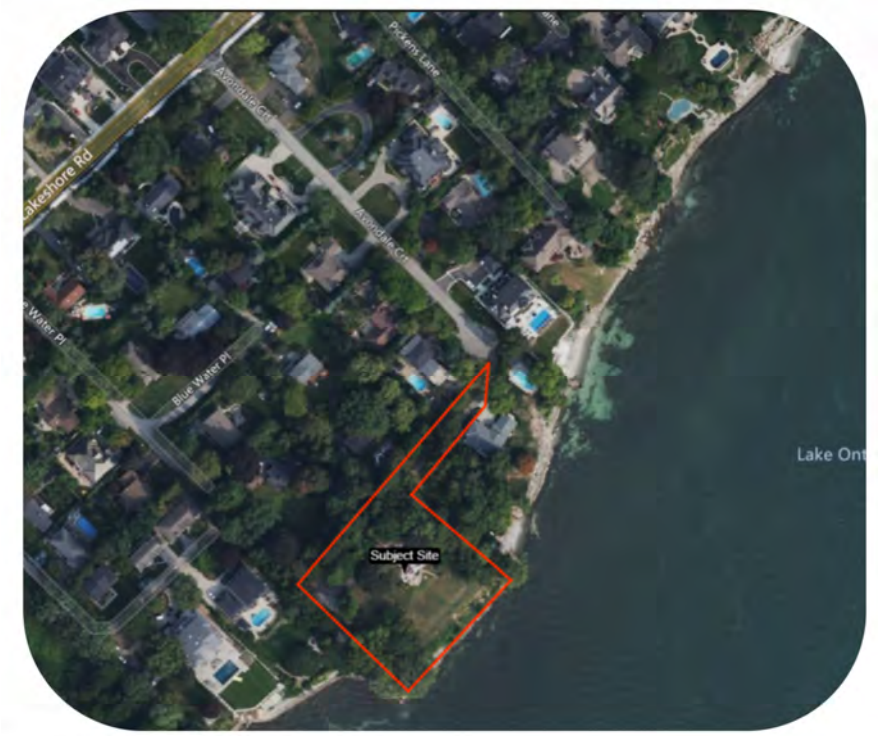
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

In Support of Rezoning



105 Avondale Court, City of Burlington
Proposed Residential Development

Report Prepared for:

Veyron Inc.

Report Prepared by:

KWA Site Development Consulting Inc.
2453 Auckland Drive
Burlington, Ontario
L7L 7A9

KWA Project#: 24056

December 2024

This report reflects best engineering judgment based on the material available at the time of its preparation. KWA Site Development Consulting Inc. accepts no responsibility for any damages to a third party that may arise as a result of decisions made or actions taken based on this report.

Table of Contents

1.0 Introduction 1
2.0 Background Information 1
3.0 Design Population 1
4.0 Sanitary Demand 1
4.1 Existing Sanitary Servicing 1
4.2 Proposed Sanitary Servicing 2
4.2.1 Sanitary Flow 2
4.2.2 Outlet and Capacity 3
5.0 Water Demand 3
5.1 Existing Water Servicing 3
5.2 Proposed Water Servicing 4
5.2.1 Domestic Demand 4
5.2.2 Fire Demand 4
6.0 Stormwater Management 5
6.1 Existing Conditions 5
6.1.1 Predevelopment Drainage 5
6.2 Proposed Drainage Conditions 5
6.3 Drainage Channel and Culvert Hydrology and Hydraulics Report 6
6.4 Stormwater Management Criteria 6
6.4.1 Quantity Control 6
6.4.1.1 Design 7
6.4.2 Water Balance 7
6.4.3 Water Quality 8
7.0 Conclusion 9

List of Tables

- Table 1 – OBC Sanitary Demand
- Table 2 – Water Demand
- Table 3 – Pre-development Peak Flow Rates, 5 and 100-year event
- Table 4 – Post development Peak Flow Rates, 5 and 100-year event
- Table 5 – Pre and Post-development Peak Flow Rates Comparison

List of Appendices

- Appendix A – Existing Survey, Profiles, and Report Excerpts by Others
- Appendix B – Sanitary Demand Calculations
- Appendix C – Water Demand Calculations
- Appendix D – Stormwater Management Calculations
- Appendix E – Drawings

List of Drawings

- SGP – Site Grading Plan
- SSP – Site Servicing Plan
- EDP – Existing Drainage Plan
- PDP – Proposed Drainage Plan

1.0 INTRODUCTION

KWA Site Development Consulting Inc. ("KWA") has been retained by Veyron Inc. ('proponent') to prepare this Functional Servicing and Stormwater Management Report in support of a Rezoning Application ("ZBA") for the development of a new residential home at 105 Avondale Court in the City of Burlington, herein referred to as the "Subject Site".

The subject site is approximately 0.91 hectares (2.25 acres) and is presently occupied by an existing residential home.

Surrounding land uses include:

- Residential land to the north, east, and west.
- Lake Ontario to the south

The site is within the Shoreacres Creek Subwatershed. Drainage within the subject site drains to Lake Ontario via drainage ditches along the east and west property lines and directly south over the existing breakwater.

The previous owner of the subject site had the property zoned for higher density residential use, and the proponent intends to re-zone the property back to single family residential. A **Site Plan (A1.1)** has been developed by Aventus Development Corp. ('Aventus') and provides the basis for this Report.

The site plan proposes a three (3) storey 25,000+ square feet residential home with access from Avondale Court to the east, landscaped grounds to the west, south, and east.

2.0 BACKGROUND INFORMATION

This Functional Servicing and Stormwater Management Report has been prepared in coordination and regarding the following documents and drawings:

- Architectural Site Plan prepared by Aventus Development Corp.
- Topographic Survey by Asenhurst Nouwens Ltd.
- Record Drawings from the City of Burlington
- Record Drawings from the Region of Halton
- Regional Municipality of Halton–Water and Wastewater Linear Design Manual (October 2019 Version 5)
- City of Burlington - Stormwater Management Design Guidelines (May 21, 2020 Edition)
- Preconsultation Comments from the City of Burlington and Region of Halton, updated document dated October 26, 2022 and revised August 2024.
- *105 Avondale Court Channel Rehabilitation and Culvert Replacement* Report prepared by Water's Edge Environmental Solutions Team Ltd. and dated December 17, 2024

3.0 DESIGN POPULATION

There is one (1) large residential home contemplated for the subject site. The equivalent population of this development type is generally calculated using the Region of Halton's Water and Wastewater Linear Design Manual (WWLDM) using a population density factor of 55 people per hectare (table 2-1 of Halton WWLDM). The resultant population equivalent of **48 people** is too conservative; therefore, it is proposed that a design population of **8 people** (double that typically used for a residential home) is utilized. Please see **Site Plan** prepared by Aventus on the following page.

4.0 SANITARY DEMAND

4.1 EXISTING SANITARY SERVICING

An existing 200mm diameter asbestos cement sanitary sewer is located in Avondale Court along the west curb line. This gravity sewer extends approximately 60 metres south from Lakeshore Road and drains north with a slope of 1.00 % from existing manhole MH7963. The sewer depth is approximately 1.4 metres to obvert at MH7963, and the gravity

SITE PLAN GENERAL NOTES:

1. WHERE POSSIBLE, NO EXCAVATION SHOULD BE CARRIED OUT WITHIN THE DRIP LINES OF THE TREES TO BE SAVED, ROOT LOSS MUST BE MINIMAL

2. THE CONTRACTOR (BUILDER) TO CHECK AND VERIFY LOCATION AND ELEVATION OF EXISTING UTILITIES (CONNECTIONS) PRIOR TO CONSTRUCTION.

3. ALL DISTURBED AREAS WITHIN EXISTING ROADS AND BOULEVARDS TO BE RECONSTRUCTED TO THE SATISFACTION OF THE CITY OF BURLINGTON WORKS DEPARTMENT.

4. ROOF DOWN SPOUTS TO SPILL ONTO GROUND VIA SPLASH PADS.

5. A SNOW FENCE OR OTHER BARRIER SHOULD BE ERECTED AROUND THE TREE TO AT LEAST THE DRIP LINE. THE SMALL FIBROUS ROOTS, WHICH FEED THE TREE ARE IN MOST CASES LOCATED PRIMARILY AT THE EXTREMITIES OF THE ROOT SYSTEM AND THEREFORE, MUST BE PROTECTED.

6. DO NOT BURN WASTE OF FLUSH CONCRETE TRUCKS OR CEMENT MIXERS OVER NEAR THE ROOT SYSTEM. ANY AND ALL DAMAGED TREES MUST BE IMMEDIATELY REPAIRED AT THE CONTRACTORS EXPENSE.

7. THE STRUCTURAL DESIGN OF ANY RETAINING WALL OVER 600 mm. IN HEIGHT OR ANY RETAINING WALL LOCATED ON A PROPERTY LINE IS TO BE SHOWN ON THE SITE GRADING PLAN FOR THIS PROJECT AND IS TO BE APPROVED BY THE CONSULTING ENGINEER FOR THE PROJECT.

8. THE OWNER IS RESPONSIBLE FOR ENSURING THAT THE TREE PROTECTION HOARDING IS MAINTAINED THROUGHOUT ALL PHASES OF DEMOLITION AND CONSTRUCTION IN THE LOCATION AND CONDITION AS APPROVED BY THE PLANNING AND DEVELOPMENT DEPARTMENT. NO MATERIALS (CONSTRUCTION MATERIALS, SOIL, ETC.) MAY BE STOCKPILED WITHIN THE AREA OF HOARDING. FAILURE TO MAINTAIN THE HOARDING AS ORIGINALLY APPROVED, OR THE STORAGE OF MATERIALS WITHIN THE HOARDING WILL BE CAUSE FOR THE TREE PRESERVATION LETTER OF CREDIT TO BE HELD FOR 2 (TWO) YEARS FOLLOWING COMPLETION OF SITE WORKS.

SIGNATURE OF HOMEOWNER:

9. SEDIMENT CONTROLS AS PER CITY STANDARD ARE TO BE IMPLEMENTED DURING CONSTRUCTION.

10. ALL DAMAGED LANDSCAPE AREAS ARE TO BE REINSTATED WITH TOPSOIL AND SOD PRIOR TO THE RELEASE OF SECURITIES.

11. ANY EXCESS EXCAVATED MATERIAL IS TO BE REMOVED FROM THE SITE

12. EXISTING DRAINAGE PATTERN IS TO BE MAINTAINED.

13. THE PORTIONS OF THE DRIVEWAY WITHIN THE MUNICIPAL BOULEVARD WILL BE PAVED BY THE APPLICANT.

14. AT THE ENTRANCES TO THE SITE, THE MUNICIPAL CURB WILL BE CONTINUOUS THROUGH THE DRIVEWAY AND A CURB DEPRESSION WILL BE PROVIDED FOR EACH ENTRANCE.

15. ALL PROPOSED CURBING AT THE ENTRANCES TO THE SITE IS TO STOP AT THE PROPERTY LINE OR AT THE MUNICIPAL SIDEWALK. CURB RETAINS SHALL MAINTAIN A MINIMUM CLEARANCE OF 1.2M FROM ABOVE GROUND UTILITIES (EG. HYDRO POLES, HYDRANT)

16. PRIOR TO ISSUANCE OF A BUILDING PERMIT, A SECURITY/ LETTER OF CREDIT IS REQUIRED (TREES, SHRUBS, SOD, FENCING) TO BE SUBMITTED TO THE BUILDING OF FINANCE DEPT. ONCE SITE WORK IS DONE, CONTACT ENGINEERING STAFF TO ARRANGE A SITE INSPECTION, TO ALLOW RELEASE OF SECURITIES.

17. ALL EXTERIOR LIGHTING WILL BE DIRECTED ONTO THE SITE AND WILL NOT INFRINGE UPON THE ADJACENT PROPERTIES.

18. IF A WELL IS DISCOVERED, IT WILL BE DECOMMISSIONED IN ACCORDANCE WITH THE ONTARIO WATER RESOURCES ACT REGULATION 903 (formerly 612/84) AND ANY OTHER APPLICABLE REGULATIONS AND GUIDELINES.

19. THE HOARDING MUST BE INSPECTED PRIOR TO REMOVAL OF ANY TREE PROTECTION HOARDING FROM THE SITE.

20. ALL DISTURBED DRIVEWAY AREAS ARE TO BE RE-ASPHALTED PRIOR TO SECURITIES RELEASE.

21. PRIOR TO ANY CONSTRUCTION TAKING PLACE, HOARDING ADJACENT TO EXISTING PROPERTIES TO PROTECT FROM CONSTRUCTION ACTIVITIES AND ALL REQUIRED HOARDING IN ACCORDANCE WITH THE ONTARIO OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS MUST BE ERECTED AND THEN MAINTAINED THROUGHOUT ALL PHASES OF CONSTRUCTION.

22. THE APPLICANT WILL BE RESPONSIBLE FOR THE COST OF ANY RELOCATIONS NECESSITATED BY THE SITE PLAN.

23. SHOULD THE INSTALLATION OF BELOW GROUND SERVICES REQUIRE HOARDING TO BE REMOVED, PLANNING AND BUILDING STAFF ARE TO BE CONTACTED PRIOR TO THE COMMENCEMENT OF SUCH WORK. SHOULD AN ALTERNATE SERVICE ROUTE NOT BE POSSIBLE, STAFF WILL INSPECT AND DOCUMENT THE CONDITION OF VEGETATION AND SERVICING INSTALLATION IN ORDER TO MINIMIZE DAMAGE TO VEGETATION.

24. ALL UTILITY COMPANIES WILL BE NOTIFIED FOR LOCATES PRIOR TO THE INSTALLATION OF THE HOARDING THAT LIES WITHIN THE LIMITS OF THE CITY BOULEVARD AREA.

25. CONSTRUCTION MATERIALS ARE NOT TO BE PUT OUT FOR COLLECTION.

DEVELOPMENT ENGINEERING REQUIRED NOTES:

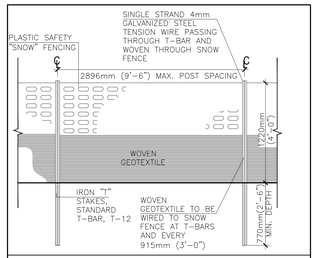
1. ALL SURFACE DRAINAGE WILL BE SELF CONTAINED, COLLECTED AND DISCHARGED AT A LOCATION TO BE APPROVED PRIOR TO THE ISSUANCE OF A BUILDING PERMIT.

2. ALL PROPOSED CURBING WITHIN THE MUNICIPALITY BOULEVARD AREA FOR THE SITE IS TO SUIT AS FOLLOWS: A) FOR ALL SINGLE FAMILY RESIDENTIAL PROPERTIES INCLUDING AN STREET TOWNHOUSES, ALL CURBING IS TO STOP A THE PROPERTY LIMIT OR THE BACK OF THE MUNICIPALITY SIDEWALK, WHICHEVER IS APPLICABLE.

3. THE EXISTING DRAINAGE PATTERN WILL BE MAINTAINED EXCEPT WHERE NOTED.

4. THE APPLICANT WILL BE REQUIRED TO CONTACT ALL UTILITY COMPANIES TO OBTAIN ALL REQUIRED LOCATES PRIOR TO THE INSTALLATION OF HOARDING WITHIN THE MUNICIPAL RIGHT OF WAY.

1 / A1.2 GENERAL NOTES
SCALE: DNS



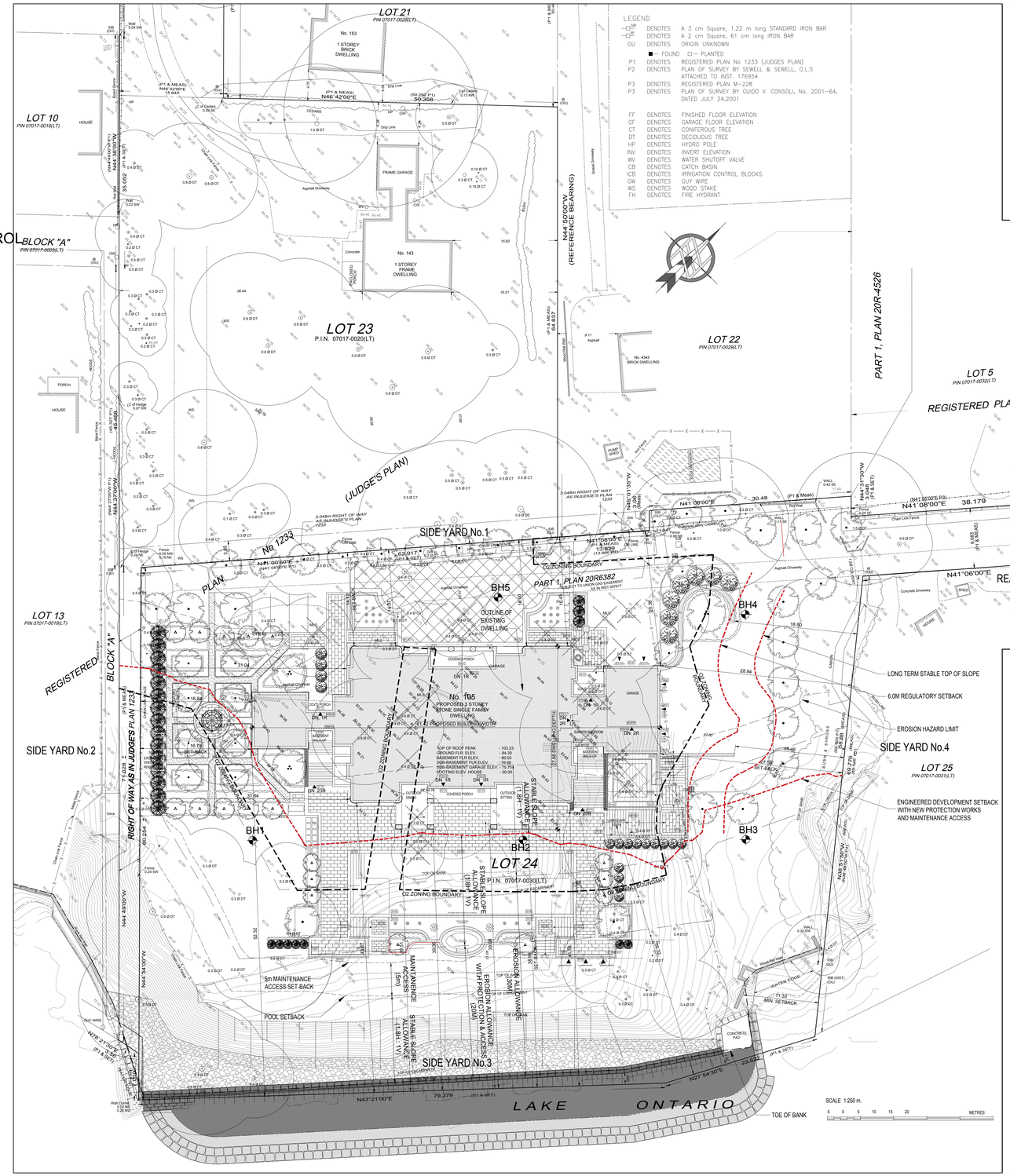
D SEDIMENT CONTROL HOARDING

3 / A1.2 HOARDING - SEDIMENT CONTROL
SCALE: DNS

4 / A1.2 RESERVED
SCALE: DNS

2 / A1.2 DETAIL
SCALE: ENTER SCALE

5 / A1.2 DETAIL
SCALE: ENTER SCALE



6 / A1.2 PARTIAL SITE PLAN (SOUTH EAST END)
SCALE: 1:250

LEGEND

○SIB	DENOTES	A 3 cm Square, 1.22 m long STANDARD IRON BAR
○CB	DENOTES	A 2 cm Square, 61 cm long IRON BAR
OU	DENOTES	ORIGIN UNKNOWN
■—	FOUND	□— PLANTED
P1	DENOTES	REGISTERED PLAN No 1233 (JUDGES PLAN)
P2	DENOTES	PLAN OF SURVEY BY SEWELL & SEWELL, O.L.S ATTACHED TO INST. 176954
P3	DENOTES	REGISTERED PLAN M–228
P3	DENOTES	PLAN OF SURVEY BY GUIDO V. CONSOLI, No. 2001–64, DATED JULY 24,2001
FF	DENOTES	FINISHED FLOOR ELEVATION
GF	DENOTES	GARAGE FLOOR ELEVATION
CT	DENOTES	CONIFEROUS TREE
DT	DENOTES	DECIDUOUS TREE
HP	DENOTES	HYDRO POLE
INV	DENOTES	INVERT ELEVATION
WV	DENOTES	WATER SHUTOFF VALVE
CB	DENOTES	CATCH BASIN
ICB	DENOTES	IRRIGATION CONTROL BLOCKS
GW	DENOTES	GUY WIRE
WS	DENOTES	WOOD STAKE
FH	DENOTES	FIRE HYDRANT



8 / A1.2 KEY PLAN
SCALE: DNS

SITE STATISTICS			
ADDRESS:	105 AVONDALE COURT BURLINGTON, ONTARIO L7L 2M8		
LEGAL DESCRIPTION:	LOT 23,24 AND BLOCK "B" JUDGE'S PLAN 1233		
ZONING:	RESIDENTIAL R1.2		
	%	METRIC	IMPERIAL
LOT AREA:		9130.42	98282.24
LOT FRONTAGE:			
AT STREET		16.54	54.27
AS PER DEFINITION (5.1m back from property line)			
GROSS FLOOR AREA:			
PERMITTED (35% of total Lot Area)	35	3195.65	34398.78
PROPOSED GFA			
GARAGE		75.30	811
GROUND FLOOR		858.51	9,241
SECOND FLOOR		787.83	8,480
THIRD FLOOR		710.50	7,648
TOTAL	26.64	2432.14	26,180
TOTAL BASEMENT		976.37	10,510
FINISHED AREA		445.07	4,790
LOWER GARAGE		266.44	2,868
UNFINISHED AREA		684.85	7,372
LOT COVERAGE:			
PERMITTED	35	3195.65	34,398.78
PROPOSED DWELLING (INCL. GARAGE)	10.62	968.51	10,425
PROPOSED COVERED PORCHES	1.56	142.84	1,538
PROPOSED STAIRS & SUB-GRADE BSMT. STRUCT.	1.35	123.67	1,331
PROPOSED TOTAL	13.53	1235.03	13,294
MAXIMUM HEIGHT TO RIDGE:			
PERMITTED		11.50	37'-9"
PROPOSED		23.39	76'-8 3/4"
PERMITTED	2- 1/2 STOREYS		
PROPOSED	3- 1/2 STOREYS		
NO. OF STOREYS:			
SETBACK CALCULATIONS:			
FRONT YARD - PERMITTED (DWELLING)	=	9.00	29.53
- PROPOSED (DWELLING)		38.90	127.62
FRONT YARD - PERMITTED ROOF OVERHANGS	=	8.00	26.25
- PROPOSED ROOF OVERHANGS		0.00	0.00
FRONT YARD - PERMITTED (PORCH)	=	8.35	27.40
- PROPOSED (PORCH)		17.99	59.02
FRONT YARD - PERMITTED (BALCONY)	=	9.00	29.53
- PROPOSED (BALCONY)		0.00	0.00
REAR YARD - PERMITTED (DWELLING)	=	9.00	29.53
- PROPOSED (DWELLING)		14.12	46.33
REAR YARD - PERMITTED (BALCONY)	=	9.00	29.53
- PROPOSED (BALCONY)		0.00	0.00
REAR YARD - PERMITTED ROOF OVERHANGS	=	8.00	26.25
- PROPOSED ROOF OVERHANGS		0.00	0.00
SIDE YARD - PERMITTED (10% X LOT WIDTH)	=	10.908	35.79
- PROPOSED DWELLING		16.78	55.05
SIDE YARD - PERMITTED ROOF OVERHANGS	=	8.31	27.26
- PROPOSED ROOF OVERHANGS		0.00	0.00

9 / A1.2 SITE STATISTICS
SCALE: ENTER SCALE

Drawings must NOT be scaled. Contractor must check and verify all dimensions, specifications and drawings on site and report any discrepancies to the architect prior to proceeding with any of the work.

SITE ACCREDITATION:

SURVEYOR'S REAL PROPERTY REPORT - PART 1

LOTS 23, 24 AND BLOCK "B" JUDGE'S PLAN 1233
IN THE CITY OF BURLINGTON

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

REGISTERED EASEMENTS AND /OR RIGHT OF WAY
07017-0020: SUBJECT TO 156350, 238879, 411130 , 818324 AND 844952
07017-0030: SUBJECT TO 113136 (EXCEPT 176954 & PT1, 20R4359,) AND 597917

THIS SURVEY WAS PREPARED FOR GILLIAN STEVENS AND THE UNDERSIGNED ACCEPTS NO RESPONSIBILITY FOR USE BY OTHER PARTIES.

SURVEYOR'S REAL PROPERTY REPORT - PART 2
THIS PLAN MUST BE READ IN CONJUNCTION WITH THE SURVEY REPORT DATED N/A

BEARING NOTE
BEARINGS ARE ASTRONOMIC AND ARE REFERRED TO THE EASTERLY LIMIT OF LOT 23 AS SHOWN ON JUDGE'S PLAN No. 1233 HAVING A BEARING OF N44°50'00"W.

BENCHMARK NOTE
CITY OF BURLINGTON BENCHMARK No 380.
BRASS PLAQUE ON THE NORTH FACE AT THE TOP NORTHWEST CORNER OF A CONCRETE RETAINING WALL AT THE NORTHEAST CORNER OF THE INTERSECTION OD POPLAR DRIVE AND LAKESHORE ROAD.
ELEVATION 82.57m

SITE LEGEND:

	PROPERTY LINE
0.0 DT	EXISTING GRADE
83.97	FINISHED GRADE
F.F.E.	FINISHED FLOOR ELEVATION
F.B.E.	FINISHED BASEMENT ELEVATION
F.D.E.	FINISHED DECK ELEVATION
	MAIN ENTRANCE
	SECONDARY ENTRANCE
	EXISTING TREE TO REMAIN
	EXISTING TREE TO BE REMOVED
	TREE NUMBER PER ARBOURIST REPORT
	TREE HOARDING AS PER ARBORIST REP
82.93 T/B	ELEVATION AT TOP OF RETAINING WALL
82.14 B/E	ELEVATION AT BOTTOM OF RETAINING WALL

5	24.10.21	ISSUED FOR GRADING COORDINATION	
4	24.06.14	ISSUED FOR PRECONSULT APPLI.	
3	23.02.20	ISSUED FOR CLIENT REVISIONS	
2	21.05.27	ISSUED FOR CLIENT MEETING	
1	21.04.06	ISSUED FOR CLIENT MEETING	
REF.	DATE:	DESCRIPTION:	

REVISIONS / ISSUANCE:

CLIENT:
PRIVATE RESIDENCE

ADDRESS:105 AVONDALE CRT. LOT 24
CITY: CITY OF BURLINGTON, ONTARIO

DRAWING TITLE:
SITE PLAN
SITE STATISTICS

DRAWN: CP
DATE: 21.04.04
SCALE: 1:250
JOB NUMBER:
SHEET NUMBER: A1.2

C:\USERS\BOJANO\DROPBOX\ONCAD\CLIENT - DEV\COS\AVONDALE\DRAWING\ZONING SITE PLAN APPROVAL\20-243.105 AVONDALE A1.1 SITE PLAN 24.10.02.DWG

sewer has gravity service connections to 3 lots at the north end of Avondale Court. Additionally, based on the records provided, five (5) lots further south of MH7963 are serviced by individual sanitary forcemain connections.

The dwelling at 105 Avondale Court is approximately 200 metres from the MH7963 and uses a septic system for its wastewater. In order to meet Regional and Provincial requirements through the rezoning of the subject site, a connection to the municipal sanitary sewer is required.

Similar to Avondale Court, Bluewater Place contains an existing gravity sewer for approximately 100 metres south of Lakeshore Road and services a portion of the existing lots fronting that private laneway. 105 Avondale Court does not have frontage to this private laneway.

4.2 PROPOSED SANITARY SERVICING

It is proposed that a new sanitary forcemain connection be made to the existing sanitary manhole MH7963, see **Site Servicing Plan** in **Appendix E**. The service connection will be extended to the subject site property beneath a new upsized stormwater culvert (see **Section 6.3**) at the access and to the proposed dwelling. The service would be owned and maintained by Halton Region within the municipal ROW limits and owned and maintained by the subject site owner within the subject site limits.

4.2.1 SANITARY FLOW

In the existing condition, the current home within the subject site utilizes a septic tank for sanitary sewage drainage. Based on an equivalent population of 4 people for the existing detached home and an average residential flow rate of 275 L/person/day as per the Region of Halton WWLDM, the existing sanitary wastewater discharge (without peaking factors or extraneous flows) is:

$$Q_{avg} = Population * Residential\ Flow\ Rate$$

$$= (4\ people) \times 275\ L\ per \frac{person}{day} = \frac{\mathbf{1100}\boldsymbol{L}}{\boldsymbol{day}} = \mathbf{0.013}\ \boldsymbol{L/s}$$

In the proposed condition, the sanitary design flows for the subject site can be calculated two (2) ways:

1) Typical Region of Halton Criteria Related to Equivalent Population
2) Ontario Building Code Calculations Related to Dwelling Size

The first (1st) method to calculated sanitary flows utilizes the Region of Halton WWLDM. The design population for the proposed development is **8 people** as per **Section 3.0**, and therefore the proposed average sanitary sewage rate is 0.03 L/s.

Peak flows are determined by applying the Harmon's Peaking Factor, which is calculated to be 4.4. Infiltration is based on 0.286 litres/s/ha of total site area, resulting in **0.26 L/s** for the Site.

The total sanitary sewer flow for the Site is:

$$Q_{san} = Average\ Flow * Harmon\ Peaking\ Factor + Infiltration =$$

$$= (0.03 * 4.4) + 0.26 = \mathbf{0.29}\ \boldsymbol{L/s}$$

Where:

- Q = Peak Sanitary Flow (L/s)
- Population = 8 people [As calculated in Section 3.0]
- Per Capita Flow = 275 L/capita/day
- Peaking Factor $M = 1 + (\frac{14}{4 + P^{\frac{1}{2}}})$ [4.4]
    - Where M = ratio of peak flow to average flow
      P = equivalent tributary population in thousands [0.008]

- Infiltration = 0.286 L/s/ha

This results in a peak sanitary demand of **0.29 L/s**, including extraneous flows.

The second (2nd) method to calculated sanitary design flows is utilizing section 8.2.1.3 of the Ontario Building Code. Choosing the maximum of a 5-bedroom dwelling, the sanitary generation is 2500 L/day. This value is then adjusted for each additional m^2 over 200m^2, up to 2500 m^2 (approximate size of the proposed single-family home).

Table 1: OBC Sanitary Demand

Staff Type	No Units.	Unit Flow Rate (L/D)	Total Flow Rate (L/D)
5-Bedroom Dwelling	1	2500	2500
Each 10 m2 over 200 m2 up to 400 m2	20	75	1500
Each 10 m2 over 400 m2 up to 600 m2	20	50	1000
Each 10 m2 over 600 m2	183	50	9150
		Total	14150 L/day
		Avg Flow	1179 L/hr
		Peak Flow	5216 L/hr

As shown in the OBC Sanitary Flow Calculations above and in **Appendix B**, the Total Sanitary Flow generation is 14,150 L/day. Assuming that this flow is generated over a period of 12 hours, the Average flow generated is 1179 L/hr. Using a peaking factor of 4.4 (determined previously), the Peak Sanitary Flow for the proposed development is estimated to be 5216 L/hr or **1.44 L/s**.

The peak flow rate calculated utilizing OBC criteria is most conservative, and therefore is used in subsequent calculations completed in **Section 4.2.2**. A duplex grinder pump capable of 1.44 L/s discharging to a 50 mm diameter forcemain is proposed to Region of Halton manhole MH7963. Preliminarily, a 3,600 L Pump Chamber is shown on the Servicing Plan and located outside of the proposed dwelling to house the grinder pumps and provide a location for the sanitary flows to drain to. The sizing of the chamber, pumps, and forcemain will be reassessed in future applications to consider additional details of the home and its operation.

Refer to **Appendix B** for all sanitary flow calculations.

4.2.2 Outlet and Capacity

Sanitary flows will outlet to the existing 200 mm diameter sanitary sewer on Avondale Court. The sanitary sewer on drains north with a pipe slope of 1.00%. The pipe capacity of this sanitary sewer is **32.8 L/s.** Based on the sanitary design flow calculated for the Site, 1.44 L/s, the peak sanitary design flow would equate to **4.4%** of the capacity of the 200mm sanitary sewer on Avondale Court.

Refer to **Appendix B** for sanitary flow calculations.

5.0 Water Demand

5.1 Existing Water Servicing

An existing 150mm diameter asbestos cement watermain located within the east portion of Avondale Court services the majority of existing lots along the roadway. It terminates at the south end of Avondale Court, where a hydrant is located north of lot 117.

5.2 PROPOSED WATER SERVICING

The watermain design proposes a new 50 mm diameter PEX water connection to the existing 150 mm diameter AC watermain via tapping sleeve and valve slightly north of the existing hydrant. The watermain extends west within the drive aisle, beneath a new upsized stormwater culvert (see **Section 6.3**), and to the proposed residential dwelling.

5.2.1 DOMESTIC DEMAND

In the existing condition, the average water demand is equal to the average existing sanitary wastewater flow calculated in **Section 4.2.1**, **0.013 L/s**.

In the proposed condition, the watermain design flows for the Site have been calculated using the Region of Halton WWLDM. The design population for the proposed development is **8 people** as per **Section 3.0**.

The average daily flow of 275 litres/capita/day equates to **0.03 L/s**.

The water demand for the site is summarized in **Table 2**. Fixture Unit calculations may be provided in future applications upon detailed design of the interior of the proposed dwelling to confirm water usage and service connection sizing.

Table 2: Water Demand

Condition	Non-Residential Peaking Factors	Flow (L/s)
Max Daily Demand	2	0.05
Max Hour	4	0.10

5.2.2 FIRE DEMAND

In accordance with the City's criteria, fire flow demands are determined using the Fire Underwriters Survey methodology. A value of **128 L/s** was calculated based on the following inputs:

- NBC Occupancy 'C'
- Construction class: Ordinary Type III
- Limited-combustible contents factor
- 2 hr Masonry firewalls in located noted by Aventus Development Corp.
- Applicable exposure charges based on distance to adjacent buildings.

As per Region of Halton's design criteria, watermains shall be sized to meet the greater of either:

- Maximum day demand plus fire flow or
- Maximum hour demand
  Therefore, the overall water demand for the development is maximum day plus fire flow, **128.05 L/s** (128 L/s + 0.05 L/s).

The Region of Halton WWLDM specifies maximum recommended static pressure to be 700 kPa (100 psi). Additionally, the pressure during normal operation should be between 350 kPa to 550 kPa (50 to 80 psi) and not less than 275 kPa (40 psi). The pressure during simultaneous maximum day demand & fire flow must be above 140 KPa (20 psi).

A hydrant flow test was completed by Watermark on November 8th, 2024. The static pressure was found to be 75 psi. The results indicate that there is an available flow rate of approximately 133 L/s (2120 USGPM) while maintaining a pressure of 20 psi.

Therefore, the conditions specified in the design criteria will be satisfied as the pressure at maximum day demand & fire flow will exceed 20 psi. The inputs utilized to determine the fire flow demand for the subject property will continue to be evaluated in future applications to confirm its adherence to the calculations within this report.

Refer to **Appendix C** for Water Demand and Fire Flow calculations, and Hydrant Flow Test results.

6.0 STORMWATER MANAGEMENT

6.1 EXISTING CONDITIONS

The site is 0.91 ha in area and contains a residential home, access drive aisle with parking, and landscaped area. The development concept maintains 0.04 ha of the existing laneway east of the culvert crossing, and therefore the impacted site area is 0.87 Ha. Runoff from the subject site is conveyed either east to the watercourse between 105 and 111 Avondale Court and then to Lake Ontario, or west to the swale between the subject site and 136 Secord Lane and then to Lake Ontario.

The site access crosses over an existing 1.2m diameter CSP culvert that conveys drains from the rear of Bluewater and Avondale lots, in addition to an upstream tributary north of Lakeshore of unknown size.

The highest elevations are generally observed along the North property line (approximately 84.40 m) and the lowest to the south at the existing concrete retaining wall/breakwater (approximately 76.40 on the high side). Refer to the **Existing Drainage Plan (EDP)** in **Appendix E**.

6.1.1 PREDEVELOPMENT DRAINAGE

Pre-development release rates were delineated to the three (3) distinct outlets for the subject site: EAST (Drainage Ditch), WEST (Neighbour/Swale) and SOUTH (Lake Ontario). The pre-development peak flow rates were determined using the Rational Method and are summarized in **Table 3** below. The inputs are as follows:

- Pre-development Time of Concentration (T_c): 10 minutes minimum
- Pre-development Runoff Coefficient: 0.27 to 0.37 as per the Existing Drainage Plan
- Rainfall intensity parameters A, B, and C were taken from the City's design criteria for the corresponding rainfall Intensity-Duration-Frequency ('IDF') curves.

The subject site has three (3) outlet directions as described in **Section 6.1**. The pre-development release rate is calculated using the rational method for the 3 existing tributary areas delineated on the **Existing Drainage Plan**:

Table 3: Predevelopment Peak Flow Rates, 5 and 100-year event

Area ID	Area (ha)	Runoff Coefficient*	Time of Concentration (min)	5-Year Release Rate (L/s)	100-Year Release Rate (L/s)
EAST	0.49	0.37	10	39.5	102.7
WEST	0.17	0.35	10	13.0	33.7
SOUTH	0.21	0.27	10	12.3	32.1

*Runoff Coefficients are adjusted for the 100-year storm event by multiplying by 1.25.

Refer to **Appendix C** for rational method calculations.

6.2 PROPOSED DRAINAGE CONDITIONS

The proposed grading design aims to direct the majority of site stormwater flows to the south directly to Lake Ontario. Flows directed east and west are compared with predevelopment peak flowrates as determined in Section 6.1.1 to confirm no resultant increase in the post development condition. Therefore, if the post development peak flow rates to the east and west conveyance ditches are less than the pre-development condition, no attenuation is required. Refer to the **Proposed Drainage Plan (PDP)** in **Appendix E** that depicts the following drainage areas:

- **Area POST-W:** This area consists of 0.04 ha of landscaped drainage that is conveyed to the west property boundary, eventually directed south to Lake Ontario.
- **Area POST-E:** This area consists of 0.32 ha of driveway and landscaped drainage that is conveyed to the east property boundary, eventually directed south to Lake Ontario.
- **Area POST-S:** This area consists of 0.51 ha of roof and landscaped drainage that is conveyed south to Lake Ontario.

Refer to the **Site Grading Plan (SGP)** and **Site Servicing Plan (SSP)** in **Appendix E** for the proposed grading and stormwater servicing of the subject site. Roof leaders are sent underground and directed to the corresponding outlets via corrugated plastic piping where they will convey flows south to the lake. Erosion mitigation will be examined in future applications for the Subject Site.

6.3 Drainage Channel and Culvert Hydrology and Hydraulics Report

Water's Edge Environmental Solutions Team Ltd. ('Water's Edge') conducted a hydrologic and hydraulic assessment of the existing culvert located beneath the site access from Avondale Court, and the drainage channel conveying flows from the north tributary and associated incoming piped flows.

A field assessment of the culvert and existing headwalls noted deterioration and detachment, in addition to rust and corroded areas within the CSP portion of the culvert.

The hydrologic assessment modelled the flooding conditions from the 100 year storm event within the existing drainage channel reach to Lake Ontario. Cross sections concluded water depth of 1.5 to 2.2 metres, with velocities up to 3.0 m/s.

Based on the field assessment and modelling completed by Water's Edge, they have recommended 50 metres of channel rehabilitation and replacement of the culvert. The 1.8m tall x 2.4m wide box culvert would generally match obverts of the existing culvert, and include 600 mm of 50 mm diameter riffle to mitigate erosion.

The culvert replacement is shown on section 1-1 on the **Site Servicing Plan** (see **Appendix E**), with crossing services providing a minimum of 0.50m of separation beneath the invert of the structure.

For additional information related to the modelling and design recommendations noted above, please refer to the 105 Avondale Court Channel Rehabilitation & Culvert Replacement Report by Water's Edge, dated December 17, 2024 under separate cover.

6.4 Stormwater Management Criteria

Based on the City's Stormwater Management Design Guidelines, the stormwater management objectives are:

- **Quantity Control:** Match or reduce post development peak flow rates to pre-development levels for drainage conveyed to the east and west drainage ditches.
- **Water Balance:** Minimize impact on the natural water balance through use of Low Impact Development (LID)

6.4.1 Quantity Control

The City of Burlington's has noted that any increase in peak stormwater flow rates to the east and west stormwater ditches must be analyzed to confirm it will not impact the conveyance of these features. Therefore, the proponent may match or reduce post development peak stormwater release rates to predevelopment levels without the need for attenuation or further analysis of these ditches. Drainage directly to Lake Ontario can be accommodated without the need for any quantity control.

Therefore, the target release rate to the EAST and WEST outlets is as per the calculations provided in **Table 3** of **Section 6.1.1**.

6.4.1.1 DESIGN

The post-development release rate is calculated using the rational method for the 3 proposed tributary areas delineated on the **Proposed Drainage Plan**:

Table 4: Post-development Peak Flow Rates, 5 and 100-year event

Area ID	Area (ha)	Runoff Coefficient*	Time of Concentration (min)	5-Year Release Rate (L/s)	100-Year Release Rate (L/s)
POST-E	0.32	0.55	10	38.3	99.7
POST-W	0.04	0.36	10	3.1	8.0
POST-S	0.51	0.55	10	60.8	158.2

*Runoff Coefficients are adjusted for the 100 year storm event by multiplying by 1.25.

The peak stormwater flows are compared with pre-development release rates to determine whether attenuation is required:

Table 5: Pre and Post-development Peak Flow Ratse Comparison

Area ID	PRE 5-Year Release Rate (L/s)	PRE 100-Year Release Rate (L/s)	POST 5-Year Release Rate (L/s)	POST 100-Year Release Rate (L/s)	5yr Difference (POST-PRE)	100yr Difference (POST-PRE)
EAST	39.5	102.7	38.3	99.7	-1.2	-3.0
WEST	13.0	33.7	3.1	8.0	-9.9	-25.7
SOUTH	12.3	32.1	60.8	158.2	+48.5	+126.1

Therefore, since the peak stormwater release rates to the east and west outlets are reduced in the post development condition, no attenuation is required. Refer to **Appendix D** for rational method calculations.

Stormwater released directly south to Lake Ontario is increased due to the larger tributary area and greater impervious surface in the post development condition. Infiltration measures proposed along the top of slope will further reduce flows conveyed overland in frequent storm events, see section **6.4.2** for LID design.

6.4.2 WATER BALANCE

The City of Burlington prefers that low impact developments (LID's) be utilized on all sites to minimize the impact of development to groundwater. Additionally, infiltration of frequent storm events will reduce the volume and erosion impacts of overland flow conveyed over the existing stable slope.

A Geotechnical Assessment and slope stability analysis was completed by Englobe Corp in 2015 and updated in October 2024 with five (5) boreholes advanced within the subject site limits. The boreholes noted sandy silt to silty sand material overlaying clayey silt till and weathered shale bedrock. Groundwater within boreholes 1-3 located north of the stable slope and central to the subject site was found at an elevation of approximately 78.20 (~6 metres below existing ground). The report found no evidence of deep-seated instability of the shoreline slope and the overall slope appeared

to be in stable condition (Section 2.1.1 Englobe Report, dated October 31, 2024). Based on the native sandy materials and depth to groundwater, the subject site appears to provide acceptable conditions for infiltration measures.

The proposed development includes an outdoor amenity space located to the south of the proposed 3-storey family home. A pool with impervious decking, mirrored outlooks, and south walkways are designed to drain south over the existing shoreline slope, and are located north of the Stable Slope Allowance 5m offset linework as shown on the Site Plan and included grading and servicing plans in **Appendix E**.

As the majority of impervious area is located south of the proposed dwelling and is draining over the existing stable slope, a shallow infiltration trench is proposed along the southern limit of construction to infiltrate frequent storm events from the 0.16 ha tributary area. Using the first 10 mm of rain as a target, the following depth of infiltration media (washed clear stone or similar) is required:

$$\text{Required Depth} = \frac{(Tributary\ Area\ \times Target\ Rain\ Event) \div Infiltration\ Trench\ Area}{Void\ Space}$$

$$= \frac{(0.16\ ha\ \times 10mm) \div 50m2}{40\%}$$

$$= 0.80\ m$$

Therefore, the proposed infiltration trench will require infiltration media depth of 0.80 metres, corresponding to 16 m^3 of infiltration.

The low point of the proposed infiltration trench is at 81.45 and therefore the bottom of trench would be 80.65. Since groundwater was found consistently at the 78 masl elevation based on boreholes within the Englobe geotechnical report, the trench will have adequate separation (minimum 1.0m as is typical).

6.4.3 WATER QUALITY

Formal quality control objectives for the proposed development have not been provided. The proposed development is for a single-family dwelling, and as such, limited traffic is expected with minor impacts to the quality of stormwater effluent. The proposed design intends to conserve trees and natural vegetation and utilize these buffers to provide suspended solids removal naturally, before draining to the east water course.

Generally, only driveable surfaces are assumed to create "dirty" stormwater effluent and all other roof, landscaping, and walkways are assumed to be clean flows. The driveway in the predevelopment condition is 825 m^2 in area and 1250 m^2 in the proposed development condition. The increase of 425 m^2 of area is minor, especially when considering the limited traffic that is expected for the subject site. As such, the design chooses to maintain the existing vegetation and trees along the east portion of the subject site. This 10-metre-wide vegetation buffer is a mature and established vegetated filter strip that has shown to reduce suspended solids, nitrogen, phosphorus, and heavy metals (see National Stormwater Best Management Practices (BMP) Database prepared by the American Society of Civil Engineers). This type of BMP is most appropriate for the proposed development, and it is our understanding that it is deemed acceptable by City of Burlington Development Engineering.

7.0 CONCLUSION

In summary:

Sanitary Demand:

- Using an equivalent population of **8 people** and the Region WWLDM, the peak sanitary sewer flow for the Site is **0.29 L/s.**
- Using OBC Criteria based on the floorplan of the proposed dwelling, the peak sanitary sewer flow for the Site is 1.44 L/s.
- Duplex Grinder Pumps, Pump Chamber, and a Sanitary Forcemain will be sized to convey flows from the proposed dwelling to existing MH2 within Avondale Court.
- The pipe capacity of this sanitary sewer is **32.8 L/s.**

Watermain Demand:

- Using an equivalent population of **8 people**, the water supply demand for the Site is as follows:
    - Average Daily Demand = **0.03 L/s**
    - Max Daily Demand = **0.05 L/s**
    - Peak Hour Demand = **0.10 L/s**
- The overall water demand for the development is maximum day plus fire flow, **128.05 L/s**.
- The Site will be serviced by the existing 150 mm dia. AC watermain on Avondale Court. A new 50 mm diameter watermain connection will be installed to the Avondale Court watermain and will extend service connections to the subject site beneath a new upsized stormwater culvert within the subject site drive aisle entrance.
- The Region of Halton WWLDM specifies maximum recommended static pressure to be 700 kPa (100 psi). Also, the pressure during normal operation should be between 350 kPa to 550 kPa (50 to 80 psi) and not less than 275 kPa (40 psi). The pressure during simultaneous maximum day demand & fire flow must be above 140 KPa (20 psi). A hydrant flow test was performed to ensure these criteria are met.

Quantity Control:

- Any increase in stormwater peak flowrates to the existing storm water conveyance ditches along the east and west boundaries must be analyzed.
- Pre and Post Development peak flow rates to each stormwater outlets were calculated using the rational method and determined a net reduction to the east and west stormwater ditch systems. Therefore, no stormwater controls are required for the subject site.
- Stormwater peak flow rates are increased to the south outlet directly at Lake Ontario. A shallow infiltration ditch located along the southern boundary of the table lands (north of the stable slope line) will infiltrate the first 10 mm of stormwater.

Water Balance:

- It is preferred that low impact developments (LID's) be utilized on all sites to minimize the impact of development to groundwater.
- An infiltration trench is proposed along the boundary of the subject site table lands to infiltrate the first 10 mm of rain for the 0.16 ha tributary area.

Quality Control:

- Driveable surface drainage is conveyed east through the existing vegetation buffer prior to draining into the stormwater conveyance ditch. This 10-metre vegetation buffer will reduce suspended solids within the contributing stormwater, and provide additional quality control benefits as noted. The method of conserving the natural environment is ideal for the single family residential use of the subject site.

We trust that this report sufficiently addresses the site servicing requirements and that the proposed development is feasible from a municipal servicing and stormwater management perspective.

Please do not hesitate to contact the undersigned if you have any questions or concerns.

Regards,

KWA Site Development Consulting Inc.



Per:

Ben Jackson, P.Eng.

Ben.Jackson@kwasitedev.com

APPENDIX A

Existing Profiles and Report Excerpts

1) Topographic Survey by Asenhurst Nouwens Ltd.

2) Avondale Court Plan and Profile dated Feb. 85

3) Halton Region Sanitary Operations Maps

4) Halton Region Water Operations Maps

5) Water's Edge Hydrology and Hydraulics Report
Recommended Design Excerpt pg. 5 of 6

SURVEYOR'S REAL PROPERTY REPORT – PART 1

LOTS 23, 24 AND BLOCK "B" JUDGE'S PLAN 1233

IN THE

CITY OF BURLINGTON

SCALE 1:250 m.

5 0 5 10 15 METRES 20

GUIDO V. CONSOLI
ONTARIO LAND SURVEYOR

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

REGISTERED EASEMENTS AND/OR RIGHT-OF-WAY.
07017-0020: SUBJECT TO 156350, 238879, 411130 , 818324 AND 844952
07017-0030: SUBJECT TO 113138 (EXCEPT 176954 & PT1, 20R4359,) AND 597917

THIS SURVEY WAS PREPARED FOR GILLIAN STEVENS AND THE UNDERSIGNED ACCEPTS NO RESPONSIBILITY FOR USE BY OTHER PARTIES.

SURVEYOR'S REAL PROPERTY REPORT – PART 2

THIS PLAN MUST BE READ IN CONJUNCTION WITH THE SURVEY REPORT DATED N/A

BEARING NOTE
BEARINGS ARE ASTRONOMIC AND ARE REFERRED TO THE EASTERLY LIMIT OF LOT 23 AS SHOWN ON JUDGE'S PLAN No. 1233 HAVING A BEARING OF N44°50'00"W.

BENCHMARK NOTE
CITY OF BURLINGTON BENCHMARK No 380.
BRASS PLAQUE ON THE NORTH FACE AT THE TOP NORTHWEST CORNER OF A CONCRETE RETAINING WALL AT THE NORTHEAST CORNER OF THE INTERSECTION OD POPLAR DRIVE AND LAKESHORE ROAD.
ELEVATION 82.57m

LEGEND

SIB	DENOTES	A 3 cm Square, 1.22 m long STANDARD IRON BAR
IB	DENOTES	A 2 cm Square, 61 cm long IRON BAR
OU	DENOTES	ORIGIN UNKNOWN
		■— FOUND □— PLANTED
P1	DENOTES	REGISTERED PLAN No 1233 (JUDGES PLAN)
P2	DENOTES	PLAN OF SURVEY BY SEWELL & SEWELL, O.L.S ATTACHED TO INST. 176954
P3	DENOTES	REGISTERED PLAN M-228
P3	DENOTES	PLAN OF SURVEY BY GUIDO V. CONSOLI, No. 2001-64, DATED JULY 24,2001
FF	DENOTES	FINISHED FLOOR ELEVATION
GF	DENOTES	GARAGE FLOOR ELEVATION
CT	DENOTES	CONIFEROUS TREE
DT	DENOTES	DECIDUOUS TREE
HP	DENOTES	HYDRO POLE
INV	DENOTES	INVERT ELEVATION
WV	DENOTES	WATER SHUTOFF VALVE
CB	DENOTES	CATCH BASIN
ICB	DENOTES	IRRIGATION CONTROL BLOCKS
GW	DENOTES	GUY WIRE
WS	DENOTES	WOOD STAKE
FH	DENOTES	FIRE HYDRANT

SURVEYOR'S CERTIFICATE
I CERTIFY THAT:

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

2. THE SURVEY WAS COMPLETED ON THE 8th DAY OF JUNE, 2011.

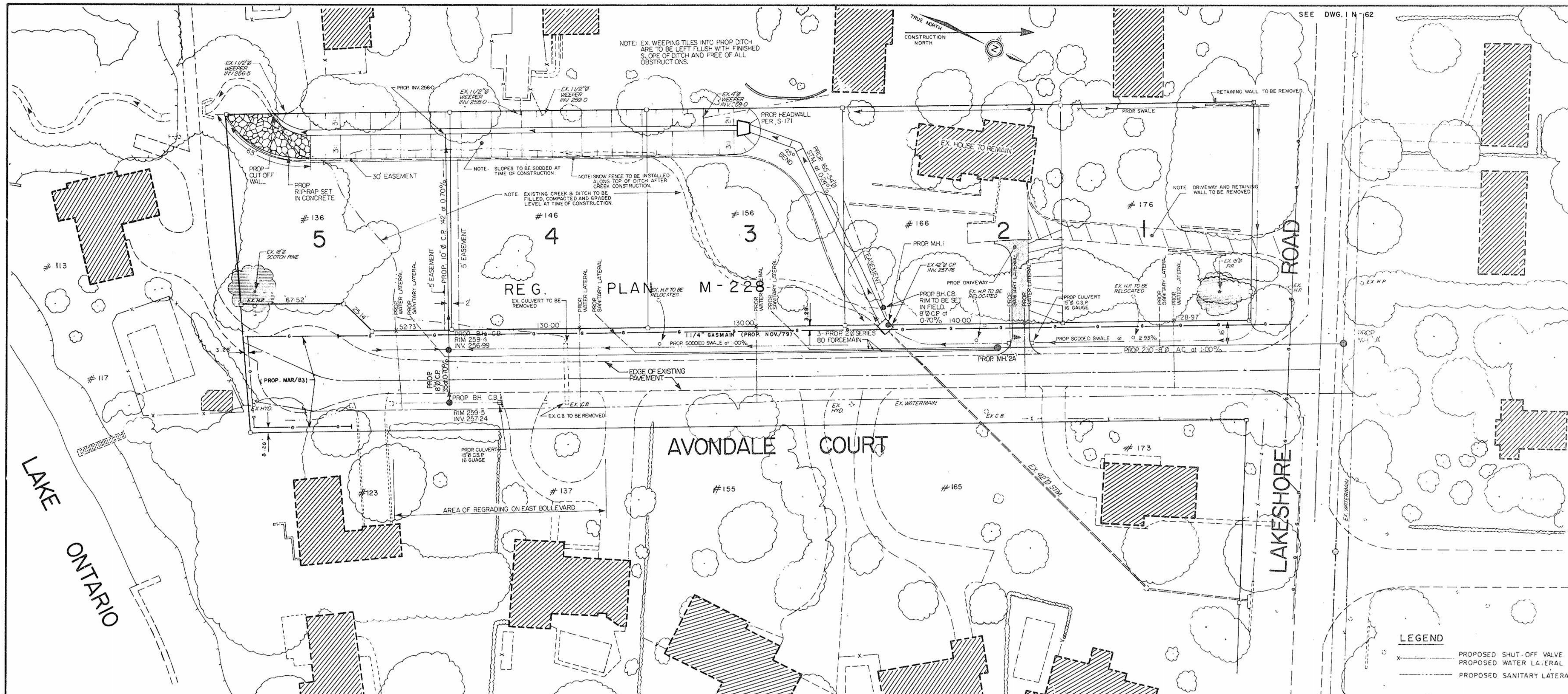
JUNE 10/11
DATE

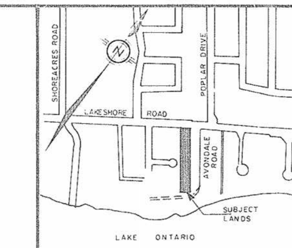
GUIDO V. CONSOLI
ONTARIO LAND SURVEYOR

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
18057/35
THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR
In accordance with Regulation 1026, Section 29(3)

ASHENHURST NOUWENS LIMITED
PROFESSIONAL ENGINEERS & ONTARIO LAND SURVEYORS
315 YORK BOULEVARD, SUITE 201, HAMILTON, ONTARIO L8R-3K5
TELEPHONE: (905) 529-6316
(905) 529-4314
FAX: (905) 529-6651
e-mail: anl@AshenhurstNouwens.com
ESTABLISHED 1956

DRAWN BY	CALC'D BY	CHK'D BY	FILE No.
B.K.	G.V.C.	G.V.C.	11112 TOPO-1





KEY PLAN
N.T.S.

NOTES:

SANITARY COLLECTION SYSTEM:

1. Sewers are to be constructed in accordance with current Region Standards and Specifications.
2. Sanitary sewer pipes of 12"Ø and under to be "Extra Strength" vitrified clay (flex lox joint) or asbestos cement with approved joint and laid according to the Manufacturer's Specifications.
3. All building laterals that temporarily end at the property line shall be securely plugged with an approved mechanical plug to prevent infiltration and sand from entering the mains.
4. Lots 5, 4 and 3 to be serviced by individual pumps to gravity system. BARNES: SE 51 or Equivalent FORCEMAIN: 2"Ø P.E. Series 80.

STORM COLLECTION SYSTEM:

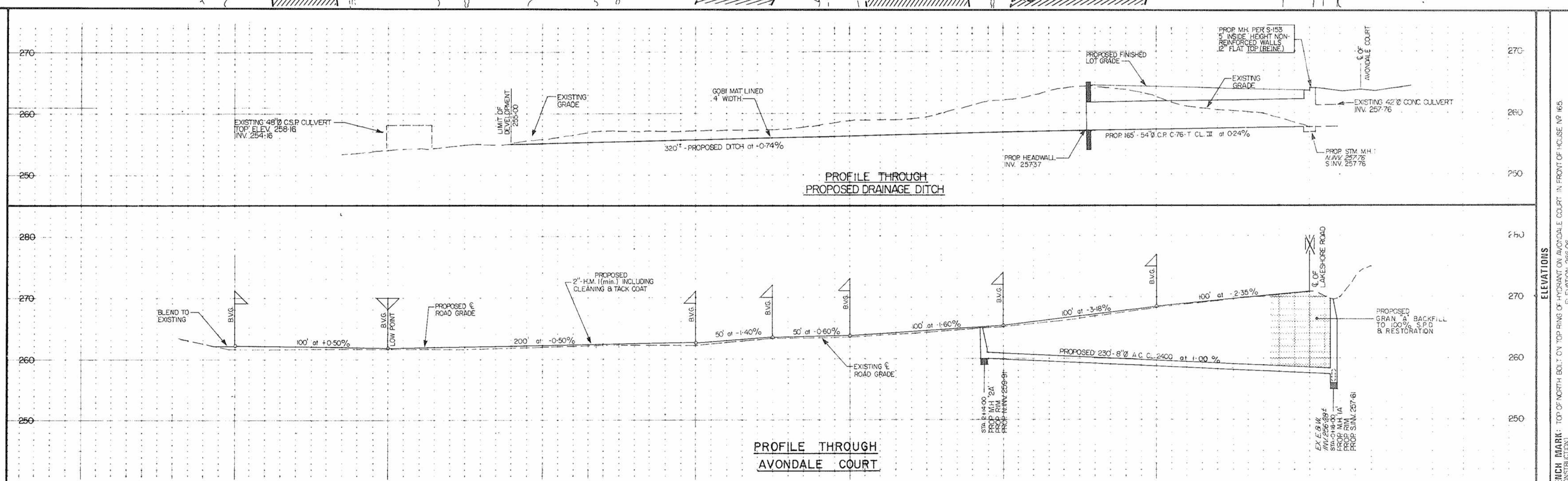
1. Sewers are to be constructed in accordance with current City of Burlington Standards and Specifications.
2. Single Roadway Catchbasins -
   Detail: S-191 OR S-193
   Lead : 8"Ø C.P. CSA A257·1
   Grate : S-198
3. Sump Pumps are to be installed with check valves per STD S-183 (by others).

WATER DISTRIBUTION SYSTEM:

1. Private water connections to be 3/4"Ø Type 'K' Soft Copper with shut-off valves at property line.
2. Watermains to be laid on a minimum of 6" selected Native Material bedding or 6" Granular 'A' as directed.
3. All watermains to have minimum 5'-6" cover from finished centreline road grade.
4. All services tapping existing watermains to be done by Region only.
5. All proposed watermains and water services to be inspected by Regional Municipality before backfilling.
6. Halton Region's Standard Specifications and Drawings are to be included in the Contract.

GENERAL:

1. Roof drainage down spouts to discharge into lawns via splash pads: S-117 (by others).
2. The owner is responsible for supplying and installing all material according to the Region of Halton's Standards and Specifications from the watermain in the road allowance to the building.
3. Driveway culverts to be installed at time and as a condition of Building Permit (by others).



	7+00		6+00		5+00		4+00		3+00		2+00		1+00		0+00
ROAD DATA — EXISTING GRADES	261·46	261·48	261·44	261·49	261·83	262·22	262·23	263·14	263·44	264·20	265·04	266·54	268·22	269·51	270·74
ROAD DATA — PROPOSED GRADES	262·11	261·86	261·61 B.V.G.	261·86	262·11	262·36	262·61 B.V.G.	263·31 B.V.G.	263·61 B.V.G.	264·41	265·21 B.V.G.	266·80	268·39 B.V.G.	269·57	270·74
STORM SEWER DATA															
SANITARY SEWER DATA											PROP. M.H. '2A' STA. 2+14·00	PROPOSED 230'-8"Ø AC. CL. 2400 at 1·00%			PROP. M.H. '1A' STA. 0+16·00
CHAINAGE	7+00		6+00		5+00		4+00		3+00		2+00		1+00		0+00

Nº	DATE	BY	REVISIONS
3	FEB./85	D.M.	NOT AS CONSTRUCTED
2	1979-11-19	I.W.M.	EASEMENT WITHIN LOT 2 REVISED
1	1979-07-09	I.W.M.	54"Ø STM. SEWER ADDED 11/Jul/" R.

DESIGN	B.S. MELVILLE, C.E.T.	CHECKED	T.W. GREEN, P.ENG.	DATE 1979-03-26
DRAWN	J.M. STADNYK, C.S.T.	CHECKED	B.S. MELVILLE, C.E.T.	

SCALE VERTICAL 0 5 10 HORIZONTAL 0 10 20 30 40

REFERENCES

FIELD NOTES K.T. HOWE BOOK Nº 237

APPROVALS

APPROVED BY CITY OF BURLINGTON

DIRECTOR OF PUBLIC WORKS
DATE May 26/79

APPROVED BY REGION OF HALTON

DESIGN OF SANITARY & WATER SERVICES APPROVED SUBJECT TO DETAIL CONSTRUCTION CONFORMING TO HALTON REGION STANDARDS & SPECIFICATIONS & LOCATION APPROVAL FROM AREA MUNICIPALITY

DIRECTOR OF PUBLIC WORKS
DATE 79-03-25

KERRY T. HOWE LIMITED
CONSULTING ENGINEERS
PLANNING CONSULTANTS
St.Catharines, Ontario
416-688-6550

CITY OF BURLINGTON
DEPARTMENT OF PUBLIC WORKS

BRYAN SPENCE
AVONDALE

AVONDALE COURT
LAKESHORE ROAD TO SOUTH LIMIT

R. P. M-

MUNICIPAL DRAWING Nº G 40

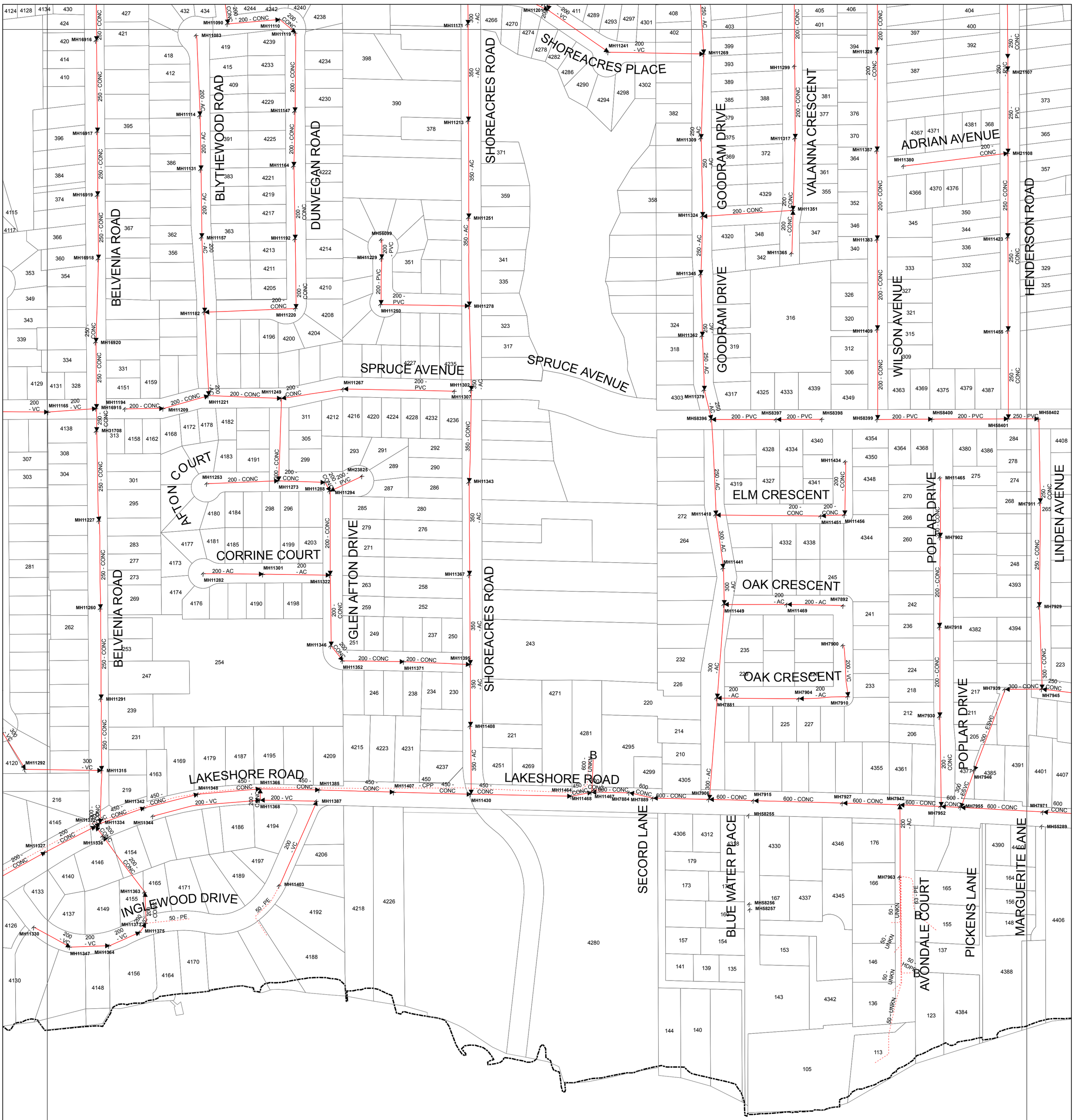
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CONTRACT Nº

CONSULTANT DRAWING Nº 8265-CI

SHEET

G 40



REGIONAL MUNICIPALITY OF HALTON
Department of Public Works

SANITARY OPERATING MAPS

TOWN OF BURLINGTON

Sewer Types

- Treated Discharge Sewer
- Untreated Discharge Sewer
- ForceMain
- Proposed ForceMain
- Gravity Sewer (In Service)
- Gravity Sewer (Out of Service)
- Proposed Gravity Sewer

Maintenance Hole Types

- K Maintenance Hole
- J Chamber

Major System Facilities

- E Wastewater Storage Tank
- G Wastewater Treatment Plant
- B Pumping Station
- Municipal Boundary

Meters
0 25 50 100 150 200

Map Index

Grid Number: 205D
Print Date: Oct 19, 2018

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REGIONAL MUNICIPALITY OF HALTON
Department of Public Works

WATER OPERATING MAPS

TOWN OF BURLINGTON

REGIONAL MUNICIPALITY OF HALTON IT"S EMPLOYEES, OFFICERS AND AGENTS ARE NOT RESPONSIBLE FOR ANY ERRORS, OMISSIONS OR INACCURACIES WHETHER DUE TO THEIR NEGLIGENCE OR OTHERWISE. ALL INFORMATION SHOULD BE VERIFIED.
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Protection Valve Type
- Q Air Release
- N Check
- ° Pressure Reducing
- Surge
- Vacuum

Control Valve
- Valve In Chamber
- ´ System
- ' Zone Isolation, No ByPass
- · Zone Isolation, With ByPass

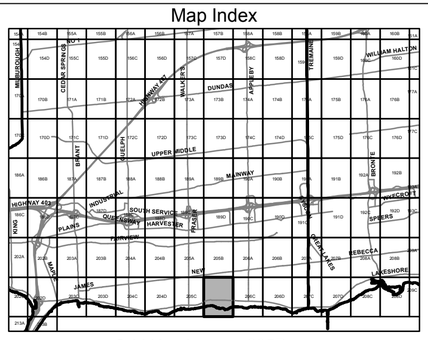
Fittings
- o Cap
- p Cross
- q Reducer
- v Sleeve
- r Tee
- s Tapping Sleeve

System Structure
- K Booster Station
- L Intake
- J Municipal Well
- I Reservoir
- H Tank
- G Water Purification Plant

Other
- In Service Watermain
- Proposed Watermain
- Private Watermain/Service Lead
- M System Meter
- U Hydrant
- Chamber
- Pressure Zone
- Municipal Boundary

Meters
0 25 50 100 150 200

Map Index



Grid Number: 205D
Print Date: Oct 26, 2018

6. Recommended Design

The recommended design includes approximately 50 m of channel rehabilitation and culvert replacement. Vegetated riverstone banks installed at a 2H:1V slope, riffles and pools, keystones, a 1.8 m tall x 2.4 m wide box culvert complete with wingwalls under the driveway, and a driveway elevation of 79.6 m (CGVD2013) are recommended. This design necessitates the removal of the existing culvert, gabions, wooden retaining walls, and some trees. Downstream of the culvert, the rip rap on the left bank appears stable and can remain. The banks upstream of the culvert, and the right bank downstream of the culvert are to be replaced with vegetated riverstone installed at a 2H:1V slope. See **Appendix B** for concept design drawings for details.

Armourstone retaining walls have been considered and can be implemented where existing gabions and retaining walls are installed as an alternative design. However, the required height of the retaining walls and the shale bedrock at or near the elevation of the invert of the channel adds complexity to this alternative design possibility.

The hydraulic modelling of the recommended design shows that safe access is achievable with the estimated 100-year flow and the extent of flooding is significantly reduced. An approximately 0.8 m reduction in water surface elevation upstream of the culvert was observed in the model. **Table 3** shows the proposed hydraulic parameters at cross sections 67 and 45 from the estimated 100-year flow. The water depth is representative of the difference in elevation between the water surface and channel bottom. **Figure 2** displays the water surface elevation and flood extent from the estimated 100-year flow, alongside the proposed hydraulic model geometry.

Table 3: Estimated 100-year Flow Proposed Hydraulic Parameters

Cross Section (m)	Water Surface Elevation (m, CGVD2013)	Water Depth (m)	Velocity (m/s)
67	78.7	1.4	1.5
45	77.1	1.5	2.9

APPENDIX B

Sanitary Demand Calculations

Proposed Sanitary Demand

Project Name:	105 Avondale Court
Project Number:	24056
Location:	City of Burlington
Date:	12/12/2024
Prepared By:	BJ

Average Daily Domestic Flow	275	litres / capita / day
Land Area	0.91	ha
Population		
Resulting Population:	8	People
Peaking Factor	Harmons Equation	
Harmon's Equation:	4.4	
Min. Harmon's Value (typ. 2.0)	2.0	
Peak Dry Weather Flow	0.03	Litres / second
Extraneous Flows	0.26	Litres / second
Extraneous Flow Rate	0.286	Litres / second / ha
Peak Flow (incl. extraneous)	0.29	Litres / second

OBC Sanitary Flow

Project Name: 105 Avondale Court
Project Number: 24056
Location: City of Burlington
Date: 12/12/2024
Prepared By: BJ

Staff Type	No Units.	Unit Flow Rate (L/D)	Total Flow Rate (L/D)	
5-Bedroom Dwelling	1	2500	2500	
Each 10 m2 over 200 m2 up to 400 m2	20	75	1500	
Each 10 m2 over 400 m2 up to 600 m2	20	50	1000	
Each 10 m2 over 600 m2	183	50	9150	
		Total	14150	L/D
		Avg Flow.	1179	L/hr
		Peak (*4.3)	5216	L/hr

APPENDIX C

Water Demand and FUS Calculations

Proposed Water Demand

Project Name:	105 Avondale Court	
Project Number:	24056	
Location:	City of Burlington	
Date:	12/12/2024	
Prepared By:	BJ	
Average Daily Domestic Flow	275	litres / capita / day
Land Area	0.91	ha
Population		
Population	8	People
Peaking Factor	Constant	
Max Day Factor:	2	
Max Hour Factor	4	
Average Daily Demand	0.03	Litres / second
Max Daily Demand	0.05	Litres / second
Max Hourly Demand	0.10	Litres / second

Fire Underwriters Survey - Fire Demand Calculations

Project Name: 105 Avondale Court
Project Number: 24056
Location: City of Burlington
Date: Dec-24
Prepared By: BJ

Guide for Determination of Required Flow Copyright I.S.O

Building Information					System Type							Contents Information		Exposure Charge												Unadjusted Flow (F=220C sqrt A)			Correction Factors				Required Flow	
														East			West			North			South										
Building	NBC Occupancy	Total Floor Area (m^2)	# of Storeys	Construction Class	NFPA 13 Sprinkler	Credit	Standard Water Supply	Credit	Fully Supervised	Credit	**Total Credits**	Contents Factor	**Contents Charge**	Distance (m)	L-Ht^2 (ft)	Charge	Distance (m)	L-Ht^2 (ft)	Charge	Distance (m)	L-Ht^2 (ft)	Charge	Distance (m)	L-Ht^2 (ft)	Charge	**Total Charges (Maximum 75%)**	C	A (m^2)	F (L/min)	Occupancy	FF Adjusted for Occupancy	Sprinkler Decrease	Exposure Charge	**L/min**	**L/s**
Residential	C	1590	3	OC	No	0%	No	0%	No	0%	**0%**	LC	**-15%**	40	over 120	0%	45	over 120	0%	45	over 120	0%	40	over 120	0%	0%	1	1590	**9000**	-1350	7650	0	0%	**7650**	**128**

$$F = 220C\sqrt{A}$$

where
F = the required fire flow in litres per minute.
C = coefficient related to the type of construction.
= 1.5 for wood frame construction (structure essentially all combustible).
= 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior).
= 0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls).
= 0.6 for fire-resistive construction (fully protected frame, floors, roof).

A = The total floor area in square metres (including all storeys, but excluding basements at least 50 percent below grade) in the building being considered.

Legend

Construction Class
- WF wood frame construction
- OC ordinary construction
- NC non-combustible construction
- FC fire-resistive construction

Contents Factor
- NC non-combustible
- LC limited combustible
- C combustible
- FB free burning
- RB rapid burning

Non-Combustible	-25%	Free Burning	+15%
Limited Combustible	-15%	Rapid Burning	+25%
Combustible	No Charge		

Calculation Notes:
1 Includes all storeys, but excluding basements at least 50% below grade in the building being
2 Length - Height of Facing Wall of Exposure Building determined by multiplying the length of the facing wall of the exposure in feet by the height of the exposure in stories.
3 Maximum exposure charge = 75%
4 Round to Nearest 1,000 L/min

Separation	Charge	Separation	Charge
0 to 3m	25%	20.1 to 30 m	10%
3.1 to 10m	20%	30.1 to 45m	5%
10.1 to 20m	15%		

Hydrant Flow Test Report

Residual Hydrant Number _____

Operator: Lee Stansfield

Date: 08-Nov-24 Time: 1:00 PM

Witness: Halton Region

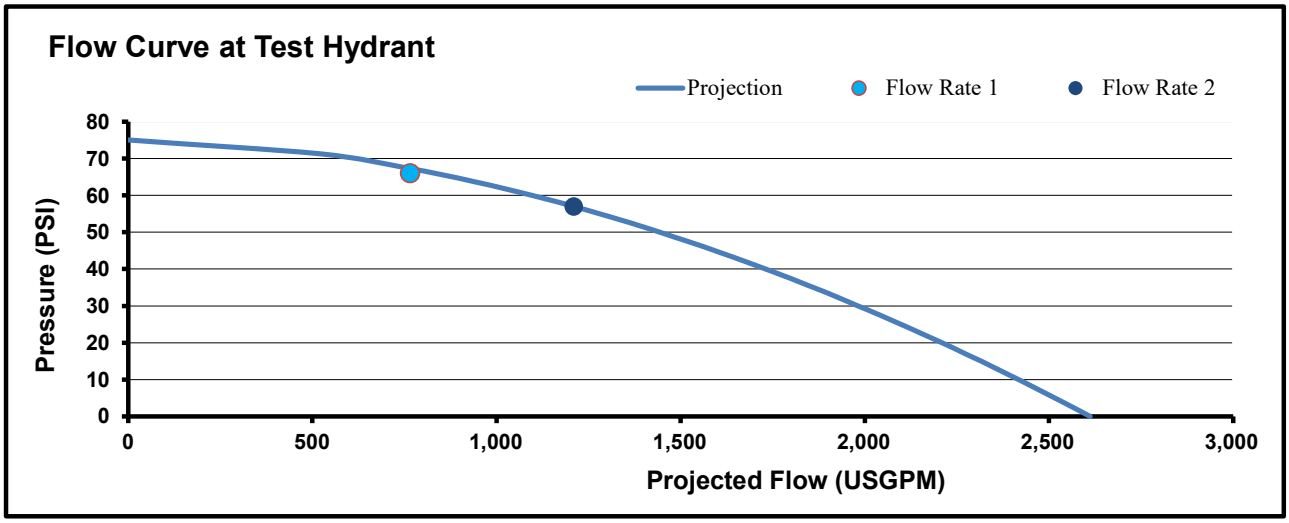
Residual Test Hydrant:	155 Avondale Court		
Hydrant Number:		NFPA Colour Code:	**CLASS AA - BLUE**
Owner:	Halton Region		

STATIC PRESSURE:	75 psi	517 kPa	Pressure Drop
RESIDUAL PRESSURE 1:	66 psi	455 kPa	12.0%
RESIDUAL PRESSURE 2:	57 psi	393 kPa	24.0%

			Hydrant Number
Flow Hydrants:	A	105 Avondale Court	
	B		
	C		

Hydrant No.	Flow Device	Outlet Dia. (in.)	Flow Rate 1 Reading (psi)	Flow Rate 1 (USGPM)	Flow Rate 2 Reading (psi)	Flow Rate 2 (USGPM)
A	Pitot	2.5	24	764	15	604
A	Pitot	2.5		0	15	604
A	HoseMonster	4"		0		
Total Flow (USGPM)			764		1208	
Total Flow (L/second)			48		76	
Available Flow At Test Hydrant at 20 ps			2,031	USGPM	2,209	USGPM
			128	L/second	139	L/second

Average Projection at 20 PSI	2,120	USGPM



Comments/Discrepencies/Diagram:

Watermark Solutions Limited
(705) 250-0368 www.watermark.ca

APPENDIX D

Stormwater Management Calculations

Uncontrolled Release Rate to East

Project Name: 105 Avondale Court

Project Number: 24056

Rational Method - 2 Year Predevelopment

Event:		2	years
ABC's:	A	681.52	
	B	6	
	C	0.78	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.37	
Site Area	A	0.49	ha
Intensity $i=A/(T)^c$	i	78.39	mm/hr
Flow	Q	0.039	m^3/s
Q=CiA/360		**39.5**	**l/s**

Rational Method - 5 Year Predevelopment

Event:		5	years
ABC's:	A	802.04	
	B	5	
	C	0.764	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.37	
Site Area	A	0.49	ha
Intensity $i=A/(T)^c$	i	101.31	mm/hr
Flow	Q	0.05	m^3/s
Q=CiA/360		51.0	l/s

Rational Method - 10 Year Predevelopment

Event:		10	years
ABC's:	A	918.28	
	B	5	
	C	0.763	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.37	
Site Area	A	0.49	ha
Intensity $i=A/(T)^c$	i	116.31	mm/hr
Flow	Q	0.06	m^3/s
Q=CiA/360		58.6	l/s

Rational Method - 25 Year Predevelopment

Event:		25	years
ABC's:	A	1065.95	
	B	5	
	C	0.762	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.41	
Site Area	A	0.49	ha
Intensity $i=A/(T)^c$	i	135.38	mm/hr
Flow	Q	0.07	m^3/s
Q=CiA/360		75.0	l/s

Rational Method - 50 Year Predevelopment

Event:		50	years
ABC's:	A	1172.34	
	B	5	
	C	0.761	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.44	
Site Area	A	0.49	ha
Intensity $i=A/(T)^c$	i	149.30	mm/hr
Flow	Q	0.09	m^3/s
Q=CiA/360		90.2	l/s

Rational Method - 100 Year Predevelopment

Event:		100	years
ABC's:	A	1281.34	
	B	5	
	C	0.761	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.46	
Site Area	A	0.49	ha
Intensity $i=A/(T)^c$	i	163.18	mm/hr
Flow	Q	0.10	m^3/s
Q=CiA/360		102.7	l/s

Uncontrolled Release Rate to South

Project Name: 105 Avondale Court

Project Number: 24056

Rational Method - 2 Year Predevelopment

Event:		2	years
ABC's:	A	681.52	
	B	6	
	C	0.78	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.27	
Site Area	A	0.21	ha
Intensity $i=A/(T)^c$	i	78.39	mm/hr
Flow	Q	0.012	m^3/s
Q=CiA/360		**12.3**	**l/s**

Rational Method - 5 Year Predevelopment

Event:		5	years
ABC's:	A	802.04	
	B	5	
	C	0.764	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.27	
Site Area	A	0.21	ha
Intensity $i=A/(T)^c$	i	101.31	mm/hr
Flow	Q	0.02	m^3/s
Q=CiA/360		16.0	l/s

Rational Method - 10 Year Predevelopment

Event:		10	years
ABC's:	A	918.28	
	B	5	
	C	0.763	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.27	
Site Area	A	0.21	ha
Intensity $i=A/(T)^c$	i	116.31	mm/hr
Flow	Q	0.02	m^3/s
Q=CiA/360		18.3	l/s

Rational Method - 25 Year Predevelopment

Event:		25	years
ABC's:	A	1065.95	
	B	5	
	C	0.762	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.30	
Site Area	A	0.21	ha
Intensity $i=A/(T)^c$	i	135.38	mm/hr
Flow	Q	0.02	m^3/s
Q=CiA/360		23.5	l/s

Rational Method - 50 Year Predevelopment

Event:		50	years
ABC's:	A	1172.34	
	B	5	
	C	0.761	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.32	
Site Area	A	0.21	ha
Intensity $i=A/(T)^c$	i	149.30	mm/hr
Flow	Q	0.03	m^3/s
Q=CiA/360		28.2	l/s

Rational Method - 100 Year Predevelopment

Event:		100	years
ABC's:	A	1281.34	
	B	5	
	C	0.761	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.34	
Site Area	A	0.21	ha
Intensity $i=A/(T)^c$	i	163.18	mm/hr
Flow	Q	0.03	m^3/s
Q=CiA/360		32.1	l/s

Uncontrolled Release Rate to West

Project Name: 105 Avondale Court

Project Number: 24056

Rational Method - 2 Year Predevelopment

Event:		2	years
ABC's:	A	681.52	
	B	6	
	C	0.78	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.35	
Site Area	A	0.17	ha
Intensity $i=A/(T)^c$	i	78.39	mm/hr
Flow	Q	0.013	m^3/s
Q=CiA/360		**13.0**	**l/s**

Rational Method - 5 Year Predevelopment

Event:		5	years
ABC's:	A	802.04	
	B	5	
	C	0.764	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.35	
Site Area	A	0.17	ha
Intensity $i=A/(T)^c$	i	101.31	mm/hr
Flow	Q	0.02	m^3/s
Q=CiA/360		16.7	l/s

Rational Method - 10 Year Predevelopment

Event:		10	years
ABC's:	A	918.28	
	B	5	
	C	0.763	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.35	
Site Area	A	0.17	ha
Intensity $i=A/(T)^c$	i	116.31	mm/hr
Flow	Q	0.02	m^3/s
Q=CiA/360		19.2	l/s

Rational Method - 25 Year Predevelopment

Event:		25	years
ABC's:	A	1065.95	
	B	5	
	C	0.762	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.39	
Site Area	A	0.17	ha
Intensity $i=A/(T)^c$	i	135.38	mm/hr
Flow	Q	0.02	m^3/s
Q=CiA/360		24.6	l/s

Rational Method - 50 Year Predevelopment

Event:		50	years
ABC's:	A	1172.34	
	B	5	
	C	0.761	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.42	
Site Area	A	0.17	ha
Intensity $i=A/(T)^c$	i	149.30	mm/hr
Flow	Q	0.03	m^3/s
Q=CiA/360		29.6	l/s

Rational Method - 100 Year Predevelopment

Event:		100	years
ABC's:	A	1281.34	
	B	5	
	C	0.761	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.44	
Site Area	A	0.17	ha
Intensity $i=A/(T)^c$	i	163.18	mm/hr
Flow	Q	0.03	m^3/s
Q=CiA/360		33.7	l/s

Uncontrolled Release Rate to East

Project Name: 105 Avondale Court

Project Number: 24056

Rational Method - 2 Year Postdevelopment

Event:		2	years
ABC's:	A	681.52	
	B	6	
	C	0.78	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.55	
Site Area	A	0.32	ha
Intensity $i=A/(T)^c$	i	78.39	mm/hr
Flow $Q=CiA/360$	Q	0.038	m^3/s
		38.3	**l/s**

Rational Method - 5 Year Postdevelopment

Event:		5	years
ABC's:	A	802.04	
	B	5	
	C	0.764	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.55	
Site Area	A	0.32	ha
Intensity $i=A/(T)^c$	i	101.31	mm/hr
Flow $Q=CiA/360$	Q	0.05	m^3/s
		49.5	l/s

Rational Method - 10 Year Postdevelopment

Event:		10	years
ABC's:	A	918.28	
	B	5	
	C	0.763	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.55	
Site Area	A	0.32	ha
Intensity $i=A/(T)^c$	i	116.31	mm/hr
Flow $Q=CiA/360$	Q	0.06	m^3/s
		56.9	l/s

Rational Method - 25 Year Postdevelopment

Event:		25	years
ABC's:	A	1065.95	
	B	5	
	C	0.762	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.61	
Site Area	A	0.32	ha
Intensity $i=A/(T)^c$	i	135.38	mm/hr
Flow $Q=CiA/360$	Q	0.07	m^3/s
		72.8	l/s

Rational Method - 50 Year Postdevelopment

Event:		50	years
ABC's:	A	1172.34	
	B	5	
	C	0.761	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.66	
Site Area	A	0.32	ha
Intensity $i=A/(T)^c$	i	149.30	mm/hr
Flow $Q=CiA/360$	Q	0.09	m^3/s
		87.6	l/s

Rational Method - 100 Year Postdevelopment

Event:		100	years
ABC's:	A	1281.34	
	B	5	
	C	0.761	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.69	
Site Area	A	0.32	ha
Intensity $i=A/(T)^c$	i	163.18	mm/hr
Flow $Q=CiA/360$	Q	0.10	m^3/s
		99.7	l/s

Uncontrolled Release Rate to South

Project Name: 105 Avondale Court

Project Number: 24056

Rational Method - 2 Year Postdevelopment

Event:		2	years
ABC's:	A	681.52	
	B	6	
	C	0.78	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.55	
Site Area	A	0.51	ha
Intensity $i=A/(T)^c$	i	78.39	mm/hr
Flow	Q	0.061	m^3/s
Q=CiA/360		**60.8**	**l/s**

Rational Method - 5 Year Postdevelopment

Event:		5	years
ABC's:	A	802.04	
	B	5	
	C	0.764	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.55	
Site Area	A	0.5077	ha
Intensity $i=A/(T)^c$	i	101.31	mm/hr
Flow	Q	0.08	m^3/s
Q=CiA/360		78.6	l/s

Rational Method - 10 Year Postdevelopment

Event:		10	years
ABC's:	A	918.28	
	B	5	
	C	0.763	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.55	
Site Area	A	0.5077	ha
Intensity $i=A/(T)^c$	i	116.31	mm/hr
Flow	Q	0.09	m^3/s
Q=CiA/360		90.2	l/s

Rational Method - 25 Year Postdevelopment

Event:		25	years
ABC's:	A	1065.95	
	B	5	
	C	0.762	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.61	
Site Area	A	0.5077	ha
Intensity $i=A/(T)^c$	i	135.38	mm/hr
Flow	Q	0.12	m^3/s
Q=CiA/360		115.5	l/s

Rational Method - 50 Year Postdevelopment

Event:		50	years
ABC's:	A	1172.34	
	B	5	
	C	0.761	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.66	
Site Area	A	0.5077	ha
Intensity $i=A/(T)^c$	i	149.30	mm/hr
Flow	Q	0.14	m^3/s
Q=CiA/360		139.0	l/s

Rational Method - 100 Year Postdevelopment

Event:		100	years
ABC's:	A	1281.34	
	B	5	
	C	0.761	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.69	
Site Area	A	0.5077	ha
Intensity $i=A/(T)^c$	i	163.18	mm/hr
Flow	Q	0.16	m^3/s
Q=CiA/360		158.2	l/s

Uncontrolled Release Rate to West

Project Name: 105 Avondale Court

Project Number: 24056

Rational Method - 2 Year Postdevelopment

Event:		2	years
ABC's:	A	681.52	
	B	6	
	C	0.78	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.36	
Site Area	A	0.04	ha
Intensity $i=A/(T)^c$	i	78.39	mm/hr
Flow Q=CiA/360	Q	0.003	m^3/s
		3.1	**l/s**

Rational Method - 5 Year Postdevelopment

Event:		5	years
ABC's:	A	802.04	
	B	5	
	C	0.764	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.36	
Site Area	A	0.0393	ha
Intensity $i=A/(T)^c$	i	101.31	mm/hr
Flow Q=CiA/360	Q	0.00	m^3/s
		4.0	l/s

Rational Method - 10 Year Postdevelopment

Event:		10	years
ABC's:	A	918.28	
	B	5	
	C	0.763	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.36	
Site Area	A	0.0393	ha
Intensity $i=A/(T)^c$	i	116.31	mm/hr
Flow Q=CiA/360	Q	0.00	m^3/s
		4.6	l/s

Rational Method - 25 Year Postdevelopment

Event:		25	years
ABC's:	A	1065.95	
	B	5	
	C	0.762	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.40	
Site Area	A	0.0393	ha
Intensity $i=A/(T)^c$	i	135.38	mm/hr
Flow Q=CiA/360	Q	0.01	m^3/s
		5.9	l/s

Rational Method - 50 Year Postdevelopment

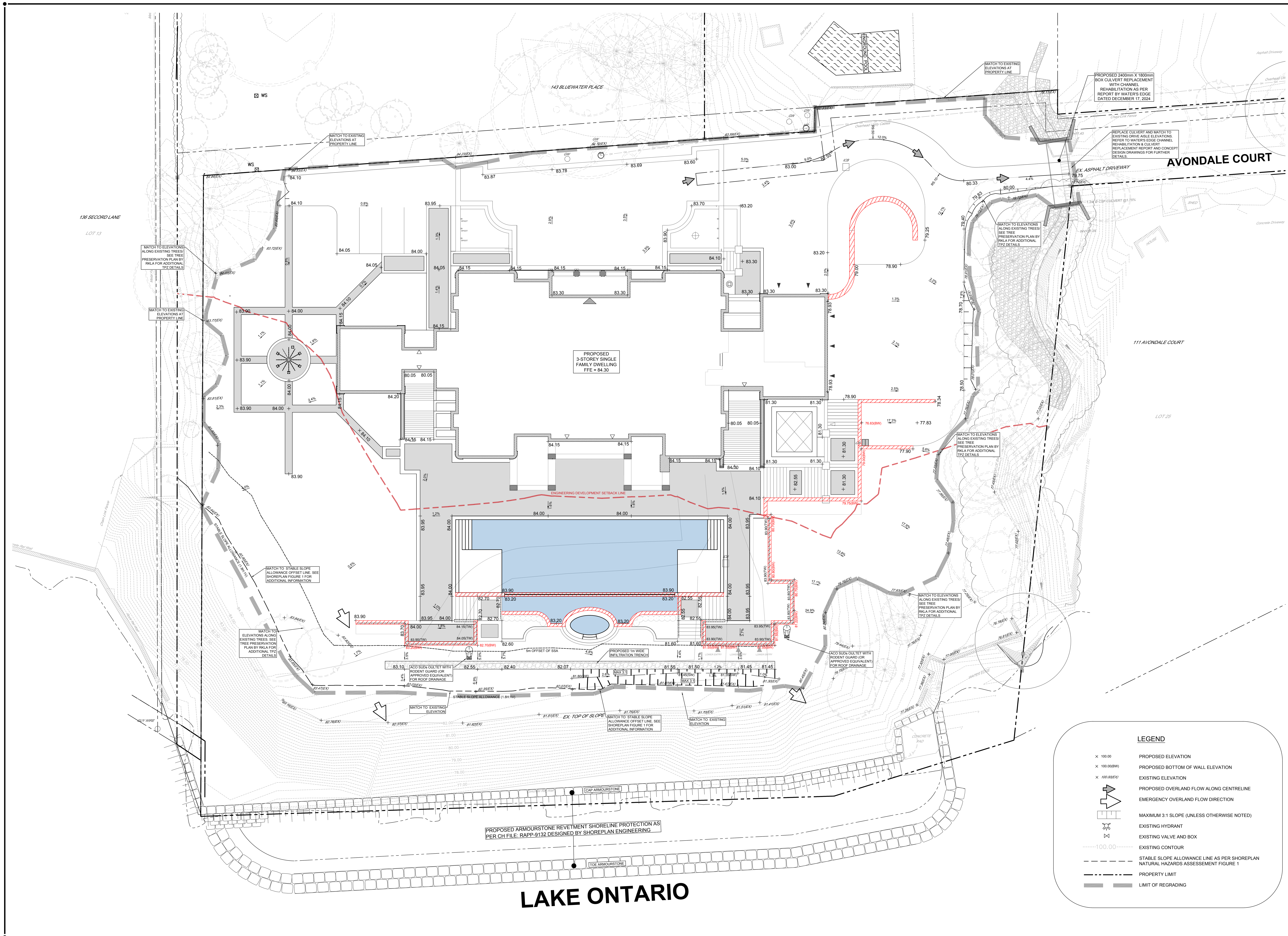
Event:		50	years
ABC's:	A	1172.34	
	B	5	
	C	0.761	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.43	
Site Area	A	0.0393	ha
Intensity $i=A/(T)^c$	i	149.30	mm/hr
Flow Q=CiA/360	Q	0.01	m^3/s
		7.0	l/s

Rational Method - 100 Year Postdevelopment

Event:		100	years
ABC's:	A	1281.34	
	B	5	
	C	0.761	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.45	
Site Area	A	0.0393	ha
Intensity $i=A/(T)^c$	i	163.18	mm/hr
Flow Q=CiA/360	Q	0.01	m^3/s
		8.0	l/s

APPENDIX E

Design Drawings



REVISION BLOCK

#	DATE	DESCRIPTION
1.	12/19/24	ISSUED FOR ZBA

REGISTERED PROFESSIONAL ENGINEER
B.JACKSON
100210382
DEC. 4, 2024
PROVINCE OF ONTARIO

KWA SITE DEVELOPMENT CONSULTING INC.
2453 Auckland Drive
Burlington, ON L7L 7A9

NORTH ARROW

METRIC SCALE
0 5 10 Meters
1:200

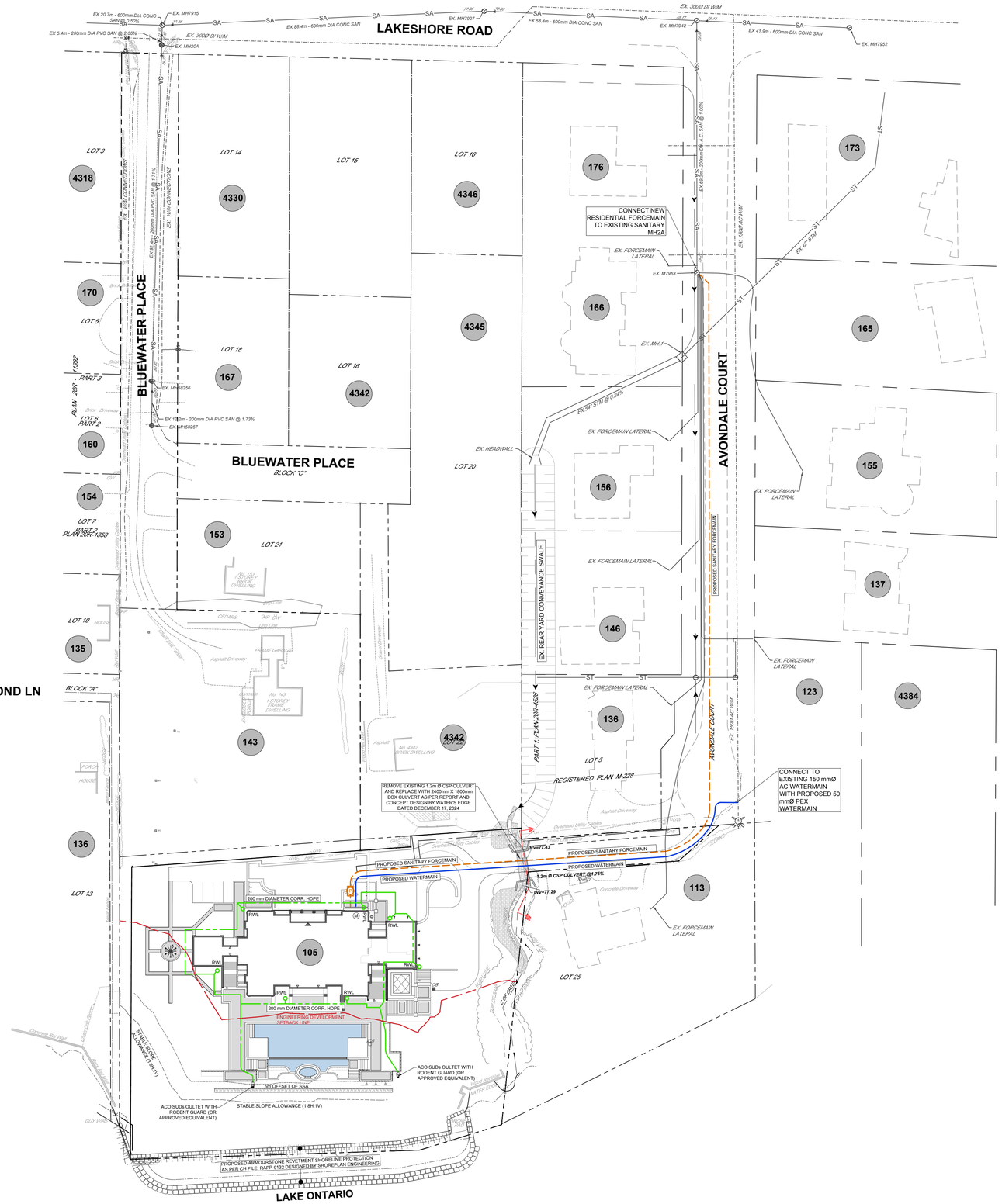
SITE GRADING PLAN

PRIVATE RESIDENCE

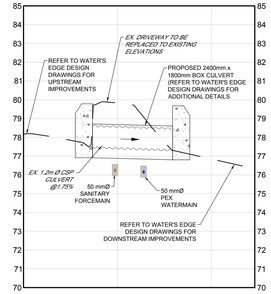
105 AVONDALE COURT
BURLINGTON, ON

PROJECT No: 24056
DRAWN BY: BJ
CHECKED BY: RA

SGP



1-1 PROPOSED CULVERT CROSSING



H: 1:300
v: 1.150

LEGEND

- ST — EXISTING STORM SEWER
- EXISTING WATERMAIN\
- EXISTING HYDRANT
- EXISTING WATER VALVE
- 78.15 SA 78.20 — EXISTING SANITARY SEWER (WITH INVERTS)
- EXISTING SANITARY MANHOLE
- PROPOSED 50 mm DIAMETER PEX WATERMAIN
- PROPOSED 200 mm DIAMETER HDPE SEWER FOR SUBDRAINAGE AND ROOF DRAINAGE CONVEYANCE
- RWL — PROPOSED RAIN WATER LEADER DIRECTED UNDERGROUND
- PROPOSED 50 mm DIAMETER FORCEMAIN
- 3600L PUMP CHAMBER
- P — DUPLEX GRINDER PUMP (MIN. 1.25 L/S)
- M — WATER METER

REVISION BLOCK

#	DATE	DESCRIPTION
1.	12/19/24	ISSUED FOR ZBA

REGISTERED PROFESSIONAL ENGINEER
B.JACKSON
100210382
DEC 4, 2024
PROVINCE OF ONTARIO

KWA SITE DEVELOPMENT CONSULTING INC.
2355 Main Street, Unit 1
Burlington, ON L7L 7A9

NORTH ARROW

METRIC SCALE
0 15 30
1:600

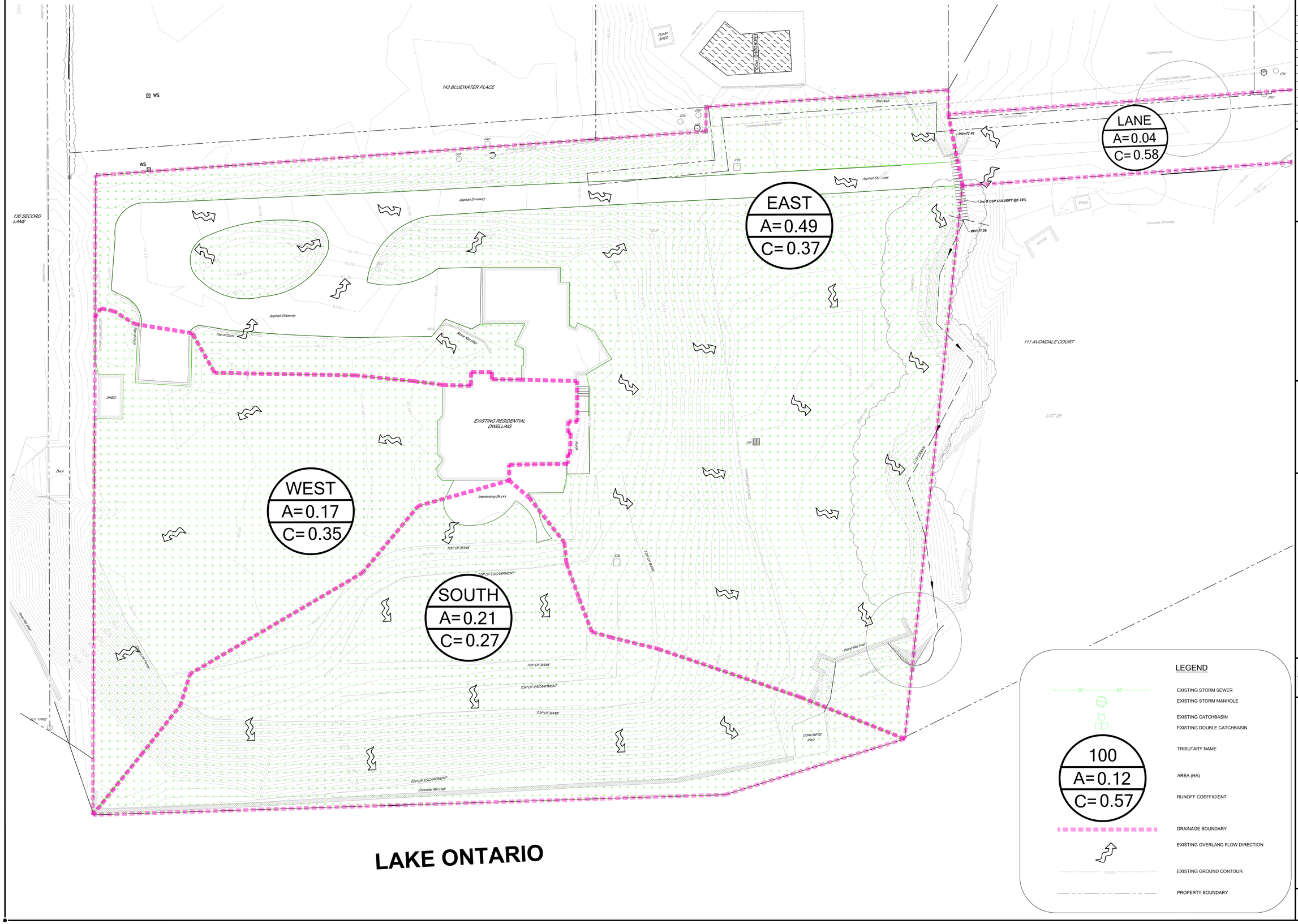
SITE SERVICING PLAN

PRIVATE RESIDENCE

105 AVONDALE COURT
BURLINGTON, ON

CHECKED BY: RA
DRAWN BY: BJ
PROJECT No: 24056

SSP



REVISION BLOCK

#	DATE	DESCRIPTION
1.	12/19/24	ISSUED FOR ZBA

KWA SITE DEVELOPMENT CONSULTING INC.
2245 Millcreek Drive, Unit 1
Burlington, ON L7L 7A9

NORTH ARROW

LEGEND

- EXISTING STORM SEWER
- EXISTING STORM MANHOLE
- EXISTING CATCHBASIN
- EXISTING DOUBLE CATCHBASIN
- TRIBUTARY NAME (100 / A=0.12 / C=0.57)
- AREA (HA)
- RUNOFF COEFFICIENT
- DRAINAGE BOUNDARY
- EXISTING OVERLAND FLOW DIRECTION
- EXISTING GROUND CONTOUR
- PROPERTY BOUNDARY

METRIC SCALE
0 5 10 Meters
1:200

EXISTING DRAINAGE PLAN

PRIVATE RESIDENCE

105 AVONDALE COURT
BURLINGTON, ON

PROJECT No: 24056 | DRAWN BY: BJ | CHECKED BY: RA

EDP

HEDGE

138 SECORD LANE

143 BLUEWATER PLACE

AVONDALE COURT

LANE
A= 0.04
C= 0.58

PROPOSED 2400mm X 1800mm BOX CULVERT REPLACEMENT WITH CHANNEL REHABILITATION AS PER REPORT BY WATER'S EDGE DATED DECEMBER 17, 2024

1.2m Ø CSP CULVERT @1.75%

INV=77.43

INV=77.29

REPLACE CULVERT AND MATCH TO EXISTING DRIVE AISLE ELEVATIONS. REFER TO WATER'S EDGE CHANNEL REHABILITATION & CULVERT REPLACEMENT REPORT AND CONCEPT DESIGN DRAWINGS FOR FURTHER DETAILS.

111 AVONDALE COURT

LOT 25

POST-W
A= 0.04
C= 0.36

105

POST-E
A= 0.32
C= 0.55

POST-S
A= 0.51
C= 0.55

RWL

200 mm DIAMETER CORR. HDPE

ENGINEERING DEVELOPMENT SETBACK LINE

STABLE SLOPE ALLOWANCE (1.8H:1V)

ACO SUDs OULTET WITH RODENT GUARD (OR APPROVED EQUIVALENT)

ACO SUDs OULTET WITH RODENT GUARD (OR APPROVED EQUIVALENT)

PROPOSED ARMOURSTONE REVETMENT SHORELINE PROTECTION AS PER CH FILE: RAPP-9132 DESIGNED BY SHOREPLAN ENGINEERING

LAKE ONTARIO

LEGEND

- PROPOSED 200 mm DIAMETER HDPE SEWER FOR SUBDRAINAGE AND ROOF DRAINAGE CONVEYANCE
- PROPOSED RAIN WATER LEADER DIRECTED UNDERGROUND
- TRIBUTARY NAME
- AREA (HA)
- RUNOFF COEFFICIENT
- DRAINAGE BOUNDARY
- PROPERTY BOUNDARY

RWL

CBMH1
A= 0.09
C= 0.38

REVISION BLOCK

#	DATE	DESCRIPTION
1.	12/19/24	ISSUED FOR ZBA

KWA SITE DEVELOPMENT CONSULTING INC.
2355 Main St. Unit 2 Box
Burlington, ON L7L 7A9

NORTH ARROW

METRIC SCALE

0 5 10 Meters

1:200

PROPOSED DRAINAGE PLAN
PRIVATE RESIDENCE
105 AVONDALE COURT
BURLINGTON, ON

CHECKED BY: RA
DRAWN BY: BJ
PROJECT No: 24056

PDP