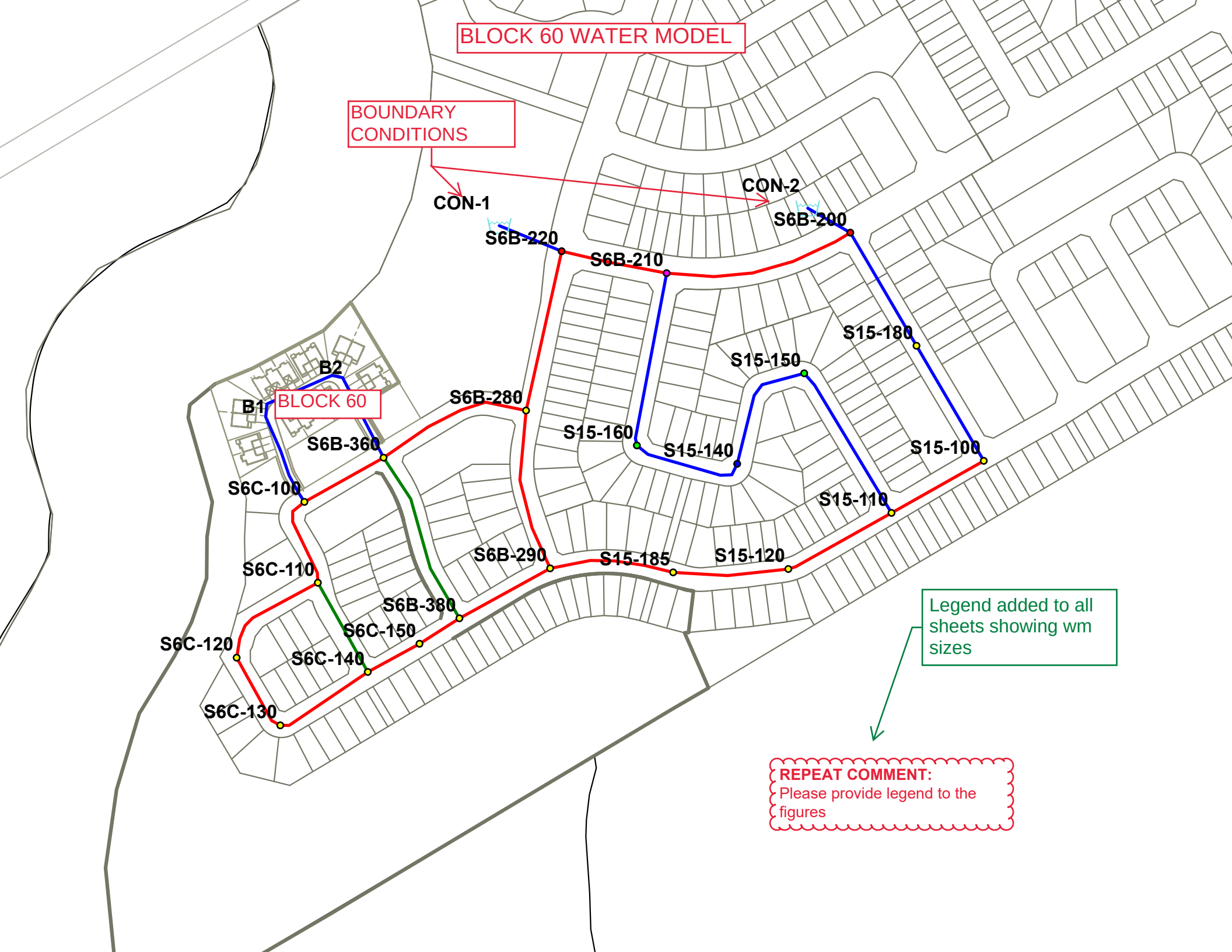
Use	0%	
Adjustment	0	l/min

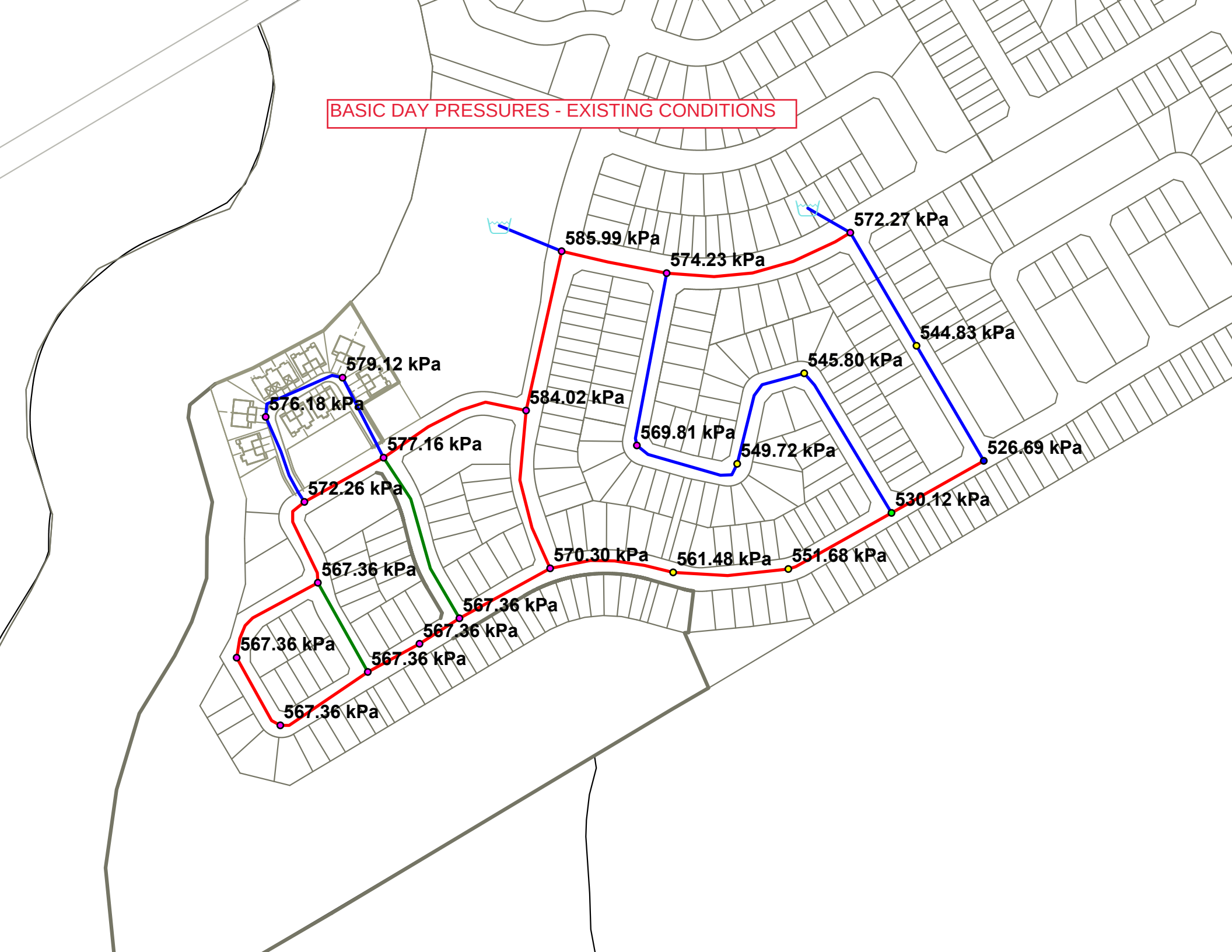
Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north	>45	0.0	0	0	0%
east	3.2	17.0	1	17	17%
south	18.9	30.0	1	30	13%
west	7.4	17.0	1	17	17%
Total					47%

Adjustment	2,797	l/min
Total adjustments	2,797	l/min
Fire flow	8,747	l/min
Use	**9,000**	**l/min**
	150.0	**l/s**

* Exposure charges from Techinical Bulletin ISTB 2018-02 Appendix H (ISO Method)


BLOCK 60 WATER MODEL
BOUNDARY CONDITIONS
CON-1
CON-2
S6B-220
S6B-210
S6B-200
S15-180
S15-150
B2
B1
BLOCK 60
S6B-280
S15-160
S15-140
S15-100
S6B-360
S6C-100
S15-110
S6B-290
S15-185
S15-120
S6C-110
S6B-380
S6C-150
S6C-120
S6C-140
S6C-130
Legend added to all sheets showing wm sizes
REPEAT COMMENT:
Please provide legend to the figures


BASIC DAY PRESSURES - EXISTING CONDITIONS
585.99 kPa
574.23 kPa
572.27 kPa
544.83 kPa
545.80 kPa
579.12 kPa
576.18 kPa
584.02 kPa
569.81 kPa
549.72 kPa
526.69 kPa
577.16 kPa
572.26 kPa
530.12 kPa
570.30 kPa
561.48 kPa
551.68 kPa
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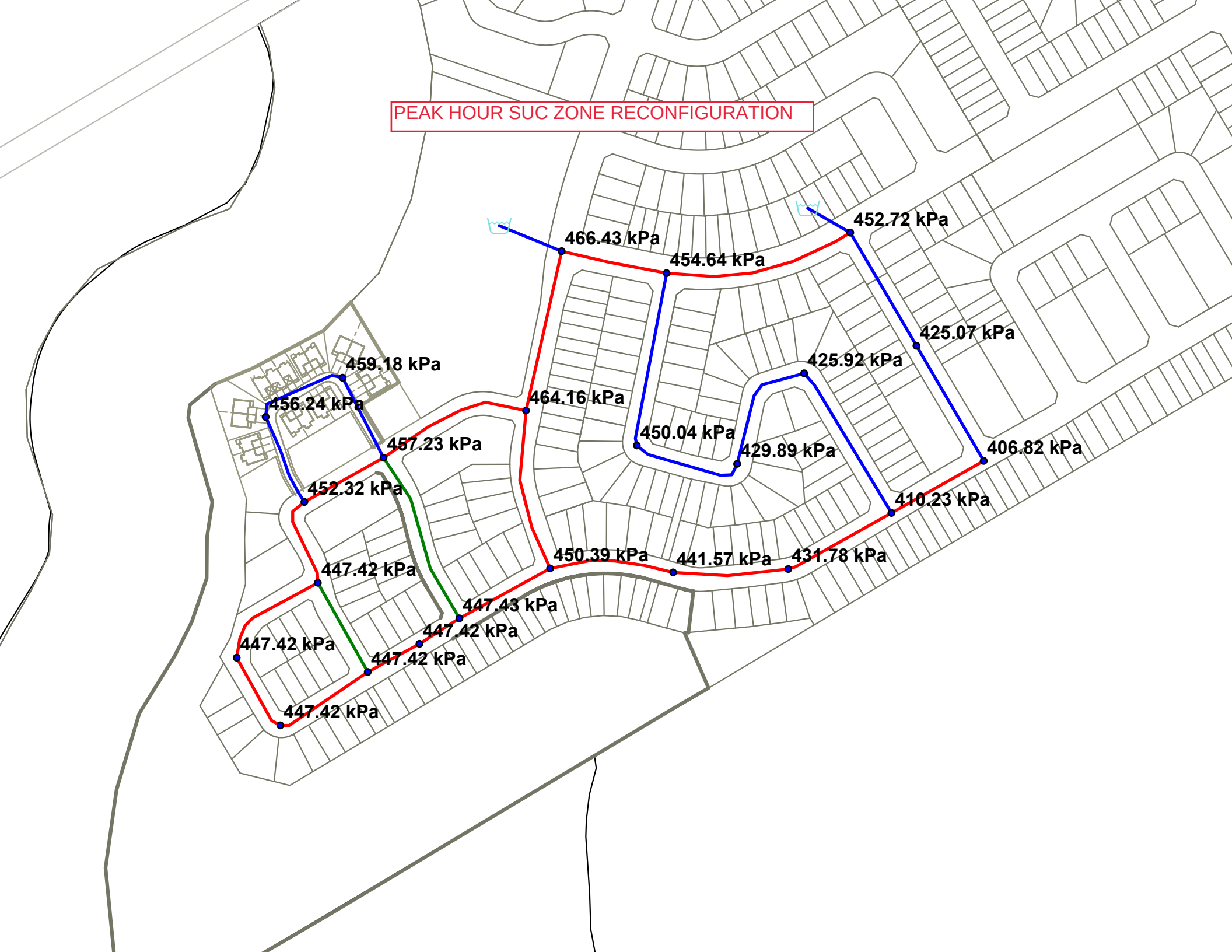
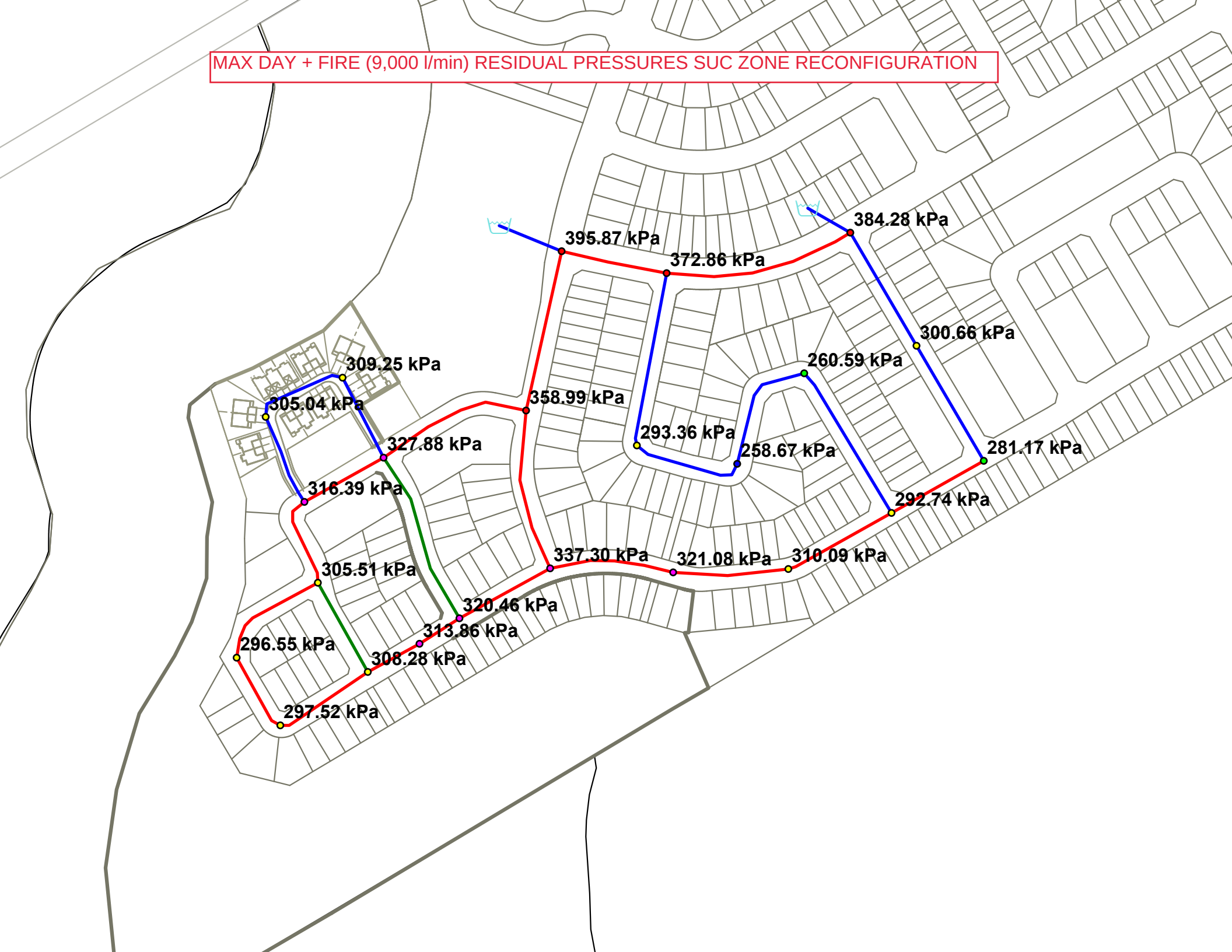
567.36 kPa
567.36 kPa
567.36 kPa
567.36 kPa


PEAK HOUR SUC ZONE RECONFIGURATION
466.43 kPa
454.64 kPa
452.72 kPa
425.07 kPa
425.92 kPa
459.18 kPa
456.24 kPa
464.16 kPa
450.04 kPa
429.89 kPa
406.82 kPa
457.23 kPa
452.32 kPa
410.23 kPa
450.39 kPa
441.57 kPa
431.78 kPa
447.42 kPa
447.43 kPa
447.42 kPa
447.42 kPa
447.42 kPa
447.42 kPa

MAX DAY + FIRE (9,000 l/min) RESIDUAL PRESSURES SUC ZONE RECONFIGURATION



Basic Day - Existing Conditions - Junction Report

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)	Water Age (hrs)
1	☐	B1	0.09	97.10	155.90	576.18	0.00
2	☐	B2	0.10	96.80	155.90	579.12	0.00
3	☐	S15-100	0.22	102.15	155.90	526.69	0.00
4	☐	S15-110	0.19	101.80	155.90	530.12	0.00
5	☐	S15-120	0.19	99.60	155.90	551.68	0.00
6	☐	S15-140	0.11	99.80	155.90	549.72	0.00
7	☐	S15-150	0.23	100.20	155.90	545.80	0.00
8	☐	S15-160	0.21	97.75	155.90	569.81	0.00
9	☐	S15-180	0.26	100.30	155.90	544.83	0.00
10	☐	S15-185	0.15	98.60	155.90	561.48	0.00
11	☐	S6B-200	0.21	97.50	155.90	572.27	0.00
12	☐	S6B-210	0.34	97.30	155.90	574.23	0.00
13	☐	S6B-220	0.08	96.10	155.90	585.99	0.00
14	☐	S6B-280	0.25	96.30	155.90	584.02	0.00
15	☐	S6B-290	0.19	97.70	155.90	570.30	0.00
16	☐	S6B-360	0.19	97.00	155.90	577.16	0.00
17	☐	S6B-380	0.11	98.00	155.90	567.36	0.00
18	☐	S6C-100	0.24	97.50	155.90	572.26	0.00
19	☐	S6C-110	0.16	98.00	155.90	567.36	0.00
20	☐	S6C-120	0.06	98.00	155.90	567.36	0.00
21	☐	S6C-130	0.11	98.00	155.90	567.36	0.00
22	☐	S6C-140	0.11	98.00	155.90	567.36	0.00
23	☐	S6C-150	0.11	98.00	155.90	567.36	0.00

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)	Water Age (hrs)
1	☐	B1	0.48	97.10	143.66	456.24	0.00
2	☐	B2	0.54	96.80	143.66	459.18	0.00
3	☐	S15-100	1.21	102.15	143.67	406.82	0.00
4	☐	S15-110	1.06	101.80	143.66	410.23	0.00
5	☐	S15-120	1.06	99.60	143.66	431.78	0.00
6	☐	S15-140	0.61	99.80	143.67	429.89	0.00
7	☐	S15-150	1.29	100.20	143.67	425.92	0.00
8	☐	S15-160	1.14	97.75	143.68	450.04	0.00
9	☐	S15-180	1.42	100.30	143.68	425.07	0.00
10	☐	S15-185	0.83	98.60	143.66	441.57	0.00
11	☐	S6B-200	1.14	97.50	143.70	452.72	0.00
12	☐	S6B-210	1.89	97.30	143.70	454.64	0.00
13	☐	S6B-220	0.45	96.10	143.70	466.43	0.00
14	☐	S6B-280	1.39	96.30	143.67	464.16	0.00
15	☐	S6B-290	1.06	97.70	143.66	450.39	0.00
16	☐	S6B-360	1.02	97.00	143.66	457.23	0.00
17	☐	S6B-380	0.61	98.00	143.66	447.43	0.00
18	☐	S6C-100	1.32	97.50	143.66	452.32	0.00
19	☐	S6C-110	0.89	98.00	143.66	447.42	0.00
20	☐	S6C-120	0.30	98.00	143.66	447.42	0.00
21	☐	S6C-130	0.61	98.00	143.66	447.42	0.00
22	☐	S6C-140	0.61	98.00	143.66	447.42	0.00
23	☐	S6C-150	0.61	98.00	143.66	447.42	0.00

Peak Hour - Zone Reconfiguration - Pipe Report

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status	Flow Reversal Count	Water Age (hrs)
1	☐	P57	S6C-100	B1	71.23	204.00	110.00	-0.05	0.00	0.00	0.00	Open	0	0.00
2	☐	P53	B2	B1	72.15	204.00	110.00	0.53	0.02	0.00	0.00	Open	0	0.00
3	☐	P61	S6B-220	CON-1	1.00	204.00	110.00	-12.83	0.39	0.00	1.27	Open	0	0.00
4	☐	P63	S6B-200	CON-2	1.00	204.00	110.00	-8.71	0.27	0.00	0.62	Open	0	0.00
5	☐	2003	S15-100	S15-110	80.40	250.00	110.00	2.33	0.05	0.00	0.02	Open	0	0.00
6	☐	2005	S15-110	S15-120	89.24	250.00	110.00	2.18	0.04	0.00	0.02	Open	0	0.00
7	☐	2015	S15-150	S15-140	96.88	204.00	110.00	-2.20	0.07	0.00	0.05	Open	0	0.00
8	☐	2021	S15-110	S15-150	125.30	204.00	110.00	-0.91	0.03	0.00	0.01	Open	0	0.00
9	☐	2011	S6B-210	S15-160	133.38	204.00	110.00	3.95	0.12	0.02	0.14	Open	0	0.00
10	☐	2013	S15-140	S15-160	85.90	204.00	110.00	-2.81	0.09	0.01	0.08	Open	0	0.00
11	☐	2001	S15-100	S15-180	101.35	204.00	110.00	-3.54	0.11	0.01	0.12	Open	0	0.00
12	☐	P35	S15-120	S15-185	87.69	250.00	110.00	1.12	0.02	0.00	0.01	Open	0	0.00
13	☐	2047	S6B-290	S15-185	94.82	250.00	110.00	-0.29	0.01	0.00	0.00	Open	0	0.00
14	☐	P33	S15-180	S6B-200	99.56	204.00	110.00	-4.96	0.15	0.02	0.22	Open	0	0.00
15	☐	1471	S6B-200	S6B-210	146.06	250.00	110.00	2.62	0.05	0.00	0.02	Open	0	0.00
16	☐	1469	S6B-210	S6B-220	81.42	250.00	110.00	-3.22	0.07	0.00	0.04	Open	0	0.00
17	☐	1517	S6B-290	S6B-280	124.29	250.00	110.00	-3.50	0.07	0.01	0.04	Open	0	0.00
18	☐	1515	S6B-220	S6B-280	124.10	250.00	110.00	9.15	0.19	0.03	0.25	Open	0	0.00
19	☐	1541	S6B-380	S6B-290	78.68	250.00	110.00	-2.73	0.06	0.00	0.03	Open	0	0.00
20	☐	1533	S6B-280	S6B-360	120.14	250.00	110.00	4.26	0.09	0.01	0.06	Open	0	0.00
21	☐	P55	B2	S6B-360	68.36	204.00	110.00	-1.07	0.03	0.00	0.01	Open	0	0.00
22	☐	1519	S6B-380	S6B-360	136.30	155.00	100.00	-0.07	0.00	0.00	0.00	Open	0	0.00
23	☐	P51	S6C-150	S6B-380	35.92	250.00	110.00	-2.19	0.04	0.00	0.02	Open	0	0.00
24	☐	P37	S6B-360	S6C-100	68.88	250.00	110.00	2.09	0.04	0.00	0.02	Open	0	0.00
25	☐	P39	S6C-100	S6C-110	70.09	250.00	110.00	0.83	0.02	0.00	0.00	Open	0	0.00
26	☐	P43	S6C-110	S6C-120	89.78	250.00	110.00	0.14	0.00	0.00	0.00	Open	0	0.00
27	☐	P45	S6C-130	S6C-120	62.22	250.00	110.00	0.16	0.00	0.00	0.00	Open	0	0.00
28	☐	P41	S6C-110	S6C-140	77.62	155.00	100.00	-0.20	0.01	0.00	0.00	Open	0	0.00
29	☐	P47	S6C-130	S6C-140	78.88	250.00	110.00	-0.77	0.02	0.00	0.00	Open	0	0.00
30	☐	P49	S6C-140	S6C-150	44.68	250.00	110.00	-1.58	0.03	0.00	0.01	Open	0	0.00

Max Day + Fire (9,000 l/min) - Zone Reconfiguration - Fireflow Design Report

		ID	Total Demand (L/s)	Available Flow at Hydrant (L/s)	Critical Node ID	Critical Node Pressure (kPa)	Critical Node Head (m)	Design Flow (L/s)	Design Pressure (kPa)	Design Fire Node Pressure (kPa)
1	☐	B1	150.22	273.80	B1	139.96	111.38	273.80	139.96	139.97
2	☐	B2	150.25	277.95	B2	139.96	111.08	277.95	139.96	139.97
3	☐	S15-100	167.22	328.67	S15-100	139.96	116.43	328.67	139.96	139.97
4	☐	S15-110	167.15	361.64	S15-110	139.96	116.08	361.64	139.96	139.97
5	☐	S15-120	167.15	365.91	S15-120	139.96	113.88	365.91	139.96	139.97
6	☐	S15-140	166.95	253.20	S15-140	139.96	114.08	253.20	139.96	139.96
7	☐	S15-150	167.26	259.32	S15-150	139.96	114.48	259.32	139.96	139.96
8	☐	S15-160	167.19	288.50	S15-160	139.96	112.03	288.50	139.96	139.96
9	☐	S15-180	167.32	347.07	S15-180	139.96	114.58	347.07	139.96	139.96
10	☐	S15-185	167.05	379.84	S15-185	139.96	112.88	379.84	139.96	139.97
11	☐	S6B-200	167.19	3,009.25	S6B-200	140.00	111.79	3,009.47	139.96	139.96
12	☐	S6B-210	167.53	810.88	S6B-210	139.96	111.58	810.88	139.96	139.96
13	☐	S6B-220	166.88	3,080.31	S6B-220	140.00	110.39	3,080.54	139.96	139.92
14	☐	S6B-280	167.30	487.03	S6C-110	134.58	111.73	481.14	139.96	145.64
15	☐	S6B-290	167.15	423.40	S6B-290	139.96	111.98	423.40	139.96	139.98
16	☐	S6B-360	167.14	361.99	S6B-360	139.96	111.28	361.99	139.96	139.98
17	☐	S6B-380	166.95	361.71	S6B-380	139.96	112.28	361.71	139.96	139.98
18	☐	S6C-100	167.27	338.41	S6C-100	139.96	111.78	338.41	139.96	139.97
19	☐	S6C-110	167.08	319.10	S6C-110	139.96	112.28	319.10	139.96	139.97
20	☐	S6C-120	166.81	299.05	S6C-120	139.96	112.28	299.05	139.96	139.97
21	☐	S6C-130	166.95	301.15	S6C-130	139.96	112.28	301.15	139.96	139.97
22	☐	S6C-140	166.95	325.78	S6C-140	139.96	112.28	325.78	139.96	139.97
23	☐	S6C-150	166.95	340.91	S6C-150	139.96	112.28	340.91	139.96	139.97

APPENDIX C

Sanitary Sewer Design Sheet
125506-400 - Sanitary Drainage Plan
Pathways Phase 2 Sanitary Design Sheet
Pathways Phase 2 Sanitary Drainage Area Plan

IBI GROUP
400-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
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SANITARY SEWER DESIGN SHEET

Pathways Phase 3 Block 60
CITY OF OTTAWA
Leitrim South Holdings Inc.

LOCATION				RESIDENTIAL										ICI AREAS								INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL FLOW	PROPOSED SEWER DESIGN						
				AREA	UNIT TYPES				AREA	POPULATION		RES	PEAK	AREA (Ha)						ICI	PEAK	AREA (Ha)		FLOW				CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAILABLE CAPACITY	
STREET	AREA ID	FROM MH	TO MH	w/ Units (Ha)	SF	SD	TH	APT	w/o Units (Ha)	IND	CUM	PEAK FACTOR	FLOW (L/s)	INSTITUTIONAL		COMMERCIAL		INDUSTRIAL		PEAK FACTOR	FLOW (L/s)	IND	CUM	(L/s)	IND	CUM	(L/s)	(L/s)	(m)	(mm)	(%)	(full) (m/s)	L/s	(%)
														IND	CUM	IND	CUM	IND	CUM															
EQ Block	MH1A	MH1A	MH2A	0.23			5			13.5	13.5	3.72	0.16	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.23	0.23	0.08	0.00	0.00	0.24	27.59	28.12	200	0.65	0.851	27.35	99.13%
EQ Block	MH2A	MH2A	MH3A	0.04			1			2.7	16.2	3.71	0.19	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.04	0.27	0.09	0.00	0.00	0.28	27.59	8.13	200	0.65	0.851	27.30	98.97%
EQ Block	MH3A	MH3A	MH4A	0.37			14			37.8	54.0	3.65	0.64	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.37	0.64	0.21	0.00	0.00	0.85	20.24	44.77	200	0.35	0.624	19.39	95.80%
EQ Block	MH4A	MH4A	MH5A	0.13			2			5.4	59.4	3.64	0.70	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.13	0.77	0.25	0.00	0.00	0.95	20.24	9.13	200	0.35	0.624	19.29	95.28%
EQ Block	MH5A	MH5A	EXBLKHDN	0.18			4			10.8	70.2	3.63	0.82	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.18	0.95	0.31	0.00	0.00	1.14	20.24	48.37	200	0.35	0.624	19.10	94.38%
							26																											
		EXBLKHDN	EXMH6018A							0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.95	18.25	200	0.34	0.615	19.95	100.00%
		EXMH6311A	EXMH6018A							0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.22	78.20	200	1.00	1.055	34.22	100.00%
		EXMH6022A	EXMH6018							0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.24	46.78	200	0.35	0.624	20.24	100.00%
		EXMH6018	EXMH6025							0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.53	71.51	200	0.36	0.633	20.53	100.00%

Design Parameters:

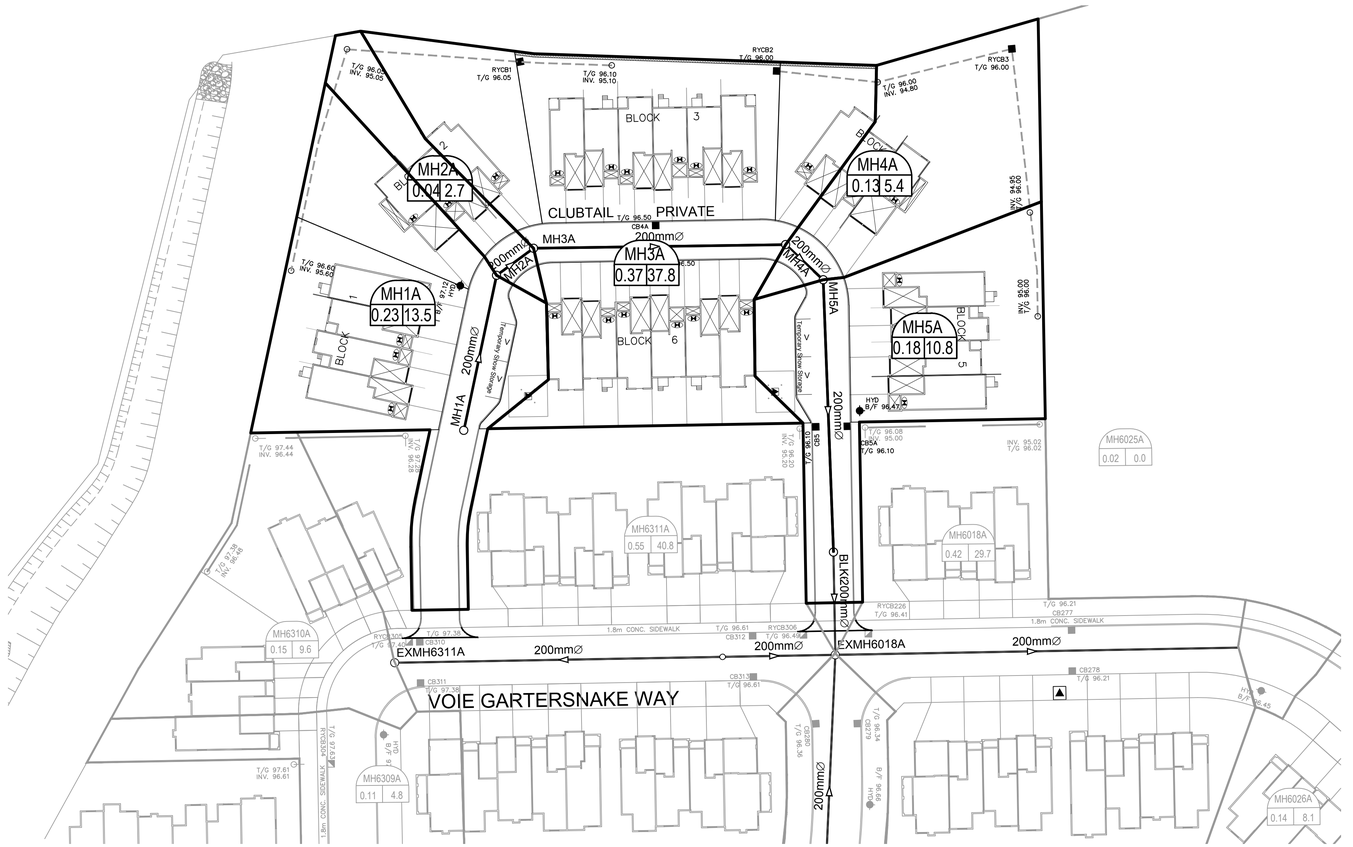
Residential			ICI Areas			
SF	3.4	p/p/u				
TH/SD	2.7	p/p/u	INST	28,000	L/Ha/day	
APT	1.8	p/p/u	COM	28,000	L/Ha/day	
Other	60	p/p/Ha	IND	35,000	L/Ha/day	MOE Chart
				17000	L/Ha/day	

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 200 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
   where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area,
   1.5 if greater than 20%, otherwise 1.0

Designed: RM
Checked: DY
Dwg. Reference: 125506-400

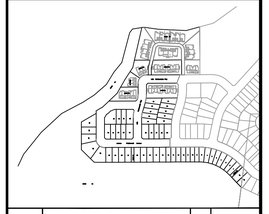
No.	Revision	Date
1.	Design Brief - Submission No. 1	2021-05-10
2.	Design Brief - Submission No. 2	2021-07-29

File Reference: 125506-6.4.4
Date: 2021-05-10
Sheet No: 1 of 1



LEGEND :

MH4A
0.14 | 4.8
AREA NUMBER
POPULATION
AREA IN HECTARES



No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
2	REVISED PER CITY COMMENTS	D.G.Y.	2021:08:24
1	SUBMISSION No.1 FOR CITY REVIEW	D.G.Y.	2021:05:13

LEITRIM SOUTH HOLDINGS INC.

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

Project Title
pathways
at FINDLAY CREEK
BLOCK 60

LICENCED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
21/08/24
PROVINCE OF ONTARIO

Drawing Title
SANITARY DRAINAGE AREA PLAN

Scale
5 0 5 10
1:500

Design	Date
R.M.	OCTOBER 2020
Drawn	Checked
M.M.	K.H.
Project No.	Drawing No.
125506	400

D07-12-21-0070

#18475

IBI GROUP
400-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
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ibigroup.com

SANITARY SEWER DESIGN SHEET

Pathways at Findlay Creek Phase 2
CITY OF OTTAWA
Regional Group

LOCATION				RESIDENTIAL										ICI AREAS								INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL FLOW	PROPOSED SEWER DESIGN						
				AREA w/ Units (Ha)	UNIT TYPES				AREA w/o Units (Ha)	POPULATION		RES PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha)						ICI PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha)		FLOW				CAPACITY	LENGTH	DIA	SLOPE	VELOCITY (full)	AVAILABLE CAPACITY	
STREET	AREA ID	FROM MH	TO MH		SF	SD	TH	APT		IND	CUM			INSTITUTIONAL		COMMERCIAL		INDUSTRIAL				IND	CUM	(L/s)	IND	CUM	(L/s)	(L/s)	(m)	(mm)	(%)	(m/s)	L/s	(%)
														IND	CUM	IND	CUM	IND	CUM														
Wabikon Crescent	MH6070A	MH6070A	MH6071A	0,28			7			18,9	18,9	3,71	0,23	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,28	0,28	0,09	0,00	0,00	0,32	27,59	35,86	200	0,65	0,851	27,27	98,84%
Wabikon Crescent	MH6071A	MH6071A	MH6072A	0,31			9			24,3	43,2	3,66	0,51	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,31	0,59	0,19	0,00	0,00	0,71	20,24	48,19	200	0,35	0,624	19,54	96,51%
Wabikon Crescent	MH6072A	MH6072A	MH6073A	0,37			10			27,0	70,2	3,63	0,82	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,37	0,96	0,32	0,00	0,00	1,14	20,24	35,65	200	0,35	0,624	19,10	94,36%
Wabikon Crescent	MH6073A	MH6073A	MH6074A	0,15			2			5,4	75,6	3,62	0,89	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,15	1,11	0,37	0,00	0,00	1,25	20,24	13,11	200	0,35	0,624	18,99	93,81%
Wabikon Crescent	MH6074A	MH6074A	MH6075A	0,88			27			72,9	148,5	3,55	1,71	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,88	1,99	0,66	0,00	0,00	2,37	20,24	115,32	200	0,35	0,624	17,88	88,31%
Wabikon Crescent	MH6075A	MH6075A	MH6076A	0,17			3			8,1	156,6	3,55	1,80	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,17	2,16	0,71	0,00	0,00	2,51	20,24	16,03	200	0,35	0,624	17,73	87,58%
Wabikon Crescent	MH6076A	MH6076A	MH6080A						0,06	0,0	156,6	3,55	1,80	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,06	2,22	0,73	0,00	0,00	2,53	20,24	41,03	200	0,35	0,624	17,71	87,49%
Miikana	MH6079A	MH6079A	MH6080A	0,80			21			56,7	56,7	3,64	0,67	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,80	0,80	0,26	0,00	0,00	0,93	30,60	99,58	200	0,80	0,944	29,67	96,95%
Miikana	MH6080A	MH6080A	MH6081A	0,92			25			67,5	280,8	3,47	3,16	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,92	3,94	1,30	0,00	0,00	4,46	45,12	118,42	300	0,20	0,618	40,66	90,11%
Miikana	MH6081A	MH6081A	MH6082A	0,19			3			8,1	288,9	3,47	3,25	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,19	4,13	1,36	0,00	0,00	4,61	45,12	33,86	300	0,20	0,618	40,51	89,78%
Miikana	MH6082A	MH6082A	MH6083A	0,83			27			72,9	361,8	3,43	4,03	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,83	4,96	1,64	0,00	0,00	5,66	45,12	95,47	300	0,20	0,618	39,45	87,45%
Miikana	MH6083A	MH6083A	EXBLK6105AV	0,70			23			62,1	423,9	3,41	4,68	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,70	5,66	1,87	0,00	0,00	6,55	45,12	92,36	300	0,20	0,618	38,57	85,48%
Gartersnake Way	EXT-6	BLK6018A	MH6018A	1,88	12		25			108,3	108,3	3,59	1,26	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	1,88	1,88	0,62	0,00	0,00	1,88	20,24	20,00	200	0,35	0,624	18,36	90,72%
Place Ninaatik	MH6021A	MH6021A	MH6022A	0,49	8					27,2	27,2	3,69	0,33	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,49	0,49	0,16	0,00	0,00	0,49	41,91	52,92	200	1,50	1,292	41,42	98,84%
Place Ninaatik	MH6022A	MH6022A	MH6018A	0,12	1					3,4	30,6	3,68	0,37	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,12	0,61	0,20	0,00	0,00	0,57	20,24	47,03	200	0,35	0,624	19,68	97,20%
Future Private Road	BLK6018NA	BLK6018NA	MH6018A	0,93			22			59,4	59,4	3,64	0,70	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,93	0,93	0,31	0,00	0,00	1,01	20,24	41,00	200	0,35	0,624	19,24	95,02%
Gartersnake Way	MH6018A	MH6018A	MH6025A	0,40			11			25,7	228,6	3,50	2,59	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,40	3,82	1,26	0,00	0,00	3,86	20,24	71,91	200	0,35	0,624	16,77	81,64%
Gartersnake Way	MH6025A	MH6025A	MH6026A						0,03	0,0	228,0	3,50	2,59	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,03	3,85	1,27	0,00	0,00	3,86	20,24	14,68	200	0,35	0,624	16,39	80,94%
Gartersnake Way	MH6026A	MH6026A	MH6032A	0,16			3			8,1	236,1	3,50	2,68	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,16	4,01	1,32	0,00	0,00	4,00	20,24	35,84	200	0,35	0,624	16,24	80,25%
Paakanaak Avenue	EXT-5	BLK6003A	MH6003A	1,40	22					74,8	74,8	3,62	0,88	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	1,40	1,40	0,46	0,00	0,00	1,34	20,24	20,00	200	0,35	0,624	18,90	93,38%
Paakanaak Avenue	MH6003A	MH6003A	MH6004A	0,47	8					27,2	102,0	3,59	1,19	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,47	1,87	0,62	0,00	0,00	1,80	20,24	58,90	200	0,35	0,624	18,44	91,08%
Paakanaak Avenue	MH6004A	MH6004A	MH6008A	0,13	2					6,8	108,8	3,59	1,26	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,13	2,00	0,66	0,00	0,00	1,92	20,24	19,95	200	0,35	0,624	18,32	90,49%
Paakanaak Avenue	EXT-1		BLK6005A	2,18	35					119,0	119,0	3,58	1,38	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	2,18	2,18	0,72	0,00	0,00	2,10	20,24	0,01	200	0,35	0,624	18,14	89,63%
Paakanaak Avenue	MH6005A	BLK6005A	MH6006A	0,13	2					6,8	125,8	3,57	1,46	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,13	2,31	0,76	0,00	0,00	2,22	20,24	15,82	200	0,35	0,624	18,02	89,04%
Paakanaak Avenue	MH6006A	MH6006A	MH6007A	0,35	5					17,0	142,8	3,56	1,65	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,35	2,66	0,88	0,00	0,00	2,52	20,24	38,14	200	0,35	0,624	17,72	87,53%
Paakanaak Avenue	MH6007A	MH6007A	MH6008A	0,18	3					10,2	153,0	3,55	1,76	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,18	2,84	0,94	0,00	0,00	2,70	20,24	27,36	200	0,35	0,624	17,55	86,67%
Miikana Road	MH6008A	MH6008A	MH6030A	0,34	4					13,6	275,4	3,48	3,10	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,34	5,18	1,71	0,00	0,00	4,81	41,91	68,18	200	1,50	1,292	37,10	88,52%
Miikana Road	MH6030A	MH6030A	MH6031A	0,18	3					10,2	285,6	3,47	3,21	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,18	5,36	1,77	0,00	0,00	4,98	40,49	23,29	200	1,40	1,248	35,51	87,70%
Miikana Road	MH6031A	MH6031A	MH6032A	0,14	3					10,2	295,8	3,46	3,32	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,14	5,50	1,82	0,00	0,00	5,14	20,24	34,19	200	0,35	0,624	15,11	74,63%
Miikana Road	MH6032A	MH6032A	MH6033A	0,30	5					17,0	548,9	3,36	5,98	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,30	9,81	3,24	0,00	0,00	9,22	20,24	62,82	200	0,35	0,624	11,02	54,46%
Miikana Road	MH6033A	MH6033A	MH6050A	0,29	4					13,6	562,5	3,36	6,12	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,29	10,10	3,33	0,00	0,00	9,45	20,24	62,82	200	0,35	0,624	10,79	53,30%
	EXT-2		BLK6037A	2,60	44					149,6	149,6	3,55	1,72	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	2,60	2,60	0,86	0,00	0,00	2,58	20,24	0,01	200	0,35	0,624	17,66	87,25%
Ginebik Way	BLK6037A,	BLK6037A	MH6038A	0,49	8					27,2	176,8	3,53	2,02	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,49	0,49	0,16	0,00	0,00	2,19	20,24	53,10	200	0,35	0,624	18,06	89,20%
Ginebik Way	MH6038A	MH6038A	MH6051A	0,37	6					20,4	197,2	3,52	2,25	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,37	0,86	0,28	0,00	0,00	2,53	20,24	60,90	200	0,35	0,624	17,71	87,48%
Dun Skipper	MH6052A-1	MH6052A-1	MH6051A	0,51	8					27,2	27,2	3,69	0,33	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,51	0,51	0,17	0,00	0,00	0,49	48,39	69,23	200	2,00	1,492	47,90	98,98%
Dun Skipper	MH6051A	MH6051A	MH6050A	0,26	3					10,2	234,6	3,50	2,66	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,26	1,63	0,54	0,00	0,00	3,20	21,64	81,99	200	0,40	0,667	18,44	85,23%
Miikana	MH6050A	MH6050A	MH6034A	0,42	5					17,0	814,1	3,28	8,67	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,42	12,15	4,01	0,00	0,00	12,68	31,63	29,78	250	0,26	0,624	18,96	59,93%
Block 46 (Park)	BLK6049A	BLK6049A	MH6034A						2,85	0,0	0,0	3,80	0,00	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	2,85	2,85	0,94	0,00	0,00	0,94	20,24	15,50	200	0,35	0,624	19,30	95,35%
Miikana		MH6034A	MH6049A							0,0	814,1	3,28	8,67	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,00	0,00	0,00	0,00	0,00	8,67	17,45	60,81	200	0,26	0,538	8,78	50,33%
Dun Skipper	MH6052A-2	MH6052A-2	MH6053A	0,51	8					27,2	27,2	3,69	0,33	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,51	0,51	0,17	0,00	0,00	0,49	29,63	72,59	200	0,75	0,914	29,14	98,33%
	EXT-3		BLK6035A	3,00	41		20			193,4	193,4	3,52	2,21	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	3,00	3,51	1,16	0,00	0,00	3,37	20,24	0,01	200	0,35	0,624	16,88	83,37%
Esban Drive	BLK6035A	BLK6035A	MH6053A	0,25	4					13,6	207,0	3,51	2,36	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,25	3,76	1,24	0,00	0,00	3,60	48,39	44,16	200	2,00	1,492	44,79	92,56%
Dun Skipper	MH6053A	MH6053A	MH6042A	0,43	7					23,8	258,0	3,48	2,91	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,43	4,70	1,55	0,00	0,00	4,46	20,24	80,00	200	0,35	0,624	15,78	77,95%
Block 58	EXT-4	BLK6036A	MH6041A	3,26	19		56			215,8	215,8	3,51	2,45	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	3,26	3,26	1,08	0,00	0,00	3,53	45,91	43,83	200	1,80	1,416	42,38	92,31%
Dun Skipper	MH6041A	MH6041A	MH6042A	0,12	1					3,4	219,2	3,51	2,49	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,12	3,38	1,12	0,00	0,00	3,61	45,91	18,05	200	1,80	1,416	42,30	92,14%
Omagaki Way	MH6042A	MH6042A	MH6043A	0,58			18			48,6	525,8	3,37	5,74	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,58	8,66	2,86	0,00	0,00	8,60	27,59	76,88	200	0,65	0,851	18,99	68,82%
Omagaki Way	MH6043A	MH6043A	MH6044A	0,18			3			8,1	533,9	3,37	5,83	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,18	8,84	2,92	0,00	0,00	8,74	27,59	11,48	200	0,65	0,851	18,84	68,30%
Omagaki Way	MH6044A	MH6044A	MH6045A	0,58	2		16			50,0	583,9	3,35	6,34	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,58	9,42	3,11	0,00	0,00	9,45	21,64	82,62	200	0,40	0,667	12,19	56,33%
Omagaki Way	MH6045A	MH6045A	MH6046A	0,27	6					20,4	604,3	3,34	6,55	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,27	9,69	3,20	0,00	0,00	9,75	20,24	34,11	200	0,35	0,624	10,50	51,85%
Omagaki Way	MH6046A	MH6046A	MH6047A	0,29	5					17,0	621,3	3,34	6,72	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,29	9,98	3,29	0,00	0,00	10,02	20,24	34,11	200	0,35	0,624	10,23	50,52%
Omagaki Way	MH6047A	MH6047A	MH6048A	0,27	4					13,6	634,9	3,33	6,86	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,27	10,25	3,38	0,00	0,00	10,24	24,19	34,18	200	0,50	0,746	13,95	57,66%
Omagaki Way	MH6048A	MH6048A	MH6049A	0,17	2					6,8	641,7	3,33	6,93	0,00	0,00	0,00	0,00	0,00	0,00	1,00	0,00	0,17	10,42	3,44	0,00	0,00	10,37	24,19	41,98	200	0,50	0,746	13,83	57,14%

Design Parameters:

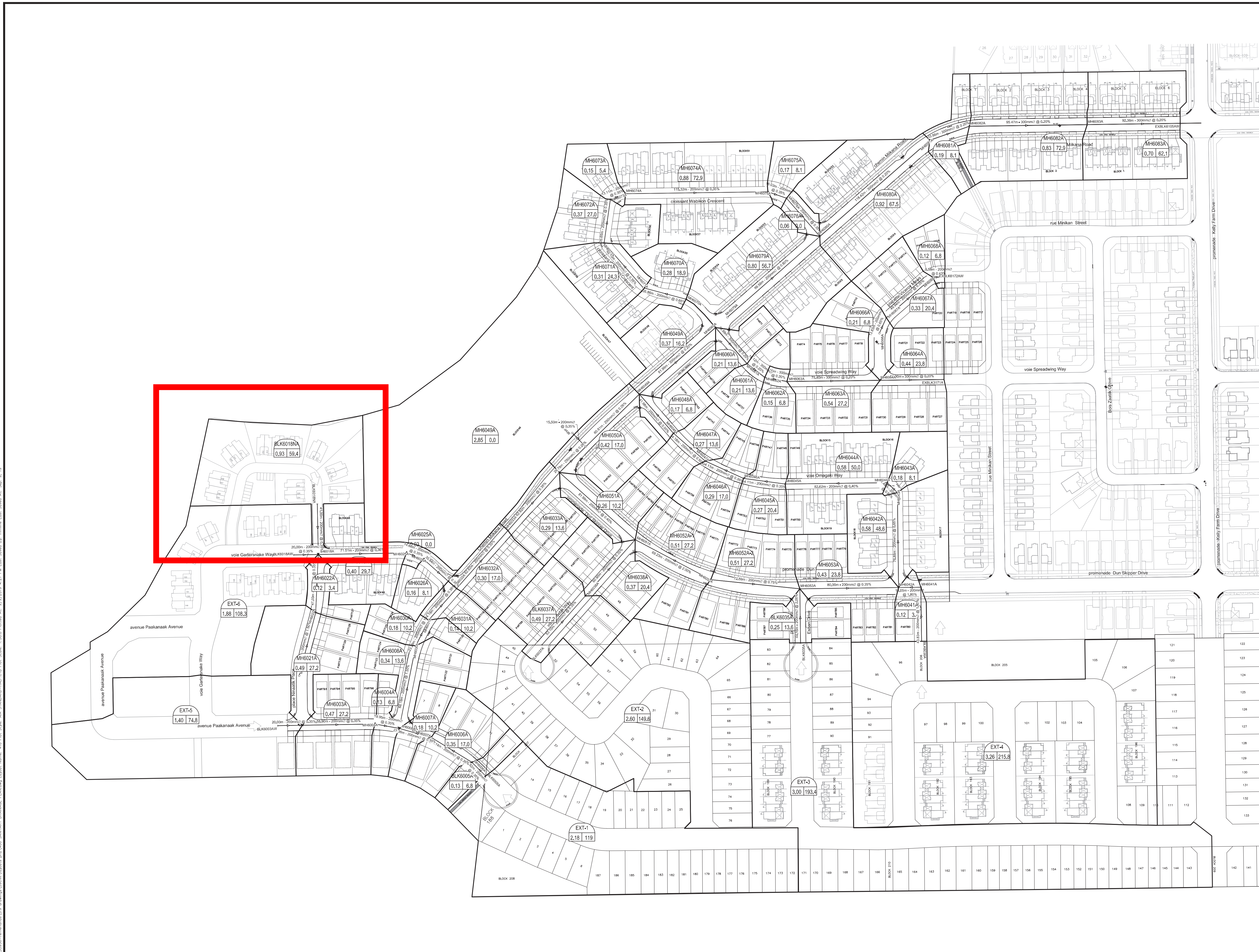
Residential			ICI Areas			
SF	3.4	p/p/u	INST	28,000	L/Ha/day	
TH/SD	2.7	p/p/u	COM	28,000	L/Ha/day	
APT	1.8	p/p/u	IND	35,000	L/Ha/day	MOE Chart
Other	60	p/p/Ha		17000	L/Ha/day	

Notes:
1. Mannings coefficient (n) = 0,013
2. Demand (per capita): 280 L/day 200 L/day
3. Infiltration allowance: 0,33 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
   where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area, 1.5 if greater than 20%, otherwise 1.0

Designed: KH
Checked: JIM
Dwg. Reference: 33956 - 400

No.	Revision	Date
1.	SUBMISSION NO. 1 FOR CITY REVIEW	2019-02-28
2.	SUBMISSION NO. 2 FOR CITY REVIEW	2019-07-15
3.	SUBMISSION NO. 3 FOR CITY REVIEW	2019-09-10

File Reference: 33956.5.7.1
Date: 2019-09-10
Sheet No: 1 of 2



LEGEND :

MH6083A	AREA NUMBER
0,70 | 62,1	POPULATION
	AREA IN HECTARES
	AREA BOUNDARY

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3	SUBMISSION No. 3 FOR CITY REVIEW	J.I.M.	2019:09:10
2	SUBMISSION No. 2 FOR CITY REVIEW	J.I.M.	2019:07:17
1	SUBMISSION No.1 FOR CITY REVIEW	J.I.M.	2019:02:28

LEITRIM SOUTH HOLDINGS INC.

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

Project Title

pathways at FINDLAY CREEK PHASE 2

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
2019/09/10
PROVINCE OF ONTARIO

N

Drawing Title

SANITARY DRAINAGE AREA PLAN

Scale	
1 : 1500	
Design: K.H.	Date: FEBRUARY 2019
Drawn: M.M.	Checked: J.I.M.
Project No.: 33956	Drawing No.: 410

D07-16-03-0018PH2

#17896

APPENDIX D

Storm Sewer Design Sheet
125506-500 - Storm Drainage Plan
125506-600 - Ponding Plan
Pathways Phase 2 Storm Design Sheet
Pathways Phase 2 Storm Drainage Area Plan
Pathways Phase 3 Storm Drainage Area Plan
Pathways Phase 3 Excerpt Table 5.4 SWM Criteria
Modified Rational Method on-site SWM calculations
On-site Underground Storage System
Storm HGL Calculations
Pathways Phase 2 HGL Reference
Overflow Depth/Capacity Calculation
Temporary Orifice Sizing

REPEATED COMMENT:
Please provide sample calculation for the Runoff Coefficients

Sample Calculations provided in Appendix D

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ibigroup.com

According to the drawings, Area R4 discharges between MH 3 / 4. Please clarify.

Design sheet updated accordingly.

Some pipe sizes do not match drawings. Please review and revise accordingly.

Drawing updated accordingly. Design Sheet was correct.

STORM SEWER DESIGN SHEET

Pathways Phase 3 - Block 60
City of Ottawa
Leitrim South Holdings Ltd.

LOCATION				AREA (Ha)						RATIONAL DESIGN FLOW														SEWER DATA									
STREET	AREA ID	FROM		C= 0.57	C= 0.65	C= 0.69	C= 0.70	C= 0.76	C= 0.80	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW IND	FIXED FLOW CUM	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	PIPE SIZE (mm) W	PIPE SIZE (mm) H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (2yr) (L/s)	AVAIL CAP (2yr) (%)
Clubtail Private		MH1	MH2							0.00	0.00	10.00	0.61	10.61	76.81	104.19	122.14	178.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.62	30.00	250			0.45	0.821	41.62	100.00%
Clubtail Private	S2	MH2	MH3							0.00	0.00	10.61	0.18	10.79	74.54	101.08	118.48	173.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.62	8.70	250			0.45	0.821	41.62	100.00%
Clubtail Private	R3	MH3	MH4	0.19				0.33		1.00	1.00	10.79	0.82	11.60	73.92	100.22	117.46	171.69	73.79	100.05	117.26	171.39	125.00	125.00	73.79	139.51	41.60	450			0.22	0.850	65.72	47.11%
Clubtail Private	R4	MH4	MH5	0.17						0.27	1.27	11.60	0.19	11.79	71.16	96.43	113.00	165.14	90.21	122.25	143.25	209.34	35.00	160.00	90.21	139.51	9.68	450			0.22	0.850	49.30	35.34%
Clubtail Private	S5	MH5	EXBLKHDN					0.14		0.30	1.56	11.79	0.96	12.75	70.55	95.60	112.02	163.69	110.30	149.46	175.14	255.93	25.00	185.00	110.30	248.09	48.86	600			0.15	0.850	137.78	55.54%
				0.36				0.47		1.56	TRUE																						
									A=	0.83																							
									Avg C=	0.68																							
		EXBLKHDN	EXMH6018							0.00	1.56	12.75	0.26	13.01	67.65	91.61	107.33	156.81	105.76	143.24	167.81	245.16	0.00	0.00	105.76	248.09	13.18	600			0.15	0.850	142.32	57.37%
		EXMH6311	EXBLKHDW							0.00	0.00	0.00	0.44	0.44	167.22	230.48	271.61	398.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	640.56	58.39	600			1.00	2.195	640.56	100.00%
Gartersnake Way		EXBLKHDW	EXMH6018							0.00	0.00	0.44	0.15	0.60	158.12	217.59	256.29	376.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	640.56	19.98	600			1.00	2.195	640.56	100.00%
Ninaatik Place		EXMMH6022	EXMH6018							0.00	0.00	0.60	0.89	1.49	155.25	213.54	251.48	368.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	264.11	48.57	600			0.17	0.905	264.11	100.00%
		EXMH6018	EXMH6025							0.00	1.56	0.00	1.23	1.23	167.22	230.48	271.61	398.62	261.45	360.35	424.65	623.23	0.00	0.00	261.45	654.22	73.59	900			0.12	0.996	392.78	60.04%

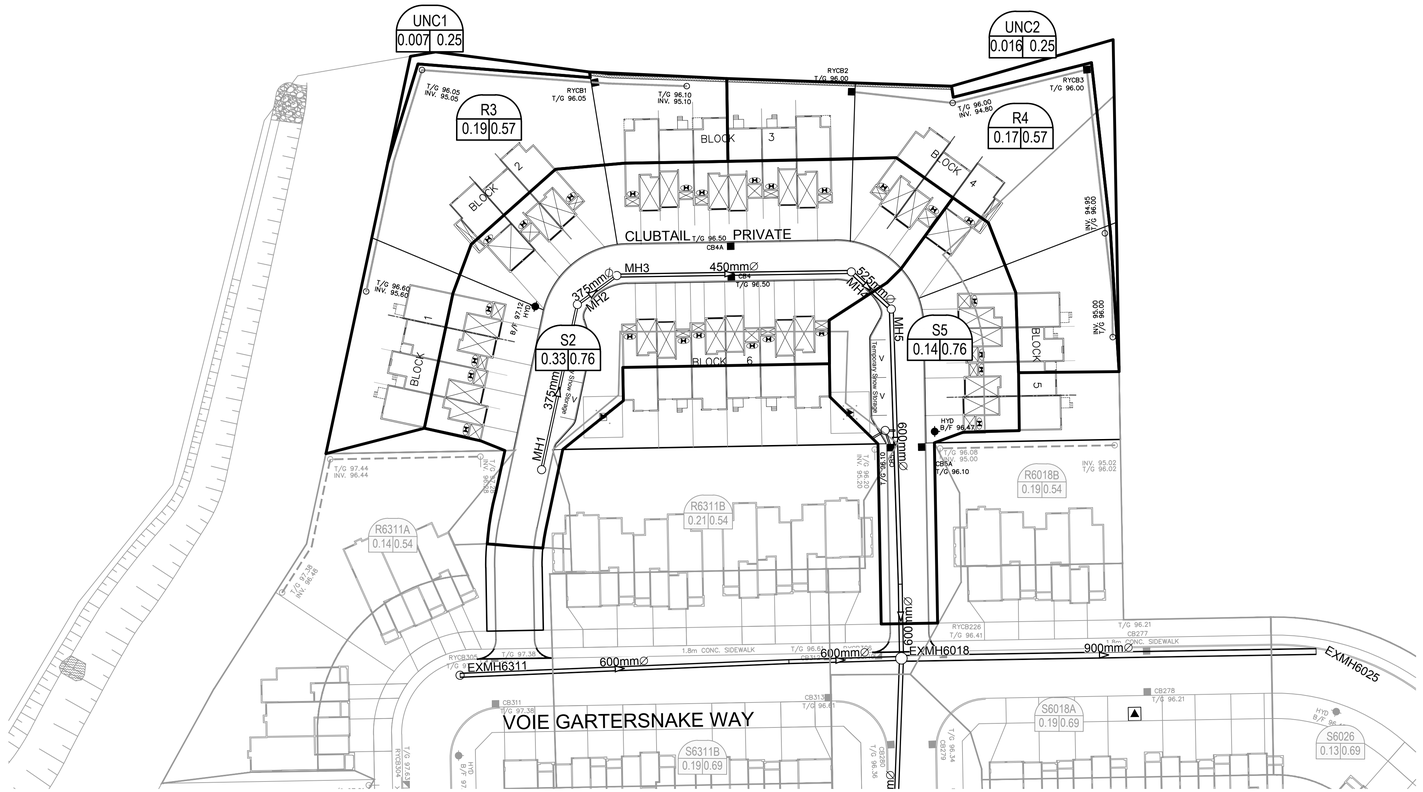
Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 732.951 / (TC+6.199)^0.810] 2 YEAR
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

Designed: RM
Checked: DY
Dwg. Reference: 125506-500

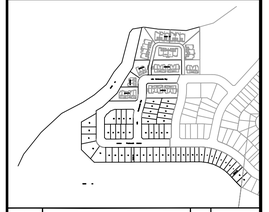
No.	Revision	Date
1.	Design Brief - Submission No. 1	2021-05-10
2.	Design Brief - Submission No. 2	2021-08-23

File Reference: 125506-6.04.04
Date: 2021-05-10
Sheet No: 1 of 1



LEGEND :

S2 — AREA NUMBER
0.32 0.69 — RUNOFF COEFFICIENT
AREA IN HECTARES



No.	REVISIONS	By	Date
14			
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3			
2	REVISED PER CITY COMMENTS	D.G.Y.	2021:08:24
1	SUBMISSION No.1 FOR CITY REVIEW	D.G.Y.	2021:05:13

LEITRIM SOUTH HOLDINGS INC.

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

Project Title
pathways
at FINDLAY CREEK
BLOCK 60

LICENCED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
21/08/24
PROVINCE OF ONTARIO

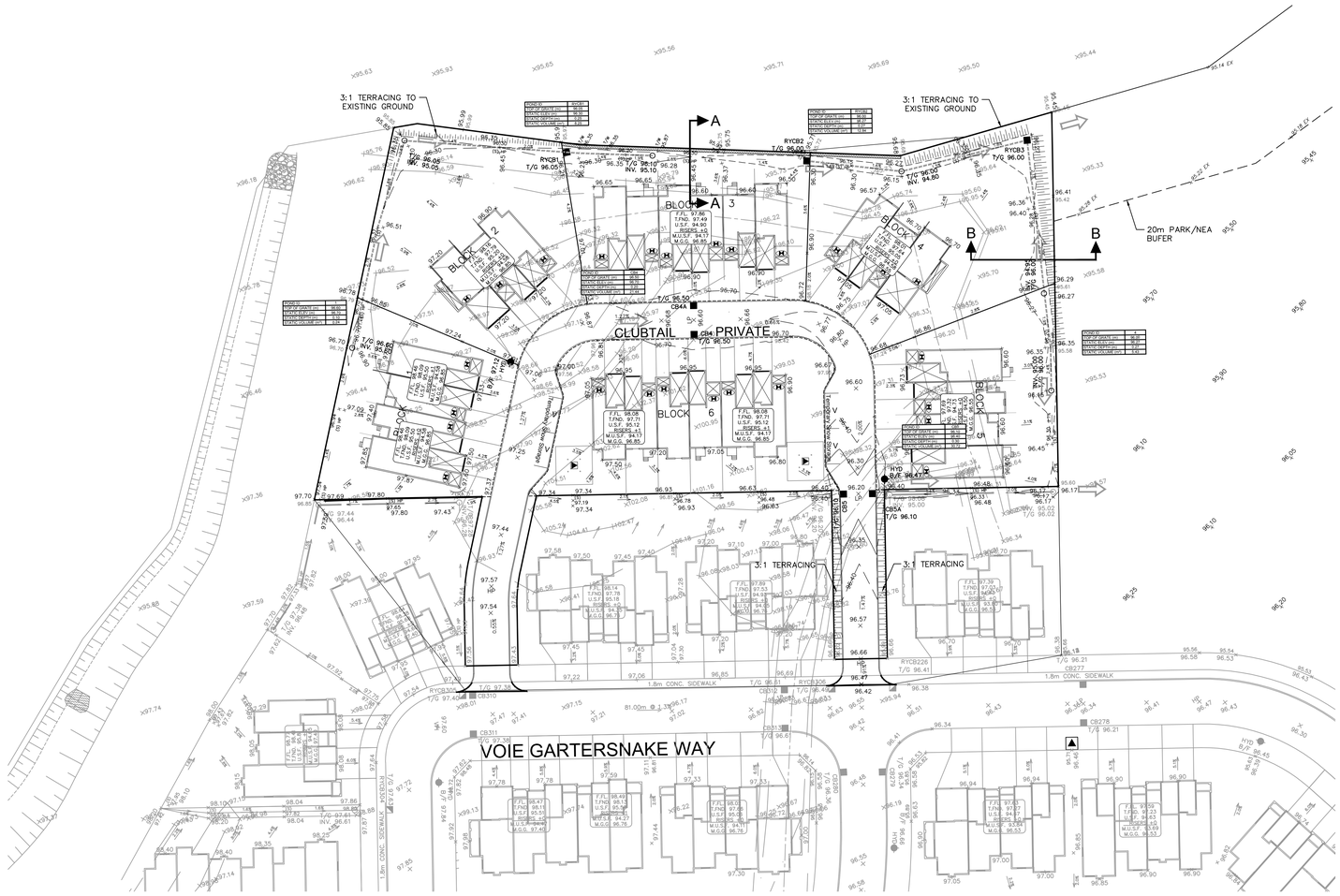
Drawing Title
STORM DRAINAGE AREA PLAN

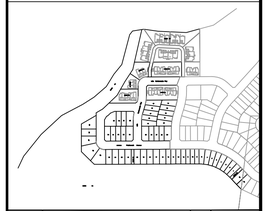
Scale
5 0 5 10
1:500

Design	Date
R.M.	OCTOBER 2020
Drawn	Checked
M.M.	K.H.
Project No.	Drawing No.
125506	500

D07-12-21-0070

#18475





No.	REVISIONS	By	Date
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3			
2	REVISED PER CITY COMMENTS	D.G.Y.	2021:08:24
1	SUBMISSION No.1 FOR CITY REVIEW	D.G.Y.	2021:05:13

LEITRIM SOUTH HOLDINGS INC.

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

Project Title

pathways at FINDLAY CREEK BLOCK 60

LICENSED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos 90
21/08/24
PROVINCE OF ONTARIO

Drawing Title

PONDING PLAN

Scale

1:500

Design	Date
R.M.	OCTOBER 2020
Drawn	Checked
M.M.	K.H.
Project No.	Drawing No.
125506	600

D07-12-21-0070

#18475

IBI GROUP
400-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
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LEGEND

Black text 2 year event curve design
Red text 5 year event curve design (Miikana Road, Dun Skipper Drive)
Blue text 100 year even curve design (DI 1)
EXBLK3171 Existing infrastructure, shown for information only

STORM SEWER DESIGN SHEET

Pathways at Findlay Creek Phase 2
City of Ottawa
Regional Group

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW													SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.25	C= 0.40	C= 0.50	C= 0.54	C= 0.61	C= 0.69	C= 0.70	C= 0.75	C= 0.80	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	W	H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (2yr) (L/s)	(%)
Paakanaak	EXT 7	BLK6003W	MH6003									0.98		2.04	2.04	11.72	0.37	12.09	70.78	95.91	112.39	164.24	144.63					144.63	200.65	20.00	525			0.20	0.898	56.02	27.92%
Paakanaak	S6003, R6003	MH6003	MH6004					0.17	0.27					0.71	2.76	12.09	1.16	13.25	69.62	94.31	110.51	161.47	191.89					191.89	248.09	58.97	600			0.15	0.850	56.20	22.65%
Paakanaak		MH6004	MH6008											0.00	2.76	13.25	0.38	13.63	66.24	89.69	105.06	153.48	182.59					182.59	248.09	19.53	600			0.15	0.850	65.50	26.40%
Paakanaak	EXT 4	BLK6005	MH6006									1.51		3.15	3.15	10.00	0.26	10.26	76.81	104.19	122.14	178.56	241.81					241.81	449.81	15.40	750			0.15	0.986	208.00	46.24%
Paakanaak	R6006	MH6006	MH6007					0.15						0.23	3.37	10.26	0.65	10.91	75.82	102.84	120.55	176.21	255.78					255.78	449.81	38.33	750			0.15	0.986	194.03	43.14%
Paakanaak	S6007	MH6007	MH6008						0.32					0.54	3.92	10.91	0.50	11.40	73.49	99.63	116.77	170.66	287.79					287.79	449.81	29.35	750			0.15	0.986	162.03	36.02%
Miikana		MH6008	MH6030											0.00	6.67	13.63	0.40	14.03	65.20	88.27	103.39	151.02	435.08					481.48	1,364.35	71.84	750			1.38	2.992	882.87	64.71%
Miikana	S6008	MH6008	MH6030						0.31					0.53	0.53	13.63	0.40	14.03	65.20	88.27	103.39	151.02		46.40				481.48	1,364.35	71.84	750			1.38	2.992	882.87	64.71%
Miikana		MH6030	MH6031											0.00	6.67	14.03	0.11	14.14	64.16	86.83	101.70	148.55	428.10					550.65	1,364.35	20.23	750			1.38	2.992	813.70	59.64%
Miikana	R6030	MH6030	MH6031					0.59						0.89	1.41	14.03	0.11	14.14	64.16	86.83	101.70	148.55		122.55				550.65	1,364.35	20.23	750			1.38	2.992	813.70	59.64%
Miikana		MH6031	MH6032											0.00	6.67	14.14	0.59	14.74	63.87	86.44	101.24	147.86	426.18					640.44	986.85	39.35	1050			0.12	1.104	346.41	35.10%
Miikana	S6031, R6031	MH6031	MH6032					0.44	0.24					1.07	2.48	14.14	0.59	14.74	63.87	86.44	101.24	147.86		214.27				640.44	986.85	39.35	1050			0.12	1.104	346.41	35.10%
Gartersnake	EXT 6	BLK6018W	MH6018									1.64		3.42	3.42	14.38	0.15	14.53	63.28	85.62	100.28	146.46	216.37					216.37	640.56	20.06	600			1.00	2.195	424.19	66.22%
Ninaatik	S6021	MH6021	MH6022						0.18					0.31	0.31	10.00	0.59	10.59	76.81	104.19	122.14	178.56	23.44					23.44	75.98	52.67	250			1.50	1.500	52.54	69.14%
Ninaatik	S6022, R6022	MH6022	MH6018					0.53	0.21					1.15	1.46	10.59	0.98	11.57	74.63	101.20	118.62	173.38	108.73					108.73	184.99	48.76	525			0.17	0.828	76.25	41.22%
Future Private Road	EXT 5, S6018B, R6018A-B	BLK6018N	MH6018					0.37		0.15		0.73		2.37	2.37	12.00	0.74	12.74	69.89	94.70	110.96	162.13	165.31					165.31	248.09	37.97	600			0.15	0.850	82.77	33.36%
Gartersnake	S6018A	MH6018	MH6025							0.19				0.36	7.61	14.53	1.23	15.76	62.90	85.11	99.67	145.57	478.42					478.42	654.22	73.58	900			0.12	0.996	175.81	26.87%
Gartersnake		MH6025	MH6026											0.00	7.61	15.76	0.26	16.03	60.03	81.18	95.05	138.79	456.58					456.58	654.22	15.81	900			0.12	0.996	197.65	30.21%
Gartersnake	S6026	MH6026	MH6032							0.13				0.25	7.86	16.03	0.56	16.58	59.45	80.38	94.12	137.42	466.99					466.99	654.22	33.40	900			0.12	0.996	187.23	28.62%
Miikana		MH6032	MH6033											0.00	14.53	16.58	0.72	17.31	58.26	78.77	92.22	134.63	846.47					1,103.60	1,928.87	56.60	1350			0.12	1.305	825.27	42.79%
Miikana	S6032, R6032	MH6032	MH6033					0.32	0.18					0.79	3.26	16.58	0.72	17.31	58.26	78.77	92.22	134.63		257.13				1,103.60	1,928.87	56.60	1350			0.12	1.305	825.27	42.79%
Miikana		MH6033	MH6050											0.00	14.53	17.31	0.86	18.17	56.81	76.78	89.88	131.20	825.33					1,096.80	1,928.87	67.56	1350			0.12	1.305	832.07	43.14%
Miikana	S6033	MH6033	MH6050						0.16					0.27	3.54	17.31	0.86	18.17	56.81	76.78	89.88	131.20		271.47				1,096.80	1,928.87	67.56	1350			0.12	1.305	832.07	43.14%
Ginebik		DI 1	BLK6037	11.60										6.45	6.45	146.39	0.36	146.75	12.49	16.68	19.43	28.15			181.53			181.53	210.32	27.65	450			0.50	1.281	28.79	13.69%
				2016 UPDATED SERVICEABILITY REPORT												12.81																				
Ginebik	EXT 3, S6037, R6037	BLK6037	MH6038					0.21	0.26			2.42		5.80	5.80	12.81	0.89	13.70	67.47	91.37	107.05	156.39	391.46					391.46	449.81	52.48	750			0.15	0.986	58.36	12.97%
Ginebik		MH6038	MH6051											0.00	5.80	13.70	1.09	14.78	65.02	88.02	103.10	150.60	377.26					377.26	449.81	64.37	750			0.15	0.986	72.55	16.13%
Dun Skipper	S6052C, R6052C	MH6052	MH6051					0.36	0.19					0.86	0.86	10.00	0.60	10.60	76.81	104.19	122.14	178.56		89.88				89.88	142.67	69.94	300			2.00	1.955	52.79	37.00%
Dun Skipper		MH6051	MH6050											0.00	5.80	14.78	0.81	15.60	62.28	84.26	98.68	144.11	361.34					571.53	947.10	83.50	825			0.40	1.716	375.57	39.66%
Dun Skipper	S6051A-C, R6051A-B	MH6051	MH6050					0.59	0.44					1.63	2.49	14.78	0.81	15.60	62.28	84.26	98.68	144.11		210.19				571.53	947.10	83.50	825			0.40	1.716	375.57	39.66%
Miikana		MH6050	MH6049											0.00	20.33	18.17	1.10	19.27	55.18	74.54	87.25	127.35	1,121.71					1,600.31	2,554.60	92.47	1500			0.12	1.400	954.30	37.36%
Miikana	S6050	MH6050	MH6049						0.23					0.39	6.42	18.17	1.10	19.27	55.18	74.54	87.25	127.35		478.60				1,600.31	2,554.60	92.47	1500			0.12	1.400	954.30	37.36%
Dun Skipper	S6052A-B, R6052A-B	MH6052	MH6053					0.66	0.33					1.55	1.55	10.00	0.67	10.67	76.81	104.19	122.14	178.56		161.54				161.54	388.55	70.37	525			0.75	1.739	227.01	58.42%
				2016 UPDATED SERVICEABILITY REPORT												14.50																				
Esban	EXT 2, S6035	BLK6035	MH6053						0.32			2.21		5.15	5.15	14.50	0.30	14.80	62.97	85.21	99.79	145.74	324.34					324.34	420.63	46.80	450			2.00	2.562	96.29	22.89%
Dun Skipper		MH6053	MH6042											0.00	5.15	14.80	0.88	15.69	62.23	84.19	98.60	143.99	320.53					595.11	1,424.40	84.50	1050			0.25	1.594	829.29	58.22%
Dun Skipper	S6053A-B, R6053	MH6053	MH6042					0.62	0.46					1.71	3.26	14.80	0.88	15.69	62.23	84.19	98.60	143.99		274.58				595.11	1,424.40	84.50	1050			0.25	1.594	829.29	58.22%
PARK	PARK 2	BLK6140S	MH6140	0.82										0.46	0.46	10.00	0.30	10.30	76.81	104.19	122.14	178.56	35.02					35.02	59.68	14.50	300			0.35	0.818	24.67	41.33%
Dun Skipper		MH6140	MH6041											0.00	0.46	10.30	0.16	10.45	75.69	102.66	120.33	175.90	34.51					60.62	142.67	18.60	300			2.00	1.955	82.05	57.51%
Dun Skipper	S6140	MH6140	MH6041						0.15					0.25	0.25	10.30	0.16	10.45	75.69	102.66	120.33	175.90		26.11				60.62	142.67	18.60	300			2.00	1.955	82.05	57.51%
				2016 UPDATED SERVICEABILITY REPORT												16.34																				
Dun Skipper	EXT 1	BLK6036	MH6041									2.78		5.80	5.80	16.34	0.28	16.62	58.78	79.46	93.04	135.83	340.68					340.68	601.94	45.33	525			1.80	2.694	261.26	43.40%
Dun Skipper		MH6041	MH6042											0.00	6.25	16.62	0.08	16.70	58.19	78.66	92.10	134.45	363.82					389.72	859.40	13.63	600			1.80	2.945	469.68	54.65%
Dun Skipper		MH6041	MH6042											0.00	0.25	10.45	0.08	10.53	75.10	101.85	119.39	174.51		25.91				389.72	859.40	13.63	600			1.80	2.945	469.68	54.65%

Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 732.951 / (TC+6.199)^0.810] 2 YEAR
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

Designed: KH
Checked: JIM
Dwg. Reference: 33956-500

No.	Revision	Date
1.	SUBMISSION NO. 1 FOR CITY REVIEW	2019-02-28
2.	SUBMISSION NO. 2 FOR CITY REVIEW	2019-07-15
3.	SUBMISSION NO. 3 FOR CITY REVIEW	2019-09-10

File Reference: 33956.5.7.1
Date: 2019-09-10
Sheet No: 1 of 2

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LEGEND

Black text 2 year event curve design
Red text 5 year event curve design (Miikana Road, Dun Skipper Drive)
Blue text 100 year even curve design (DI 1)
EXBLK3171 Existing infrastructure, shown for information only

STORM SEWER DESIGN SHEET

Pathways at Findlay Creek Phase 2
City of Ottawa
Regional Group

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW												SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.25	C= 0.40	C= 0.50	C= 0.54	C= 0.61	C= 0.69	C= 0.70	C= 0.75	C= 0.80	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	W	H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (2yr) (L/s)	(%)
Omagaki	S6042	MH6042	MH6043							0.05				0.10	11.50	16.70	0.49	17.18	58.03	78.45	91.84	134.08	667.28					953.44	2,296.77	75.12	1050			0.65	2.570	1343.33	58.49%
Omagaki		MH6042	MH6043											0.00	3.52	15.69	0.49	16.18	60.19	81.40	95.31	139.17		286.16				953.44	2,296.77	75.12	1050			0.65	2.570	1343.33	58.49%
Omagaki	R6043	MH6043	MH6044					0.36						0.54	12.04	17.18	0.09	17.28	57.05	77.10	90.26	131.76	686.82					967.87	2,296.77	13.96	1050			0.65	2.570	1328.90	57.86%
Omagaki		MH6043	MH6044											0.00	3.52	16.18	0.09	16.27	59.13	79.94	93.60	136.66		281.04				967.87	2,296.77	13.96	1050			0.65	2.570	1328.90	57.86%
Omagaki	S6044, R6044	MH6044	MH6045					0.21		0.38				1.04	13.08	17.28	0.69	17.97	56.87	76.86	89.98	131.34	744.06					1,024.18	1,801.74	83.64	1050			0.40	2.016	777.56	43.16%
Omagaki		MH6044	MH6045											0.00	3.52	16.27	0.69	16.96	58.93	79.68	93.29	136.20		280.12				1,024.18	1,801.74	83.64	1050			0.40	2.016	777.56	43.16%
Omagaki	S6045, R6045	MH6045	MH6046					0.57		0.36				1.55	14.63	17.97	0.32	18.29	55.55	75.05	87.85	128.23	812.66					1,085.90	1,560.35	33.53	1050			0.30	1.746	474.45	30.41%
Omagaki		MH6045	MH6046											0.00	3.52	16.96	0.32	17.28	57.50	77.72	90.99	132.83		273.24				1,085.90	1,560.35	33.53	1050			0.30	1.746	474.45	30.41%
Omagaki		MH6046	MH6047											0.00	14.63	18.29	0.32	18.60	54.96	74.25	86.91	126.84	804.04					1,074.23	1,560.35	33.15	1050			0.30	1.746	486.12	31.15%
Omagaki		MH6046	MH6047											0.00	3.52	17.28	0.32	17.59	56.87	76.85	89.97	131.33		270.19				1,074.23	1,560.35	33.15	1050			0.30	1.746	486.12	31.15%
Omagaki		MH6047	MH6048											0.00	14.63	18.60	0.25	18.85	54.39	73.47	86.00	125.50	795.72					1,062.96	2,014.40	33.53	1050			0.50	2.254	951.44	47.23%
Omagaki		MH6047	MH6048											0.00	3.52	17.59	0.25	17.84	56.25	76.02	88.99	129.89		267.24				1,062.96	2,014.40	33.53	1050			0.50	2.254	951.44	47.23%
Omagaki	S6048A-B	MH6048	MH6049							0.29				0.56	15.19	18.85	0.33	19.18	53.96	72.88	85.30	124.47	819.35					1,084.33	2,014.40	44.78	1050			0.50	2.254	930.07	46.17%
Omagaki	S6048A-B	MH6048	MH6049											0.00	3.52	17.84	0.33	18.17	55.78	75.37	88.23	128.78		264.98				1,084.33	2,014.40	44.78	1050			0.50	2.254	930.07	46.17%
PARK	PARK 1	BLK6049	MH6049	2.70										1.50	1.50	10.00	0.20	10.20	76.81	104.19	122.14	178.56	115.30	156.41				115.30	200.65	11.00	525			0.20	0.898	85.35	42.54%
Miikana		MH6049	MH6060											0.00	37.02	19.27	0.77	20.04	53.24	71.90	84.14	122.78	1,970.63					2,750.11	4,644.39	81.99	1800			0.15	1.768	1894.29	40.79%
Miikana	S6049A-B, R6049	MH6049	MH6060					0.22		0.30				0.91	10.84	19.27	0.77	20.04	53.24	71.90	84.14	122.78		779.47				2,750.11	4,644.39	81.99	1800			0.15	1.768	1894.29	40.79%
Spreadwing	S6060	MH6060	MH6061						0.15					0.25	37.27	20.04	0.42	20.46	51.96	70.16	82.10	119.79	1,936.71					2,697.33	5,142.48	41.59	1950			0.12	1.668	2445.15	47.55%
Spreadwing		MH6060	MH6061											0.00	10.84	20.04	0.42	20.46	51.96	70.16	82.10	119.79		760.63				2,697.33	5,142.48	41.59	1950			0.12	1.668	2445.15	47.55%
Spreadwing		MH6061	MH6062											0.00	37.27	20.46	0.17	20.63	51.31	69.26	81.05	118.25	1,912.22					2,663.13	5,142.48	17.10	1950			0.12	1.668	2479.35	48.21%
Spreadwing		MH6061	MH6062											0.00	10.84	20.46	0.17	20.63	51.31	69.26	81.05	118.25		750.91				2,663.13	5,142.48	17.10	1950			0.12	1.668	2479.35	48.21%
Spreadwing	R6062	MH6062	MH6063					0.44						0.66	37.93	20.63	0.17	20.80	51.04	68.90	80.62	117.62	1,936.06					2,683.06	5,142.48	17.18	1950			0.12	1.668	2459.43	47.83%
Spreadwing		MH6062	MH6063											0.00	10.84	20.63	0.17	20.80	51.04	68.90	80.62	117.62		746.99				2,683.06	5,142.48	17.18	1950			0.12	1.668	2459.43	47.83%
Spreadwing	S6063, R6063	MH6063	MH6064					0.51	0.26					1.21	39.14	20.80	0.70	21.50	50.78	68.54	80.20	117.01	1,987.35					2,730.46	6,266.12	73.60	2100			0.12	1.753	3535.66	56.43%
Spreadwing		MH6063	MH6064											0.00	10.84	20.80	0.70	21.50	50.78	68.54	80.20	117.01		743.10				2,730.46	6,266.12	73.60	2100			0.12	1.753	3535.66	56.43%
Spreadwing	S6064A-B	MH6064	*EXBLK3171*						0.36					0.61	39.75	21.50	0.47	21.97	49.74	67.12	78.53	114.56	1,976.94					2,704.64	6,768.18	53.01	2100			0.14	1.893	4063.54	60.04%
Spreadwing		MH6064	*EXBLK3171*											0.00	10.84	21.50	0.47	21.97	49.74	67.12	78.53	114.56		727.70				2,704.64	6,768.18	53.01	2100			0.14	1.893	4063.54	60.04%
Spreadwing		*EXBLK3171*	*MH6171*											0.00	39.75	21.97	0.36	22.32	49.07	66.21	77.46	112.99	1,950.36					2,668.18	6,768.18	*40.39*	*2100*			*0.14*	1.893	4099.99	60.58%
Spreadwing		*EXBLK3171*	*MH6171*											0.00	10.84	21.97	0.36	22.32	49.07	66.21	77.46	112.99		717.82				2,668.18	6,768.18	*40.39*	*2100*			*0.14*	1.893	4099.99	60.58%
Viceroy	S6065	MH6065	MH6066						0.25					0.42	0.42	10.00	0.26	10.26	76.81	104.19	122.14	178.56	32.56					32.56	60.53	12.95	300			0.36	0.830	27.97	46.21%
Viceroy	R6066	MH6066	MH6067					0.27						0.41	0.83	10.26	0.24	10.50	75.82	102.84	120.55	176.21	62.88					62.88	96.79	12.33	375			0.28	0.849	33.91	35.04%
Viceroy		MH6067	MH6068						0.31					0.53	1.35	10.50	0.97	11.47	74.93	101.61	119.10	174.09	101.53					101.53	148.72	52.48	450			0.25	0.906	47.19	31.73%
Viceroy	S6068	MH6068	*XBLK6172W*											0.00	1.35	11.47	0.16	11.63	71.59	97.03	113.71	166.17	97.01					97.01	210.44	8.99	525			0.22	0.942	113.43	53.90%
Viceroy		*EXBLK6172W*	*MH6172*											0.00	1.35	11.63	0.72	12.35	71.08	96.32	112.87	164.94	96.31					96.31	210.44	*40.78*	*525*			*0.22*	0.942	114.13	54.24%
Wabikon	S6069	MH6069	MH6070							0.12				0.23	0.23	10.00	0.47	10.47	76.81	104.19	122.14	178.56	17.68					17.68	60.53	23.19	300			0.36	0.830	42.85	70.79%
Wabikon	R6070	MH6070	MH6071					0.07						0.11	0.34	10.47	0.72	11.19	75.06	101.79	119.32	174.41	25.17					25.17	60.53	36.08	300			0.36	0.830	35.36	58.42%
Wabikon	S6071, R6071	MH6071	MH6072					0.17		0.22				0.68	1.01	11.19	0.99	12.18	72.52	98.30	115.20	168.36	73.42					73.42	139.51	50.23	450			0.22	0.850	66.09	47.37%
Wabikon	S6072, R6072	MH6072	MH6073					0.22		0.23				0.77	1.78	12.18	0.75	12.92	69.35	93.95	110.08	160.84	123.72					123.72	248.09	38.12	600			0.15	0.850	124.37	50.13%
Wabikon	R6073	MH6073	MH6074					0.19						0.29	2.07	12.92	0.25	13.17	67.15	90.93	106.52	155.62	138.94					138.94	248.09	12.76	600			0.15	0.850	109.15	44.00%
Wabikon	S6074A-B, R6074A-C	MH6074	MH6075					0.73		0.36				1.79	3.86	13.17	2.27	15.44	66.44	89.96	105.39	153.95	256.18					256.18	402.33	120.00	750			0.12	0.882	146.15	36.33%
Wabikon	R6075	MH6075	MH6076					0.29						0.44	4.29	15.44	0.23	15.67	60.75	82.16	96.21	140.48	260.66					260.66	402.33	12.19	750			0.12	0.882	141.67	35.21%
Wabikon	S6076	MH6076	MH6080							0.26				0.50	4.79	15.67	0.76	16.44	60.23	81.45	95.37	139.26	288.47					288.47	402.33	40.44	750			0.12	0.882	113.86	28.30%
Miikana	S6079, R6079	MH6079	MH6080					0.54		0.24				1.27	1.27	10.00	1.16	11.16	76.81	104.19	122.14	178.56	97.62	132.43				97.62	163.60	99.66	375			0.80	1.435	65.98	40.33%
Miikana		MH6080	MH6081											0.00	4.79	16.44	1.77	18.21	58.58	79.19	92.72	135.36	280.56					458.68	986.85	117.49	1050			0.12	1.104	528.17	53.52%
Miikana	S6080A-B	MH6080	MH6081							0.51				0.98	2.25	16.44	1.77	18.21	58.58	79.19	92.72	135.36		178.12				458.68	986.85	117.49	1050			0.12	1.104	528.17	53.52%
Miikana		MH6081	MH6082											0.00	4.79	18.21	0.53	18.74	55.10	74.44	87.14	127.18	263.93					511.16	986.85	34.93	1050			0.12	1.104	475.70	48.20%
Miikana	S6081, R6081	MH6081	MH6082					0.42		0.23				1.07	3.32	18.21	0.53	18.74	55.10	74.44	87.14	127.18		247.23				511.16	986.85	34.93	1050			0.12	1.104	475.70	48.20%
Miikana		MH6082	MH6083											0.00	4.79	18.74	1.38	20.12	54.16	73.15	85.62	124.95	259.40					630.34	1,408.95	100.00	1200			0.12	1.207	778.62	55.26%
Miikana	S6082A-B, R6082	MH6082	MH6083					0.45		0.56				1.75	5.07	18.74	1.30	20.03	54.16	73.15	85.62	124.95		370.94				630.34	1,408.95	93.96	1200			0.12	1.207	778.62	55.26%
Miikana		MH6083	*XBLK6105W*											0.00	4.79	20.12	0.76	20.88	51.84	70.00	81.91	119.51	248.31					639.16	1,818.95	71.34	1200			0.20	1.558	1179.79	64.86%
Miikana	S6083	MH6083	*XBLK6105W*							0.26				0.50	5.57	20.03	0.83	20.86	51.98	70.18	82.12	119.82		390.85				639.16	1,818.95	77.38	1200			0.20	1.558	1179.79	64.86%
Miikana		*EXBLK6105W*	*MH6105*											0.00	4.79	20.88	0.21	21.09	50.66	68.38	80.01	116.72	242.63					623.67	1,818.95	*19.63*	*1200*			*0.20*	1.558	1195.29	65.71%
Miikana		*EXBLK6105W*	*MH6105*											0.00	5.57	20.86	0.21	21.07	50.69	68.42	80.05	116.79		381.04				623.67	1,818.95	*19.63*	*1200*			*0.20*	1.558	1195.29	65.71%

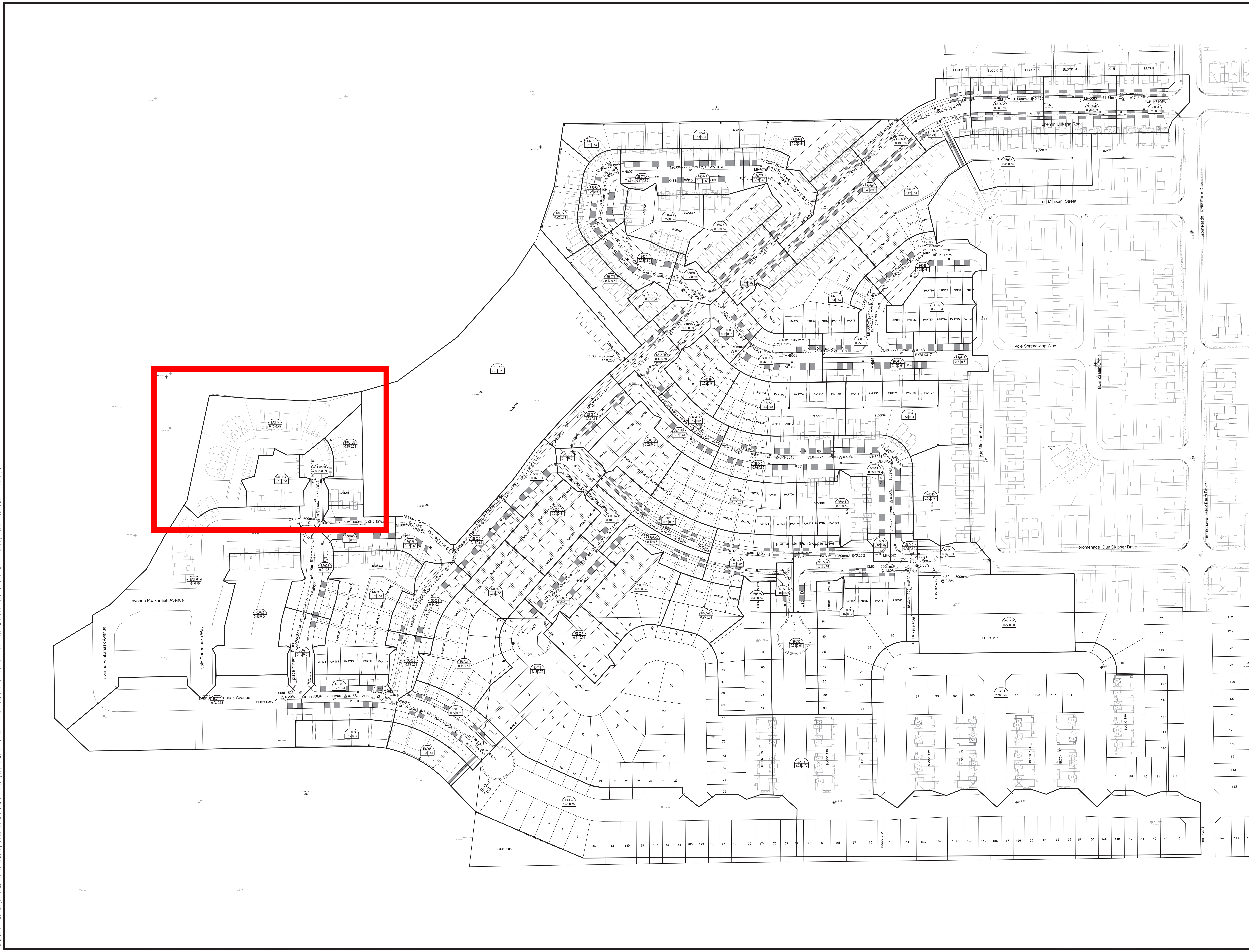
Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 732.951 / (TC+6.199)^0.810] 2 YEAR
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

Designed: KH
Checked: JIM
Dwg. Reference: 33956-500

No.	Revision	Date
1.	SUBMISSION NO. 1 FOR CITY REVIEW	2019-02-28
2.	SUBMISSION NO. 2 FOR CITY REVIEW	2019-07-15
3.	SUBMISSION NO. 3 FOR CITY REVIEW	2019-09-10

File Reference: 33956.5.7.1
Date: 2019-09-10
Sheet No: 2 of 2



LEGEND :

S6083 — AREA NUMBER
0.69 — RUNOFF COEFFICIENT
0.23 — AREA IN HECTARES
— AREA BOUNDARY

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3	SUBMISSION No. 3 FOR CITY REVIEW	J.I.M.	2019:09:10
2	SUBMISSION No. 2 FOR CITY REVIEW	J.I.M.	2019:07:17
1	SUBMISSION No.1 FOR CITY REVIEW	J.I.M.	2019:02:28

LEITRIM SOUTH HOLDINGS INC.

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ibigroup.com

Project Title

pathways at FINDLAY CREEK
PHASE 2

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
2019/09/10
PROVINCE OF ONTARIO

Drawing Title

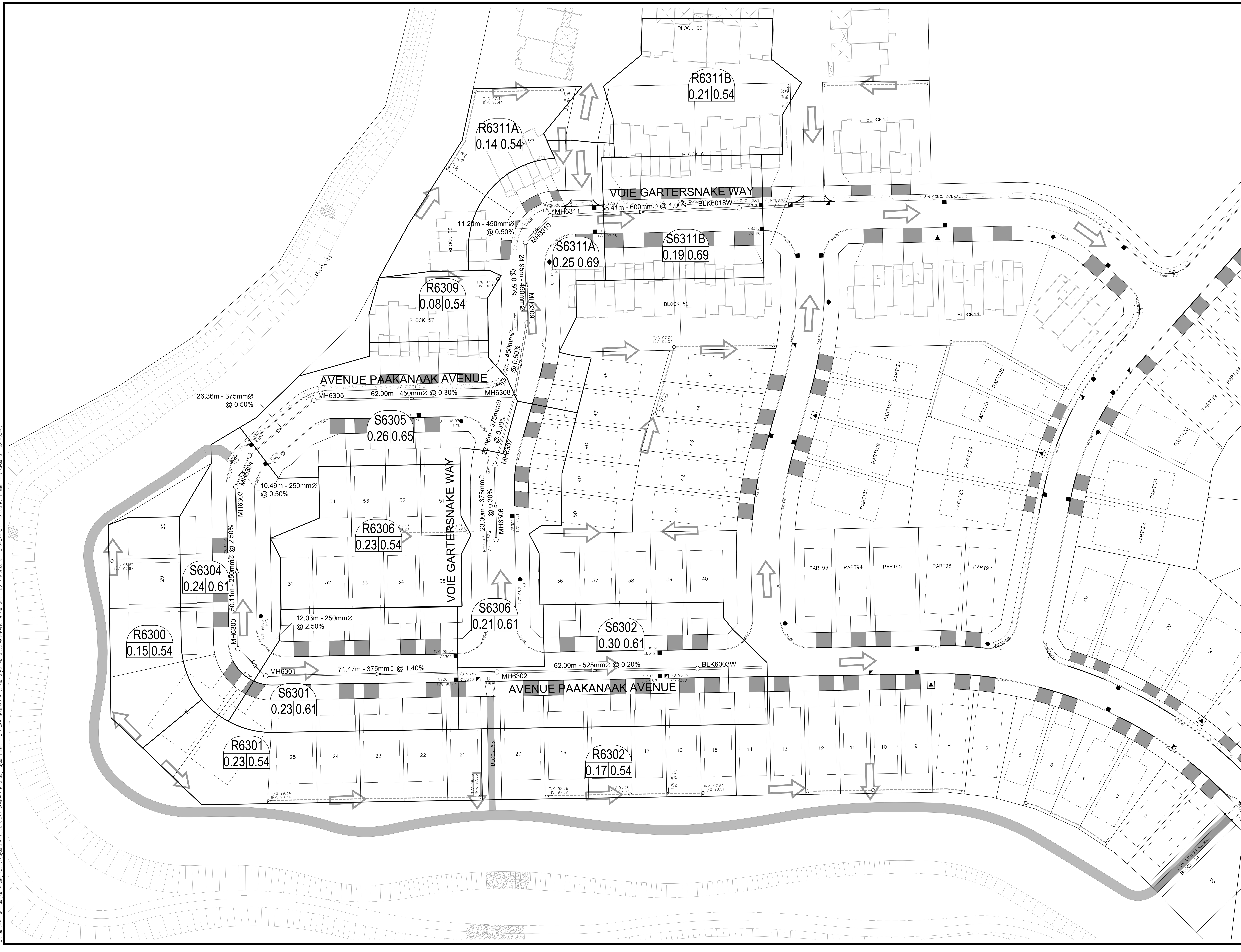
STORM DRAINAGE AREA PLAN

Scale
1 : 1000

Design	Date
K.H.	FEBRUARY 2019
Drawn	Checked
M.M.	J.I.M.
Project No.	Drawing No.
33956	510

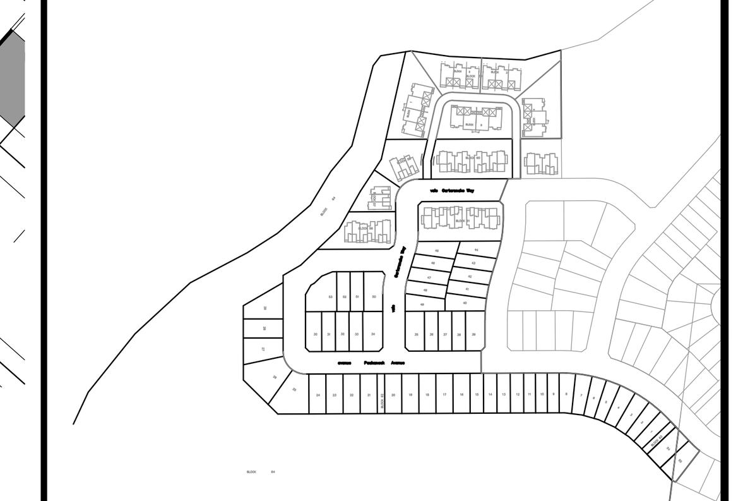
D07-16-03-0018PH2

#17896



LEGEND :

S6083	AREA NUMBER
0.69	RUNOFF COEFFICIENT
0.23	AREA IN HECTARES
———	AREA BOUNDARY



No.	REVISIONS	By	Date
14			
13			
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6			
5			
4			
3			
2	SUBMISSION No. 2 FOR CITY REVIEW	K.H.	2020:07:31
1	SUBMISSION No.1 FOR CITY REVIEW	K.H.	2020:05:07

LEITRIM SOUTH HOLDINGS INC.

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Project Title

pathways at FINDLAY CREEK PHASE 3

LICENSED PROFESSIONAL ENGINEER
K. S. HINDS
100225162
2020/07/31
PROVINCE OF ONTARIO

N

Drawing Title

STORM DRAINAGE PLAN

Scale

1:500

Design KH	Date MAY 2020
Drawn MM	Checked JIM
Project No. 33956	Drawing No. 520

D07-16-03-0018PH3

#17896

DRAINAGE AREA ID	CONTINUOUS /SAG (1)(2)	ROAD TYPE	MINOR SYSTEM DESIGN TARGET (BASED ON ROAD TYPE)		ICD (L/S)	NOTES
			MINOR SYSTEM DESIGN STORM	GENERATED FLOW ON INDIVIDUAL SEGMENT SIMULATED (L/S)		
Total restricted flow (ICD flow) - Street Segments (L/s)					**190**	
Rear Yards Segments						
R6300	Rear Yard	Rear Yard	2	14	16	
R6301	Rear Yard	Rear Yard	2	22	22	
R6302	Rear Yard	Rear Yard	2	16	17	
R6306	Rear Yard	Rear Yard	2	21	22	
R6309	Rear Yard	Rear Yard	2	7	17	
R6311A	Rear Yard	Rear Yard	2	13	17	
R6311B	Rear Yard	Rear Yard	2	20	26	
Total restricted flow (ICD flow) – Rear Yard Segments (L/s)					**137**	

(1) Capture on continuous grade is limited to capacity of grate.
(2) The minor flow restriction has been increased in sags to allow full capture of overflow from upstream segments on continuous grade during the design storm event without ponding.

For external development north of Phase 3 Pathways at Findlay Creek which will require a separate site stormwater design and analysis, the following table summarizes the assumed inflow rate and minimum on-site storage required for their design.

Table 5.4 Summary of Minimum On-Site Storage and Minor System Inflow Rate for External Development Lands North of Phase 3 Pathways

DRAINAGE AREA ID	AREA (HA)	LAND USE	IMP RATIO	MINIMUM ON-SITE STORAGE REQUIRED (CU-M)*	MINOR SYSTEM INFLOW RATE (L/S)
EXT5	0.86	Residential	0.94	54.2	187

** The on-site storage noted was used to evaluate the areas in Phase 2 Pathways. As a minimum this on-site storage should be provided.*

The storage available on-site and its maximum depth and the results of the DDSWMM evaluation for the subject site are presented in **Table 5.5**. The ponding plan for the subject site is presented on **Drawing 33956-620**. The DDSWMM output files are presented in **Appendix E**.

Table 5.5 Summary of On-Site Storage during the Target Minor System Design Storm

DRAINAGE AREA ID	MINOR SYSTEM DESIGN STORM	AVAILABLE STATIC STORAGE (CU-M)	TOTAL STORAGE USED (CU-M)	OVERFLOW (L/S)
S6302	2	5.53	0.00	0.00
S6305	2	33.79	0.00	0.00
S6306	2	6.32	0.00	0.00

The results of the on-site detention analysis show that during the restricted inflow rate of the 2 year storm event, there is no ponding on the subject site.

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PROJECT:	PROJECT
DATE:	2021-08-23
FILE:	125506-6.4.4
REV #:	2
DESIGNED BY:	RM
CHECKED BY:	RM

STORMWATER MANAGEMENT

Formulas and Descriptions

i_{2yr} = 1:2 year Intensity = $732.951 / (T_c+6.199)^{0.810}$
i_{5yr} = 1:5 year Intensity = $998.071 / (T_c+6.053)^{0.814}$
i_{100yr} = 1:100 year Intensity = $1735.688 / (T_c+6.014)^{0.820}$
T_c = Time of Concentration (min)
C = Average Runoff Coefficient
A = Area (Ha)
Q = Flow = 2.78CiA (L/s)

Maximum Allowable Release Rate

Restricted Flowrate (based on 85 L/s/Ha)

EXT5 =	187.000	L/s	From Pathways Phase 3

$Q_{restricted}$ =	187.00	L/s

Uncontrolled Release ($Q_{uncontrolled} = 2.78*C*i_{100yr}*A_{uncontrolled}$)

C =	0.25	
T_c =	10	min
i_{100yr} =	178.56	mm/hr
$A_{uncontrolled}$ =	0.023	Ha

$Q_{uncontrolled}$ =	2.85	L/s

Maximum Allowable Release Rate ($Q_{max\ allowable} = Q_{restricted} - Q_{uncontrolled}$)

$Q_{max\ allowable}$ =	184.15	L/s

MODIFIED RATIONAL METHOD (100-Year & 2-Year Ponding)

Drainage Area	R3		
Area (Ha)	0.190		
C =	0.71	Restricted Flow Q_r (L/s)=	35.00

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)
-1	462.72	174.14	35.00	139.14	-8.35
4	262.41	98.75	35.00	63.75	15.30
9	188.25	70.85	35.00	35.85	**19.36**
14	148.72	55.97	35.00	20.97	17.62
19	123.87	46.62	35.00	11.62	13.24

100Yr +20%

100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
85.02	50.02	**27.01**

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance	100+20 Overflow	100+20 Required	100+20 Balance
0.00	19.36	8.25	0	11.11	0.00	27.01	18.76
							34.74

overflows to: R4

Drainage Area	R3		
Area (Ha)	0.190		
C =	0.57	Restricted Flow Q_r (L/s)=	35.00

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
8	85.46	25.73	35.00	-9.27	-4.45
9	80.87	24.35	35.00	-10.65	-5.75
10	76.81	23.12	35.00	-11.88	**-7.13**
11	73.17	22.03	35.00	-12.97	-8.56
12	69.89	21.04	35.00	-13.96	-10.05

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	-7.13	8.25	0	0.00

overflows to: R4

Drainage Area	R4		
Area (Ha)	0.170		
C =	0.71	Restricted Flow Q_r (L/s)=	35.00

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)
-1	462.72	155.81	35.00	120.81	-7.25
4	262.41	88.36	35.00	53.36	12.81
9	188.25	63.39	35.00	28.39	**15.33**
14	148.72	50.08	35.00	15.08	12.67
19	123.87	41.71	35.00	6.71	7.65

100Yr +20%

100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
76.07	41.07	**22.18**

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance	100+20 Overflow	100+20 Required	100+20 Balance
11.11	26.44	38.70	0	0.00	18.76	40.94	2.24
							4.14

overflows to: NEA/Park

Drainage Area	R4		
Area (Ha)	0.170		
C =	0.57	Restricted Flow Q_r (L/s)=	35.00

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
8	85.46	23.02	35.00	-11.98	-5.75
9	80.87	21.79	35.00	-13.21	-7.14
10	76.81	20.69	35.00	-14.31	**-8.59**
11	73.17	19.71	35.00	-15.29	-10.09
12	69.89	18.83	35.00	-16.17	-11.64

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	-8.59	38.70	0	0.00

overflows to: NEA/Park

Drainage Area	S2		
Area (Ha)	0.330		
C =	0.95	Restricted Flow Q_r (L/s)=	90.00

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)
0	398.62	347.41	90.00	257.41	0.00
5	242.70	211.52	90.00	121.52	36.46
10	178.56	155.62	90.00	65.62	**39.37**
15	142.89	124.54	90.00	34.54	31.08
20	119.95	104.54	90.00	14.54	17.45

100Yr +20%

100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
186.74	96.74	**58.05**

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	39.37	21.44	0	17.93

100+20

Overflow	Required	Balance
0.00	58.05	36.61
		61.01

overflows to: S5

Drainage Area	S2		
Area (Ha)	0.330		
C =	0.76	Restricted Flow Q_r (L/s)=	90.00

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
8	85.46	59.58	90.00	-30.42	-14.60
9	80.87	56.39	90.00	-33.61	-18.15
10	76.81	53.55	90.00	-36.45	**-21.87**
11	73.17	51.01	90.00	-38.99	-25.73
12	69.89	48.73	90.00	-41.27	-29.71

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	-21.87	21.44	0	0.00

overflows to: S5

Drainage Area	S5		
Area (Ha)	0.140	Restricted Flow Qr (L/s)=	24
C =	0.95	50% Restricted Flow Q_r (L/s)=	12.00

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)
15	142.89	52.83	12.00	40.83	36.75
20	119.95	44.35	12.00	32.35	38.82
25	103.85	38.40	12.00	26.40	**39.59**
30	91.87	33.97	12.00	21.97	39.54
35	82.58	30.53	12.00	18.53	38.92

100Yr +20%

100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
46.08	34.08	**51.11**

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
17.93	57.53	30.72	27.06	0.00

100+20

Overflow	Required	Balance
36.61	87.72	57.00
		38.00

Stormtech SC-310 or approved equal (27.06 provided, 26.06 minimum required)

overflows to: R6018B/Park

Drainage Area	S5		
Area (Ha)	0.140		
C =	0.76	Restricted Flow Q_r (L/s)=	12.00

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
8	85.46	25.28	12.00	13.28	6.37
9	80.87	23.92	12.00	11.92	6.44
10	76.81	22.72	12.00	10.72	**6.43**
11	73.17	21.64	12.00	9.64	6.36
12	69.89	20.67	12.00	8.67	6.25

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	6.43	30.72	27.06	0.00

overflows to: R6018B/Park

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteASSIST™
FOR STORMTECH INSTRUCTIONS, DOWNLOAD THE INSTALLATION APP

PATHWAYS BLOCK 60

OTTAWA, ONTARIO

SC-310 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-310.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE OR POLYETHYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418-16a (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 50 mm (2").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2922 SHALL BE GREATER THAN OR EQUAL TO 400 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2922 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-310 SYSTEM

1. STORMTECH SC-310 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-310 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 20-50 mm (3/4-2").
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-310 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-310 & SC-740 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

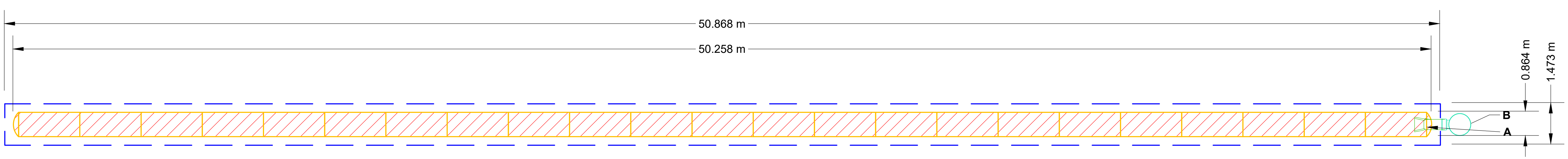
CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT	
23	STORMTECH SC-310 CHAMBERS
2	STORMTECH SC-310 END CAPS
152	STONE ABOVE (mm)
152	STONE BELOW (mm)
40	STONE VOID
27.1	INSTALLED SYSTEM VOLUME (m^3) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)
74.9	SYSTEM AREA (m^2)
104.7	SYSTEM PERIMETER (m)

CONCEPTUAL ELEVATIONS	
MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	2.997
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	1.168
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	1.016
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	1.016
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	1.016
TOP OF STONE:	0.711
TOP OF SC-310 CHAMBER:	0.559
300 mm ISOLATOR ROW PLUS INVERT:	0.175
BOTTOM OF SC-310 CHAMBER:	0.152
BOTTOM OF STONE:	0.000

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	300 mm BOTTOM PREFABRICATED END CAP, PART#: SC310EPE12BR / TYP OF ALL 300 mm ISOLATOR ROW PLUS CONNECTIONS	23 mm	
NYLOPLAST (INLET W/ ISO PLUS ROW)	B	750 mm DIAMETER (610 mm SUMP MIN)		



ISOLATOR ROW PLUS (SEE DETAIL)

NO WOVEN GEOTEXTILE

BED LIMITS

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

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REV	DRW	CHK	DESCRIPTION

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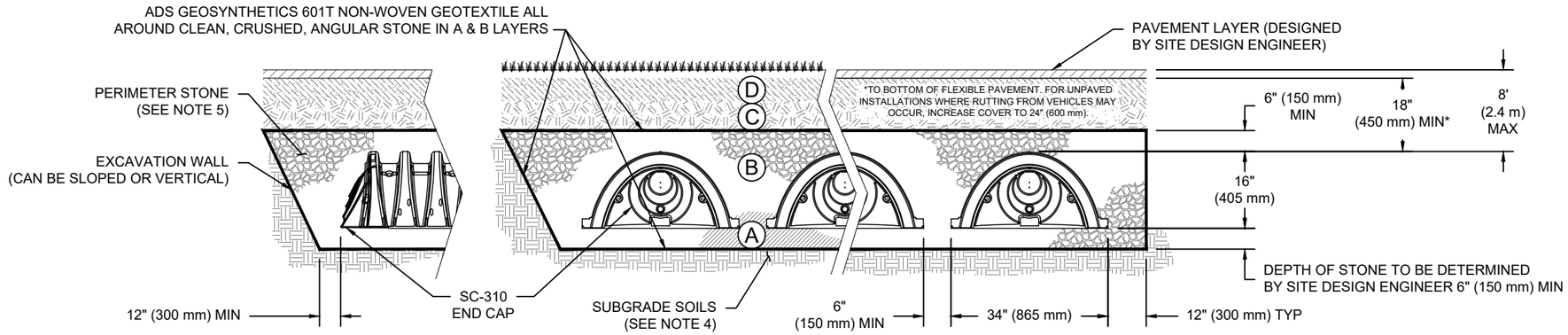
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

SCALE = 1 : 150

ACCEPTABLE FILL MATERIALS: STORMTECH SC-310 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418-16a (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-310 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2922 SHALL BE GREATER THAN OR EQUAL TO 400 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

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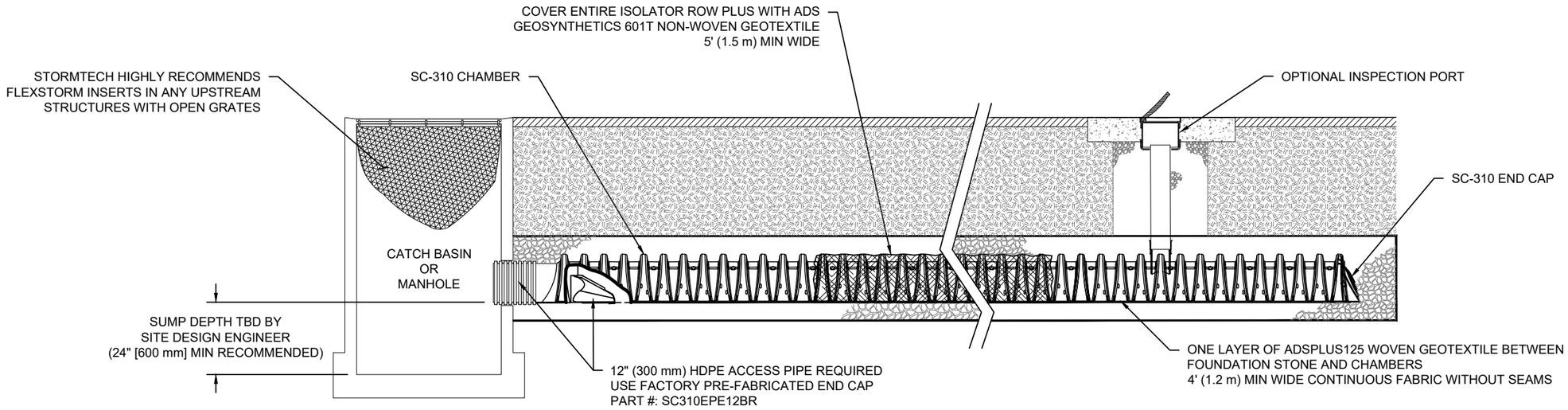

SC-310 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

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SC-310 TECHNICAL SPECIFICATION

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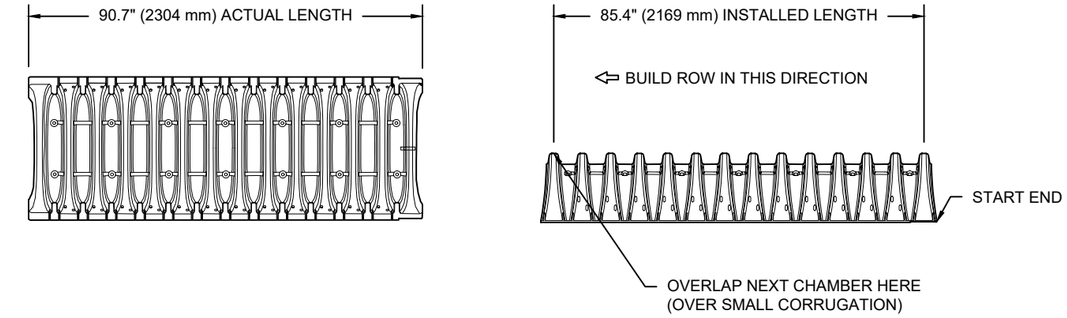
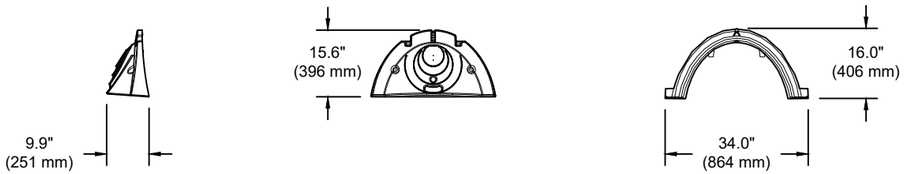
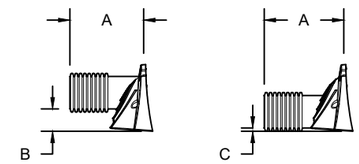




NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	34.0" X 16.0" X 85.4"	(864 mm X 406 mm X 2169 mm)
CHAMBER STORAGE	14.7 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	31.0 CUBIC FEET	(0.88 m³)
WEIGHT	35.0 lbs.	(16.8 kg)

*ASSUMES 6" (152 mm) ABOVE, BELOW, AND BETWEEN CHAMBERS



PRE-FAB STUB AT BOTTOM OF END CAP WITH FLAMP END WITH "BR"
PRE-FAB STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PRE-FAB STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
PRE CORED END CAPS END WITH "PC"

PART #	STUB	A	B	C
SC310EPE06T / SC310EPE06TPC	6" (150 mm)	9.6" (244 mm)	5.8" (147 mm)	---
SC310EPE06B / SC310EPE06BPC			---	0.5" (13 mm)
SC310EPE08T / SC310EPE08TPC	8" (200 mm)	11.9" (302 mm)	3.5" (89 mm)	---
SC310EPE08B / SC310EPE08BPC			---	0.6" (15 mm)
SC310EPE10T / SC310EPE10TPC	10" (250 mm)	12.7" (323 mm)	1.4" (36 mm)	---
SC310EPE10B / SC310EPE10BPC			---	0.7" (18 mm)
SC310EPE12B	12" (300 mm)	13.5" (343 mm)	---	0.9" (23 mm)
SC310EPE12BR	12" (300 mm)	13.5" (343 mm)	---	0.9" (23 mm)

ALL STUBS, EXCEPT FOR THE SC310EPE12B ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC310EPE12B THE 12" (300 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 0.25" (6 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

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NYLOPLAST DRAIN BASIN

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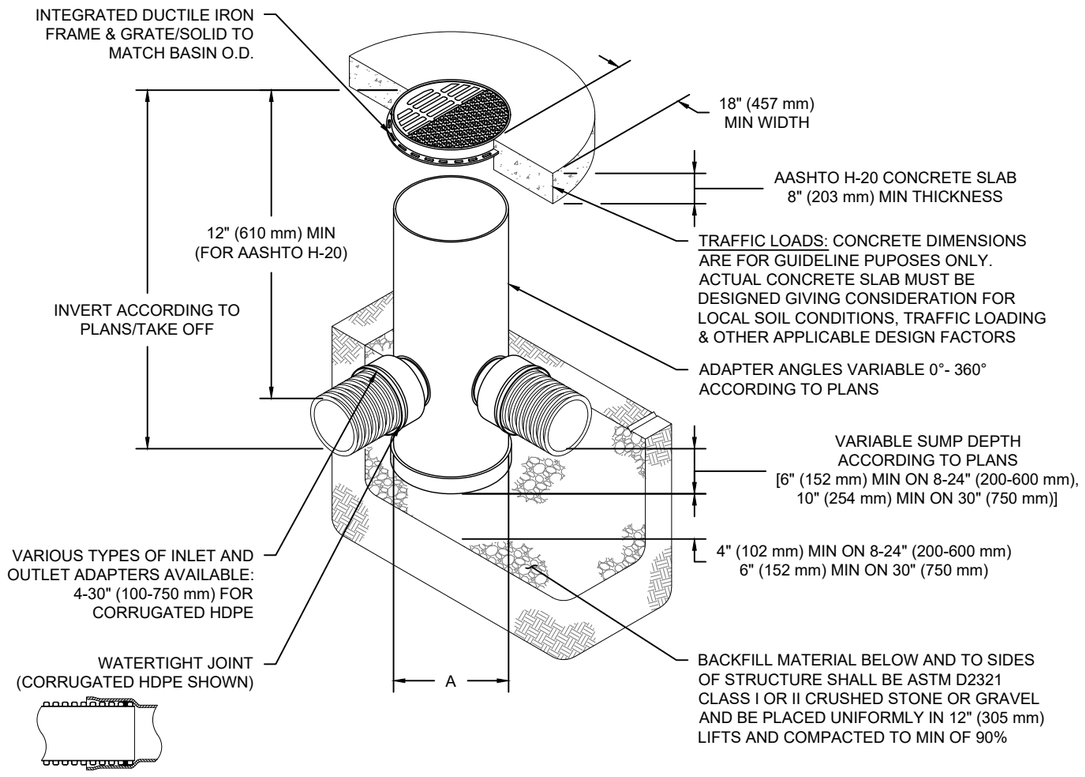

NOTES

1. 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
2. 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
5. FOR COMPLETE DESIGN AND PRODUCT INFORMATION: **WWW.NYLOPLAST-US.COM**
6. TO ORDER CALL: **800-821-6710**

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

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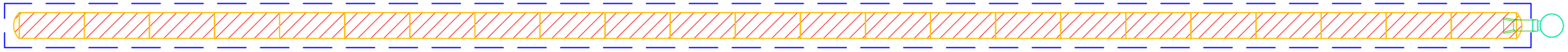

Pipe sizes and slopes on this HGL calc are correct, drawing updated. HGL adjusted as a result of shift R4 into upstream sewer run.

Some pipe sizes do not match the drawings. Please review and revise accordingly.

IBI GROUP

HYDRAULIC GRADE LINE DESIGN SHEET
Pathways Phase 3 - Block 60
CITY OF OTTAWA
Leitrim South Holdings Inc.

JOB #: 125506-6.4.4
DATE: 2021-05-11
DESIGN: RM
CHECKED: RM
REV #: -

FRICTION LOSS	FROM MH	TO MH	PIPE ID
Block 60	**BLK6018**	**5**	
INVERT ELEVATION (m)	92.859	92.932	
OBVERT ELEVATION (m)	93.459	93.532	
DIAMETER (mm)			600
LENGTH (m)			48.86
FLOW (l/s)			185.00
HGL (m) ***	**93.450**	**93.494**	**0.044**
MANHOLE COEF K= 0.75	LOSS (m)	0.016	
TOTAL HGL (m)		**93.680**	
MAX. SURCHARGE (mm)		**148**	

MANNING FORMULA - FLOWING FULL

DIA (m)	Area (m2)	Perim. (m)	Slope (%)	Hyd.R. (m)	Vel. (m/s)	Q (l/s)
0.6	0.28	1.88	0.150	0.15	0.84	237.21

HYDRAULIC SLOPE = 0.47 %
DESIGN FLOW TO FULL FLOW RATIO (Q_i) 0.780
DESIGN FLOW DEPTH = 0.396

Head loss in manhole simplified method p. 71 (MWDM)
fig1.7.1, Kratio = 0.75 for 45 bends K_L=0.75
Velocity = Flow / Area = 0.65 m/s
$HL = K_L * V^2/ 2g$

FRICTION LOSS	FROM MH	TO MH	PIPE ID
Block 60	**5**	**4**	
INVERT ELEVATION (m)	93.112	93.133	
OBVERT ELEVATION (m)	93.562	93.583	
DIAMETER (mm)			450
LENGTH (m)			9.68
FLOW (l/s)			160.00
HGL (m) ***	**93.680**	**93.711**	**0.031**
MANHOLE COEF K= 0.75	LOSS (m)	0.039	
TOTAL HGL (m)		**93.749**	
MAX. SURCHARGE (mm)		**166**	

MANNING FORMULA - FLOWING FULL

DIA (m)	Area (m2)	Perim. (m)	Slope (%)	Hyd.R. (m)	Vel. (m/s)	Q (l/s)
0.45	0.16	1.41	0.220	0.11	0.83	132.73

HYDRAULIC SLOPE = 0.72 %
DESIGN FLOW TO FULL FLOW RATIO (Q_i) 1.205
DESIGN FLOW DEPTH = 0.450

Head loss in manhole simplified method p. 71 (MWDM)
fig1.7.1, Kratio = 0.75 for 45 bends K_L=0.75
Velocity = Flow / Area = 1.01 m/s
$HL = K_L * V^2/ 2g$

FRICTION LOSS	FROM MH	TO MH	PIPE ID
Block 60	**4**	**3**	
INVERT ELEVATION (m)	93.133	93.225	
OBVERT ELEVATION (m)	93.583	93.675	
DIAMETER (mm)			450
LENGTH (m)			41.60
FLOW (l/s)			160.00
HGL (m) ***	**93.749**	**93.880**	**0.131**
MANHOLE COEF K= 0.05	LOSS (m)	0.003	
TOTAL HGL (m)		**93.883**	
MAX. SURCHARGE (mm)		**208**	

MANNING FORMULA - FLOWING FULL

DIA (m)	Area (m2)	Perim. (m)	Slope (%)	Hyd.R. (m)	Vel. (m/s)	Q (l/s)
0.45	0.16	1.41	0.220	0.11	0.84	134.01

HYDRAULIC SLOPE = 0.32 %
DESIGN FLOW TO FULL FLOW RATIO (Q_i) 1.194
DESIGN FLOW DEPTH = 0.450

Head loss in manhole simplified method p. 71 (MWDM)
straight through K_L=0.05
Velocity = Flow / Area = 1.01 m/s
$HL = K_L * V^2/ 2g$

FRICTION LOSS	FROM MH	TO MH	PIPE ID
Block 60	**3**	**2**	
INVERT ELEVATION (m)	93.425	93.464	
OBVERT ELEVATION (m)	93.675	93.714	
DIAMETER (mm)			250
LENGTH (m)			8.70
FLOW (l/s)			125.00
HGL (m) ***	**93.883**	**94.268**	**0.385**
MANHOLE COEF K= 0.05	LOSS (m)	0.017	
TOTAL HGL (m)		**94.284**	
MAX. SURCHARGE (mm)		**570**	

MANNING FORMULA - FLOWING FULL

DIA (m)	Area (m2)	Perim. (m)	Slope (%)	Hyd.R. (m)	Vel. (m/s)	Q (l/s)
0.25	0.05	0.79	0.450	0.06	0.81	39.80

HYDRAULIC SLOPE = 4.61 %
DESIGN FLOW TO FULL FLOW RATIO (Q_i) 3.141
DESIGN FLOW DEPTH = 0.250

Head loss in manhole simplified method p. 71 (MWDM)
straight through K_L=0.05
Velocity = Flow / Area = 2.55 m/s
$HL = K_L * V^2/ 2g$

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STORM HYDRAULIC GRADE LINE DESIGN SHEET
Pathways Phase 3 - Block 60
CITY OF OTTAWA
Leitrim South Holdings Inc.

JOB #: 125506-6.4.4
DATE: 2021-05-11
DESIGN: RM
CHECKED: RM
REV #: -

FRICTION LOSS	FROM MH	TO MH	PIPE ID
Block 60	**2**	**1**	
INVERT ELEVATION (m)	93.484	93.665	
OBVERT ELEVATION (m)	93.734	93.915	
DIAMETER (mm)			250
LENGTH (m)			30.00
FLOW (l/s)			0.00
HGL (m) ***	**94.284**	**94.284**	**0.000**
MANHOLE COEF K= 0.05	LOSS (m)	0.000	
TOTAL HGL (m)		**94.284**	
MAX. SURCHARGE (mm)		**369**	

MANNING FORMULA - FLOWING FULL

DIA (m)	Area (m2)	Perim. (m)	Slope (%)	Hyd.R. (m)	Vel. (m/s)	Q (l/s)
0.25	0.05	0.79	0.450	0.06	0.94	46.17

HYDRAULIC SLOPE = 0.00 %
DESIGN FLOW TO FULL FLOW RATIO (Q_i 0.000
DESIGN FLOW DEPTH = 0.003

Head loss in manhole simplified method p. 71 (MWDM)
straight through K_L=0.05
Velocity = Flow / Area = 0.00 m/s
$HL = K_L * V^2/ 2g$

FRICTION LOSS	FROM MH	TO MH	PIPE ID
Block 60	**1**	**DUMMY**	
INVERT ELEVATION (m)	93.665	93.665	
OBVERT ELEVATION (m)	93.865	93.865	
DIAMETER (mm)			200
LENGTH (m)			10.0
FLOW (l/s)			0.00
HGL (m) ***	**94.284**	**94.284**	**0.000**
MANHOLE COEF K= 0.05	LOSS (m)	0.000	
TOTAL HGL (m)		**#DIV/0!**	
MAX. SURCHARGE (mm)		**#DIV/0!**	

MANNING FORMULA - FLOWING FULL

DIA (m)	Area (m2)	Perim. (m)	Slope (%)	Hyd.R. (m)	Vel. (m/s)	Q (l/s)
0.2	0.03	0.63	0.450	0.05	0.00	0.00

HYDRAULIC SLOPE = #DIV/0! %
DESIGN FLOW TO FULL FLOW RATIO (Q_i #DIV/0!
DESIGN FLOW DEPTH = #DIV/0!

Head loss in manhole simplified method p. 71 (MWDM)
straight through K_L=0.05
Velocity = Flow / Area = 0.00 m/s
$HL = K_L * V^2/ 2g$

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

Overflow - Property Line East of MH6

PROJECT:	Pathways Block 60
	CITY OF OTTAWA
DEVELOPER :	
JOB #:	125506 - 6.2.4
DATE:	Jul-21
DESIGN:	RM

FLOW EVALUATION:

Manning's Formula *City of Ottawa sewer design guidelines 6.4.1*

Q cap = 1000 * (A * $R^{2/3}$ * S^1/2) / n

Flow Calculations:

	Depth	**0.08**	**m**
	Grade	**0.1**	**%**
	Roughness:	0.02	low vegetation
Properties			
	Area	0.320	sq.m
	Wetted Per.	16.002	m
	Hydr. Radius	0.020	
Q = (1/N)(A)(R^0.66)(S^0.5)			
	$Q_{CAPACITY}$ =	**38.26**	**l/s**
Target Release rate=		37.50	l/s

Dimensions Used for Area

Width	8 m
Depth	0.08 m

IBI GROUP
400-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT:	BLK 60 - temp orifice
DATE:	2021-07-29
FILE:	125506-6.4.4
REV #:	-
DESIGNED BY:	RM
CHECKED BY:	RM

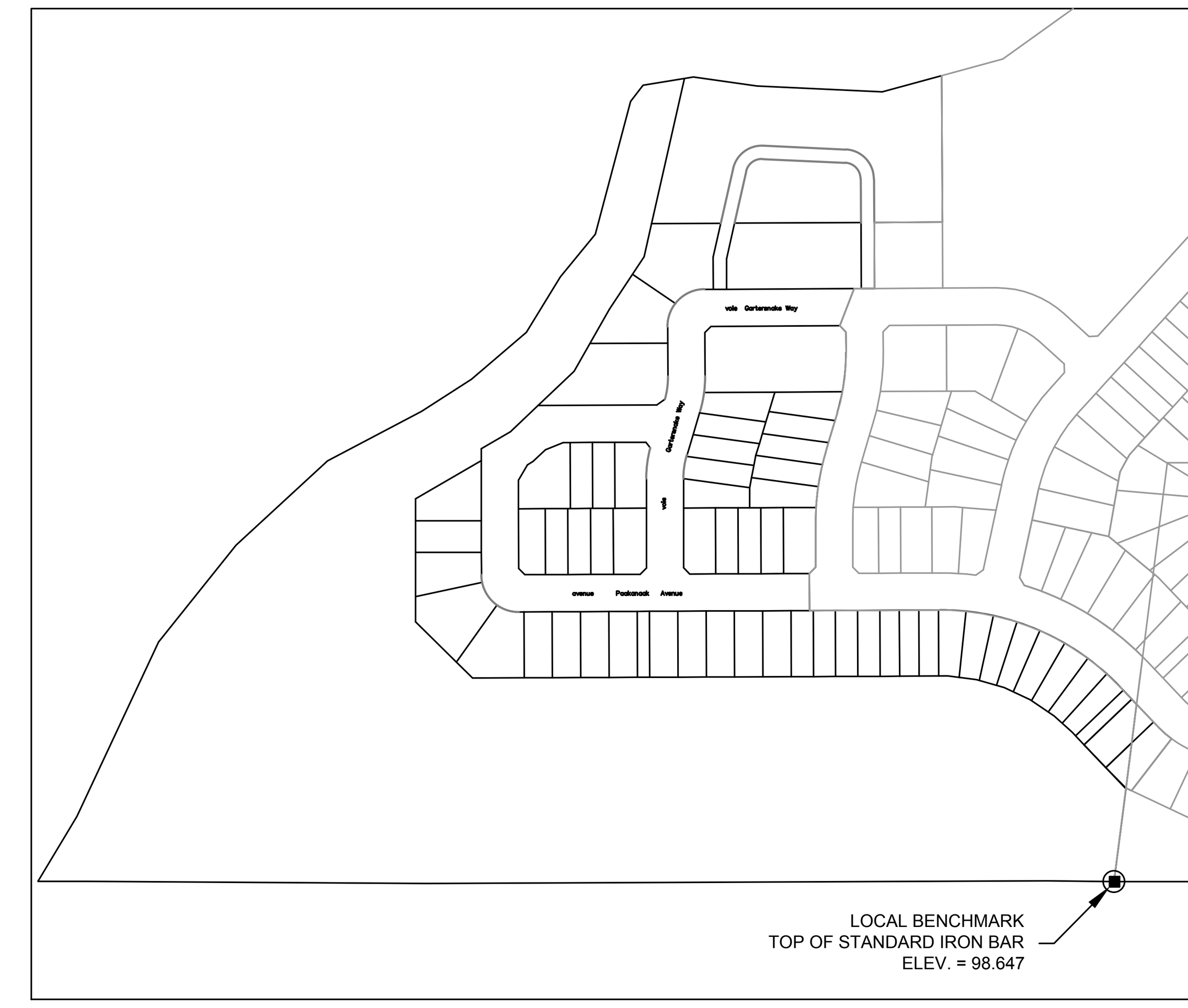
ORIFICE SIZING

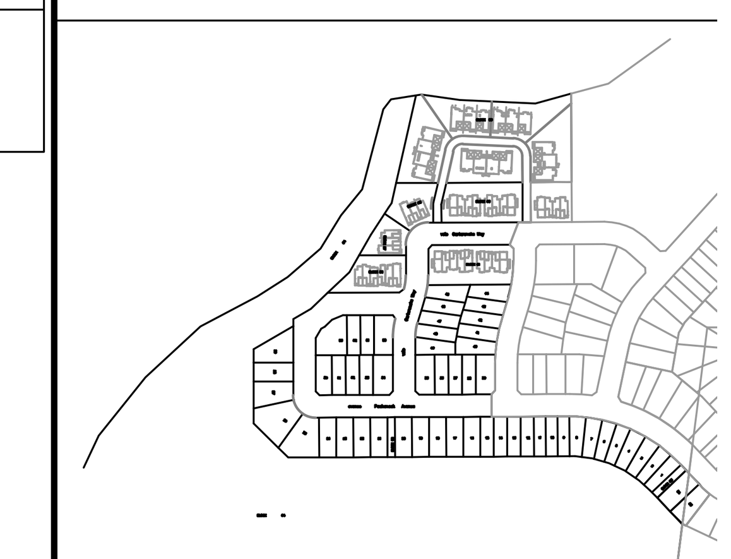
Orifice coefficients	
Cv =	0.60
Cv =	0.65

							Theoretical		Recommended	
	Invert	Diameter	Centre ICD	Max. Pond Elevation	Hydraulic Slope	Target Flow	Orifice	Actual Flow	Orifice	Actual Flow
	(m)	(mm)	(m)	(m)	(m)	(l/s)	(m)	(l/s)	(m)	(l/s)
Temp ICD	92.839	600	93.139	95.14	2.000	150.00	0.2000	150.34	0.200	150.34
						150.00				**150.34**

APPENDIX E

125506-900 - Erosion and Sediment Control Plan
125506-200 - Grading Plan





No.	REVISIONS	By	Date
14			
13			
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3			
2	REVISED PER CITY COMMENTS	D.G.Y.	2021:08:24
1	SUBMISSION No.1 FOR CITY REVIEW	D.G.Y.	2021:05:13

LEITRIM SOUTH HOLDINGS INC.

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

Project Title

pathways at FINDLAY CREEK
BLOCK 60

LICENSED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
21/08/24
PROVINCE OF ONTARIO

N

Drawing Title

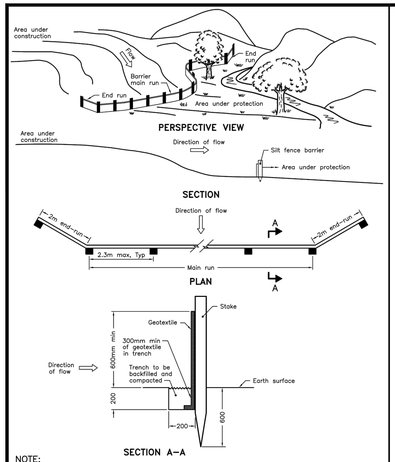
GRADING PLAN

Scale

1:500

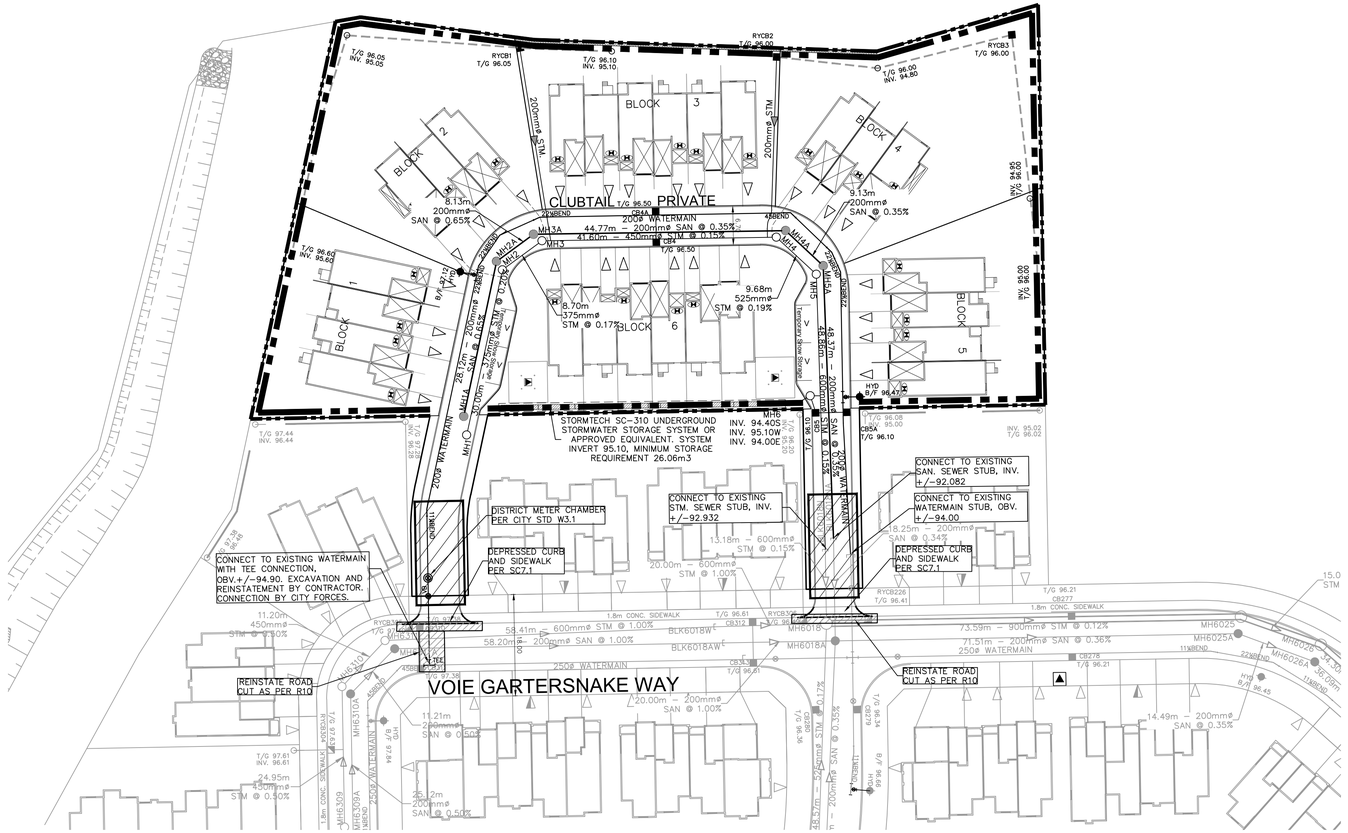
Design: R.M.	Date: OCTOBER 2020
Drawn: M.M.	Checked: K.H.
Project No.: 125506	Drawing No.: 200

#1847



NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2006	Rev 1	
LIGHT–DUTY SILT FENCE BARRIER			OPSD 219.110



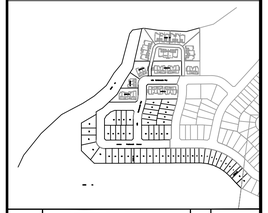
NOTES:

THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY,

1. SILT FENCE TO BE ERECTED PRIOR TO EARTH WORKS BEING COMMENCED. SILT FENCE TO BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED OR UNTIL START OF SUBSEQUENT PHASE.
2. STRAW BALE SEDIMENT TRAPS TO BE CONSTRUCTED IN EXISTING ROAD SIDE DITCHES. TRAPS TO REMAIN AND BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED.
3. SILT SACK TO BE PLACED AND MAINTAINED UNDER COVER OF ALL CATCHBASINS. GEOTEXTILE SILT SACK IN STREET CBs TO REMAIN UNTIL ALL CURBS ARE CONSTRUCTED. GEOTEXTILE FABRIC IN RYCBs TO REMAIN UNTIL VEGETATION IS ESTABLISHED. ALL CATCHBASINS TO BE REGULARLY INSPECTED AND CLEANED, AS NECESSARY, UNTIL SOD AND CURBS ARE CONSTRUCTED.
4. CONTRACTOR TO PROVIDE DETAILS ON LOCATION(S) AND DESIGN OF DEWATERING TRAP(S) PRIOR TO COMMENCING WORK. CONTRACTOR ALSO RESPONSIBLE FOR MAINTAINING TRAP(S) AND ADJUSTING SIZE(S) IF DEEMED REQUIRED BY THE ENGINEER DURING CONSTRUCTION.
5. CONTRACTOR TO PROTECT EXISTING CATCHBASINS WITH FILTER CLOTH UNDER THE COVERS TO TRAP SEDIMENTATION. REFER TO IDENTIFIED STRUCTURES.
6. THIS IS A "LIVING DOCUMENT" AND MAY BE MODIFIED IN THE EVENT THE PROPOSED CONTROL MEASURES ARE INSUFFICIENT

LEGEND :

- LIGHT DUTY SILT FENCE AS PER OPSD-219.110
- SNOW FENCE
- STRAW BALE CHECK DAM AS PER OPSD-219.180
- ROCK CHECK DAM AS PER OPSD-219.210
- SILT SACK PLACED UNDER EXISTING CB COVER
- TEMPORARY MUD MAT 0.15m THICK 50mm CLEAR STONE ON NON WOVEN FILTER CLOTH (7.0 × 15.0)



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LICENSED PROFESSIONAL ENGINEER
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21/08/24
PROVINCE OF ONTARIO

Drawing Title
SEDIMENT & EROSION CONTROL PLAN

Scale
1:500

Design	Date
R.M.	OCTOBER 2020
Drawn	Checked
M.M.	K.H.
Project No.	Drawing No.
125506	900

D07-12-21-0070

#18475